Introduction to the proceedings of the USE2013 Conference

The papers in the proceedings are organised by the first author. The index organised alphabetically by first author of papers, abstracts, roundtable discussions and workshops. The title of the contribution is written below the author(s) and is hyperlinked to the paper/abstract etc.

Enjoy all the contributions presented at the USE2013 Conference! They have all contributed to the conference theme: From USE to action: transforming our understanding of small enterprises into practice to create healthy working lives in healthy businesses.

Associate Professor Ian Laird and Dr Kirsten Olsen
USE2013 Conference Programme Committee

Review process of abstracts and papers for the USE 2013 conference

All presentations for the USE2013 conference have been through a review process. Some papers were peer reviewed and some were non-peer reviewed. The process for both is outlined below.

1. Non-peer reviewed papers
An abstract for the paper/oral presentation was submitted to the Conference Programme Committee. The abstracts were then reviewed by one member of the conference committee and were either accepted with comments and recommendations in relation to content and structure for the full paper or it was rejected either absolutely or with the possibility to resubmit the abstract for reconsideration where after it would either be accepted or rejected. The Author then submitted the paper for presentation. This paper did not go through a peer review process but was either accepted or rejected.

2. Peer reviewed papers
Abstract for the peer reviewed papers went through the same process as the abstracts for the non-peer reviewed papers. The full peer reviewed papers were then submitted to the Conference Programme Committee. Each paper was sent to two members of the conference’s International Scientific Committee. The papers were sent back to the Programme Committee with comments and recommendations for acceptance, acceptance with revisions or rejection. The comments were combined and the programme committee returned the papers with final recommendations to the author(s) who revised the paper and resubmitted it. Finally the papers were either accepted or rejected.
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Fishing industry participation in OHS intervention

Author
Danae Anderson OHS Research Group, School of Management, AUT University, Auckland, New Zealand. Danae.anderson@aut.ac.nz

Abstract
The contingent and seasonal nature of the fishing industry means it is problematic to implement OHS interventions, and approaches need to account for a number of unique features such as the employment strata, geographical job isolation, precariousness of employment, increasing workforce diversity, and social issues such as substance and alcohol abuse. While there have been industry developments in terms of safety, the relationship between worker involvement and organisational performance; combined with slow progress towards mandatory worker participation has meant accident and fatality rates remain static. 2002 amendments to the Health and Safety in Employment Act 1992 have sought to redress the lack of formal recognition that effective worker participation systems can make in improving the work environment, while opening new channels to mitigate workplace risk. Nonetheless, this approach has been undermined by the dominant payment scheme adopted by fishing contractors in New Zealand: catch scare. This allocation of profit by catch volume determines fishing crew income in addition to base salary, and can be extremely lucrative. Consequently, in an industry where self-employment and subcontracting is the norm, remuneration is directly affected by time spent ‘on the water’. As a result, enthusiasm for worker participation is nominal within the small worker groups that prevail.

Discussion reports on findings from interview data of New Zealand fishing industry employers and employees, focusing on the conflict between current remuneration practices and worker participation in health and safety. Exposed are a number of barriers to implementing and maintaining OHS measures, for example, increasingly tight profit margins, time pressures, and confusion around regulatory requirements. Initial findings also indicate that the importance of contracting relationships in influencing employee involvement. Finally, mechanisms that may influence the development of more effective forms of worker participation will be debated.

Keywords
Fishing industry, seafood, health, safety, intervention
Video exposure monitoring for transfer of knowledge in chemical hazards to small enterprises

Authors
Ing-Marie Andersson, Professor, Work Sciences, Dalarna University, Sweden, ima@du.se
Gunnar Rosén, Professor Emeritus, Work Sciences, Dalarna University, Sweden, grs@du.se

Abstract
Despite the development of effective control technology, occupational exposure to silica and wood dusts is a significant important problem for many small enterprises. Tens of millions of workers’ occupations involve hazardous silica dust exposure, and thousands of these workers die every year. Wood dust has been classified as carcinogenic to humans, but a number of other negative health effects have also been reported. Within the European Union alone, about 3.6 million workers are exposed to inhalable wood dust.

The present study used the PIMEX-method (Rosén et al., 2005) with the aim to document the effect of different control measures on workers’ exposure to dust. The PIMEX method implies that work environment problems are visualised by combining the use of video and real time monitoring instruments for hazards in the workplace.

Typical work situations within the industries that are expected to cause high exposure have been documented. The results demonstrate that proper use of generally available technology and knowledge can drastically reduce worker exposure, usually by 90% or more. However, this technology and knowledge is sadly underused, especially in small enterprises.

The PIMEX-method used in this project implies knowledge transfer and also aims at improving workers as well as managers motivation to use available knowledge. Several videos have been produced for use via mediums such as the Internet. This material is used in close contact with employer organisations and vocational schools with the aim to improve the situation. Compared to information in textbooks, visualised presentations using PIMEX are more effective. The method also helps small companies focus on technical control measures where they are most cost-effective.

Keywords
Silica dust, Wood dust, Exposure control, Visualisation, PIMEX.

1. Introduction
Despite the development of effective control technology, occupational exposure to silica and wood dust poses an important problem in many small enterprises. Exposure to silica dust has been well known to cause the deadly disease silicosis for hundreds of years. Wood dust causes irritation of the respiratory system, and has also been classified as carcinogenic for humans by the International Agency for Research on Cancer (IARC). A report by the European Union states that about 3.6 million workers in the European Union are occupationally exposed to inhalable wood dust. Of those workers, 16% are exposed to dust concentrations exceeding 5 mg/m³.

The report “Less Dust” details different kinds of contact dermatitis, allergic disease of the nasal mucous membranes, asthma, and extrinsic allergic alveolitis as documented negative
health effects (EFBWW, 2010). The same report presents a number of possible control measures, including good housekeeping, as well as specifically designed technical control measures.

International Labour Organisation (ILO) has reported that tens of millions of workers have occupations with hazardous silica dust exposure, and that thousands of these die each year from silica-related disease. Silicosis continues to be one of the most important occupational health illnesses in the world (ILO, 2012), presenting a clear case for greater knowledge of how exposure can be controlled.

The application of different methods aimed at reducing occupational exposure to silica and wood dust is urgent. Technical control measures are normally necessary, however these can prove ineffective if the worker has no basic knowledge of how they work, or how the air contaminants are emitted from the source and transported to her/his breathing zone. This knowledge, combined with the motivation to use the knowledge, is fundamental to guaranteeing acceptable conditions (Rosén et. al., 2005).

One method to facilitate such knowledge transfer is to utilise VEM (video exposure monitoring) (Rosén et.al., 2005). VEM implies simultaneous use of real time monitoring instruments and video, and results in visualised training material that can easily be distributed to large groups. This paper describes a project which aimed to use VEM for production of training material for workers, as well as pupils in vocational schools studying for work in the Swedish quarrying and woodworking industries.

2. Material and methods

The VEM method PIMEX (PIcture Mix EXposure) has been used to document worker exposure to airborne dust during normal work in a number of typical situations in the quarrying and woodworking industries. The method is based on simultaneous use of video filming and monitoring of air contaminants in the breathing zone with a real time monitoring instrument (Rosén et. al., 2005). A light scattering instrument TSI DustTrak II, was used. The real time monitoring instrument as well as the transmitter for the signal was carried in a backpack by the studied worker. The signal from the instrument was sent by telemetry over to a receiver, and was synchronised with the video in the PIMEX2008 program. Exposure variability and video footage can then be seen on the computer screen or edited for specific use, in this case for production of training material.

The selection of studied workplaces and work situations was made in collaboration with representatives for employers' associations, unions, as well as teachers in vocational schools. These representatives discussed different strategies for distribution of the training material. The production of training material, its evaluation and revision was made in close collaboration with the target groups.

Measurements and recordings were made at four quarries, four woodworking industries, and two vocational schools for the woodworking industry during the period of 2011 to 2012. All studied workplaces were small companies with about 10-20 employees.

3. Results

Many hours of recordings were made of the selected workplaces, through which shorter videos were produced. The goal was not to only show problematic situations, but also to illustrate a solution for the problem. A PIMEX-video example is shown in figure 1.

Figure 1. Example from a PIMEX-video, in this case from work on a sanding machine.
The current exposure to dust is shown as a red bar to the left of the video window. To the right of the video window is a graph showing how exposure varied throughout the sequence. The vertical line moves along the graph showing the current position in the video.

Almost all of the recordings show that exposure levels vary dramatically throughout a normal work day. Typically, exposure to silica or wood dust occurs as short peaks with a duration which only represents a minor part of the time worked. The focus was, therefore, to analyse the reasons for such peaks in exposure, and to identify and document possible solutions. The edited PIMEX-videos are normally between one and two minutes, and are normally combined two-by-two illustrating the problem as well as the solution. The produced examples have been made available on the Internet, and also distributed via other electronic media such as through USB memory sticks. A limited number of such PIMEX-videos have been provided with commentaries in English (www.du.se/pimexfilm_en). All involved persons and companies have accepted that the recordings may be distributed and used freely for the purpose of transferring knowledge in effective hazard control.

The recording illustrated in figure 1 is from a vocational school where a pupil is sanding wood plates on a belt sander. The figure shows a number of exposure peaks during the one minute period. Possible solutions were therefore discussed with the teacher who said that the machine was originally delivered with a cover intended to make the exhaust to the machine more effective. However, this cover had been removed some time prior for an unknown reason. The teacher decided to replace it for testing and a new PIMEX-recording was made. The result is shown in figure 2.

Figure 2. Effect of using a cover on the sanding machine in figure 1
Results of this test were an eye opener for teachers as well as pupils, who believed that removing the cover had little impact on exhaust levels.

A number of other, similar tests were made in the same school which illustrated, for example, how effective the use of covers on other machines was, and also how much the exposure was reduced when exhaust were used on a number of other machines. The negative effect of using compressed air for cleaning the machines was also visualised. Typical exposure reduction was 90% or better, and since this often represents work tasks that explains an important part of the total exposure, the overall effect will be significant. Some months later, measurements were taken and the PIMEX-videos were shown. Discussions with the teacher revealed that a number of routines at the different workstations had been changed with the intention to improve the work environment, and that the school had invested in new exhaust equipment and was now more safety-conscious. He was also convinced that the use of the PIMEX-videos would result in a new way of thinking in all vocational schools.

PIMEX-measurements were also taken in a small factory producing stairs made of wood with the intention to support the director in her desire to reduce worker exposure to wood dust. The measurements were taken from all machines and operations in use over a day. The results were immediately discussed with the staff, along with a presentation of material visualising dust exposure as well as the work done. The material was used by the director during a course day for the staff. Based on this, possible control measures for implementation were discussed. After such measures were implemented, new PIMEX-measurements were taken during a half-day visit. The analysis, together with discussions among the staff and the director, now focused on the individual’s role in improving the situation. The manager expressed that when viewing the PIMEX-videos it became obvious that it was possible to make improvements quite easy. One way to do this was simply by changing some of the work operations that caused problems.

Within the quarrying industry, documentation was taken of a number of different work tasks, to illustrate how simple control measures, visualised by the PIMEX-videos, might help to reduce worker exposure to silica dust. One example was on a quarry producing paving stone, where two workers were doing exactly the same type of work. Although the workers were using largely identical machines, the videos showed that one of them was much more exposed to dust than the other. Close examination of the videos showed the reason. The small covering plate on one of the machines had been removed for an unknown reason. Neither the workers nor the manager understood that removal of the plate dramatically reduced the effect of the exhaust system. Another example was the comparison of two different methods of cleaning the rock surface before drilling, namely using compressed air or water. The PIMEX-videos clearly illustrated a striking difference between the methods.

One of the participating companies decided to use the videos during regularly arranged training days. It was also planned that such activities should be arranged for other quarrying companies that shared a concern for workers’ health and safety. The material was also used in the vocational school for the branch.

4. Discussion

Most of the companies in Sweden’s quarrying and woodworking industries are small. What they have in common is that worker exposure to silica dust or wood dust is a significant potential health risk for many of their employees. Different kinds of investments in technology aimed at reducing emission and exposure to dust are necessary. As this is expensive for the companies, it is essential that the efficiency of this investment is good. However, this cannot be achieved if those involved are not motivated to use the equipment correctly, and do not
have a basic understanding of how air contaminants are transported from the source to their breathing zone or how exhaust systems, for example, are designed to work. If workers do not possess the necessary knowledge and motivation to use the machines effectively, is it a huge risk that the efficiency will be very low of made investments aiming at hazard control. Visualising the dangers of incorrect use of equipment provides a much more effective method of conveying information than alternative means, such as lectures and textbooks during studies, or through verbal instruction from management. Workers have a much better chance of accepting and remembering proper procedure if they are able to observe a person doing work similar to their own. The PIMEX-method allows for this. It also presents situations within which exposure may be high, and shows how behaviour affects exposure. A number of such videos which illustrate the most typical situations have been produced and made available via Internet for interested parties. Examples of such groups include teachers in vocational schools, as well as regional safety representatives appointed by unions with knowledge on this matter who service small companies in Sweden.

Feedback from those who have already used the videos is encouraging. The plan for the future is to adopt the videos for use on smartphones, making it possible to link appropriate videos to specific machines or workstations using QR-codes which directly select and display a relevant visualisation. Another means of using the videos will be part of a web-based training program and examination for the licence to “drive machines” in the woodworking industry.

5. Conclusions
This work has demonstrated that video exposure monitoring methods such as PIMEX serve as an excellent tool for identification of critical moments concerning risk for dust exposure in the stone and woodworking industries. Two main types of benefits for small as well as bigger companies can be identified. The ability to produce and distribute visualised training material via the Internet provides an opportunity to effectively reach out to workers and managers. This study implies that knowledge will be better accepted via visualisation compared to written information or verbal instructions by a supervisor. The PIMEX-method also helps in the identification of economically effective technical control measures. By focusing on situations that cause peaks in exposure, ineffective and expensive control measures can be avoided.

6. References


A national intervention aiming at improving welders’ health and safety

Authors
Ann-Beth Antonsson, IVL Swedish Environmental Research Institute, Box 210 60, 100 31 Stockholm, Sweden and the KTH Royal Institute of Technology, Department of Ergonomics, Stockholm, Sweden, ann-beth.antonsson@ivl.se
Bengt Christensson, IVL Swedish Environmental Research Institute, Box 210 60, 100 31 Stockholm, Sweden, bengt.christensson@ivl.se
Helena Strehlenert, IVL Swedish Environmental Research Institute, Box 210 60, 100 31 Stockholm, Sweden

Keywords
welders, web-site, intervention, evaluation

1. Background
Welders experience many hazardous exposures in their working environment, e.g. welding fumes, poor working postures, electromagnetic fields and electric hazards. Studies have shown that even though many of the control measures that are required to reduce the exposures are known, they are not applied by welders and in welding workshops. In addition, employers and other actors affecting welders working conditions do not seem to be aware of several of the measures required.

2. Aim
The aim was to improve the working environment of Swedish welders.

3. Method
Based on research about the working environment in welding and an understanding of the conditions in welding companies, drivers for improvement and change, what actors that may have an impact on the working environment and what actions are required to improve the working environment, a web-site, Svetsa Rätt ("Weld right", www.svetsaratt.se) was developed, to serve as a knowledge platform supporting the intervention.

The website presents concrete advice on how to improve the working environment, structured in relation to

- the welder,
- the company,
- the premises,
- the welding workplace
- the welding method.

The advice reflect a perspective where working environment improvements are connected to other incentives and business advantages such as increased productivity, quality and profit.
The web-site is developed to suit several actors, e.g. welders, their employers, and the occupational health service. The pedagogy in the parts directed towards the welders are adapted to welders conditions, e.g. using a set of short films (20 seconds to 3 minutes) showing how to work and weld in order to create a good working environment. In additions the web-site is developed to suit a stakeholder that small enterprises often rely on for advice on occupational health and safety, their suppliers.

The intervention includes cooperation with The Swedish Welding Commission, an organization for welders, welding companies and suppliers of welding equipment. They use the web-site in their ordinary activities including education. Additionally, the website has been presented for teachers at vocational education of welders and the study course literature used for welders now refer to the web-site for education on working environment matters. During the first half of 2012 the website has been launched and marketed towards welders and managers in welding companies, vocational educations of welders, suppliers selling welding equipment and the occupational health service. Each of these actors has their own "entrance" to the web-site, giving adapted advice on how to use the website and what parts of the web-site are most relevant for them.

The intervention strategy applied include capacity building in the welding society, a strategy for dissemination and drivers supporting the uptake and use of the advice given on the web-site.

4. Results and conclusions
The web-site was launched in January 2012. The first activity was to present it for about 100 teachers involved in vocational education of welders. The response was very positive and the teachers found the website very useful. In addition the publisher of study material for vocational education of welders, decided not to include occupational health and safety in their material but instead link to the web-site. In this way the website will be used in future education of welders and also set the standards for occupational health and safety for welders.

In co-operation with Svetskommissionen (a Swedish welding association) and the social partners we have informed welding companies, safety representatives and welders about the web-site.

During a fair about welding, all exhibitors were visited and the website was demonstrated to each interested exhibitor in order to discuss in what way they could make use of the web-site in their contact with their customers, mainly welding companies. We know that welding companies often contact their suppliers, also about occupational health and safety. The web-site can be useful in such contacts, as the salespersons often lack detailed knowledge about occupational health and safety in welding.

Also the occupational health services, OHS, and especially the safety engineers have been informed about the web-site in an article, describing different means of using the web-site in
order to serve OHS welding company customers and as the basis of new offers to welding companies.

To summarize, the dissemination strategy is directed both towards the welding companies and their employees and towards other actors that in different ways support the welding companies with support and advice about their working environment.

An evaluation conducted about half a year after launching the website shows that the target groups are very positive to the web-site. It is judged to be easy to understand and navigate, the language is clear and simple and adapted to the target group incl. welders. Teachers in vocational training of welders have already used the web-site and plan to use it even more in the future. The website is considered to be of high quality. Respondents from welding enterprises think that the level of detail is well adapted to their needs, whereas safety engineers from occupational health services with previous experience of welding asks for more detailed advice. All respondents are positive to the broad perspective on welding, showing the connection between a good working environment, quality, productivity and profit. One welding expert, however asks for more detailed information e.g. about how to calculate costs and profits.
Strategies to improve safety in small agriculture businesses

Author
Ann-Beth Antonsson, IVL Swedish Environmental Research Institute, Box 210 60, 100 31 Stockholm, Sweden and the KTH Royal Institute of Technology, Department of Ergonomics, Stockholm, Sweden, ann-beth.antonsson@ivl.se

Keywords
agriculture, accidents, statistics, control strategies

1. Background
Statistics on accidents and work-related diseases and their characteristics is often used in order to analyze occupational health hazards and to give priority to interventions aiming at reducing occupational accidents and diseases. However, statistics on injuries and diseases in agriculture is not reliable. A study indicates that only about 10 % of accidents in Swedish agriculture are actually reported (Pinzke and Lundqvist 2006). Additionally, statistics is often difficult to interpret and a more thorough analysis is needed in order to understand the causes of the accidents and in order to develop successful strategies for intervention.

2. Aim
The aim of this study (Antonsson et al 2009) was to identify the most common serious accidents in agriculture in Sweden, analyze the factors contributing to the accidents and develop strategies that if implemented can effectively reduce the most common accidents.

3. Method
Insurance compensation claims from members of the main farmers’ organization, LRF, were analyzed. This insurance was included in the membership fee of LRF and was managed by an insurance company, LRF Försäkring. The insurance cover accidents causing medical invalidity, fatal accidents or persistent detriments, why the accidents analyzed were severe. Only accidents that were reported to be due to work were selected. About 600 insurance reports from one year, 2005, were studied and categorized and the causes were analyzed. The categories were selected to serve as a basis for developing control strategies that would reduce the accidents. The categories were developed during the interpretation and mainly described the kind of work conducted before the accidents or the cause of the accidents. The insurance cost for the accidents in the categories was also calculated. The categories were:

- forest work
- cutting fire-wood
- cattle
- fall to a lower level
- contact with machine that moves
- horses
- accidents with vehicles
- hit by a falling object
- crushing injuries
For the most common and the most severe accidents, workshops were conducted in order to discuss the accidents, contributing causes and technical and organizational measures that could prevent the type of accidents. The participants in the workshops represented a wide variety of competences including farmers, experts in agriculture, in occupational health and safety, manufacturers, inspectors from the Swedish Work Environment Authority and researchers.

4. Results and conclusions
The analysis of the insurance cases showed that the following accidents and activities when the accidents occurred were the most common ones (see Table 1):

Table 1.

<table>
<thead>
<tr>
<th>Accidents or activities when the accidents occurred</th>
<th>Number of analyzed accidents</th>
<th>% of analyzed accidents</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry</td>
<td>146</td>
<td>24</td>
<td>Trees on the ground (67), tree felling (45), falling in the forest (22); 67 mentioned chainsaw, 65 were probably related to handling of trees that had fallen during storm</td>
</tr>
<tr>
<td>With animals</td>
<td>124</td>
<td>20</td>
<td>Cattle (69): handling (23), moving (21), milking (14) Horses (43): Riding, training, driving (22), moving (8), handling (7)</td>
</tr>
<tr>
<td>Fall to a lower level</td>
<td>55</td>
<td>9</td>
<td>Repair of machine or building (19) Falling or slipping (10) hay loft (8) Ladder mentioned (15)</td>
</tr>
<tr>
<td>Cutting of firewood</td>
<td>54</td>
<td>9</td>
<td>Tripping, slipping and falling on plane surfaces e.g due to ice in the winter or due to slippery floors</td>
</tr>
<tr>
<td>Wounded by a handled object</td>
<td>47</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Fall on the same level</td>
<td>43</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Contact with a moving part of a machine</td>
<td>41</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Crushing injuries</td>
<td>41</td>
<td>7</td>
<td>Few but potentially very severe accidents with tractors</td>
</tr>
<tr>
<td>Accident with vehicle</td>
<td>40</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Hit by a falling object</td>
<td>15</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Many Swedish farmers are also active in forestry, but only occasionally. Poor knowledge about safety precautions in forestry in combination with risk-taking probably explains many of
these accidents. Due to an ongoing activity aiming at improving safety in forestry, Säker Skog (Safe Forest), these accidents were not analyzed further.

In addition to forestry, there were several accidents related to cutting of fire-wood. Also this is handled within Säker Skog, why we did not analyze this further.

One workshop dealt with tractor accidents. These accidents are due both to technical shortcomings in the tractors as well as behavioral mistakes. Several fatal accidents have occurred when a passenger is thrown out of the tractor. A safety belt on the passenger side of the tractor would reduce this risk. Today safety belts are only compulsory on the driver's side. Additionally the protective device covering the power transmission often breaks, and many farmers do not replace it due to the cost but also due to technical shortcomings of the devices. Technical improvement of the protective device is needed. There is also a need for improvement of the device used for attaching machines to the tractor. Today hitch-hooks are used in Sweden but safer alternatives are available. One well-known problem with tractors is the combination tractors and children. To improve safety, education of farmers is needed. This could be done in co-operation with insurance companies. Additionally, some kind of guide for farmers presenting safety demands that can be used when buying a new tractor would be beneficial.

One workshop dealt with cattle. In general, the risks were judged to be higher with beef cattle compared to dairy cattle. The discussions resulted in the conclusion that there is a need for more clear advice on the design of safe cattle-houses. The design has to be adapted to new forms for loose housing. There was a discussion that lessons could be learned from swine houses. There is also a need for farmers to develop a better understanding of cattle behavior and how to "read" the cattle. Two especially risky situations are moving of cattle and handling of a cow with a calf. A conclusion was that there is a need for education and training for farmers, both for agricultural schools and for working farmers. Education and co-operation is also needed for salespersons involved in design and selling of equipment for new or remodeled cattle houses. A challenge is to motivate farmers to take part of such an education. To motivate farmers, a co-operation with the program Säker Gård (Safe Farm) is a possibility.

There is also a need for activities aiming at improving safety when working with horses. Several activities were however ongoing or planned, why it is important to evaluate these activities.

The workshops were very constructive and pointed at several causes of the accidents and combinations of different kinds of control measures that are needed to reduce the accidents. The workshops also discussed how to implement the measures needed.

5. References
Antonsson, Ann-Beth; Lindahl, Cecilia; Östlund, Gabriella. (2009) Vad krävs för att arbetsskadorna i lantbruket ska minska? Analys av de vanligaste olyckorna och förslag till förebyggande insatser. (What is needed to reduce the accidents in agriculture? An analysis
of the most common accidents and suggestions for preventive measures.) IVL-report B1828 (In Swedish, English summary)

The unmet promise of occupational health and safety harmonisation: continued complexity for small, multi-jurisdictional firms

Authors
Susanne Bahn, PhD, Centre for Innovative Practice, School of Management, Edith Cowan University s.bahn@ecu.edu.au
Susan Mayson, PhD, Department of Management, Monash University susan.mayson@buseco.monash.edu.au
Rowena Barrett, Professor, School of Management, Edith Cowan University r.barrett@ecu.edu.au
Llandis Barratt-Pugh, Associate Professor, Centre for Innovative Practice, School of Management, Edith Cowan University l.barratt_pugh@ecu.edu.au

Abstract
Harmonisation of state-based occupational health and safety (OHS) regimes is a Council of Australian Governments (COAG) initiative designed to ‘cut red tape’ for Australian firms. However Western Australia’s, South Australia’s and Victoria’s lack of harmonisation makes it problematic for firms that conduct business in multiple jurisdictions. In this paper we investigate what impacts harmonisation has on firms generally and specifically smaller, multi-jurisdictional firms. First, we look at the requirements of the model WHS Act and what it said about managerial responsibilities for OHS. We focus on the due diligence clause which places personal liability on company directors or persons conducting a business or undertaking (PCUBs) for breaches in their duty. As a new duty, this also increases complexity for small, multi-jurisdictional firms depending on the jurisdiction in which they operate and the legislation to which they need to attend. We then question how these small firms may deal with this problem and draw on findings of a study where the impact of the harmonisation on safety professionals and training design and delivery was explored. Although the focus was not specifically on small firms, the data suggests small firms do not use dedicated safety professionals and instead rely on industry associations to understand their OHS obligations. Indeed, some small firms attempt to avoid compliance entirely, until ordered by regulators to comply. This is a risky strategy as the costs of being found guilty of a breach or non-compliance are significant. Moreover, small, multi-jurisdictional firms need to be conversant with at least two sets of OHS legislation with differing requirements and levels of penalties. The paper contributes to the debate on small firm regulation and shows that despite attempts to ease the regulatory burden in smaller firms that operate across state borders, complexity remains.

Keywords
Small firms, occupational health and safety, regulation, complexity, qualitative

1. Introduction
The Council of Australian Governments (COAG) National Reform Agenda (Safe Work Australia, 2011) has been driving the process of harmonising state-based OHS legislation. A fully harmonised system was expected to operate from 1 January 2012, but unfortunately this aim was not reached. Whilst most states have committed to harmonisation, some have resisted. For several States a critical issue was the extra burden harmonisation would impose in relation to additional training and documentation that small firms would be required to undertake in order to comply with the model WHS Act (Baillieu & Rich-Phillips, 2012). Small firms generally have limited resources and there was concern about the potential costs this regulatory change would impose upon them.

The small firm compliance challenge is underscored by evidence of their repeated attendance at harmonisation information sessions (Bahn & Barratt-Pugh, 2012). For small, multi-jurisdictional firms (or those that operate across state borders) the inability for all states to harmonise has meant that they need to adhere to multiple legislative requirements. Moreover, in the model WHS Act fines for breaches were significantly increased (up to $3M) beyond the insurance limits of many small firms. These fines, should they be incurred would harm small firms and some owner-managers have indicated their uncertainty about how they could manage if found guilty of a breach and fined (Baillieu & Rich-Phillips, 2012).

The purpose of this paper is to investigate what impacts harm onisation has on firms generally and specifically smaller, multi-jurisdictional firms. In the next section we outline the current state of play in terms of harmonisation and this is followed by a discussion about specific requirements in the model WHS Act. From there we examine the literature on small firms and consider the burden the WHS Act may have on small firm’s operations and in particular what happens to firms that conduct business across state borders. Finally, we detail the key themes that emerged from a study conducted in 2011/12 that explored the burden on small firms in their uptake of the harmonised legislation from a sample of training organisations, advisory bodies and Unions.

2. The WHS Act and small firms
By late 2012, the harmonisation of state-based OHS regimes had not been completed despite calls from Prime Minister Gillard for this to occur. While the states were expected to mirror the model WHS Act, what resulted was considerable variation between the states (Tooma, 2012). The picture of harmonisation at November 2012 is shown in Table 1.

Harmonisation was supposed to benefit multi-jurisdictional firms but clearly this has not occurred. The current state of play both improves and complicates the situation for multi-jurisdictional firms. For example, in Queensland and NSW the legislation is very similar and if firms operate in these two jurisdictions then complexity is reduced. However, if firms operate in Victoria and NSW or Queensland and WA, complexity remains and they need to abide by two sets of legislation. Moreover, the legislative environment in these cases is no better than what it was pre-harmonisation except that firms must adjust to the requirements of at least one new state-based Act. In short, the promise to reduce complexity for all Australian firms from harmonisation has not been met. In the next section, we examine specific requirements in the model WHS Act including due diligence and communication.
Table 1: State of Harmonisation

<table>
<thead>
<tr>
<th>State</th>
<th>Outcome</th>
<th>Differences between model WHS Act and resultant legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commonwealth</td>
<td>Passed legislation 24\textsuperscript{th} Nov 2011</td>
<td>Change to the definition of ‘officers’ Additional requirement to consult, co-operate and co-ordinate with other duty holders</td>
</tr>
<tr>
<td>New South Wales</td>
<td>Passed legislation 7\textsuperscript{th} June 2011</td>
<td>Toughening up of provisions for unions to prosecute breaches</td>
</tr>
<tr>
<td>Queensland</td>
<td>Passed legislation 6\textsuperscript{th} June 2011</td>
<td>None</td>
</tr>
<tr>
<td>Australian Capital Territory</td>
<td>Passed legislation 20\textsuperscript{th} Sept 2011</td>
<td>Retained existing provisions relating to asbestos, hazardous chemicals and major hazard facilities</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>Passed legislation 1st Dec 2011</td>
<td>None</td>
</tr>
<tr>
<td>Western Australia</td>
<td>Not yet passed</td>
<td>Concerns about impact on small firms, the high penalties for breaches, rights of entry for unions and the power for Health and Safety representatives to direct work to cease and issue Provisional Improvement Notices.</td>
</tr>
<tr>
<td>Victoria</td>
<td>April 2012 decision to remain with the state based system</td>
<td>Argued to retain the state’s industrial magistrates, tripartite review committees and the Safe Work SA Advisory Committee.</td>
</tr>
<tr>
<td>South Australia</td>
<td>The legislation passed through the lower house 29\textsuperscript{th} Nov 2011 and was defeated in the upper house in Feb 2012.</td>
<td></td>
</tr>
<tr>
<td>Tasmania</td>
<td>April 2012 agreed to implement legislation Jan 2013</td>
<td>None</td>
</tr>
</tbody>
</table>

2.1 The WHS Act on due diligence and communication

In the analysis of the impact of implementing the model WHS Act, Access Economic (2011:18) reports that “for the most part, neither substantial changes, nor large costs or benefits are expected”. However, the interpretation of sections 19, 27(5), and 47 to 49 in relation to “ensuring health and safety” (the PCBU duty) and exercising ‘due diligence’ (the officer duty) and ‘consultation’ with workers has far reaching implications (Tooma, 2010). The due diligence clause in the WHS Act places personal liability for workplace safety on officers who include company directors, financial officers and persons who make or participate in making decisions that affect the whole or a substantial part of a business or undertaking (eg members of boards). The responsibility for company directors (or PCBUs) is clearly spelt out in the WHS Act as a positive duty where they can be deemed personally liable for breaches in their duty (Foster, 2012).

Section 27 of the WHS Act describes where this duty applies:

1. That there is a corporate “PCBU” which has a duty or obligation under the WHS Act;
2. That the accused individual is an “officer” of that PCBU;
3. That the accused has failed to exercise “due diligence” to ensure that the PCBU complies with that duty or obligation (Safework Australia, 2011). Section 27 of the WHS Act seeks to encourage employers adherence to due diligence in business undertakings and reduce the blurring of responsibilities for breaches in their duty of care. Responsibility travels from the injured worker up to the company director and includes all managers in between. The requirements for this section have occurred in response to past examples where responsibility for health and safety has been devolved to third parties. For example, Mayhew and Quinlan (1997) noted in their research several cases of host organisations attempting to shift the management and supervision of contracted labour back to the third party firm rather than taking on the role themselves. Johnstone and Quinlan (2006) also noted this blurring of work health and safety responsibilities, employment conditions and the transfer of human resource management functions to labour agencies (Connell & Burgess, 2002). When employing contracted staff, James, Johnstone, Quinlan and Walters (2007) explained that in determining employer duties, including health and safety responsibilities, there was difficulty in distinguishing between self-employed workers and employees. In order to improve conditions, Deakin (2004) called for more ‘reflexive’ forms of regulation that were less prescriptive about duty of care, allowing for employer flexibility and the sharing of employer duties between employment agencies and host organisations. Finally, Johnstone, Mayhew and Quinlan (2005) argued that regulation of health and safety for contracted or outsourced labour was more difficult than for in-house labour. They maintained that their use “increases the likelihood of multi-employer worksites, corner-cutting, and dangerous forms of work disorganisation, as well as situations where the legal responsibilities of employers are more ambiguous and attenuated” (Johnstone, et al 2005:391).

Workers’ health and safety falls squarely on the shoulders of company directors under the WHS Act yet this is not the case in all states, especially where the legislation has not changed. For small, multi-jurisdictional firms this makes the situation complex.

2.2. Burdens on small firms
We understand that the response of small firms to regulation and regulatory change of this type, depends on a complex interaction of cultural, contextual and economic factors in concert with owner-managers’ responses as well those of employees and other stakeholders (Barrett & Mayson 2008; Barrett & Rainnie, 2002; Mayson & Barrett, 2006; Wilkinson, 1999). Yet it is often stated that regulation is an unnecessary burden and/or “red tape” for small firms despite the contradictory evidence of this. According to Kitching (2006) regulation may constrain small firm activities through compliance, but regulation could also bring benefits or opportunities by making certain actions possible or by encouraging certain activity in others. In support of this, the conclusion from Anyadike-Danes, Athayde, Blackburn, Hart, Kitching, Smallbone and Wilson’s (2008: iii) study of 1205 smaller firms was that “knowledge of regulation, coupled with internal capacity to respond positively can and does enable business owners to adapt business practices and products to overcome some of the constraining influences of regulation”. However, findings from Fairman and Yapp’s (2005) work in small and medium enterprises in the UK found that many owners/managers of small firms were
unaware of their legal requirements and in not knowing how to meet their obligations, only took action when they were ordered to do so by a workplace inspector.

Regulation can be seen as ‘red tape’ because of small firms are generally resource poor and this gives rise to “structures of vulnerability” (Nichols, 1997: 161). With health and safety processes, poor performance has been shown to be “related more to the inadequate management of risk than to the absolute seriousness of the hazards faced” (Baldock James, Smallbone, & Vickers, 2006: 829). Documentation of risk is problematic (Eakin, Champoux & MacEachen, 2010) in small firms whose management systems generally lack formality, and as Barrett and Mayson (2008; Mayson & Barrett, 2006) have established, this is particularly so in regard to managing the employment relationship. Small firms are less likely to employ OHS practitioners (Pilkington, Graham, Cowie, Mulholland, Dempsey, Melrose, & Hutchinson, 2002) and they are less likely to be inspected by regulatory agents than larger firms. A lack of resources, expertise and formality may impact on their OHS performance. For example, worker participation is critical to improving health and safety outcomes and research shows a positive relationship between the presence of representative participation and improved management practices (Bohle & Quinlan, 2000; Quinlan & Johnson, 2009). Yet in small firms there is less likelihood that relevant infrastructure such as employee training and union organisation will exist to make participation effective (Bohle & Quinlan, 2000; Frick & Walters, 1998; Walters, 2001).

So when the WHS Act poses a requirement to communicate with workers on all matters concerning health and safety in the workplace (WHS Act 2011 Section 48: Safework Australia, 2011), there is likely to be a problem for small firms. The requirement to communicate and work with workers when developing and implementing safety systems is problematic in the face of informal management systems. A formal safety system may not exist and in the small firm it is unlikely a dedicated safety professional is employed to ensure the due diligence requirements of the WHS Act are met. A further complexity is that the requirement to communicate and work with workers on health and safety matters is not explicit in the state legislation of WA, SA and Victoria.

2.3. Small, multi-jurisdictional firms
It is not uncommon for small firms to operate their business across state borders in a number of locations, particularly if they are located in towns and regions along the state borders (ABS, 2010). Small firms may have offices and shops situated in nearby towns that fall in different states because of their proximity to state boundaries. This is most likely to occur on the Queensland/NSW, Victoria/NSW and SA/Victoria state borders. For firms along the NSW and Victorian border and the SA and Victorian border, two OHS regulatory regimes remain in place with no benefits from harmonisation. Moreover there is a necessity to comply with new state-based legislation in those states that adopted new OHS legislation.

Sub-contractors (often smaller firms) with be especially affected as they are most likely to work across jurisdictions. In the resources sector the current demand for Australian minerals and the construction work underway, means sub-contractors may be working in several states in the same year as they contract for work. In these examples, firms are formally
regulated according to varying levels of health and safety compliance within the specific regulations as they cross state borders. We would assume that most small firms in this situation would informally operate under the lesser regulatory requirements or be unsure about operating under two or more sets of regulations. Hence there could be cases of different levels of communication, consultation and documentation between the business premises and where the work is located. We argue that this complexity is open to abuse and draw on Goldsmith's (2000: 139) work on regulation of the internet where he suggests “the true scope and power of a nation’s regulation is measured by its enforcement jurisdiction, not its prescriptive jurisdiction”. Incomplete harmonisation of the WHS Act in Australia increases complexity not only for the multi-jurisdictional small firm to comply with differing legislative requirements but also for the state regulators to enforce compliance.

In summary, while there is an implication that small firms view regulation as a burden, we note studies that suggest it can be an enabler and encourage positive change and growth in small firms. In Australia health and safety regulation is complex and complicated. For small firms conducting business across multiple jurisdictions there is added complexity and requirements. At least two sets of legislation will need to be understood, differing sets of documentation will need to be used, and fines at varying levels for any breaches that occur will apply. For these firms regulation may indeed be as onerous as it was pre-harmonisation. Complexity occurs through the unmet promise of a simpler unified regulatory system. For small, multi-jurisdictional firms there is a requirement to comply with at least two set of legislation.

3. Research design and methodology
If we accept that firms operate in a complex reality then a critical realist perspective (Sayer, 1992; Archer, Bhaskar, Collier, Lawson & Norrie, 1998) may offer theoretical insights to inform this study. The "realist asserts that organisations are real. They have form, structures, boundaries, purposes and goals, resources, and members whose behaviours result from structured relations among them" (Dubin, 1982:372). Sayer (1992) defines organisational structures as sets of internally related objects and mechanisms as ways of acting. These objects are internally linked to the structure and their identity depends on their relationship with the other components of the structure. People are therefore co-creators of their reality and have some power to frame their experiences and understandings of their world. Human experience is viewed from this perspective as complex, and human behaviour is unpredictable, although generally explicable (Sayer, 1992; Archer, Bhaskar, Collier, Lawson & Norrie, 1998). The meanings, actions and processes of the other people with whom they interact, impact upon each individual’s experience of everyday life (Clark, 2008). In organisations, structures exist which are beyond a person’s control, impacting upon the capacity of individuals to construct their own sense of reality. However, individuals also make sense of their organisational reality. Behaviour is not totally determined by structure; there is agency – ie regulations can be ignored. They do not force behaviour unless there are immediate sanctions or as Kitching (2006) argues regulations are viewed as opportunities, highlighting how small business owners/subcontractors make sense of and act in response to regulation.
From this perspective OHS regulations operate as structures that shape behaviour; safe work practice is the mechanism and action of those structures in the workplace (Sayer, 1992). Actions are mediated by the structures of regulation, and by training and safety culture maturity (Dubin, 1982). Structures in organisations can be changed and are changed; however, whether these changes permeate to individuals to create a change in their behaviour is of interest to this study. The harmonisation of state-based OHS regimes in Australia has effectively lead to greater penalties for non-compliance and has produced a regulatory structure that will influence and mediate organisational decisions and managerial actions. Many organisations operating under new legislation are endeavouring to have in place processes to adhere to the new regulations (Access Economics, 2011).

The sample for the study consisted of eighteen semi-structured 30-60 minute interviews (Fontana & Frey, 2008) conducted with representatives from four registered training organisations (RTOs), five advisory and regulatory organisations, three unions, three universities, one TAFE and one Health and Safety Manager in a large Australian resources company, across WA, SA, NSW, Victoria and Queensland. Eight interviews were conducted face-to-face with a further ten interviews conducted by telephone. The interviews took place between October 2011 and April 2012. The interviews were audio recorded, fully transcribed and checked for errors and paralinguistic information. The data was analysed using a template approach (Miles & Huberman, 1994), which entails analysing the text through the use of a ‘guide’ consisting of a number of relevant themes supported by NVivo (Grbich, 2007). Verbatim quotes of individual participants are used in the paper as examples of these recurring themes. For this paper, we focus on the specific themes that emerged about small firms. Although the participants of the study were not in themselves small firm owner-managers they either provided training or advice to small firms across Australia or were able to identify the issues that the legislation may have for this cohort.

4. Findings

Pre-harmonisation, nine different Acts existed with supporting Regulations. By October 2012, most states and all territories had introduced legislation to ‘mirror’ the model WHS Act. Victoria had kept its own legislation, Western Australia had the legislation under review, and South Australia’s legislation was in the Parliament. The aim of harmonisation was to reduce complexity but clearly this has not occurred as Table 1 indicates. As one respondent indicated:

I will bet you in five years time they’ll still have confusion. (Registered Training Organisation 3).

In the twelve months leading up to January 2012, Safe Work Australia canvassed key stakeholders in the form of a Regulatory Impact Statement to determine issues with the harmonised legislation. However, as the following quote attests, less than 1% of all Australian firms were consulted and the number of those that were small was unknown. Suspicion about the actions of the regulatory body, where Safe Work Australia was seen to be losing legitimacy due to its lack of consultation, was apparent in the following quote.

They (Safe Work Australia) apparently went out to about four and half thousand businesses. I don’t know whether they did that electronically. I assume that was their
data base and they did that scatter approach. They had seventy-three responses and they used those responses to substantiate the findings. (Advisory Body 1).

The model WHS Act endeavoured to incorporate many of the commonalities of the individual state legislation. But even in producing a national act changes were made. The WHS Act has a stronger focus on communication and consultation between employers and employees in the delivery of health and safety processes and practices in the workplace than the individual state acts. These two themes appear consistently throughout the legislation and have raised concerns by the governing, legislating and training professionals interviewed in regards to responsibility. As one respondent indicated, the implications of the Act’s focus on consultation were wide-reaching in terms of firm-based communication.

The Act can be summarised as two things. One it’s got a mission and the mission is to have a safe and healthy work environment and two it’s got a process of how we achieve that and the Act said it’s a process of consultation, participation and involvement of work place parties and incentives and so I guess the consultation is more than just consultation it’s actual participation. (Registered Training Organisation 2).

The issue of operating businesses across state borders was raised. Managing multiple legislations has been identified as an issue across all sized firms and may impact on small firms in particular due to their lack of formalisation and resources. As one respondent pointed out:

The Act focuses on consultation. The concern that I have around the consultation requirements is a bit like the piece of string. They’re not fenced off so you really don’t know where they end. I suspect what is a little bit clearer is the internal consultation, you know, talking to your workers, working down through safety reps, safety committees, other consultant mechanisms. The real problems lies on the multi-PCBU¹ sites, you know, who does what? How do you discharge a particular duty? Who’s responsible for it? What are the agreements? (Advisory Body 2).

Job titles were identified as problematic under the WHS Act in that responsibility for breaches continues up and down the line from injured worker to Director. This provision led to concern about where the responsibility for work health and safety rested.

We’ve had advice from people from the West who tell us: “if you have the word ‘manager’ in your title, then you are deemed as being an officer of the company. And as an officer of the company, then those accountabilities that used to fit with directors now will trickle down to you”. I’m a director and so I take on those responsibilities but I’ve got my own staff here scratching their heads going “I’m not sure I want to be called Safety Manager or I want to be called a Project Manager” because of the additional legislative burden it brings with it. (Manager 1).

In states where the model WHS Act has been ‘mirrored’, several changes to health and safety documentation will be required. Much has been stated about the limited funds that are required to bring systems into line with the new legislation (Access Economics, 2011);

¹ PCUB – persons conducting or undertaking a business
however there appears to be a general dissatisfaction among those sampled about the costs they expected to incur.

_Saying there is absolutely no change under new the WHS framework is not constructive and can in fact be a disservice._ (Advisory Body 2).

_Not only will companies need to work through their normal kind of training systems, general systems, they'll also be looking at their agreements and revising their agreements in line with the new requirements and that will take time, it's intensive._ (Registered Training Organisation 3).

_But when you get to the medium to small employers at what stage do they say too many costs, it's too hard?_ (Advisory Body 1).

While the quotes above referred to regulatory changes more generally, small firms were most at risk as they do not have the services of dedicated safety professionals.

_What about small business and medium sized business who don’t have dedicated safety professionals, who don’t have things in place? They’ll be totally lost._ (Registered Training Organisation 4).

_So some of the bigger firms are very pro-active in what they’re doing about it and they’re getting on top of everything but they’ve got safety professionals. Small businesses that don’t have that that, you know, aren’t getting things done because they don’t know or understand it as much._ (Advisory Body 2).

_Business might need to have an understanding of ten or twelve of the Codes, and the Regulations and the overarching Act. So to get to grips with a seventy-page document and another seventy-page document and another seventy page document… is probably over the top for a small to medium enterprise._ (Union 1).

One participant argued that there was a large amount of unsubstantiated hype about the process and worried that, organisations particularly small firm owner-managers were attending repeated information sessions unnecessarily.

_I don’t see that as being hugely dramatic. I’m actually staggered at the various conferences that we’ve run and people want to go along to the harmonisation sessions and they’ve heard it twenty-three times._ (Advisory Body 1).

However, repeat attendance at information sessions indicated that small firms did not understand the implications of changes or their obligations.

_The people doing their own work just don’t know it, don’t understand it and don’t realise the importance of the legislation._ (Advisory Body 2).

Small firms generally rely on industry associations and employer groups for support in industrial relations, legislation compliance and legal advice (Bartram, 2005). Industry Association representatives who were interviewed raised a concern with their own workloads given small firms difficulty in understanding and applying the legislative requirements.
They’ll be lost. They will depend on organisations such as CCI\(^2\) or other associations or other course providers to go along and at least learn the fundamentals, but their ability to sit down and look at the Act or the Code will end up with CCI codes of practice. (Advisory Body 1).

Many small businesses don’t have anything to do with health and safety, they just get in and they do it. If you’re just doing typing from home, you run your own business, you’re self-employed; who are you going to consult with? You just do things. If you’re a contract bricklayer you just go out. It might be even a labourer are you going to have a whole safety management system? (Registered Training Organisation 1).

The model WHS Act did not alter the duty of care obligations of employers but instead extended the reach from employee to Company Director. This must be understood in small firms where business and personal assets are often intertwined. Impacts will be felt of this change when a breach occurs and becomes a court case.

They need to understand whilst the duty…in some respects the duties haven’t changed, those duties have always been there. But there’s a greater transparency to those duties now. Which means if they haven’t been fully on top of it previously they need to now be fully on top of it. Now the lawyers might come to work that out but certainly small business won’t. (Advisory Body 1).

I think the bigger issue for small business is not so much the penalties it’s the cost and the resource that’s required to actually defend a case. The lawyers charge a lot of money, a lot of money and they’re not insured for that. We do know there have been circumstances of small business gone to the wall because they go bankrupt. (Advisory Body 2).

Support for small firms can occur through prescriptive and detailed Codes of Practice that support the WHS Act as well as from Industry Associations. Participants in the study explained the need for increased support for Industry Associations to assist small firms in their uptake of the health and safety legislation.

Codes of Practice need to be focussed; they need to be short and sharp enough for a small to medium enterprise. (Advisory Body 1).

There is a network out there already what’s needed is money to fund the employer associations to assist partner with government in getting to the SMEs and that’s the level where the improvements need to be made. The big businesses often have the infrastructure to deal with a work health and safety issue or to adapt to any changes to the work health and safety legislation as well. (Advisory Body 2).

5. Discussion

The incomplete OHS harmonisation was seen as complex for small firms and for small, multi-jurisdictional firms. The lack of consultation with small firms prior to harmonisation was seen to cause distrust of regulatory change and the bodies driving it. The aim of harmonisation

\(^2\) CCI – Chamber of Commerce and Industry
was to reduce complexity; however, confusion reigns. Small firms are at risk of non-compliance as they generally do not have the expertise and resources, such as the services of dedicated safety professionals that can be used to help them navigate through their legislative requirements. Where small firms operate in multiple jurisdictions the risk of confusion and non-compliance is higher as these firms need to be conversant at least two sets of regulations.

The intent of the harmonisation of work health and safety legislation was to incorporate many of the commonalities of the individual state legislation into the one national Act. However, in producing a common national act some important changes have been made to the focus of the legislation. The new WHS Act has a stronger focus on communication between employers and workers in the delivery of health and safety processes and practices in the workplace than the individual state acts. These two themes appear consistently throughout the legislation and have raised concerns by governing, legislating and training professionals in regards to the responsibilities of business owners. It is when a safety breach occurs that is severe enough to be tried in court that the impact of the new regulations and responsibilities really come into play. Court rulings can be affected by the level of communication and consultation about health and safety in the workplace between employers and workers. Where this issue comes to the fore is in the case of small, multi-jurisdictional firms that work across state borders and in some jurisdictions may need to communicate, consult and document for very different regulatory requirements.

Furthermore, job titles have also been identified as problematic under the WHS Act: responsibility for breaches continues up the line from injured worker to Director with the result that some workers in companies may be reluctant to take on the title of ‘manager’ as they may fear the additional responsibilities. Finally, the WHS Act has not altered the duty of care obligations of employers as this has appeared consistently in state legislation. However, due to the ‘officer’ clause in the new legislation, the duty of care now has an extended reach from worker to Company Director. Small firms that have not engaged with the legislation in the past will need to ensure improved compliance under the WHS Act. Once again, this will have a significant impact if a breach occurs and results in a court case. This issue is further exacerbated given that the level of fines for breaches has significantly increased under the WHS Act and small firms are unlikely to have acquired sufficient insurance to cover such costs, exposing them financially. Small, multi-jurisdictional firms that are regulated under more than one set of legislation, have the added complexity of several levels of fines for breaches with very high fines occurring in states under the harmonised Act. So, in this case for a multi-jurisdictional firm if an accident is to occur it would be better in a workplace that is not regulated by the harmonised Act! However, this may confront more informed managers with considerable ethical dilemmas.

For organisations in Australian states that have mirrored the WHS Act, several changes to health and safety documentation will be required. Much has been stated about the limited funds that are required to bring systems into line with the new legislation (Access Economics, 2011); however there appears to be a general dissatisfaction among those sampled about the costs they expect to incur. This issue was pivotal in the Victorian Governments’ decision
to remain with their state legislation (Baillieu & Rich-Phillips, 2012). For small, multi-jurisdictional firms systems will be needed to address the requirements of at least two sets of legislation. Although the requirement to address systems across borders already existed prior to harmonisation, the incomplete mirroring of the WHS Act has resulted in more paperwork and compliance for firms operating across state borders. For the small, multi-jurisdictional firm these requirements are simply an added burden. Indeed the complexity and confusion of the current situation may detract from the ability and resources of small firms addressing the very relevant intentions of the Act through improved communications and consultation. It is ironic that current dilemmas of small firms in regard to workplace health and safety have been exasperated by the lack of consultation and communication in the political crafting of the new legislative environment.

There was evidence in the study that small firms were attending repeated information sessions on their compliance requirements to uptake the WHS Act. In addition, the Industry Associations interviewed raised the concern that due to small firms’ difficulty in understanding and applying the legislative requirements a greater reliance on their services would be required. Small, multi-jurisdictional firms may be more inclined to call on their services. Participants in the study explained the need for increased support for Industry Associations to assist small firms in their efforts to comply.

6. Conclusion
The harmonisation of state-based OHS regimes was designed to ‘cut red tape’ for Australian business. However, harmonisation is a goal unlikely to be reached with Victoria, Western Australia and South Australia currently retaining their legislation and Victoria likely to resist all efforts to encourage change. Firms, particularly small ones, were apparently ignored in the consultation process prior to the harmonisation of the WHS Act and this was a key reason why Victoria has retained its state legislation. A lack of consultation with small firms, despite the predominance of them in the business population threatens the legitimacy of the regulators in the eyes of the business community. Most importantly, though, the continued complex and large number of health and safety legislation acts and regulations in Australia has resulted in a lack of legislation unification. This is problematic for small firms who conduct business across multiple state jurisdictions.

7. References


“Growing a Safety Culture” in small forestry businesses

Authors
Hillary Bennett, PhD, Consultant, Resiliency Centre, P O Box 300594, Albany, Auckland. hillary@resiliencycentre.co.nz
Don Ramsay, PGDipBusAdmin (Dist), Consultant, iSafety Ltd., PO Box 8154, The Gardens, Dunedin. 9041. don.ramsay@isafety.co.nz

Abstract
In an attempt to improve safety performance the focus has shifted from looking for engineering solutions, to improving the health and safety systems, to focusing on the safety culture. The safety cultural approach arises from the recognition of the limitations of other approaches but does not replace the importance of sound engineering and safety management systems. Safety culture is a reflection of the ‘way we do things around here’. Although safety culture programmes are a popular initiative for improving safety performance in large organisations, little work has been done however in attempting to introduce safety culture programmes into small forestry businesses.

Despite experienced forestry contractors having a good knowledge of hazards and knowing how to control them, there are still a high numbers of accidents and injuries in the forestry sector. The objective of the programme was to test a developmental approach to explore and test new approaches and concepts to achieving productive, safe and healthy businesses in the New Zealand forestry sector and to build safety leadership capability and improve safety culture in forestry businesses.

Four facilitated workshops were run over a 12 month period, in two separate regions, Rotorua and Nelson. The workshops were attended by forest owners, contractors, and frontline crews. The objectives of the workshops were to 1) identify the cultural elements (e.g. risk taking) related to why experienced contractors with a good knowledge of the hazards of the sector were having so many incidents and injuries and 2) to explore actions that could be taken by the crews to address these issues.

Between workshops the participants had the opportunity to attend two presentations on how other organisations, one a large corporation in the manufacturing sector and the other a successful shearing contractor business, were building a safety culture.

An analysis of the workshop data identified 12 safety culture elements that were commonly agreed to have a significant influence on keeping contractors safe in a forestry operation. The 12 elements were: Management’s Leadership Commitment to Safety, Communication, Safety Systems and Procedures, Work Pressure, Continuous Learning, Resources, Rewards, Training and Competency, Worker Involvement, Investigating and Reporting, Relationships, and Risk Taking. These elements were turned into a ‘Growing a Safety Culture’ model using a tree as a metaphor. This framework was used to develop a safety
culture assessment tool that could be used in the field by crews to assess their own safety culture.

Keywords
Forestry, safety culture

1. Introduction
Over the past 26 years, since Chernobyl, much effort has been dedicated to defining, assessing, and improving safety culture and exploring the relationship between safety culture and sought-after health and safety outcomes. Most of this effort has been targeted at high risk large organisations, with little focus on building and sustaining safety culture in small businesses and even less focus on small forestry businesses.

Reason (1997, p. 1991) said “few things are so sought after and yet so little understood” (1997, p. 191). This is supported by others (e.g., DeJoy, 2005; Hale, 2000) who argue that the construct ‘safety culture’ has both definitional and measurement problems. Despite this conceptual confusion, there is little disagreement that safety culture is seen as key to achieving positive health and safety outcomes. A review of international research on workplace culture and health and safety commissioned by the Department of Labour’s Workplace Group in 2007 found consistently strong evidence of the benefits of a positive safety culture, including (in order of magnitude):

- a decrease in injuries and lost time;
- a decrease in accidents;
- an increase in safe behaviours of workers;
- an increase in psychological well-being;
- an increase in perceived management commitment;
- an increase in job satisfaction; and
- a decrease in physical symptoms.

The safety cultural approach emerged from recognition of the limitations of other approaches, but does not replace the importance of sound engineering and safety management systems. It is now commonly proposed that a cultural approach is required to achieve further improvements in health and safety outcomes, as the traditional ‘engineering’ and ‘health and safety systems’ approaches are yielding progressively diminishing returns. The cultural approach is sometimes referred to as the “third wave” of safety performance improvements (see the following diagram, Figure 1).

In 2009 the Department of Labour (DoL), the Accident Compensation Corporation (ACC), and a representative organisation of the NZ Forest Owners Association (NZFOA) initiated a safety culture programme for small forestry businesses.
2. Objectives
Despite experienced forestry contractors having a good knowledge of hazards and knowing how to control them, there are still a high numbers of accidents and injuries in the forestry sector. According to the Independent Taskforce on Workplace Health and Safety (2012), for the period 2003 to 2008, Forestry had the second highest annual rate of ACC work-related claims in New Zealand, just marginally behind commercial fishing. Through combining available research and good practice with the insights and experiences of people working in New Zealand forestry business experiences the project aimed to:

- test a developmental approach to explore and test new approaches and concepts to achieving productive, safe and healthy businesses in the forestry sector and;
- build safety leadership capability and improve safety culture in forestry businesses.

The principles that guided the project included taking a developmental perspective, using a safety culture organising framework, having an action orientation, the inclusion of frontline employees, the use of credible developers and facilitators, support in the field from credible ‘bushmen’, independence of sponsors and endorsement from forest owners.

3. Method
Four facilitated one-day workshops titled ‘Building a Productive, Safe and Healthy Forestry Business’ were run over a 12 month period, in two separate regions Rotorua and Nelson. The workshops were attended by 20 forest owners, contractors, and frontline crews. Participation in the workshops was voluntary. There were two representatives, a manager / owner / contractor and an operational person from each participating organisation. The workshops were developed and facilitated by an organisational psychologist who had extensive experience in assessing and developing safety cultures across other sectors in.
New Zealand and Australia, including transport, manufacturing, oil and gas, quarrying and mining and waste management.
3.1 Workshop 1: Assess: How are we doing? How could we do better?
The objectives of Workshop One were to:

1. Explore and discuss the elements of a ‘productive, safe and healthy workplaces’. Topics covered included:
   - Safety, health and productivity
   - Approaches to improving safety practices
   - Defining safety culture
   - Benefits of a safety culture
   - Dimensions of safety culture
   - Building a safety culture

2. Identify current helpful and unhelpful work and safety practices in the forestry business, related to key safety culture dimensions.

3. To identify ways in which the work and safety practices, associated with the safety culture dimensions, identified as unhelpful, could be improved.

After the workshop, the insights gathered were analysed by the facilitator. A refined set of 12 safety culture elements were identified by the participants as key to building a safety culture in forestry businesses. These were:

1. **Management’s leadership commitment for safety**: Managers / contractors listen and regularly talk to the crews about safety and follow through on commitments they make to deal with safety issues.
2. **Communication**: Crews get actively involved in safety discussions.
3. **Safety systems and procedures**: Safety instructions and procedures are understood and used by all crew members on site.
4. **Worker involvement**: Crews are invited and encouraged to contribute to safety discussions.
5. **Training and competency**: Crews have the job and safety skills to do their job safely.
6. **Investigating and reporting**: All hazards, near misses and accidents are reported by all crew members on a site.
7. **Rewards**: Safe practices and behaviour are recognised and rewarded.
8. **Relationships**: There is trust and openness between management and crew and amongst the crew members.
9. **Resources**: There is enough time, people and gear to do the job safely.
10. **Risk taking**: Managers and crew step in, stop work, and speak up if they see someone working unsafely.
11. **Continuous learning**: Near misses, incidents and accidents are all ways used as a chance to learn and improve safety.
12. **Work pressure**: Safety always comes before getting the job finished.

The 12 elements become the organising framework for workshops 2 and 3.

3.2 Workshop 2: Plan: Taking Action
The objectives of Workshop 2 were to:

1. Identify which of the unhelpful practices related to each of the 12 safety culture dimensions identified in Workshop 1 that participants wanted to change.
2. Learn how to develop good action plans.
3. Start developing action plans to achieve a culture of safety in business and in the forestry sector. Three months later, at the second workshop, the participants got summarised feedback from the first workshop run in each region. Working with the other person from their business, participants identified a safety culture project that they could undertake in their own business. They developed an Action Plan to address the unhelpful practices of one of the 12 Safety Culture dimensions identified in Workshop 1. They were told that they would present their projects at the next workshop to be held in 3 months’ time.

The facilitator visited each group during the project to provide support on any problems encountered.

3.3 Workshop 3: Project Presentations
The objectives of Workshop 3 were to:
1. Present and discuss the safety culture projects
2. Review the draft safety culture resources.

The third workshop was a feedback session where participants outlined to the group the details of the safety culture project they undertook, the strategy they used, and the key challenges and learnings. Each group had 30 minutes to present, discuss and get feedback on their project. This sharing of actions and learnings helped the participants understand some of the issues and challenges in implementing a safety culture initiative.

Prior to the third workshop, a set of draft resources had been developed. The participants were asked to review and provide feedback on the resources. The resources included:
‘The Safety Culture Tree ‘an awareness raising poster ‘Growing a Safety Culture’, which become known as the ‘Safety Culture Tree’. These 12 elements were later used to develop a safety culture assessment instrument. See Figure 2.

A Safety Briefing for each safety culture element. Each briefing included a brief description of the element, why it is important, how to make a difference. These briefings can be found at http://www.osh.dol.govt.nz/resources/tools/scs/scs-4.shtml

3.4 Workshop 4: Safety Coaching
The objectives of the fourth workshop were to:
1. Review the collective learnings from the workshops and projects
2. Focus on exploring and learning a key non-technical skill that contributes to building a workplace culture of safety i.e. safety coaching.

The safety coaching skills included communication skills, feedback skills, safe performance management skill, how to complete an ABC analysis of unsafe behaviours, setting health and safety targets and stress management skills.
Figure 2: Growing a Safety Culture

GROWING A SAFETY CULTURE

WORK PRESSURE
Does safety always come ahead of getting the job finished on your site?

RISK TAKING
Do managers and crew step in, stop work, or speak up if they see someone working unsafely?

CONTINUOUS LEARNING
Are near misses, incidents and accidents always used as a chance to learn and improve safety on your site?

RELATIONSHIPS
Is there trust and openness between management, crew and amongst the crew itself on your site?

RESOURCES
Have you allowed enough time, people and gear to do the job safely?

INVESTIGATING & REPORTING
Are all hazards, near misses and accidents reported by all crew members on your site?

REWARDS
Are safe work practices and behaviours recognised and rewarded on your site?

WORKER INVOLVEMENT
Are workers invited and encouraged to contribute to safety decisions?

TRAINING AND COMPETENCY
Do all crews on your site have the job and safety skills to do their job safely?

COMMUNICATION
Do workers get actively involved in safety discussions?

MANAGEMENT’S LEADERSHIP COMMITMENT FOR SAFETY
Do all managers/contractors listen and regularly talk to the crews about safety and follow through on the commitments they make to deal with safety issues?

SAFETY SYSTEMS & PROCEDURES
Are you confident that the safety instructions and procedures are understood and used by all crew members on your site?
4. Results
The developmental approach to developing safety culture amongst small forestry businesses in New Zealand resulted in the following:

- the ‘Growing a Safety Culture’ organising framework that is owned and used by the sector,
- completion of individual projects / SafeGuard awards,
- development of forestry ‘owned’ and used assessment tools based on the 12 safety culture elements,
- started new conversations within individual crews and across crews and
- used as an example of good practice in other sectors.

Some of the challenges that had to be overcome included overcoming initial scepticism and getting ‘buy in’, getting contractors to commit the time, keeping momentum, literacy levels, usability in the field and moving ownership of funding and supporting projects to forest owners.

In conclusion, the ‘Workplace Culture and Leadership in Forestry’ built safety leadership capability and has made inroads to improving safety culture in New Zealand forestry businesses.

5. References


Return to work and prevention of occupational risks: examples from Europe with focus on small businesses

Author
Hans-Juergen Bischoff, PhD, ISSA-Section Machine and System Safety, Germany
bischoff@ivss.org

Abstract
Occupational risks are insured by social security legislation in European countries. The kind of insured events and extent/range of benefits may be quite different however, also the number of responsible insurers, depending on the kind of event.

Prevention, rehabilitation, compensation in one hand: This structure will normally create the most interest by the responsible body to invest particularly in prevention. This is the best chance to focus on selected (1) target groups, normally with high risks: branches/sectors with a high accident rate or high health risks (for example construction, agriculture, nurses) or (2) groups of workers (young and inexperienced).

Losses resulting from occupational accidents and occupational diseases amount to about 4% of gross national product. In a world with a growing need for qualified workers also the potential loss, temporarily or permanently, of such people needs to be tackled, for social and economic reasons.

Some approaches to improve return to work-processes and successful prevention of occupational risks shall be presented. New ISSA-guidelines “return to work” and “workplace health promotion” are based on the experiences of ISSA-members. The German approach how to control the rehabilitation process shall be mentioned.

The ISSA-Special Commission on Prevention with its 13 international Sections has decided to plan and put to work a working program specifically for small enterprises. This was mainly due to worldwide similar facts: the high number of SE (about 90% of all enterprises), their limited resources and the difficulties to reach this high number of small enterprises.

A first international project was started regarding young and inexperienced workers because they have accident rates at least 2x higher than average. As it became quite clear how difficult it is to reach the groups involved: young workers/teachers of vocational training schools/OHS-consultants it was decided to create a website www.safety-work.org and distribute information for the target groups involved in different languages. Good examples to be presented in this website range from poster and multimedia products to programs for vocational training on OHS. The website also includes a self-assessment for small businesses, based on the keys to success (presented at the USE2009 conference).
In the past two years small business became has become a more important target group for several institutions. Some examples and specific approaches will be given:

- Partnerships of insurers, branch associations, vocational training schools: synergy (France), European project for hairdressers (Germany).
- Help small enterprises to do the necessary risk assessment, according to EU-legislation (France).
- Assistance to managers of SMEs: example from the hospitality sector. Modules of standard topics to consider in running a business, also integrate those modules into an online-seminar, due to the lack of time of managers to go to seminars at specific times (Germany, Italy). Transferable to other branches.
- Prevention in bakeries, mostly micro enterprises: return on investment for prevention measures. Results of applied programs in over 1.000 bakeries (Germany).
- Financial incentives for prevention measures which go above legal requirements. Examples from France, Italy, Russia.
- A different but promising approach is to make small businesses conscious of the costs of accidents, insured and non-insured. Cost-calculator models from Canada, France and Switzerland.
Hospitality and tourism

Facilitator
Hans-Juergen Bischoff, PhD, ISSA-Section Machine and System Safety, Germany  
bischoff@ivss.org

Programme (90 minutes)

1. Introduction - aims of international project; ‘transferability’ of German guideline
Hans-Juergen Bischoff

2. Cost calculator - application in the hospitality sector and tourism
Terri Holizki

The cost calculator model for SMEs was first developed in British Columbia, Canada. It enables the individual owner of a small business, via password, to calculate his/her own non-insured costs following an accident at work. Already a light accident with only a few days’ absence from work can “produce” costs quickly equal to a month net income, for example.

Thus the cost calculator over several years has developed into a tool creating a lot more interest of SME owners to invest into prevention of occupational risks.

It is available for different sectors and can be used free of charge by other interested institutions worldwide). As an example results of its application in the hospitality sector and tourism shall be discussed

3. Experiences and new methods of Training in Safety and Health in the Tourism Sector: Transformation of a Guideline into an online seminar
Andrea Weimar

The Berufsgenossenschaft Nahrungsmittel und Gastgewerbe (BGN) as a national statutory accident insurance has the task of prevention, rehabilitation and compensation of work-related accidents and diseases in the HORECA sector, the meat processing industry and the foodstuff industry. According to German law, the accident insurance institutions are called upon to take any measure appropriate to prevent occupational accidents, occupational diseases and work-related health hazards, and to cooperate with the health insurance companies to achieve this goal.

The BGN has over 300,000 member enterprises with more than 3 million insured persons. Over 90% of them are so called SMEs, small and medium enterprises. For instance the catering and hotel sector. One challenge for the BGN is to qualify the owners of these enterprises to act in a preventive way, for owner and for employees, and to avoid
occupational and health risks. 93% of these enterprises have less than ten, 97% less than 20 employees.

BGN usually offers trainings in seminar hotels, about 670 seminars for 11,000 participants a year. In the hospitality sector we realized that we did hardly reach specific target groups like hotel managers, because they were not able to be away from their company for more than one day.

So in 2008 BGN built an online academy to provide the opportunity of qualification to all insured members.

Of ten different seminars available for specific target groups one is the online seminar “Occupational Safety and Health in Hotels.” The content of the seminar was developed from the “Guideline for hotels” from BGN.

An evaluation shows the positive experiences and conclusions from this way of learning. This approach was therefore also being used in a cooperation project from BGN with an Italian Partner, EBT, Venezia.


Hans-Juergen Bischoff

The collaboration between BGN (Berufsgenossenschaft Nahrungsmittel und Gastgewerbe) and the Bilateral Agency for Tourism in the Venetian Area (Ente Bilaterale Turismo dell’ area Venezia) exists since 2010. It is characterized by a close cooperation of the two institutions, because their target groups are dealing with the same risks in occupational safety and health in the tourism branch. Both institutions have edited two manuals for the catering branch, one of them will be used now all over Italy. As by Italian law all employees are required to participate in an OHS training. They built together an online seminar for the HORECA sector. We are now planning a partnership between vocational schools in Venice (Italy), Heidelberg (Germany) and Moscow (Russia).

Some points of international interest for the HORECA sector will be presented.

5. Which websites fit in with SMEs?: Two examples (backpain, stress) of microsites for employers, employees and experts for occupational health and safety in the catering branch and the foodstuff industry and an overview of the international SME-website

www.safety-work.org

Andrea Weimar

Qualifying tools have to fit in with the structure and tasks of a branch and the employers of small, family enterprises. It is very important that these tools can be reached easily, without the need to invest a lot of time and money. Tools will be used more if there is an obvious
benefit for the owner of an SME, for instance in rising profits, competitiveness or increasing skills which are needed in the job.

Furthermore the occupational experts need material which they can use immediately, for instance if they are instructing people, or when organizing a training or a health campaign. Due to the high number of SMEs it is nearly impossible to offer “live training” to all members. In using a website we have the chance to reach many more, both the consumers and users as well as experts to join a qualifying program.

Two examples will be shown concerning the prevention of back pain and stress.

As stress is a major health risk and the participation in “outside seminars” is particularly difficult in the hospitality sector and tourism we shall show some examples from our international website www.safety-work.org, selected for this sector.

The website’s use practically has no limits: open to all branches/for different target groups (entrepreneurs, employees, trainers in vocational schools, consultants, vulnerable groups)/ available in several languages (currently five)/ a large variety of examples (from complex training program to simple poster)/ internationally user friendly (structure based on typo3 technology).

The website is active since September 2011. First evaluations have been done how well target groups can be reached.
The role of government and industry partners to support the SME sector in developing healthy workplaces

Author
David C. Caple, Director of David Caple & Associates Pty Ltd, Melbourne, Australia
david@caple.com.au

Abstract
With over 90% of registered workplaces in Australia being SME the challenge for government to have a direct relationship and input with each workplace is minimal. The challenge is to identify and utilise third parties that can influence the SME operators to meet the government’s expectations of healthy workplaces.

These third parties may be industry associations and trade groups who interface directly with the SME operators. They meet the primary criteria with the SME in that they are trusted, have good industry specific knowledge and can provide practical advice.

A greater understanding of the supply chain is required for governments to promote support for SME through their industry links. Many SMEs work as subcontractors to larger organisations including government. By supporting their approach to healthy workplaces in an industry “end to end” process, the SME can benefit both commercially and obtain contemporary knowledge and skills through their interaction within the respective supply chain.

Governments can also fund and facilitate innovative projects for SME such as industry based websites and subsidised OHS consulting services. These can be targeted to the specific needs and presented in language and media that is understood and accessible to the SME operators.
Risk factors associated with upper limbs and low back disorders among informal workers of hand-operated rebar benders

Authors
Sunisa Chaiklieng, PhD, Assistant Professor, Faculty of Public Health, Khon Kaen University; Back, Neck and Other Joint Pain Research Group, Khon Kaen University, Khon Kaen 40002, Thailand. csunis@kku.ac.th
Wiwat Sungkhabut, MPH, Section of Public Health Emergency Response and Disease Control, The Office of Disease Prevention and Control 5th Nakhon Ratchasima Province 30000, Ministry of Public Health, Thailand. wiwats@kkumail.com

Abstract
The upper limb disorders (ULDs) and low back pain (LBP) are obvious problems related to occupational hazards. Hand-operated rebar bender certainly is home working within the informal small economy, working with the physical exertion and repetitive movement of upper extremities that might be the cause of ULDs and LBP. This cross-sectional analytic study aimed to investigate the prevalence and risk factors for ULDs and LBP among hand-operated rebar benders in Nakhonratchasima Province, Thailand. Subjects (n=241) were interviewed with the structured questionnaires and the physical fitness test was performed. Descriptive statistics and inferential statistics of multiple logistic regression analysis were used. The odds ratio (OR) and 95% confident interval of OR (95%CI) indicated the associated risk factors with ULDs and LBP at p<0.05. Data showed the highest prevalence of ULDs and LBP during a 12-month period among various anatomical areas which were at the position of wrists/hands (78.8%), low back (68.9%) and shoulders (46.9%), respectively. The significantly associated risk factors with wrists/hands pain were poor grip strength (OR_{adj}=2.69, 95%CI=1.37-5.27), smoking (OR_{adj}=4.44, 95%CI=1.18-16.69), work experience ≥6 years (OR_{adj}=2.34, 95%CI=1.26-4.35). The significant risk factors for low back pain were age ≥50 years (OR_{adj}=1.88, 95%CI=1.01-3.94), work experience ≥6 years (OR_{adj}=1.89, 95%CI=1.01-3.55), work hour ≥8 hours/day (OR_{adj}=3.44, 95%CI=1.08-10.97). Risk factors for shoulders pain were number of workday >5 days/week (OR_{adj}=2.25, 95%CI=1.03-4.95), had psychosocial work factor as subjective workload index (SWI) ≥2 (OR_{adj}=2.23, 95%CI=1.13-6.87), work experience ≥6 years (OR_{adj}=3.00, 95%CI=1.45-5.95). The high prevalence of wrists/hands disorder and low back pain were an important health impact of hand-operated rebar benders. The findings of risk factors for ULDs and LBP are useful for the surveillance program of musculoskeletal diseases among informal sector workers. The employers should be aware of health and safety at work of home workers in compliance with the Home Workers Protection Act.

Keywords
Upper limbs disorders, Low back pain, Hand-operated rebar bender, Risk factor, Prevalence
1. Introduction

Thailand is classified as a developing country. The National Statistical Office, Thailand (2011) reported that the majority of Thai workforces are informal sector workers. In 2011, there are 24.6 million informal workers from total employed workers of 39.3 million. The upper limb disorders (ULDs) including of hands/wrists, arms and shoulders disorders (Burton, 2008, Shuval & Donchin, 2005) and low back pain (LBP) are obvious problems related to occupational hazards (Fredriksson et al., 2002, Lee et al., 2001). Hand-operated rebar bender certainly is a traditional work in home working of informal sector workers of small economy. The work practices with physical exertion and repetitive movement of upper extremities and manual handling, which might be the cause of ULDs and LBP. Moreover, the incidence of the musculoskeletal disorders and connective tissue problems are arisen in global health (Bernard, 1997, Roquelaure et al., 2006). Loss of working time by illness increased costs both direct and indirect to the small business enterprise. This study, therefore, aimed to investigate the prevalence and associated risk factors with ULDs and LBP among hand-operated rebar benders in Thailand.

2. Materials and methods

2.1. Subjects

This study was a cross-sectional analytic research and was approved by the Khon Kaen University ethics committee for human research No.HE542265 to investigate of ULDs and LBP among hand-operated rebar bender of home workers, excluding foreign workers. Area study was in Non-sung district of Nakhon Ratchasima province, Thailand. The sample size was calculated to estimate the proportion of the populations which is small and unknown number of peoples. By a systematic random sampling method, there were 241 subjects who met the study criteria i.e. 1) work experience of at least one year 2) age of at least 18 years 3) no underlying disease or disorders, or history of severe injuries related to the musculoskeletal system diagnosed by doctor 4) no pregnant and 5) volunteer.

2.2. Research tools

Data were collected by interviews with the Standardized Nordic questionnaire (SNQ) for analysis of musculoskeletal symptoms (Kuorinka et al., 1987) and work ergonomic factors questionnaires (Chaiklieng et al., 2010). A physical fitness test was performed.

2.3. Data processing and analysis

Descriptive statistics and inferential statistics were used for analysis. Risk factors were identified significantly by the multiple logistic regression analysis at p<0.05. The odds ratio (OR) and 95% confident interval of OR (95%CI), adjust odds ratio (OR_adj) indicated the associated factors with ULDs and LBP. All analyses were carried out with the statistical package STATA version 10.0, the licensing program of Khon Kaen University.

3. Results

3.1. Demographic characteristics and work conditions
Most informal sector workers were female (78.1%), aged 25-76 years (median=49 years), married (84.2%), educated at primary school level (79.7%). The workers had chronic disease for 28.2% (n=68). Work experiences were 1 up to 15 years (median= 5 years), major group was 6-10 years (37.8%, n= 91). Most working hour was ≥ 8 hours/day (n=118, 48.1%). The physical fitness test indicated that the grip strength of workers was at good level for 43.1% (n=105), and back strength was mostly at fair level for 52.7% (n=127).

3.2. Prevalence of the upper limb disorders and low back pain
Data showed that the top three prevalence of musculoskeletal pain among various anatomical areas during 12-month period was found as the ULDs and LBP as follows: wrists/hands 78.8% (95% CI: 73.13–83.82), lower back 68.9% (95% CI: 62.62–74.67) and shoulders 46.9% (95% CI: 40.45–53.40). The prevalence of the last 7-day period was found in the same areas: wrists/hands 45.6% (95% CI: 39.24–52.16), lower back 41.5% (95% CI: 35.20–47.99) and shoulders 27.4% (95% CI: 21.86–33.48).

3.3. Risk factors associated with disorders of hands/wrists, low back and shoulders
The univariate analysis indicated that the significant factors (p-value< 0.05) for the wrists/hands disorders were grip strength and work experience. The psychosocial work factor and work experience associated with the shoulders disorder. For the associated risk factor with low back pain, factors of age and work experience were significantly indentified. Table 1 showed the multivariate analysis of potential risk factors for ULDs and LBP among informal sector workers. To minimize the influence of confounders reported by previous studies, gender, age and work experience were always entered into the multiple logistic regression analysis. Other considering factors which had p-value <0.20 from univariate analyses were also entered into the model (body mass index (BMI), physical fitness parameters, chronic diseases, smoking, working hour, level of workstation and psychosocial work factor (Subjective Workload Index: SWI). Risk factors of hands/wrists, low back and shoulder disorders found in this study were explained as follows:

3.3.1. Wrists/hands pain
The informal workers of hand-operated rebar benders who had poor grip strength had 2.69 times higher risk compared to those of good grip strength (95% CI: 1.37–5.27; p = 0.004). Workers with smoking had a higher risk of pain occurrence at 4.44 times compared to those of non smoking (95% CI: 1.18–16.69; p = 0.028) and workers with work experience ≥ 6 years had risk occurrence at 2.34 times higher than those with less experiences (95% CI: 1.26–4.35; p = 0.007).

3.3.2. Shoulder pain
The workers who had worked >5 days per week had 2.25 times higher risk than those of working less than 6 days per week (95% CI: 1.03–4.95; p = 0.043). As well, workers who had psychosocial work factor (Subjective Workload Index (SWI) ≥2) meaning of discomfort work had risk occurrence at 2.23 times (95% CI: 1.13–6.87; p = 0.026). Work experience ≥ 6 years increased the higher risk to shoulders pain compared to less experience (OR adj = 3.00; 95% CI: 1.45–5.95; p = 0.003).
3.3.3. Low back pain

The workers of age ≥ 50 years had risk occurrence to LBP at 1.88 times higher than those of younger (95% CI: 1.01–3.94; p = 0.043). Work experience ≥ 6 years increased the risk to LBP at 1.89 times compared to those with less work experience (95% CI: 1.01–3.55; p = 0.045). The workers who worked ≥ 8 hours a day had 3.44 times higher risk to LBP than those of less working hour (95% CI: 1.08–10.97; p = 0.037).

Table 1. Risk factors significantly associated with disorders of wrists/hands, shoulders and low back (p-value <0.05).

<table>
<thead>
<tr>
<th>Risk factors of body parts</th>
<th>ULDs or LBP</th>
<th>ORadj (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wrist/hands</td>
<td></td>
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<tr>
<td>1.1 Smoking</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Non smoking</td>
<td>153 (70.5)</td>
<td>64 (29.5)</td>
<td>1</td>
</tr>
<tr>
<td>- Smoking</td>
<td>14 (58.3)</td>
<td>10 (41.7)</td>
<td>4.44 (1.18-16.69)</td>
</tr>
<tr>
<td>1.2 Grip strength</td>
<td></td>
<td></td>
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<tr>
<td>- Good strength</td>
<td>84 (61.7)</td>
<td>52 (38.4)</td>
<td>2.69 (1.37-5.27)</td>
</tr>
<tr>
<td>- Poor strength</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1.3 Work experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 1-5 years</td>
<td>66 (61.1)</td>
<td>42 (38.9)</td>
<td>2.34 (1.26-4.35)</td>
</tr>
<tr>
<td>- ≥ 6 years</td>
<td></td>
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<td></td>
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<tr>
<td>2. Shoulders</td>
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<tr>
<td>2.1 Work day per week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- ≤ 5 days/week</td>
<td>62 (84.9)</td>
<td>11 (15.1)</td>
<td>1</td>
</tr>
<tr>
<td>- &gt; 5 days/week</td>
<td>127 (75.6)</td>
<td>41 (24.4)</td>
<td>2.25 (1.03-4.95)</td>
</tr>
<tr>
<td>2.2 Psychosocial work factor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Comfort work (SWI 1&lt;2)</td>
<td>56 (87.5)</td>
<td>8 (12.5)</td>
<td>1</td>
</tr>
<tr>
<td>- Discomfort work (SWI ≥2)</td>
<td>133 (75.1)</td>
<td>44 (24.9)</td>
<td>2.23 (1.13-6.87)</td>
</tr>
<tr>
<td>2.3 Work experience</td>
<td></td>
<td></td>
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<tr>
<td>- 1-5 years</td>
<td>113 (84.9)</td>
<td>20 (15.1)</td>
<td>1</td>
</tr>
<tr>
<td>- ≥ 6 years</td>
<td>76 (70.4)</td>
<td>32 (29.6)</td>
<td>3.00 (1.45-5.95)</td>
</tr>
<tr>
<td>3. Low back</td>
<td></td>
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<tr>
<td>3.1 Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- &lt; 50 years</td>
<td>102 (79.7)</td>
<td>26 (20.3)</td>
<td>1</td>
</tr>
<tr>
<td>- ≥ 50 years</td>
<td>77 (68.1)</td>
<td>36 (31.9)</td>
<td>1.88 (1.01-3.94)</td>
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<tr>
<td>3.2 Work hours per day</td>
<td></td>
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<tr>
<td>- &lt; 8 hours/day</td>
<td>167 (75.6)</td>
<td>54 (24.4)</td>
<td>1</td>
</tr>
<tr>
<td>- ≥ 8 hours/day</td>
<td>12 (60.0)</td>
<td>8 (40.0)</td>
<td>3.44 (1.08-10.97)</td>
</tr>
<tr>
<td>3.3 Work experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 1-5 years</td>
<td>107 (80.5)</td>
<td>26 (19.5)</td>
<td>1</td>
</tr>
<tr>
<td>- ≥ 6 years</td>
<td>72 (66.7)</td>
<td>36 (33.3)</td>
<td>1.89 (1.01-3.55)</td>
</tr>
</tbody>
</table>

Factors of age, gender and work experience were always entered into the model of multiple logistic regression analysis as well as other considering factors of p-value<0.20 from Univariate analysis.
4. Discussion

This study found the high prevalence of ULDs and LBP during the last 12-month period (wrists/hands 78.8%, low back 68.9%, shoulders 46.9%), and the combination pain at wrists and low back areas. Findings indicate the health impact among informal sector workers from hand-operated rebar bender who exposed to physical exertion force, repetitive work, unbalanced posture while prolonged sitting which were not fully supported by epidemiological data (Gagnon et al., 1995). Consistent with studies in other countries, ULDs and LBP were major problem found in difference workers from various occupations, either in the industrial enterprises or in informal economy. The reports of that repetitive movements, static-postural load and body side-bending caused repetitive strain injuries affecting acute-chronic illness (Chaiklieng & Suggaravetsiri, 2012, Li et al., 2003, van Vuuren et al., 2007). Moreover, severe ULDs and LBP were exhibited by the dose-response correlation with working load and posture (Holmström et al., 1992).

The exposure to work environmental hazards in home working place with inappropriate workstations and the lower standard conditions of light intensities were indentified at some workplaces. Shoulders flexion, wrists extension and deviation, twisting and bending of back and the binding force of handling the work tools among these workers resulted in disorders (Chaiklieng & Homsombat, 2011). Consistent with epidemiological studies, the problem of unsafe conditions of ergonomic factors increased the prevalence of ULDs and LBP among workers used upper extremity, predominantly for working (Punnett & Wegman, 2004, Roquelaure et al., 2002).

Physical factors and psychosocial factors associated with the occurrence of ULDs and LBP in this study was consistent with the study of Marras (2000). That mentioned risk factors from work environment injured the upper limb and lower back were the frequency or repetitive movements and prolonged posture at work. However, smoking was reported that this factor associated with persists of lower back pain (Lei et al., 2005) as found in this study. This study confirms that good physical fitness is the protector for the development of repetitive strain injuries (Chaiklieng & Suggaravetsiri, 2012). The psychosocial work factor associated with musculoskeletal disorders among various occupations as previous reports (Hagen et al., 1998, Linton, 2000). Therefore, home workers of informal economy in Thailand should be considered for surveillance of ULDs and LBP. The risk conditions what shall be improved among hand-operated rebar bender can be applied to other similarly informal workers in the small and medium-enterprise.

5. Conclusion

The musculoskeletal pain at wrist/hand and low back among hand-operated rebar benders was an important health impact which should not be neglected. The particularly female and elderly informal workers, a high proportion in rural areas of Thailand had potential health risks to ULDs and LBP both acute and chronic effects. The findings of personal factors, physical factors and psychosocial factors associated with ULDs and LBP are very useful for the surveillance of musculoskeletal diseases among informal sector workers. The employers
should be aware of safety at work of home workers in compliance with Home Workers Protection Act of Thailand.

6. References


Risk factors for low back pain among university office workers: a prospective cohort study

Authors
Sunisa Chaiklieng, PhD, Assistant Professor, Faculty of Public Health, Khon Kaen University, Back, Neck and Other Joint Pain Research Group, Khon Kaen University, Khon Kaen 40002, Thailand. csunis@kku.ac.th
Pornnapa Suggaravetsiri, PhD, Assistant Professor, Faculty of Public Health, Khon Kaen University, Khon Kaen 40002, Thailand. porsug@kku.ac.th

Abstract
This prospective cohort study was designed to investigate the incidence of low back pain (LBP) and the associated factors with LBP among university office workers. The participants were 159 office workers in Khon Kaen University, Thailand. Data were collected by an interview, measurements of physical fitness and lighting intensity at workstations. The LBP incidence was estimated from 12 months follow-up. The associations between LBP and studied factors were identified by a chi-squared test and the multiple logistic regression analysis. Risk factors were identified by relative risk (RR) and 95% confident interval of RR (95%CI) at p-value<0.05. The results showed that the incidences of LBP at periods of 3, 6 and 12 months follow-up were 52.8%, 64.8%, and 83.0%, respectively. Almost workstations (91.8%) had the lighting intensity lower than the standard requirement (600 lux). The physical fitness test identified that the strength of back, leg and hand grip for LBP cases were significantly lower than those of non-cases (p-value <0.05). The multiple logistic regression analysis indicated that the significant risk factors for LBP were BMI ≤25.0 kg/m², (RR_adj = 3.49, 95%CI: 1.27-9.55), back pain prevention behaviour at low level (RR_adj = 3.44, 95%CI: 1.08-10.98) and inappropriate workstation width (RR_adj = 5.72, 95%CI: 1.44-22.70). The results provide an indication of the nature of the hazards in the academic workplace, a small business enterprise, affecting low back pain of university office workers. The findings suggest that workers and the university need to be aware of what improvements may be necessary in the workplace that adheres to safety office standards.

Keywords
Cohort, Ergonomics, Physical fitness, Incidence, Low back pain

1. Introduction
Persisting musculoskeletal disorders (MSDs) is common in society. 70-85% of all people have low-back pain at some time in life. The annual prevalence of back pain in general ranges from 15% to 45% (Andersson, 1999). It has been reported that the prevalence of neck or shoulder pain in office workers is much higher than in the general population (Chiu et al., 2002, Kamwendo, 1991). Previous studies showed that one year prevalence of neck pain in office workers at Hong Kong University was found to be 59% (Chiu et al. 2002). For back pain prevalence in academic personnel, it was 21.8% among school personnel in Nagoya,
Japan (Tsuboi, 2001). Some studies had investigated the relationship between MSDs and risk factors at working conditions. Postulated factors in the occupation group include: individual factors (Andersson, 1999, Chiu et al., 2002), work environmental factors (workstations, lifting, repetitive work), physical factors (prolonged sitting, awkward posture) (Fredriksson et al., 2002, Spyropoulos et al., 2009), and stress (Linton, 2000). The university in Thailand is not only the academic institute but also a kind of small business enterprise. At present, the numbers of private universities or universities under Thai government regulation have been arisen. These universities stand on their own business management. Personnel or resource persons are therefore the employees of the university as the small business enterprise. While prevalence of low back pain was reported in the university office workers, it is still unclear on risk factors which related to the low back pain (LBP) (Chaiklieng et al., 2009). This prospective cohort study was therefore designed to investigate the incidence of LBP and the associated factors with LBP among university office workers.

2. Material and methods
This study was designed as a prospective cohort study among 159 office workers in Khon Kaen University, Thailand. The participants were invited and interviewed before entering to this study. They were considered eligible for inclusion in this study if they were a full-time University employee and had at least one-year work experience at the current position. Participants were excluded if they had chronic low back pain or injuries or any disorders related to thoracic or lumbar spine such as rheumatoid arthritis, degenerative disc disease, etc., pregnant and unwillingness to participate. In this study, low back pain was defined as a pain experienced in the spine area specifically from the lumbar vertebrae to the buttocks or gluteal folds, or between the lumbar-sacral vertebrae prominence applied from Maniadakis and Gray (2000).

Data were collected by face-to-face interview with the structured questionnaires. The physical fitness test was performed to measure grip strength, leg and back strength, and the back muscle flexibility. The lighting intensity at workstations were measured by lux meter and compared to the standard of the office workplace with computer use (Ministry of labour, 2006). The 3, 6, and 12-month follow-up with short interview in each 14 days (for evaluating of the new case of LBP) applied from Hush et al. (2006).

Data were analysis by STATA version 10 (Khon Kean University’s Copy Rights). Descriptive statistics were used to describe the characteristics i.e. the percentage, mean and standard deviation (SD). The LBP incidence was estimated for period of 3, 6 and 12 months follow-up. The associations between LBP and studied factors were identified by a chi-squared test and the multiple logistic regression analysis. Risk factors were identified by relative risk (RR) and 95% confident interval of RR (95%CI) and adjust relative risk (RRadj) at p-value<0.05.

3. Results

3.1 Personal factors and health status
Among 159 university office workers, most workers were female (76.7%, n=122) and 23.3% were male (n=37). The mean age was 33.8±9.9 years (min = 23, max = 59). Regarding work
experience, the mean value was 12.6±10.1 years (min = 1, max = 39). Most participants had work experience 1-5 years (37.7%), followed by 16-20 years (17.0%) and 21-25 years (14.5%). Bachelor degree was the major group of educational background (79.9%) and the minor group was master degree (20.1%).

According to the standard of nutritional status (Department of Health, 2007), 20.1% of workers were classified as obese state identified by the body mass index (BMI) >25 kg/m², 15.7% were overweight (23.0-25.0 kg/m²), and 54.7% were on normal state (18.5-23.0 kg/m²). By the stress test (Department of Mental Health, 2010), most workers had normal stress (62.3%), followed by high stress (21.4%). Most workers (79.2%) had no regularly exercise (at least 30 minutes, and 3 times a week). The behaviour of back pain prevention was predominantly at medium level (61.3%), followed by low level (21.4%) and high level (11.3%). The factor of back pain found in a member of family was reported for 40.3%.

3.2 Work environmental factors and anthropometric factors

The lighting intensities accorded to the office standard with computer use (Ministry of Labour, 2006), the surveys identified that 136 workstations (91.8%) had light intensities lower than the minimum standard requirement (600 lux) (min = 110 lux, max= 823 lux). Chairs in university office had backrest for 95%, up-down flexible for 43.4%, and turn able around for 75.5%. There were 66.7% (n= 106) and 72.3% (n= 115) for inappropriate seats height, and width, respectively. There were 66.0% (n= 105) and 63.5% (n= 101) for inappropriate table height and width, respectively. There were 63.5% for inappropriate work area width for 66.7% (n= 106)

3.3 Low back pain and risk factors associated with LBP

By every 14 days interview, the long term follow-up identified that incidence of LBP at period of 3, 6 and 12 months were 52.8%, 64.8%, and 83.0%, respectively. From the comparison between LBP cases and non LBP cases, most parameters of physical fitness were correlated with the development of LBP. The strength of back, leg and hand grip for LBP cases were significantly lower than those of non LBP cases. The poor strength of hand grip, back and leg muscle of office workers significantly correlated with the development of LBP at p-value =0.003, p =0.002, and p=0.006, respectively.

The univariate analysis showed no significant associations between LBP and factors of age, gender, and work experience. The personal factors which were significant associated with LBP were back pain prevention behaviour, back pain found in members of family and the stress level. Worker who had BMI ≤ 25 kg/m² had 2.94 times higher risk to the LBP development compared to BMI >25 kg/m² (95%CI:1.18-7.27, p-value=0.020). Also, if there was back pain in members of the family, workers had 3.55 times higher risk to the development of LBP compared to no back pain in members of the family (95%CI:1.27-9.96, p-value= 0.016). Workers who had the high stress had 3.01 times higher risk to the development of LBP compared to normal stress (95%CI: 1.01-9.43, p-value= 0.049). Workers who had back pain prevention behaviour of low level had 3.85 times higher risk to the development of LBP compared to those of good behaviour (95%CI:1.01-9.43, p-value=0.013). Interestingly, this study found the nature of ergonomics at works station
significant related to LBP. Workers with inappropriate workstation width had the higher risk to LBP development compared to the appropriate workstation width (RR= 3.09, 95%CI: 1.32-7.21, p-value= 0.009).

Even though, gender, age and work experience were not significantly associated with LBP, the factors were always entered into the model of multiple logistic regression analysis as the confounders. All considering factors with p-value less than 0.20 from univariate analysis were entered into the multiple logistic regression analysis for relative ratio adjustment. This study found that personal factors and nature of ergonomic still significant correlated with LBP. The analysis identified the significant risk factors for LBP which were BMI ≤ 25.0 kg/m
^2 (RR_{adj} = 3.49, 95%CI: 1.27-9.55, p-value = 0.015), back pain prevention behaviour at low level (RR_{adj} = 3.44, 95%CI: 1.08-10.98, p-value=0.037) and inappropriate workstation width (RR_{adj} = 5.72, 95%CI: 1.44-22.70, p-value= 0.013).

4. Discussion
By the prospective cohort study design of one year follow-up, the recalled bias was minimized in this study. The finding of high incidence of LBP among University office workers in 12 months period (83.0%) supports the previous reports of MSDs cases among university office workers (Chiu et al. 2002, Fredriksson et al. 2002, Kamwendo et al., 1991, McBeth & Jones, 2007, Tsuboi et al., 2001). As the major causes of LBP among university office workers which were prolonged sitting in the same posture and awkward posture (Chaiklieng et al., 2009), those reasons might explain similarly why office workers had higher risk to the development of LBP than the general people (Andersson, 1999, Chiu et al. 2002, Kamwendo et al., 1991, Tsuboi et al., 2001).

The nature of office working was sitting in front of computer or head down performing document or working with the number at least 6 hours a day. The inappropriate workstation was found as a risk factor in this study could play a potential role to provoke low back pain as reported by other studies (Spyropoulos et al., 2009, Hush, 2006). Moreover, it can be notice that office workers with BMI ≤ 25 kg/m
^2 had higher risk to the development LBP compared to BMI > 25 kg/m
^2. One hypothesis is that the non-optimized ergonomic workstation for individual worker may contribute to the development of LBP among university office workers. Concerning work environment, this study identified that almost workstations (91.8%) had the lighting intensity lower than the minimum standard requirement (600 lux). Insufficient illumination normally play an important role on unsafe conditions, in computer office workplace, it can be subsequently attributed to eyes strain during gazing to the job and finally induced MSDs in long term (Chaiklieng & Suggravetsiri, 2012).

Low back pain is the chronic disease that the onset of symptom can be recovery provoked when exposed to the same risk factor or performed the risk behaviour after completed treatment (Andersson, 1999, Shural & Donchin, 2005). The low practice on back pain prevention significantly correlated with LBP as one risk factor, therefore, knowledge and practice of LBP prevention for the safe posture can reduce the risk of LBP. By the matter of that poor muscle strength significantly related to the developing LBP in this study, therefore workers are suggested to avoid the risk by awareness of health promotion with regular
exercise and continuous health monitoring. Healthy workplace should be promoted in the university. The university, one type of business in Thailand, the employer is responsible for 50% of total cost of health care services of employees. The chronic LBP causes a long term cost of treatment and might be also an increased sick leave among employees. Those situations can impact further the academic related outcome of the university and the lost underneath in the academic enterprise.

5. Conclusions
The results provide an indication of the nature of the hazards in the university workplace, the academic, small business enterprise, indicating the incidence of low back pain among office workers. The findings of risk factors including personal and work environmental factors suggest workers and the university to be aware of what improvements might be necessary that adhere to safety office standards. A health promotion program and training in office ergonomics should be provided to workers in order to prevent chronic low back pain among the university office workers. This study has found that a physical fitness test might be a good tool of health risk assessment for musculoskeletal disorders or low back pain among office workers as a part of the surveillance of occupational back pain.

6. References


Advancing research on delivering workplace health and safety to small businesses: A U.S. perspective

Authors
Thomas R. Cunningham, Ph.D, National Institute for Occupational Safety and Health, United States of America TCunningham@cdc.gov
Raymond Sinclair, Ph.D., National Institute for Occupational Safety and Health, United States of America
Paul Schulte, Ph.D., National Institute for Occupational Safety and Health, United States of America

Abstract
In the United States, small businesses are a substantial majority of the businesses in every major industrial sector, including dangerous sectors such as forestry, fishing, agriculture, construction and mining. Of the 120 million plus workers employed in 2008 in the U.S., more than 54% worked in establishments with less than 100 employees. Other industrialized countries have similar employment profiles related to small enterprise. Several studies suggest that workers in smaller businesses endure a disproportionate share of the burden of occupational injuries, illnesses and fatalities. In the United States, the National Institute for Occupational Safety and Health (NIOSH) is the federal agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness. The NIOSH Small Business Assistance and Outreach Program is working toward the development and evaluation of a model for reaching small businesses with workplace health and safety information and practical tools for occupational safety and health program development. Research on the unique characteristics of small businesses that affect safety and health activities has been unfocused and largely descriptive. Given the lack of resources available for safety and health training in most small businesses, there have been calls for more research and models for achieving greater impact in this arena. This presentation will describe how prevention research for small businesses will benefit from better explication of the "small business" construct and use of marketing research approaches as an organizing framework for further research.

Keywords
Small business, Occupational safety and health, Research agenda, NIOSH

1. Introduction
In 2007, 89% of U.S. firms had less than 20 employees and 79% had less than 10. Small businesses are a substantial majority of the businesses in every major industrial sector, including dangerous sectors such as forestry, fishing, agriculture, construction and mining. Of the 120 million plus workers employed in 2008 in the U.S., more than 54% worked in establishments with less than 100 employees (U.S. Department of Commerce, 2008). Other industrialized countries have similar profiles (Champoux and Brun, 2003; Hasle et al., 2010;
Mizoue et al., 1999; O'Connell et al., 2001). Smaller firms also provide the U.S. economy with more net new jobs than larger ones (Headd, 2010).

Several studies suggest that workers in smaller businesses endure a disproportionate share of the burden of occupational injuries, illnesses and fatalities (Buckley, 2008; Fabiano et al., 2004; Fenn and Ashby, 2004; Hinze and Gambatese, 2003; Jeong, 1998; Mendeloff et al., 2006; Morse et al., 2004; Page, 2009). Evidence indicates that resource deficiency, isolation, low probability of inspection, and inaccurate perceptions about illness and injury incidence rates because of low frequency reduce motivation to engage in prevention activities among owner/operators in small enterprises (Barbeau, 2004; Champoux and Brun, 2003; Dennis, 2002; Haslam et al., 2010; Hasle and Limborg, 2006; Walker and Tait, 2004). However, organization size is often not considered in occupational safety and health (OSH) studies and it is frequently absent from discussions and texts devoted to OSH (Levy et al., 2011).

The purpose of this paper is to introduce two critical areas which must be addressed to move small business OSH research forward: small-business construct explication issues and intervention marketing from a social-systems perspective.

2. Defining and measuring “small business”
Research and policy are being hampered by imprecision in defining small business and the matter is essential to setting the agenda for research. The “small business” label is used so frequently in political, economic, and popular contexts that they cloud scientific usage. More conceptual work is needed in five areas: size, newness, structure, manager centricity, and construct measurement.

2.1 Size
For OSH research, number of employees has at least two dimensions in the concept of size. Number of employees is related to worker exposure to workplace hazards, although having fewer employees may mean less or greater hazard exposure for the workers depending on workplace circumstances. Number of employees is also a component of capacity for prevention activities (e.g., people available for safety committees, inspections, job rotations). There is evidence that small businesses have less “resource slack” compared to large organizations, meaning they tend to not have underemployed capacity to devote to non-production-related activities such as OSH (Page, 2009). The implications of even these simple dimensions of business size for OSH have not been explored.

2.2 Newness
Almost all businesses start small. In the U.S., approximately ten percent of the nation’s businesses with employees were started within the preceding year, and 95% of them have less than 20 employees (U.S. Department of Commerce, 2011). The managerial and employee inexperience that often comes with newness may put workers at greater risk for injuries and illnesses. One study found that among new U.S. businesses (presumed to be small-sized enterprises), those that failed within one or two years had an average workplace injury rate that was more than twice the rate of those that survived for more than five years (Holizki et al., 2006).
2.3 Structure

Business structure includes geographic locations, mix of industries in which it is engaged, or its legal form. Distinctions are often made between establishments (all operations and employees at a specific location), firms (all establishments in a state), and enterprise (all firms in a company). Establishments with few employees may be in small or large firms. In an investigation of size and fatality rates, when controlling for firm size there was a strong negative association of establishment size with fatality rates, but when establishment size was controlled, firm size was not related to risk, even though the simple firm-fatality relationship was strongly negative (Mendeloff et al., 2006). It may be the geographic dimension is related to OSH factors such as differences in employer control at remote locations.

Both firms and establishments of all sizes may be engaged in multiple activities or industries. Research on mining accidents found firms that had more diverse operations had lower rates while mines with greater task diversity had higher rates, at least to a certain point (Page, 2009).

Establishments may be franchises, subcontracts, sole proprietorships, partnerships, corporations, or other forms, each with different relationships between employers and employees that affect OSH. Subcontracting includes self-employment, and in the U.S. self-employed workers (approximately 11% of the workforce [Hipple, 2010]) were found to be 2.7 times as likely to die from work-related injuries as wage and salary earners (Pegula, 2004). Much of that difference could be explained by the self-employed being over-represented in dangerous industries.

2.4 Manager-centered

Small business research often focuses on the personality, skills, and attitudes of its owner/operator and how they impact the success of the organization, which includes OSH efforts (Eakin, 1992; Haslam et al., 2010; Hasle et al., 2009). Part of the reason for this is that OSH regulations place the responsibility on the employer. The owner of a smaller organization often perceives it as an extension of his/her personality, which is intricately bound with family needs and desires (Carland et al., 1984). This may make exertion of authority over both family and non-family employees in areas such as safety behavior an uncomfortable activity may be avoided. Another characteristic of owner/operators is entrepreneurialism – development of new businesses with innovation, independence, and risk-taking. Small firm culture has also been characterized as focused on survival, control, pragmatism, and financial prudence (Haugh and McKee, 2004). Each of those characteristics may function as support or barrier to prevention activities.

The dominance of the manager-centric conceptualization also neglects small businesses’ social context. Small businesses exist in commercial, regulatory, cultural, professional, and industry sector environments that influence their OSH behavior. The contextual influences that directly address OSH are frequently “misaligned with the character and context of small workplaces and their health and safety problems” (p. S32) (Eakin et al., 2010). OSH in small
businesses will be better-served by a conceptualization of small businesses as isolated entrepreneurs and also as active participants in multiple networks of suppliers and regulators.

2.5 Construct measurement
Small business OSH studies almost always use number of employees as the sole metric. No studies were found that used sales or financial resources as size measures even though lack of resources is frequently cited in the reviews as the key issue predicting safety activities. The U.S. Small Business Administration (SBA) operationalizes “small” by using number of employees or annual receipts. It chooses one or the other based on which one “best represents the magnitude of operations of a business” (p. 8) (U.S. Department of Commerce, 2009). Further, many studies define “small” by stipulating an arbitrary number of employees. In a group of studies concerning OSH in small businesses (Table 1), 12 different definitions of “small” were used, ranging from less than five to less than 1000 employees. When a justification was given, it was most often that a government standard specified that size, thus confounding measurement of size and degree of regulation. Standards cited as justification were often related to commerce rather than OSH. When possible, researchers should operationalize size as a continuous variable and use “smaller” and “larger” as labels until sufficient justification exists for more precisely defining business size categories.

Table 1: Definitions of “small” in selected studies

<table>
<thead>
<tr>
<th>Definition</th>
<th>Justification</th>
<th>Focus of study</th>
<th>Lead Author</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5</td>
<td>None</td>
<td>OSH in SB</td>
<td>O’Connell (2001)</td>
<td>New Zealand</td>
</tr>
<tr>
<td></td>
<td>OSH information provision to SB</td>
<td>Mayhew (1997)</td>
<td>Australia</td>
<td></td>
</tr>
<tr>
<td>&lt; 10</td>
<td>Government standard</td>
<td>Fatalities in horticultural services</td>
<td>Buckley (2008)</td>
<td>United States</td>
</tr>
<tr>
<td>&lt; 20</td>
<td>Government standard</td>
<td>Size (F) &amp; IIFa outcome</td>
<td>Fabiano (2004)</td>
<td>Italy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Predictors of IIF</td>
<td>Kotev (2007)</td>
<td>Australia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Predictors of IIF</td>
<td>Tompa (2008)</td>
<td>Canada</td>
</tr>
<tr>
<td>None</td>
<td></td>
<td>Size &amp; intervention choice</td>
<td>Akbar (2000)</td>
<td>United States</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Predictors of IIF</td>
<td>Gardner (1999)</td>
<td>Australia</td>
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<tr>
<td></td>
<td></td>
<td>Size (E)b &amp; IIFa outcome</td>
<td>Hasle (2009)</td>
<td>Denmark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Size (F) &amp; IIF outcome</td>
<td>Kines (2003)</td>
<td>Denmark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Predictors of IIF</td>
<td>Lentz (2006)</td>
<td>United States</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>Government standard</td>
<td>Size (F) &amp; IIF outcome</td>
<td>Champoux (2003)</td>
<td>Canada</td>
</tr>
<tr>
<td></td>
<td>OSH programs in SB</td>
<td>Antonsson (2002)</td>
<td>Sweden</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>OSH experiences of SB workers</td>
<td>Eakin (2003)</td>
<td>Canada</td>
<td></td>
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<tr>
<td></td>
<td>Work-related disability in WA</td>
<td>Cheadle (1994)</td>
<td>United States</td>
<td></td>
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<tr>
<td>Size (E) &amp; IIF outcome</td>
<td>Nakata (2006)</td>
<td>Japan</td>
<td></td>
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<tr>
<td>------------------------</td>
<td>---------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SB response to regulation&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Vickers (2005)</td>
<td>United Kingdom</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| SB owners’ opinions of S&H | Brosseau (2007) | United States |

| SB intervention effectiveness | Breslin (2010) | Canada |

| Size (F) & IIF management | Kotey (2005) | Australia |

| Size (E) & IIF outcome | Okun (2001) | United States |

| Size (F) and OSHA complaints | Scherer (1993) | United States |

| Predictors of safety scores | Samant (2007) | United States |

| OSH management practices | Walker (2004) | United Kingdom |

| Size (F) & employee behaviors | Headd (2000) | United States |

| Worker health promotion in SB | McMahan (2001) | United States |

| Predictors of management motivation for safety | Gunningham (2004) | United States |

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<sup>a</sup> Number of employees; first column is minimum if specified
<sup>b</sup> Small business
<sup>c</sup> Firm size
<sup>d</sup> Occupational illnesses, injuries, and/or fatalities
<sup>e</sup> Establishment size
<sup>f</sup> Defined < 10 as “micro firms”
<sup>g</sup> Definition for small to medium enterprises (“SMEs”)

Some studies use number of employees at the establishment level and others use firm or enterprise level. Establishment-level analysis makes sense for assessing risks to workers and resulting illnesses and injuries. Hazards likely vary by location. Measurement of firms may be better when considering available resources for OSH activities if resource decisions are made at that level. Also, firm-level data may be a more reliable way to account for mobile workers who may work in multiple establishments (e.g., workers in construction and agriculture). Another neglected area for research is the number and size of sub-categories of “small” needed to advance research, policy development, and prevention activities.

Concept explication will advance theory-building and prevention efforts best if, in addition to size measurement questions, researchers routinely gather data about the age and structure...
of small businesses they investigate and focus on owners, managers, and employees as components of an enterprise’s persona.

3. Marketing OSH and small businesses

Businesses operate in a complex system of organizational relationships, and changing those operations depends on a thorough understanding of those relationships. OSH resources are available to small businesses from a variety of public and private organizations, but these efforts are underfunded and poorly coordinated. Research is needed to understand small business social networks, organizational opinion leadership, and where disparate interests intersect and can be coordinated for injury prevention efforts. That is, market research is needed to understand the extent to which OSH for small businesses might fit into the value proposition suppliers of other goods and services offer those small businesses.

Hasle and Limborg (2006) prepared the most comprehensive review of the small business literature currently available. It focused on studies about the nature of small enterprises and their managers and business characteristics that make workers more vulnerable to illnesses, injuries, and fatalities. They also included an analysis of the use of intermediary organizations (e.g., insurance companies, labor unions, accountants) to deliver OSH interventions to small firms. Although there were few studies in that area to consider, they offered a model showing the embedding of interventions in intermediary organizations, which then embed the interventions in small businesses. This two-stage model opens the scope of research to the social systems level, attends to the problem of limited public health capacity, and uses organizations that have greater familiarity and credibility with small businesses than OSH organizations, but the model lacks a prescription for marketing OSH at the broader level to appeal to intermediaries.

Marketing approaches include the “four p’s”: product, place, promotion, and price (McCarthy, 1960). In this marketing context, marketing OSH is akin to marketing a cause, or social marketing (Andreasen, 1994). This subfield of marketing has a substantial literature, its own models, and has been applied in OSH contexts (Cowley S, 2004; Menzel and Shrestha, 2012; Sorensen et al., 2011; Yoder and Murphy, 2012). The following sections provide an overview of small business OSH research from a very basic marketing perspective.

3.1 Product

Regarding OSH for small businesses, much attention has been given to the product. Marketing research suggests small business intervention research is hampered by overemphasis on intervention effectiveness, or product development research, at the expense of other more important product characteristics such as compatibility with existing systems and cost (Dearing, 2009). For example, in a study of firms with less than 50 employees, safety activities closely-related to production such as equipment maintenance and inspection of premises were more common than other activities such as keeping an accident register, conducting air quality evaluations, and noise reduction activities (Champoux and Brun, 2003). Non-adoption of the latter activities may be because they are not sufficiently compatible with highly production-focused small business operations.
3.2 Price
Price, or the cost of a training intervention is rarely considered by researchers, and although the equipment cost of an OSH engineering intervention for small businesses may be reported, we found no studies that considered the cost match of such equipment to small business resources (Cohen and Colligan, 1998; Crouch and Gressel, 1999; Earnest et al., 2002). Likewise, we found no studies that considered the relative simplicity of an OSH intervention. Given the findings that small businesses have few resources and little OSH technical expertise and the evidence that intervention effectiveness is not very important to potential adopters, studies about matching intervention cost, simplicity, and compatibility with existing work demands should be a high priority. Furthermore, intermediary organizations must be influenced to consider what they are willing to pay in time and/or capital to obtain OSH information and what they can charge small businesses (fees or good will received) for passing OSH information and services on to them. Small businesses must see a potential benefit from the investment of time and resources for the OSH services the intermediaries offer.

3.3 Promotion
The promotion component has been informed by existing research about the OSH knowledge, attitudes, and behaviors of small business managers (Brosseau, 2007). Faulty risk perceptions and the responses to them are a common issue. An investigation of small organization owners’ accident causation attributions found they often attributed an employee injury to unforeseeable circumstances. Following a workplace injury to an employee, they avoided seeking OSH training for their employees related to preventing such incidents as a means of maintaining the belief that unforeseeable circumstances are responsible. Thus, safety training is avoided so ineffective prevention efforts cannot be blamed for contributing to accidents (Hasle et al., 2009). Additional research on managers’ OSH information-seeking behaviors will help change agents tailor their messages and identify commonly-used channels through which messages can be delivered.

3.4 Place
Hasle/Limborg’s (2006) work has opened research on the place component with their focus on intermediary organizations. Their model places the network of intermediary organizations that serve small businesses with goods and services in the role of change agent, as they are already in an active and trusted position with the small businesses they serve. Such organizations include workers’ compensation insurers, trade associations, chambers of commerce, accountants, occupational health clinics, equipment manufacturers and suppliers, and small business development centers (Brosseau, 2007; Hasle et al., 2010; Lentz et al., 2001; Lentz and Wenzl, 2006). If those intermediary organizations are convinced that introducing an OSH intervention will increase the perceived value of their organization to a client, then they are likely to do so. And if they influence a small business who then talks about that service to others, then the intermediary organization may gain new small businesses to serve. However, the use of intermediary organizations means that public health research must focus on understanding the social networks of those intermediary organizations too, including finding their opinion leaders as well as the small business opinion leaders. Finding the optimum balance of effort may mean that public health agencies
will have to take a more visible role with intermediaries and a less visible role with small businesses.

4. Conclusion
Researchers should examine the multiple meanings of “small business” and select and specify the dimensions that will lead to more consistent use of the small business label across studies and disciplines. For OSH issues, attention to the nominal size dimension (with its sub-dimensions of people and financial resources) should be supplemented by consideration of the age and structure of the business. Researchers should also consider how small business is a reflection of the personality and behavior of its owner/operator and employees. Operationalization of the construct in these ways will lead to better understanding of its critical elements.

As more rigour is brought to defining the construct, marketing research approaches provide a framework for studying ways to improve small businesses’ OSH performance. It underscores the importance of a social systems perspective. It places a bigger responsibility on the interveners to develop and market interventions that will survive in the competitive small business environment where the resources required for adoption could always be used in other ways.

Understanding and using social networks are at the heart of the Hasle/Limborg model and marketing ideas. Hasle/Limborg model focuses externally on use of intermediary organizations to reach small business, and that method shows promise (Hasle et al., 2010). However, public health professionals must first market OSH to the intermediaries who will then market the idea to small businesses. This additional layer may require resources that public health does not and likely cannot be expected to have. But to be successful, resources must be invested in understanding and negotiating OSH as a valuable service offering to intermediaries.

This suggested research agenda is limited in that it is only an organized collection of variables for study. It is weak on causative hypotheses, and they are needed to advance understanding of small business OSH. It focuses attention on interventions and neglects other important areas including economics, surveillance, and policy research. Finally, while it asks researchers to take small businesses’ lack of resources for OSH into account, it does little to identify ways to increase those resources.

Disclaimer: The findings and conclusions in this paper are those of the author(s) and do not necessarily represent the views of the National Institute for Occupational Safety and Health

5. References


Abstract

Employee-oriented CSR in multinational SME’s: what is the role of values of owner-managers within international business

Authors

Johan de Jong, Hanze University of Applied Sciences, University of Groningen, Zernikepark 7, 9447 AS Groningen, d.j.de.jong@rug.nl

Frank Jan de Graaf, Hanze University of Applied Sciences, Amsterdam Business School f.j.de.graaf@pl.hanze.nl

Abstract

Does globalisation lead to a race to the bottom, or can high HR-standards lead to competitive advantage. This paper develops propositions about the transfer of employee oriented corporate social responsibility (CSR) practices within multinational SMEs by assessing four Polish subsidiaries of Dutch companies. The cases enable us to explore whether an individual owner-manager can add value within a foreign subsidiary by means of normatively-based, employee-oriented CSR. Based on four case-studies we suggest that not only motives but also the skills of the owner/manager as an institutional entrepreneur are critical in dealing with institutional variance.

Keywords

Corporate social responsibility; SME’s; Labour relations, International transfer; Stakeholder View.
Ethical stakes of corporate governance, ergonomic contribution to organizational redesign aiming at subsidiarity

Authors
Bernard Dugué, PhD, teacher and researcher, Ergonomics Department, ENSC/IPB, University of Bordeaux, France, bernard.dugue@ensc.fr
Johann Petit, PhD, teacher and researcher, Ergonomics Department, ENSC/IPB, University of Bordeaux, France, johann.petit@ensc.fr

Abstract
Corporate governance, through the involvement of employees and the dynamics that it can produce, is an essential precondition for efficiency and for safeguarding workers’ health.

Many studies have shown that individual autonomy is a determining factor in implementing occupational health. Employees must be allowed a certain amount of room for maneuver in organizing their work (e.g. varying their modes of operation), they must be able to show their creativity (not be satisfied with applying procedures that have been defined by others), and influence their work environment, especially in periods of change. Organizational design should provide the opportunity to influence management modes, distribution of power, the functioning of the chain of command, individual participation in the design processes. Ultimately, this is a question of areas for deliberation and the allocation of decision-making power.

Contrary to the idea of a predetermined definition of all the decisions that can be taken at every level of the hierarchy, efficiency consists in constantly adapting the level of decision-making to the problem being dealt with. This requires constructing an organization which is sensitive to details of events, which can be always adjusting the levels at which matters are dealt with. However, this swing from one decision level to another is only possible if the organization and the people within it are well prepared beforehand.

Thus the concept of subsidiarity constitutes an ethical point of reference for dealing with questions of corporate governance. It favors decision-making at the lowest appropriate level by following three organizing principles: the competency principle, the assistance principle, and the substitution principle.

Small businesses can be an accessible framework for a systemic approach to these questions and an excellent setting for organizational experimentation.

Keywords
Ergonomics, organization, subsidiarity

1. Introduction
Corporate governance, through the involvement of employees and the dynamics that it can produce, is an essential precondition for efficiency and for safeguarding workers' health.

Canguilhem (1947) developed the idea that living should never mean having to endure the environment in which one finds oneself. As man has developed, and adopted activities, he has always needed to be able to challenge existing norms, and establish new ones according to different contexts and situations. Sen (1999) stressed the link between the development of freedoms and an individual's ability to influence the world and to contribute to the life of the community. A great deal of research, following that by Karasek (1979), has shown that employee autonomy is a determining factor in the construction of health at work. This means that employees should have room for maneuver in the organization of their work (for example to vary procedures), they should be able to show creativity (not only to apply procedures defined by others), they should also be able to influence their work environment, especially in the context of technical or organizational changes. These psychosocial requirements also apply to the collective dimensions of activity, and in particular to the way in which individuals are able to receive from (or give to) their work colleagues any form of instrumental or emotional support.

From here we go on to consider how the way in which a company operates can enable healthy individuals to meet these development objectives, while still targeting the efficiency of the system. This poses the question of areas for discussion about work and the allocation of decision-making power throughout organizations. Organizational design should provide the opportunity to act in this way, especially concerning management modes, power structure, the functioning of the line hierarchy, participation of workers in design processes and their involvement in the dynamics of change.

Thus the concept of subsidiarity, which defines principles behind the distribution of power in a community, can represent an ethical point of reference for dealing with questions of corporate governance. For Melé (2005), subsidiarity can be defined as the principle by which "a larger and higher-ranking body should not exercise functions which could be efficiently carried out by a smaller and lesser body. Rather, the former should support the latter by aiding it in coordinating its own activities with those of the greater community". It promotes decision-making at the lowest appropriate level by following three organizing principles: a principle of competency, a principle of assistance, a principle of substitution.

We demonstrate our argument in an ergonomic study in a small service sector company with 92 employees, selling and managing mutual insurance products. We will show how we became interested in the individual and collective room for maneuver available to employees in the context of their day-to-day work. From there, we show how this situation was significant for the functioning of the company when considered more globally and for existing modes of decision-making. We conclude by highlighting the advantages that the concept of subsidiarity was able to bring to the necessary reflection process on organizational design, focusing on the organizational learning dimension that the ergonomic intervention can represent when carried out as a participatory exercise.
2. Material and methods

Seven months prior to our intervention, the MUTU company had set up a system of digitizing their files and incoming mail. After the mail was opened and sorted, it was digitized for dispatch to the electronic mail-boxes of employees in the relevant departments. When we arrived, the mail/digitization department was approximately 1.5 months behind schedule, and the receiving departments were experiencing major operating problems (absenteeism, lateness, mistakes). Many difficulties were described as due to a deterioration in interpersonal relations. The company management asked us to carry out a diagnosis of the situation in the mail/digitization department to determine areas where improvements could be made. We were eventually allowed to extend our study to the administrative departments.

We decided to consider the situation from a dual standpoint: first looking "from the bottom up" by getting an understanding of the real nature of the work done by the people concerned, and then "from the top down" by examining the way in which the digitization had been implemented in the company and how the change had been introduced to the employees. To do this, we carried out observations at the workplace, then held individual interviews and then group work, first within departments and then between departments. We started with the failures in production (lateness, mistakes, difficulties with data processing...) to create a common base for exchange which could bring together management, technicians and employees to discuss the organization. We were able to identify production situations where there were problems, from the point of view of work efficiency and the consequences for the individuals concerned, which could be the subject of shared discussion. We distinguished three levels of determinants which also constituted three possible levels of action: there were aspects that resulted from the national context (regulations, politics of the mutual insurance sector, choice of computers and software); aspects related to the establishment (company structure, operational hierarchy, staff management, relations between departments), and aspects concerning the day-to-day work within each department. There were links between the three, but there was also a relative degree of autonomy.

Our first observation was that the digitization project had been implemented as a purely technical project, with a totally simplistic view of the work done in the mail room, with underestimation of the organizational consequences of this project, and without involving the relevant staff in the process of change. The new head of this department was a computer specialist, chosen purely on the basis of technical abilities. However, we very quickly realized that sorting the mail required a global vision of the way the company operated, an excellent knowledge of the administrative processing circuits, the legislation to be applied, and the functioning of the departments. Sending digitized documents straight into the mail boxes of the employees also changed work in the departments considerably. Previously, the mail was sent to the head of department, who distributed it to the employees according to those who were present, their particular skills, the files they were currently working on. The heads of department therefore always had an overview of the work that was going in their own unit. From now on, however, they had to go round afterwards to each individual mailbox to check whether or not there were any administrative problems and then make any corrections when necessary.
Our second observation, on the need to ensure that all processes were reliable, is a point that was raised by management to justify the centralization of management decisions, including those that concerned the day-to-day functioning of departments. Here are two examples to illustrate this situation:

1. At the end of a working day in the mail room, there were documents for which it was difficult to determine the intended recipient, and which were therefore difficult to sort. In addition, some digitized documents that had been sent out to the departments were returned to the mail room because of an "anomaly". In both these instances, the rule stated that these elements should be passed on to the head of the unit, who would then resolve any difficulties. Employees who had decided for themselves what procedures to adopt in such situations were severely reprimanded for having "overstepped their competency and their responsibilities".

2. During a working group with the mail room/digitization department and a department further down the hierarchy, we were able to list the difficulties experienced. No business meeting had taken place previously between these two departments, with exchanges only ever having been through the department heads. One of the difficulties identified appeared at first to be trivial: the mail department used different colored pens to highlight certain elements of the incoming mail to facilitate identification and subsequent processing. However, now that digitization had been put in place, when certain colors were used, this meant that the highlighted data was illegible. Documents then had to be returned to the mail department, the original had to be retrieved, then digitized once again with a better resolution, and sent back to the receiving department. The group very quickly agreed that it would be better not to use certain colors any more, and this measure was put in place without delay, to everyone's satisfaction. Shortly afterwards, the head of the unit reacted very strongly to this decision, about which he had not been consulted, and insisted that staff should return to the former practices. The director general, while recognizing that there was a problem, confirmed that it was "undesirable that micro decisions should be taken without the formal approval of the head of department", as this raised the "question of the credibility of the hierarchy".

These are just two of several examples where a wish for centralized organizational control was evident, leaving very little leeway for the individuals involved. In this case, the company functions using a strong model, which is not necessarily specified, yet is very perceptible, with the only rationality coming "from above". This results in an all-encompassing desire to see everything move up to the higher echelons of the hierarchy. This also leads to a virtually non-existent involvement on the part of the workers when processes of change are introduced. This lack of empowerment ultimately blocks any form of initiative on a day-to-day basis in the way the departments operate. The fact that everything has to go up to the higher levels leads to two possible behaviors, which the employees themselves acknowledge: either the problem is sent up to the highest level, where it will probably be seen as a minor matter, it will not be dealt with and will eventually be left pending; or the employees hesitate to send such "minor details" up the hierarchy, and since the lower echelons do not have any freedom in terms of decision-making, once again the problem is not dealt with.
This company clearly does not see itself as a "learning organization" (Argyris, Schön, 1996), anxious to develop and value individual and collective know-how. In addition to the loss of efficiency, this is also at a cost for the people involved. The works council and colleagues in the department should represent both a resource for individuals, the place where new and existing employees can help one another, and at the same time, the place where any problems, successes or failures that employees have encountered at work can be opened up for discussion. In this case, employees tended rather to describe obstacles to forming a works council: "We’re not really supposed to talk amongst ourselves and help one another. If we have a problem, we have to ask the Head of the unit. But when we have time, we don’t stick to this". Ultimately, the employees are inherently seen as constituting a risk and this absence of corporate confidence produces a strong feeling of injustice, as it prevents workers having their own legitimacy as a basis for any criticism of the organization and proposing alternatives (Campoy, Neveu, 2007). This is true for all levels of the hierarchy.

Of course, the aim of ensuring that all processing treatments are reliable and homogeneous is a perfectly legitimate one. This is what in the context of industry is called regulated reliability, in other words anticipating a certain number of foreseeable situations and ruling on them. The problem is that this never covers all situations at work. Working always involves coping with situations that have not been anticipated or which are just "on the borderline" of the official rules. Such situations are nevertheless managed using three types of resource: the skills of the workers, possible mutual help between colleagues, support from the hierarchy. This could be called managed reliability, whereby employees are able to cope with unexpected situations in real time. The true reliability of a system results from a combination of these two types of contribution, and a discussion of rules and practices so that change is possible (Amalberti, 2006).

In accordance with the original request from the company, we looked first at the reorganization of the mail/digitization department and how to resolve the problem of delays. As a result of this, we considered the structuring of the decision-making circuits, what could best be dealt with at each level of the hierarchy in order to ensure efficient production, to develop autonomy and responsibility, not to overburden the hierarchy with matters that could be dealt with at a lower level, and also to facilitate greater fluidity and reactivity. As a result of this reflection, two measures were in fact put in place: a change in the operating rules within departments and between departments, based on discussion and experiments in the working groups and with supervisory staff; a total overhaul and redefinition with management of the delegation of the degree of power to be given to each level of the hierarchy and the amount of room for maneuver that each of these levels was to be allowed to make any adjustment they felt necessary in real time.

### 3. Results and discussion

When a participative process is put in place, ergonomic intervention can be a time for constructing and testing out a different mode of operation (Petit, 2006, 2008), with the actors contributing to understanding the problems to be dealt with (Petit et al. 2011) and learning how to participate in decision-making processes. Thus it has a truly educational role to play.
within the organization (Dugué et al., 2010). However, ensuring that these modes of operation will be perpetuated in the structure of the organization remains the key issue for any intervention constructed in this way.

Integrating the principle of subsidiarity into the organizational design means ensuring that nothing is handed to a given level of the hierarchy to deal with which could be done more efficiently at a lower level. One must be constantly looking for the most appropriate level for an action to be carried out. This definition gives rise to three principles (Pradines, 2004): the upper level must refrain from carrying out any task that the lower level can carry out by itself (competency principle); the upper level must carry out tasks that the lower level cannot (assistance principle); the lower level must refrain from handing over certain tasks which are theirs (substitution principle). Subsidiarity can therefore be seen as a model for constructing the organizational structure by stacking up the different levels, with each one retaining its capacity to act and its autonomy, and with each one holding a "piece of sovereignty".

For some decisions it is more appropriate if they are taken centrally, and for others it is not. But no complete list can be drawn up beforehand of all the decisions that may need to be taken by each level in the hierarchy. Efficiency therefore lies in continually adapting the decision-making level to the problem to be dealt with, according to the knowledge that each level has at its disposal. This requires an organization that is sensitive to detail and is constantly adjusting the levels at which matters are dealt with, using action levers spread across different levels of the hierarchy. However, switching from one decision level to another is only possible if the organization and the people who make up the organization are prepared for it, and in particular if the following two conditions are met:

1. a learning organization, keen to analyze its shortcomings, to learn from its mistakes, to use and develop individual skills, to strengthen works councils. This presuppose that feedback concerning real work and the regulations necessary in the course of work activity are possible and received sympathetically;

2. a confident organization, breaking away from the Tayloristic idea of the operator who is "incapable of understanding the science of work" and who is therefore deprived of all initiative, or the tenets of "Lean Management" where operators are asked to identify and flag up any problems that need to be dealt with in order to improve production conditions, yet are still kept at a distance from all structural decision-making.

4. Conclusion

Using the ergonomic approach, the focus can be directed to the need for permanent dialogue between rules and the realities that work situations can reveal. Working consists of always coping with the unexpected, with complications and continually adapting modes of operation to variations in the working environment and to one's own variability. To continue with production under these conditions, operators from all levels of the hierarchy are constantly applying individual and collective regulations (Reynaud, 1989). It is important that the cost of these regulations can be discussed and incorporated into decision-making.

Subsidiarity is not a recipe for organizational success. It is a means of discussing collectively the way a company is structured, with the two-fold aim of productive efficiency and
maintaining the good health of the workforce. By asking the question, "why have a given level of the hierarchy deal with something that can be dealt with perfectly well by the level below?", the subsidiarity approach makes it possible to reconsider the implementation of different concepts such as autonomy, power to act, freedom in decision-making, organizational dependence, room for maneuver, regulations. Acknowledging dignity at work means giving each person responsibility for their actions. As Pradines points out (2004), "breaking from this principle […] is […] both an injustice and a mistake. An injustice because it is a negation of the recognition of the individual, and a mistake because it deprives society of all the capacity for intelligence, creation and initiative of which this person is capable". Building an organization from this perspective is also an incarnation of democracy in organizations, accepted not only as a moral requirement but as a condition for productive efficiency. We are certain that small businesses can be a very accessible setting for a systemic approach to these questions and an ideal place for organizational experimentation.
5. References


Health and safety problems of small enterprises in Turkey

Authors
M. Sarper Erdogan, MD, PhD, Prof.Dr., Cerrahpasa Medical Faculty, Dept. of Public Health, Istanbul University, Istanbul, Turkey sarper@istanbul.edu.tr
Ozer Kanburoglu, Prof.Dr., Fine Arts Faculty, Dept. of Photography, Kocaeli University, Kocaeli, Turkey ozerkanburoglu@gmail.com
A. Ayhan Yuceokur, MD, Assist.Prof.Dr., Cerrahpasa Medical Faculty, Dept. of Public Health, Istanbul University, Istanbul, Turkey yuceokur@istanbul.edu.tr

Abstract
According to EU recommendation 2003/361, small-sized enterprises are companies that employ up to 50 workers, whilst medium-sized enterprises have up to 250 employees. The small and medium-sized industry constitutes a major component of Turkish economy. But the health and safety issues are much neglected especially in small sized establishments paradoxal to its importance for the public economy. In this study we aimed to discuss the problem in the view of occupational injuries happened at small enterprises between 2003 and 2009 in Turkey.

For this study the databank of Turkish Statistical Institute was reviewed and related data were presented.

As the employment rate of small size enterprises in Turkey varies between 65-70% by years, the percentage of small sized company employees among all injured workers is changing between 60-65 %. The official numbers suggest that the injury producing rate of small-sized enterprises is smaller than that of bigger companies. But this is controversial with the general knowledge of that small-sized companies are handicapped in many aspects dealing with health and safety issues: they use cheaper raw materials; pose greater hazard level; have poor environmental conditions, inferior equipment maintenance, inadequate personal protection, inferior pay rates, longer working hours. Additional to those occupational health services are not mandatory in small sized enterprises in Turkey.

It is apparent that the official numbers are not sufficient to assess the health and safety issues in small-sized enterprises. Thus there is a need of comprehensive research projects to put the real situation at the small workplaces. The law must be amended and regulatory obstacles be lifted immediately to provide the small workplaces with occupational health services.

Keywords
Small enterprises, work safety, occupational health, Turkey

1. Introduction
1.1 The role small enterprises play in the economy
Small enterprises play a pivotal role in the national economies of countries all around the world. Industry is moving away from large vertically integrated firms. Small enterprises account for a significant and growing share of employment in many countries. Small enterprises are recognized no more as peripheral but a key component of the value chain. A healthy small enterprise sector is important to increase the resilience of the economy to economic shocks [Ozdemir et al, 2007]. But the health and safety issues are much neglected especially in small-sized establishments paradoxal to its importance for the public economy. Workplace size is related to the incidence of occupational injuries, with workers in small enterprises experiencing higher rates of major injuries than those in larger enterprises. Fatal injuries are consistently found to be elevated in small companies, with some estimates showing the fatality rate to be four to 10 times higher than medium to large size firms [Breslin et al., 2010]. There is a strong evidence for high accident risks in small enterprises. Exposure to physical and chemical hazards are larger [Hasle & Limborg, 2006]. There is considerable diversity among small enterprises in terms of work. The exposure for risks in work environment can be higher as few people work in the enterprise and usually have to do different work tasks. Complicated technical measures to control the working environment are relatively more expensive for small enterprises, and there are often problems in ensuring ongoing maintenance [Gunnarsson & Andersson, 2010].

1.2 Small-sized enterprises in Turkey
Straddling the continents of Europe and Asia, Turkey’s strategic location has given it major influence in the region and control over the entrance to the Black Sea. She has a population of 73.3 million (OECD, 2008) and area of 779,452sqkm (300,948sq miles). Her capital is Ankara and the language is Turkish, majority religion is Islam. Life expectancy in Turkey is 68 years (men), 73 years (women); she has a very young population; 45 % of it being under 25 years old. Turkey is a middle income country; GDP per capita (at Purchasing Power Parity) is US$ 12,260 [Karpak & Topcu, 2010].

The small-sized industry constitutes a major component of Turkish economy. They account for 70 percent of employment, almost 40 percent of investments and 26.5 percent of total value added. The informal economy could represent about 50 % of small enterprise activity [Seker & Correa, 2010]. Small enterprises in Turkey comprise 99.8% of the total number of enterprises, 76.7 % of the total employment [Karpak & Topcu, 2010].

According to EU recommendation 2003/361, small-sized enterprises are companies that employ up to 50 workers, whilst medium-sized enterprises have up to 250 employees (Table 1). This classification is also used by the Social Security Institution of Turkey [Baykal, 2007].

Table 1. The Classification of Enterprises According to the Number of Employees

<table>
<thead>
<tr>
<th>Enterprises</th>
<th>Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro</td>
<td>&lt; 10</td>
</tr>
</tbody>
</table>
2. Material and methods
For this study the databank of Turkish Statistical Institute was reviewed and related data were presented.

3. Results
The enterprises with less than 50 workers constitute approximately 99% of total enterprises in Turkey (Table 2) while the employment rate is about 70% [TUIK, 2013].

Table 2. The Distribution of Enterprises and Employment by the size of Enterprises in Turkey, 2002

<table>
<thead>
<tr>
<th>Size of Enterprises</th>
<th>Enterprises</th>
<th>%</th>
<th>Employment</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10</td>
<td>1 788 835</td>
<td>96.27</td>
<td>3 305 259</td>
<td>50.87</td>
</tr>
<tr>
<td>10-49</td>
<td>58 521</td>
<td>3.15</td>
<td>1 132 077</td>
<td>17.42</td>
</tr>
<tr>
<td>50-150</td>
<td>7 407</td>
<td>0.40</td>
<td>611 066</td>
<td>9.41</td>
</tr>
<tr>
<td>151-250</td>
<td>1 577</td>
<td>0.08</td>
<td>304 225</td>
<td>4.68</td>
</tr>
<tr>
<td>&gt; 250</td>
<td>1 851</td>
<td>0.10</td>
<td>1 144 413</td>
<td>17.62</td>
</tr>
<tr>
<td>Total</td>
<td>1 858 191</td>
<td>100.00</td>
<td>6 497 040</td>
<td>100.00</td>
</tr>
</tbody>
</table>

As the employment rate of small-size enterprises in Turkey varies between 65-70% by years [TUIK, 2013], the percentage of small-sized company employees among all injured workers is changing between 60-65% (Table 3).

Table 3. Numbers of Employment Injuries in Small-sized Enterprises Compared to Bigger Enterprises in Turkey by Years

<table>
<thead>
<tr>
<th>Years</th>
<th>Number of injured persons in workplaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-49</td>
</tr>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>2003</td>
<td>49 712</td>
</tr>
<tr>
<td>2004</td>
<td>52 451</td>
</tr>
<tr>
<td>2005</td>
<td>46 342</td>
</tr>
<tr>
<td>2006</td>
<td>48 133</td>
</tr>
<tr>
<td>2007</td>
<td>49 549</td>
</tr>
<tr>
<td>2008</td>
<td>44 175</td>
</tr>
<tr>
<td>2009</td>
<td>40 671</td>
</tr>
</tbody>
</table>

4. Discussion
The official numbers suggest that the injury producing rate of small-sized enterprises is smaller than that of bigger companies. But this is controversial with the general knowledge of that small-sized companies are handicapped in many aspects dealing with health and safety issues. According to the results of the study conducted by Fisek Institute in an organized
industrial zone the health and safety scores of companies are positively correlated with the size of the companies (Table 4). In the study the 10 criteria about working conditions developed by EU Occupational Health and Safety Commission were used [Gokbayrak, 2003].
Table 4: Health and Safety Scores of the Enterprises by the Number of the Employees

<table>
<thead>
<tr>
<th>The number of employees</th>
<th>Health and safety score of the enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>2,347</td>
</tr>
<tr>
<td>6-10</td>
<td>2,498</td>
</tr>
<tr>
<td>11-15</td>
<td>2,630</td>
</tr>
<tr>
<td>16-20</td>
<td>2,625</td>
</tr>
<tr>
<td>&gt; 20</td>
<td>2,795</td>
</tr>
</tbody>
</table>

Workplace size is a strong determinant of the effectiveness of health and safety representation [Frick & Walters, 1998]. The conditions for small enterprises with less than 50 employees in Turkey are quite different from the enterprises with just a few more employees. Because in spite of the fact shown by many studies that the small companies are already handicapped in terms of working conditions enterprises in Turkey with less than 50 employees are not required to establish a safety organisation.

Labour Act of Turkey regulates to a large extent the principles and procedures such as occupational physicians and hygienists, their numbers, their assignments, their duties, their responsibilities, their working conditions, their training and certification. It also regulates the workplace health and safety units that will be installed in the workplace with characteristics of common health and safety units, personnel, equipment, apparatus and equipment that there should be in these units, qualifications and training of personnel assigned, the reception of the service from public health and safety units. The SE’s were exempt from the enforcement of the Law Nr. 4857. With the Occupational Health and Safety Act released on 30.06.2012 the number required for employees is removed for health and safety service, but the application must wait until the law comes fully into force in a two year period and the related regulations are released. Up to that time the related issues of the Labour Act will be in force.

The OHS Act law will cover all workers in the private sector and also those of public sector workers. Agricultural workers, tradesmen and artisans, and public employees that were out of the scope of the Labor Act will be taken into the scope of the OHS legislation when OHS Act fully enters into force.

The Occupational Health and Safety Act requires that all enterprises undertake a workplace assessment. Making a risk assessment has been the responsibility of the employer, although there isn’t a detailed approach on how to do risk assessment.

In SEs which are employing less than 50 workers the employers are obliged to charge personnel and provide them from outside in the field of OHS for providing protective and preventive services. However, preventive health and safety initiatives aimed at small enterprises require special skills and methods from the working environment professional due to the unique culture of the small enterprises.

Comparing to larger companies the financial structure of SE’s are weak and they are easily affected by the competitive market conditions. Due to limited resources the SEs have problems with fulfilling legal requirements for the control of OHS. Building a safe and healthy...
working environment is an expense and a financial gain through OHS services will seldom be perceived as possible [Hasle, 2000]. Even in the small enterprises where a safety organisation has in fact been established, it seldom fills its formal role. Small enterprises are unsystematic because they do not have formal longterm planning and organisational structure [Demir, 2011].

Most small enterprises are personally owned and in the vast majority of enterprises, the owner and daily manager are the same person. The owner identifies himself strongly with the enterprise. They behave action-oriented, patriarchal and ego-centric both for the enterprise and employees. [Hasle, 2006] Many owners try to run everything in the enterprise themselves and are very production oriented. Thus they are focused on timely manufacture and delivery of products rather than on the work environment. They usually consider health and safety to be the responsibility of the employees. Possible working environment problems are attributed to conditions over which the owner has no control. They think that the employees don't comply with the measures the owner has taken. On the other side the employees are unwilling to compromise the discomfort from personal protective equipment. There is limited availability of training, advice, and publications [Sener, 2005]. Managers of small-scale enterprises have insufficient knowledge to improve the working environment. They are not aware of their legal obligations [Gunnarsson & Andersson, 2010]. The owner and the employees are usually not very educated. They are usually from the same region, they trade regionally and their markets are local. Considered the small businesses’ short life cycles many of them are already new in the industrial sector and are not familiar with relevant safety regulations and practices yet [Breslin et al, 2010].

In some of SE’s work and family life flow together. Often, other family members also work in the enterprise. But the family-employee may be more inclined to engage in activities potentially detrimental to health and safety like extended working hours or safety shortcuts. Besides small firms are more likely to employ young and low educated workers. In most SE’s there is no central heating system, running water, toilet and lockers [Sener, 2005], [Lansdown et al, 2007].

Unionisation is low in the small enterprises and small enterprises are out of the sight of trade unions much of the time [Gokbayrak, 2013]. Parallel to this there is a problem with the level of worker representation on health and safety issues within the small enterprise [Yılmaz, 2009]. Worker participation increases the practicability of preventive measures and the motivation to implement them. Without direct participation they are not involved with the determination of their working environment. Therefore, it is difficult to employ legal rights to refuse dangerous work or obtain information concerning the risks of their work [Frick & Walters, 1998]. On the contrary, the close relationship between owner and employees that results in a better psychological working environment makes the employees reluctant to call for improvements in the work environment [Gunnarsson & Andersson, 2010]. Positive relations with owner/managers may encourage employees to accept riskier work conditions, ignoring personal requirements in favour of the economic interests of the enterprise. In the same fashion, the owner frequently feels a sense of responsibility toward the employees who take ill, especially if it is a case of a workplace accident. They are in a mood of ensuring the
employees continued employment in the enterprise and try to remove the problem causing the injury. In this way, the owner feels a clear responsibility for the working environment but often at an individual and very concrete level. small enterprises are focused on immediately visible hazards and already existing illnesses and accidents. This often occurs by means of an informal co-operation between the owner and the directly affected employees and in some cases the employees themselves obtain responsibility for solving the problem [Lansdown et al, 2007].

The SE’s are not much controlled by the inspectors of Labor Ministry. But this is not specific to SE’s. It is common problem in Turkey due to quantitative insufficiency of inspectors who are responsible to control the firms in terms of health and safety. The number of controlled workplaces is decreasing each year. It has sunk to 2,6 % in 2009 to 1,1 in 2010. As of 2012, 166 inspectors and 358 assistant inspectors are employed in Labor Ministry. Regarding the numbers of employees and enterprises being subject to controls in 2012 there are 67 815 workers and 8 666 enterprises in the responsibility of just one inspector. Yet in UK with its population 60,7 million there are 3.811 inspectors, in Germany with the population of 82,5 million 3 870 inspectors and in France with the population of 61,5 million 1 341 inspectors are assigned to control the enterprises. With the assumption of 10 workplaces’ visit capability of one inspector in a month, it appears that all inspectors of Turkey can control 16 600 workplaces in a year. So, the 1 438 623 enterprises that are registered in Social Security Institution of Turkey as of 2012 has to wait 86 years for a second visit of the inspectors [Karadeniz, 2012].

5. Conclusions

It is apparent that the official numbers are not sufficient to assess the health and safety issues in small-sized enterprises. Taking into account that nearly half of the working force is unregistered employment and as it is intensified in small enterprises, off-the-record accidents may also be high in number in small enterprises. On the one hand there is a need of comprehensive research projects to put the real situation at the small workplaces. On the other hand, restrictive provisions which discard small enterprises in the legislation should be eliminated so as to improve occupational health and safety level. The law must be amended and the 50 workers limit be lifted immediately to provide the small workplaces with full scope of occupational health services. The unique culture of the small enterprises should be known well and taken into account when new regulations are prepared.

The numerical deficiency in labour inspection, unregistered employment and the deficiency of statistics are still being the indirect causes of occupational injuries and diseases in Turkey. But in the light of developments in legislation and the diagnostic system; cases number of occupational diseases which are expected but not detected in our country is planned to increase to by development of sensitivity and knowledge level of the parties concerned with the issue. We could hope that this will affect also small enterprises.

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Informal entrepreneurs in public spaces in downtown Fortaleza, Brazil

Authors
João Bosco Feitosa dos Santos, Economist. PhD in sociology. Senior Lecturer of the Universidade Estadual do Ceará. bosco_feitosa@yahoo.com.br
Regina Heloisa Maciel, Psychologist. PhD in psychology. Professor of the Universidade de Fortaleza
Angelica Maria Pinheiro Ramos, Economist. PhD in education. Assistant Lecturer of the Universidade Estadual do Ceará.
Larissa Menezes Santos Rocha, Student of social sciences of the Universidade Estadual do Ceará-UECE.

Abstract
The aim of this paper is to discuss the work of micro entrepreneurs that have their business in a square of downtown Fortaleza and employ other hawkers. Although acting as a formal capitalist entrepreneur, they consider themselves informal workers. We question whether this is a strategy to avoid obligations related to formal employers or if they are informal workers in their way to be formal employers. We carried out a qualitative case study with a group of six informal micro-entrepreneurs, mentioned by the street hawkers as being their “bosses” that work in the downtown public square (Praça Lagoinha). Direct observations of the work and semi-structured interviews were conducted to identify the trajectories of the entrepreneurs and their future perspectives. We also used part of the quantitative results of a previous study as source of documentary data; some data from the Instituto de Desenvolvimento do Trabalho – IDT (Labor Development Institute) and from the local government on informal workers. The interviewees said that they entered informality as street hawkers and then settled in a box provided by the City Council for marketing diversified products or providing services. These informal micro-entrepreneurs are in a gray area between formality and informality, producing new workers in precarious conditions while learning the strategies of capitalists to obtain profit, even by circumventing labor laws and keeping their employees as informal workers. We call this a disguised and precarious formalization. Relying on their informal condition, they obtain higher profits from exploiting labor, while the people they hire feel more secure, because they can always count on a fixed “salary” and commissions. They are, in fact, reproducing a process of precarious informalization and, at the same time, making their lives more precarious. These informal-micro-entrepreneurs dream of increasing their profits and becoming medium and large businesspeople in the future. They recognize that today they are different; more realized and consider themselves employers that give opportunities to those that have no other option. In the debate over formality and informality a conflict of identity can be perceived in these micro-entrepreneurs: they feel like employers but at the same time they see themselves as informal workers. Their discourse changes according to their intention.

Keywords
1. Introduction

Informal labor in Brazil, and particularly in Fortaleza, is a historical structural characteristic. Data of 2008, showed that informal workers represented 54.6% of the total occupied population (IDT, 2008). These figures do not vary with economic growth or crisis (Meneleu…).

Santos et al (2012) examined the patterns of informal, freelance and itinerant workers of urban spaces in the downtown and beachfront areas of Fortaleza (capital of the state of Ceará) and identified street hawkers that differ according to their labor status: some were self employed and others were employed by micro-entrepreneurs in return for a commission plus a fixed amount (generally half the minimum monthly wage). These micro-entrepreneurs are street hawkers themselves who have managed to obtain a fixed stall, called a “box”, from the city government to sell their wares or services and act as employers like any other formal entrepreneur. These workers are called here “micro-entrepreneurs”.

This field observation prompted some questions: Is this occupation really informal? What reasons lead these informal entrepreneurs not to formalize their employees? Is this option only to avoid payroll charges? Do they see themselves as still being in the informal economy or as micro-entrepreneurs/employers? In order to answer these questions, we first discuss the concepts of informal sector and informal economy, to better understand the debate about this kind of informal activity bordering formal.

The expression “informal sector” emerged in the 1970s in a report of a program implemented in Africa by the International Labor Organization (ILO, 1972). In the report it is stated that “informal activities are not confined to employment on the periphery of the main towns, to particular occupations or even to economic activities. Rather, informal activities are the way of doing things, characterised by (a) ease of entry; (b) reliance on indigenous resources; (c) family ownership of enterprises; (d) small scale of operation; (e) labor-intensive and adapted technology; (f) skilled acquired outside the formal school system; and (g) unregulated and competitive markets (Bangasser, 2000, p.10).

The coining of this expression by the ILO for an activity in reality long known in the productive world was nevertheless an important milepost in the discussion of informal labor and entrepreneurial activities, although there is still no consensus on the precise meaning of informal sector. Since 1972 various aspects of labor have changed and informal labor is also constantly reconfigured, but still, no agreement has been reached on the meaning of informality.

Santos (2004) presents a reflection dividing the urban space into two economic circuits: (i) the “upper circuit”, composed of “modern” economic activities, aimed at accumulating capital in the global economy, incorporating the latest technology and employing workers with good schooling/qualification levels, engaged in commercial activities aimed at the middle and upper classes; and (ii) the “lower circuit”, with orientation to the local population and
economy, through intensive use of labor and relatively unsophisticated technology, usually carried out under precarious conditions in terms of social protection and aimed at serving the needs of the middle to lower classes. These two circuits coexist and mutually influence each other. The lower circuit is the informal sector where the informal entrepreneurs operate.

In the urban economy there is an informal economy conducted through individual and social actions that aims to obtain the means to survive by those that are outside the regulated labor market and hence are not covered by the rights established in law and the fringe benefits provided by employers. The reflection of Santos (2004) is important to think about the Brazilian informal economy and its two circuits, where formal and informal workers cross paths.

In addition to this conception, there are other attributes of informal activity: disguised unemployment, underemployment, unstructured clandestine and illicit activity, etc. All of these have been widely discussed in the literature. Nevertheless, they can be grouped into three categories: informal as the opposite of formal; informal as marginal activity; and informal as a rebellion against Fordism. In the first conception, the informal sector is the result of population growth and the movement of workers to cities, where there are not enough formal jobs, forcing people into low-paid activities, without social and labor protection. In this sense, the informal and formal sectors are inversely proportional (ILO, 1972, PREALC, 1978).

The second conception views the informal sector as made up of people engaged in non-capitalist, unregulated and even illegal activity, in the context of an underground or unregistered economy (Filgueiras, Druck & Amaral, 2004). This conception goes beyond the notion of ‘sector’ and has to be redefine, in a broader sense, as informal economy. It does not exist only in underdeveloped or emerging countries and the autonomy of the informal worker is not always present.

The third approach to informality considers the activity to be non-Fordist (CUT/DESEP, 1999; Jacobsen, Martins & Dombrowski, 2000). The “not typically capitalist” character stands out. The informal occupations meld into formal ones, with the purpose of flexible but illegal production practices under the name of informality.

To sum up, the general conception of informality is related to survival through activities with low productivity, lack of legal protection and small earnings. As activities can vary within “informal sector” more logical term is “informal economy”. This economy is composed of family workers, liberal professionals, highly qualified consultants, traditional farmers, freelance service providers, peddlers and street hawkers, all enjoying greater flexibility but also held hostage to precarious work conditions with no labor benefits.

This paper describes a case study of a group of informal micro-entrepreneurs in the main downtown public square of Fortaleza, mentioned by the street hawkers as being their “bosses”, in order to establish their social status, activities they are engaged in and the way they employ other workers.
2. Method
Six micro-enterpreneurs who have fixed stalls in Praça da Lagoinha and hire people to sell their wares in the nearby streets or in other public squares were interviewed. Their activities include selling clothes, food and low-cost imported products. We also consulted data from the Instituto de Desenvolvimento do Trabalho – IDT (Labor Development Institute); documents of the municipal government on informal workers of Fortaleza and data of a survey on “Informal Workers in Urban Leisure Spaces in the Municipality of Fortaleza” (Santos et al, 2012).

The interviews were recorded, transcribed and submitted to a discourse analysis (Bardin, 1977). The results, however, include data form the other sources consulted.

3. Results
According to the Fortaleza city government, of the total of 1,254 people enrolled in business activities in Praça da Lagoinha, men are in the slight majority (664) and 694 are 39 years old or younger. With respect to schooling level, 212 are illiterate or did not complete basic education (through ninth grade), while 507 have a basic education, 514 finished high school and only 20 have at least some college education. Of these workers, 66% reside in Fortaleza. The average time working in their current endeavor is 5.69 years.

Of the 1,254 enrolled as sellers in the municipality, 780 work in a fixed sales point and of these it is estimated, according to the information from the interviews, that at least half (390) hire other workers to sell their wares, paying half the minimum monthly wage plus a commission on sales, and/or employ unpaid family members for this purpose. This practice of expanding sales turns them into micro-employers of other informal workers: although the latter receive a fixed wage plus commissions, there is no formal labor contract, with no payment of social security (pension system) contributions and other payroll charges. The majority of these employees (92.52%) do not have social protection. Each micro-employer has, on average, two street hawkers, not counting unpaid relatives.

The micro-entrepreneurs interviewed began their informal careers by their own choice or by recommendation of relatives or friends. The competition for a space to set up the stall was first regulated by consensus among the informal worker but now is controlled by the city government. Those who have managed to obtain fixed spots have progressed more in their undertakings and nowadays spots are informally sold, that is, there is a parallel market of spots, outside government control.

According to interviewees, knowing that many merchants were recruiting people to sell their goods on consignment in nearby streets and squares, they decided to do the same. At first they did not have proper control over the process and lost goods, since the arrangement was by oral contract only with no ‘salary’ accorded, but as time passed they started to pay a fixed wage (half the minimum monthly wage) plus commission, which reduced such losses. The practice of these workers in the center of Fortaleza shows a category of informal employers that, although covered by the definitions of informal labor (Charmes, 2009), does
not appear in the official statistics as an economic unit. It is an informal category that is on the verge of formality because of the hiring of other workers with the same purposes of formal merchants.

Indeed, there is a “process of structural changes under way in society and economy that includes the redefinition of production relations, forms of workers insertion in the production system, work processes and institutions,” which Cacciapuoti (2000; p. 157) called the process of informality. The reality of these freelancers who sell products, render services and employ other informal workers in the public squares of large urban centers is an example of the activities that take place in the lower circuit of the economy (Santos, 2004).

These workers, from our point of view, are, in fact, resisting the global structural changes of the production system, seeking in informality a chance for financial survival but, also, personal realization in a system where formal jobs are scarce, low paid and low recognized. In order to circumvent their situation they use practices similar to those of great capitalists in activities poorly remunerated, underappreciated and, especially, unregulated and considered illegal by public authorities.

Just like many merchants in the formal economy, the micro-entrepreneurs interviewed try to cut costs by ignoring labor laws doing what can be called a “disguised and precarious formalization”. Relying on their informal condition, they obtain higher profits hiring cheap labor, while the people they hire have the illusion of security and less vulnerability: they can always count on a fixed “salary” and commissions. Micro-entrepreneurs are reproducing the process of precarious informalization as a mirror in front of other mirrors, taking advantage of their employees and exploiting their work as any other capitalist entrepreneur, reproducing the process that led them to informality in the first place.

These micro-entrepreneurs dream of increasing their profits and becoming medium and large business people in the future. They use the discourse of informal workers in speaking about their trajectories. But they also recognize that today they are different, more established and consider themselves employers that are giving an ‘opportunity’ to those that have no other option: “I think soon I’ll be able to open a business…then I’ll feel realized…I’ll employ lots of people,” said a micro-entrepreneur.

Asked about the possibility of formalizing the labor relations, they use the same argument of capitalists complaining of the lack of support from a government that charges high taxes from employers: “If taxes were not so expensive I could formalize the contracts with these people… besides, there is the ‘bureaucracy’”, said a connectionist of Lagoinha.

In the debate over formality and informality a conflict of identity can be perceived in these micro-entrepreneurs: they feel like employers but at the same time they see themselves as informal workers. Their discourse changes according to their intention.

4. Final considerations
It can be concluded that the informal micro-entrepreneurs interviewed are in a gray area between formality and informality, producing new workers in precarious conditions while
learning the strategies of capitalists to find strategies to obtain profit, even by circumventing labor laws and keeping their employees in informal status. As one respondent in the clothing business stated: “I know lots of people here who started small ... and today they’re secretly big businessmen…I want to do the same.”

5. Acknowledgements
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6. References


Non-peer reviewed paper
Occupational health intervention in the wood processing sector - A New Zealand government project on reducing exposure to noise and wood dust

Authors
Philippa Gibson, Labour Group, Ministry of Business, Innovation and Employment, New Zealand
John Wallaart, PhD, Programme Manager Accident Compensation Corporation, New Zealand
Ian Laird, PhD, Massey University Centre for Ergonomics, Occupational Safety and Health, New Zealand
Jeroen Douwes, PhD, Massey University Centre for Public Health Research, New Zealand
John Pearse, PhD, Acoustics Research Group, Canterbury University, New Zealand

Abstract
The New Zealand Ministry of Business, Innovation and Employment is trialling an intervention project focussed on reducing exposure to noise and wood dust in the wood processing sector. The intervention focuses on reducing exposure primarily through engineering control, and improved exposure management. The project will facilitate and fund academics, acoustic engineers, occupational hygienists, ventilation engineers and other specialists to work with companies participating in the project. The model is similar to the US OSHA free consultation program for small businesses, and it is envisaged that, if successful in New Zealand, the model could be expanded to a wide variety of workplaces and exposures.

Keywords
Wood dust; noise; intervention effectiveness research; hazardous substances; exposure prevention

1. Introduction
Evidence from recent New Zealand research shows exposure to noise and wood dust in the wood processing sector is causing harm.

Wood processing and sawmilling have some of the highest noise exposures of any sectors (Laird, 2011) and this is reflected in high rates of noise-induced hearing loss compensation claims. Multiple factors lead to poor management of noise exposure in New Zealand. These include: a lack of incentive for industry to reduce exposure; the predominant noise control strategy being minimisation, specifically, the use of hearing protection, with little attention given to elimination, isolation and engineering control; poor effectiveness of hearing protection; lack of monitoring to assess exposure and effectively manage risk; lack of consideration in workplace design and machinery selection to effectively reduce noise exposure; capability constraints limiting the input of technical expertise in providing best practice solutions (Laird et al, 2011).
Research shows an increased prevalence of asthma in New Zealand sawmill workers, and elevated exposure to dust is associated with a significant decline in lung function, of both an obstructive and a restrictive nature (Douwes et al, 2001, 2006, McLean et al, 2012). There is also potentially, a cancer risk as wood dust has been classified by IARC as a Group 1 carcinogen (IARC Monographs, 1995). It is expected that the same factors leading to poor noise management are applicable to wood dust and other exposures. In addition, there appears to be a general lack of knowledge amongst industry about health effects from wood dust exposure e.g. cancers (’t Mannetje, 2012).

To address noise-induced hearing loss and respiratory illness in the wood processing sector, the New Zealand Ministry of Business, Innovation and Employment is trialling an intervention project focussed on reducing exposure to noise and wood dust. The intervention is based on a prevention effectiveness concept (Kristensen, 2005) with the intention that, by reducing exposure, there will be a subsequent reduction in associated adverse health outcomes.

The project will focus on employers reducing harmful exposure in both the short and long term.

2. Intervention design
The intervention focuses on three key areas, as proposed by LaMontagne et al (2005). The three focus areas are: the physical environment; organisational environment; and the worker interface. The hypothesis is that intervention in each of the three areas will result in a reduction in exposure to wood dust and noise.

Focus on the physical environment will address changes that can be made to the machinery, work processes or work areas to reduce emissions and levels of noise and wood dust.

Focus on the organisational environment is aimed at raising the level of management via improving exposure and health management systems, and improving knowledge, perceptions, attitudes and behaviours towards occupational health.

The worker interface focuses on what the worker can do to manage their exposure. Again, the aim is to improve knowledge, perceptions, attitudes and behaviours towards occupational health and effective PPE use. The focus also includes assessment of the attenuation of ear plugs, respirator fit, provision of training on the use of hearing protection, respiratory protection, use of exposure controls in the workplace, and hazard awareness training.

The strategy will be tested with a pilot project focussing on up to 10 businesses in the wood processing sector. The businesses will be those willing to participate, who will receive the advice and training for free, and will in an agreed timeframe implement control measures where it is considered they are needed. It is expected that engineering controls will vary in cost and ease of implementation, and as such a realistic timeframe for implementation will be agreed between the business and the Ministry. This model is similar to the US Occupational Health and Safety Administration (OSHA) ‘Free On-site Consultation Program’ for small businesses. In the program, OSHA facilitates consultants from state agencies or universities.
to work with employers to identify workplace hazards, provide advice on compliance with
standards, and assist in establishing injury and illness prevention programs. In exchange the
employer is required to correct serious job safety and health hazards.

3. Collaborating Partners
The Ministry is collaborating with various experts to implement the intervention. These
include:

- Massey University Centre for Ergonomics, Occupational Safety and Health, for
  intervention design and evaluation of attitudes, perceptions and behaviours
- Canterbury University Acoustics Research Group, for noise assessment, identification
  of sources and engineering controls
- Massey University Centre for Public Health Research, for wood dust exposure
  assessment and peak exposure identification
- Egmont Air Limited, for assessment of and advice on extraction ventilation systems
- 3M Occupational Health and Environmental Safety Division, for respiratory fit testing
  and ear plug attenuation evaluation, and training in the selection, use and care of
  protective equipment.

In addition, there will be collaboration with the onsite engineers and health and safety
representatives in identifying exposure and designing and implementing engineering
controls. Research from the UK Health and Safety Executive (2009) supports the benefits of
including on site engineers in developing control solutions.

4. Intervention Evaluation
In their 2005 paper, LaMontagne et al reported “a particular shortage of intervention studies
targeting occupational disease and associated exposures” and suggested that such
intervention studies be given a high research priority. For such studies, it is also essential
that exposure prevention interventions are rigorously tested for effectiveness to ascertain
whether the intervention has had the desired effect (Kristensen, 2005).

Given the need for good intervention evaluation, this project includes a number of
quantitative and qualitative measures taken both before intervention and following
intervention. These include: noise mapping (Leq and frequencies); personal noise exposure
measurements; video exposure monitoring to identify and quantify peak wood dust
exposures; personal Time Weighted Average wood dust exposure measurements; ventilation
effectiveness measures e.g. capture and transport velocity, static and velocity pressure
measurements; visual assessment of local exhaust ventilation systems; attenuation of ear
plugs; fit testing of respiratory protection; assessment of compliance with the New Zealand
Approved Code of Practice for Management of Noise.

5. Discussion
For this project, finding a balance between good intervention design, valid measurement of
exposure reduction, and the need for delivering an outcome in a relatively short time frame is
a challenge. However, it is hoped that this model of facilitating experts to work with industry
to manage exposure, is successful, and can be expanded and adapted to a wide variety of workplaces with a variety of exposures. It is also hoped that, from the project, the Ministry can develop tools to enable health and safety inspectors to engage directly with companies about options for effective engineering control.

6. Acknowledgements
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Challenges in participatory primary stress management interventions in knowledge intensive SME’s

Authors
Liv Gish, Post.doc., PhD, Technical University of Denmark, Department of Management Engineering Work System Design, ligi@dtu.dk
Christine Ipsen, Associate Professor, PhD, Technical University of Denmark, Department of Management Engineering Work System Design chip@dtu.dk

Abstract
While knowledge intensive SMEs have recognized the need for change with respect to productivity and wellbeing, and to some extend have access to tools and methods for enabling this, they still lack process competences and are uncertain about how to approach primary stress interventions and initiate relevant change processes. This paper presents the outline of our research and development project on participatory primary stress management interventions in knowledge intensive SMEs, as well as the preliminary results and related implications. The research and development project is conducted in order to develop an operational model which SMEs can use when they want to initiate participatory primary stress management interventions in their company. The development project builds on a process model for participatory primary interventions in larger knowledge intensive companies and the premises behind this model in combination with other theories which have been used successfully in other interventions.

The project is only in its initial phases in conducting the intervention, but so far the preliminary results indicate that management support and allocation of resources is vital, that internal facilitators are important drivers of the change process and that easy-to-use tools are requested from the involved company actors. Given that the interventions in the selected companies are conducted successfully we argue that a new organizational capability to address work-related stress in a collective and collaborative manner is developed in the participating companies. With a successfully conducted intervention we mean that the companies have been able to implement their own change proposals in a collective and collaborative process. By developing this organizational capability we expect that the companies would be able to repeat the process with new change proposals. The research builds on observations, participatory action research, interviews and surveys.

Keywords
Primary interventions, SMEs, organizational change, participatory action research, case study

1. Introduction
In Denmark knowledge intensive SMEs find themselves in a situation where they experience increasing problems with work-related stress and strain. It is thus considered to be just as
important as accidents at the workplace. (European Agency for Safety and Health at Work, 2010)

Industrial service companies dealing with servicing, repairs and maintenance experience that their employees are affected by factors such as high workload, customer handling and communication. Small and medium sized ICT enterprises, in this case IT consulting companies, also face a number of problems regarding the psychosocial working environment. Two Danish studies point at that it is especially high demands at work, poor planning, demanding projects, workload and project management which are the main problems. In both groups they point to problems, which can lead to work-related stress, increased absenteeism and decreased productivity. (Jensen et al. 2003; Nielsen et al. 2010a)

Several tools and models to alleviate the problems are accessible for the SMEs via the unions and other organizations. A common feature of these tools and models is that they support the OHS work and shows how work-related stress and psychosocial work environment can be managed and initiate management actions. While SMEs have recognized the need for change and have access to the tools and methods, they still lack process competences and are uncertain about how to approach primary stress interventions and initiate relevant change processes. (European Agency for Safety and Health at Work 2010; Nielsen et al. 2010a) It is our experience that only few of the SMEs have access to in-house HR consultants who can apply these tools and initiate and facilitate primary stress management interventions. There is thus a need for new knowledge on how SMEs can initiate and implement primary interventions (Kompier & Kristensen 2000; Murphy 1988) and thus address the underlying organizational conditions that can lead to work-related stress. (European Agency for Safety and Health at Work 2010; Nielsen et al. 2010b; Randall et al. 2007)

A development project was therefore designed with the aim to 1) develop a model for knowledge intensive SMEs which want to initiate and implement preventive interventions in their own company based on participatory approach where existing in-house resources are being used and 2) uncover the requirements of the actors involved as well as the conditions which affect participatory preventive interventions in SMEs. The project runs from September 2011 to August 2013.

The purpose of this paper is to present the preliminary results of four SMEs participation in the development project, which is now halfway in the moment of writing. Based on our first observations, workshops and interviews, we argue that the model (developed so far) clarifies the employees workplace experiences, creates a common understanding of the working conditions creating enthusiasm and stress, explicates tacit knowledge about work-related problems and solutions and develops the organizational capability to initiate primary stress management interventions based on a participatory process.

Based on the data collection from the initial phase we argue that participatory and primary interventions can be initiated without traditional in-house resources in SMEs such as HR with a positive impact on the work processes and well-being.

2. Methodology
Work-related stress and the problems listed are not solely related to SMEs, however, the research and development project was conducted in order to develop an operational model which SMEs can use when they want to initiate participatory primary stress management interventions in their company. The development project builds on a process model for participatory primary interventions in larger knowledge intensive companies (Knowledge work and stress – Between Enthusiasm and Strain 2006-2009) and the premises behind this model in combination with other theories which have been used successfully in other interventions (Buch et al. 2009; Ipsen & Jensen 2012; Ipsen et al. 2010; Mogensen et al. 2008; Sørensen & Holman 2010).

The project is an explorative study of four case companies which each conduct a six months intervention process with the aim to develop and implement preventive strategies and changes based on a collective and collaborative process. Thus, this is not a classic change management approach, but a dynamic development process where ideas are created and further developed through collaboration among employees and managers, systems understanding, visualization, testing, repetition and adjustment.

In the effort to identify and recruit the participating companies different strategies have been applied; the researchers’ own network, Linked-in, company homepages and company databases. Specifically, four SMEs were selected in Denmark to make up the sample and have agreed to participate actively in the project, two IT-companies and two manufacturing companies ranging from 40 to 170 employees. So far the following project activities have been conducted. First, the project start-up consisted of a series of meetings attended by the researchers and the individual companies where considerations about participation in the project were addressed. When the companies had agreed to the terms and had decided to participate, a project team was formed in each company, consisting of a project manager and two facilitators.

Hereafter, all employers and employees participated in a FishBone workshop at each workplace in order to identify the employees’ experiences with enthusiasm and strain in their daily work. The outcome of each FishBone workshop was a prioritized list of working conditions to be changed which forms the basis for the following interventions. The FishBone workshop was followed by a survey questionnaire using an online survey tool. The aim of the survey was to measure the employees’ commitment to the process. The survey data was then computed for interpretation.

At the end of the companies’ priority process, where two interventions at each workplace were decided upon, relevant actors (project manager, facilitators and three employees chosen randomly at each work place) were interviewed about the usefulness of the tools applied and their experience of the process. Along with primary data, the research team also made use of secondary resources in the form of published articles and literature on participation and primary interventions. In the coming months the four companies will go ahead and implement the changes where everyone is going to participate. The process will be run by and followed closely by the in-house facilitators which have been appointed.
By working with changes over a longer period, there is opportunity for ongoing reflections, improvement and adjustment of these and thereby ensure that the changes embedded in the company and in the daily activities. (Dahler-Larsen 2001; Murphy 1988; Newell 2002) In this process, the persons engaged in the process play an important role in cooperation with the project team. Together they are responsible for driving the process and ensure that the project goes according to plan. The result of the intervention is a collective process in which a number of preventive strategies and interventions are initiated and implemented.

The research team acts as both model designers and supervisors of the change process. The team follows the process by observing the changes, holding status meetings and interview stakeholders and the in-house facilitators besides conducting four surveys during the whole process. The research team does not participate in corporate daily activities and the implementation of priority interventions. To ensure that a sharp focus is maintained on the project, it is recommended that the companies continually focus on clarifying and make the targets and process visible by visualizing both. (Gray et al. 2010; Rasmussen 2008; Womack et al. 2007) At the end each company intervention will be evaluated using the Chronicle Workshop as the evaluation tool. (Rasmussen 2011)

3. Preliminary results
In this section we present our preliminary results which can be divided into two categories: 1) results concerning the intervention model and process and 2) results concerning company gains from implementing the model.

3.1 Results concerning the intervention model and process
Based on our first workshop observations, surveys and interviews the premises and process model have been accepted and started successfully in all four companies. There has been a readiness to identify the project team including the facilitators as well as allocating time and resources to the various activities. However, the process has run more smoothly in some companies than in others.

Furthermore the facilitators are found important as drivers of the change process. The facilitators are characterized by people who are trusted by their colleagues and who is interested in contributing to the development of their work place. The majority of the appointed facilitators does not have any particular experience in running a development process or interview other people. So it seems like the trust and credibility is more important than the ability to run a process at first hand. However, some of the facilitators draw on personal competences such as being creative or being certified as a coach, others use their experience as being former managers. The personal competences are not necessarily known by their colleagues and managers but become evident during the process.

It is also evident that there is a need for easy-to-use tools which the facilitators and project group can use in monitoring and steering the change process. Specifically interview guides and clear instructions for the different activities have been requested.

3.2 Results concerning company gains from implementing the model
The involved companies have experienced results on three levels: 1) Quick wins, 2) changed daily practices and 3) development of internal process competences.

Quick wins are initiatives or issues that have revealed during the FishBone workshop which have not been voted into the top 5 priorities, but management have found value in doing something about them anyway because they were low hanging fruits. Changed daily practices are the target of the intervention and implementing the model and in some of the companies we can already now see how the daily practices change with respect to the selected initiatives. With respect to the development of the internal process competences in the companies we can see that the facilitators develop new competences with respect to how to plan and structure a change project as well how to interview colleagues and report about the process at meetings.

4. Discussion, conclusion and implications
Before the participating companies were selected and agreed to participate, the researchers were in contact with many different SMEs. Many of these SMEs found interest in the project model and acknowledged the need for interventions in SMEs. Paradoxically, however, they did not have the resources to enter the project because they had allocated their resources to other change processes at the moment. This indicates that the need for a process tool is apparent and that SMEs lack the internal resources such as a HR function to facilitate a change process.

However, in the participating companies it can be concluded that both managers and employees have succeeded in finding resources which can help facilitate the process -competences which they have been unaware of. Secondly, it is evident that there is a need for easy-to-use tools which the facilitators and project group can use such as an interview guide and clear instructions for the different activities.

In the present development project the researchers act both as model designers and supervisors of the change process which is primarily driven by the project groups in the companies. The researchers have therefore made themselves available for discussions and answering process relevant questions. This indicates that the project group, and indeed the facilitators need some external sparring partners since it can be difficult to find them in-house. Our hypothesis is thus that the facilitators need a network which can support the sustainability of the facilitators’ new capability to facilitate participatory primary interventions at the workplace. We picture that such a network could be constituted of facilitators from other companies, but also unions or other branch organizations focusing on supporting wellbeing at workplaces from an organizational point of view rather than having the individual as the target for change.

Given that the interventions in the selected companies are conducted successfully we argue that a new organizational capability to address work-related stress in a collective and collaborative manner is developed in the participating companies. With a successfully conducted intervention we mean that the companies have been able to implement their own change proposals in a collective and collaborative process. By developing this organizational
capability we expect that the companies would be able to repeat the process with new change proposals.

The present research challenge is, however, to develop the model to the extent that companies can implement it without the researchers’ interference. This is sought to through careful descriptions of the change process, guidance in selecting the qualified internal facilitators and project manager, development of easy-to-use tools, and guidance of where to seek external support (at least in Denmark where the project is conducted).

The outcome of the project is new knowledge on participatory interventions in SMEs and how the process should be designed in order to make it work and an evaluated model to support the intervention and redesign is produced.

5. References


Knowledge transfer in occupational safety and health for immigrant workers

Authors
Sylvie Gravel, Ph.D., Department of Organization and Human Resources, School of Management, Université du Québec à Montréal, gravel.s@uqam.ca
Jacques Rhéaume, Ph.D., Department of Social and Public Communication, Université du Québec à Montréal, rhéaume.jacques@uqam.ca
Gabrielle Legendre, Master's program, Organization and Human Resources, Université du Québec à Montréal, legendre.gabrielle@courrier.uqam.ca

Abstract
Three knowledge transfer (KT) activities have been developed and validated in a study on strategies to support the management of occupational safety and health (OSH) measures in small Montreal enterprises (SEs, n = 28) hiring immigrant workers. The objectives of these knowledge transfer activities were: 1) to reveal the OSH practices impeding the participation of immigrant workers, and 2) to highlight the positive experiences that encouraged the participation of these workers, and 3) to create a partnership between the OSH and immigration professionals with a view to improving the OSH practices. This paper discusses issues relating to the implementation of these knowledge transfer activities; these were issues involving employers who were immigrants themselves or OSH professionals working in multi-ethnic companies. One of the important findings of the scientific seminar for the OSH professionals and researchers (n = 178) focused on whether the managers, supervisors and employees came from the same country (homogeneity) or whether their countries of origin were mixed. Half the companies in the sample (15/28) were homogeneous. This feature may explain the difficulties experienced by the small enterprises (SEs) in developing OSH competence and understanding the relevance of a parity-based approach. With regard to the evaluation of the second KT activity (training modules), OSH professionals (n = 49) assessed their potential contribution to experiments combining OSH management with diversity; this provided an opportunity to indirectly promote OSH. The eight experiments illustrated various situations, such as French-language training of immigrant workers based on their OSH environment, or the deconstruction of immigrants’ misinterpretations of their rights. The third KT activity was a study day attended by professionals (n = 72) working in the fields of OSH and immigration. Seven recommendations were accepted. To be effective, implementation of these recommendations had to be shared by the various stakeholders involved, and form part of the path for integrating immigrants into the labour market. This integration path was dictated by the hierarchy of the immigrants’ needs, to which a hierarchy of rights was supposed to adapt. The conclusion derived from these KT activities: consultation between public and private services provided in the fields of OSH and immigration is essential if society is to apply its OSH policies without creating social inequalities in worker health. Lastly, there is a demonstration of the use of the research findings to improve services to vulnerable groups.
Keywords
Occupational health and safety, small enterprises, knowledge transfer, immigration/migration, integration.

1. Introduction
The knowledge transfer mechanisms presented in this paper stem from the project, "Strategies supporting the acceptance of health and safety measures in small enterprises hiring immigrant workers in Montreal". While conducting this study, the research team was accompanied by a committee of experts specializing in the transfer of knowledge to communities of practice (CoPs) in the field of occupational safety and health (OSH). Ten experts from diverse backgrounds, including public health centres providing OSH consultancy, joint sector-based associations (JSA), advocacy organizations for immigrants and their integration into the labour market, employers' associations and representatives of the Commission de santé et de sécurité au travail (CSST), which is Quebec's public body for worker protection, collaborated on the project. These experts delineated the factors contributing to the social exclusion of immigrant workers.

Since the 2000s, several OSH studies have focused on immigrant workers. This interest coincided with an influx of foreign workers in a number of production sectors. Perceived as a solution to the labour shortage in various sectors, these immigrant workers were exposed to the risk of injury in different ways, and had varying powers to exercise their rights when they were victims of occupational injury (Kosny and al., 2011; Smith and al., 2009; Smith & Mustard, 2009; Smith & Mustard, 2010). In the scientific literature dealing with foreign workers, two categories of studies are identified: one on scientific findings dealing with dimensions of health and access to services, and the other on information services and knowledge transfer.

In the first category are the scientific findings of research on health issues, such as the mental health of immigrant workers (Chen and al., 2010) or the overexposure of workers to injury (Smith & Mustard, 2010). Some research has focused on immigrant workers in specific sectors, such as agriculture (McLaughlin, 2009) or construction (Crick, 2007). Others have focused on the conditions of workers based on their employment status, which includes designations such as permanent immigrant worker or seasonal or temporary foreign workers (Gravel and al., 2011b; Hennebery, 2008; 2012). Lastly, some studies have focused on undocumented workers or those with pending status (Hanley et al., 2008; Sika and al.,) and workers without a contract, including those employed by agencies specializing in daily or weekly placement (Bernier, 2012).

In general, these studies weigh their findings using variables that control for the following: production sector, company size, lack of job security (full-time, part-time), gender and worker age. The studies rarely consider workers by racial or ethnic origin (Boden & Rees, 2010). Some studies point to the social exclusion -- for racial, cultural and linguistic reasons -- stemming from certain OSH practices.

Authors such as Boden and Rees (2010) complain that files on the public monitoring of worker OSH rarely contain variables such as country of birth, mother tongue, language
spoken at work, or employment and immigration status. The studies are generally conducted using samples provided by volunteers (immigrant workers from one or more communities) (Amar et al., 2009), or combined data from immigration and census files (Smith & Mustard, 2009).

These methodological shortcomings may also constitute a pretext for the inertia of certain political authorities in immigration departments, or of OSH personnel who seek to avoid monitoring the health of immigrant workers (Bogyo, 2009; Boden & Rees, 2010). Although the findings of this research do not meet the methodological requirements of epidemiological studies, they are meaningful enough to have resulted in several knowledge transfer activities. Still, it should kept in mind that the results converge; moreover, using these findings is justified because immigrant workers, be they permanent, temporary, seasonal or insecure workers, continue to find it difficult to exercise their rights. While labour and OSH laws do not exclude immigrant workers, the leverage and capabilities at the disposal of these workers for exercising their rights are weak (Bernstein et al., 2006). It is useful to categorize the exercise of access rights into four leverage categories:

a) **Personal leverage**: knowledge of laws, regulations and language skills that foster worker autonomy.

b) **Organizational leverage**: measures taken by employers and unions to support immigrant workers.

c) **Community leverage**: ethnic, religious or local neighbourhood support.

d) **Institutional leverage**: public OSH services obliged to serve all workers, regardless of their origin, gender or orientation.

In the second category of studies are actions to correct the unequal treatment of workers, thus allowing them to exercise their rights. For example, Kosny and Lifshen (2011) have identified resources in the Canadian provinces and territories directed at immigrant workers and employers. The study identified 224 resources, information guides, pamphlets, videos and information modules on over 400 websites. Some resources are translated into over 20 languages (HSE-Website, 2012). These resources for workers hired in Canada have inspired countries with few OSH structures, such as China and Vietnam, to lay the foundations for their own laws and regulations.

Many of these resources have targeted recent immigrant workers. These tools, including the "Prevention is the best medicine" module (IWH, 2012), introduce workers to the vocabulary, concepts and rules of law. Videos produced by Work Safe BC (2012) teach workers how to identify the most common risks in occupations held by immigrants, such as repetitive movements in material handling (MISI, 2012). These resources also deal with the claims process and work reintegration.

Others concentrate on employers who hire immigrant workers and on labour market integration agencies. The subject matter uses lay terms to discuss concepts and legal rules, with emphasis on understanding cultural differences. In the training modules, "A Safe Immigrant Workforce for Manitoba, An Employer’s Guide to Health and Safety Training" (2012) and "Working in Great Britain from Overseas", the section intended for employers places emphasis on the fear of reprisals felt by immigrant workers should they demand or
even articulate the need for improvements. These modules emphasize the fact that aside from those who are highly skilled most immigrant workers are from countries where OSH structures are either inadequate or absent.

Despite the abundance and ingenuity of these resources, two players are overlooked: employers who are themselves immigrants, and OSH professionals who advise companies hiring immigrant workers. Both of these stakeholders have been incorporated into the core of our research and the KT activities presented here.

2. Materials and methods
The study, "Strategies supporting the acceptance of health and safety measures small enterprises hiring immigrant workers in Montreal" was initiated by OSH professionals providing public services to small enterprises (SEs). Funded by the Institut Robert-Sauvé de recherche en santé et sécurité au travail (IRSST), it was carried out from 2008 to 2011 in a number of Montreal SEs (n = 28), each of which had 10 to 50 workers.

The sample was comprised of two groups: a) observation group SEs (n = 19), in which at least a quarter of the SE workforce was composed of immigrant workers born outside of Canada, irrespective of immigration status or length of stay in Canada; and b) comparison group SEs (n = 9) in which most of the SE workforce consisted of Canadian-born workers (≥ 75). The SEs benefited from an intervention by a team of CSSS Occupational Health (OH) professionals.

June 2008 to June 2010. Three data sources were used: a) interviews with respondents (executives and managers) involved in OSH at the SEs in the sample (n = 28); b) interviews with OSH professionals who worked as external consultants in the SEs (n = 26) and c) a self-administered questionnaire among workers in these SEs (n = 181). The topics were the same for all three data sources: the OSH committee, training and information, OSH skills and resources available, safety procedures, emergency procedures, personal protective equipment, etc.

The dynamics of OSH management were defined by structural elements identified in the literature: presence of a union, company size, material and human resources dedicated to prevention, presence of an OSH committee and a person designated as the primary OSH respondent, and utilization of external advisors. To these we added the characteristics of the immigrant labour (country of origin, immigration status and mother tongue) as elements determining worker participation in joint management representation. However, the study found that the dynamics were even more complex, due to phenomena related to the origins — homogeneous or mixed — of the managers, supervisors and workers.

3. Calculation
Three knowledge transfer (KT) activities were developed from the research findings. The KT activities were intended for OSH professionals in public services, industry associations, mutual associations working in the area of prevention and unions. They could be sources of inspiration for enterprise managers, including immigrants. The KT activities selected were: 1) the seminar, 2) the study day and 3) training modules on winning strategies for OSH
management. To validate the KT activities, we adopted the participatory evaluation of the OSH professionals and the comments made by various members of the research team.

3.1 Scientific seminar
The primary objective of the scientific seminar was to provide OSH professionals with the research findings revealing the factors that impeded the participation of immigrant workers: lack of information; lack of knowledge concerning OSH laws and regulations; and the fact that they did not have a role in activities dealing with the prevention and implementation of corrective measures. The second objective was to illustrate that the dynamics of OSH management in the small businesses differed according to the origins of the managers, supervisors and workers, particularly in work groups where everyone was an immigrant.

The scientific seminar was a presentation of about 45 minutes on the most significant findings of the research. The seminar was given 11 times, bringing together scientists, OSH professionals and occupational health physicians working for public health services or trade union federations. Between ten and thirty people attended each seminar. In total, 178 individuals participated. The research team took note of the topics debated, as well as of the most common positive and negative reactions to the topics covered during this seminar.

3.2 Study day on the recommendations
The primary objective of the study day on OSH practices among the immigrant workers was to make recommendations to improve worker and employer access to these services, and to adapt practices to an intercultural context. The second objective was to create partnerships between professionals working for the OSH services and the professionals working for immigration services so as to improve the effectiveness of the OSH services.

The research findings revealed contradictions between, on the one hand, OSH laws requiring enterprises to initiate workers to OSH safety and preventive measures and, and the other hand, the Quebec law on francization encouraging employers to function in French. Mindful of these contradictions, a debate was proposed on a set of recommendations to overcome the shortcomings of training, information sharing and the rights and obligations of management, as well as on preventive and corrective OSH measures for immigrant workers. The study day was held in May 2012, six weeks after the tabling of the new version of the OSH Act, which made no mention of immigrant workers. During the study day, two groups of panellists (n = 8) were invited to present the position of their organization or institution regarding the proposed recommendations; in addition, the audience invited to this meeting was asked to participate in the debate. Seventy professionals, representing about thirty institutions, took part. External observers (n = 3) and internal observers (three members of the research team) recorded comments from the public reacting to the panellists, and took note of the topics raised in the debate.

3.3 Training modules on best practices
The objective of the training modules on best OSH practices was to propose new avenues for initiating an intercultural approach to OSH. The intercultural approach to OSH involved going beyond the legislative framework for OSH practices so as to introduce the cultural dynamics of the work groups made up of immigrant workers.
At the request of the KT expert committee, the research team identified eight SEs that stood out by virtue of their actions to overcome problems in OSH management and diversity management. Their actions inspired initiatives among other SEs hiring immigrant workers. Some of the initiatives were supported by public funds, or encouraged by the presence of a very influential internal or external stakeholder. Yet all were the result of a desire on the part of SEs to survive the dangers stemming from economic downturn, fines and penalties, OSH contributions and labour shortages.

To develop each of these eight case studies, we did a second interview with the person(s) in charge of OSH in each enterprise to identify the factors that had facilitated the implementation of the diversity management measures interfacing with OSH. In addition to the implementation timetable, it noted the contribution made by the financial, human and technical resources.

The eight case studies were validated in four half-days of training, that is, two case studies per module. In total, 49 OSH professionals from the main CSSS partner in the research project participated, half of whom participated in two or even three training modules. The validation method was identical for all four modules. The two case studies for the module were emailed to OSH professionals five to ten days before the training day. At the start of each session, the participants were reminded of the goals. Then the case was read aloud by the leader. A pause was scheduled for the end of each section to address leadership or pedagogical issues. All comments were recorded and transposed as instructional notes. Since these cases were drawn from companies in their sector, some of the professionals were able to recognize their own contribution to these best practices in OSH and diversity management; thus, they were in a position to enrich both the description of the cases and the instructional notes.

4. Results and discussion
Since the KT activities varied, the detailed findings were also presented by activity. For each activity, the topics broached or those generating discussion were identified. Lastly, the potential impact of the activities on practices and work environments were discussed.

4.1 Scientific seminar
It took about 45 minutes for the scientific seminar to sum up the hundred or so findings (Gravel et al. 2011a). For the purposes of the present article, we will present only the topics that sparked debate. This seminar consisted of five sections: the relevance and methodology of the study; the findings according to the three sources of data in the study: OSH respondents (n = 28); OSH professionals; the SE’s outside advisors for the study (n = 26) and workers (n = 181).

On the theme of relevance, the professionals and scientists were pleased that SEs – long overlooked in the research – figured prominently in the topics discussed. The findings were found to be interesting and relevant, especially with regard to modernizing the bill respecting occupational safety and health in Quebec, which had completely ignored SEs and immigrant workers. While the topic of managing cultural diversity was seemingly new, in reality it had
always been present and would prove to be very important in the years ahead, given the heavy use of immigrant workers to meet industry workforce needs. Although there was a need for them, Quebec had few OSH resources targeting immigrant workers specifically.

The problem of forming a comparison group with non-immigrant workers prompted mocking smiles from OSH professionals, who confronted this reality on a daily basis. On the other hand, the sampling difficulty attracted attention among researchers, particularly among an international group involved in research on diversity management and OSH management in SEs (USE 2009, 2010).

All of the groups would have liked to redo the study using a larger sample that included micro enterprises (<11 workers), service enterprises such as maintenance services and agencies specializing in the weekly hiring of workers. To facilitate comparisons between enterprises, some groups would have preferred excluding subsidiaries at the national or international level.

Several of the findings triggered debate on OSH management in a multiethnic context. One of the liveliest of these debates centred on the composition -- homogeneous or mixed -- of managers, supervisors and employees within the same company. This finding surprised many by its scope and its impact on OSH dynamics in SEs. However, it could easily be explained by the presence of social networks that had been playing a role in the economic integration of immigrants. Note that half the companies in the sample (15/28) were homogeneous, that is, the managers, supervisors and workers were from the same countries of origin. Also, seven of the 28 SEs had managers and supervisors from Canada, while employing workers of mixed origin. Including the comparison group, six of the 28 companies hired mainly Canadian-born workers (taking into account all three levels in the hierarchy). The homogeneity versus the heterogeneity of employee origins emerged as a factor affecting the dynamics of OSH management in the SEs. Figure 1 shows the distribution of SEs according to their homogeneity and heterogeneity profiles at different levels in the enterprise hierarchy. Table 2 provides examples of SEs that are good illustrations of this phenomenon.

Figure 1. Distribution of SEs by workforce origin
Table 1. Examples – Workforce Composition of the SEs in the Sample, by Country of Birth

<table>
<thead>
<tr>
<th>Enterprise Number</th>
<th>Managers</th>
<th>Supervisors</th>
<th>Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 02</td>
<td>India: 100% (1)</td>
<td>India: 50% (1/2)</td>
<td>India: 77% (23/30)</td>
</tr>
<tr>
<td>No. 20</td>
<td>Africa: 50% (1/2)</td>
<td>Haiti: 50% (2/4)</td>
<td>Haiti: 72% (10/14)</td>
</tr>
<tr>
<td>No. 28</td>
<td>Lebanon: 100% (2/2)</td>
<td>Lebanon: 25% (1/4)</td>
<td>Lebanon: 21% (7/34)</td>
</tr>
</tbody>
</table>

In SEs hiring large numbers of immigrant workers: a) the OSH committees were not joint committees; b) training and introduction to the task were based on buddy systems and simultaneous translation into their mother tongue; c) immigrant workers rarely participated in assessing risks or providing solutions. These findings put to the test the ability of OSH professionals to mobilize immigrant workers around prevention projects concerning the leverage wielded by OSH management. For example, an OSH professional reported that during a visit to an SE she “insisted on interviewing the workers about the new masks that had been bought, and on the ease with which they could be worn, stored and cleaned. But the employer, satisfied with the knowledge that the equipment was certified, did not grasp the importance of becoming better informed about worker comfort”.

For the researchers, this way of characterizing the dynamic among the three levels of the enterprise hierarchy was an essential element in documenting OSH management in multiethnic SEs. The homogeneity/diversity of the origins of managers, supervisors and workers was a characteristic that was just as important as the structural components of the enterprises -- such as union presence, company size, the production sector involved and the presence an OSH representative – which together constituted the conventional determinants of the OSH dynamic in enterprises.

The training of OSH respondents attracted interest from all the groups involved. It is well known that OSH training, be it a course or an undergraduate certificate in OSH, is enough to inculcate an OSH culture in enterprises, regardless of enterprise size. However, few SEs can afford to hire a human resources manager with a university education. That said, including mandatory OSH training in management programs could influence the decision to introduce OSH culture into enterprises of any size.

The OSH professionals and researchers had doubts about the existence of OSH committees in the SEs (even committees that were not of the joint type), especially in SEs employing significant numbers of immigrant workers. Anyway, in the eyes of the OSH professionals, it was difficult to imagine a functional and effective OSH committee composed only of employers.

In homogeneous companies -- where managers, supervisors and workers are from the same countries -- the weak mobilization and the silence of immigrant workers are regrettable. OSH
professionals recognize that this weakness is the result of worker loyalty to those who hire them. It is an explicit reflection of hiring through social networks, that is, the economic integration networks used by immigrants. Even though immigrant workers might be overqualified for the jobs they hold, or for which they do not necessarily have the required skills, in areas such as materials handling or mechanical operations, they are obliged to remain loyal to those who facilitated their entry into the labour market. This fact has been noted on many occasions, but it is one to which OSH professionals had never paid much attention, given that they did not see it as an obstacle to the implementation of an OSH culture.

In mixed enterprises, especially those where the supervisors and managers were Canadian-born and the workers were immigrants, the dynamics were different. Strategies to mobilize workers tended to be laborious. In some cases, managers deployed strategies designed to shatter misconceptions regarding immigrant workers. Here too, OSH professionals cast doubt on the potential of such efforts to correct misconceptions regarding the OSH system in SEs hiring significant numbers of immigrant workers.

All groups complained about the low participation of workers in the self-administered questionnaire (n = 181). The differences in the responses between immigrant and Canadian-born workers raised questions. For example, immigrant workers were more likely to avoid reporting an incident or accident, and to avoid having to wear protective equipment. Does society have two categories of workers? Is the rate of non-participation by immigrant workers the same in both homogeneous and mixed SE workforces? Unfortunately, the ethical rules to which the project was subject did not allow us to cross-tabulate the responses of the workers and the link with the employer.

In short, the findings prompted OSH professionals to raise questions about their practices and approach in dealing with SEs. They only took note of the homogeneous SEs, in which the managers, supervisors and workers were immigrants from the same regions and not versed in OSH management methods; the managers dismissed joint approaches. To the researchers, the homogeneous and mixed workforce aspect, characterized in terms of origins, was as much of a determinant of OSH management dynamics in SEs as was the structural characteristics of the enterprises.

**4.2 Training modules on best practices**

At the request of the expert committee, best practices in the SE sample were identified. Eight good practices attracted attention, seven of which were practices of enterprises hiring significant numbers of immigrant workers. Of these, five practices were those of independent SEs, and three were those of multinational subsidiaries. The good OSH practices to which independent SEs adhered were conceived following a crisis that endangered their economic survival, market share or labour relations. The good practices arising in the SEs that were subsidiaries of multinationals were in general guided by the highest standards with which the SEs in the group had to comply.

The validation of these modules was carried out with the team of OSH professionals of the principal research partner in the project. This team was made up of 34 individuals (doctors
and nurses working in OSH, in addition to occupational hygienists, audiologists, etc.). Their comments related to the content of the cases, their impact on the role played by external advisors, and their form.

Although these practices indirectly affected their role, several OSH professionals saw them as opportunities for collaboration with the heads of enterprises. For example, in Case No. 2, an OH nurse recognized her materials; these had been used to develop a training plan that had been submitted to programs funding SEs in periods of economic downturn. The enterprise benefitted from financial support amounting to $200,000 (€156,000) for a 15-week training program.

In Cases 3, 4 and 6, the SEs adopted various training strategies, including French-language training of immigrant workers, to facilitate the incorporation of OSH practices. Here, the professionals saw openings via which they could indirectly introduce OSH practices, even though these strategies fell outside of their usual course of intervention.

Cases 1 and 3 provided information sessions on the contributory system of the OSH protection plan; this was designed to correct a misunderstanding on the part of immigrant workers to the effect that temporary assignment is a penalty imposed by the employer on injured workers (by depriving them of their sick leave). OSH professionals recognized the barriers to the informed participation of immigrant workers, and noted their potential collaboration in these kinds of information activities.
Table 2.

<table>
<thead>
<tr>
<th>Case</th>
<th>Training modules on best practices: Topic - Summary</th>
<th>Enterprise characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Cutting Box</td>
<td>Noting that its employees had a poor understanding of temporary assignment, the SE organized information sessions</td>
<td>* Non-unionized</td>
</tr>
<tr>
<td></td>
<td>with a CSST inspector on the system of compensation and the direct impact of prolonged absences on premium rates.</td>
<td>* Metal processing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 44 employees, 36 of whom were workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 34% were immigrant workers</td>
</tr>
<tr>
<td>#2 Boring-tool</td>
<td>During a downturn in production, an SE relied on different grant programs to maintain the employment relationship and</td>
<td>* Non-unionized</td>
</tr>
<tr>
<td></td>
<td>update the OSH skills and training of its employees.</td>
<td>* Manufacturing of metal tools</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 48 staff, 36 of whom were workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 39% were immigrant workers</td>
</tr>
<tr>
<td>#3 Frozen Food Packaging</td>
<td>The PE adapted the training needs of its non-francophone workers and established a</td>
<td>* Non-unionized</td>
</tr>
<tr>
<td></td>
<td>system of simultaneous translation for all its information activities, training, introduction of new tools and work processes.</td>
<td>* Plastic packaging for frozen food</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 40 staff, 33 of whom were workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 76% were immigrant workers</td>
</tr>
<tr>
<td>#4 Easter Chocolate</td>
<td>Faced with the failure of OHS training for Hispanic employees, an SE appointed</td>
<td>* Non-unionized</td>
</tr>
<tr>
<td></td>
<td>the most senior Hispanic worker to translate the training and set up a buddy system.</td>
<td>* Food processing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 75 staff, 66 of whom were workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 80% were immigrant workers</td>
</tr>
<tr>
<td>#5 Metal Bullium</td>
<td>The new director general of a subsidiary of an international company was concerned with high premium rates, hired</td>
<td>* Unionized</td>
</tr>
<tr>
<td></td>
<td>an OHS consulting firm and created the position of full-time OHS coordinator.</td>
<td>* Foundry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 41 staff, 37 of whom were workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 0% were immigrant workers</td>
</tr>
<tr>
<td>#6 Modern Chair</td>
<td>During a downturn in production, an SE implemented a linguistic integration program for all alophones employees</td>
<td>* Non-unionized</td>
</tr>
<tr>
<td></td>
<td>(managers, supervisors and workers), a program subsidized by the provincial and federal governments. The SE averted</td>
<td>* Wood and metal processing</td>
</tr>
<tr>
<td></td>
<td>layoffs during this downturn, which lasted 15 weeks.</td>
<td>* 50 staff, 43 of whom were workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 75% were immigrant workers</td>
</tr>
<tr>
<td>#7 Bread-tin</td>
<td>A joint industry association (JIA) counsellor supported a SE in the creation and implementation of its OHS committee. For two years it advised the committee members in ways of defining its mandate, developing the skills of its members and assigning tasks to each, identifying enterprise-specific risks and strengthening performance during production slowdowns.</td>
<td>* Unionized</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Galvanization of metal products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 14 staff, of whom 8 were regular workers and 6 agency workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 86% were immigrant workers</td>
</tr>
<tr>
<td>#8 Frozen Warehouse</td>
<td>A seasonal SE employing a large number of students to work at night on forklifts introduced mandatory online OSH</td>
<td>* Unionized</td>
</tr>
<tr>
<td></td>
<td>training for supervisors, OSH committee members and management. Their OSH practices were supervised until certification was obtained.</td>
<td>* Preservation, transportation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 50 staff, 44 of whom were workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 32% were immigrant workers</td>
</tr>
</tbody>
</table>
The participants' comments were informative, providing insights into the dynamics of the enterprises – be they mixed or homogeneous in terms of immigrant origins; comments were transformed into teaching notes and leadership issues.

Take the case of *Modern Chair*, a company with 50 employees, 75% of whom were immigrants. This was a mixed enterprise: two managers were from Armenia; the accountant was Canadian; of the five supervisors, only one was from Canada; of the others, one was from Armenia, one was from Sri Lanka and one was from Spain. The majority of employees (75%) were immigrants. This company made chair assemblies. Because its transformation processes were considered high risk, it was listed as an enterprise under supervision.

Following a downturn in production, *Modern Chair* developed a francization plan for all staff - managers, supervisors and workers - regardless of their position in the hierarchy. This program was funded entirely by two business assistance programs. The first program sponsored by the “State Department of Immigration and Cultural Communities”, helped pay for training costs. The other program, which was promoted by the “State Department of Employment and Social Solidarity”, gave leave with pay to all non-francophone employees. The 15-week program allowed employees regardless of their position in the hierarchy to take French courses, while maintaining their employment relationship during the downturn; employees were classified according to their level of French proficiency. The teachers had adapted their materials to the work environment, drawing on the vocabulary used in production processes, OSH safety instructions, product terms, etc. This kind of program is fairly unusual in OSH practice. However, OSH professionals saw it as an indirect and enjoyable way of promoting OSH, while helping instructors adapt their materials and checking the accuracy of the instructions provided.

The research findings and feedback from OSH professionals concerning the content of the various training modules on best practices guided the formulation of the recommendations used in the design of the third knowledge transfer tool, the study day.

### 4.3 Study day on the recommendations

The main project partner, the CSSS de la Montagne, was the institution selected to receive and serve the immigrant and refugee population, as well as the population with pending status, and integrate them into the network of health and social services of the Province of Quebec; in this capacity, this CSSS proposed a study day on the recommendations flowing from the research. These recommendations may be summarized as follows:

1. That all workers who are recent immigrants receive training on their rights, obligations and recourses in the area of OSH.
2. That small-enterprise owners who are themselves immigrants (SEs, <50 workers) receive training on OSH-related laws, regulations and obligations applying to employers.
3. That SEs provide services to support and guide the development of OSH committees, with a view to ensuring the participation of workers, particularly immigrant workers.
4. That allophone immigrant workers receive OSH training and initiation to their tasks when they are hired, and that this be tailored to their ability to correctly and unambiguously comprehend the safety instructions. This training can be provided in a specific language (e.g. Spanish, Arabic, Mandarin or other language), if the number of workers is sufficient to warrant the creation of a specific group for this purpose. If the
number of workers does not justify such action, then OSH training and initiation to the
task will be provided as usual, but accompanied by an interpreter, more specifically, a
worker trained in OSH and performing well in two languages -- the worker's mother
tongue and French.
5. Create a bank of multilingual instructors providing specific training services (e.g. forklift,
WHMIS, etc.).
6. Develop OSH management tools, including diversity management for the SEs hiring
immigrant workers; the tools would be based on an intercultural approach to OSH.
7. Develop pilot projects linked to these recommendations, and evaluate them
(implementation, impacts and effects).

Seventy individuals, including the panel members and two facilitators, participated in the
study day. The participants were from diverse backgrounds: health institutions working within
enterprises, associations, joint sector-based associations, prevention mutuals, OSH research
centres, public institutions for the protection of workers, worker advocacy organizations and
employment centres for the integration of immigrant workers. The eight panellists, who also
came from these backgrounds, discussed the relevance and implementation of the
recommendations, a discussion in which the audience, too, participated. The audience
sought guidance from the panel on several issues:
• Were the recommendations relevant and justified?
• What were the political, economic and societal issues involved in adopting these
recommendations?
• Who should be responsible for the implementation of these recommendations?

Each of the two panels pursued discussions that were very different from one another and
coloured by the backgrounds and the expertise of each panel. Although these discussions
gave rise to an abundance of suggestions, we have selected the elements marked by a
certain consensus between the panel members and the participating audience.

4.4 Relevance and justification of the recommendations
The first consensus was on the moral duty of society to treat all its workers fairly, and to
introduce forms of leverage enabling them to exercise their rights without discrimination. In
particular, it was essential that all workers become familiar with the right to refuse a task
considered dangerous, the right to preventive withdrawal when unduly exposed to a risk,
including the risks to which pregnant workers are subjected, the right to compensation when
sustaining an injury, the right to return to work after a period of convalescence, and
especially the right to protection against all forms of reprisal.
It is completely justifiable to target immigrant workers as a vulnerable group. Targeting them
would have a positive effect on all SE workers, who receive the least protection because they
rarely belong to unions or associations in a position to represent them.

For these recommendations to be effective, their implementation must be shared by the
various stakeholders and be included in the path designed to integrate immigrants into the
labour market. This integration must be determined by the immigrants’ hierarchy of needs, to
which a hierarchy of rights will have to adapt. Of course, a hierarchy of rights raises political,
economic and social issues.
4.5 Political, economic and societal stakes of these recommendations

In Quebec, the only French territory in all of North America, the integration of immigrant workers raises a political issue steeped in a symbolism and history that the panel members were quick to point out. Each panellist rose to the challenge of differentiating between their civic stance, advocating for a French-speaking Quebec, and their professional stance of supporting legitimate recommendations to protect the life and physical and psychological integrity of the workers.

Once the civic considerations -- promoting the integration of immigrants -- had been set out, the strategies for integrating immigrant workers proved to be compatible with OSH culture; these strategies included those providing for their full participation in joint prevention actions (OSH committees, inquiries, risk analysis, implementation of corrective measures, etc.). Of course, OSH management in SEs hiring significant numbers of immigrant workers requires special care; it is an investment that calls for a thorough review of guidance/coaching practices in SEs and a new division of responsibilities. As one panellist remarked, "we cannot create infinite amounts of training, tools, etc. in every language spoken by these workers". However, we can target specific actions and stakeholders who, because of their location on the path followed by workers in becoming integrated into the labour market, may help immigrant workers understand OSH culture. With time and experience, immigrant workers will come to understand the culture of prevention in the workplace, understand the meaning of parity and do so without distortion. The measures must apply to both workers and employers who are immigrants themselves (in the immigration selection process, employers are often admitted as immigrant investors). Over the course of the study day, the panellists and participants discussed a sequential series of actions depending on the integration path followed by the immigrant workers and immigrant employers, as follows on figure 2.

4.6 Responsibility for the implementation of these recommendations

These recommendations cannot all be implemented by OSH stakeholders alone. Departments of labour and immigration, local employment centres and OSH experts are potential partners in carrying out these recommendations. The best practices identified in the study were cited as examples in support of new partnerships. It is not the means or the will to participate on the part of institutions that are lacking, but the opportunities to participate. The panellists and the audience complained that the lack of time and financial resources undermined attempts to implement preventive OSH actions in SEs hiring immigrant workers.

Figure 2. Integrating immigrant workers and immigrant employers into the world of OSH practices
The study day was a great opportunity for various OSH and immigration stakeholders to discuss avenues for exploration and go beyond their respective niches of expertise in supporting immigrant workers and, indeed, all SE workers.
5. Conclusion

Implementing these recommendations through atypical partnerships is an ambitious undertaking that requires coordination and, above all, the creation of an intercultural approach to OSH. All the resources needed to protect these vulnerable workers are available; however, the initiatives facilitating the exercise of worker rights are uncoordinated. The partnership between the field of immigration and that of the OSH research is certainly unusual, yet made possible by the findings of the present interdisciplinary research. The findings depart from the types of research usually conducted on exposure to OSH risks, or on the conditions for the integration of immigrants or concerning discrimination against them. Rather, they are situated at the confluence of these two fields of research and intervention.

Information, training and initiation to the task provided at the time of hiring, as well as simultaneous translation provided during the teaching of new safety or work procedures, are initiatives providing immigrant workers with individual leverage in the exercise of their rights. There is a parallel here with worker-participation initiatives that are organizational initiatives enabling immigrant workers to exercise their rights in an environment of equality. Initiatives that involve organizations for the defence of workers, immigrants and cultural communities during the settlement and integration process are important forms of community-based leverage. Of course, these organizations for the defence of workers, immigrants and cultural communities are not qualified to train workers in identifying the risks associated with various sectors of production; they can, however, coach individuals, helping them to incorporate these dimensions as they become integrated into the labour market. Community-based leverage is also important in providing information and support to non-unionized workers during the claims process.

Lastly, if society wishes to implement OSH policy without creating social inequality in the area of health, it is essential to promote concerted action among the various levels of government and public and private services in OSH, health and immigration. To be vigilant, public institutions mandated to ensure the health of the population should have the means of monitoring the situation of workers who are vulnerable because of their immigration status, gender or age (Sika and al., 2011; Bogyo, 2009, Boden & Rees, 2010).

Having completed the exercise of knowledge transfer, we will develop and evaluate pilot projects for employers who are immigrants themselves. Drawing inspiration from the work of Kosny and Lifshen (2011), the evaluative research should answer the following questions:

- What mechanisms and resources should be favoured (training, information, simultaneous translation, initiation to the work, etc.)? By whom and at what times during the integration process are immigrants linked to these mechanisms and resources?
- Are the mechanisms and resources rigorous and of high quality? Have they been evaluated? Are they considered effective? What information is selected/retained by the workers? How do they help immigrant workers exercise their rights?
- What role can workers, employers, OSH professionals, trainers and union representatives play in informing immigrant workers about OSH practices and their rights?
6. References


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Overview of the Danish occupational health and safety system for the fishing industry

Author
Sisse Grøn, Centre for Maritime Health and Society, University of Southern Denmark, Denmark smfg@cmss.sdu.dk

Abstract
I wish to share some experiences from the Danish occupational health and safety system for the fishing industry, with the participants of the roundtable discussion Managing OHS in the fishing industry: developing a research agenda and discuss a new project too.

1. The health and safety system
1992 the Danish fishermen’s health service was established as a mandatory service for all working fishermen. Small vessels pay the same as the large ones, and the fee entitles them to 4.5 hours of counseling pr. employee. The health service’s experience is that after a difficult start, where they had to earn the fishermen’s trust, they are now being used by small and large vessels a like, the notion seems to be that since they are paying they want something in return. The safety organization is port based, with 3 regional safety organizations in the country and an annual risk assessment on each vessel irrespective of the number of employees is mandatory. At the same time our scientific institution (now centre of maritime health and safety) was established in order to conduct maritime medicine research for the benefit of fishermen and seafarers.

The health service is based in the port are in the large fishing port of the City Esbjerg and the four employees make an effort to meet the fishermen where they are and develop simple and relevant tools for prevention. These efforts has made a difference to the fishermen’s health and safety, according to their own data based on reported accident, the number of work accidents has declined from 38.6 pr. 1000 fisherman to 14.1 in 2010.

2. The intervention project
We are currently applying for funding for a project which will analyze the number of reported accidents for the last ten years and map the safety system and the safety climate on all vessels. The project will also conduct a safety culture oriented intervention involving the crew and family of 20 vessels. The vessels will be both over and under 15 m. in size and based in the same community. After the intervention we re-measure the safety climate and compare the results between intervention vessels and the rest of the Danish vessels and also between small and large vessels.

Keywords
Fishing industry, safety
Return to work in small enterprises

Authors
Kristina Gunnarsson, PhD, Department of Occupational and Environmental Medicine, Uppsala University, Sweden, kristina.gunnarsson@medsci.uu.se
Markus Larsson, Analyst, The Swedish Social Insurance Inspectorate, Stockholm, Sweden, markus.larsson@inspsf.se
Helena Persson Schill, Analyst, The Swedish Social Insurance Inspectorate, Stockholm, Sweden, helena.persson-schill@inspsf.se
Malin Josephson, Ass Prof, The Swedish Social Insurance Inspectorate, Stockholm, Sweden, Department of Occupational and Environmental Medicine, Uppsala University, Sweden, malin.josephson@inspsf.se

Abstract
All employers in Sweden are responsible for vocational rehabilitation, including making occupational adjustments and overseeing the possibility of redeployment. The Swedish Social Insurance Agency is responsible for coordinating necessary measures together with the employee, the employer and health care services or other relevant partners in order to facilitate the return to work process for the employee. As small enterprises are vulnerable for employees’ absence the need of support in the return to work process is of importance. The purpose of this study was to understand and identify possible areas of improvement in this process.

Semi-structured interviews were conducted with 16 small enterprises, representing different trades and employed up to 30 employees, both men and women. The main selection criterion for inclusion was that the enterprise should have had an employee on sick leave for more than 90 days during the past two years.

The interviews showed that employers in small enterprises made efforts to adapt the workplace for employees on sick leave. However, there was no set procedure for handling contacts between the employer and employee during periods of sick leave. It was unclear for the employers how to cooperate with the Agency in the return to work process. Three of the employers affiliated to the occupational health service had used their services to make occupational adjustments to the workplace.

An area for improvement could be extended professional competence and support in the return to work process in order to identify possibilities to adapt the workplace and hence facilitate return to work. The role of the Agency as coordinator in the process is unclear and need to be elaborated. The occupational health service have or should have the knowledge required and could constitute an active role in improvement of the return to work process.

Keywords
Return to work, small enterprises, social insurance, occupational health service
1. Introduction

Employers in Sweden, regardless of number of employees, have a responsibility for vocational rehabilitation. This includes making occupational adjustments and overseeing the possibility of redeployment to help employees return to work after a period of illness (1). The Swedish Social Insurance Agency (henceforth the Agency) is responsible for coordinating necessary measures together with the employee, the employer and health care services or other relevant partners in order to facilitate the return to work process for the employee (2).

The Swedish social insurance system generally covers sickness benefits for all employees in Sweden. The first day of sick leave is a waiting period. During day 2-14 of absence, the employer pays approximately 80% of the employees' wages as sick pay. After 7 days the employee needs to present a medical certificate to the employer. On day 15 there is a shift in financial responsibility from the employer to the Agency. Thereafter entitlement to sickness benefit is assessed by the Agency according to the rehabilitation chain which is regulated by the Social Insurance Code (2). In short this means that the employee's work capacity is assessed within certain time intervals. After 90 days of sick leave the Agency should have examined whether the employee can return to work if he or she can be reassigned to another work within the enterprise. The Agency should also coordinate the return to work process in all enterprises regardless of number of employees.

In general small enterprises do not have a department for human resources (HR), and they often have limited experience of employees being on longer sick leave. Furthermore, small enterprises are often dependent on each employee's unique skills, which means that absent employees can be difficult to replace. In larger companies, there are often several employees with similar sets of skills and also HR-departments with experience of how to proceed when employees are absent due to sickness. There is a limited possibility to redeploy an employee to other duties in a small enterprise, compared to larger enterprises, which is a further difficulty in the return to work process. Overall, this means that in small enterprises, both the employer and employees are especially vulnerable for sickness-absence.

The purpose of this study was to understand and identify possible areas of improvement for the return to work process in small enterprises.

2. Method

Semi-structured interviews were conducted with 16 small enterprises. The researchers chose to limit the study to these 16 as saturation was achieved. The enterprises were located in the midst of Sweden and needed to have had an employee on sick leave for more than 90 days during the past two years in order to be interviewed. The enterprises represented different trades and employed up to 30 employees, men and women. The interviews included questions about routines when having an employee on sick leave, kind of occupational adjustments, cooperation with and expectations on the Agency, and cooperation with occupational health services. The interviews were performed by three of the researchers and lasted for about 45 minutes. After transcriptions they were analysed individually by the researchers using content analysis. A fourth researcher, not involved in the interviews, also took part in the analysis.

3. Results
3.1 Routines when having an employee on sick leave
Almost all of the enterprises had routines for how to handle employees’ notification of sick leave. In most cases, the employee contacted a specific person at the enterprise. However, none of the enterprises had documented routines. Most of the enterprises had one or two contacts with the employee during the first 14 days of sick leave in order to follow up on his or her health status and plans to return to work. This differed between employers. All employers had knowledge of how to notify the Agency about employees’ sickness absence after the first 14 days of sick leave.

3.2 Contact between the employer and the employee on sick leave
The interviews showed that the on-going contact between the employer and employee was mostly by telephone but the employee could also visit the enterprise. Two of the employers had also visited the employee in their homes. The employees could also take an active role by informing their employer about their health status and ongoing vocational rehabilitation. The employers mentioned the importance for the employee to have social contact with the workplace. Some of the employers expressed uncertainty of what the employee can be expected to inform the employer about and pointed out the importance of being able to manage and plan the production. However none of the employers had formalised or documented routines for the return to work process.

3.3 Occupational adjustments and redeployment
The employers clearly expressed, in the interviews, that they were and should be responsible for occupational adjustments and redeployment, since it requires detailed knowledge of the enterprise’s production and organisation. Furthermore they also stated the need of support in finding adequate measures to facilitate an employee’s return to work. Examples of occupational adjustments that were mentioned during the interviews were change of working hours and work tasks as well as adjustments in the physical work place. But also to allow time for exercise, additional rest at work and work from home. One of the employers mentioned the economic responsibility of purchasing vocational aids in order to help the employee back to work. If they had to buy very specific aids they have the possibility to apply for grants from the Agency. However, the common impression was that the employers were willing to make considerable occupational adjustments to support employees in returning to ordinary work. On the other hand, employers found it more difficult to accommodate redeployment to other work tasks in the enterprise.

3.4 Cooperation with the agency
Ten of the sixteen interviewed employers had had contact with the Agency concerning employees’ sickness absence. Five of them had been contacted by the Agency, three had contacted the Agency themselves, one had contact with the Agency through the occupational health service, and one had indirect contact by responding to an employee’s statement requested by the Agency. In the five cases, where the Agency had contacted the employers the reason was to convene a coordination meeting with the employee on sick leave and his or her physician, the employer, and the Agency. The employers found these meetings most valuable for planning the employee’s return to work, given that they in advance had received information about the purpose with the meeting.
When the employers themselves contacted the Agency the reason was to find out information about ongoing steps in the process. While the employers were adamant that adaptation and redeployment were their responsibility, they also expressed lack of knowledge and uncertainty about their overall role in the return to work process. The employers wished for an early contact with the Agency, preferably within the first month of sick leave. In their opinion, early contact with the Agency was important for supporting employees in return to work, but also for work planning. They also found the Agency’s contact points rather complex and proposed easier contact ways without giving examples. The employers also pointed out the importance of the Agency’s knowledge about the workplace for the return to work process.

3.5 Contact with the Occupational Health Service

Thirteen of the interviewed enterprises were affiliated to occupational health services. Three of these stated that the occupational health service took an early and active part in the return to work process, and that they were helpful in terms of medical rehabilitation as well as occupational adjustments. The employers expressed that the occupational health service’s knowledge about the workplace was a key factor for employees’ successful return to work. Two of the thirteen enterprises received advisory support from the occupational health service. Remaining eight enterprises did not have any contact with the occupational health service in the return to work process.

4. Discussion

The interviewed employers were overall active in the return to work process. However, one problem in small enterprises is the lack of experience of the process and the absence of documented routines. Instead they try to solve the problem on an ad hoc basis, which tend to be the work approach to health and safety in the work environment in small Swedish enterprises. This is in line with a study made by the Swedish Work Environment Authority (3). An interpretation of the interviews was that the employers found it easier to have contact with employees who suffered from musculoskeletal rather than mental- or stress related disorders. Furthermore, none of the employers reflected over their own time costs in the process of supporting employees in returning to work. Having documented routines could facilitate this process for the employer as well as for the employee on sick leave.

All employers stated that they were responsible for occupational adjustments and redeployment. But as they were unsure of which steps to take for supporting the employee they asked for practical advice. In the Agency’s internal guidelines it is stated that it should coordinate the return to work process for all employees regardless of employer. Up until recently their strategies have been more addressed towards larger enterprises.

The employers were also unsure about the Agency’s role in the process. More detailed and more easily available information from the Agency could facilitate the contacts with small enterprises. The information needs to be directed to the employer when the situation with an employee on sick leave occurs otherwise it will go unnoticed.
Occupational health service could take an active part in the return to work process in small enterprises. They are supposed to have competencies in developing procedures for how to support employees on sick leave, the employer, and also on how to promote return to work for all parties involved. If the occupational health services already are familiar with work conditions at the enterprise and are involved in the prevention of health problems, they also have good knowledge of the opportunities for redeployment and work adjustments (4, 5). The occupational health service could therefore act already from the first day in the sick leave period with both medical rehabilitation and advice to the employer on how to make occupational adjustments in order to facilitate return to work. However, today only 10-50% of employees in small enterprises, depending on trade, have access to occupational health service, in Sweden (6).

4.1 Methodological limitations
A general limitation of the study is that no information has been retrieved from the employee on sick-leave nor the Agency. Certainly, this would have given more opportunities to a wider understanding and identification of areas of improvement for the return to work process.

4.2 Implications
Small enterprises are vulnerable to having employees on sick leave. An area for improvement is to extend the employers’ knowledge of various options in the return to work process. The coordinating role of the Agency in this process is unclear to the employers and need to be elaborated so that they can make use of the Agency’s knowledge and experience. The occupational health service have or should have the knowledge required and can constitute an active role in improvement of the return to work process.

4.3 Funding
This study is funded by The Swedish Social Insurance Inspectorate, Stockholm, Sweden.

5. References
Discovering authentic ethics leadership within the iron cage: a socio-historical study in a cooperative Dutch bank to explain/understand the role of leadership under the dominance of ‘new liberal economics’

Authors
Matthew Haigh, Department of Financial and Management Studies School of Oriental and African Studies University of London mh92@soas.ac.uk
Frank Jan de Graaf, Hanze University of Applied Sciences, Universiteit van Amsterdam Business School Amsterdam University of Applied Sciences f.j.de.graaf@pl.hanze.nl

Abstract
Based on a case study in finance we develop the proposition that the separation thesis in mainstream management science and economics blocks our understanding of ethical leadership and organizational change. A process perspective of organization enables us to assess the theoretical distinction between the institutional dynamic of an organization, the collective responsibility, and the opinion authentic leaders have about the direction of the organization.

A line of argumentation is presented that a business collectivity such as a group of cooperative banks can exhibit authentic practice if it attends to a means of evaluating its decisions and actions in the light of the opinion of leading professionals, most often the CEO. More widely, under consideration is whether organizations can validate moral norms even if appropriated by sector standards. The structure of an organization is an important determinant in validating norms. A real world case illustrates the whole problematic. Working with ten year old data, over a period starting about 25 years ago, we demonstrate the value of a sociological-historical approach in business ethics. Banking regulation seems to have a strong normative aspect, working with a role model that was, looking backwards, very unsuccessful.

Keywords
ethics, leadership, finance
From understanding to action: new strategies to reach out to, and support, small enterprises

Author
Peter Hasle, Professor, Centre for Industrial Production, Aalborg University Copenhagen, Denmark, hasle@business.aau.dk

Abstract
Research and practice have gained considerable knowledge about small enterprises during the last decade. The belief that support to small enterprises just was a question of scaling down large enterprise programmes to something which would look more simple, seems to be worn out. We have now a good understanding of the special features of small enterprises such as the owner-manager as the focal point of the organisation, the close social relations, the short distance from decision to action and not least the limited resources. Although there is a need to be more systematic in the design of support programmes, there are also a growing number of examples of successful support strategies which build on the understanding of small enterprises adapted to the local, sector and national context. Among the strategies are incentive systems, networking and action learning programmes.

However, working environment programmes are in many cases still placed in a sidecar with limited integration into business strategy and operation. Government programmes are most often separated in either working environment and business development. The examples of integration are rare. The same counts for many programmes developed by NGOs such as employers associations, unions and insurance companies. The same split counts for the small enterprises. The owner-managers believe that health and safety has to be cared for because of moral and legal obligations but also that health and safety is a hassle which is costly and turns the attention away from the daily fight for survival of the business.

There is therefore a need for the development of strategies which can overcome the split. One possibility is to prove the business case of working environment investment. Although helpful small enterprises rarely make such investment calculations. For most owner-managers the decisive questions have to do with the practical problem the change (whether in equipment or organisation) is supposed to solve, whether the cost is sufficient low, and whether the practical implementation and operation can be carried out with limited use of the scarce time resources. The integration of business and the working environment is therefore a question of thinking the two issues together in the daily operation. In for instance construction it is question of including the working environment in the tendering process and to use the most safe equipment because it is also the most efficient equipment. Another example can be tools based on ‘value stream mapping’ from ‘lean manufacturing’ which can be used to identify both productivity and health and safety issues at the same time.

Rethinking the business case in this way can be used by researchers and practitioners in the development of tools and methods, and it can be used by governments and NGOs in cross sectional programmes where for instance labour inspectors also relate to the business case
of the working environment and ministries of commerce integrate the working environment into their business support programmes.
Abstract

Dispelling some of the perceptions associated with small scale fishing operations in New Zealand

Author
Jeremy Hayman, PhD, OHS Research Group, School of Management, AUT University, Auckland, New Zealand. Jeremy.hayman@aut.ac.nz

Abstract
The fishing industry is perceived to be notoriously dangerous with high accident rates, widespread alcohol and drug usage, and a poor safety culture. This discussion will focus on dispelling some of these perceptions. The findings presented are based on interview data of employers and employees in the New Zealand fishing industry. The study endeavoured to broaden the current research perspectives to include the OHS perceptions of those working in small scale, independent, community-based fishing businesses within the New Zealand fishing industry. Contrary to previous studies the findings in this study indicate that many inshore fishing vessels have relatively low accident rates, have rigorous (self imposed) rules around alcohol and drug consumption and have a strong focus on health and safety. Finally, the discussion will explore a number of barriers to implementing and maintaining OHS measures, for example, increasingly tight profit margins, time pressures, and confusion around regulatory requirements.

Keywords
Fishing industry, seafood, health, safety, intervention
Relationships in small-medium enterprises (SMEs): problems, issues and resolutions

Facilitators
Marcus Ho, PhD, Senior Lecturer, Faculty of Business and Law, AUT University, Marcus.ho@aut.ac.nz
Rachel Morrison, PhD, AUT University, Rachel.morrison@aut.ac.nz
Mark Le Fevre, PhD, AUT University, Mark.lefevre@aut.ac.nz

Abstract
This workshop is an exploration of the current thinking of relationships in small-medium enterprises (SMEs). Understanding relationships in SMEs is important and can be critical to an enterprise’s functioning, health and wellbeing. Research and practical wisdom suggests that managing relations such as those with employees, suppliers, customers and investors remains a critically important issue for SMEs. Conflict and poor management of relationships within and outside the enterprise can lead to a range of negative outcomes for the business owner or entrepreneur, and can include increased stress, disengagement, work overload and decreased motivation. Further, these workplace relationship issues can spill over into other spheres of life, negatively impacting personal activities and family lives. The workshop focuses on the ways in which relationships in SMEs (be they negative relationships, employee and stakeholder relationships, or simply membership to a social or professional network) can influence and affect the management of SMEs. We hope to extend and disseminate our knowledge of social relationships, work practices and processes that affect the nature, structure and conditions of work and organisation in SMEs and, in the process, develop new directions for research and practice.

1. Objectives
This workshop examines the relationships that entrepreneurs and business owners have with their employees, families and other stakeholders, and offers insight into balancing their personal and work lives, focusing on the management of their relationships. In this workshop, we seek to share, discuss and advance our understanding of social relationships in SMEs through defining problems, raising issues and posing questions. This interactive workshop will begin with a brief presentation from the panel about recent theoretical developments and empirical investigation in the field of social relationships, work-life balance and workplace issues in SMEs to stimulate discussion of issues and resolutions for practice and research. The intention is to bring together theoretical knowledge and research and explore ways in which practical implications and practices can be garnered from research and practice in order to extend resolutions and solutions for SMEs.

2. Expected number of presenters
A 20 minutes presentation followed by 40 minutes of workshop discussion will structure the workshop. The 20 minute presentation will cover aspects of the facilitator’s research areas (see below) in the areas of organisational relationships (the nature, types and outcomes),
work-life balance in SMEs and relationships in organisations. The workshop discussion will focus on developing practical implications from the research. This workshop will focus on giving those struggling with workplace relationships a deeper understanding of how the workplace and organisational context may influence the quality, quantity, and content of relationships and outcomes within SMEs.

3. Presentation speakers
Dr Marcus Ho research and teaching interests lie at the nexus of entrepreneurship and HRM. He has taught undergraduate, postgraduate and executive courses in entrepreneurship and human resource management at the University of Auckland and AUT. His current research involves looking at worklife balance in start-ups, and managing people in SMEs.

Dr Rachel Morrison currently runs the Organisational Behaviour programme within the Faculty of Business at AUT University (NZ). She has published articles in a variety of academic Management and Psychology journals, has contributed to a leading Australasian Organisational Behaviour textbook and co-edited the book Friends and Enemies in Organizations: A work Psychology Perspective. Rachel’s research interests include relationships in the workplace, gender and equity issues, entrepreneurship, virtual social networks, work-life balance and friendship formation.

Dr Mark LeFevre’s primary interest is in the broad area of the psychology of management at both the individual and group level. He is currently engaged in a cross disciplinary research project investigating the relationships between stress, stress management, and performance in commercial managers involving researchers from the Faculties of Business and Health.

4. Programme length
1 hour
Patterns of underlying causes of work-related traumatic fatalities — comparison between small and larger companies

Authors
Theresa Holizki, LLB, Manager, Industry & Labour Services, Workers' Compensation Board of British Columbia, Richmond, British Columbia, Canada, THolizki@shaw.ca
Rosebelle McDonald, Industry Specialist, Industry & Labour Services, Workers’ Compensation Board of British Columbia, Richmond, British Columbia, Canada, Rose.Mcdonald@worksafebc.com
Faith Gagnon, HBSc, Gagnon Research Associates, Surrey, British Columbia, Canada, Faith.Gagnon@pasi.ca

Abstract
Objective: There are consistent reports of discrepancies in injury and fatality rates between small and larger businesses. We undertook this study to identify patterns of safety behaviour that might explain the differences.

Methods: We mined the database of the Workers’ Compensation Board of British Columbia (WCB) for data on all traumatic fatalities for the period 2003–2007. Investigators’ reports, coroners’ reports, and employers’ reports were also reviewed to determine underlying patterns of cause of fatalities in different industries and to assess whether there were significant differences between fatalities in small and larger businesses.

Results: There were 422 traumatic fatalities: 243 in small business and 179 in larger businesses. Fatality rates were 9.7 and 2.7 respectively. Factors for which there were significant differences by employer size were: fatalities within 1 month of employment (higher in small business); fatality rates in primary industries and transportation (higher in small business); vehicular incident fatality rates (higher in small business); and seat belt use (lower in small business). The incidence of alcohol abuse or recreational drug use contributing to the fatality did not differ by business size. Other findings were that cannabis use is prevalent in the logging industry, alcohol abuse is prevalent in the fishing industry, general construction workers do not always wear the necessary fall protection, and seat belt use is not prevalent among truckers and log haulers.

Conclusion: In British Columbia, small businesses have a significantly higher traumatic fatality rate than do larger businesses. Prevention strategies are needed to address training and supervision of new workers in small businesses, recreational drug and alcohol use, and seat belt use.

Keywords
workplace health, safety, fatality, accident prevention

1. Introduction
Prevention of fatalities is one of the primary goals of occupational health and safety programs. Understanding the causes of fatalities can lead to better-focused injury prevention strategies that will also reduce serious injury rates and overall injury rates. It has been repeatedly shown that smaller businesses have higher fatality rates than do larger businesses in the same industry (Mendeloff et al. 2012).

British Columbia is a maritime and mountainous province in Western Canada with a population of 4.5 million. Since 1917, all businesses in B.C. that have employees have been required to participate in injury and death indemnity coverage provided by the government-mandated Workers' Compensation Board (WCB). All employed workers are covered by this program whether their employer pays the insurance premiums or not. Self-employed professionals can opt in or out of coverage. Because of this universal coverage, there is a single data collection process that includes all workers and therefore provides denominator data as well as injury data, although some seasonal and part-time workers may not appear in the denominator data set. This eliminates undercounting (Rosenman et al. 2012) and the need for complex and inaccurate processes, such as that described by Cohen et al. (2006).

In an unpublished study using WCB data, the traumatic fatality rate among workers in small companies (those that employed fewer than 20 person-years) was 9.7 per 100,000 person-years, compared to 2.7 per 100,000 person-years for larger companies (those that employed 20 or more person-years) and 4.6 per 100,000 person-years in all companies in B.C. When the comparison was between companies in similar industries, the fatality rate was up to 5 times higher, even though small employers have lower overall injury rates than their larger counterparts and their serious injury rate (ICD-9) is only 2.5 times higher. We believed the difference between the relative fatality rates and the overall injury rates might reflect several factors that could affect reported serious injury and fatality rates:

- The overall injury rate among employees in small businesses may appear lower than for larger businesses because the workers in small businesses may discount minor or soft tissue injuries.
- Small businesses may under-report their payroll, for a variety of reasons, including that they tend to employ more seasonal or part-time employees, and it can be cumbersome or difficult to track the overall payroll.
- Small businesses may be subcontracted by larger businesses in similar classification units (CUs) to perform tasks that carry a higher risk of injury.
- Small businesses may not have the necessary time, budget, knowledge, or expertise to look into health and safety issues compared to larger businesses, where there are economies of scale even with respect to safety programs.

We undertook a review of traumatic fatality claims accepted by WCB over the period 2003–2007 to try to clarify the potential role of each of these factors (although we realized that some would be nearly impossible to determine) and to identify patterns among the fatalities that would enable us to develop effective injury/fatality prevention programs.

2. Material and methods
The WCB database was mined to obtain all fatalities for the period 2003–2007. All non-traumatic fatalities (such as neoplasms) were eliminated. Fatalities for which the coding did not clearly indicate whether the cause was traumatic (for example, heart attacks) were retained until further information could be obtained to clarify the cause but were excluded if the cause proved not to be traumatic.

Data fields included were:
- Injury data
- Year of injury
- CU, a designation of industry type within an industry sector
- Employer size as person-years (a number calculated on the basis of payroll and average annual income for employees in that CU)
- Claim cost (both projected and paid to date)
- Work days lost
- Age
- Gender
- Injury description, including coding for nature of injury and body part injured
- Occupation code
- Accident type (both coded and text)

An additional data set of the number of person-years employed, separated by CU and employer size, was obtained for the same period.

Using the claim number of each of the traumatic fatality claims, we manually searched for information in three other WCB databases:
- The Claims Management System, which contains electronic copies of all documents in the claim file, including physician reports
- DecisionNet, which contains documents related to acceptance of the claim
- FirmFile, which contains documents such as the investigators’ reports

These three databases were searched for information related to the following:
- The fatal incident:
  - Whether there were written work procedures or adequate supervision
  - Whether the worker had been wearing or using personal protective equipment appropriate to the task
- The employee:
  - Duration with the employer
  - Duration employed in this job
  - Experience at this job
  - Whether the incident occurred at a familiar worksite (whether the worksite was regular or variable)
  - Whether drugs or alcohol were contributing factors identified at autopsy
- The employer:
  - How long the employer had been registered with WCB (whether registration followed rather than preceded the incident)
Data that were fairly consistently available from these sources included:

- The employer report, which usually included:
  - Duration the worker was employed with this employer (start date)
  - Duration the worker was employed in this job (although this was sometimes interpreted by the employer as "this specific location" when the worksite was variable)
- WCB account status for the employer, which provided the date the employer registered with WCB

Data inconsistently available from these sources included:

- The notice of incident report
- Subsequent communication with the employer
- The coroner's report, which usually provided:
  - Detailed information about the incident
  - Information on the cause of the incident
  - Recommendations for prevention of similar incidents, including written work procedures
  - Use of seat belts in motor vehicle crashes
  - Use of personal protective equipment
  - Drug and alcohol levels with commentary on whether they were contributing factors

Overall, there were significant gaps in the data, with no relevant data available on approximately 15 to 20% of claims. Data were analyzed using Student's t-test and the chi-square test, as appropriate. Where appropriate, odds ratios were calculated.

3. Results
There were a total of 435 fatalities reviewed for the 5-year period: 251 were in small businesses, and 184 were in larger businesses. Of these, 13 proved not to be traumatic after further investigation, leaving 243 in small businesses and 179 in larger businesses. Of these, 93% were male. There were no significant differences in mean age of the claimant (44.9 ± 13.7 in small businesses vs. 44.5 ± 13.8 in larger businesses) by either gender or business size (figure 1).

Figure 1. Age distribution of fatalities by business size.
The data set of the number of person-years by CU and employer size showed that there were a total of 9,483,230 person-years: 2,587,552 in small businesses and 6,895,678 in larger businesses. These data were used as denominator data in subsequent calculations. As noted above, the overall traumatic fatality rate among workers in small companies was 9.7 per 100,000 person-years, compared with 2.7 per 100,000 person-years in larger companies (OR=3.62).

3.1 Time registered with WCB
The length of time that the employer with the fatal incident had been registered with WCB was calculated. For small employers, the mean duration was 12 years (+/– 10 years), whereas for larger employers the mean duration was 20 years (+/– 13 years) (p<0.001).

3.2 Worker duration of employment
Workers employed by small companies had been employed for shorter duration than those employed by larger companies (figure 2). Average duration of employment for small companies was 6 years (+/– 9 years), whereas average duration of employment for larger companies was 8 years (+/– 10 years) (p<0.03).

Figure 2. Duration worker had been employed by this employer. Note that the x-axis is non-linear.
The number of fatalities that occurred when duration of employment was less than one month, or even less than one week, was more significant. Among small employers, nearly 9% of fatalities occurred within 1 week of employment, whereas among larger employers the incidence of fatalities within 1 week was only half that. Among small employers, another 4% of fatalities occurred between 1 week and 1 month of commencement of employment, whereas for larger employers this was only 1% (p<0.002).

3.3 Traumatic fatality rates by industry sector and accident type

To help focus on the highest-risk sectors, fatality rates were determined by industry sector (figure 3), and to help focus on the highest-risk activities, fatality rates were determined by accident type (figure 4). These data show that primary industries (fishing and forestry), transportation and warehousing (trucking), general construction, vehicular incidents, and falls to lower level warranted further investigation.
Figure 3. Fatality rate by industry sector, showing high rates in primary industries and transportation.

![Traumatic Fatality Rate by Sector](image)

Figure 4. Fatality rates per 100,000 person-years by accident type, showing the predominance of vehicular incidents.

![Fatality Rates per 100,000 Person Years by Accident Type](image)
3.4 Vehicular incidents

The most common cause of a traumatic fatality was a road vehicle incident or crash (excluding aircraft, boats, and trains). Among workers in small businesses, 87 of 243 (36%) fatalities were the result of vehicular incidents, whereas among larger businesses, 44 of 179 (25%) fatalities were the result of vehicular incidents.

3.4.1 Location

The majority of vehicular fatalities occurred on highways. The next most common location was on a logging road (table 1). Logging roads were a more common location for small businesses, since all log-hauling fatalities were among workers employed by small businesses.

Table 1. Location of vehicular crashes by business size.

<table>
<thead>
<tr>
<th>Location</th>
<th>Small businesses (n=87)</th>
<th>Larger businesses (n=44)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway</td>
<td>51 (59%)</td>
<td>28 (64%)</td>
</tr>
<tr>
<td>Logging road</td>
<td>20 (23%)</td>
<td>2 (5%)</td>
</tr>
<tr>
<td>Off-road</td>
<td>3 (3%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>City</td>
<td>1 (1%)</td>
<td>4 (10%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>12 (14%)</td>
<td>9 (20%)</td>
</tr>
</tbody>
</table>

3.4.2 Occupation

Vehicular fatalities were then divided by whether driving was the worker’s primary occupation, was part of their regular employment but not their primary occupation (travelling sales, plumbers, home-care providers), or was not part of their regular employment (lawyers, secretaries). Although the majority of fatalities was among professional drivers (61% in small businesses, 43% in larger businesses), almost one-third (28% and 32% respectively) were among workers for whom driving was not a usual part of their job.

3.4.3 Drug and alcohol use

Drug and alcohol intoxication data were assessed where data were available, i.e., a toxicology screen was conducted at autopsy. Vehicular deaths where toxicology information was available were due to, or contributed to by, drugs or alcohol in 15 of 45 (33%) incidents in small businesses and 8 of 26 (31%) incidents in larger businesses. Analysis by intoxicating agent is given in table 2.

Table 2. Analysis of drug or alcohol use by intoxicating agent.

<table>
<thead>
<tr>
<th>Intoxicating Agent</th>
<th>Small #</th>
<th>Small %</th>
<th>Larger #</th>
<th>Larger %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicology negative (no drugs or alcohol)</td>
<td>30 67</td>
<td>18 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxicology positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol alone</td>
<td>3  7</td>
<td>1 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cannabis alone</td>
<td>4  9</td>
<td>3 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine alone</td>
<td>2  4</td>
<td>1 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other drugs alone</td>
<td>2  4</td>
<td>1 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.4.4 Seat belt use

Seat belt use was evaluated where data were available, either from police reports or from evidence at autopsy. Seat belt use was deemed “irrelevant” if seat belt use would not have affected the outcome, such as when the driver remained in the vehicle but there was no survivable space or the vehicle burned immediately. These were eliminated from the following percentages:

- Among small business workers, 14 (33%) had their seat belt on and 28 (67%) did not.
- Among larger business workers, 9 (47%) had their seat belt on and 10 (53%) did not.

3.4.5 Log hauling vehicular incidents

There were 13 fatalities among log hauling workers included in the analysis of all vehicular incidents. These 13 workers were all employed by small companies and account for 4 of those driving under the influence of drugs or alcohol: 3 (23%) were positive for cannabis (2 in combination with other drugs) and 1 (8%) was positive for another drug contributing to the incident. None were positive for alcohol. Thus, a total of 31% of log hauling fatalities had recreational drug use as a contributing factor.

Among these 13 fatalities, seat belt use was documented in 8 and not one was wearing a seat belt. Thus documented seat belt use was 0% among log hauling drivers.

3.4.6 Fault

Fault was evaluated by reference to the coroners’ reports and police reports. If the incident was a single-vehicle incident, fault was assigned to the driver, independent of the conditions. Workers who were not at fault were passengers or were involved in an incident in which another vehicle was officially reported to be at fault. Among small businesses, 54 of 87 (62%) drivers were at fault compared with 24 of 44 (54%) drivers for larger businesses.

3.4.7 Run over by own vehicle

Twelve fatalities (9% of all vehicular-incident fatalities) occurred when the driver was run over by his or her own vehicle: 6 among the 87 workers killed in vehicular incidents for small employers (7%), and 6 among the 44 workers killed in vehicular incidents for larger employers (14%).

3.5 Falls to lower level

Of the 20 fatalities resulting from falls to lower level among workers employed by small businesses, there was information available for 13 incidents: 12 (92%) did not have fall restraint, and 1 (8%) was wearing fall restraint. Of these 20 fatalities, 8 occurred where there was no fall protection. Of the 4 fatal falls among workers employed by larger businesses, there was information on 3: all 3 (100%) were noted not to be wearing fall restraint. Among these 4 falls, 2 did not have adequate fall protection (e.g., guardrails or use of fall protection or restraint).

3.6 Contributing pre-activity factors
Pre-activity factors include written work procedures, hazard analysis, training, and supervision. It was difficult to determine which activities should have had written work procedures, hazard analyses, more training, or greater supervision. For example, with respect to written work procedures, there were activities such as regular vehicle operation, for which written work procedures clearly are not required, and entry into a confined space, for which written work procedures clearly are required. However, there were many activities where the need for written work procedures was less clear. For example, if a fishing boat capsized or a farmer slipped off a stack of hay bales, should there have been written work procedures? Thus, we only report here on those fatalities where some causative value was attributed to the absence of written procedures or failure to follow procedures; inadequate hazard analyses or poor equipment maintenance; or inadequate training, education, or supervision.

3.7 Written work procedures
Among small businesses, the number of fatalities where there was documentation of non-existent or inadequate work procedures was 50 (20%), and there were 7 (3%) fatalities where existing work procedures were not followed. Among larger businesses, the number of fatalities where there was documentation of non-existent or inadequate work procedures was 43 (23%), and there were 18 (10%) fatalities where existing work procedures were not followed.

3.8 Hazard analysis or equipment poorly maintained
Comments on hazard analysis (or lack thereof) or poorly maintained equipment were only present in 18 of the 422 cases: among small businesses, there were 6 clearly documented cases of poor hazard analysis or poor equipment maintenance as causative factors; among larger businesses, there were 12.

3.9 Training and education
Among small employers, 6 incidents were cited as involving inadequate training and education; among larger employers, 8 were cited. Two larger employers were noted to have extensive training and education programs related to the task.

3.10 Supervision
Poor supervision was cited in exactly the same instances as poor training and education: 6 small employers and 8 larger employers.

3.11 Contributing physical factors
Similar to the pre-activity contributing factors, the need for guarding or lockout was difficult to determine, except in instances where the absence of guarding or lockout was identified as a causative factor.

3.12 Guarding and lockout
The majority of incidents for which there were comments on guarding were of the following types: “caught in or compressed by running equipment,” “struck by,” or “fall to lower level.”

Among small employers, there were 24 comments on guarding:
• No guarding present in 18 (66%)
• Inadequate guarding in 4 (17%)
• Guarding removed or bypassed in 2 (8%)

Among larger employers, there were 21 comments on guarding:
• No guarding present in 9 (43%)
• Inadequate guarding in 9 (43%)
• Guarding removed or bypassed in 1 (5%)
• Guarding noted to be present in 2 (10%)

The extent of guarding documented to be present was significantly different between small and larger companies (p=0.002).

Among small employers, there were 3 comments on lockout: 1 was locked out, 1 was overridden, and 1 was not locked out. Among larger employers, there were 12 comments on lockout: 5 had inadequate lockout, 6 had no lockout, and 1 was bypassed.

3.13 Alcohol and drugs as contributing factors
Coroner’s reports were available for 226 of the 422 (54%) traumatic fatalities. Of these, 129 were small businesses (53% of small business traumatic fatalities) and 97 were larger businesses (54% of larger business fatalities) (table 3 and figure 5).

Table 3. Percentages do not add up to 100% because some workers had more than one substance documented.

<table>
<thead>
<tr>
<th></th>
<th>Tox negative</th>
<th>Alcohol</th>
<th>Cannabis</th>
<th>Cocaine</th>
<th>Other</th>
<th>Tox not reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small business</td>
<td>92 (71%)</td>
<td>10 (8%)</td>
<td>15 (12%)</td>
<td>6 (5%)</td>
<td>4 (3%)</td>
<td>7 (5%)</td>
</tr>
<tr>
<td>Larger business</td>
<td>66 (68%)</td>
<td>10 (10%)</td>
<td>11 (11%)</td>
<td>4 (4%)</td>
<td>0 (0%)</td>
<td>8 (8%)</td>
</tr>
</tbody>
</table>
Figure 5. The majority of toxicology screens were negative, but significant percentages of fatalities had alcohol or cannabinoids at levels that would have impaired function.

Table 4. The number of fatal incidents that were documented as due to or contributed to by drugs or alcohol is shown by sector and industry.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Industry</th>
<th>Small (n=33)</th>
<th></th>
<th>Larger (n=22)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>70 Primary resources</td>
<td>Total</td>
<td>10</td>
<td>30</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Forestry (7030)</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Fishing (7020)</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>71 Manufacturing</td>
<td>Total</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Oil refining, recycling, storage tanks</td>
<td>0</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(713019)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>72 Construction</td>
<td>Total</td>
<td>5</td>
<td>15</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Land clearing, excavation (721031)</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Construction (7210, excluding 721031)</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>73 Transportation</td>
<td>Total</td>
<td>11</td>
<td>33</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>General Trucking (732019)</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Log Hauling, heli-logging (732043 and 732044)</td>
<td>5</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tug/barge hands (732008)</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>74 Trades</td>
<td>Total</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>75 Public</td>
<td>Total</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>76 Service</td>
<td>Total</td>
<td>4</td>
<td>12</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>84 Government</td>
<td>Total</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

3.14 Contributing factors in specific industries
3.14.1 Fishing and tug/barge hands
There were 9 fatalities among fishers and barge hands working for small employers. Toxicology information was available on 8. Of these, 3 (38%) had high alcohol levels and 1 (13%) (a barge hand) was positive for cocaine. One was documented not to be wearing a PFD.

There were 13 fatalities among fishers and barge hands working for larger employers. There were no data at all on 2 of these because the boat capsized and the bodies were not recovered. Among the remaining 11, coroner’s reports were available on 5, and 3 (60%) had high alcohol levels. Three (30%) were documented not to be wearing a PFD.

The 6 fatalities in which alcohol intoxication was a significant contributing factor represented 30% of all fatalities with documented alcohol intoxication, whereas fishers and barge hands constituted only 5% of all fatalities (OR=9.8). Because fishing employers do not document person-years, it was not possible to determine the percentage of all person-years represented by fishers and barge hands from our data.

3.14.2 Forestry
There were 38 traumatic fatalities among forestry workers employed by small employers. Toxicology screen data were available for 23 of them: 5 (22%) were positive for cannabis, 2 (9%) were positive for cocaine and cannabis (a total of 31%), and 16 (69%) were negative. There were no instances of alcohol intoxication.

There were 17 traumatic fatalities among forestry workers employed by larger employers. Toxicology screen data were available for 10 of them: 2 (20%) were positive for cannabis, 1 (10%) was positive for codeine (a total of 30%), and 7 (70%) had a negative toxicology screen. There were no instances of alcohol intoxication.

The 10 forestry fatalities with documented recreational drug use constituted 25% of all 40 fatalities in the 2003–2007 period in which recreational drug use was documented, whereas loggers constituted less than 12% of fatalities involving recreational drug use. Relative risk was 2.5.

3.14.3 General trucking
Of the 38 traumatic fatalities in small general trucking companies, there were drug/alcohol data or comments in the coroners' reports for 19 of them: 1 (5%) had cannabis, 1 (5%) had cocaine, 1 (5%) had methamphetamine, and 1 (5%) had alcohol, while 14 (74%) fatalities had documented negative toxicology screens and 1 was documented as “irrelevant.” Thus, 4 of 19 (21%) were driving under the influence of drugs or alcohol. Seat belt use was documented in 9 cases: 2 (22%) had seat belts and 7 (78%) had no seat belt.

Of the 13 traumatic fatalities in larger general trucking companies, there were drug/alcohol use data for 7 of them: 1 (14%) had cannabis and 1 (14%) had alcohol and cannabis, while 5 (63%) fatalities had documented negative toxicology screens. Thus, 2 out of 7 (29%) were driving under the influence of drugs or alcohol. Seat belt use was documented in 4 cases: 2 (50%) had seat belts and 2 (50%) had no seat belt.
3.14.4 General construction

Land clearing, blasting and avalanche control, and oil and gas pipeline construction were excluded from general construction fatalities. There were 29 fatalities in small general construction businesses and 6 among larger businesses. Coroner’s reports were available for 15 (52%) and 2 (33%), respectively. Among small business workers, there was 1 (7%) case of alcohol intoxication and 1 (7%) case of cannabis use. These incidences are lower than in high-use occupations, such as fishing (38% alcohol intoxication) and logging (22% cannabis use).

There were 9 fatalities among small business general construction workers resulting from vehicular incidents, plane crashes, or gunshots. Of the remaining 20 fatalities, 13 (65%) were not using fall protection, and there was no guarding in 9 (45%) cases. There were specific comments on 4 fatalities: 1 that the ladder used was unsafe and supervision was ineffective; 1 that there had been no hazard assessment; 1 that there were no work procedures, training, or supervision; and 1 that safe work procedures had been ignored.

Among workers in larger businesses, 1 fatality was due to a vehicular incident. Of the remaining 5 cases, 1 (20%) was using fall protection incorrectly; 1 was attributed to lack of training and supervision (20%); and 2 were attributed to not following proper procedures (40%).

4. Discussion and limitations

The discrepancy in fatality rates between small and larger employers previously reported by others (1) and noted by us is substantiated in this study. The results of the study suggest that small businesses do register with WCB. The data do not indicate that small companies are poorer at providing written work procedures, hazard analyses, overall training and education, or supervision; however, the data do clearly indicate that workers in small companies are at greater risk during the first month of employment compared with workers in larger companies. New workers employed by small businesses were at two-fold risk of a fatal injury within the first week of employment, and four-fold risk of a fatal injury within the first month of employment compared with new workers employed by larger businesses. This is consistent with our previous report of the time pattern of serious injuries among young workers (Holizki et al. 2008).

The difference in risk during the early stages of employment may be the result of small companies not being as focused on providing new worker orientation and training, or perceiving that they do not have time to provide extensive orientation and training. The lack of documentation of these safety-oriented activities in this study may be more a function of the reporting approach of the coroner when dealing with small vs. larger employers. The need for written work procedures, hazard analyses, training and education of new employees, and supervision of all employees warrants reinforcement, particularly for small employers.

4.1 Alcohol use among fishers
The fatality rate among fishers is extremely high and is generally reported to be on the order of 125 to 250 per 100,000 workers per year. This compares with an overall fatality rate in other industries of less than 4 per 100,000 workers per year. There are reports from around the world indicating that fishing fatalities are associated with alcohol abuse, including reports from both coasts of the United States (Day et al. 2010; Centers for Disease Control and Prevention 2008), Alaska (Lucas and Lincoln 2007), Denmark (Laursen et al. 2008), and Australia (O’Connor and O’Connor 2006). The international scope of this problem suggests that it is a cultural issue in the fishing community, rather than a localized issue. This presents the possibility for an international program aimed at addressing this problem, although the obstacles to disseminating information to workers who are generally living in small or remote communities and with multi-generational behaviour patterns may be difficult to overcome.

4.2 Cannabis use among forestry workers

We found a high incidence of cannabis use among fatally injured forestry workers (20 to 30%) and comparatively low rates among other fatally injured workers (<4%). In an early study (1979 to 1986), Allyne et al. (1991) found that cannabis use was documented in 10 of 459 (~2%) fatally injured workers in Alberta, Canada, where the major industries are farming and oil and gas. Shannon et al. (1993) found that, in Ontario, where the major industry is manufacturing, over the period 1986–1989 cannabis was present in 17% of fatally injured workers for whom toxicology tests were conducted (3.9% of all 470). The discrepancy between these reports and ours may reflect several factors — the period studied (cannabis use may have increased over time), the industries involved, or the different work-environment cultures.

Cannabis is known to impair psychomotor and cognitive function (Solowij and Grenyer 2002). Workers may not know or understand that although cannabinoids do initially dissipate from the brain and bloodstream within hours, they are absorbed by the fat-containing tissues, from which they are slowly released back into the bloodstream and brain over a period of many days (Johansson et al. 1989; Nahas and Latour 1992). Among heavy marijuana users, serum levels consistent with impairment (Ramaekers et al. 2006) may persist for up to 8 days (Grotenhermen 2003).
4.3 Seat belt use among fatally injured drivers
In our study, 31% of fatal injuries to workers occurred in vehicle incidents. This is consistent with other reports, such as Cohen's (2), which indicates that 33% of work-related deaths were in vehicle incidents. In our study, seat belts were worn by only 38% of those for whom seat belt use was documented. This is much lower than the overall provincial data on seat belt use, which indicates that 94.8% of car and light truck occupants wear seat belts (Insurance Corporation of British Columbia 2012). Since seat belt use reduces the risk of death by 50 to 60%, over 38 lives might have been saved if seat belts had been used. Lack of seat belt use is also highlighted as a cause of preventable occupational fatalities in a study by Brodie et al. in Australia (2009) and a study among oil and gas workers by the Centers for Disease Control and Prevention (2008).

4.4 Fall protection among construction workers
We found that fatal injuries from falls from heights were associated with workers not having fall prevention or fall arrest devices. Fatalities from falls among construction workers have also been identified as a concern by others. Jaesin et al. (2009) found that commercial roofers (usually larger businesses) were more likely to use and enforce the use of fall protection, compared with residential roofers (usually small businesses). They suggest introduction of policy interventions or regulations. Kaskatus et al. (2010) developed a training program particularly for apprentices, based on an extensive needs assessment. They found that the use of experiential adult learning techniques was helpful and resulted in positive feedback from trainees, although the report has not been followed by a comparative study to evaluate the effectiveness of the program.

4.5 Gun shots, weapon use, violence
We present this information for comparison with others’ data only. In the 5-year period of this study, there were only 4 (<1%) violent deaths: 2 gunshots, 1 stabbing, and 1 physical assault, whereas for 2010, the United States reported that 18% of their workplace fatalities were due to violence (Bureau of Labor Statistics 2012). In Washington State, between 1998 and 2002, there were 29 work-related homicides out of 437 deaths (7%) (2).

4.6 Limitations
The principle limitation of this study is the retrospective nature, which means that the study was vulnerable to database errors, such as coding errors, and of necessity relied on somewhat inconsistent investigation techniques and reporting, as well as inconsistent availability of coroners’ data. However, the potential for coding errors was mitigated by subsequent manual review of each file.

There are several patterns that appear in the results of this study and that warrant prevention efforts:

- Loggers tend to use recreational drugs.
- Fishers and barge hands tend to use alcohol to the point of intoxication.
- Seat belt use is not prevalent among truckers and may be completely absent among log hauling truckers.
- General construction workers do not wear the necessary fall protection.
• Operators of equipment who leave their vehicles to assess, repair, or investigate their vehicle can be run over by their own equipment.

5. Conclusions
Recommendations for injury prevention strategies include the following target areas:
• The need for orientation, education, and training of new workers, particularly for small businesses
• The culture of marijuana use in the logging industry, which could be addressed with education and information, not only about the hazards of marijuana use, but also about the pharmacokinetics
• The culture of alcohol use and abuse in the fishing industry
• Use of fall protection in the construction industry, to address the culture of negative regard for the value of fall protection relative to the perceived inconvenience of using it
• Use of seat belts by ALL drivers, including logging truck drivers and general trucking drivers, but also for those who drive as a casual part of their job.

6. References


Apprentices in small enterprises within building and construction: injuries related to size and discipline

Authors
Kari Anne Holte, PhD, Senior Researcher, Department for Social Science and Business Development, International Research Institute of Stavanger, Norway. Kari.anne.holte@iris.no
Kari Kjestveit, MSc, Researcher, Department for Social Science and Business Development, International Research Institute of Stavanger, Norway. Kari.kjestveit@iris.no

Abstract
An increased risk for injuries is found in small enterprises, especially evident for construction industry. A vulnerable group of workers is young workers. The aim is to study injuries among apprentices in small enterprises within different building and construction disciplines, compared to medium-sized and large enterprises. The study design was questionnaire study among all apprentices in a county in western Norway, assessing accidents and injuries. There were 669 apprentices filling out the questionnaire, giving a response rate of 81%. No significant differences in proportion of being injured were found between size groups, nor type of accident and accident causes. Differences between disciplines were however found. Different patterns between building and electrical trade were found regarding proportion of injured by company size. In conclusion, when considering injury risk, size of enterprises and young workers, additional factors like discipline and other characteristics of the enterprises should be studied as well.

Keywords
building and construction, OHS, apprentices, young workers

1. Introduction
In Norway 99% of all enterprises have less than 50 employees and employ 53,2% of the Norwegian work force. A high amount of small and medium-sized enterprises (SMEs) is found in retail, agriculture, and building and construction (Ministry of Trade and Industry, 2012). Recent studies have shown that employees in SMEs have higher risk for accidents (Hasle & Limborg, 2006; Sørensen et al., 2007). Injury rates are high in the construction industry (Kines et al., 2007), and Hasle & Limborg (2006) have pointed to construction as an industry where increased risk in SMEs is especially evident. The Norwegian building and construction industry's high amount of SMEs necessitates increased attention.

Specific work groups may be especially vulnerable for accidents and injuries, among them young workers (< 25 years old). Several studies have found that young workers are at risk for work injuries (Laberge & Ladoux, 2011; Salminen, 2004). Breslin and coworkers (2007) found that injury risk varied between type of jobs, where specific hazards and perceived work load were risk factors. In addition, construction sites were specifically mentioned as work settings giving increased risk for injuries (ibid). We are not aware of studies considering size of enterprise when looking at young workers.
As young workers are a heterogeneous group of workers, this study focuses on apprentices. They are still under education and carry out their practical training at a work site. For the case of Norway, students start secondary education the year when becoming 16. Those who choose vocational education attend school for two years, and then become apprentices for two additional years. The apprenticeship is the young students' first meeting with real life work. As the general picture show that size of enterprise is an independent risk factor for injuries, especially evident for construction, the aim is to study injuries among apprentices in small enterprises within different building and construction disciplines, compared to medium-sized and large enterprises.

2. Material and methods
A survey among all apprentices in Rogaland county (western part of Norway) was performed within the disciplines building (the raising of buildings), electrical trades, building techniques (e.g. plumbing, ventilation, painting, scaffolding, insulation, flooring) and construction (ground work, infrastructure). The survey was as part of a large study of young workers (<25 years old) within the building and construction industry (Kjestveit et al., 2011; Holte & Kjestveit, 2012). The survey was distributed by the Employer Organization Offices for Training within the included disciplines. They are responsible for the apprentices while in their training companies. The questionnaire was distributed along with an invitation to the semi-annual obligatory interview with the apprentices, and collected by the Offices for Training at the interview. Time of sampling was from October 2007 until March 2008. For apprentices in training companies outside the Employer Organizations, the questionnaires were distributed by the responsible county authority. The final study population consists of 669 apprentices, corresponding to an 81 % response rate.

The questionnaire included background questions like age, gender, apprenticeship tenure, weekly working hours, and size of training company. The apprentices were asked if they had been injured at the workplace during their period of apprenticeship (yes, no). The type of accident was assessed by the following categories: hit by an object, fall, scratched or cut, caught/trapped between objects, electrical shock, and other types. Background for the accident was assessed by the following categories: inadequate safeguarding, inappropriate use of machinery and tools, inappropriate placement, incorrect lifting technique, wrong task performance, lack of training and other causes. For both questions it was allowed to give more than one answer. The questionnaire also included questions about safety training at school and within the training company, as well as safety culture, however not reported here. Descriptive analyses were performed, using PASW 19.0. Differences between sizes and disciplines were tested by chi-square statistics.

3. Results
The study group is described in table 1. The apprentices represent both small, medium-sized and large training companies. The majority has been more than 12 months in apprenticeship, and most apprentices work within 31-40 hours a week, including lunch break.
3.1 Proportion of injured

Totally 27.3 % (n=183) of the apprentices reported being injured in an accident during their apprenticeship. The proportion of apprentices being injured by company size and by discipline is shown in figures 1 and 2 respectively. The highest proportion of injured is found in companies with 10-19 employees (33.3%). Lowest proportion is reported among apprentices in companies employing 1-4 workers (16.7 %). The difference is not statistically significant. A significant difference is found between disciplines (p=0.002), where 35.1 % of apprentices in electrical trade and 25.8 % within building reported being injured during apprenticeship. Lowest proportion of injured is found within building techniques (16.2 %).

Figure 1. Proportion of apprentices being injured during apprenticeship by company size (number of employees)
Figure 2. Proportion of apprentices being injured during apprenticeship by discipline

Building (n=306) and electrical trade (n=231) were analyzed separately (figure 3). The largest proportion of injured is found among apprentices in companies with 20-49 employees for building, and in companies with 10-19 employees in electrical trade, almost significant for electrical trade (p=0.1).

Figure 3. Proportion of apprentices being injured by company size (numbers of employees) for building and electrical trade
3.2 Type of accident by company size and discipline

Type of accident leading to an injury by company size for all trades is shown in figure 4. Due to low number of accidents no statistical analysis were performed. For all company sizes, being scratched or cut is the major accident reported.
When building and electrical trade were considered separately, no tendency by size was observed. The disciplines differed in type of accident leading to the injury, where being scratched or cut was the dominating accident within building, and electrical shock was dominant within electrical trade, additional to being scratched or cut.

### 3.3 Causes for injuries - by company size and discipline

The causes for accidents leading to injuries are shown in figure 5. For apprentices in all sizes, “other causes” is mostly stated. Apprentices in small companies report less variety in causes than those in larger companies. Lack of training is assessed as a cause by only a few injured, and by apprentices in the larger companies only. The same pattern is found when the disciplines building and electrical trade are considered separately.
4. Discussion
The results show significant differences in proportion of being injured between disciplines, not between company sizes. When studying the disciplines building and electrical trade separately, different patterns between these two disciplines regarding proportion of injured by company size were found.

4.1 Methodological discussion
This study was part of a large project focusing on young workers, not particularly focusing on company size. We did however choose to have relatively small size intervals, being able to study differences between different categories of small enterprises and potential challenges for each category, with the opportunity to collapse categories if needed. In this study 45 % of the apprentices were in companies with less than 20 employees. 7,1 % (n=48) of the study sample worked in companies with 1-4 employees. However, the small companies represent a majority of enterprises in Norway, when categorized by employees (Ministry of Trade and Industry, 2012). We therefore chose not to collapse the two smallest size categories.

Small samples and small intervals of company sizes is especially challenging when looking at those being injured only. In this study the accidents were self-assessed, and we did not state any criteria for severity except being injured in the accident. Less serious injuries that did not require any medical treatment except first aid could therefore be included. This may have led to a higher number of injuries for the analysis. Considering type of accident leading
to the injury and cause for accidents, we did not perform any statistical tests. Due to the exploratory nature of the study, conclusions cannot be given based on these results. Another disadvantage is the time-period of the reported injuries. The apprentices were asked to report if they had been injured in an accident during apprenticeship. Considering different length of apprenticeship when answering the questionnaire, this formulation opened for more reported injuries among those who had the longest tenure.

4.2 Substantial discussion

In this study, neither a significant difference in proportion of being injured between size groups, nor specific patterns considering types and causes of accidents were found. An increased risk for injuries among apprentices in small companies compared to larger companies in general could therefore not be stated. However, a significant difference in proportion of being injured between disciplines were found. Additionally, when building and electrical trade were separately analyzed, the highest proportion of injured were found in different size categories (electrical trade: 10-19 employees (43,9%), building: 20-49 employees (34,8%)), almost significant in electrical trade. We can therefore not rule out specific challenges within disciplines or branches, hence also differences between disciplines considering company size and injury risk. Further studies considering company size, young workers and injuries should therefore focus on specific disciplines, not whole industries.

There are also other company characteristics, not assessed in this study, that may impact the results. A qualitative case study in this project found that being a subcontractor had impact on the training given to new workers before they started their job in the company (Holte & Kjestveit, 2012), due to requirements from the contractors. A study of accident causes and learning ability in the petroleum sector also highlighted the importance of subcontractors versus contractors, where the contractor's requirements regarding safety had strong impact on the subcontractors' way of working (Austnes-Underhaug et al., 2011). The company's place in the supply chain may vary between small companies as well as between disciplines. A recommendation for further studies will therefore be also to ensure that information about their involvement with contractors are gathered.

A Danish study (Sørensen et al 2007) found that for independent enterprises, large enterprises had better physical working conditions compared to smaller enterprises. For part-independent enterprises the picture was opposite. A questionnaire study among Norwegian building and construction workers showed that physical demands were risk factors for injuries (Kjestveit et al., 2011). If risk factors also differ due to independency, associations between risk and size may be difficult to establish, not knowing if the apprentices in our study belong to independent or part-independent enterprises. Additionally, small part-independent enterprises may also give better in-house safety training to apprentices compared to small independent enterprises, potentially having impact on injury risk.

In conclusion, we cannot state from this study that young workers have an increased risk for injuries in small companies. However, the results indicate that in which company size apprentices are more at risk for injuries may differ between disciplines. Additional characteristics of small enterprises may also impact, and we suggest that ownership and role in the supply chain should be considered when studying injury risk.
5. References


Application of action-oriented corrective ergonomics checklist to improving a kitchen workplace at a university student canteen

Author
Sadao Horino, Guest Professor on Ergonomics, Research Institute for Well-informed and Risk-free Transportation, Kanagawa University, horino@kanagawa-u.ac.jp

1. Introduction
The objectives of the study were to introduce good practical examples showing the efficacy of a 22-item action-oriented corrective ergonomics checklist in ergonomically improving a kitchen at the student canteen at the author’s university, and to demonstrate the usefulness of a short workshop for relevant management people of a small business about how junior students learned applied ergonomics dynamically at a real workplace by utilizing an action-oriented ergonomics checklist.

2. Materials and Methods
As part of the ergonomics education program for junior students studying applied ergonomics, the author planned to carry out an on-site study making use of a student canteen in the university campus. The kitchen was the nearest study field and a typical example of a small business for focusing on low-cost improvement practices through direct observation and a group assessment approach. Upon my request, the Kanagawa University Cooperative offered the use of the canteen kitchen for two weeks every year during the last ten years as a target for the ergonomics checklist workshop.

This student canteen supplied some 4500 meals every day with 100 workers (95 part-timers and 5 full-timers) working a unique 4-hour cycle three-shift system (morning, daytime and evening).

An action-oriented corrective ergonomics checklist containing 22 items concerning materials storage and handling, workstation design, physical environment, welfare facilities and work organization was used as an analysis tool. This checklist was developed together with K. Kogi for a tutorial workshop on the occasion of the IEA (International Ergonomics Association) 2000 Congress at San Diego, USA, as a concise version of "Ergonomic Checkpoints" containing 128 items (IEA/ILO, 1996).

The author had utilized various language versions of this checklist (English, Japanese, Chinese, Thai, Indonesian, Arabic and Polish) effectively by a group assessment approach for years in various international training courses. They included courses for production management organized by AOTS (Association for Overseas Technical Scholarship, Japanese Ministry of Economy, Trade and Industry) as well as JICA (Japan International Cooperation Agency, Japanese Ministry of Foreign Affairs).
Two, three or four junior students in a group jointly observed the kitchen workplace directly by checking each checklist item one by one for 30 minutes (Figure 1) and selected three good points of the workshop through group discussion, and assessed the degree of necessity for ergonomic improvement and agreed on some concrete ergonomic interventions within subsequent 30 minutes to propose them to the management of the canteen. Finally each group presented three good points and three highlights of their ergonomic improvement proposals by means of audio-visual aids in front of the managers of the canteen. Plenary discussion followed for 30 minutes.

Figure 1. Student studying ergonomics is assessing workplace of student canteen using ergonomics checklist (2008)

This cycle was repeated two weeks allowing each student to experience the observation of two different workplaces.

3. Results and discussion

3.1 Ergonomic good points of the kitchen pointed out by the students

The checklist results revealed that the students appreciated positively concrete ergonomic good points in the kitchen workplace including a semi-automated dish washer and workspace arrangements. Typical results included the following:

1. Well considered materials storage utilizing over-head space for bread near the ceiling (Figure 2);
2. Well-arranged semi-automated dish washer workplace without obstacles (Figure 3);
3. Washed, clean and dry dishes stored at assigned positions around the semi-automated dish washer workplace;
4. Spacious aisle allowing two persons to pass at the same time at the noodle corner;
5. Well-arranged dish/plate shelf ensuring efficient work of dishing food on the plates;
3.2 Ergonomic improvement proposals for the kitchen by the students

The results of applying the corrective ergonomic checklist revealed various ergonomic interventions for the kitchen. Typical examples were as follows:

1. Gap around the workplace entrance to be removed → use of mobile racks;
2. Narrow aisle disturbing easy passing for two persons due to a refrigerator → rearranging the refrigerator under the workstation (Figure 4);
3. Inadequate sanitary conditions at the kitchen with a food tray (sandwich) placed on a trash box (Figure 5) → the possibility of utilizing overhead space under the ceiling like Figure 2;
4. The workstation height for cooking too low around the belt height of workers → the workstation height to be increased by 15 cm at least to the elbow level;
5. Repeated work motions for longer than 10 minutes during the bread making process causing heavy workload around the low back of workers → providing a specially designed chair for standing postures of workers that as introduced in 1988 at a garment factory of “Bonds”, Sydney, Australia (Figure 6);
6. Hand tools and materials were stored at random at various spots in the workplace → to arrange and classify them in small containers by label use;
7. Dust accumulated on electric power plugs → regular check and housekeeping action for clearing dust;
8. Explicit displays for the work areas lacking → label use to avoid human errors;
9. Glare of lighting for food products disturbing workers → adjusting the direction of the light sources causing glare;
10. Insufficient lighting due to only two light sources → increasing local light sources;
11. A cook heater located at the center of the workstation and disturbing efficient movements → rearranging the cooking heater at the edge of the workstation;
12. Unsafe and awkward bending postures often observed at the semi-automated dishwasher conveyer line to remove chop-sticks from machine parts for the recovery of malfunctions of the conveyer line (Figure 7, 8, 9 and 10) → (1) an intensive campaign to call for further cooperation of users to remove chopsticks when returning trays with used dishes, (2) monitoring perfect removal of chopsticks from all trays, and (3) redesign of the automated dish washer to separate plastic made chopsticks automatically.

Figure 4. Refrigerator disturbs easy passing of 2 persons, causes narrow aisle

Figure 5. Inadequate sanitary condition at the kitchen with a food tray (sandwich) placed on a trash box
Figure 6. Good example: specially designed chair for standing postures at garment factory, “Bonds”, Sydney, Australia, 1988

Figure 7. Semi automated dishwasher line

Figure 8. Chopsticks were washed manually at different section
Among concrete necessary ergonomic improvements shown above, the top three ergonomic actions proposed by the students were: (1) better use of the work space in the areas not seen from clients, for example, materials stored at random disturbing easy movement along the aisles, (2) workspace re-arrangements to be done from workers’ points of view, and (3) welfare issues to be solved such as securing sufficient space for taking spontaneous breaks.

3.3 Educational effects on students proved by expressed impressions at the workshop
This action-oriented corrective ergonomics checklist approach based on group work was very effective and two objectives of this study were achieved successfully as shown in the following impressions expressed in reports written by some students.

- I became familiar about how to use ergonomics checklist through repeated experiences of checking at the kitchen workplace, and noted the practical effectiveness of an action-oriented corrective checklist and group work.
- I noted how hard a field study was carried out through my own on-site experience and I was surprised to learn such a wide scope of ergonomics application. It was a very worthwhile workshop indeed, since we could propose ergonomics interventions as a student to the managers of the Cooperative canteen.
• I felt through this workshop that it was very difficult to improve something at a real workplace and not so easy to find out good ideas to improve immediately, therefore I need to train my eyes to observe and watch various things consciously in my daily life.

• I was surprised to see such a wonderful effect of an action-oriented ergonomic checklist method introduced in the workshop. I could find out easily necessary ergonomic improvements by checking checklist items sequentially within only 20-30 minutes on-site, and I would like to study ergonomics more and more based on this valuable experience.

We further observed that the managers of the canteen were also impressed by practical suggestions done by students in a limited short time which even managers themselves did not recognize as problems. They became aware of them affirmatively for the first time, and they were convinced to take improvement actions. And they improved indeed these items that they agreed on one by one and could make changes by following students’ suggestions.

It is fresh to note that new improvement items could be suggested by new student groups for the same kitchen workplace every year. This implies that there are continual improvements, “kaizen” in Japanese at a real working place.

Summarizing this checklist study, we could suggest several important points applicable to improving other small industrial enterprises. They are as follows; 1) The way of asking checkers action-oriented and corrective questions, so as to encourage checkers to observe the real workplace and think in terms of necessity and possibility of suggested actions. It is commonly easy to follow these suggestions. 2) Group work assessment is more effective and efficient than individual assessment. 3) Checkers need to be encouraged to find out positive good points of the real workplace rather than criticizing it. Ergonomists should be able to appreciate workers’ capability in general of doing better actions. 4) Even beginner checkers can find items to be improved ergonomically in short time by utilizing this corrective ergonomics checklist. 5) This method is now popular worldwide just because of the low-cost ways of improvement. In my view, questions of the checklist can facilitate checkers to activate their potential sensing capability to improve surroundings. 6) The ergonomic countermeasures suggested by checkers are practical and feasible in general, particularly by the on-site observation method.

4. Conclusion
This study revealed clearly that the application of an action-oriented corrective ergonomics checklist which is a concise version of “Ergonomic Checkpoints” co-edited by IEA/ILO in such short time as in the case of a 90-minute group assessment workshop for junior university students contributed effectively to proposing sound ergonomic improvements of a kitchen of a student canteen. And the management of the canteen was convinced to execute their suggestions practically. This study also revealed that the on-site group assessment approach workshop using ergonomic checklist is notably effective for young beginners to learn applied ergonomics and health and safety at work.
The business scale of the student canteen department of the Kanagawa University Cooperative is a good example of a small business in terms of sales output (4500 meals/day) and work organization (100 workers: 5 full-timers and 95 part-timers) as well as characteristics of the workplace. Therefore, the method used in this study is highly applicable to improving ergonomically workplaces in small businesses.

5. References


Establishment and operation of Workers’ Health Center for small enterprise worker’s health management in Korea; based on Incheon Workers’ Health Center

Authors
Jungho Hwang, Incheon Workers’ Health Center; Yonsei University College of Medicine Dept. of Preventive Medicine; Yonsei University College of Medicine Institute for Occupational Health, schdom@gmail.com
Inah Kim, Incheon Workers’ Health Center; Yonsei University College of Medicine Institute for Occupational Health; Graduate School of Public Health, Yonsei University, ptdoctor@hanmail.net
Jong uk Won, Incheon Workers’ Health Center; Yonsei University College of Medicine Dept. of Preventive Medicine; Yonsei University College of Medicine Institute for Occupational Health; Graduate School of Public Health, Yonsei University, juwon@yuhs.ac
Jeung ho Kim, Korea Occupational Safety & Health Agency, Korea, hodori01@kosha.net
Young sik Park, Korea Occupational Safety & Health Agency, Korea, pyspark62@naver.com
Jaehoon Roh, Incheon Workers’ Health Center; Yonsei University College of Medicine Dept. of Preventive Medicine; Yonsei University College of Medicine Institute for Occupational Health; Graduate School of Public Health, Yonsei University, jhroh@yuhs.ac

Abstract
Appointing a health administrator is not a statutory duty for small sized enterprises thus they are vulnerable to various health risk factors. In order to solve this problem, ‘Workers’ Health center’ has been established in an area where small sized enterprises are concentrated, by a private occupational health organization -funded by the government- has established ‘Workers’ Health center’ in an area where small sized enterprises are concentrated.

Yonsei University Health System has been appointed as the operator of Incheon Workers’ Health Center after carefully examined by the government on the human resources, programs, equipments, and coverage area. Government has been funding Workers’ Health Center since April, 2011 at about $600 thousand per year.

Operating hours of Workers’ Health Center are from Monday to Friday from 9am to 9pm. Primary visitors of Workers’ Health Center are of various kinds such as, employees of enterprises of less than 50 people, non-regular workers, day laborers, construction workers, foreign workers, or service job workers. Workers’ Health Center provides individualized counseling services and educates on the skills to improve health status.

Occupational medicine specialists and nurses provide counseling services on the occupational diseases and how to promote health status. A psychological therapist provides
counselling services on job stress. Physical therapists and human ergonomics specialists give advice on how to prevent musculoskeletal disease and how to improve work environments.

Any expenses incurred during the courses of examination or counselling services are for free. Workers are referred to adjacent hospitals when treatment is necessary. Workers’ Health Center has been providing follow up counselling services after medical check-ups, Participatory Action Oriented Trainings (PAOT), muscle strengthening exercises and psychological counselling services. A mobile health center has also been operated by Workers’ Health Center.

14,000 cases of health counselling services in 2011, and 18,000 cases of health counselling services in 2012. Daily average of 30 people, annual average of 5,000 people have use Workers’ health center. As the demand increase a branch office and a mobile center has been established. Workers are paying more attention to condition of their health, and due to ease of use number of workers who use Workers’ Health Center are increasing.

Role of Workers’ Health Center is to enhance health management of small sized enterprises of various kinds. Comprehensive occupational health service system could be established by utilizing the Workers’ Health Center.

Keywords
Workers’ Health Center, small enterprise, occupational health services, health care management
Standardisation as a strategy for economic growth in Europe, a literature review

Authors
Catherine Jordan, BSc. MSc. College of Engineering & Informatics, Department of Mechanical and Biomedical Engineering, National University of Ireland, Galway. c.jordan7@nuigalway.ie
Martina Kelly, BA., HDipEd., MSc., PhD. Lecturer and researcher, College of Engineering & Informatics, Department of Mechanical and Biomedical Engineering, National University of Ireland, Galway. martina.kelly@nuigalway.ie

Abstract
It is increasingly recognised that the growth and competitiveness of SMEs is the route to economic recovery in the European Union. SMEs are the principal form of business organisation in Europe, representing the majority of businesses in many European states employing nearly 90 million people (NORMAPME, 2012). However, the continued growth and competitiveness of SMEs in Ireland and Europe, has been greatly affected by the economic downturn. According to the World Economic Forum Report ‘rapid falls in employment in several southern European economies and in Ireland “have made all too clear the imperative of addressing competitiveness weaknesses in order to promote stable economic progress”’ (World Economic Forum, 2012).

To increase the competitiveness of SMEs the EU has developed many programmes and tools over the years, but more recently, with the introduction of ‘new initiatives to assist small enterprises to go international’ in 2012, the EU focus is on standardisation. The evidence suggests that standardisation will help performance, compliance with regulation, introduction of new products and the opening up of new markets.

The literature was reviewed with the intention of investigating standardisation as a strategy for economic growth in Europe. The strategies, programmes of work and tools available to SMEs to support them in the standardisation of their businesses were also examined for their appropriateness and their effectiveness. The review was undertaken by searching key scientific databases and European Commission reports. A number of key search terms were used such as, economic recovery; European economy; SMEs; standardisation and strategies.

The paper concludes that standardisation can work as a strategy for economic growth in Europe as there is evidence to suggest that there are economic benefits associated with standardisation. The strategies, programmes of work and tools identified for SMEs to support them in standardisation were found to be appropriate, however evaluation of these tools and communication of the availability of these tools were limited.
1. Introduction
This study assesses the potential of standardisation as a means of enhancing the competitiveness of SMEs in Europe, which can lead to future growth of these businesses. For the purpose of this study SMEs are defined in accordance with the EU definition, medium-sized enterprises <250 employees with annual turnover ≤ €50 million or annual balance sheet ≤ €43 million, small enterprises <50 employees annual turnover ≤ €10 million or annual balance sheet ≤ €10 million and micro enterprises <10 employees annual turnover ≤ €2 million or annual balance sheet ≤ €2 million (European Commission, 2005).

Internationalisation has provided access to international markets, and standardisation allows companies to enter these markets with new products and services as well as benefiting from international technology and services. Differences in rules and regulations globally however can obstruct the free exchange of goods and services within these markets. Standards, designed and developed by multidisciplinary teams ensure a level playing field for businesses in a particular market by laying down common requirements thereby enhancing competitiveness. SMEs are widely regarded as the driving force for growth and employment and economic growth to a large extent depend on SMEs (Hu, 2010). The EU through several strategies and policies continues to promote and provide support for SMEs to facilitate their competitiveness and encourage sustainable growth despite current economic circumstances. Among these strategies are international standards developed with a view to standardisation across various industries. An analysis of the literature examines standardisation as a solution for economic recovery and examines the appropriateness and effectiveness of a number of the strategies, programmes of work and tools available to SMEs to support them in the standardisation of their businesses.

2. Method
A literature review was performed by searching key scientific databases such as Scopus – V.4 (Elsevier); SourceOECD; Eurostat; National Standards Authority of Ireland (NSAI) Database; World Standards Services Network and Compendex EI Engineering Village. An internet search was undertaken also on websites and online databases such as, European Committee for Standardisation; European Sources Online (ESO) and Europa. The aim was to identify papers and documents examining standardisation as method of enhancing the competitiveness of medium, small and micro enterprises. The search targeted information on the subject of standardisation as a means to economic recovery in Europe and also focused on the available tools, strategies and work programmes available to support SMEs in the standardisation and internationalisation of their businesses. The search terms selected were identified from previous searches of European Commission reports and documents regarding the failing economy and SMEs. Standardisation was being presented in the literature as a...
potential method of enhancing the competitiveness of SMEs and in so doing promoting their growth. The literature and reports examined also suggested that the competitiveness of SMEs would facilitate economic growth and sustainability and that the growth of SMEs was the most viable means of leading Europe out of recession. These findings led to a further more focused examination of standardisation as a strategy for economic recovery and a review of the strategies, programmes of work and tools available to SMEs. Many papers and reports were identified as relevant to the selected theme. Only the most recent papers and reports were included, those from 2000 to the present day as growth and sustainability have become more topical in recent times.

3. Review

The complexity and constraints for SME growth have long been recognised (Almeida and Carneiro, 2009; Andersen et al., 2007; Blackburn, 2008; Jorgen, 2005; Levie and Autio, 2011; MacEachen et al., 2010). Tools and strategies to reduce these constraints and enhance SME growth such as, Impact Assessments (IA) and Regulatory Impact Analysis (RIA), have been available since at least 1997 (OECD, 1997). These analyses recommended an examination of potential, social, environmental and economical impacts on SMEs of all proposals to introduce new legislation, policy or standards in the future. However, the implementation of these strategies was not a legal requirement until the introduction of the Small Business Act for Europe in 2008 (SBA) (Ferris, 2009). The SBA requires impact assessments to be carried out but also includes an SME test and was founded on ‘think small first principle’, for example the Act requires member states to encourage the growth of SMEs by minimising costs, adapting policy to SME needs, encouraging SMEs to benefit from growing markets etc (SEC2101, 2008).

Following a review of the SBA (European Commission COM78, 2011), the performance of SMEs in 2009 (Directorate - General for Industry and Enterprise, 2010) and a sharp downturn in the economy, the European Commission (Commission) focused on SME competitiveness in a global market through standardisation. The Commission has demonstrated support for standardisation, with recent publications such as ‘A strategic vision for European Standards’ (European Commission Com311, 2011), ‘a proposal for a regulation on European Standardisation’(European Commission COM315, 2011) and through the formation of a committee for standardisation, a standardisation system and European Small Business Portals (European Small Business Portal, 2012b). The European Committee for Standardisation (CEN), the European Committee for Electrotechnical Standardization (CENELEC), and European Telecommunications Standard Institute (ETSI) are the standardisation bodies established to help SMEs in the standardisation process. These standardisation bodies are recognised as the European Standards Organisations (ESO). The ESO together with the Commission and the European Free Trade Association (EFTA) combine to make up the European Standardisation System (ESS) (Enterprise and Industry, 2012a). The Commission is fundamental in the plans to achieve standardisation and internationalisation.
The European Standardisation System has led to participation in international standardisation, access to international markets and has enhanced the competitive position of Europe through the delivery of the single European market. The Single Market Act was adopted by the Commission in 2011 with the proposal for 12 new actions or drivers for growth, known as, the legislative framework, in an attempt to revive the single market and to create growth through internationalisation. The framework is a package of measures that harmonises European standards for services and products recognised throughout Europe i.e. standardisation of requirements, specifications (European Commission COM206, 2011).

The EU tools, strategies and programmes are devised to support the internationalisation of SMEs and the EU’s strategy for Europe 2020, ‘a strategy for smart sustainable and inclusive growth’, with five measurable objectives backed by Commission proposals; employment, innovation, education, social inclusion and climate/energy - to be reached by 2020 (European Commission, 2010a). In order for the Commission to achieve these objectives, the following programmes are underway:

- The Competitiveness and Innovation Framework Programme (CIP) – SMEs innovation initiatives are its main target for financial support. €1.4 million will be allocated to CIP under the new Programme for the Competitiveness of enterprises and SMEs (COSME) for the 2014 -2020 period (European Commission COSME, 2011)

Annual European Standardisation Work Programme 2012 - Identifies priorities for Commission standardisation requests in 2012 and looks at requests already issued. ‘The priorities concern firstly ‘harmonised standards’ which ensure that products meet the essential requirements set out in EU harmonisation legislation, where the European standardisation organisations (ESO) should also continue to improve existing standards to further consolidate the internal market.’(European Small Business Portal, 2012a)

- European Small Business Portal - The portal website gathers and presents the information provided by the EU on and for SMEs, such as practical advice, information on policy, regulation, finance and support initiatives. The portal is managed by the Directorate General (DG) for Enterprise and Industry and financed under the CIP Framework (Enterprise and Industry, 2012). The portal has contact points in the majority of European Member States most often being the standardisation body of each state. The portal also provides links to business information and support services, using help desks. There are a variety of help desks accessible in many countries, for instance:
  - ‘European Business and Innovation Centre Network (EBN) - An umbrella organisation bringing together over 200 businesses and innovation centers (BICs), to support the creation of new businesses and to develop activities in existing SMEs.
  - ‘SMEs in Research – Guidance and support for SMEs interested in the opportunities offered by EU funding for research.’
The SME Standardisation Toolkit (SMEST 2) introduced by CENCENELEC. A revision of SMEST 1, the objective of SMEST 2 is to strengthen the link between SMEs and standardisation, by creating awareness, providing information and promoting participation. CENCENELEC in conjunction with NORMAPME are actively running workshops throughout the EU and EFTA countries with national standardisation bodies, SMEs and SME associations to achieve the objectives (CENCENELEC, 2012).

In October 2012, the ‘SME Tool Box’ of solutions was introduced by CENCENELEC. This is a new section on their website that makes it easier for SMEs to access business information on standards and standardisation in Europe.

On the 4th of October, 2012 the Council adopted a new Regulation on European Standardisation. This regulation aims at modernising and improving the European standardisation system and will come in to effect from January 1st, 2013. This will contribute to shorten the standard setting process and thereby facilitate representation and participation of SMEs.

The Digital Single Market. ‘Innovative on-line services based on high-speed communication networks, doubling the shares of the internet economy in European GDP and of online sales in European retail by 2015’ (European Commission., 2011). Digital marketing will result in International trade at a lower cost.

There is a link between internationalisation and increased performance of SMEs, ‘European standards are a powerful means of enhancing the competitiveness of SME’s’ (NORMAPME, 2012), however standardisation and internationalisation may create an additional cost for SMEs (Directorate - General for Industry and Enterprise, 2010; Enterprise and Industry Expert Group Enterprise, 2007; European Commission COM803, 2011). In the current climate, SME resources are limited and the cost required to implement and comply with standards ‘may be too costly and complex to implement for small businesses’ (CEN/CENELEC, 2010). The European Standardisation System however aims to deliver a standardisation system for Europe by 2020 that will meet the needs of businesses of all sizes (European Commission, 2010b).

A research project carried out April 2000 examined the economic benefits of standardisation and concluded that European and International standards have a positive effect on businesses. They are used for example to ‘lower transaction costs’ and ‘assert power over suppliers and customers’ (Dresden and Karlsruhe, 2000). The research concluded that International standards not only had a positive effect on individual businesses that used them as a marketing tool but they also had a positive effect on the economy as a whole.

A precedent for standardisation has already been set with the harmonisation of standards in various industries. The International Standards Organisation (ISO) through the development and harmonisation of international quality and trade standards ensure the safety, reliability
and quality of products and services and facilitate international trade (International Organisation for Standardization, 2012). The Global Harmonisation Task Force (GHTF) introduced in 1999 and the European Medicines Evaluation Agency (EMEA) have encouraged convergence in regulating practices within the medical device and the pharmaceutical industries respectively to ensure the safety and effectiveness of performance and quality. More recently the National Legislative Framework (NLF) through a number of harmonised and aligned regulations and standards such as ‘CE Marking’, ‘Product Safety Directives’ has ‘strengthened the safety of products available on the market and ensured a better functioning internal market through, inter alia, equal treatment of economic operators on the market’(The European Commission Directorate-General, 2010).

4. Conclusion

This study examined standardisation as a strategy for economic growth and examined the available tools, strategies and programmes developed to support businesses in standardisation. Upon examination of the tools, strategies and programmes of work available to support SMEs there were two, which were found to be the most developed. CEN/CENELEC have organised seminars in countries throughout Europe in conjunction with the national standards authority in each country and have published feedback from these seminars to raise awareness of the SME Standardisation Toolkit (SMEST 2) and the ‘SME Tool Box’ of solutions. Many of the other available tools have not yet been implemented and some have projected targets not due to be measured for a number of years therefore their effectiveness has not yet been evaluated. European competitiveness as a whole is reviewed regularly but competitiveness is reported under grouped headings such as ‘EU exports’. However, after investigating these tools in detail it can be concluded that they are appropriate and should aid SMEs and other enterprises in the standardisation of their businesses.

The research identified cases where standardisation was successfully used to enhance trade between businesses nationally and internationally. However, the benefits could not be verified, as a measurement system was not available. The benefits are based on the fact that standardisation leads to increased business opportunities for SMEs, reduction of red tape when trading internationally, increased occupational, environmental and product safety enhanced product quality and reduced costs while at the same time promoting confidence in products and inevitably increasing sales. A measurement system is required, a survey of SMEs trading internationally and the adoption of the International Standard Cost Model may be one method of obtaining verification of standardisation as a means of enhancing SME growth in Europe and internationally. Although it cannot be demonstrated scientifically, with the introduction of the legislation reforming the European standardisation system and the benefits that can be realised from standardisation we can conclude that as a strategy for economic recovery, standardisation is a viable option to be developed further.

Standardisation as a means to economic recovery is a sound solution however; the effectiveness of standardisation and the available tools will depend very much on the communication of their availability. The strategies and tools are available online to all
however, awareness of their existence is something that must be considered. Many of the enterprises in Europe are SMEs and of these SMEs, the majority are micro enterprises who may not have the knowledge to access this information. Further work is required to explore the concept of standardisation as a strategy for economic recovery in Europe, to devise a system and measure the effectiveness of standardisation, and finally to ensure that communication of all developments in Europe are being channelled to the SMEs on the ground in each member state. The nature and the needs of SMEs must be considered; otherwise, the costs of standardisation might outweigh the benefits.

5. References


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Non-peer reviewed paper

Safety in the on shore transport sector for SME enterprises

Author
Kirsten Jørgensen, PhD, Associated professor, DTU management Engineering, DTU, Denmark

Abstract
In EU the transport sector has an incident rate of accidents at work at 40 per 1000 employees. The Danish insurance company CODAN has insured a big part of this sector concerning transport of goods on shore. The transport branch is characterized by many small enterprises of which 97 % of the enterprises in Denmark have less than 50 employees and 89 % have less than 10 employees.

The purpose of the project is to document the safety problems in the sector and to develop a strategy for a preventive intervention in transport enterprises through making successes in 6 enterprises by an intervention program.

The safety problems for the employees are the activities carried out by loading, unloading or work with transport equipment carried out at many different work places. The main safety problems are falls, heavy lifting, poor ergonomic working conditions, hits or collisions with goods, equipment or falling objects, the traffic risk situations, work with animals and finally the risk of violence and robbery.

The intervention is carried out in 6 SME transport enterprises over a three year period, beginning spring 2011. The intervention is organized together with the employers and follows their plan for integrating safety in their basically work.

The intervention until now shows a relevant focus on both the risk for occupational accidents but also the risk of accidents that have consequences for the cars and the deliveries to customers. A calculation of the internal costs of compensation of all damages and injuries shows an amount that covers 20-100 % of the enterprises’ profit for a year.

The intervention in the enterprises is a simplification of safety management methods but adjusted into a new focus and awareness for the managers of small enterprises.

Keywords
Transport sector, safety management, intervention, reflexive qualitative methodology, involvement and motivation

1. Background
According to Denmark's business statistics 2008, there are over 7,000 haulage contractor companies in Denmark with approximately 30,000 employees. Among these companies there are 89% with less than 10 employees and up to 97% have less than 50 employees. That is to say, an industry characterised by quite a few very large transport enterprises and quite a few very small enterprises.

A large proportion of the small haulage contractor companies, in particular, are insured with one insurance company, Codan, where their statistics show an incident rate of 46 per 1000 employees. Other national statistics show a slightly lower result of 37 per 1000 employees (Jørgensen 2010).

The insurance company Codan has data regarding the accidents in the haulage contractor industry, which shows that the reasons for the claims are: Falling objects, trips and falls, traffic accidents, repetitive strain injuries, theft of machinery and violent robberies (Jørgensen 2011).

An analysis of the details from accidents treated in Danish casualty departments shows that the causes of the injuries are: Falls, contact with moving objects, squeeze injuries, straining of the body and cuts. The EU report on the land transport of goods industry emphasizes the following reasons for injury: Falls to lower levels and falls on the same level, contact/collision with moving or stationary objects and being struck by falling or moving objects, as well as physical strain during manual operations (lifting/carrying) and inappropriate movements and working positions. (Jørgensen 2011)

The Danish National Labour Inspection has additional and more detailed information regarding accidents. An analysis of accidents for the land transport of goods for the period 1993-2002 shows the following causality.

Falls to lower levels represent the largest group of accident types at 22%. It is primarily falls from vehicles, either when getting in or out of the cab or from the truck bed and the injuries consist of broken bones and sprains in particular. Repetitive strain injuries represent 14% of the accidents, which particularly involve sprains and strains, where 2/3 are back injuries. The third most frequent accident type (13%) is being caught by, caught between or under objects. A large proportion is due to the injured party being caught/struck by the end board on the platform of the truck, that the injured party was caught/struck by pallets or the means of conveyance (not lift trucks) that moved the pallets, other injuries were due to the use of lift trucks and finally the injured party being caught in doors of different types. These accident types generally have a high degree of seriousness of injury. 12% of accidents occur through collision or by the injured party being struck by objects, of which in 2/3 of cases it is the object that is in motion that strikes the injured party. Forklift trucks, lift trucks, doors, manual lorries, etc. are involved here. In the other cases it was the injured party that was in motion and who struck lift trucks, truck lifts, pallet trucks, etc. Here one sees a broad distribution of the injuries with wounds being the most frequent, followed by sprains, soft tissue injuries and broken bones. 11% of injuries are due to trips and falls on the same level, which in very
many cases occurs in association with the injured party climbing into, out of or down from the vehicle, either from the cab or from the end gate/load. But 1/3 also occur during normal journeys. By far the vast majority of injuries occurring to ankles and feet are primarily sprains. Finally, 10% of accidents occur through the injured party being struck by a falling object. In over 2/3 of these cases, the falling object is the same that the injured party is in process of handling, moving, carrying, etc. i.e. the injured party drops it or contributes to the object falling down. Quite a few broken bones and sprains occur to the feet, toes and legs in particular in connection with this while wounds occur when objects strike the head, shoulders, etc. (Jørgensen 2011).

An EU report stresses that the transport industry's working conditions are generally poorer than the average for all industries, as risks are found in the surroundings with noise, dust, dangers associated with hazardous goods and road traffic, vibrations, high and low temperatures, poor ergonomic conditions, partly when loading and unloading and the sedentary work as a driver, work outside of normal working hours and long working days. Also, a number of organisational risks are observed, such as high job demands combined with a low level of self-inspection of the work and little potential for experience development in the job. Finally, it is stressed that employees in the transport sector are to a higher degree subjected to physical violence, assault and discrimination from colleagues and other persons. (The European Foundation for Improvement of Living and Working Condition 2004)

2. Theory
The formal framework within the small enterprise is generally limited. It is still the employer who sets the agenda, i.e. decides which tasks are to be performed and under what circumstances. The employer often has a close, almost family-type, relationship with the employees but in quite a few industries the employer needs the employees to be able to act independently. The informal framework, including planning and organisation, means, among other things, that communication routes are short. When a decision is initially made, it is then acted on immediately (Hasle and Limborg 2004). This means that when demands are placed on systematic management such as the systematic access to working environment management, then the small enterprises choose not to participate. This is too time-consuming and expensive and does not fit in with their way of operating (Antonsson and Smidt 2003). This means that the requirement for systematic strategic planning and organisation that is prescribed in the methods for achieving a high degree of certainty, do not generally have an actual basis in the small enterprise. On the other hand, many of the elements that are included in safety management and safety culture will also be necessary in the small enterprise.

The challenge therefore lies in how to be able to use the best from the large enterprises, but with an adaptation to a form that fits into the day to day operation of the small enterprise. The following 5 points include some of the challenges in small enterprises that make this even more difficult:

- The fact that the accident frequency is high, but the risk awareness is low
• The fact that culture and organisation are extremely different for different industries, professions and individual employers
• The fact that management resources are small, so that a lot needs to be delegated to the individual employee
• The fact that the gains from a high level of safety are difficult to monitor.
• That resources for finances, time and knowledge as regards safety activities are limited

On the other hand, the small enterprise seldom experiences an accident among its own employees, and if it occurs then it is often an accident process that the employer feels is not his fault. By far the majority accidents are so-called ‘trivial accidents’, such as falls, bumping into something or muscle sprains during heavy lifting. The triviality lies in the fact that the course of events are simple and easy to explain, therefore subsequently, but also that these accidents have a strong element of people's behaviour and actions, at the same time as the conditions that create the accidents are perceived as being everyday occurrences and not something particularly dangerous. Herein also lies the fact that in the small enterprise there is a lack of competence in investigating and analysing accidents (Walters 2001). All in all, this means that the awareness of hazards and their possible consequences is generally low.

The managerial resources limitation in small enterprises is generally illustrated in the literature that deals with small enterprises. There is perhaps no use for large formal systems when things can just as well be discussed in the day-to-day situation. Therefore, also informal frameworks and an often ad hoc characterised organization to the work (Hasle et al 2009, Walters and Lamm 2003, Eakin et al 1998)

In addition, a task in many small enterprises is characterised by the fact that it must be performed within their business premises or away from where they employer is located. This is applicable in the building and construction sector, within trade and enterprise, within agriculture, in the cleaning industry and within the transport industry, etc. The challenge lies in getting the employer to see the costs for safety in relation to the risk rather than the actual accidents, so that he has an opportunity to evaluate the value of safety rather than spending money on something in which he can see no effect. It is furthermore stressed that the small employer and the business owner's resources are limited both with respect to finance and to time, not least to activities that he regards as peripheral in relation to that which he derives his income (Brooks 2008, Walters and Lamm 2003). In addition, in general the employer and owner of the small business primarily have professional knowledge regarding what the business is based on and not specific knowledge regarding safety and the working environment. Nor are these the topics he first tackles in gaining knowledge of: finance and accounting, authoritative requirements, sales and customer contact come first.

Knowledge regarding safety will not immediately be what is first on the list when employees are employed. It is more about getting a few staff members to perform the tasks for which there are customers. Therefore, in small enterprises, there can be resistance against investing in equipment and tools (Vickers et al 2003). Time to acquaint oneself with a new
professional area, such as the working environment and safety, which are not product relevant, is generally not something there is space for at the small employer (Walters and Lamm 2003). Therefore, his need is to receive a plan and method that is worked up by others with the necessary knowledge, but which fulfils his criteria about it being low cost, easy to use and maintain and being adapted to his tasks and industry related requirements (Vassie and Cox 1998).

3. Methodology
The research project is an intervention and process study of 6 small and medium sized enterprises within the haulage contractor industry. The goal of the intervention is to investigate which methods for the prevention of accidents these haulage contractors could find useful and that are actually possible in the individual enterprises with the tasks, resources and management they have.

The intervention is planned to last for a 3 year period based on the understanding that it will take time both to get the methods understood, implemented and to have the opportunity to see whether they have any effect.

The point of departure in the individual enterprises is mapped at the first visit, where at the same time an initial structure of how the co-operation and course of events can come to function occurs. Selection of the individual enterprises has occurred based on the criteria that they should be positively prepared to participate in the longer term, but with a promise that the tempo for their development that will be initiated will be adapted to suit their abilities, resources and possibilities.

At the initial visit to each enterprise there was therefore a certain duration i.e. 5 days with the following course of events: 1. Mapping out and calculation of the current expenses that the enterprise has due to accidents, injuries, errors, failure, etc. 2. Carrying out a basic discussion with the manager regarding the task, the process, roles and strategy, 3. Gathering experience regarding the drivers' normal working day, i.e. out and driving with a number of employees to see their work and speak with them, 4. A planning meeting with the manager about the common meeting's structure, content and goal, 5. Carrying out a common meeting with all employees, where plans and activities are discussed and agreed, 6. Final decision-making meeting with the manager regarding the course of events up to the next visit.

Based upon this course of events, a strategy and action plan will be developed together with the employer regarding what will happen subsequently. After this the enterprises will be regularly monitored, in part monthly with e-mail correspondence and every half year with a revisit, where results and new measures are discussed and set in motion. The enterprises will be monitored relatively closely, where the researcher will function as an advisor and dialogue partner, but at the same time also as an observer of what the manager does and does not do, what they have carried out and what works or is difficult to get to work. The preliminary results of this progress study are presented in the following section, approximately halfway in the progress.
4. Results
The enterprises participate in the project are haulage contractor businesses with between 20 and 50 employed drivers. The administrative part of the business is from 2 to 10 persons, where the medium-sized enterprises have transport managers, who are a type of intermediate manager between the employer and the drivers. The items that are transported are packages and goods, earth, gravel and building materials, waste and waste disposal and live animals.

None of the enterprises have had any thoughts whatsoever regarding strategies or policies regarding safety beyond what they can do to adhere to applicable laws. This means that they have chosen safety representatives but keep safety meetings to an absolute minimum. They also adhere to rules regarding driving-rest time and traffic safety rules. The normal working day is about procuring tasks for the company and ensuring they are carried out. When the drivers meet up they are told that they are to transport items from A to B and otherwise be kept driving throughout the day over the telephone. Most of the drivers have their "own" vehicles, i.e. they have a permanent vehicle for which they are responsible for maintaining and cleaning but they must lend it out to colleagues when they are off work. The vehicles must be out driving every day in order to generate revenue. It is a tough industry.

One of the first things that was tackled in the enterprises was to obtain a picture of the costs that the enterprise had incurred for different types of injuries caused by something that had gone wrong. The reason for this part was to give the employer an understanding of how expensive it actually is and what he can save if he carries out new preventative measures. Naturally, the goal is to motivate him to want to make an effort to obtain a positive result. In this course of events we found out that none of the enterprises had this overview. This quite simply was not included in their financial setups.

The financial calculations solely have focus on the enterprises' own costs, which include 1. coinsurance, 2. absence, 3. replacement goods, 4. repairs to damage outside of the insurance, 5. administrative time spent.
- Coinsurance was established based on what is settled on the insurance’s claim list
- Absence was settled based on the number of days of absence due to illness and the driver's average salary
- Repairs to vehicles was established based on the actual expenses, cf. annexes
- Compensation to customers and third person property was established based on annexes
- Administration costs were established based on an evaluation of working hours and the hourly price for the administrative employees

The result was surprising for all of the applicable employers, as it was shown that their own expenses for damages amounted to between DKK 250,000 (EUR 35,000) and up to over DKK 700,000 (EUR 100,000), which corresponded to an amount between 20-100% of their profit.
This knowledge provided the basis and the interest for a dialogue regarding how one can create a positive development with fewer claims in the business. In connection with this, a general policy, strategy and action plan were agreed with the primary purpose of getting the initiatives that were needed to be carried out passed into the entire enterprises’ objectives and mindsets.

Through the dialogue that was carried out in several rounds the first few days a number of general themes emerged (Figure 1), that along the way all of the companies could nod in recognition to.

Figure 1. themes to the haulage contractor's company policies

| Working environment, Safety, smoking, breaks, clothing, alcohol, health | Technology/vehicles – responsibility/maintenance |
| Quality of work in relation to customers, behaviour | Environment, economy when driving and passive driving |
| Colleagues, be a good colleague, respect, support speed and attention | The road as a place of work |

These themes were subsequently transformed into the following company policies:

- That the employees have a good working environment with a high degree of personal safety and safe behaviour in relation to other people
- That the employees work with well-maintained vehicles and without own damage to vehicles
- That the employees are able to exhibit good professional behaviour towards customers when collecting the waste or delivering goods on time, place and good quality, and especially with respect for the customer's time.
- That all driving occurs with great respect for the environment with regard to fuel consumption and driving behaviour
- That all employees exhibit mutual respect toward each other and are a good colleague, especially with the use of other's vehicles and common use of containers that should be delivered in the same condition as they would like to be received
- That all employees have a fundamental understanding of the road as a workplace and the requirements that are made for carrying out tasks

This first subsequently up to following guidelines as an indication of what he means by the content in the individual policy points:

At the same time, there was a dialogue regarding what actually was desired or the dream for the relevant employer that precisely his business could be known for. That is to say, his vision. This was nothing that anyone had written down but they all had thoughts about what it was.

On the basis of this dialogue their thoughts were written down and subsequently read through thoroughly by the employer himself and arranged according to his wishes.
one’s thoughts written down on paper, getting help to formulate it and compile it so it looked a bit professional was a very positive experience for all parties.

Within the first half of the period the companies have participated in a co-operation with researchers to carry out a number of activities and are in the process of developing a catalogue over what they can set in motion, either one thing at a time or in an interaction. Completely dependent on what they each especially find interesting and suited just to them. A number of the activities are not targeted to the working environment, but together with the activities that are targeted toward the working environment they provide a whole that the employer and drivers want to and can see an idea in. A large part of the activities involve the drivers so they begin to participate in what is going to happen in the companies. Precisely this involvement is a part of the strategy to create a co-ownership, involvement and communication between drivers and management.

One of the first activities includes, among others, mapping out the working environment problems at the company through the use of a simplified, targeted form, which could be filled out without a lot of writing or spending a lot of time.

The range of other activities in the 6 haulage contractor businesses includes 1) development of the newsletter, 2) meetings and involvement of employees, 3) following up on costs for injuries, 4) staff conversations, 5) training by elite employees, 6) safety measures, 7) the good driver behaviour, 8) driver of the year, 9) collective rewards/consequence, 10)community and on-going dialogue.

Overall there has been a need by employers to understand the management task in relation to employees. The haulage contractor spends all his time bringing in work to the business and making agreements with customers. Drivers have a car at their disposal and are told to drive from A to B. But exercising leadership toward employees and ensuring that they actually carry out the work as one would like to have it done, also in a safe and qualitative manner does not lie within the haulage contractor’s field of competency.

The task was therefore to help him to understand this part of his task as an employer and illustrate how he gets a positive value out of the effort.

5. Conclusions
Difficulties in the task are to maintain the attention of the companies in the long run, at the same time as there are periods where their resources cannot handle other than bringing home work to the business.

Creating a change process in a company seems to require a certain surplus in the company and at least that the earning related conditions are somewhat stable. It seems as though there is a type of Mashlow's pyramid for businesses, which has a significance to when they can establish a change process.
The advantage is that if this surplus is in place, then there is not a long way from the understanding to decision making and implementation. Something actually occurs on the basis of a clear effort. The main conclusion is that there is a need for helping the small businesses employers to understand what the management task involves and how he/she can develop himself and the business in a simple way without the large grand system. But, it also shows that the efforts regarding safety first become accepted when they are integrated in other efforts so that there is a visible whole in relation to the company's overall goals.

6. References


Finnish women entrepreneurs' work well-being

Abstract
This paper presents the main results of a comprehensive study on Finnish women entrepreneurs' well-being at work. In the study women entrepreneurs' work well-being was examined from six viewpoints: health and work ability, work satisfaction and engagement, physical and psycho-social work load, professional and business competencies, work-life balance and support needed to continue at work. The results reveal the differences in well-being between the different business sectors and between self-employed and employers. It also clarifies how age is related to well-being at work among women entrepreneurs. Based on the results the paper discusses the actions needed to promote women entrepreneurship in Finland.

Keywords
Women entrepreneurs, work ability, work well-being, occupational health, occupational health services, questionnaire study

1. Introduction
At present, entrepreneurship of women is highlighted as a potential source of new employment opportunities and innovations worldwide. Health and well-being at work have been shown to be positively related to productive work and the success of enterprises (1–5). Still, in Finland there is only a limited number of studies and development attempts focusing on the health and well-being of women entrepreneurs. Particularly, we lack a comprehensive picture of the occupational health and safety, working conditions, work-life balance and the coverage and usage of Occupational Health Services and other support systems among women entrepreneurs working within different industries.

To fill the gap in scientific knowledge about women entrepreneurs' work well-being and factors related to it a comprehensive research and development project was launched by the Finnish Institute of Occupational Health (FIOH), the Central Association of Women Entrepreneurs in Finland and the Ministry of Employment and the Economy in Finland. The
A study aimed to produce general, reliable knowledge to be used in developing and supporting women entrepreneurship in Finland in terms of business development and women entrepreneurs’ well-being at work.

2. Material and methods
The research was conducted between 1.9.2008 and 31.3.2009 as a questionnaire study. Women entrepreneurs’ well-being at work was examined from six viewpoints integrating the multi-dimensional character of well-being at work concept (Figure 1.)

![Figure 1. Six viewpoints of work well-being](image)

Validated questions on work stress and engagement, work-ability, work-life balance and working conditions were included in the questionnaire as well as open questions about motivation, social networks, usage of OHS and gender related disadvantages were included in the questionnaire. (6–10).

In the questionnaire, psychosocial work stressors (36 items) were rated on a 5-point scale, ranging from not at all (value of 1) to very much (value of 5). Job satisfaction and work engagement (16 items) were rated on a 7-point scale, ranging from never (value of 0) to daily (value of 6). The questionnaire contained also structured questions about health and work-ability (10 items), work-life balance (7 items), working conditions (20 items), gender equality, violence and sexual harassment at work (4 items), and the usage of OHS and other health supporting services (5 items). Open questions in the questionnaire provided the respondents an opportunity to give further information about their work motivation and goals, gender related disadvantages and sexual harassment at work, usage of OHS and rehabilitation services, social networks and actors supporting their entrepreneurship. Factor analysis was applied to reduce the number of the items.
The data was based on a stratified random sample of 3254 firms run by women entrepreneurs in different business sectors and geographical areas in Finland. The sample was produced by Statistics Finland. 1691 (52 %) women entrepreneurs returned the questionnaire and 474 gave reasons for not answering to it (e.g. retired, business over). 1239 (45 %) answered to the questions. 72 % of the respondents were self-employed, and 28 % were employers. The average age was 47.4 years and the tenure 12.3 years, respectively. Real estate, renting and business activities, personal services and other social services, health and social work, and wholesale and retail trade were the most common business sectors represented by the respondents (Table 1.)

Table 1. The representativeness of different business sectors in the study (percentage of the respondents)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Total (n=1239)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real estate, renting and business activities</td>
<td>19.3</td>
</tr>
<tr>
<td>Personal services and other social services</td>
<td>18.2</td>
</tr>
<tr>
<td>Health and social work</td>
<td>17.2</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>16.8</td>
</tr>
<tr>
<td>Agriculture, forestry and fishing</td>
<td>8.7</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>7.4</td>
</tr>
<tr>
<td>Accommodation and catering</td>
<td>4.4</td>
</tr>
<tr>
<td>Construction</td>
<td>3.6</td>
</tr>
<tr>
<td>Transportation, storage and communication</td>
<td>2.9</td>
</tr>
<tr>
<td>Education</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Sum scales were developed from the items with the highest factor loadings within each factor (minimum loading 0.54). Content validity was measured by Cronbach's alpha (Table 2).

Table 2. Sum scales, number of items and Cronbach’s alpha coefficient

<table>
<thead>
<tr>
<th>Sum scale</th>
<th>Number of items</th>
<th>Cronbach’s alpha coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedication to the work</td>
<td>5</td>
<td>0.87</td>
</tr>
<tr>
<td>Uncertainty at work</td>
<td>3</td>
<td>0.70</td>
</tr>
</tbody>
</table>

3. Results
Women entrepreneurs were highly motivated by their work and dedicated to it. Dedication to work was high especially among women entrepreneurs working in health and social sector and in personal and other social services. They felt that their work was meaningful and it had
a clear purpose more often than those working in other sectors. In agriculture, forestry and fishing and in accommodation and catering sector dedication to work was somewhat lower (Table 3.) The most dedicated to their work and most energetic were women entrepreneurs of 55 years or over and self-employed entrepreneurs.

Table 3. Dedication to the work (sum scale) in different business sectors in the study (percentage of the respondents) (0–0.5=never, 0.51–1.5=a few times a year, 1.51–2.5=monthly, 2.51–3.5=a few times a month, 3.51–4.5=weekly, 4.51–5.5=a few times a week, 5.51–6=daily)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Never–monthly</th>
<th>A few times a month</th>
<th>A few times a week</th>
<th>Mean</th>
<th>Deviation</th>
<th>Number (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All sectors (total)</td>
<td>2.6</td>
<td>13.1</td>
<td>84.2</td>
<td>5.08</td>
<td>1.09</td>
<td>1211</td>
</tr>
<tr>
<td>Health and social work</td>
<td>1.0</td>
<td>6.6</td>
<td>92.4</td>
<td>5.41</td>
<td>0.84</td>
<td>211</td>
</tr>
<tr>
<td>Personal services and other social services</td>
<td>1.4</td>
<td>10.4</td>
<td>88.2</td>
<td>5.24</td>
<td>0.95</td>
<td>222</td>
</tr>
<tr>
<td>Other sectors</td>
<td>2.1</td>
<td>17.9</td>
<td>80.0</td>
<td>5.03</td>
<td>1.10</td>
<td>95</td>
</tr>
<tr>
<td>Real estate, renting and business activites</td>
<td>3.9</td>
<td>11.7</td>
<td>84.4</td>
<td>4.99</td>
<td>1.11</td>
<td>231</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>4.5</td>
<td>12.4</td>
<td>83.1</td>
<td>4.98</td>
<td>1.07</td>
<td>89</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>3.9</td>
<td>13.7</td>
<td>82.4</td>
<td>4.97</td>
<td>1.22</td>
<td>204</td>
</tr>
<tr>
<td>Accommodation and catering</td>
<td>1.8</td>
<td>23.6</td>
<td>74.6</td>
<td>4.79</td>
<td>1.21</td>
<td>55</td>
</tr>
<tr>
<td>Agriculture, forestry and fishing</td>
<td>2.9</td>
<td>24.3</td>
<td>72.8</td>
<td>4.78</td>
<td>1.23</td>
<td>103</td>
</tr>
</tbody>
</table>

Women entrepreneurs experienced their health and work ability as fairly good, but still somewhat poorer than employed women. Women entrepreneurs in the health and social work sector had a better work ability than their counterparts in other sectors. Older women entrepreneurs’ work ability was poorer than that of younger entrepreneurs under 35 years.

Women entrepreneurs experienced stress more often than employed women. Stress was caused for example by financial responsibility, pressure of time and work undone, and uncertainty about availability of sufficient work in the future. They were also afraid of falling ill. Most stress was experienced in the accommodation and catering sector and among employers. Many of the psychosocial load factors accumulated in the same sectors, most often in accommodation and catering, manufacturing and agriculture, forestry and fishing (Table 4.)
One in seven women entrepreneurs had experienced violence or the threat of it at least at some time during their work. One in six had experienced sexual harassment. Most frequently physical violence was experienced in the accommodation and catering, as well as in health and social services. Sexual harassment was most common in construction, education, transportation, accommodation and catering, personal services, and health and social services. Young, under 30-year-old women are at the greatest risk of sexual harassment. Unequal treatment and gender-based discrimination was as common among women entrepreneurs as among employed women, and again young women were more likely to experience such treatment. Employers had experienced discrimination more often than self-employed entrepreneurs.

Table 4. The uncertainty at work experienced as annoying, disturbing or stressful in different industries in the last six months of the year, percentage of the respondents. (1.0–1.5=not at all, 1.51–2.5=quite a bit, 2.51–3.5=some, 3.51–4.5=pretty much, 4.51–5.0=very much)

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Not at all–quite a bit</th>
<th>Some</th>
<th>Pretty much–very much</th>
<th>Mean</th>
<th>Deviation</th>
<th>Number (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All sectors (total)</td>
<td>52.6</td>
<td>30.7</td>
<td>16.7</td>
<td>2.54</td>
<td>0.97</td>
<td>1200</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>42.0</td>
<td>30.7</td>
<td>27.3</td>
<td>2.86</td>
<td>1.00</td>
<td>88</td>
</tr>
<tr>
<td>Other sectors</td>
<td>39.4</td>
<td>37.2</td>
<td>23.4</td>
<td>2.79</td>
<td>0.93</td>
<td>94</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>50.7</td>
<td>29.8</td>
<td>19.5</td>
<td>2.64</td>
<td>0.95</td>
<td>205</td>
</tr>
<tr>
<td>Accommodation and catering</td>
<td>45.4</td>
<td>36.4</td>
<td>18.2</td>
<td>2.63</td>
<td>0.96</td>
<td>55</td>
</tr>
<tr>
<td>Personal services</td>
<td>49.8</td>
<td>32.0</td>
<td>18.2</td>
<td>2.60</td>
<td>0.99</td>
<td>219</td>
</tr>
<tr>
<td>Real estate, renting and business activities</td>
<td>53.5</td>
<td>30.4</td>
<td>16.1</td>
<td>2.48</td>
<td>0.99</td>
<td>230</td>
</tr>
<tr>
<td>Agriculture, forestry and fishing</td>
<td>61.0</td>
<td>27.0</td>
<td>12.0</td>
<td>2.34</td>
<td>1.00</td>
<td>100</td>
</tr>
<tr>
<td>Health and social work</td>
<td>64.9</td>
<td>28.4</td>
<td>6.7</td>
<td>2.25</td>
<td>0.81</td>
<td>208</td>
</tr>
</tbody>
</table>

Almost third of the women entrepreneurs had physically heavy work in terms of repetitive work motions, lifting and carrying and awkward work positions. Physically heavy work was most common in personal services, agriculture, forestry and fishing and in manufacturing.

Work hindered women entrepreneurs' private life more than vice versa. One in three women entrepreneurs experienced a conflict between work in home and at the workplace and wanted to spend more time with family and friends. Combining work and private life was most successful for women entrepreneurs in the health and social sectors and for older entrepreneurs. Work-life balance problems were most common in accommodation and catering sector and among employers.
Two out of three women entrepreneurs felt need to develop their professional competence and more than half wanted to improve their business competence. Especially young entrepreneurs and employers needed improve their skills in ICT, marketing and business planning. They saw professional and business expertise as a prerequisite for their well-being as well as for the success of their enterprises.

Family and other entrepreneurs were the most important support for women entrepreneurs. Support for their entrepreneurship was obtained also from the Employment and Economic Development Offices. The opportunity to relax and rest from the work was seen as the best way of ensuring the ability to cope with work. Also, a better pension, getting help in the work and access to rehabilitation, as well as occupational health services would help women entrepreneurs to carry on their work.

Only one out of three women entrepreneurs had arranged OHS for themselves. OHS was most often arranged in agriculture, forestry and fishing, business services, wholesale and retail trade and among employers. The others did not know much about OHS. Only a handful of women entrepreneurs had participated in rehabilitation.

4. Conclusions
Psychosocial and physical stress factors accumulated to certain business sectors such as accommodation and catering, agriculture, forestry and fishing, and industry and especially to employers. Also older than 55 years as well as younger, under 35 years old entrepreneurs were more prone to be at risk in terms of psychosocial and physical work load. Also, factors related to well-being at work accumulated to such sectors as health and social services and personal services.

Many of the work stress factors identified in this study can be prevented or reduced. It is also possible to further strengthen women entrepreneurs’ work ability and well-being at work. For example, OHS can support women entrepreneurs’ work ability and help them reduce their work load and improve their working conditions. Therefore it is important to provide them with the knowledge about the benefits of OHS and how they can arrange the services for them and their employees. Also, there is a need to improve the access to OHS and develop its services to better meet the needs of women entrepreneurs.

The vast majority of women entrepreneurs feel the need to develop their skills, and a fifth is overloaded because of the shortage of skills. In spite of the wealth of business training and education, and the variety of entrepreneurship projects, it seems that they are not fully utilized. Supporting the possibility to take leave from work would make it easier to women entrepreneurs to improve their competencies and well-being.

In addition to developing social security system, there are also some specific measures that can be taken to support women entrepreneurship. Improving business and entrepreneurial competencies and the access to counselling services would support the professional growth
of women entrepreneurs. Networking with other entrepreneurs and actors promoting entrepreneurship would provide women entrepreneurs with contacts and skills, business and learning opportunities and support from peers. They are important also for the well-being of women entrepreneurs. Arranging OHS would enable women entrepreneurs get professional support for their work ability.

5. Implications
Supporting women entrepreneurs and ensuring the success of their enterprises requires joint efforts in the fields of health, training and business development. Based on the research results these areas were included in a comprehensive women entrepreneurship development project conducted 2010-2012 in collaboration with women entrepreneurs, their representatives, FIOH and the Ministry of Employment and the Economy.

6. References


Anthropometric data to develop relaxing chair for workers working in small scale hospitality industry to enhance enterprising ability

Authors

Tulika Khare, Research Scholar, College of Home Science, Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, Udham Singh Nagar, Uttarakhand
Promila Sharma, Professor, College of Home Science, Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, Udham Singh Nagar, Uttarakhand

Abstract

Restaurant workers, who works in the kitchen, doing the different activities in continuous standing posture and spent most of the time inside the buildings and therefore experience the greatest amount of exposure while performing various activities and at greatest risk. They do the work which is very labor intensive. The workers working in the restaurants withstand the pressure, string of working for long hours, suffering from high blood pressure due to prolong standing posture, lifting heavy pots and kettles and working near hot ovens and grills. An occupational hazard includes slips and falls, cuts and burns. Restaurant relaxing chair is one of important furniture design that cause people especially who work in the restaurant feel comfortable after prolong stand. Each parts of chair should be designed properly so that it can have more ergonomics characteristics to ensure the user to get a good posture. It also can assist the user to minimize fatigue and injury by fitting the chairs to the body size, and also suggest the strength and range of movement. Correct sitting and standing posture is an important factor for the prevention of musculoskeletal symptoms. Therefore, the study was undertaken design of ergonomically functional and aesthetically sound relaxing chair for kitchen related standing activity. For the present study 120 workers were selected from the four south Indian restaurant i.e. Sri nidhi sagar, Raaga the family restaurant, Tamarind and Inchara the family restaurant, Bangalore city, Karnataka State. Descriptive cum experimental research design was used for the present study. Purposive sampling procedure was followed to select the sample and data was gathered by interview method. The workers were mainly literate and aged from 25-40 years. The data further showed that the existing conditions of the restaurant workers were satisfactory i.e. work environment. Besides this occupational risks were noticed among workers which can result in health hazards. Statistical analysis showed the significant difference between physiological cost of work and different activities such as preparation, cooking, serving and dishwashing performed by the restaurant workers. It was found that the restaurant workers faced lot of problems due to non availability of relaxing chair at their work unit. Hence due to prolong standing posture and, continuous working hours and absence of relaxing of body they suffered with arthritis problem, lower and upper back problem, headache, swelling on ankles, stiffness in leg and hand joints, numbness in body, reduced grip strength, limiting movement of fingers etc. Besides this there was a problem of slips, falls, repetitive body motion, and adoption of awkward posture for performing especially preparation and dishwashing activities.
besides cooking activity. Mainly lower back and leg/feet were the affected body parts while doing the work. Their work abilities were affected and hence the need was felt to design relaxing chair for Dabbawala units.

**Keywords**
Restaurant workers, ergonomically functional

1. **Introduction**
The hotel, restaurant and catering sector covers a wide range of different Businesses, including hotels, pubs and restaurants, contract caterers in various industrial and commercial premises, fast-food, cafes and bistros. It plays an important role as a job creator in the service sector and in the economy as a whole in many States. The hotels and restaurant sector includes a range of tasks and jobs that pose different risks. The complexity of the sector makes it difficult to present an exhaustive view of the situation. Much attention goes towards working in kitchens. A common pain that related to this situation is Musculoskeletal Disorder (MSD). The pain is related to the damage or defect happen to any parts of the worker's body especially the thoracic area which is at the back side body part of the worker. This could happen if the restaurant worker does not practice the right position during work. This pain can be a permanent pain if there is no action or research taken to help restaurant workers in increasing the level of comfort while working. Those actions can be summarized to be the change in the way of seating or in other words the design of chair used by the restaurant workers. Restaurant relaxing chair is one of important furniture design that cause people especially who are work in the restaurant feel uncomfortable after prolong stand. Each parts of chair should be designed properly so that it can have more ergonomics characteristics to ensure the user get a good posture. It also can assist the user to minimize fatigue and injury by fitting the chairs to the body size, strength and range of movement. Correct sitting and standing posture is an important factor for the prevention of musculoskeletal symptoms. Nowadays in the market there are many resources that can produce the restaurant relaxing chair in various shapes, sizes and types. According to the Vishwanathan(1991) a functionally designed restaurant kitchen is much more than merely a food storage and place for cooking, its main objective being to increase the work output with least utilization of the human resources. The restaurant kitchen must be designed as per the needs of the restaurant workers to reduce physiological cost of work and fatigue to the minimum as well as which maintain a good working posture. A good working posture reduces the physiological cost of work to the minimum whereas, static muscular efforts and incorrect posture for longer duration during kitchen activities may cause tiredness and may increase the energy expenditure in proportion to the physical efforts involved, leading to irreparable damage to the body (Sangwan, et al. 2003).

In the present study we evaluated the exposure of the restaurant workers in the kitchen related standing activities such as preparation, cooking, serving and dish washing. Four restaurants were purposively selected for the present study namely- Sri nidhi sagar, Raaga the family restaurant, Tamarind and Inchara the family restaurant, Bangalore city, Karnataka State, India. Health effects of occupational exposure due to prolong standing posture in restaurant workers, including backache, muscles pain, pain in lower leg, pain in lower back,
pain in joints, shoulders, high blood pressure, increased heart rate etc. the objective for the present study was:

- Introduction of relaxing chair to enhance enterprising ability.

**Limitation of the study**

- The study was limited to the restaurant workers only.
- The study was limited to the metropolitan restaurant workers.
- The study was limited to the family restaurants only.

**Delimitation**

- The sample was selected from various restaurants of Bangalore city of Karnataka state.

2. Methodology

Four restaurants were purposively selected for the present study namely- Sri nidhi sagar, Raaga the family restaurant, Tamarind and Inchara the family restaurant, Bangalore city, Karnataka State. An exhaustive list of restaurant workers were taken from their respective departments, then from the list, 120 restaurant workers performing group of activities as preparation of food, cooking, serving and dish washing were selected. From each subcategory 20 workers were selected for the experimental data thus making 120 samples for survey and 20 samples for controlled group. The details of sampling design are presented in figure. Simple random sampling without replacement was used to select the study area and workers. Sample size was determined before the data collection. For the descriptive data the sample size of 120 was selected and 20 workers of the total sample were selected for experimental data. Descriptive data was collected personally by using the interview schedule method. Experimental data like moisture, temperature, light and noise was also taken while performing the different activities in restaurant kitchen. All the subjects volunteered for the study. They were informed about the study. The study protocol is presented in figure 1.

Figure 1. Sampling design
The assessment of the need for relaxing chair for kitchen related standing activities in restaurants were studies for one year among restaurant workers in for restaurants.
3. Results

3.1 Designing through Auto CAD ergonomically functional and aesthetically sound relaxing chair

All the anthropometric measurement of workers was analyzed and on the basis of that, the final dimensions shown in the table 1 were used for the design and development of relaxing chair for restaurant workers.

Table 1. Dimensions of designing of relaxing chair for workers

<table>
<thead>
<tr>
<th>Measurements (C.M.)</th>
<th>5th percentile</th>
<th>50th percentile</th>
<th>95th percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting height</td>
<td>89</td>
<td>90.6</td>
<td>96.5</td>
</tr>
<tr>
<td>Sitting eye level height</td>
<td>72.89</td>
<td>79.5</td>
<td>85</td>
</tr>
<tr>
<td>Buttock popliteal ht.</td>
<td>43.9</td>
<td>49.5</td>
<td>54.86</td>
</tr>
<tr>
<td>Buttock to knee</td>
<td>54</td>
<td>59</td>
<td>64.77</td>
</tr>
<tr>
<td>Sitting popliteal ht.</td>
<td>39.37</td>
<td>43.9</td>
<td>49</td>
</tr>
<tr>
<td>Sitting knee ht.</td>
<td>49</td>
<td>54.3</td>
<td>59.4</td>
</tr>
<tr>
<td>Thigh clearance</td>
<td>10.9</td>
<td>14.47</td>
<td>17.5</td>
</tr>
<tr>
<td>Waist depth</td>
<td>18</td>
<td>24.6</td>
<td>31.24</td>
</tr>
<tr>
<td>Elbow rest ht.</td>
<td>18</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td>Sitting hip breadth</td>
<td>31</td>
<td>35.56</td>
<td>40</td>
</tr>
<tr>
<td>Forearm to forearm breadth</td>
<td>35</td>
<td>42</td>
<td>50.5</td>
</tr>
<tr>
<td>Hand thickness at meta carpals</td>
<td>2.79</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>Hand length</td>
<td>17.6</td>
<td>18.62</td>
<td>19.02</td>
</tr>
<tr>
<td>Palm length</td>
<td>10.13</td>
<td>10.43</td>
<td>10.73</td>
</tr>
</tbody>
</table>

CAD sketches of the relaxing chair are presented in Figures 2 (side view) and 3 (front view).
3.2 Comparisons between existing furniture for relaxation and ergonomically designed relaxing chair

When the dimensions of the existing used furniture for relaxation and ergonomically sound relaxing chair were calculated for comparison then it was found that there was a measurable difference in dimensions and other features (see Table 2). Where it was calculated statistically, the significant difference was found in all dimensions of existing and ergonomically designed relaxing chair.
Table 2. Comparison between the dimensions of existing chair and ergonomically designed relaxing chair

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Dimensions of ergonomically designed relaxing chair (cm)</th>
<th>Dimensions of existing furniture (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting height</td>
<td>96.5 (95th percentile)</td>
<td>68.3</td>
</tr>
<tr>
<td>Sitting eye level height</td>
<td>85 (95th percentile)</td>
<td>52</td>
</tr>
<tr>
<td>Buttock popliteal ht.</td>
<td>54.86 (95th percentile)</td>
<td>51.3</td>
</tr>
<tr>
<td>Buttock to knee</td>
<td>64.77 (95th percentile)</td>
<td>59.1</td>
</tr>
<tr>
<td>Sitting popliteal ht.</td>
<td>49 (95th percentile)</td>
<td>43.4</td>
</tr>
<tr>
<td>Sitting knee ht.</td>
<td>59.4 (95th percentile)</td>
<td>55.2</td>
</tr>
<tr>
<td>Thigh clearance</td>
<td>17.5 (95th percentile)</td>
<td>13.3</td>
</tr>
<tr>
<td>Waist depth</td>
<td>31.24 (95th percentile)</td>
<td>23</td>
</tr>
<tr>
<td>Elbow rest ht.</td>
<td>29 (95th percentile)</td>
<td>-</td>
</tr>
<tr>
<td>Sitting hip breadth</td>
<td>40 (95th percentile)</td>
<td>37</td>
</tr>
<tr>
<td>Forearm to forearm breadth</td>
<td>50.5 (95th percentile)</td>
<td>42.6</td>
</tr>
<tr>
<td>Hand thickness at metacarpals</td>
<td>3.3 (95th percentile)</td>
<td>-</td>
</tr>
<tr>
<td>Hand length</td>
<td>19.02 (95th percentile)</td>
<td>-</td>
</tr>
<tr>
<td>Palm length</td>
<td>10.73 (95th percentile)</td>
<td>-</td>
</tr>
</tbody>
</table>

As the existing furniture was not properly comfortable for foot rest, back rest, hand rest and head rest, therefore, employees were reluctant to regular use of there.

In the present investigation design and development of relaxing chair was done on the basis of anthropometric data of users which need to be tested on the basis of relevant standards. Awkward things are adopted to take rest (see Figures 4-7 for examples).
4. Conclusion

The restaurant industries are not ready to compensate with employees having partial and full injuries and are not covered by life insurance. Adequate relaxing equipment like relaxing chair should be provided to the restaurant workers so that they can relax their foot, hand, head and neck and workers can work comfortably.

The data showed that 30.83 percent worker’s lower back and 23.33 percent worker’s leg and feet were the main affected body part from pain or discomfort.

The mean height of the restaurant workers was 165.13 cm and average weight was 57.36 kg. mean value of standing eye height, standing overhead reach, standing forward reach, sitting height, sitting eye level height, buttock popliteal height, buttock to knee height, sitting knee height, thigh clearance, waist depth, elbow rest height, sitting hip breadth, forearm to forearm breadth, hand thickness at metacarpals are of restaurant workers were 164.34cm, 222.78 cm, 88 cm, 91 cm, 80 cm, 50 cm, 59 cm, 44 cm, 54 cm, 14 cm, 25 cm, 24 cm, 36 cm, 42.2 cm, 3.12 cm respectively.

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The anthropometric measurement required for designing the relaxing chair for the restaurant workers were taken on controlled group. The relaxing chair was designed through auto cad. On the basis of anthropometric data recorded of the restaurant workers by calculating 5th, 50th and 95th percentile. The relaxing chair was designed in such a manner so that the workers can relax and support their hand, back, leg and head.

5. References

Agricultural workers' motivation for participating in HSE training

Authors
Kari Kjestveit, MSc, Researcher, Department for Social Science and Business Development, International Research Institute of Stavanger, Norway. Kari.kjestveit@iris.no
Brit Logstein, MSc, Researcher, Norwegian Centre for Rural Research, Trondheim, Norway. Brit.logstein@bygdeforskning.no
Kari Anne Holte, PhD, Senior Researcher, Department for Social Science and Business Development, International Research Institute of Stavanger, Norway. Kari.anne.holte@iris.no

Abstract
Agricultural workers are at risk of fatal accidents and occupational injuries. The majority of Norwegian farmers are self-employed, but many receive help from family members. Accident prevention is challenging, because this group of workers is difficult to reach. A nationwide occupational health service offers a "Course in practical HSE" to farmers and others working in agriculture. The aim of this study is to explore participants' motivation for attending these courses. The overall study has a longitudinal qualitative design, and the paper is based on 16 pre-course interviews with participants attending four different courses. Our impression of the data was that an external motivation was dominating when farmers decided to sign up for the course, and that it was mainly related to an apprehension of requirement and penalty. The course-related information perceived by the participants in advance was neither concrete nor detailed. Moreover, the perceived obligation to attend was for many participants difficult to address.

Keywords
Agriculture, occupational health and safety, training, motivation, qualitative data

1. Introduction
Workers in agriculture have high risk for injuries and fatal accidents. In Norway, agriculture had the highest rates of fatal accidents in 2010; more than double the risk of the industries next to (the Norwegian Labour Inspection Authority, 2011). Several studies point out that employees in small and medium-sized enterprises have higher risk for accidents (Hasle & Limborg, 2006; Sørensen et al., 2007), especially evident for industries with a high amount of small enterprises, like agriculture (Hasle & Limborg, 2006).

Within the joint category of agriculture, forestry and fishery, 98 % of the enterprises have four employees or less (Ministry of Trade and Industry, 2012). Among farmers working in individual agricultural enterprises, the majority is self-employed (Statistics Norway, 2012). However, 14 % of Norwegian farmers had a spouse working what constitutes a half-day position or more in 2011, and for 63 % the spouse worked between 1 and 850 hours yearly (Logstein 2012). The same study also found that 25 % of Norwegian farmers have another family member involved for more than 200 hours each year (ibid). In Norway the number of
farmers as well as man-labor-years have been reduced the last decades. Yet, holdings are more efficient and there is no overall reduction in the production of agricultural products (Statistics Norway, 2010).

Prevention of accidents and health complaints among farmers may be challenging. First, farmers may be a difficult group to reach, and second; farmers may have individual resistance towards risk management (Legg et al., 2010). A suggested intermediary is the occupational health service (Hasle & Limborg, 2006). In Norway, a nationwide occupational health service partly funded by agricultural interest groups offers a three-phased "Course in practical HSE" to farmers and others working in agriculture. The aim of the course is 1) to give farmers basic system-understanding and to use this understanding in practical HSE-activities for own needs, and 2) to start using a documentary tool, which satisfies legal requirements for systematic HSE-activities.

The course is organized by a local association of e.g. sheep farmers or milk producers, while the lecturer is a consultant from the nearest office of the mentioned occupational health service, which is represented in several geographical regions. Part one consists of a half-day theoretical lecture. Part two is a web-based training course, which combines theory, legislation, illustrations and tests. A finishing examination has to be passed to get an overall certificate. Part three is a farm visit, conducted one month after part one. As part of a large Norwegian research project aiming to study occupational health and safety within agriculture, an evaluation of this course was included. The aim of this paper is to explore participants' initial motivation for taking part in these courses. We anticipate a relation between motivation to attend and benefit from the course, which is to be studied in further steps of the project. We therefore want to illuminate the strategies of recruiting in order to ensure that HSE knowledge is spread and maintained among farmers.

2. Material and methods
The overall study has a longitudinal qualitative design. Participants and lecturers are interviewed one week before the course starts, and then two months and two years after attending. This paper presents results from the interviews before attending the course. Four courses with different lecturers and in different regions were chosen, based on a request for variation in landscape/terrain, farm size and production forms among the participants. Courses were followed during winter 2012. All the enrolled received an invitation from the local administrator or the lecturer to participate in the research study, including a written consent to be signed. A return envelope was addressed directly to the researchers to ensure anonymity. Due to time constraint and late enrollment, participants were also invited by phone. Totally 27 (10, 5, 6, and 6) participants were invited, and 16 participants agreed to participate in the study (3-5 at each course). The researchers used phone to establish personal contact with participants and to carry out pre-course interviews. A semi-structured interview guide was used. The guide included questions about the farm, former accidents and injuries at the farm, risk perception, reasons for participating, and expectations for the HSE-course. All the interviews were taped, written into text, and analyzed through conventional content analysis (Hsieh & Shannon, 2005). The texts were coded using an
inductive approach, however linked to the anticipated, not theory-based importance of motivation. The content was weighted regarding frequency and strength.

3. Results
Background information about the 16 participants is shown in table 1. Except for two, all participants worked full time at the farm, and only three participants had solely one type of production.

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>3</td>
<td>Milk</td>
</tr>
<tr>
<td>30-39</td>
<td>3</td>
<td>Cattle/meat</td>
</tr>
<tr>
<td>40-49</td>
<td>3</td>
<td>Sheep</td>
</tr>
<tr>
<td>50-59</td>
<td>5</td>
<td>Other</td>
</tr>
<tr>
<td>≥60</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Participant demographics

3.1 Information about the course
The participants received information about the courses by word, through magazines, e-mail or by text messages. All the informants from one course could link the invitation directly to a formal organizer. None of the attendants from another course had a formal organizer to refer to. For yet another course, it was hard to state whether the information was given by a formal or an informal channel, due to the overlap between personal relations and formal roles. One participant claimed that he had signed up for the course mainly under the pressure from his mother in law, which also was his main information channel.

3.2 Motivation
Based on the informants' descriptions, we found two categories of motivation for attending the course. One category we have named *external motivation*. This category captures the informants' expressions of motivation as a feeling of obligation and also linked to formal requirements with economic consequences. The second category we named *internal motivation*, which was related to personal experience influencing the participants' risk understanding.

3.2.1 External motivation
Knowledge of specific formalities plays a part in how the participants expressed their motivation for attending the course. Norwegian farmers are members of the food quality assurance organization (KSL), which seeks to ensure required quality standards of the agricultural products. The KSL inspectors do farm visits at regular intervals (e.g. every six years for milk producers), and HSE is part of the audit. The farmer has to carry out annually internal audits as well. Having completed the "Course in practical HSE" will be registered both by KSL and by the product distributor, which is entitled to reduce the payment to producers who repeatedly fail to fulfill this requirement.
The majority of the participants claimed to join the course because they felt that it was compulsory. When asked why they felt an obligation to join, some were not able to address any specific requirements given. They answered as if they had heard or read something, without being able to account for the source or the details. As one participant replied: "Am I not required to?"

One farmer felt that he was morally obligated to join the course, while another farmer knew that he ought to join the course. When the researcher asked him to go thoroughly into why he ought to join the course he answered; "I don't know, that is only my impression"

Other participants were more specific in their feelings of obligation to attend. Some addressed the obligation to KSL in general, implicitly that KSL required them to attend. Others were aware that KSL required the course, because they had seen it in their audit forms. They claimed to attend the course only to fulfill the missing parts in the audit. When asked for consequences for not participating, i.e. not being able to tick off the course in the annual audit, a few of these referred to economical disadvantages. They knew that not attending the course in turn would reduce their income due to lower product prices.

3.2.2 Internal motivation
The second category we have named internal motivation. The participants' internal motivation was related to risk awareness and care for others, e.g. children living at the farm. One participant was attentive to the need for both spouses to have sufficient knowledge and "all in order", in case of a sudden death among them. This informant was familiar with fatal agricultural accidents in the area, and therefore had a higher awareness to being prepared for this unspeakable outcome. There also seemed to be a relation between existing safety attitudes and motivation for the course, in the sense that an existing focus on HSE activities increased the motivation to learn more.

4. Discussion
We found that our category external motivation was the main cause for deciding to sign up for the course in practical HSE, indicated both by the frequency and the strength in how it was expressed. The external motivation was mainly related to an apprehension of requirement and penalty. Secondly, the course-related information perceived by the participants in advance was neither concrete nor detailed. Moreover, the perceived obligation to attend was for many participants difficult to address. These two findings will be further discussed in section 4.2.

4.1 Methodological discussion
Data in this study were collected using qualitative interviews. Despite anonymity assurances, there is a risk of participants presenting themselves as more risk conscious than they actually are. On the other hand, some participants had a time constraint for completing the course and their KSL audit form, which might have affected their motivation negatively. The HSE courses have existed for about 10 years, and studying motivation today may give other
results than for some years ago, anticipating that the most motivated farmers attend the courses first.

4.2 Substantial discussion
The initial motivation to join the course was mainly driven by external factors, among others economic incentives, which entail to a feeling of obligation. A few of the participants gave the impression of being solely driven by internal motivation. Participants who felt obligated also had personal experiences and perceptions leading to their motivation, and served as examples of mixed motivation. Other participants gave “the right” reasons for attending, but later turned out to participate mostly based on the formal requirements. This is not surprising, since economic incentives or punishment is mentioned as a motivational factor in other studies (Legg et al., 2010).

The results are interesting because a number of participants cannot address the obligation directly, while others claim that the food quality assurance organization (KSL) requires them to attend the course. Yet a few describe economic disadvantages for not taking the course. However, it is not KSL, but the product distributor which has the power of reducing the prices for those with incomplete KSL audits. KSL is not in any way responsible for or accomplice to the HSE courses given. We may therefore claim that an economic punishment processed by an "unknown" authority (the product distributor) seems to be the strongest motivator for farmers to attend the course.

Surprisingly few participants are familiar with the KSL requirements in general, considering that they all are obligated to carry out the annual internal audit. Moreover, the participants do not link the economic punishment to the product distributor. The interviews reveal uncertainty among the participants regarding facts about the courses, the requirements and the economic punishment for not attending.

None of the participants mentioned having received written material from the occupational health service responsible for the courses. However, their perceived information seems more influenced by verbal communication in their circle of acquaintances than based on the written word. This might also be the case for their understanding of the formal requirements, which seems to be more based on the grapevine than seeking explicit information on their own. This can shed light on farmers as a difficult group to reach (Legg et al., 2010).

Based on the pre-course interviews only, we know little of the motivation’s impact on course benefit. Further steps in this study will focus on this relation, and the analyses will consider the farmers’ knowledge and use of written and systematic HSE-tools.

5. References


Promoting participatory practices to improve small-scale workplaces in developing countries

Authors
Kazutaka Kogi, DMSc, Research Adviser, Institute for Science of Labour, Kawasaki, Japan
k.kogi@isl.or.jp

Abstract
Types of training effective for fostering good practices to improve small-scale workplaces are discussed based on inter-country networking experiences in industrially developing countries. It is encouraging that participatory action-oriented training programmes are extended with concrete results to small enterprises, agriculture and informal workplaces. Experiences in these programmes clearly indicate that many workplace improvements are gained when participatory action-oriented steps are taken relying on the positive aspects of small-scale workplaces. The initiative of workplace people in building on local good practices overcoming prevalent limitations is critically important. The effectiveness of participatory training is enhanced when the planning and implementation of feasible improvements are facilitated by (a) positive orientation building on local good practices through stepwise progress, (b) simple procedures focusing on low-cost, risk-reducing improvements and (c) active support through the use of locally adapted action toolkits. Action checklists and illustrated action guides are particularly useful. It is commonly important that the trainers act as facilitators for organizing group work on existing good practices and on readily feasible improvements that have real impact in the local context. It is suggested to promote the exchange of positive experiences in participatory training reflecting these principles with the support of trainers and localized toolkits.

Keywords
Participatory training, small-scale workplaces, stepwise progress, low-cost improvements, developing countries

1. Introduction
Participatory action-oriented training approaches for promoting safety and health at work are gaining impetus in both industrially developing and developing countries. Partners of our Asian network for work improvement have collaborated since the 1990s for developing these action-oriented approaches for small-scale workplaces particularly in developing countries (Kawakami et al., 2004; Kogi, 2006, 2012a). The partners are research and educational institutions, occupational safety and health centres and voluntary groups in Asian countries. The network has emphasized participatory training building on local good practices and locally effective training toolkits (Kogi, 2008; Khai et al., 2011). It is encouraging that participatory action-oriented training (PAOT) methods are spreading to various sectors...
including manufacturing, construction, agriculture, health care services and informal workplaces (Kawakami et al., 2009, Khai et al., 2011; Niu and Kogi, 2012).

These experiences demonstrate the importance of addressing the positive aspects of small-scale workplaces and facilitating voluntary procedures leading to immediate, low-cost improvements feasible in the local context (Kogi, 2002; Kawakami and Kogi, 2005; Itani et al., 2006; Tan and Kawakami, 2009; International Labour Office, 2010). It is useful to examine what aspects of small-scale workplaces are important in promoting initiative of managers and workers in undertaking feasible improvements. Attention is drawn to the types of participatory training that can help initiate voluntary actions for improving existing conditions and facilitate workplace-level steps for achieving real impact on reducing work-related risks (Zalk, 2001; Kogi, 2012b; Khai et al., 2011). The aim is to know participatory steps that can lead to sustained actions in the local context of small-scale workplaces in developing countries.

2. Networking experiences

The inter-country networking in Asia for promoting participatory training activities for small enterprises, home workers, farmers, health care workers and trade unions has led to many realistic improvements (Kogi, 2012a). The partners of the networking have developed participatory training programmes for fostering good practices in safety and health in various sectors. They include i) WISE (work improvement in small enterprises) and similar training programmes for small enterprises, construction sites, health care and other workplaces (Thurman et al., 1988; Kogi, 2006; ILO, 2004); ii) WIND (work improvement in neighbourhood development) workshops for farmers, WISH (work improvement for safe home) training for home-based workers and similar workshop-style training for informal workplaces (Kawakami et al., 2009; Niu and Kogi, 2012), and iii) participatory programmes in BOHS (basic occupational health services) for small enterprises, POSITIVE (participation-oriented safety improvement by trade-union initiative) training by trade unions and other support services for small enterprises (Kawakami et al., 2004; Kogi, 2012b).

The main types of these participatory training programmes are summarized in Table 1. These programmes commonly aim at encouraging workplace people to make voluntary improvements in multiple aspects based on good practices feasible in local conditions. To have real impact on reducing work-related risks, the improvement achieved include low-cost solutions in materials handling, work stations, the physical improvement and work organization. Local networks of trainers are important in adapting the participatory training methods to local circumstances.

Table 1. Main types of participatory training for promoting safety and health at work

<table>
<thead>
<tr>
<th>Participants</th>
<th>Examples of participatory training</th>
<th>Emphasis placed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers/workers of small enterprises</td>
<td>- WISE training for small enterprises and small construction sites</td>
<td>- Voluntary improvements in multiple technical areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Low-cost actions for risk reduction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Work improvement programmes</td>
</tr>
</tbody>
</table>

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The collaborative actions are effective when they emphasize i) stepwise progress through voluntary initiative of workplace people relying on the positive aspects of small-scale workplaces, ii) simple action-oriented procedures for addressing multifactorial risks and iii) the use of training toolkits that can facilitate the planning and implementation of immediate improvements. It appears commonly important to develop training methods emphasizing these aspects in a composite manner.

3. Stepwise progress relying on positive orientation of small enterprises

The reviewed experiences indicate that serial participatory steps are suited to the common orientation of small enterprises and other small-scale workplaces. Typical steps are to learn local good practices, plan immediately feasible improvements in multiple technical areas, implement priority improvements and follow-up by obtaining feedback about achievements for sustained action. These steps are identical to the risk management steps known as the Plan-Do-Check-Act process. Managers and workers in small-scale workplaces are accustomed to accepting information and advice by informal approaches and look for opportunities for stepwise progress despite their many constraints. Their key constraints relate to economic difficulties, limited technical resources and lack of training in practical improvements, and therefore the emphasis on stepwise progress relying on their positive orientation seems to be effective despite these constraints.

The merits of emphasizing stepwise progress relying on the positive orientation of small enterprises are indicated in Table 2. The participatory steps commonly taken by the reviewed participatory programmes assist local people in overcoming their constraints in a serial manner. The local people are generally motivated to undertake practical improvements similar to local good practices and sustain their actions seeing the immediate benefits. The stepwise progress focusing on readily applicable improvements through these steps has proven effective in different work settings.

Table 2. Stepwise progress in improving small enterprises relying on their positive aspects

<table>
<thead>
<tr>
<th>Participatory steps</th>
<th>Aim of actions taken</th>
<th>Relevant positive aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learn local good</td>
<td>- Emphasize local initiative</td>
<td>- Responsive to changes</td>
</tr>
<tr>
<td>practices</td>
<td>- Focus on local achievements</td>
<td>- Interest in raising productivity</td>
</tr>
</tbody>
</table>

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Plan and implement locally feasible improvements
- Provide practical advice
- Do multifaceted improvements
- Have impact on safety/health
- Confirm business benefits
- Praise sustained good practices
- Promote worker participation
- Accepting advice
- Usually quick in action
- Accustomed to teamwork
- Respecting praise and benefits
- Flexible in solving issues
- Action-oriented and practical

It is therefore crucial to provide adequate support for looking at local achievements in similar conditions, voluntarily selecting feasible improvements and conducting adequate follow-up. The exchange of positive experiences should be promoted through the inter-country networking suited to special circumstances of small-scale workplaces.

4. Action-oriented procedures focusing on locally feasible improvements

In view of the various constraints faced by small-scale workplaces, practical action-oriented procedures are essential for planning and implementing workplace improvements. The reviewed programmes usually provide simple procedures for training participants about feasible types of improvements. A particular emphasis is generally placed on low-cost improvements that can reduce work-related risks and enhance productivity. As a rule, simple procedures are taken for each of the participatory training steps. These simple procedures are usually easy to follow as they make use of participatory toolkits applied in conducting group work in each step. Typical toolkits comprise local good examples, action checklists, improvement guides and group work aids. Trainers can support the serial group work steps by means of these toolkits as they can facilitate action-oriented group discussion.

For example, the initial step of learning good practices is commonly done by group discussion of locally achieved good examples. Participants can learn from these good examples about the need for identifying significant work-related risks and feasible types of improvements that can reduce these risks. The subsequent group work steps for planning and implementing selected improvements are likewise simple by discussing feasible low-cost improvement options utilizing action checklists listing such options as well as illustrated improvement guides. In each technical area covered by the checklists and guides, group work is made easy by discussing good points and immediate improvements by utilizing these toolkits. Usually, a set of presentation slides in PowerPoint files can explain the low-cost improvements applicable in local conditions. Application of basic principles of ergonomics and occupational hygiene is particularly focused on. Similarly, the follow-up procedures are easy to take by trainers and participants, as they utilize simple report forms and group discussions of achievements, benefits and further challenges.

The practical procedures taken in the participatory steps of the reviewed programmes are shown in Table 3. It is important to provide easy-to-follow procedures leading to feasible actions with the support of action-oriented toolkits. As the steps are concentrated on locally feasible improvements based on good practices known to participants, group work can relatively easily lead to consensus about immediate improvements and their implementation.
Table 3. Simple procedures for workplace improvements by participatory training.

<table>
<thead>
<tr>
<th>Typical steps</th>
<th>Practical training procedures</th>
<th>Emphasis of support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learn from local good examples</td>
<td>- Present good examples in multiple technical areas</td>
<td>- Feasibility of prompt actions by voluntary initiative</td>
</tr>
<tr>
<td></td>
<td>- Conduct walkthrough to identify significant risks requiring actions</td>
<td>- Setting workable goals for fostering good practices</td>
</tr>
<tr>
<td>Select and implement locally feasible low-cost improvements</td>
<td>- Provide practical advice about low-cost improvements</td>
<td>- Low-cost improvements that can reduce work-related risks</td>
</tr>
<tr>
<td></td>
<td>- Facilitate proposals for reducing identified risks</td>
<td>- Accelerating planning of priority improvements</td>
</tr>
<tr>
<td></td>
<td>- Advance prompt actions</td>
<td>- Implementing adequate solutions by consensus</td>
</tr>
<tr>
<td>Report and follow-up achievements</td>
<td>- Repeat follow-up meeting/visits</td>
<td>- Exchanging positive results - Confirming benefits</td>
</tr>
<tr>
<td></td>
<td>- Collect/report achievements</td>
<td>- Continual improvements</td>
</tr>
<tr>
<td></td>
<td>- Encourage sustained actions</td>
<td></td>
</tr>
</tbody>
</table>

5. Facilitation of improvements in small-scale workplaces in developing countries

The facilitation measures utilized in the reviewed programmes are usually taken by a group of trainers trained in the sequential training steps and the use of action-oriented toolkits. As the toolkits are designed for direct use by training participants, trainers can facilitate group work by going through the practical procedures for planning and implementing effective workplace improvements. The common facilitation processes and the corresponding use of toolkits with the support of trainers are listed in Table 4.
Table 4. Facilitation measures contributing to improving small-scale workplaces.

<table>
<thead>
<tr>
<th>Facilitation processes</th>
<th>Role of trainers</th>
<th>Effective types of toolkits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building on local good practices</td>
<td>- Supporting voluntary initiative of workplace people for improving work through local good practices</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Help initiate participatory steps</td>
<td>- Photographs/video clips of local good examples</td>
</tr>
<tr>
<td>Planning and implementing feasible improvements</td>
<td>- Organize serial group work steps for proposing feasible improvements</td>
<td>- Action checklists listing typical low-cost improvements</td>
</tr>
<tr>
<td></td>
<td>- Advise practical options</td>
<td>- Improvement guides in multiple technical areas</td>
</tr>
<tr>
<td></td>
<td>- Help build consensus and implement priorities</td>
<td>- Training aids for group work methods</td>
</tr>
<tr>
<td>Follow-up activities</td>
<td>- Follow-up visits</td>
<td>- Feedback report forms</td>
</tr>
<tr>
<td></td>
<td>- Achievement workshops</td>
<td>- Evaluation forms</td>
</tr>
<tr>
<td></td>
<td>- Disseminate good practices</td>
<td>- Trainers guide on group work and follow-up</td>
</tr>
<tr>
<td></td>
<td>- Encourage sustained action</td>
<td></td>
</tr>
</tbody>
</table>

As the table shows, it is necessary to incorporate typical local good examples in the action checklist and training materials and thus facilitate the group work of feasible improvements to be proposed, selected and implemented. We should note that these measures can also be effective in developed countries and that they are generally adapted to situations in developing countries. By using a locally adjusted toolkit comprising many local examples, the trainers can thus organize brief training workshops. By means of the toolkit, the trainers can encourage the initiative of workplace people for changing existing conditions.

6. Conclusion
The effectiveness of participatory training in improving small-scale workplaces is enhanced by relying on positive orientation of managers and workers and by facilitating the improvement process by simple action-oriented procedures. The roles of trainers are important as they act as facilitators for organizing group work and focusing on locally feasible improvements that have real impact in the local circumstances. We need to promote the participatory action-oriented training for improving small-scale workplaces in developing countries by designing locally adjusted toolkits for direct use by trainers and training participants. It is suggested to encourage the exchange of positive experiences in participatory training and the design and use of localized toolkits with the support of trainers.

7. References


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A practical toolkit for voluntary trainers in improving small enterprises in a developing country

Abstract
The effectiveness of a new participatory training toolkit was examined during its direct use by voluntary trainers for training workers in improving small enterprises. The toolkit was tested in three serial workshops for training 28 volunteers from trade unions in 14 small enterprises in an industrial area in South India. After the initial two workshops, the trainers trained their fellow workers about implementing practical improvements. In the final workshop, the improvements achieved through the enterprise-level training were reported. The effectiveness of the training toolkit was assessed by examining these achievements and the results of a questionnaire about training methods. The training toolkit contained local good examples, a workplace action checklist and training slides about low-cost improvements feasible in local conditions. The number of workers trained in each enterprise ranged from 22-41. As a result, 78 improvements were reported, including improvements in materials handling, workstations, physical environment and environmental protection. The number of correct answers for the four-choice questions of the questionnaire about ergonomic principles significantly increased after the initial workshop, with this level maintained throughout the subsequent training process. The implemented improvements in the small enterprises reflected the ergonomic actions learned through the use of the toolkit. The factors that contributed to the training effects included the focus on locally feasible improvements in multiple technical areas, the use of easy-to-apply action guides and group planning of immediate changes. These training results confirmed the effectiveness of the newly developed training toolkit for its direct use by volunteer trainers in small enterprises. The locally adjusted nature of the toolkit was conducive to achieving concrete results despite the constraints in small enterprises. It is suggested to promote the use of a participatory training toolkit that can be easily applied by voluntary trainers from small enterprises in developing regions.
Keywords
Participatory training, volunteer trainers, low-cost improvements, small enterprises, developing countries

1. Introduction
Action-oriented training toolkits are developing for supporting the training process for improving workplace conditions in small enterprises (Kawakami et al., 2004; Kogi, 2006; Tan and Kawakami, 2009). Recent experiences in many industrially developing countries indicate the usefulness of short-term training workshops for training local trainers who can then train local people about conducting practical improvements in their small workplaces (Kogi, 2008; Khai et al., 2011). These experiences have applied participatory action-oriented training methods initiated as WISE (work improvement in small enterprises) methodology (Thurman et al., 1988; Kogi, 2002; ILO, 2004). The methodology is spreading to various sectors including agriculture, construction and the informal sector (Kawakami et al., 2009, Khai et al., 2011; Niu and Kogi, 2012). The use of action-oriented toolkits by local trainers has proven particularly useful for achieving concrete results by local people (Kawakami and Kogi, 2005; Itani et al., 2006; International Labour Office, 2010).

The action-oriented nature of these training toolkits is important. In particular, the combined use of action checklists and simple guides about practical ways of improving workplaces conditions at low cost can lead to many improvements conducted by the trained local people. The link with local good practices seems helpful. Such toolkits can facilitate the understanding of locally feasible improvements that have real impact on the reduction of work-related safety and health risks (Zalk, 2001; Kogi, 2010; Khai et al., 2011). It is necessary to know how a new training toolkit for direct use by voluntary trainers for training workers in small enterprises can be developed in the local context. The present study was conducted to examine the process of designing and using a participatory action-oriented toolkit designed in the local context of small enterprises in a developing country.

2. Methods
A new training toolkit was designed for direct use by voluntary trainers for training workers in small enterprises about practical ways to improve their workplace conditions. The participatory action-oriented training methods based on the POSITIVE (participation oriented safety improvement by trade union initiative) programme relying on the initiative of trade unions were applied (Kawakami et al., 2004; Khai et al., 2011). The toolkit was developed and tested during three serial workshops conducted in an industrial zone in South India in 2011 for training 28 volunteers from trade unions in 14 small enterprises. After the initial two workshops held in May and July 2011, the trainers conducted training sessions at their enterprises for training their fellow workers about implementing practical improvements. In the final workshop held in November 2011, the improvements achieved through the enterprise-level training were reported.

In the course of the initial two workshops, a special effort was made to select typical low-cost improvements achieved locally in the industrial zone and design an action checklist listing...
them by covering multiple technical areas. Then a set of presentation slides presenting basic principles of ergonomics and occupational hygiene for these technical areas was developed by reflecting the opinions of the participating trainers. Before and after each workshop, the trainers replied to four-choice questions of a questionnaire about training methods and basic principles applied for improving workplace conditions. The effectiveness of the training toolkit used by the trainers was assessed by examining their achievements and the questionnaire results.

3. Results

3.1 Training steps

The initial two workshops were held in May and July 2011 for three days each for the volunteer trainers selected from trade union members in small enterprises in the industrial zone. Twenty-eight trainers attended these workshops. In the first workshop in May 2011, the participating trainers were trained about applying participatory action-oriented training methods for training workers about improving their existing workplace conditions. The methods relied on local good practices in occupational safety and health and focused on low-cost improvements learned from these good practices in multiple technical areas. The methods were similar to those used in WISE (work improvement in small enterprises) courses. Utilizing the local good practices as practicable goals, the participants learned the practical ways to plan and implement locally feasible improvements in these multiple areas. A special emphasis in applying these methods was placed on promoting trade union initiative in collaboration with national and regional trade union centres. In organizing the workshops and subsequent training activities, the authors collaborated together with the Indian National Trade Union Congress.

In the second workshop in July 2011, the trainers further learned how to organize participatory training sessions for their fellow workers and discussed the contents and the presentation methods of training tools. Based on the outcome of the two workshops, a complete set of training materials, including a locally adjusted action checklist for improving local workplaces and presentation slides describing how to plan and implement practical improvements in the local situation of the industrial zone.

During the period from August to October 2011, the 28 trainers organized one-day training sessions for training their fellow workers in their small enterprises by means of the new training toolkit. They reported many improvements thus achieved in these enterprises at the final workshop held in November 2011. In this workshop, the training steps taken since May 2011 were reviewed. Taking into account the training steps and the reported achievements as well as the questionnaire results described below, the effectiveness of the new training toolkit was examined.

3.2 Design process of a new toolkit for trainers

The new training toolkit was designed through the initial workshops and actually applied in the subsequent onsite training sessions. The experiences gained through the training
sessions in the trainers’ enterprises further contributed to adjusting the toolkit to the local situation in South India. The sequence of the design and test process of the new toolkit is described in Table 1.

The design steps according to the time table shown in Table 1 were successfully taken. The training toolkit contained local good examples, a workplace action checklist and training slides about low-cost improvements feasible in local conditions. As the presentation of computer-based slides was not practical for the trainers in conducting on-site training sessions in their small enterprises, a set of A3 sheets corresponding to the developed slides was produced and utilized by them. The successfully conducted training session for fellow workers in the small enterprises proved the efficacy of the training sheets in training workers about immediate low-cost improvements.

<table>
<thead>
<tr>
<th>Sequential steps taken</th>
<th>Action taken for the toolkit</th>
<th>Emphasis placed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Collection of local good practices</td>
<td>Compiling photos and brief case reports in multiple technical areas</td>
<td>Multifaceted examples for reducing work-related risks</td>
</tr>
<tr>
<td>2. Design of a checklist and training slides</td>
<td>Listing locally feasible low-cost improvements in an action checklist and training slides showing how-to guides</td>
<td>Reference to locally achieved improvements in multiple technical areas with real impacts</td>
</tr>
<tr>
<td>3. Workshop 1 (4 days)</td>
<td>Going through training methods</td>
<td>Practical ways to organize group work about simple improvements</td>
</tr>
<tr>
<td>4. Workshop 2 (4 days)</td>
<td>Examining training materials and rehearsals about training sessions</td>
<td>Improving training skills and ways to facilitate action by workers</td>
</tr>
<tr>
<td>5. Producing a mobile toolkit for 1-day training</td>
<td>Compiling all training slides into A3 sheets for direct use by each trainer</td>
<td>Providing a complete mobile set for onsite training of workers</td>
</tr>
<tr>
<td>6. One-day training sessions in participating small enterprises</td>
<td>Onsite training sessions by a small number of trainers using the training toolkit</td>
<td>Group work by workers for planning and implementing risk-reducing improvements</td>
</tr>
<tr>
<td>7. Workshop 3 (3 days)</td>
<td>Examining the training results and the effectiveness of the toolkit tested</td>
<td>Close link between the new toolkit and risk-reducing improvements achieved</td>
</tr>
</tbody>
</table>

3.3. The characteristics of the new training toolkit

The training toolkit was designed for direct use by voluntary trainers in training workers about practical ways to plan and implement simple workplace improvements. In line with the recent experiences in WISE training for small enterprises particularly in developing countries, the newly developed toolkits consisted of local good examples, an action checklist and training
slides concerning multiple technical areas. The characteristics of the new toolkit are indicated in Table 2.

Table 2. Characteristics of the new training toolkit

<table>
<thead>
<tr>
<th>Training tools</th>
<th>Characteristics of the tool</th>
<th>Main roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local good examples</td>
<td>Photographs with brief case reports</td>
<td>To facilitate proposing simple risk-reducing improvements that are locally feasible</td>
</tr>
<tr>
<td>An action checklist</td>
<td>A 30-item checklist listing typical low-cost improvements that are locally feasible</td>
<td></td>
</tr>
<tr>
<td>A3-sheets corresponding to</td>
<td>Presenting basic principles of ergonomics and occupational</td>
<td>To provide how-to guidance about planning and implementing improvements</td>
</tr>
<tr>
<td>training slides</td>
<td>hygiene and local good examples</td>
<td></td>
</tr>
<tr>
<td>Trainers’ guide</td>
<td>Practical hints for organizing participatory action-oriented</td>
<td>To facilitate participatory steps aimed at immediate multifaceted improvements</td>
</tr>
<tr>
<td></td>
<td>training and strengthening worker initiative</td>
<td></td>
</tr>
</tbody>
</table>

Corresponding to local good practices from the industrial zone, a 30-item action checklist was designed to cover materials handling (6 items), workstations (6), machine safety (5), physical environment (6), welfare facilities (5) and environment protection (2). Each item indicated a typical improvement action feasible in local conditions at low cost, such as providing mobile racks, adjusting working height at the elbow level, guarding dangerous parts of machines, improving lighting and ventilation, proving resting corners and inserting short breaks. The A3-sheets were compiled based on the training slides used during the initial two workshops. The corresponding A3 sheets contained descriptions of basic principles of ergonomics and occupational hygiene in all the technical areas as well as typical local good examples. As the toolkit comprising all these practical tools was easy to use by the local trainers, the onsite training sessions could be smoothly organized.

By using the toolkit, the volunteer trainers could thus train their fellow workers in one-day training sessions held in the 14 enterprises. The number of workers trained in each enterprise ranged from 22-41. As a result, 78 improvements were conducted and reported. They included improvements in the technical areas, i.e., materials handling, workstations, machine safety, physical environment, welfare facilities and environmental protection. The trainers could thus encourage the initiative of workers for changing workplace conditions.

The number of improvements done in the participating enterprises and their examples are shown in Table 3. The reported improvements clearly reflected the ergonomics and occupational hygiene principles and thus indicated the usefulness of the toolkit.

Table 3. Number of improvements reported to the trainers from the participating enterprises

<table>
<thead>
<tr>
<th>Technical areas</th>
<th>Number of cases</th>
<th>Examples reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials handling</td>
<td>11</td>
<td>Marked passages, labels in storage,</td>
</tr>
</tbody>
</table>

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3.4. The effects on the knowledge and opinions of the trainers

Table 4 shows the changes in the knowledge levels and opinions of the trainers before and after each of the three workshops.

Table 4. Changes in the questionnaire results before and after each of the three workshops.

<table>
<thead>
<tr>
<th>Average scores</th>
<th>Control group</th>
<th>Workshop 1 Before</th>
<th>After</th>
<th>Workshop 2 Before</th>
<th>After</th>
<th>Workshop 3 Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of correct answers to 10 four-choice questions about improvement principles</td>
<td>4.0</td>
<td>4.5</td>
<td>5.5*</td>
<td>6.0</td>
<td>6.8*</td>
<td>6.3</td>
<td>6.3*</td>
</tr>
<tr>
<td>Willingness to contribute to safety and health activities (maximum score = 4)</td>
<td>3.17</td>
<td>3.57**</td>
<td>3.67</td>
<td>3.57</td>
<td>3.40</td>
<td>3.57</td>
<td>3.53</td>
</tr>
<tr>
<td>Evaluation of the efficacy of the training methods used (maximum score = 4)</td>
<td>3.10</td>
<td>3.46***</td>
<td>3.60</td>
<td>3.40</td>
<td>3.52</td>
<td>3.48</td>
<td>3.46</td>
</tr>
</tbody>
</table>

The results of the paired t-test and the independent-samples t-test:
*: the difference from the initial level of 4.5 significant at the significance level of 0.05.
**: the difference from the control group of 9.5 significant at the significance level of 0.001.
***: the difference from the control group of 15.5 significant at the significance level of 0.01.

The questionnaire results showed that the capability of the trained trainers increased in the course of the first and second workshops. The increased level was maintained through the subsequent training steps up to the final workshop. For example, they improved their knowledge about basic principles about materials handling, workstation design, lighting and ventilation and welfare facilities. The changes in the average scores about the willingness to apply the methods learned and about the efficacy of the training methods also increased after the initial workshop. The scores for each question ranged between 4 ("strongly agree"), 3 ("agree"), 2 ("do not agree") and 1 ("do not agree at all"). The average score of three questions regarding the willingness to apply the methods learned at their workplaces, in proposing improvements to management and at safety committees was significantly higher than that of the control group throughout the three workshops. The average score of five
questions about the usefulness of the training methods (for preventing accidents, improving workers' health, better management-worker relationships, raising awareness of workers and strengthening trade union activities) significantly increased during the first workshop, with this level maintained during subsequent training steps.

The results of the questionnaire were in accordance with the implemented improvements in the participating small enterprises that reflected the actions learned through the use of the training toolkit. Typical local good examples incorporated in the toolkit served in a visible manner to facilitate those practical improvements.

3.5. Applicability of the toolkit and constraints
At the final workshop, the views of the trainers were summarized through group discussion about the applicability of the training toolkit used and the constraints faced during the training steps. There was a general agreement among the trainers that the one-day training sessions proceeded smoothly with concrete results. The trainers agreed that group planning of improvements by their fellow workers was generally successful and that the training conducted contributed to improving safety and health activities in their enterprises. As main constraints faced in organizing the enterprise-level training sessions, the trainers mentioned difficulties in finding an adequate time frame for training, difficulties sometimes met in engaging managers in training and improvement activities, and involving all workers in the enterprise. Since the training sessions could be successfully organized in all the enterprises, the trainers agreed that the new training toolkit and the methods used were useful also for overcoming these constraints.

The factors that contributed to the training effects through the use of the toolkit included the focus on locally feasible improvements in multiple technical areas, the use of easy-to-apply action guides and group planning of immediate changes. The support of the trade unions throughout the training steps was also important. The active involvement of the participating trainers in designing and using the new toolkit was another important factor for locally adjusting the toolkit and enhancing its effectiveness.

4. Conclusion
The training results confirmed the effectiveness of the newly developed training toolkit for its direct use by volunteer trainers in their small enterprises. The locally adjusted nature of the training toolkit was conducive to achieving concrete results in the participating small enterprises despite their constraints. It is suggested to promote the use of participatory training toolkit that can be easily applied by voluntary trainers for improving small-scale workplaces in developing countries.

5. References


Kawakami, T., Khai, T.T., Kogi, K., 2009. Developing the WIND training programme in Asia; participatory approaches to improving safety, health and working conditions of farmers. ILO Subregional Office for East Asia, Bangkok.


Abstract

The prevention of noise induced hearing loss in dairy farming in New Zealand

Author
Ian Laird, PhD, Centre for Ergonomics, Occupational Safety and Health, School of Public Health, Massey University, Palmerston North, New Zealand i.s.laird@massey.ac.nz

Abstract
This paper reports on part of a major study in New Zealand to identify effective strategies for the prevention of noise induced hearing loss (NIHL) and focusses specifically on the agricultural sector (dairy farming).

The objective of the project was to evaluate existing work-related interventions to reduce NIHL, to identify critical factors in the development and implementation of such strategies, and to propose strategies/interventions where current interventions are considered ineffective. In addition, the research examined those aspects of workplace culture that affect decision-making around NIHL in small enterprises.

A systematic review of the research literature was completed specifically focussing on the effectiveness of interventions in the prevention of NIHL. Data collection involved surveys of specific industry sectors including dairy farming. In addition to area noise measurements and personal dosimetry, assessments of the small enterprises conformance to current noise management standards and safety climate were undertaken.

Five key effective strategies were identified from the literature. As anticipated, area and personal noise exposures were found to vary considerably within the agricultural sector; range: LAeq 8hr 80-90 dB). Most farms surveyed did not conform to the specific requirements of the noise management standard (Code of Practice). Safety climate was not the major factor in noise management within the enterprises.

The research provided disappointing evidence on the implementation of noise management strategies in NZ agriculture. As a consequence of the research, a comprehensive multi-level intervention strategy is proposed.

Keywords
Noise exposure; noise induced hearing loss; agriculture; dairy farming; interventions.
The challenges of researching OHS of vulnerable workers in the small business sector

Author
Felicity Lamm, PhD, Associate Professor, Centre for Occupational Health & Safety Research, Auckland University of Technology

Abstract
There is evidence that workers in the small business sector are increasingly engaged in low paid, non-standard, insecure or precarious working arrangements which often make these workers vulnerable (see Sargeant and Tucker, 2009). Added to this mix is the fact that small workplaces are becoming more culturally and ethnically diverse. For example, 60 percent of the population in Auckland, New Zealand’s largest city, are now new international migrants, many of whom are working in small businesses. The changes to both traditional working arrangements and the characteristics of the labour force within the small business sector have profound occupational health and safety (OHS) implications for workers, particularly vulnerable workers. Emerging studies suggest that vulnerable workers in small businesses are typically relegated to the dirty, dangerous, demeaning, low paid jobs, which often result in injuries, ill-health, and fatalities. In addition, the plight of an injured, vulnerable worker is often made worse as they rarely have sufficient economic and social support.

Vulnerable workers in the small business sector, however, are notoriously difficult to research as they are frequently transient, often work non-standard hours, and are likely to be marginalised and “invisible”. Moreover, compared to permanently employed, full-time workers, the OHS issues faced by vulnerable workers are more complex as a result of their employment and/or migration status, which in turn can make analysis and interpretation of the data difficult for researchers. Drawing on studies from the 1990s onwards, the presentation will attempt to identify these and other challenges when researching OHS of vulnerable workers in the small, culturally diverse workplaces. The presentation will also detail more recent studies on the topic that are currently being undertaken by the team of researchers in the Centre for Occupational Health and Safety Research as a way of highlighting some of the strategies that can be applied to overcome these challenges. Finally, the presentation will outline future research initiatives to be embarked upon by the next generation of researchers.
Managing stress in small workplaces: developing a research agenda

Facilitators

Mark Le Fevre, PhD, Auckland University of Technology, New Zealand
mark.lefevre@aut.ac.nz
Claire George, Auckland University of Technology, New Zealand clare.george@aut.ac.nz

There is a growing concern that as stress levels rise in small workplaces, so too does the rate of injury. Investigation into this area must be focused on reducing the stress levels among personnel who are often working past their limits to fulfil the daily business requirements. Individuals differ in the ways that stress is dealt with and react to certain environmental stressors in different ways, leading to maladaptive behaviour and in some cases serious injury. Stress-related injury has emerged as a major concern and attracted increased interest from academics both in New Zealand organisations and abroad. According to the American Institute of Stress, stress is a major contributing factor in as many as 80 percent of all work-related injuries and 40 percent of workplace turnover (Richardson & Rothstein, 2008). Similar figures have been reported in the United States, the United Kingdom, Europe, and Australia (Richardson & Rothstein, 2008; Le Fevre, 2001; Department of Labour stress update, 2007; Kenny & Cooper, 2003).

Despite the damaging effects of occupational stress, employees are under increasing pressure to be more efficient, be profit driven, and at the same time manage greater workloads (Schneider & Kuemmel, 2006; Levi, 1990). It appears that in the modern business world the well-being of employees is becoming less and less important and the economic well-being of the business of greater priority. According to Dr. J Wren (Personal communication Nov. 18, 2009) reducing the costs of occupational stress at an individual and organisational level is of great concern for New Zealand’s Accident Compensation Corporation (ACC) and Department of Labour (DOL) as they work closely with researchers, universities, and local business community members.

As Mullen (2004) stated, managers and researchers must consider organisational culture and social factors when identifying the causes of workplace injuries and accidents. The challenge, therefore, is now to develop new stress-preventions that mimic the multifaceted nature of OHS within small workplaces and aim to reduce stress levels among employees who view their stress as necessary or at least not something worth focusing on.

The purpose of this workshop and discussion is to develop a collaborative, international research agenda. In particular the discussion session will be divided into facilitated sub-sessions coving the following topics:

- The challenges of managing and preventing stress in small business where the common view of stress is one of ignorance and dismissal as opposed to
understanding and prevention. An overview of the literature will be covered as well as key themes and issues. (Facilitators: Clare George and Mark Le Fevre)

- Possible future research directions: the discussion will be open, to identify and prioritise the primary research gaps, to establish a research agenda, and to draft a research proposal as well as to allocate tasks. (Facilitator: Mark Le Fevre)
- Further symposia: in order to facilitate on-going dialogue on this topic and to present progress reports on the research undertaken, a symposium in 2014 will be planned and tasks allocated.

**Timetable**

<table>
<thead>
<tr>
<th>Sessions &amp; facilitators</th>
<th>Detail of activities &amp; presenters</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introductions &amp; Outline of the programme</strong></td>
<td>Introduction and outline of workshop.</td>
<td>5 minutes</td>
</tr>
<tr>
<td>- Clare George and Mark Le Fevre</td>
<td>Aim: “To establish a group of researchers with a shared agenda to progress research and develop solutions to reduce the risks of stress and injury in small business.”</td>
<td></td>
</tr>
<tr>
<td><strong>Overview of Extant Research &amp; Research Gaps:</strong></td>
<td>Challenges of doing the research in this area:</td>
<td>30-40 minutes</td>
</tr>
<tr>
<td>- Clare George and Mark Le Fevre</td>
<td>- Definitions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Stress and injury risk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Measurement and intervention</td>
<td></td>
</tr>
<tr>
<td><strong>Future Research Directions</strong></td>
<td>Identify and prioritise the primary the research gaps:</td>
<td>30 minutes</td>
</tr>
<tr>
<td>- Mark Le Fevre</td>
<td>- Establish a research agenda</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Draft of potential research proposal(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Allocation of tasks</td>
<td></td>
</tr>
<tr>
<td><strong>Further Symposia on Progress</strong></td>
<td>Destinations and dates</td>
<td>5 minutes</td>
</tr>
<tr>
<td>- Mark Le Fevre</td>
<td>Aims of Symposiums</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Allocation of Tasks</td>
<td></td>
</tr>
<tr>
<td><strong>Concluding Remarks</strong></td>
<td></td>
<td>5 minutes</td>
</tr>
<tr>
<td>- Clare George and Mark Le Fevre</td>
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</tbody>
</table>

Non-peer reviewed paper
Networking among small and medium-sized enterprises - meeting the challenge of promoting safety and health measures

Authors
Hans Jørgen Limborg, PhD, Research Director, Team WorkingLife, Copenhagen Denmark
hjl@teamarbejdsliv.dk
Maya Flensborg Jensen, Senior Researcher, Team WorkingLife, Copenhagen Denmark
MCFJ@teamarbejdsliv.dk

1. Introduction – The challenge of small enterprises
Most research on Small and Medium-sized Enterprises (SMEs) conclude that SME’s differ in organizational structure and dynamics from large enterprises. However, these differences have not been adequately studied. SMEs account for 99% of the Danish companies, covering more than 1/3 share of employment, and they are considered a major source of growth (Hasle & Limborg, 2006:10). Nevertheless, it has previously been the study of large companies that has created the basis for our understanding on how regulation of SME should be conducted and developed. Two findings encourage us to add to this knowledge gap. One is that SME’s in general have poorer working conditions than larger companies (van Stolk, 2012) and the other that SME’s do not meet regulation, information, and support schemes in the same positive way as larger companies (Hasle og Limborg, 2006, Walters 2001). Thus the aim of this paper is to add to our understanding of how SMEs can be motivated and encouraged to improve working conditions and thus reduce work related exposures, health risks and sick leave absence.

Current research on the public regulation of SME concerns the identification of SMEs knowledge on legislation and obligations, and the difficulties they have to comply with the law and causes. One of the main points in the literature is, that the SME’s have a reasonably knowledge of legislation and health and safety regulations, but experience great difficulties in meeting the requirements of more structured work environment interventions (Hasle et al, 2004 : 44; Forteyn et al., 1997; Aldrich et al., 1999). A problem that has been found in the rest of Scandinavia and outside the Nordic region as well (Antonsson, 1998; Vassie, 2000) is that SMEs have few resources and often are ignorant towards regulatory requirements that are considered unnecessary or irrelevant due to their own experience (Champoux & Brun, 2003; Hasle & Limborg, 2006: 35). SMEs are further characterized by a lower degree of formalized and systematic planning than those of larger companies. The consequence is that the managements of SMEs are likely to approach working environment questions in a similar ad-hoc and informal manner. Thus, priority to improvements of working conditions and preventive measures will often relate to an external pressure, an unexpected incident or an inspiration for a technical solution that aligns with the ingenuity of the entrepreneur (Hasle, 2000; Walters, 2001; Axelsson, 2002). However, research shows that other key characteristics of the companies are important motivating factors and drivers as well as e.g. leadership, owner motivation, delegation, involvement, dialogue, responsiveness, employee

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motivation and training opportunities (Birgersdotter et al., 2002; Johansson, 1998; Lamm, 2000).

Danish policy instruments that intend to create an internal pressure on the companies and to motivate the companies to live up to the work environment requirements can, in accordance with the definition of Vedung et al. (1998), be categorised in three overall types: regulation (stick), information (sermon) and motivation (carrot) (Limborg & Mathiesen, 2010).

Few studies have indicated that influence from other companies can motivate SMEs to work with work environment (Kvadsheim et al., 2000). The aim of this paper is to add knowledge on how networks among SME’s, can be a catalyst for general policy instruments and even be a mechanism to lift the level of occupational health and safety. It is based upon the results from an on-going research project. We will argue that the low impact of regulation on SME’s (Hasle & Limborg, 2006) is not only a result of the quality of the methods of regulation, but also relates to the fact that in most cases the party responsible for most campaigns or interventions imagine the target group as a multitude of single SMEs.

Inspired by two current work environment projects in the brewery and dairy sectors, we propose to take a broader approach and by understanding the SME as a part of a social network of SME’s related through similar production methods, sharing of suppliers of technology, producing for the same market and often organised in some form of business association or a branch of an employer’s union. Our basic assumption is that a social network in itself will have a stronger impact on the values and priorities of the SME and the owner-manager, than general attempts to convince an enterprise prioritize Occupational Health and Safety (Hasle & Limborg, 2006, Limborg & Petersen, 2008). Further we assume that if owner-managers in a network are to be encouraged to influence each other to give priority to health and safety, it is vital that the network will receive support in terms of funding and access to technically skilful consultants, as well as support to facilitate the process in the network. (Kvadsheim et al., 2000). A third assumption is that trust among the participants in the network is essential to create open knowledge sharing. To create a trustful network the individual participating company must be confident that the network will contribute to their own learning and will prove to be beneficial. (Hasle & Limborg, 2006). The last assumption is that Inspection and the threat of possible enforcement is an important motivational factor for the development of networks.

Summarizing these assumptions, the paper and the project is built on the hypothesis, that an increased facilitation and support of networks among SME’s within the same line of business can supplement or replace authority based enforcement of improvements of the working environment in single companies, and contribute to more sustainable and applicable solutions.

The paper analyses two networks of small enterprises working with very similar occupational health projects. It seeks greater knowledge of the ‘mechanisms’ that are able to motivate or inaugurate the projects, drive the process, overcome the obstacles and bring them through
with the expected outcomes and impact. By this we hope to reach a better understanding of how SME can be facilitated and supported to improve the occupational health situation.

2. The empirical data - two network projects

The dairy and the brewery sector both have a high proportion of small businesses, which have constituted both formal and informal networks. Both sectors have recently gained funding from the Danish Prevention Fund in order to prevent Muscle Skeletal Disorders (MSD) due to heavy lifting and awkward postures. Both projects are established by industry network with many small owner-managed businesses among respectively microbreweries and small milk and cheese producing dairies. Both networks are characterized by an industry which is dominated by one very large company, to which the smaller companies see themselves in opposition. The networks are sanctioned and supported by employers’ associations, which traditionally have focused on the large companies, in both cases the SME’s have formed a formal subsection of the association.

The two prevention projects are developed through collaboration within the networks promoted by leading members and external working environment consultants. Both projects applied for and achieved funding in the scale of 1 – 2 million DKK from the Prevention Fund. The basic interventions in both projects are thus network management and financial support in combination with occupational health and safety expertise from external consultants and the trade association.

2.1 The Dairy project

The Dairy industry demonstrates high scores in statistics on work-related accidents and injuries and on heavy and awkward lifting. The Dairy Industry OHS Committee (consisting of both unions and employers associations) initiated and conducted a survey of the ergonomic loads on the smaller dairies in 2008, and at the same time the Dairy Industry Board established the "Working environment Network for smaller dairies (WNSD)". This network consisted of 21 dairies that were not associated with the industry's dominant company.

The survey was conducted by an external safety consultant, and described a number of problems with heavy lifting, arduous routines and stressful posture in many of the dairies. The survey also pointed to a number of proposals to solve or alleviate the problems that the individual dairies had experienced. The consultant recommended the network to apply for funds to develop some of the technical solutions that were needed. The application was prepared in cooperation with the consultant, and was met with a grant of 1.5 million DKK. The project was launched in January 2010.

The Prevention Fund project was titled: "Development of technical aids for small dairies". The target group of the project was the low skilled workers at the dairies, the group primarily responsible for the hazardous jobs. The secondary target group was all the smaller dairies themselves, since they have difficult conditions to automate and develop their own tools.
The project's success criteria was that applicable and affordable technical lifting gear would be developed and implemented to relieve the loads of the employees back, shoulders and arms. From the survey three of the most hazardous operations were selected. The measured strain of the work operations was expected to be reduced by 50% and total lifting volume reduced by 60%. This reduction was documented through a physiological assessment.

The project formed three working groups, each working on one of the priority problems. Each working group designated a 'test dairy', in cooperation with which the new "tool" was developed and then implemented. Dairies with the same problem participated as 'follow dairies' to one or more of the test dairies; they had a direct opportunity to follow the development and to implement the tool when developed. The technical development of the tool was sent out to tender and the most advantageous offer was chosen. The development of the tool was meant to be carried out in close cooperation between the test dairy, 'follow dairies' and machine supplier. After developing the prototype, testing and commissioning, the tool was implemented at the test dairy. Employees actively participated in the development and adaptation. It was a crucial that the test dairies 'opened the doors' for other dairies in the network, giving assess to examine and borrowing the tool for self-examination. The long-term goal was that all the dairies that experienced the same problems would acquire the newly developed tools, and thereby the amount of heavy and awkward lifting would be reduced throughout the industry. In the fall of 2011 the project received The National Working Environment Council Award for best intervention in the category Muscle Skeletal disorders.

2.2 The Brewery project
25 small breweries are involved in the brewery project. All these breweries are members of the Brewers' Association SMB Group (Small and medium-sized breweries). A large number of new small breweries have emerged in the period from 2000. The small breweries can be divided into a number of different types including:

- Newly established microbreweries characterized by craftsmanship, enthusiasm and with relatively few employees.
- Restaurant Breweries
- Home brewers
- Old breweries, tradition and old production facilities

Members of the SMB group belong primarily in to the category of newly established micro-breweries, as well as a few old breweries. The small breweries covers only 3.5% of the Danish beer market, most of them are relatively newly established, and are characterized by having invested heavily in technology and equipment.

As a result of the short lifespan of the sector, statistics on work related diseases are not yet relevant. The industry is generally characterized by manual tasks with heavy and repetitive lifting and awkward postures. The smaller breweries are not automated to the same extent as the large. Technological solutions exist but are generally too costly and too complex. The many heavy lifts are causing MSD and constitute at the same time a highly labour-intensive factor in the workplace. There is thus a potential for at the same time being able to reduce
the extent of strain and reduce labour costs, if it is possible to develop inexpensive and practical tools that can be widely used by the brewers.

This is why the Brewers' Association and two of the most motivated small brewers in collaboration with a safety consultant developed a project application for the Prevention Fund and achieved in early 2010 support for the project of 2 million DKK.

The project is in its basic model very similar to dairy project, which has also been an inspiration. It began with a general ergonomic mapping of the 26 participating breweries. This formed the background for the OHS advisor to make a catalogue of practical ideas of reducing strain. The survey identified 23 processes that potentially could be hazardous. Among these three work operations were selected, as relevant to develop tools, that could prevent the musculoskeletal disorders. The survey also documented a variety of ideas and practical functioning measures, which reduced loads like turntables, mechanical conveyors, etc. The catalogue of ideas was disseminated to all the breweries. The project then aimed to develop new technical means (a vacuum cleaner to transport malts, lifting equipment for bottles and tools for handling of kegs.) for the selected problems. The development of each of the three products was placed in the hands of three different breweries. The project also included the development of an analytical tool that can support the newly established brewers in organizing work with respect to prevention.

The project's overall objective is the development of low cost technical means to overcome the worst ergonomic loads through the development of practical aids. The long-term goal is to reduce MSD by changing routines through application of the aids. The evaluation is based on questionnaires to the participating brewers and employees and a number of focus group interviews. The evaluation is carried out by the external consultant and not yet concluded.

In Figure 1, below, we have created an illustration of the process leading up to the application to the prevention fund (marked with orange boxes) and program theory for the prevention fund project (marked with purple boxes).

Figure 1. The process of the dairy project
3. Theoretical framework

In order to analyse whether, or how, the increased facilitation and support of the brewery and dairy networks can contribute to more sustainable and applicable working environment solutions than interventions in single companies, we will use Pawson’s evaluation theory and network theory.

Theories of evaluation designs have provided great insight into how to understand and analyze interventions, and are fruitful in analysing the output and outcome of the brewery and dairy projects. The work by R. Pawson (see Pawson & Tilley, 1997; Pawson et al. 2005, Pawson 2006) has recently gained particular awareness (e.g. Petersen et al., 2012). Pawson revises the traditional realistic model in promising new ways by incorporating context factors in the design without compromising the criterion, and that interventions must be independent of other changes (Cochrane criterion). Pawson asks us to pay particular attention to: ‘what works for whom, under what circumstances, in what respects and how’ (Pawson, 2006). Pawson’s generative model of intervention processes is shown in Figure 2.
The model assumes that resource allocation and program theories on interventions (i.e. the design, aim and process steps) have no power in themselves. Accordingly, the model holds that to infer an outcome (O) in a company, one need to understand the underlying local mechanisms (M) and Context (C) that ‘trigger’ or ‘transform’ specific program theories as e.g. the brewery and dairy projects. The local mechanisms are called ‘choice’ mechanisms and are defined as specific behaviours or events (social programs). The context (C) e.g. institutions, relations and structures constrain these (conscious / unconscious) choice mechanisms i.e. the mechanisms are expected to be prelimited and loaded by the context (Pawson 2006).

We attempt to analyse the brewery and dairy projects through the lenses of Pawson’s model, and we assume, that the program theories in the two projects have no power in themselves. However, although the simplicity of the model makes it easy to apply to almost any case, this is also the weakness of the model. For example researchers (see e.g. Petersen et al., 2012) have criticized Pawson for defining the concept of ‘Mechanisms’ and ‘Context’ too poorly, both on a theoretical and operational level. We agree with this criticism. Especially our network approach shows that one limitation of Pawson is his one dimensional focus on a single intervention in single companies. We suggest, however, that interdependence and integration network governance theory might contribute to Pawsons theory and our analysis of the projects, since these theories describe the character of mechanisms, we might expect to find at the network level of the analysis.

3.1 The mechanisms of network constellation

According to integration network theory, networks are likely to be subject to ‘top-down’ processes that influence the institutional design of the network. A well described top-down process is isomorphic pressure. The integration theory mentions three types of isomorphic pressure: coercive, mimetic and normative pressures. That is, isomorphic pressure often ‘forces’ networks or companies to look like each other because it creates the expectation that the network members can increase their legitimacy or economic efficiency by looking like each other. E.g. the standardisation of work environment rules influences both the dairy and brewery branches (Torfing and Soerensen, 2005:96). Inspired by integration theory and
Pawson, we will call the top down pressure, materialised in specific behaviours or events of external actors, which influence the network design: ‘External mechanisms’ (EM).

Both the integration and the interdependence theory highlight that the relation and processes between the network members influence the network design as well, but from slightly different perspectives.

According to the integration perspective it is crucial for the cohesiveness of the network, that it develops a collective notion of a ‘we’. Often, this notion is interconnected with a collective perception of various external pressures or events that ‘threaten’ the stability of the actors in the network and encourage the network actors to act collectively in order to restore conditions for community development, because: ‘everybody is in the same boat’. Accordingly, the community development, i.e. the sharing of competences, knowledge and resources through regular contact, is built on a desire to strengthen the community (Torfing and Soerensen, 2005: 100).

The interdependence theory agrees that the main reason for establishing network is an idea of shared interests and interdependence. However, it suggests that the driving force is the perception that shared resources are necessary in order to realize the actors shared goals. Joining together the actors will achieve more influence and impact. The dynamics of the network is, therefore, characterized by interest matches, and the establishment of the network requires pre-negotiation that can aggregate the interests (Torfing and Soerensen, 2005: 39-42, 48). That is, the collaboration between the network members depends on the possibility of formulating shared goals (instead of interest differences) and assignments that can act as an umbrella for the participation of various interests and objectives. Crucial to the network cohesion is also that the interdependency is big enough to solve the conflict interest through negotiation and through the development of formal and informal rules. Further, it is essential to create trust relations between the network actors, enabling them to enter into binding corporation (especially when the exchange of resources is over time) (Torfing and Soerensen, 2005: 42-43, 49). The integration theory shares the understanding of the importance of shared goals, rules and interdependence, however, it highlights that interactions and a shared community of meaning are crucial as well.

As well, both the interdependence theory and integration theory highlight the inclusion and exclusion mechanisms of networks. The interdependence theory holds that the cohesion of the network is threaten by the fact that resources often are asymmetric among the network actors. A fact, that creates ‘strong’ and ‘weak’ participants. The integration theory stresses that this asymmetric pattern means that the network will require the participants to have some sort of capacity and there is a risk that it will leave the ‘weak’ actors to be excluded (Torfing and Soerensen, 2005: 48-49, 102).

Looking at the above described dynamics of network, through the lenses of Pawson, we gain valuable knowledge on what context and mechanism that might occur in the brewery and dairy networks and how the mechanisms of companies, joining these networks, might be
understood. Accordingly it seems crucial to separate the ‘Company mechanisms’ (CM), that motivate the companies to join and participate in the network, from the ‘Internal mechanisms’ (IM) and context of the network i.e. the behaviours or events that trigger and constitutes the program theory.

Accordingly our analytic model used to analyse the empirical findings in the brewery and dairy projects is pictured in Figure 3.

Figure 3. The modified model of External Mechanism (EM) and Context (CEEC), Internal Network Mechanisms (IM) and Context (CN) and Company Mechanisms (CM) and Context (CC)

4. Method
In order to examine our hypothesis and assumptions in the dairy and brewery project, we used qualitative methods, document analysis and observations. The document analysis in both projects included readings of articles, project descriptions, the developed material, evaluations and minutes from meetings etc.

In the dairy project we have conducted five interviews with the consultants, the three test dairies and one follow dairy. Four of the interviews were focus group interviews with both the dairy leader and employee representatives. We attended one meeting in the trade association and saw three of the diaries.

In the brewery project eight interviews were made. Three interviews were made with the trade organization, two interviews were made with the owners of two of the test breweries, and finally three telephone interviews were made with other breweries in the network.

5. Results
As described the Dairy and Brewery projects more or less rested on the same programme theory Nevertheless, the dairy project did to a larger extent, than in the case with the brewery project, fulfil its own programme theory. In this section we will show how and why the two projects ended up with two different storylines despite of the rather similar point of departure. We will do this by unfolding the impact of the different contexts and mechanisms that constrained and drew the projects.

5.1 The contexts constraining the projects

Looking at the two projects, through the lenses of our framework, we saw not ‘one’ but at least two ‘contexts’ that constrained the program theories. An external context and a network context.

The external context that influenced both project were:

- The union and employee association
- External consultants (working with work environment issues in the industries),
- The Danish Working Environment Authorities (DWEA)
- The Prevention Fund.

These organizations were all characterized by awareness on high risk occupational health industries during the project period. And since statistically evidence showed that both the brewery and dairy industry had high numbers of back pain related illnesses and early retirement, an orientation towards these industries seemed ‘appropriate’.

The network contexts of the small dairies and breweries have many characteristics in common. Both network contexts are characterized by a culture of ‘openness’ and cooperative. The network actors had a tradition for knowledge sharing and mutual support and a high interest in quality and traditions. Both networks were in a situation where the groups of small enterprises saw themselves in opposition to one leading and very large business in the industry i.e. they had a common ‘enemy’. As well, the network actors were members of an association of small businesses within the sectors and most of them knew the external consultants that were hired to do project consulting during the process, their skills within occupational safety and health and their knowledge and understanding of the industry.

Despite these similarities, the brewery and dairy network contexts differed in several ways.

The roots of the collaboration and network among the dairies are generally old and some of the businesses have a long tradition of cooperative structures among the farmers. They also have several shared meeting forums. As well, the production in the dairies is also rather stable and rather formalized with several employees.

The network among the breweries is rather new since more than half of the small businesses (typically with only 2-3 employees) are newly established companies. The tradition of the cooperation is based upon their entrepreneur spirit and their high enthusiasm for the product. As well, the enthusiasm builds upon professional interest in brewing and not necessarily
running a profitable business. The brewery directors themselves are typically part of the productions.

Resources are limited in both cases, however, the breweries are still burdened by investments in new production capacity and a decreasing market, while the dairies as mentioned have more stable production conditions.

5.2 The mechanisms triggering the interventions and program theories

The case studies revealed that it was fruitful to distinguish between both external and internal mechanisms in the dairy and brewery projects and not to talk about ‘mechanisms’ in general as Pawson suggest. The two types of mechanisms triggered and transformed the external and network context in different ways that ‘drew’ the projects and program theories in specific directions and with specific behavioural outcomes.

Below we will differentiate between the mechanisms related to the small enterprises’ decision to join and create a shared project about ergonomics improvements i.e. the decision-making process and the implementation of the program theory i.e. the intervention process.

5.2.1 The mechanisms triggering the decision-making process

The findings show that both the dairy and the brewery decision-making process were influenced by external mechanisms and pressure.

In both projects the trade union and the external consultants were deeply involved in the designing and the description of the projects. The union and consultants more or less wrote the application to the Prevention Found and the small enterprises in both networks described that they did not know the Prevention Found beforehand and that they would not have had the resources (time and skills) to write an application themselves. Had the external consultants and the trade union not known the Prevention Found or had they not written the applications no project would have been made. As well, had the consultants and unions not decided to reorient their focus from the dominating and large business in the industry to the small no shared project concerning ergonomics would have been made.

Further, the fact that the Prevention Found choose to sponsor the projects were another important mechanism. The small enterprises confirm that the funding was a prerequisite for the projects, as neither of these projects would have seen the day without the possibility of financial support e.g. payment for the consultants work during the project.

The dairies were influenced by another more ‘negative’ external mechanism. A couple of month before the project the labour inspection gave several injunctions to some of the dairies concerning ergonomic issues. On the contrary, none of the interviewed breweries had had any ‘negative’ experience with the Labour Inspection. According, the brewery had no ‘fear’ that Labour Inspections and fines were a serious external threat to the businesses. Though some of them revealed that they were sure this would not be the case in the future, it was a general experience that the Labour Inspectors primarily were giving advises of how to solve the problems rather than enforcing costly solutions upon them. Whether this was due to a the
Labour Inspectors policy towards newly established companies, indulgence towards breweries, or a coincidence we do not know, however, the threat of control was not obvious to the breweries at the time of the interviews.

Beside these crucial external mechanisms important network mechanism were also at play in the decision making process.

The network mechanisms that triggered the decision-making process in the dairy was a pioneer among the small dairies who ‘stood up’ several times at shared meetings articulating three shared interests and challenges among the dairies. First, he highlighted ‘the negative awareness of the Labour Inspections’ and a shared problem with ergonomic issues. Second, he mentioned a shared enemy ‘the dominating company in the branch' who so far had gained all support from the union, and thirdly he highlighted the history of mutual gains by doing shared learning processes among the dairies. That is, the dairies were motivated by the articulation of potential economic gains, knowledge gaining incentives and a feeling of moral obligation.

The network mechanisms that were the driver for the decision-making process in the brewery network were primarily that most brewery owners took part in the work themselves. Therefore they all experienced, that they would not be able to continue working with that kind of strain for many years. Most of them were thus positive towards improvements of the working environment. However, driven by enthusiasm the issue of occupational hazards had not yet entered the top of the agenda at the brewery.

This way both external and internal mechanisms triggered the network contexts in a way that made the ergonomic projects seem ‘appropriate’ in both networks.

5.2.2 The program theory and the mechanisms unfolding it

In both program theories the network were expected to establish a project group and working groups. The dairy projects had described more precisely that the working group should be formed around a three ‘test’ dairies and several ‘following’ dairies.

A crucial network mechanism that made a difference in the dairy network was the network actors’ decisions to make an ‘openness and commitment pact’. One of the dairy managers describes the process, this way: ‘When we decided to make a pact on 'open doors' (the possibility of studying each other’s production processes and workflows, red) it was completely silent. So we asked if anyone was against the idea. Deafening silence - Eventually we had to ask everyone to stand up and say, whether they were ‘in’ or not, and then some had to think it over’. Further, the network mechanisms that embossed the selection processes of both the project group and the test and follow dairies are characterized by a shared understanding of the ‘common good’, consensus seeking (there is no conflicts) and recognition of asymmetry among the diaries i.e. that the dairies can contribute with different aspects to the project. These mechanisms seem to result in a selection process where the appointed test diaries represent most of the dairies shared
interest and challenges in such a way that everyone was expected to benefit from the process and development of products.

It was this aim of the idea of the ‘common good’ that formed the inclusion and exclusions processes in the network. Some dairies were ‘encouraged’ to be a test dairy and all the dairies that decided to be either follow or test dairies were told, that they thereby obligated themselves to participation and enthusiasm. As a result of this mechanism, those dairies who either did not show motivation, were embarrassed about the conditions at their dairy or had too few resources to invest in the project (time consuming) were excluded from these project groups.

This way the working groups were formalised and their obligations under stressed from the very beginning of the project in the dairy network. This process and the idea of ‘the pact’ were supported and facilitated by the consultants i.e. an external mechanism. The consultants found the pact beneficial because it allowed them to break with their confidentiality pact they normally were obligated to use. Furthermore the consultants shared their knowledge from their visits at the different types of dairies in the selection process and got huge influence on the selection of at least one of the test dairies. One of the consultants highlighted that this dairy was interesting because it was a ‘front runner’ and typically ambitious and obligated.

In the brewery network the establishment of the working group was dominated by a more ad-hoc process less influenced by network dynamics and the external consultants, but more influenced by ‘single’ business, ‘pioneers’ who wished to be test breweries themselves. That is, the idea of the network mechanism of the ‘common good’ of the network was never a driving mechanism among the breweries and the idea of a formalised partnership was never formulated.

This pattern of more visible and ‘radical’ external and network mechanisms in the dairy network dominate the rest of the process as well.

In the dairy network the consultant’s behaviour is an important external mechanism as they reminds and pressure the dairies to attend and arrange project meetings and ask the companies to include employee representatives. They also support the selecting process of the supplier by hire ring an engineer from the consultancy company with many supplier contacts. He selects and presents a couple of different suppliers to the test dairies and supervises the dairies on whom to choose.

The network mechanisms, that influence the dairy project at this stage is the formalized interaction and knowledge sharing about applicability potentials of the tools among both test and follow dairies (there are 6-8 meetings between the test and follow dairies). At the same stage in the brewery network, the consultants are replaced and the companies very dissatisfied with the new consultants whom they fell did not know enough about engineering and tool development. This meant that the consultants did not influence the project in any
direction. As well, the breweries had no formal meetings with other breweries, but more
unformal knowledge sharing process and ad hoc visits took place among some of the
breweries at this stage.

At the stage of the project were the tools were to be implemented at the dairies the network
dynamics and mechanisms get less powerful. The ‘test’ enterprises revealed different
patterns of resistance and resilience among the employees who was to use the newly
developed ergonomic tools. In one of the test dairies the employees are forced to use the
product (they can't avoid using it) and they meet the expected results (in the program
theory). On the two other dairies the employees get segregated in two groups one which
enjoy to use the product, and with the expected results, and one that refuse to use the tools
– ‘they are stubborn’ as one of the pro-tool employee explains.

At the final stage of the dairy process the experience with the technological improvements is
supposed to be disseminated to both follow dairies and other network members. This stage
is influenced by the network mechanism of ‘positive’ ‘group pressure’. Some of the dairies
come and visit the test dairies. However, the assumed result of the program theory is not
met. Neither the follow nor other dairies have (to our knowledge) implemented the newly
developed technology.

6. Discussion and conclusion
This paper has investigated whether support and facilitation of network of SME’s within the
same lines of business can supplement or replace authority based enforcements of work
environment improvements. We approached our assumptions and hypothesis by making a
comparative analysis of two rather similar network projects on ergonomic improvements
within a network of small dairy and brewery informed by a theoretical framework of realistic
evaluation and network theory.

Our findings suggest that network definitely has a great potential when it comes to
encouraging SMEs to improve their working conditions and to pave the way for more
applicable, adjustable, and sustainable interventions. However, our findings also made it
obvious that network is not a new form of regulation and cannot stand alone or replace
authority based regulation.

The comparative study of the brewery and dairy network showed in accordance with the
existing literature that the SME’s suffers from lack of resources, ad-hoc procedures, and that
change is often encouraged by external pressure. Our findings confirmed that access to
funding, technical and process consulting, as well as an emergence of mutual trust among
the participants was crucial for the success of the network. Whereas our assumption about
that the impact from colleagues (owner-manager colleagues) is stronger than that of
‘external’ authorities and consultants when it comes to work environment issues is still left to
be answered.
Our comparative study more specifically added to our understanding of the important mechanisms that allow network projects among SME’s to succeed. Despite of rather similar program theories the result and process of the dairy intervention was more successfully accomplished. This is explained by a difference in the external and network mechanisms that influence the network during the process. In other words these mechanisms allow us to understand which mechanisms are appropriate if network of SMEs are to be used as a mean to produce occupational health improvements in the future.

In Table 1, below, we have summarized these mechanisms and visualised which mechanisms that were active (or lacked) in the two networks.

Table 1.

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Dairies</th>
<th>Breweries</th>
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<tbody>
<tr>
<td>External</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External pressure</td>
<td>+++</td>
<td>+</td>
</tr>
<tr>
<td>External funding</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Professional support</td>
<td>+++</td>
<td>(+)</td>
</tr>
<tr>
<td>Internal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust within network</td>
<td>++(+).</td>
<td>++</td>
</tr>
<tr>
<td>Accept of asymmetrical contribution and benefit from project</td>
<td>+++</td>
<td>(+)</td>
</tr>
<tr>
<td>Pact on openness in relation to the project</td>
<td>+++</td>
<td>(+)</td>
</tr>
<tr>
<td>Shared commitment to new standards</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

The table shows three of the external mechanisms that we have identified as important drivers of the networks, but which emerged to a higher extent in the dairy network. First, a crucial external mechanism seems to be the existence of ‘negative’ external pressure on a network. That is, the possibility of inspection, control, and eventual stigmatisation as a “bad guy” seem to be an important driver. This pressure is generally higher in the dairy network since several fines and penalties form the Labour Inspection were giving in this industry, while the brewery industry did not experience this same kind of pressure. Secondly, public support to such projects, preferably through financial funding of development costs and expertise, seemed to be a prerequisite for the collaboration on occupational health and safety issues among the small enterprises in these industries, since these small business
traders have a strained economy. Finally, we saw that the presence and involvement of external consultants - skilled in writing applications, facilitating of processes and planning, and with a thorough expertise of the problems at stake in the industries, seemed essential for the dairy project projects to be designed and successfully accomplished. Moreover, it seemed important that the consultants functioned as an external mechanism by supporting and facilitating a formalized ‘community of practise’ and nudging pioneers among the network participants to take a clear leadership and ownership role in the project, in a way that left the consultants guidance as a ‘shadow of hierarchy’ (Scarpf) guiding the process from the ‘distance’. We see this as an important external mechanism as this kind of guidance and formalized collaboration between the breweries were very low.

Another mechanism that triggered the initial dialog in both the dairy and network context was the articulation of the benefit of collaboration and trust in the network on occupational and health issues. It was highlighted that knowledge sharing and the idea of developing preventive aids together could inspire and benefit everybody. This articulation of trust is as far as we see it the most important network mechanism.

Whereas both networks articulated the issue of trust the dairies materialised the importance of trust and collaboration in a more radical way by using two other network mechanisms. First, a pioneer painted a picture of a shared enemy and articulated the idea of a ‘pact of openness’ were the directors of all the small enterprises arose and said clearly in the presence of everybody that they would allow the other dairies to visit them. Second, as mentioned the process of selecting test dairies were more formalized and driven by a ‘consensus’ mechanism and the idea that the three test diaries should represent the different kind of production tools that could benefit as many diaries productions as possible. As well, the follow dairies, which were selected to each test dairies committed themselves to be active and motivated in the process. These mechanisms never appeared in the same way among the breweries were the pioneers chose themselves as test breweries and no formal follow dairies were chosen.

This way, both networks shared the network mechanism of exclusion and inclusion processes. They spoke more or less explicit about the asymmetrical pattern of the network i.e. that they were different enterprises with different motivation, capabilities and interests. However, in the dairy case the design included the test diaries, follow diaries and sideliners, distributing the immediate benefits unevenly, but on a foundation of mutual believe that all dairies would benefit in the end. Whereas in the case of the breweries, the uneven distribution of the resources and potential common gains of the development projects did not seem to be ‘realised’ by most network members, and as such they did not think of themselves as having any part in the project.

In the program theory of the interventions it is clearly, that a network mechanism of commitment to a shared standard on the accepted level of occupational health strain was expected e.g. that the SME would be encouraged to agree that certain equipment should be considered standard in the business. That is, the idea that the members of the network would
decide that they would not accept businesses that did not ‘live up’ to the standards and therefore collectively would help and inspire enterprises which needed help. This mechanism would be expected to materialize the ultimate level of trust and collaboration in a network. Neither of the two projects have, however, taken the development this far. However, some of the dairies who were ‘excluded’ from the process have visited the test dairies were the ergonomic strains have been reduced.

In this paper we have discussed how two projects with rather similar program theories could end up with rather different results. We have argued that the differences are related to whether or not important external and network mechanism appeared and were fostered during the process. By differentiating between external and network mechanisms and contexts Pawsons generative model of causation is expanded and more complex but hopefully more usable.

7. References


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Evaluation of a Swedish national programme on injury prevention in small farm businesses

Author
Peter Lundqvist, PhD, Department of Work Science, Business Economics and Environmental Psychology, Swedish University of Agricultural Sciences, Box 88, 23053 Alnarp, Sweden peter.lundqvist@slu.se

Abstract
Swedish research has shown that only 10% of actual injuries are reported in the agricultural sector and that the injury frequency is highest for small farm units (< 400 work hours/year). These findings, together with a high frequency of fatal injuries, prompted the Swedish Government to initiate an action programme against injuries on farms. The aim was to develop a system of farm supervisors, provide training for these and plan for a first action period (2009-2013), related to the EU Rural Development Programme. This action plan was given the name “Safe Farmers Common Sense” to point out that the key to improved safety is in the head of the farmer. The Swedish Farmers’ Association is running the programme, with part-time farmers as supervisors, and they offer support to farmers through farm visits or a short course entitled “Three Steps to a Safe Farm”.

The aim of this programme is to reduce the number of injuries by 50% by the end of the action period in 2013, but also to make farmers’ more safety aware and more proactive in improving safety on their farms.

In order to evaluate this programme for the first whole year of activity (2010), a telephone survey was carried out in early 2011 with farmers who had received an on-farm visit (n=220, 73% response rate) or attended the short safety course (n=364, 77% response rate) and a control group (n=209, 84% response rate). The farmers were asked whether they had introduced any preventive measures on their farms, but also about their attitudes to health and safety.

The results showed that over 90% of those surveyed were satisfied with the activity in which they had participated. Regarding the key question of whether they had taken any measures to improve working conditions and prevent injuries on their farm, almost 70% of farmers who attended the safety course reported having made some kind of improvement (e.g. technical improvement, changing working routines, personal protective equipment or further safety education). Of those who received a farm visit, 90% had made improvements. In the control group, less than 20% had made any safety improvements during the period studied. These results indicate that activities that stimulate farmers to improve their working conditions could be effective, but it is important to monitor whether the effects persist and evaluate the effects on the actual injury rate. Further evaluations of these and other farmers will follow.
Keywords
Agriculture, injury prevention, national program, evaluation
A case study of a clothing vendor at street fairs of Fortaleza: A description of a socio-productive network

Authors
Regina Heloisa Maciel, PhD Psychology, Professor, Universidade de Fortaleza, reginaheloisamaciel@gmail.com
Tereza Glaucia Rocha Matos, Universidade de Fortaleza
Luciana Maria Maia Viana, Universidade de Fortaleza
Marselle Fernandes Fontenelle, Universidade de Fortaleza
João Bosco Feitosa dos Santos, Universidade Estadual do Ceará

Abstract
This study is a case study of street fairs selling clothing in downtown Fortaleza, Ceará, Brazil. The aim is to reveal how informal labor is dependent on social networks and their social capital so as to undertake a reflection on what we call socio-productive networks, illustrated by the street fairs in the city's downtown area. The importance of a better understanding of informal labor and how these workers live is justified by the increase in their numbers in recent years. To indicate the aspects of informality and the characteristics of the networks that sustain this type of activity, we carried out an in-depth interview with a producer/vendor, as well as a documentary research of news stories and local government documents to help establish the context of these outdoor markets and of informal economic activity in Fortaleza. In the final considerations, we discuss the kind of network and the social capital they provide in order to fight unemployment and endure the poor working conditions that exist at the market. To understand the activities that occur at street markets and the social and productive relationships that are formed around them, we propose the term "socio-productive network" as a construct to prompt further considerations in other studies.

Keywords
Informality, street markets, social productive networks.

1. Introduction
The aim of this study is to reveal how informal labor is dependent on social networks and their social capital, illustrated by the street markets selling clothing in downtown Fortaleza, Ceará, Brazil. It is a case study composed of two parts: a documentary research related to the recent history of the city’s street markets, focusing the complex structure of these markets in order to establish the context where informal work occurs; and an in-depth interview with a street vendor that belongs to a family that sell their products in the markets and has experienced the recent history of the fairs.

The changes that have occurred in recent decades in the world of labor have produced a concentration of income, a reduction of formal employment and an increase in social
inequality. This context has given rise to a set of activities that compose the informal economy and that are fundamental for the insertion of individuals in the labor market, besides guaranteeing their survival and social recognition (Durães, 2002). Cacciamali (2001) points out that the phenomenon of informality covers countless heterogeneous economic activities and proposes the use of the term “informal economy” instead of “informal sector”, as first proposed by the International Labor Organization in 1972 (Jütting & De Laiglesia, 2009). Outsourced labor, freelance work, street hawking, door-to-door peddling, temporary work and illegal work, involving tax evasion, are but some examples of activities making up the informal economy. Jütting & De Laiglesia (2009) and Charmes (2009) believe that informal labor is the norm rather than the exception nowadays and the tendency is for it to increase, even in developed countries. According to them, the question of informality is problematic both for individuals and for society. From the individual’s standpoint, informal work means being outside the protection of the state, and thus in a situation of social vulnerability. Nevertheless, although informal labor is related to poverty and precariousness (Quinlan, 2009), it also can mean greater social mobility and better opportunities, since in some regions, access to good-paying formal work practically does not exist (Gagnon, 2009). The importance of a better understanding of informal labor and how these workers live is justified by the increase in their numbers in recent years. In Fortaleza, data of 2008, showed that informal workers represented 54.6% of the total occupied population (IDT, 2008).

Informal labor is propitious for the development of social capital, in the sense proposed by Bourdieu (1980), and for the configuration of social networks able to supply a certain degree of support for these workers. According to the initial definition given by Bourdieu (1980) and expanded by Coleman (1988), social capital is the set of actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition. On the other hand, social networks are complex systems composed of agents who establish varied types of relationships. The concept and methods for their analysis are increasingly present in the literature on social development (Hatala, 2006). To understand regional disparities one must study the assembly of the networks, conventions and institutions that permit cooperative actions, which enrich the social fabric of a certain region (Abramovay, 1999).

Thus, the study described here is an attempt to show that the activities and relations that occur in the informal labor of street markets can be better understood based on the optic of the social networks and social capital provided by them. To differentiate the concept utilized here from the more common idea of social networks, we propose to call the phenomenon “socio-productive networks”. The social network provides exchanges based on the social capital of the group, whether or not formally constituted. Social networks, on the other hand, are composed of the webs of meanings where the resources of social capital and its characteristic factor – trust – can expand (Eagle et al., 2010, p. 1029).

**2. Methods**

In this study two qualitative procedures were used. The first is a documental analysis that traces the contemporary history of the street markets of Fortaleza, complemented by *in loco*
visits and informal observations to find an interviewee that represents most of the protagonists of these street markets. The second is an interview with a young man that runs a family business in the markets in study.

The documental analysis consisted of an active search of news and reviews about the constitution and debates related to the clothing street markets of Fortaleza and similar markets of the northeast region of Brazil. It was also included documents provided by local government. It is important to note that there are no formal records of these street markets, as well as activities developed there and social demographic data about the workers. The documents were analyzed with the objective of building the recent history of the markets and understand the system.

The second part was an interview with a representative of a family that is linked to the markets. The interviewee is 22 years old and participates in managing the family business. In depth unstructured interviews took place at the university in three occasions. The stall owner belongs to a family that is present in the clothing markets since 1998, producing and selling their goods in total informality. A discourse analysis focusing the main aspects of the experience in the market was done, based in Bardin (1977).

3. Results and discussion

3.1 Clothing street markets of Fortaleza
The garment street markets in the city of Fortaleza have become known as places to buy simple products of low quality at cheap prices, accessible to low-income people. Until a short time ago, these clothing markets were mainly concentrated in the area called Beco da Poeira, created in 1989. It was a permanent street market selling clothing and other manufactured low cost goods. This market was located between two public squares, but in 2010, the vendors were transferred by the city council to a nearby location. The removal from its original place and the choice of the new venue was not an easy process, once one of the objectives of public authorities was the formalization of the market and to contain the process to one location. There were a number of disputes between the city government and vendors. Although some of the producers and vendors did transfer to the New Beco, and in doing so, formalized their businesses, the great majority decided to go elsewhere and even those with stalls in the New Beco also transfer part of their business to another informal location: the Feira da José Avelino. In refusing formalization owners and workers show a kind of resistance only possible based on coordinated social actions of a network.

The Feira da José Avelino is a center in the streets near the Cathedral. This venue is more recent. Silva et al. (2010) explain that, initially, part of one street was occupied by a small group of embroiderers, who displayed their poducts on tarps on the ground. This market started to attract producers and intermediaries of handcrafts and manufactured goods, reaching large proportions and becoming a national reference in garment commerce.

The occupation of the public space, the lack of regularization of the merchants and even suspicions that some are representatives of shop owners are known to the local
authorities and a bone of constant contention between the government and vendors. But the business remains vibrant and each week attracts a large number of buyers, including those coming in chartered buses from outlying areas of Ceará and other states of the Northeast. The growing demand for apparel at wholesale prices for resale has become a new element in the competition among the vendors and between them and other establishments in the sector. Now it’s even possible to buy “in the middle of the street” using a credit card. (....). (Salvi, 2008).

Due to the problems this commerce caused to traffic circulation in downtown, the city government decided to remove it from the area and again transfer the merchants. However, a good part of the vendors remained downtown, occupying former warehouses that exist on José Avelino street. Currently, the Feira José Avelino occurs both in the old warehouse buildings and outside them in the street. The market is busiest in the predawn hours of Thursdays and Mondays, receiving buyers not only from the entire interior region of Ceará but also from other northeastern states and even from Cape Verde. 33.6% of the vendors earn between 300 and 600 reais per month (150 to 300 dollars), 76.4% are small manufacturers who work out of their homes or outsource the sewing, and only 23.6% are resellers (Toniatti, 2008).

Lazari (2010) stress the importance of the informal apparel commerce in downtown Fortaleza, which congregates at least 1700 vendors and other informal workers. The reports about the conflicts and disputes that occur regarding this type of commerce show the importance of the market to this group of people who live by informal labor. The group’s organization indicates a rich network of relations that winds up imposing its survival tactic on the strategies of the local authorities (Certeau, 1994). The vendors and manufacturers are linked in intricated social-production networks.

The market is just the end of a chain that starts with the informal production of goods inside homes and constitutes a network of informal jobs where extended members of a family and their friends work. They are also bound by an association of vendors that represents them and fight against the tentatives of contention and formalization by city authorities. The association links the various network and promotes exchange of information and social protection. Thus, augmenting the social capital of individual networks.

3.2 Interview
The analysis of the interview conducted with a young man who maintains stalls in Beco and José Avelino permits identifying some characteristics of the networks that are established and provides evidence of the informality, networks and social capital, as well as the precariousness of the conditions and organization of labor that prevail in these commercial venues.

The market is a space for survival, a space to escape from unemployment and/or low wages, one of the reasons for the increase in informal jobs (Jütting & De Laiglesia, 2009). As put by the respondent: “they’re employees who don’t have a formal labor contract (...) at times they
don’t even earn the minimum monthly wage”. The inexistence of contracts shows the intensity of the trust and social capital present in the network.

The expectation of achieving a better life and the desire to own their own business (Charmes, 2009) appears to contribute to the willingness to submit to the precarious working conditions and the chaotic organization of the market: “this is an attempt to realize dreams (…) what motivates many people, even to be exploited, is the hope of one day escaping from that situation [unemployment]”. Thus, the option for this type of employment is not only based on the lack of a better job opportunity, but rather is employment without some of the negative features of a formal job: “this is the good side of Beco, you laugh all day (…)”. Elements of this nature favor the creation of strategies to face the adverse conditions at the market.

The informality of the labor relations is evident, as well as its dynamic nature: to remain active the actors create alternatives to adapt to new contingencies, using the social capital provided by the network:

My mom called the seamstresses to work with us [to work in the respondent’s home]; it was a family process. After a little while, my mom and dad discovered it wasn’t so profitable to have the seamstresses in our home, so we started to donate the machines for them to work in their own homes. So we stayed at home in a type of faction, cutting, pasting and applying (…) we prepared the pieces and sent them to the seamstresses and they did the sewing, and we always paid for production, because the biggest problem was always the seamstresses, sometimes they leave us and go work for people who could pay more.

Family and friends relationships provide the necessary social support for the development of activities and the survival of a growing population that are outside formal labor market. Solidarity and trust are the exchange coin inside the network. The interviewee indicated members of his extended family that are part of the network, some participate in the manufacturing of goods and others in selling at the markets: “My mom and my aunt got a machine and start manufacturing. My cousins and sisters learned with them (…). I participate in organizing the selling”.

The logic of work at the market naturally accepts the precariousness of the labor. That is, people are willing to endure not so good working conditions to be part of the network and use its social capital to survive.

I’ve seen employees getting shocked in the midst of the tools there, falling on the ground, because when separating things there, sometimes somebody touches a bare wire without meaning to.

4. Final considerations
As can be noted from the descriptions recounted by the producer/vendor interviewed and the brief history of the formation of the garment street markets in downtown Fortaleza, as well as the head-butting with the city authorities, these markets are much more than mere commercial venues. They represent the mode of living of thousands of people who, in one
way or another, survive from this economic process. The sector is eminently informal, with informal and precarious occupations. However, the belonging to a network and the possibility of using the social capital lead workers to accept the working conditions as natural.

The network has many “nodes” connected by relations of friendship and kinship, primarily, and of commerce and labor in the second instance. It sustains and gives meaning to the activities carried out both in the direct commerce at the market and in the small informal factories, where the seamstresses are “brought inside” the home of the proprietor to work or do piecework in their own homes, in total informality. The expression “local socio-productive network” can better contextualize the subject matter in question, because the characteristics of this informal social network are not dictated by technology, although they are affected by it in some form, nor are they limited or determined by organizational strategies.

The market provides a way of living for an urban population without access to formal employment or that choose to work informally due to the low quality of the jobs on offer in the formal sector. It is a point of resistance against the growing difficulty of finding good formal jobs, based on networks of family and friends that can offer resources, social capital, that can be used, mainly in exchange for labor and social protection.

Thus, these networks can be called socio-productive networks and should be studied from this point of view. The city authorities should also acknowledge their importance and device public policies aimed to take advantage of the socio productive networks instead of confronting producers and vendors.

5. References


Informality: a better choice or a result of no choice at all?

Authors
Regina Heloisa Maciel, PhD Psychology, Professor, Universidade de Fortaleza, reginaheloisamaciel@gmail.com
Virna Nascimento, MSc Psychology, Universidade de Fortaleza
Renata Guimarães de Carvalho, MSc Psychology, PhD student, Universidade de Fortaleza
Ana Cristina Martins Batista, Psychology, MSc student, Universidade de Fortaleza
Karen Bomfim Hyppólito, Psychology, MSc student, Universidade de Fortaleza
Isaac Bastos de Andrade, MSc Psychology, Universidade de Fortaleza
Elayne de Sousa Carvalho e Oliveira, Psychology, MSc student, Universidade de Fortaleza
Tereza Glaucia Rocha Matos, PhD Psychology, Professor Universidade de Fortaleza
Luciana Maria Maia, PhD Psychology, Lecturer Universidade de Fortaleza

Abstract
Productive restructuring and the new form of capital accumulation led many workers to unemployment, underemployment and informality. Informality is directly associated with poverty, low educational level and a miserable way of survival and marginality. However, despite the connection of informality with precarious work, it can be a desired employment situation. It may be part of a process of rational choice in which the person opts for informal work. The objective of this work is to verify how the insertion of the workers in the context of informality occurs, focusing workers of José Avelino fair of Fortaleza, Brazil. The qualitative research was held in one of the largest street fairs in the Northeast of Brazil, based on the technique of life history. It was found that workers decide to enter informality due to lack of opportunities in the formal sector and the influence of family traditions when parents were already in the informal trade. Upon entering informality they recognize both positive and negative aspects as facets of this experience.

Keywords
Informal work, precarious work, professional choice, qualification, life story

1. Introduction
There was a growth on informality in the labor market in Brazil from 1990 on, due mainly to changes in the productive system restructuring (Durães, 2002), related to increased flexibility, changes in labor relations and informality of production. Consequences of these changes were a decline in the number of jobs, increasing unemployment and precariousness of labor relations (Antunes, 1998; 1999). Given this context, informality is present in the debates on labor market, especially as informality relates to inequality and poverty (Feijo, 2011).
The notion of informality has its origin in studies of the International Labor Organization (ILO), developed in the years 1970 in Africa. At the time, the term “informal sector” was used to refer to family business, where activities were developed with own resources; with small-scale production; intensive use of labor and adapted technology. The workers in these businesses were generally not qualified and the economic activity was not regulated by government (Cacciamali, 2000). Since then, the idea and consequences of informal sector and economy is being discussed in order to define and separate it from other perspectives, often referring to different phenomena (Noronha, 2003). The IBGE (the National Institute of Statistics, 2003) defines informal sector as composed by economic units owned by self-employed persons or business with up to five employees, being their jobs either the main or secondary activity.

The survey released by IBGE in 2003 on the urban informal sector, pointed out that trade is among the dominant economic activities (33%) and that persons employed in informal sector are, in general, self-employed (69%). The research also found that Informal workers enter the sector through personal relationships (81%), but other reasons found were: lack of employment, flexible schedule and independence. In relation to the work journey, 67% worked 21 to 30 days per month; 44% had a journey of 40 to 60 hours per week and 8% worked more than 60 hours/week. The data indicate that the majority of these workers had low educational level (incomplete first grade).

From an economic and social perspective, there seems to be a relationship between informal work and poverty and income inequality (Rosenbluth, 1994). About this association, recent data indicate that in Brazil there had been an increase in informal workers since the 1980, but it has decrease in the last decade from 43.6% in 2002 to 37.4% in 2009 (IBGE, 2012). These fluctuations seem to be related to changes in the national economic policy and must be analyzed with caution, especially when it turns out that there is a relation between informality, educational level and experience in the labor market; not to mention that this group of workers does not have their labor rights secured, which suggests that informal workers find themselves in a situation of social vulnerability.

Considering the diversity of occupations that can be categorized as informal work, this article discusses some specifics trends of workers of garment fairs of Fortaleza, Brazil. Fairs are a form of commerce well established prior to industrialization and, despite centuries of existence, it maintains much of its original features. Socially, fairs are multidimensional spaces in which art work and sociability are interwoven (Sato, 2007). Fairs, mainly the ones in the Northeast region of Brazil, have a wide variety of products marketed in tents, on tarps and/or through walking vendors and intend to reach not only the local population but other cities and regions. In the Northeast, garments fairs have great importance for the urban and regional economy (Dantas, 2008).

José Avelino fair is located in the city center of Fortaleza and is today the largest generator of informal jobs in Ceará, being its largest outdoor garment fair and one of the largest in the Northeast region of Brazil, with, approximately, eight thousand vendors. The fair attracts
buyers from several states of Brazil as Piauí, Maranhão, Pará, and Manaus, but also from other countries such as Cape Verde, Port-au-Prince and French Guiana (Chaves, 2012). The fair takes place during the nights of Wednesdays to Thursdays, Sundays, all day and Monday nights and mornings. In the high season up to 20,000 people visit the fair per day. This gathering of people from various locations makes the fair a space of social effervescence that modifies, even for a short time, the city sight and its dynamics. The fair has a poor structure to expose goods and many vendors occupy part of the track for cars and buses with tarps and tents, hindering the normal flow of vehicles. Despite the inconvenience, the fair is an option for many formal unemployed, as anyone can sell their merchandise in the middle of the street or inside the stalls, if they decide to rent a place.

The objective of this work is to verify how the insertion of workers in the context of informality occurs, focusing workers of José Avelino fair.

2. Method
Data were collected through a “life story” procedure, a qualitative method. The qualitative approach aims a deep understanding of facts and individual processes and the meanings, values, beliefs, representations and singularities of a phenomena (Paulillo, 1999; Spindola & Santos, 2003; Boni & Quaresma, 2005). The life story procedure consists of an in-depth interview in which the researcher interacts constantly with the informant. Its main function is to portray the experiences of the person, groups or organizations involved (Minayo, 1993). The experiences reported consist of a rich material for analysis, which are a reflection of the collective dimension from an individual perspective (Boni & Quaresma, 2005).

The participants were selected intentionally, according to availability and convenience of researchers. Three men and seven women were interviewed, all informal workers of José Avelino fair. Interviewee’s educational background varied: one had studied up to 3d grade of basic school, four have finished basic school, two had a technical school degree and one was in a graduation course. Seven of the respondents were married; two live with a companion and one was a widow. The age of respondents ranged from 30 to 61 years, with an average of 46 years.

The interviews were recorded and transcribed. This material was analyzed using a content analysis technique, which consists of “information processing where the content of the communication is transformed, through objective and systematic application of categorization rules” (Bauer & Gaskell 2000, p. 192). In this article only the contents referring to factors that contribute to the worker's entry in the context of informality are presented.

3. Results
In relation to the worker's integration in the context of informality, three main categories were identified: (1) Socialization and perceived advantages of informality; (2) Disadvantages of informality; (3) Difficulties of entering formal labor market.
In the first category, socialization in the environment of informality, the preponderant discourse was the preference for informal work, because they have been socialized in the informal sector, that is, they work in a family business and the choice for the informality was influenced by the family.

Some justified entering informality by a perception of greater autonomy and flexibility and the absence of formal organizational rules. The workers also showed that advantages of going informal are linked to the possibility of having a richer social life and follow more closely their children development, in addition to have a higher income compared to the salaries paid in the formal sector. Thus, it seems that informality signifies, for the workers, a greater feeling of freedom as they can decide their working routines besides having a greater purchasing power. These results, in general, corroborate previous research (IBGE, 2003; Rosenbluth, 1994).

Although respondents report many benefits of being an informal worker, disadvantages were also pointed out. These contents were grouped in the second category – disadvantages of informality - which brings together a discourse that refers to the need for more dedication, including the total time worked, to meet the work demands of the fair. In the case of business owners, they point out more physical and emotional wear and tear as a result of increased responsibility.

The third category, difficulties for entering the formal labor market, is linked to the educational workers characteristics. Respondents especially talk about the increase in the requirements to get a formal job due to age and poor educational level and training. The perception of these workers is in line with data from the IBGE (2003) that indicate that people who are in the informal sector are mostly older and have a lower education level.

4. Final considerations
The discourses suggest that workers were led to work at José Avelino fair mainly due to the lack of opportunities in the formal labor market and the influence of family traditions. Upon entering informality, they recognize both positive and negative aspects as facets of this experience.

It is not possible to conclude that entering informality is a rational choice, since workers in the informal sector are primarily those with less education and less experience and, therefore, less able to find a job with a decent wage in the formal labor market. On the other hand, the discourse about the conditions and characteristics of the work at the fair seem to suggest that these employees value this experience as their only chance of survival.

5. References


My wife is my risk manager: the role of the wife of the entrepreneur in occupational health and safety management

Authors
Christophe Martin, PhD, Mines-ParisTech, Centre for research on Risks and Crises /ESAIP-Cerade, Researcher at the Centre for research on Risks and Crises and Programme Director at Isp-Fenelon-Esaip-Grasse, christophe.martin@mines-paristech.fr
Franck Guarnieri, PhD, Director of the Centre for Research on Risks and Crises, Mines-ParisTech, Centre for research on Risks and Crises, franck.guarnieri@mines-paristech.fr

Abstract
This article reports on a qualitative monographic study that looked at the role of the spouse of a small business owner in occupational health and safety risk management. In this specific context, characterised by weakly polarised social relations, the owner often finds it difficult to create a profile for themselves in order to deploy a risk prevention plan. This study was carried out in a French company with fewer than 50 employees and aimed to follow the progress of a process that began with the company owner becoming aware of his statutory obligations and ended with the operationalization of risk prevention in the field. Although programmes designed to raise the awareness of business owners of their regulatory obligations have been well documented, little is known about their sustainability. The study was carried out in the construction sector, which is known to be particularly accident-prone and highlights the means deployed by the spouse of the owner to carry out her mission, and the organisational and symbolic difficulties that she came up against. Through an intervention approach, where the researcher implements management tools and co-produces knowledge with the company’s actors during the intervention, this study throws new light on the change resistance mechanisms at work and the spouse’s limited ability to take action in dealing with these issues.

Keywords
Small business, social relations, business owners’ spouses, risk assessment, prevention plan.

1. Introduction
Raising the awareness of the owners of small and medium-sized businesses (SMEs) of their occupational health and safety regulatory obligations is a major challenge for prevention specialists. One indication of the situation in France is the fact that 98% of work-related accidents and 40% of occupational illness occur in companies with fewer than 200 employees (DARES, 2004). Occupational risk assessments became a legal requirement in France in 2001 and the main effect has been to stimulate prevention professionals to take action. Risk assessment is an taxing issue and many studies have reported the difficulty of
educating and helping business owners with the task (Frick & Walters, 1998; Lamm, 1997; Walters, 2001).

Over the course of the past decade, various initiatives have emerged that aimed to help small businesses to catch up. There have been many notable efforts at both regional and national level and programmes have been offered by Chambers of Commerce. However, raising the awareness of the owner of a small business of their regulatory obligations is a necessary but not sufficient step as prevention actions aimed at small businesses have proven to be short-lived. The lack of sustainability is due not only to a lack of programme funding but also the difficulty of moving from regulatory compliance to the deployment of a prevention plan.

Two main issues have been identified. The first relates to social relations, which are different in small businesses compared to large companies. In small businesses social relations are family-based and the company owner consequently finds it difficult to establish the kind of hierarchical relationships characterised by employment contracts. The business owner is seen more as a team member than a manager (Eakin, 1992). In these circumstances, respecting the rules becomes difficult unless someone is appointed specifically to enforce them. The second reason relates to the culture of small businesses that, generally speaking does not give much weight to planning or rational actions on the part of the owner. The operationalization of a risk prevention plan can quickly turn into a series of daily compromises that occur in an organisational context where actors have considerable scope for independent action.

However, during the phase in its life-cycle that is focussed on streamlining operations, the owner may be more inclined to consider integrating risk prevention measures into the overall management of the company. They can either fulfill the role themselves or delegate it to an employee. As a general rule this person holds the position of Human Resources Manager or the Head of Finance and Administration. In family-based SMEs the role is often held by the spouse (or partner) of the owner. This paper therefore presents the results of a monographic study that investigated the role played by the spouse of a small business owner in the implementation of risk prevention tools, during a phase of the company’s life-cycle that was marked by profound changes.

The first part of this article presents the methodology; the second presents and discusses the main results. The conclusion outlines some short and medium-term avenues for further research in order to consolidate the work carried out.

2. Context
This research was a follow-on study from a programme initiated to educate small business owners about the prevention of occupational risk. The programme involved SMEs with fewer than 50 employees in the south of France in 2006–2007 (Martin & Guarnieri, 2008). The objective was to understand the process of operationalizing risk management in the company by the owners who took part in the programme. The working hypothesis was that
occupational risk management would be made the responsibility of the owner’s spouse insofar as they represented a mediator between the owner and their employees. This section describes, in turn, the company, its industrial context and methodology used.

The company in question had signed up to a regional programme established with the aim of educating businesses about occupational risk prevention. At the end of the programme, which enabled companies to assess their level of compliance with French labour regulations, some companies wanted to go further and draw up their own occupational risk assessment. The owner of the company in question wanted not only to draw up a risk assessment for his company, but also to deploy in the field the actions recommended in the prevention plan. The task of drawing up the risk assessment and ensuring its implementation in the field was given to his wife. The company offered researchers (who were responsible for the evaluation of the educational programme) access to the field and the opportunity to follow developments in the deployment of the prevention plan in exchange for the provision of methodological resources.

The company belonged to the building and public works sector and its business was timber construction. It produced timber-framed houses and large structures for public facilities managed by local authorities. It therefore undertook both public sector contracts and participated in the private housing market.

At the beginning of the study, the business had been operating for seven years. While it faced competition in the private housing sector, it had unmatched expertise in large-scale timber construction. This had created strong growth right from the beginning and the company had established a good reputation for itself. In 2008, it employed 26 members of staff and consisted of two divisions that managed the private housing market and public procurement activities respectively.

3. Methods
The study used a research intervention methodology (Moisdon, 1984). Research intervention is a qualitative method used in management science. It is based on an intervention tool and a knowledge production approach that enables an organisation to change, and measure the results of the changes. It therefore includes both actions in the field and learning. In this regard, it could be said that through the intervention there is a co-production of knowledge between researchers and actors in the organisation.

Data collection took several forms: semi and non-directed interviews, field observation and access to the company's administrative documentation. The data was analysed using the conceptual categories method developed by Paillé and Mucchielli (2001).

The intervention consisted of four phases. In the first phase a software tool was used to evaluate the company’s regulatory compliance. In the second, methodological and software resources for risk assessment were provided and observations were made of the work carried out by the spouse of the company owner in modelling the activity and its impact on the company. The aim of the third phase was to observe the streamlining of activities in the
company and the attempt to establish a formal hierarchy in the form of an organogram. Finally, the fourth goal was to observe the deployment of a plan for employee training in occupational first aid and Skills Certificates in Driving Safety.

The following sections outline the principal results of the study.

4. Results and discussion

The principal results of the study highlighted the difficulties faced by the partner of the company owner in trying to reach her intended goals in terms of prevention actions. This section begins by describing the organisational context that was at the origin of the difficulties encountered, then goes on to look at the tensions that she had to manage between her role as risk prevention officer and spouse.

Eakin (1992) provided a very clear description of the attitude of SME managers to occupational risk prevention. Most consider risk prevention to be the employee’s problem; in other words they “leave it up to the workers”. This attitude is linked to the fact that in many sectors company owners depend on skilled labour and it is difficult to retain good staff. In addition, in an organisation in which social relations are weakly polarised, it is often impossible for the owner to impose their authority on workers in order to enforce risk prevention measures. These particularities of the organisational context help to explain the obstacles faced by the company owner’s partner in executing her mission.

It should be noted that, right from the first phase of the study, the owner’s partner lacked legitimacy in carrying out the programme as she did not have a detailed technical understanding of the work. However, the marginalisation of her actions was most visible in the second and third phases of the intervention. By formalising the practices of employees in the risk assessment and creating an organogram to highlight the company’s hierarchical levels, she totally upset the organisational ecosystem. This desire to streamline tasks marked, at the same time a managerial desire to move the company towards a more formal hierarchy. The company’s ‘old timers’ recognised the signs of the crystallisation of hierarchical relationships, of which the owner’s partner became the symbol.

Although she had received formal training in risk assessment, her lack of first-hand knowledge of work on construction sites put her at a disadvantage when taking action. Moreover, the formalisation of the organisation created a problem. The company was in a phase of its life-cycle that required it to make productivity gains and structure its activity. At the same time there was a growing need for prevention services, in order to streamline risk prevention in the form of a prevention plan. However, up until this point, the company owner had relied on team spirit to ensure his company’s growth. Paradoxically, the organisation of meetings to discuss risk prevention was perceived by the ‘team’ as a sign of increasing hierarchical distance. This formalisation of the organisation led to strong resistance from longstanding employees who saw the process as an attempt to limit their freedom of action (Crozier & Friedberg, 1977). Consequently, occupational risk prevention became an internal power struggle and the owner’s partner found herself in a difficult position – both between
her husband and the company’s employees – and her role as company prevention officer and family member. Research has shown that a consequence of family-managed SMEs is that tensions in the family are reflected in the company and vice-versa. Bauer (1995) showed that the decisions of SME owners are guided by three considerations: politics, economics and family. In the case in question, the delegation of occupational health and safety responsibilities had a dual impact: it affected the equilibrium of both family relationships and the relationship between the company owner and his employees.

In her desire to take responsibility for health and safety at work the owner’s partner felt that she was playing the role of ‘fuse’ and had been overwhelmed by the complexities of the situation. This role of fuse can be explained by the wishes of the company owner who wanted to develop risk prevention without putting himself at odds with his employees.

5. Conclusion
Although these results cannot be applied universally as each organisation is unique and has its own problems, they can help to provide a better understanding of which actors in a company are able to carry out a prevention plan. The choice must take into account the technical skills and the legitimacy of actors in the opinion of other staff members in the company. Crude restructuring and streamlining efforts that ignore the informal organisation are counter-productive. This case study confirms the findings of Julien and Marchesnay (1988) on the interactive organisation found in small businesses; this enables the organisation to be more flexible, but also carries costs that include (not least) conflicts between individuals and family members. At the end of the study, it was not possible to resolve the owner's problem, which was to create a profile for himself in the eyes of his employees with respect to occupational health and safety. The attempt to bypass the problem, which consisted of delegating occupational risk prevention management to his spouse, failed. If the spouse of a company owner can be considered an appropriate candidate for risk prevention services in handling administrative aspects of occupational health and safety, it seems that the delegation of managerial responsibilities is ineffective in such an organisational context. The spouse of a company owner may constitute a special assistant in the sense described by Couteret (1996), i.e. an expert who takes the role of internal consultant, but who must not be placed in a managerial position. Risk prevention must remain the sovereign responsibility of the owner.

These results merit further investigation on a wider scale. They are currently confined to one French company, but an international comparison of similarly-sized companies would enrich the dataset.

6. References


Case-series analysis of occupational disease/injury among migrant workers in Japan

Authors
Ippei Mori, Graduate School of Medicine, Mie University and Institute for Science of Labour, Japan, i-mori@doc.medic.mie-u.ac.jp
Toru Yoshikawa, Institute for Science of Labour, Japan
Kazuhiro Sakai, Institute for Science of Labour, Japan

Abstract
Mainly due to the aging of the population, demands for migrant workers have increased rapidly over the last 20 years in Japan. Accordingly, there is a growing concern about health and safety among migrant workers since they are generally employed at small enterprises which are often underserved in terms of OSH (Lee et al., 2001). To give scientific bases for developing the OSH training program for migrant workers, we conducted a case-series study on occupational diseases/injuries among migrant workers and revealed major characteristics of those diseases/injuries.

We accessed labour consultation records kept by a trade union, picked up those records in the order they were filed in the cabinets and collected 93 cases of occupational diseases and injuries except for commuting accident cases. The records have detailed information for conditions of employment, occurrence of disease/injury and its compensation. We described characteristics of the cases and analyzed causes of the diseases/injuries.

Most cases were experienced during 1998 – 2009. Forty-two cases out of ninety-three were Peruvian. The number of undocumented workers was twenty. Forty-seven cases were employed in manufacturing industries and another twenty-eight cases were employed in construction industries. Seventy-one cases were compensated as occupational disease/injury and fifty-two of them received additional compensation for disability. Compensation was mostly given for injury cases. As for disease cases, only a few were compensated. Among 93 cases, fracture was the most prominent cause (30 cases) and 37 cases were injuries of fingers. The most common type of accident resulting in disease/injury was being caught in or compressed by equipment (28 cases), followed by overexertion or strenuous movements including repetitive motion (15 cases) and struck by flying or falling object (14 cases). Detailed descriptions of the disease/injury occurrences for each case suggested that simple, basic and standard countermeasures could prevent many of these cases.

The number of examined cases was small, but the results showed a similar profile with the statistics of injuries among the “Technical Intern Trainee” by the Japan International Training Cooperation Organization (JITCO) or the Occupational Accident Statistics by the
government. We found that in many cases, migrant workers were injured due to simple causes commonly seen in small enterprises.

It is often said that migrant workers are vulnerable to occupational health/safety risks (ILO, 1977). However, it is not necessarily true. Small enterprises, which employ most migrant workers, are vulnerable because they often suffer from difficulties trying to improve their working conditions and environment by themselves. What we need is to develop a simple, feasible and sustainable training program/tools for work improvement in small enterprises.

Keywords
Migrant worker, occupational disease/injury, case-series analysis

References

Employers' attitudes towards mental health in Japanese micro-scale enterprises: a study protocol

Authors
Jiro Moriguchi, Kyoto Industrial Health Association, Kyoto, Japan, moriguchi@hokenkai.jp
Hayato Terada, National Statistics Center of Japan, Tokyo, Japan
Fumiko Ohashi, Kyoto Industrial Health Association, Kyoto, Japan
Yoko Katagiri, Eijinkai Kyoto-ekimae Mental Clinic, Kyoto, Japan
Satomi Kakimori, Fukuoka Regional Occupational Health Center, Fukuoka, Japan
Junko Nakatani, University of Occupational and Environmental Health, Kitakyushu, Japan
Sonoko Sakuragi, Kyoto Industrial Health Association, Kyoto, Japan
Satomi Kakimori, Fukuoka Regional Occupational Health Center, Fukuoka, Japan
Ikuko Mizushima, Osaka University, Osaka, Japan
Masayuki Ikeda, Kyoto Industrial Health Association, Kyoto, Japan

Abstract
In Japan, the Industrial Safety and Health (ISH) Law stipulates that enterprises with less than 50 employees are exempted from establishment of a health and safety committee and appointment of an occupational physician. Thus occupational health (OH) activities including mental health measures in small-scale enterprises (SSE) are poor in general. There are few studies on mental health activities in SSEs, especially in micro-scale enterprises (MSE) with less than 30 employees, in Japan. In a review on preventive OH and safety in SSEs, it has been summarized that an employer in SSE is the dominant player in relation to any changes made in SSEs. The aim of this study is to clarify attitude of employers and situation of mental health activities in MSEs and to establish measures for improvement of the situation in Japan.

In this study, “mental health” includes early detection and support of employees with mental ill-health, care of employees on sick-leave, education for employees, managers and employers, improvement of work condition, and co-operation with e.g. external specialists. In the first year of this study, a questionnaire survey on mental health will be made by contacting with 500 employers in MSEs in four major prefectures in Japan (Tokyo, Kyoto, Osaka, and Fukuoka). Questionnaire includes knowledge on mental diseases and ISH law, attitude of employers on mental health like employer-employee communication and preparation of annual plan for mental health, morbidity rate of mental ill-health cases, current practical measures to deal with such cases, current cooperation with external OH specialists, future plan for mental health activities and expectation for external OH specialists, etc. Through careful investigation of the results, more than 30 employers with high motivation or enough knowledge will be chosen for structured interview to gain in-depth details of mental health activities. The situation of mental health activities will be clarified though statistical analysis, and examples of good practice will be identified through the interviews. Effective
measures expected by employers will be determined from the analysis of questionnaire survey and interview as well. Then tools like brochures and files for lectures to improve the situation of mental health in MSEs will be prepared. In the second year, tools, lectures, individual counseling for employers and employees, etc. will be offered to MSEs. At the end of the second year, the effectiveness of tools will be assessed and revision will be made as necessary.

Most of subject MSEs in this study may be inactive in mental health measures. Therefore, practical goal of this study would be development of tools based on the results of questionnaire survey to have a clue to activate the measures. Validity of the tools will be assessed through the practice after the two-year study period. Randomized control trial will be considered.

This study is supported by Japan Foundation for Promoting Welfare of Independent Entrepreneurs.

Keywords
Attitude, Employer, Measure, Mental health, Micro-scale enterprise, Small-scale enterprise
Occupational health hazards among women workers in small scale industries in Uttarakhand State of India

Authors
Kavita Narwal, Post graduate scholar, kavi.narwal@gmail.com
Promila Sharma, Professor, College of Human Sciences, promila34@gmail.com
Uma Melkania, PhD, Professor and Dean College of Basic Sciences

Keywords
Health, hazards, ergonomically sound, women, workers, MSDs

Abstract
In a country like India, because of large population size and low general economic status, the use of manpower may likely to persist on a larger scale in small scale industries sector. Employment in small scale industries sectors comprises one half to three-quarters of non-agriculture employment in developing countries. Small scale industries employment is comprised of both self-employments in small scale industries enterprises (i.e. small and/or unregistered) and wage employment in small scale industries jobs i.e without secure contracts, worker benefits, or social protection (International Labour Organization, 2002).

In India, there is large magnitude of workforce getting their livelihood from the small scale industries sector. About 370 million workers constituting 92% of the total workforce in a country were employed in the unorganized sector as per NSS Survey 1999-2000. It plays a vital role in terms of providing employment opportunity to large segment of the working force in the country and contributes to the national product significantly. The contribution of the unorganised sector to the net domestic product and its share in the total NDP at current prices has been over 60%. In the matter of savings the share of household sector in the total gross domestic saving mainly unorganised sector is about three fourth.

These units typically operate at low level of organization, with little or no division between labour and capital as factors of production and on a small scale. The small scale industries sector is regarded as a group of production units, which form part of the household sector as household enterprises or equivalently, unincorporated enterprises owned by households. Small scale industries sector is a multi-situation syndrome, as is characterised by non-uniformity in the nature, characteristics and conditions of jobs. These sectors consist of regular workers and casual labour, self employed and those working for others, illiterate to semi-educated in all age group.

In Uttarakhand state of India small scale industries are growing like mushroom all over and a large proportion of women work force are engaged in these Industries. The work is unhumanizes and the women are at the risk. Hence a descriptive cum experimental
research will be initiated to release women workers from pain. Data shows that large numbers of women workers are working in above sectors under poor environmental condition with poor technologies and poor management practices hence facing lot of problems of MSDs, postural stress and poor vision. These women workers suffer with problem like allergies, respiratory problems, joints problem, headache etc. To conclude it may be stated that to humanize the work of these women and to protect their life safety and preventive measure need to be introduce in above large number of industries. The implication of such action oriented researches initiated are carried out with actions such as development of motion pictures, movies, software programmes and other educational programmes on ergonomically, functional and aesthetically sound techniques and technologies which need to be implemented in these mushroom type coming up industries. So that health hazards, injuries and ill effects of poor parameter on women workers may be minimized.

1. Introduction
In most of the developing countries like India, Small Scale Industries (SSI) constitutes an important and crucial segment of the industrial sector. They play an important role in employment creation, resource utilisation and income generation and helping to promote changes in a gradual and phased manner. They have been given an important place in the framework of Indian planning since beginning both for economic and ideological reasons. The reasons are obvious. Small scale enterprises are generally more labour intensive than larger organisations. As a matter of fact, small scale sector has now emerged as a dynamic and vibrant sector for the Indian economy in recent years. It has attracted so much attention not only from industrial planners and economists but also from sociologists, administrators and politicians. Today, India operates the largest and oldest programmes for the development of small-scale enterprises in any developing country. As a matter of fact, small scale sector has now emerged as a dynamic and vibrant sector for the Indian economy in the recent years.

The Small Scale Industries in India contribute about 40 per cent of industrial production, 35 per cent of national exports and 6.75 per cent of GDP. The SSIs currently provide employment to over 19.2 million persons, dispersed over the entire country and has been contributing significantly to the socio-economic development. The average rate of growth of production in SSI sector was estimated at 7.7% and the average growth in employment was about 3.7% per annum during the Ninth Plan.

By its less capital intensive and high labour absorption nature, SSI sector has made significant contributions to employment generation and also to rural industrialisation. This sector is ideally suited to build on the strengths of our traditional skills and knowledge, by infusion of technologies, capital and innovative marketing practices. So this is the opportune time to set up projects in the small scale sector. It may be said that the outlook is positive, indeed promising, given some safeguards. This expectation is based on an essential feature of the Indian industry and the demand structures. The diversity in production systems and demand structures will ensure long term co-existence of many layers of demand for
consumer products / technologies / processes. There will be flourishing and well grounded markets for the same product/process, differentiated by quality, value added and sophistication. This characteristic of the Indian economy will allow complementary existence for various diverse types of units. The promotional and protective policies of the Govt. have ensured the presence of this sector in an astonishing range of products, particularly in consumer goods. However, the bug bear of the sector has been the inadequacies in capital, technology and marketing. The process of liberalisation will therefore, attract the infusion of just these things in the sector.

India is one of the largest producers of food, and is the largest producer of milk, sugarcane and tea, as well as second largest producer of rice, wheat, fruits and vegetables. Nearly 70 percent of the population depends on agriculture and agro-based industries. AGRO Industries are considered an extended arm of agriculture but in India they have not received as much attention as agriculture. While agriculture contributes about 25 per cent of India's GDP the value added by the processing industry is only 8 per cent of total food production. For example, only two per cent of horticulture products are estimated to be processed and more than 30 per cent of production is wasted due to lack of storage and processing facilities.

The agro Industry is broadly categorised in two-three types:

1. Village Industries owned and run by rural households with very little capital investment and a high level of manual labour; products include pickles, papad, etc.
2. Small scale industry characterized by medium investment and semi-automation; products include edible oil, rice mills, etc.

Large scale industry involving large investment and a high level of automation; products include sugar, jute, cotton mills, etc.

1.1 Working condition of Small Scale sectors
The majority of urban Small Scale Sector workers live in poor areas, lack basic health and welfare services and social protection and work in an unhealthy and unsafe working environment. For many workers in Small Scale sector operators their home and workplace are one and the same place. Vulnerability to diseases and poor health result from a combination of undesirable living and working conditions. The conditions under which most Small Scale industries workers operate are precarious and unsafe. Many of the micro-enterprises in which they operate lack sanitary facilities or potable water and have poor waste disposals. In the Small Scale sector, the distinction between working and living conditions often becomes blurred and both are related to broader problems of poverty and underdevelopment. The interaction between occupational hazards and poor living conditions can exacerbate the health problems of Small Scale sector workers. Some of the most prevalent problems were: poor lighting, lack of ventilation, excessive heat, poor housekeeping, inadequate work space and working tools, lack of protective equipment, exposure to hazardous chemicals and dusts and long hours of work (International Labour Organization). The most prevalent health impairments were musculo-skeletal disorders and
low back pain; allergic reactions and other respiratory disorders; physical strain, fatigue and stress. Injuries with tools were also frequent. Due to high production demands and poor work organization, the tools and facilities used for lifting and transporting materials are often inadequate. This, linked to repetitive working movements, carrying of heavy loads and awkward postures, provokes a physical workload which may reach unacceptable levels causing unnecessary strain on the workers and fatigue, contributing towards injuries. Hazardous working conditions not only harm Small Scale sector workers’ health but also decrease the enterprise’s productivity and therefore income due to poor health and the inability to work effectively. Awareness both of the adverse long-term effects of poor and hazardous working conditions as well as of how to improve workers’ protection and business practices in order to increase productivity are very low among the micro-entrepreneurs.

Thus Small Scale sector has a crucial role in our economy in terms of employment and its contribution to the National Domestic Product, savings and capital formation. Inspite of having such great importance of Small Scale sector in Indian economy the working condition of these sectors is still very poor. Working in extreme condition has led to a number of health risks both due to the heavy work burden and nature of their work. Sufferings from muscular aches and pains, injuries, exhaustion, weakness, fever and swelling of feet were quite common and went untreated. Many laws have been provided to ensure a safe and healthy working environment for the female workers – the Trade Union Act (1926), the Minimum Wages Act (1948), the Maternity Benefits Act (1961), etc. Despite these laws, health and health services remains disheartening.

So, keeping in view the poor condition of the workers involve in Small Scale sectors the present study is taken to design the work requirement or workplace condition in a way that will optimize productivity and at the same time preserve the health and safety of the workforce by the application ergonomics.

1.2 Agro based Industry Scenario in India

Agro based industry is regarded as the sunrise sector of the Indian economy in view of its large potential for growth and likely socio economic impact specifically on employment and income generation. The agro industry is regarded as an extended arm of agriculture. The development of the agro industry can help stabilise and make agriculture more lucrative and create employment opportunities both at the production and marketing stages. The broad-based development of the agro-products industry will improve both the social and physical infrastructure of India. Since it would cause diversification and commercialization of agriculture, it will thus enhance the incomes of farmers and create food surpluses.

The agro-industry mainly comprises of the post-harvest activities of processing and preserving agricultural products for intermediate or final consumption. It is a well-recognized fact across the world, particularly in the context of industrial development, that the importance of agro-industries is relative to agriculture increases as economies develop. It should be emphasized that ‘food’ is not just produce. Food also encompasses a wide variety of processed products. It is in this sense that the agro-industry is an important and vital part
of the manufacturing sector in developing countries and the means for building industrial capacities. In Uttarakhand state there are large numbers of agro-based industries which are contributing to Indian economy. Hence efforts were made to initiate the work in selected agro-based industries of Uttarakhand.

1.3 Objectives
The broad objective of the proposed study is to assess the occupational health hazards among workers in agro-based sector of Uttarakhand. A very few studies has been conducted, which has covered these issues (as discussed above), and especially in Indian context, in recent period. Therefore keeping in mind these facts the research study was planned with the following objective

1. To study the demographic profile of workers involved in agro-based small scale enterprise.
2. To study the type of activities performed by workers.
3. To study the environmental parameters at the workplace.
4. To study the health statistics of workers involved in above industrial unit.
5. To study the physiological cost of the workers.
6. Introduction of innovation technologies/technique for the well being of the workers and humanizing the workforce.

1.4 Hypothesis
H1: There exist no relationships between physiological cost and work efficiency.
H2: There exist no relationships between environmental parameters and health hazards.

1.5 Limitation
The study was undertaken only in agro based industries with limited sample.

2. Methodology
A descriptive cum experimental research design was used for the present study.

2.1 Conceptual framework of the study
Conceptual framework of the study represents the relationship of variables with respect to objectives of the study. It is proposed that demographic profile, family variables, situational variables of workers may affect the performance in various activities. This occupational exposure was recognised through hazards/ illness of workers while in various operation. After recognition of health hazards, it was control through introduction of innovation which further increases the work efficiency and may reduce the chances of risk, diseases and occupational health hazards and provide safe culture for workers.

Figure: 1 Conceptual frame work of the study
2.2 Variables
A concept which can take on different values in intervals is called variables. Schematic representation of interaction of variables is given in Fig 2. The variable related for the present study are given below.

Figure: 2 schematic represent of interaction of variables

2.3 Construction of the tool

2.3.1 Selection of tool
Pre-coded interview schedule was used as an instrument.

2.3.2 Construction of tool
The pre-coded interview schedule was constructed in order to elicit the information about the background characteristics of the sample and detailed information needed to obtain the objectives of the study.

2.4 Selection of sample
1. Locale of Sample
The study was carried out at different district of Uttarakhand state. The locale of the study was selected considering the availability of target respondents in required number and practical convenience of the student.

2. Sample Size
The unit of enquiry was agro based Small Scale sector and the key informant was workers involved in those sectors. Total sample size comprised of 40 workers.

3. Sample Design
Random sampling technique in combination with purposive sampling technique was used to select the sample respondents.
3. Result and discussions

Table 1.

<table>
<thead>
<tr>
<th>Uttarakhand Hills</th>
<th>Plains</th>
<th>Total</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Population (in lakhs)</strong></td>
<td>37.61</td>
<td>47.28</td>
<td>84.89</td>
</tr>
<tr>
<td>Male</td>
<td>18.21</td>
<td>25.05</td>
<td>43.26</td>
</tr>
<tr>
<td>Female</td>
<td>19.41</td>
<td>22.22</td>
<td>41.63</td>
</tr>
<tr>
<td>Population Growth</td>
<td>1.93</td>
<td>2.13</td>
<td></td>
</tr>
<tr>
<td>Population Density</td>
<td>159</td>
<td>325</td>
<td></td>
</tr>
<tr>
<td>Sex Ratio</td>
<td>962</td>
<td>933</td>
<td></td>
</tr>
<tr>
<td>Crude Birth Rate</td>
<td>20.9</td>
<td>23.8</td>
<td></td>
</tr>
<tr>
<td>Crude Death Rate</td>
<td>7.4</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>Infant Mortality Rate</td>
<td>42</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td><strong>Literacy Rate Total</strong></td>
<td>71.6</td>
<td>64.8</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>83.3</td>
<td>75.3</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>59.6</td>
<td>53.7</td>
<td></td>
</tr>
</tbody>
</table>
Source: 2007 Census

This section covers the demographic profile, type of enterprise, involvement of labour force, environmental/ infrastructure facilities, and health statistics of workers involved in small scale industries and the remedial measure taken.

3.1 Demographic indicators

Table 2. Types of Small Scale Industries in Uttarakhand

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Items</th>
<th>Year/period</th>
<th>Unit</th>
<th>statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Khadi udyog/ gramodyog units</td>
<td>2006-2007</td>
<td>No.</td>
<td>809</td>
</tr>
<tr>
<td>2.</td>
<td>Small scale industries (SSIs)</td>
<td>2006-2007</td>
<td>No.</td>
<td>32116</td>
</tr>
<tr>
<td>3.</td>
<td>Total employees of khadi units</td>
<td>2006-2007</td>
<td>No.</td>
<td>4987</td>
</tr>
<tr>
<td>4.</td>
<td>Total employees of SSIs</td>
<td>2006-2007</td>
<td>No.</td>
<td>87279</td>
</tr>
</tbody>
</table>

Factories (Regd. under Act, 1948)

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Items</th>
<th>Year/period</th>
<th>Unit</th>
<th>statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>No. Of Factories</td>
<td>2004-2005</td>
<td>No.</td>
<td>752</td>
</tr>
<tr>
<td>2.</td>
<td>No. Of Workers</td>
<td>2004-2005</td>
<td>No.</td>
<td>35349</td>
</tr>
<tr>
<td>3.</td>
<td>Total Person engaged</td>
<td>2004-2005</td>
<td>No.</td>
<td>51762</td>
</tr>
<tr>
<td>5.</td>
<td>Net Value Added</td>
<td>2004-2005</td>
<td>Rs. Lakh</td>
<td>194801</td>
</tr>
<tr>
<td>7.</td>
<td>Gross fixed capital formation</td>
<td>2004-2005</td>
<td>Rs. Lakh</td>
<td>77726</td>
</tr>
<tr>
<td>8.</td>
<td>Profits</td>
<td>2004-2005</td>
<td>Rs. Lakh</td>
<td>105677</td>
</tr>
</tbody>
</table>

Reference: http://ua.nic.in

3.1.1 Age

Age determine the maturity of an individual and has a bearing on the thinking, experience and exposure of a person that are achieved, at different stages of life. The age of the respondents were categorized into 20-25 year, 26-35 years, 36-45 years, 46-55 years, 55-65 years (Table 1). The data revealed that majority of respondents were of the age group ranging 36-45 years. It was followed by the respondents of age group ranging 26-35 years.

3.1.2 Sex

The data collected revealed that the percentage of the female was 80 %, whereas, that for the males was 20 % which showed that the percentage of females was more than double than that of the male (Table 1).

3.1.3 Education
Educational qualification is supposed to have strong influence on life style, knowledge and decision making of the respondent. Education of the respondents was categorized under following group:

1. Literate
2. Illiterate

The data gathered revealed that maximum number of the respondent were illiterate. Only few of them were literate.

Table 3: General Information of the workers involved in agro-based industries

<table>
<thead>
<tr>
<th>Information</th>
<th>Frequency (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of respondent</td>
<td></td>
</tr>
<tr>
<td>20-25</td>
<td>4(10%)</td>
</tr>
<tr>
<td>26-35 year</td>
<td>13(32.5%)</td>
</tr>
<tr>
<td>36-45 year</td>
<td>15(37.5%)</td>
</tr>
<tr>
<td>46-55 year</td>
<td>6(15%)</td>
</tr>
<tr>
<td>55-65</td>
<td>2(5%)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8(20%)</td>
</tr>
<tr>
<td>Female</td>
<td>32(80%)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Literate</td>
<td>7(17.5%)</td>
</tr>
<tr>
<td>Illiterate</td>
<td>33(82.5%)</td>
</tr>
<tr>
<td>Monthly household income</td>
<td></td>
</tr>
<tr>
<td>Below 500</td>
<td>7(17.5%)</td>
</tr>
<tr>
<td>500-1000</td>
<td>19(47.5%)</td>
</tr>
<tr>
<td>1000-1500</td>
<td>11(27.5%)</td>
</tr>
<tr>
<td>Above 15,00</td>
<td>3(7.5%)</td>
</tr>
</tbody>
</table>

3.1.4 Monthly household income

The total monthly income was categorized in four categories (Table 1). The data revealed that more than half of the workers belong to 500-1000 monthly income group followed by 1000-1500 monthly income group.
Figure 4. Type of industries: - Agro-based Industries; type of product handling: - jams, jelly, juices and pickle

Table 4. Information regarding type and time spent in different activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Place</th>
<th>Average Time (minutes)</th>
<th>Technologies used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning</td>
<td>Sink and floor</td>
<td>200</td>
<td>Bucket, tub and crate</td>
</tr>
<tr>
<td>Crushing</td>
<td>Slab and floor</td>
<td>220</td>
<td>Crusher, peeler and knife</td>
</tr>
<tr>
<td>Chopping</td>
<td>Slab, floor and wooden stool</td>
<td>330</td>
<td>Knife, sickle and chopper board</td>
</tr>
<tr>
<td>Pasteurizing</td>
<td>Slab</td>
<td>180</td>
<td>L.P.G, electric boiler, stove and heater</td>
</tr>
<tr>
<td>Cooking</td>
<td>Floor and cooking range</td>
<td>280</td>
<td>L.P.G, electric boiler, stove, furnace and heater</td>
</tr>
<tr>
<td>Bottling</td>
<td>Floor and counter</td>
<td>90</td>
<td>Electric crown cork machine</td>
</tr>
<tr>
<td>Packaging</td>
<td>Floor and counter</td>
<td>40</td>
<td>Pouch packing machine</td>
</tr>
</tbody>
</table>

3.2 Environmental parameters

Since the study was done in three different regions of Uttarakhand, and four environmental parameters were taken into consideration i.e temperature, relative humidity, light and sound level, in the month of March and April. In the month of March optimum temperature inside and outside the lab should be 15.42°C and 19.67°C respectively. In small scale unit, temperature inside and outside was recorded 20.9°C, it was 5.48°C more than optimum temperature inside the lab, whereas temperature outside the unit was recorded 25.5°C, it was 5.83°C more than optimum temperature. While in some unit it varies 10.95°C more than inside optimum temperature and 12.35°C more than outside lab temperature.
Relative humidity also varied in different units. In month of March, the relative humidity inside and outside the lab should be 59.75% and 64.2% respectively. In some unit humidity inside the lab was recorded 48.00% it was 11.75% less than optimum level, whereas relative humidity outside the lab was recorded 41.50% it was 22.7 percent less than optimum level. In other units, relative humidity inside and outside the lab varies as 20.90 percent less than inside optimum temperature and 28.6 percent less than outside optimum temperature.

Optimum level of light is required in a lab so that respondents can work efficiently without any strain in the eyes. The optimum level of light should be 375 lux. It varied in the range of 250-500 lux. In some unit intensity of light was recorded 80 lux it was 295 lux less than optimum level. In other units, intensity of light varies as 275 lux less than optimum level.

For normal conversation optimum sound level should be 45 db. It varied for 30 to 60 db, but it should not exceed beyond 90 db (permissible limit). Sound level in most the unit is 20 db more than the optimum range.

Table 5. Body part effected due to poor environmental conditions

<table>
<thead>
<tr>
<th>Occupational health hazard</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Headache</td>
<td>33</td>
<td>7</td>
</tr>
<tr>
<td>2.Backache</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>3.Irritation in eyes</td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>4.Respiratory problem</td>
<td>6</td>
<td>34</td>
</tr>
<tr>
<td>5.Allergies</td>
<td>13</td>
<td>27</td>
</tr>
<tr>
<td>6.Cuts</td>
<td>29</td>
<td>11</td>
</tr>
<tr>
<td>7.Burns</td>
<td>33</td>
<td>7</td>
</tr>
</tbody>
</table>

Figure 5.
According to the above mentioned data, when asked about any treatment they were taking regarding occupational health hazards due to poor working condition maximum number of the respondent reported that they were used to all these hazards and in their company they have no such facilities. If the condition become very poor than only they consult their personal doctors.

Data showed that nearly 70 percent of the respondents take 3-4 times monthly leave due to their poor physical condition. Some take 1-2 times monthly leave due their poor health.

3.3 Body part affected by occupational health hazards

The occupational health hazards were more among the older age group then the younger age group. Problem of headache, backache, irritation of eyes, knee pain, forearm pain, pain in calf muscle were more among older age group, whereas problem of burning sensation in fingers, numbness in the fingers was prominent among younger respondents. This study was similar to the finding of Lingam(1988)

Table 3. Awareness scale on occupational health hazards due to poor environmental condition

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Environmental condition</th>
<th>1-No</th>
<th>2-Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Too much temperature in work place causes physically tiredness.</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>b.</td>
<td>Lack of sanitation in workplace causes uneasiness.</td>
<td>23</td>
<td>17</td>
</tr>
</tbody>
</table>
c. Loud noise can damage to hearing abilities 19 21

d. Poor lighting causes irritation of eyes. 0 40

e. Dust can lead to respiratory problem. 4 36

f. Different type of pollutant can lead to uneasiness. 37 3

g. Contaminated drinking water causes allergic reaction. 2 38

Above data showed that maximum number of the respondents were aware about the fact that appropriate temperature, humidity, sound and light level is necessary for efficient work.

Workers were aware about the fact that if the drinking water and proper sanitation is not provided than it can lead to various allergic reactions.

They were aware about the various pollutants which can affect their health. But in spite of all this awareness they have no idea of how to protect them self from all these hazardous factors which can affect their health.

3.4 Physiological cost in term of postural stress, among different activities experienced by the respondents

Mean angle of spinal cord both for upper back and lower back during rest was found to be significantly (p≤0.05) different from all activities whereas after work mean angle of spinal cord for some activities was significantly (p≤0.05) different while for other it was not significantly (p≤0.05) different. On the basis of percentage deviation in angle of spinal cord at upper back it could be emphasized that cutting activities has maximum percentage deviation in angle of spinal cord (+19.56), whereas bottling and packing accompanied least percentage deviation in angle of spinal cord (+08.87 and +08.80 respectively). The reason may be that during cutting of fruits and vegetables, respondents were remain in the static posture for longer hours beside this they may be bending more during cutting, whereas during packing and bottling they were spending less time and may be bending less. Further on the basis of percentage deviation in the angle of spinal cord at lower back it could be highlighted that cooking activity has maximum percentage deviation in angle of spinal cord while bottling accompanied least angle of deviation in spinal cord. The reason may be same as described for upper back level.

3.5 Physiological cost in term of muscular stress, among different activities experienced by the respondents
Statistical comparison of muscular strength at right hand and left hand during rest was significantly (P≤0.05) different from all other activities of food processing, whereas after work muscular strength for some activities were significantly (P≤0.05) different while for other it might not be significantly (P≤0.05) different. Beside this percentage decrease in mean muscular strength for right hand and left hand was highest during cutting and lowest during packing. The reason may be that during cutting of fruits and vegetables, stress on muscles of hand was more than in packing.

3.6 Remedial measures
In order to reduce the postural stress and muscular stress experienced by the respondents following remedial measures were used:-

1. To reduce the occupational work load of women certain guidelines was given to respondents working in food processing units, so that they can improve their working posture and thus the occupational work load can be reduced.
2. Since these respondents are working in the work place which are not ergonomically designed therefore, need is to plan policies, programmers' and specific services which provide adequate information of ergonomically designed tools, equipments, work place etc.
3. Non government organizations should be developed which provide relevant information to these workers, so that they can improve their quality of work and protect themselves from postural stress, muscular stress and other occupational stress.
4. In area of research, there is need for more comprehensive research that would provide an adequate database on ergonomics and women food processors, which facilitates the quality of work of women workers and improve their health aspects.
5. The government should introduce women- friendly technologies, labour saving devices etc.

4. Government policy towards small scale and cottage industries
Small scale and cottage industrial sector has emerged as an engine of growth in several developing and developed economies of the world. In India also they have emerged as a vibrant and dynamic sector of Indian economy by virtue of their significant contribution to GDP, industrial production and export. However, the most vital contribution of this sector is headed for employment generation which is next to agriculture.

The recent experience shows that while employment in agricultural sector has been declining, large industries are also facing jobless growth. In such a situation, the major responsibility to create employment opportunities lies with the unorganized sector including small scale and cottage industries. In increasing industrial production, diversifying the base of industrial production as well as increasing employment opportunities, small scale industries have been playing a prominent role in India. No one can deny that cottage and small scale industries are the driving force behind economic development across the globe. This sector is widely accredited with generating the highest rates of revenue and employment in virtually all economies. The small scale and cottage industrial sector have
found their economic rationale in Mahalanobis model of economic development, which was the basis for India’s second and subsequent Five Year Plans. The major thrust of all economic policies being pursued in India today is to eliminate poverty, generate adequate employment opportunities and to ensure the utilization of physical and human resources to the best of their potential. Given the scope of generating tremendous employment opportunities, promoting entrepreneurial abilities and adding to the National Product, the SSI sector continue to be the most important economic proposition for a labour surplus economy like India. The rate of employment creation in this sector is the fastest and is able to provide employment across the length and breadth of the country.

While the promotion of small scale industries has been one of the major objectives of economic planning in India, the policies and strategies have undergone change from time to time. The six Industrial Policy Resolutions and eleven Five Year Plans supported a continuous flow of incentives, both protective and promotional in nature; as an element of development strategy to meet socioeconomic objectives like employment generation, removal of poverty and regional disparities, optimum utilization of local resources, etc.

A comprehensive package of programmes and policy measures has been formulated by the government to accelerate the growth and productivity of small scale sector. The support packages includes a variety of promotional and protective measures like industrial estates programme, ancillarisation programme, product reservation policy, programme of technology upgradation and modernization and financial support measures, etc. The policy of the Government of India towards the small scale sector has been guided by the consideration that SSIs are hampered in their growth by imperfections in factor markets especially in capital markets.

Therefore, special support policies are needed for this sector. Amongst developing countries, India was the first to display special concern for small scale and cottage industrial sector, before it become fashionable do so.
Building capability for healthy SME and informal work: workshop on ergonomics and hygiene

Facilitators
Paula Naumanen, Professor, Chair of ICOH's Scientific Committee on Occupational Health of Small-scale Enterprises and the Informal Sector
Kristina Gunnarsson, PhD, Department of Occupational and Environmental Medicine, Uppsala University, Sweden, kristina.gunnarsson@medsci.uu.se

Abstract
Aim of this workshop is to:

- Identify the current status of occupational health capabilities (hygiene, ergonomics and health monitoring) in SMEs and informal sectors. Understand basic practices in occupational hygiene that can be integrated with other health services.
- Provide a ‘taster’ of occupational hygiene methods and tools that can be used to develop preventive programs in SME and the Informal sector.

Overall, we hope to enable each participant, with whatever level of occupational health knowledge, gain a basic understanding of some practical tools in their workplaces and/or industry sector. This workshop will be of particular interest to workplace and public health professionals dealing with SMEs and the informal sector; government regulators, OHS policy makers, employee representatives and NGOs.

The workshop will commence with a brief introduction, including an overview of the aims of the session. A ‘taster’ of how occupational hygiene, ergonomics and health monitoring can be used as low-cost preventive tools in SMEs and informal sectors will be presented. Basic practices in hazard identification, assessment and control will be demonstrated.

Programme 22 February 2013 8.15am – 12.15pm

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From practice to products - new innovations as a result of well-being at work project in Finland

Authors
Paula Naumanen, Finnish Institute of Occupational Health, Finland
Jyrki Liesivuori, Finnish Institute of Occupational Health, Finland
Tiina Saarelma-Thiel, Finnish Institute of Occupational Health, Finland
Markku Sainio, Finnish Institute of Occupational Health, Finland
Jouni Lehtelä, Finnish Institute of Occupational Health, Finland

Abstract
This presentation will introduce three products as a result of Finnish well-being development project in 2007-2008.

The products were based on interviews focused on representatives from all personnel groups (employers, employees) and occupational health professionals. The qualitative data were analysed by content analysis.

As a consequence, project produced three products: 1) a training programme called Well-being at Work as The Basis of Workplace Culture, 2) Well-being at Work Analysis Method, and 3) the Integration Model of Well-being at Work Strategy in the organisation.

The content of the training programme Well-being At Work as The Basis of Workplace Culture approaches the topics with broad perspective including individual workers (health, professionalism), work community, work environment, work itself, leadership and management, measurements of well-being, and the company image. This training programme is focused on both employers and employees representing different branches and all sized organisations including micro- and small-scale enterprises, as well as occupational and safety professionals. This programme gives basic information about the subareas of well-being at work and the ways to promote it. According to the training programme feedback, participants have got new ideas for improvements. Evaluation in 2010 showed, that all participant workplaces have done improvements.

The Well-being at Work Analysis Method includes the analysis process, needed data, interview themes and the frame of well-being at work. This method is suitable especially for medium- and large-scale enterprises, and is also applicable for small-scale enterprises. It has benefitted enterprises to know their strengths and weaknesses, and given suggestions for improvements in all well-being at work sectors.

The Integration Model of Well-being at Work Strategy consists of 1) the business strategy linked to well-being at work, 2) health staff, work society and work environment, 3) fair
leadership and management, 4) measurement and follow-up of well-being at work, and 5) well-being at work as company image. This model has helped to manage well-being at work as a whole. Well-being at work should be organised as a wholeness, integrated through all activities, and be part of strategic decision making regardless of the size of enterprise.
From practice to products - comprehensive well-being at work culture in Finland

Authors
Paula Naumanen, Finnish Institute of Occupational Health, Finland
Jyrki Liesivuori, Finnish Institute of Occupational Health, Finland
Tiina Saarelma-Thiel, Finnish Institute of Occupational Health, Finland
Markku Sainio, Finnish Institute of Occupational Health, Finland
Jouni Lehtelä, Finnish Institute of Occupational Health, Finland

Abstract
This presentation will introduce new products that have been developed in Finnish Well-being at Work Projects in 2010-2011 in big national organisations.

These products are based on the qualitative data that were collected by interviews from all personnel groups (employers, employees) in order to get a broad opinion and views from the current well-being at work. The data were analysed by qualitative content analysis.

The new products presents 1) the different sectors of comprehensive well-being at work, 2) the management model of well-being at work, 3) the implementation model of well-being at work, 4) the levels of well-being at work, and 5) the stages toward sustainable well-being at work culture.

Different sectors of comprehensive well-being at work are: employee (health, professionalism), work community, work, work environment, management and leadership as well as function and business of company. Each subfield contains several detailed issues. This model helps understanding the variety of well-being at work and is applied for all sized enterprises representing different branches.

The management model of well-being at work includes prevention, action and follow-up levels. Prevention level forms from management system and resources. In action level, it is essential to know the strengths and weaknesses by assessing well-being at work situation. It is also important to use effective activities to meet the challenges. In follow-up level, the indicators show the trends and effectiveness of activities as well as the management system. This model shows the elements how to manage well-being at work in enterprises including small-scale ones.

The comprehensive well-being at work model connects different sectors of well-being at work to indicators and measurements allowing reactive follow-up. This model is more suitable for medium and large scale enterprises than the smallest ones.
Well-being at work can be come true in different levels and ensure the top level performance. Model illustrates well-being at work and its effects both in the basic and top levels. This model is applicable in all sized enterprises and is essential for the business and productivity if all well-being at work sectors are in order.

The culture of well-being at work with positive effects is a functional part of longitudinal continuous company development. This idea is suitable for all sized enterprises. If there is a need to change the well-being at work culture, the change is possible to happen more rapidly in small-scale enterprises than in large ones.
Occupational safety and health risk management in small and microenterprises

Authors
Paula Naumanen, PhD, Adjunct Professor, FIOH, paula.naumanen@ttl.fi
Panu Oksa, PhD, Adjunct Professor, Head physician, FIOH, panu.oksa@ttl.fi
Jorma Lappalainen, Senior Adviser, FIOH, jorma.lappalainen@ttl.fi
Mika Liuhamo, Chief of service center, FIOH, mika.liuhamo@ttl.fi
Mika Nyberg, Training designer, FIOH, mika.nyberg@ttl.fi
Rauno Pääkkönen, PhD, Adjunct Professor, Director of theme, FIOH, rauno.paakkonen@ttl.fi
Minna Savinainen, PhD, Specialized research Scientist, FIOH, minna.savinainen@ttl.fi
Jarmo Vorne, Special Specialist, FIOH, jarmo.vorne@ttl.fi

Abstract
The new risk assessment tool for micro and small-scale enterprises and action model for occupational health professionals were built in Finland in collaboration with occupational health professionals and entrepreneurs. The risk assessment tool consists of guide book, several forms, annual timeline, memory stick and document case. According to the new action model, occupational health professionals are key persons in sharing and marketing the tool to micro- and small-scale enterprises. The first experiences about the use of the tool and action model are very promising.

Keywords
Risk assessment, tool, small and micro-scale enterprises, occupational health care, action model

1. Introduction
There is 5.4 million people living in Finland of whom 2.4 million are employed (Demographics of Finland 2012, Finnish Labour Market 2012). The number of micro-enterprises (employing less than 10 persons) is nearly 245 000 (93% of all enterprises) and small enterprises (employing 10-49 persons) almost 14 500 (5.5%) in Finland. About a quarter of all working age population (630 000 persons) work in these workplaces (Finnish Statistic Center 2010).

According to the Finnish Occupational Safety Act (738/2002), the employer is obligated to assess occupational safety and health risks at the workplace, and to manage these risks by eliminating or minimizing them in order to avoid occupational accidents and illnesses. It is also recommended that occupational health professionals participate in the risk assessment process as an expert. The results from earlier studies show, however, that over 50% of micro-enterprises have not done any risk assessment, and occupational health professionals very seldom participate in the risk assessment in these enterprises (Savinainen et al. 2010).
There are several risk assessment tools available for workplaces in Finland, but majority of them are designed for large companies which makes them too complex and unsuitable for micro- and small enterprises. Many workplaces have therefore developed their own tools that suit better for their needs.

According to the Finnish Occupational Health Care Act (1383/2001), the main tasks of occupational health services (OHS) are planning the annual occupational health care activities, performing workplace visits and reports, and conducting health checks, counselling and advice for the staff. Many employers also voluntarily include the treatment of sicknesses as part of the OSH contract. Health hazards and harms related to staff, work, working environment, work climate, work community as well as leadership and management issues are identified during workplace visits by OHS professionals and workplace representatives. Any findings regarding health risks, recommendations and suggestions for improvement are documented in the occupational worksite report. This report is most beneficial both to the enterprise when developing working conditions, and to OHS professionals when planning suitable OSH activities to offer for enterprises and following up possible changes. In general, occupational health professionals use observations, interviews and suitable forms and inquiries as assessment methods.

Occupational Safety and Health Care Acts (1383/2001, 738/2002) obligate both the workplace and the occupational health care to identify occupational health hazards and risks. Both parties feel that the risk assessment and the occupational worksite report are overlapping. Yet, existing risk assessment tools and action models don’t take into consideration co-operation between the workplace and the occupational health care, especially in micro- and small enterprises (Leinonen et al. 2007). It was therefore necessary to develop a risk assessment tool and action model for the use of occupational health care in micro- and small enterprises, and to activate these enterprises to purchase occupational health care services.

The Finnish Institute of Occupational Health (FIOH) and the Ministry of Social Affairs and Health launched the risk assessment development project in the end of 2008. The aim of the project was to build a common risk assessment tool and action model for micro-enterprises and OHS professionals, and to activate the employers to carry out mandatory risk assessments and corrective and preventive actions. This paper will introduce the new tool and action model, and the evaluation results about their use in practice.

2. Material and methods
The project team found about 200 different risk assessment tools and methods, of which the most common ones were analysed and used as the basis of a preliminary tool. It was thought to identify the most common occupational hazards in the Finnish working life.

Occupational health professionals from three separate OHS units participated in the development project together with the project team. The OSH professionals tested the preliminary tool several times in micro-enterprises and shared their experiences with the
project team in the project meetings. Some entrepreneurs also commented the usability of the tool. These comments were taken into account when modifying the final version. The new product was called "The management of safety and health risks in micro and small-scale enterprises" (abbreviation "PiRa" in Finnish) and it was published in 2011 as a document folder.

The project team also designed a new action model of occupational health professionals. FIOH trained a large number of occupational health professionals in 2012 to market the new tool and to advice how to use it in the workplaces.

The evaluation results of the PiRa risk assessment tool and the operation model were published in 2012 by Tuomela. The evaluation described experiences of occupational health nurses about the use of the new tool and action model, about combination of risk assessment and worksite report by using the new tool, and about the effects of the new operation model. The data were gathered from interviews of five occupational health nurses, who participated in the development project and used the new tool in their work. The data were analysed by using qualitative concept analysis method. (Tuomela 2012.)

3. Results

The new PiRa risk assessment tool consists of

- the short guide book to help enterprises to assess risks and support them to make a worksite report together with occupational health professionals. There are also questions to help assessment of different risks.
- forms for the identification of occupational exposures, hazards and harmful loads, management of risk, occupational worksite report, and occupational safety and health action plan done with occupational health professionals
- form for listing chemicals in the workplace
- annual timeline for planning the main safety and health tasks
- memory stick including all the material in electric form
- document case where to save this material and other occupational and safety papers

The content of the guide book includes viewpoints about the benefits of risk assessment, and practical advices how to make the first risk assessment and safety and health action plan, how to make the next risk assessment, how to prevent different kinds of risks, and how to list the chemicals.

The risk assessment form is only one A4 sheet including the topics for main risk categories such as work environment, machines and equipments, chemicals, physical load, mental load, unsafe working methods, and other hazards and damages. Each of these categories includes individual risk factors that are all assessed by three level scale:

1. high risk - immediate improvements are needed,
2. moderate risk - development or follow-up is needed,
3. low or no risk - things in order or the risk does not exist.
The risk management form includes the development areas arising from the risk assessment and suitable corrective actions with their schedule, responsible person, and follow-up.

Risk assessment and management plan are tied to occupational worksite report that consists of the positive findings, health risks, recommendations, advice from risk prevention, occupational hygiene or other special measures, and the follow-up.

There is also a form for the safety and health action plan, and a form where to list harmful and dangerous chemicals present in the workplace. According to the new action model, this new risk assessment tool is distributed and marketed to micro- and small enterprises by occupational health professionals, especially by nurses, who more often visit at workplaces than the other OHS experts.

According to the evaluation results (Tuomela 2012), the PiRa risk assessment tool was thought to be practical, simple and easy to use in collaboration with occupational health professionals and also independently by enterprises. The tool was suitable for risk assessment in micro- and small enterprises in different branches, and it was also possible to combine it with occupational workplace report due to similar contents. The preventive and corrective actions were more systematic and effectively organised by the help of the tool. Both the risk assessment and the workplace report supported each other. The co-operation between the enterprise and the OHS unit was also more productive when both parties could share their expertise in broad and diverse ways by identifying, discussing, advising and making different suggestions to solve the problems. This method saved nurses' and entrepreneurs' time when filling needed documents during the workplace visit. Entrepreneurs' and staffs' negative attitudes and lack of skills and knowledge toward risk assessment of both parties were thought to be challenges according to the opinions of nurses. (Tuomela 2012.)

Preliminary information about the popularity and effects of PiRa risk assessment tool and action model for the working circumstances are promising. Prior experiences of similar projects focused on micro- and small enterprises have showed that most reasonable, expert supported actions activate entrepreneurs to make improvements. The entrepreneurs who have tested the PiRa tool consider it suitable for their needs and easy to use, and many others show growing interest towards it. Also, The Social Insurance Institution of Finland, that supports the enterprises with the acquisition of their mandatory OSH services, has agreed to support the use of PiRa tool.

4. Discussion
Approximately half of the micro- and small enterprises in Finland have acquired no occupational health care services due to their limited resources in economy, time, information and staff, or due to the general negative attitude towards occupational health care services. These enterprises also have very limited risk assessment skills. The occupational safety and health authorities have limited resources to monitor all enterprises,
at least the numerous micro- and small-scale enterprises. In many cases, the very smallest enterprises are out of reach by any kind of expert networks.

Occupational health units and OHS professionals are key persons to provide safety and health know-how to micro- and small enterprises. The PiRa risk assessment tool and action model will give OSH professionals better opportunities to co-operate with enterprises, to show their expertise to entrepreneurs, and to activate them to purchase occupational health care services. Entrepreneurs can also reassess risks later by themselves with the tool. It is essential that the risk assessment tool is simple enough, rapid and ready to use. Active co-operation with occupational health professionals is a key issue when achieving the best results.

The PiRa tool and action model is still new for most occupational health professionals and will take some time to be part of their everyday practice. The OSH units show growing interest towards the tool, however, and the first edition of the book with 1000 copies has already sold out. English and Swedish versions are also under planning. We know more about the effects after coming years.

5. References


Three years into the DairyNZ sponsored Dairy Farmer Wellness and Wellbeing programme in the New Zealand rural dairy sector: What is the issue, what is being done, and what are the results to date?

Authors
Brent Neilson, Business Manager, NZ Institute of Rural Health, New Zealand
brent@nzirh.org.nz
Chris Polaczuk, ACC Workplace Injury Prevention Program Manager, ACC, New Zealand
Chris.Polaczuk@acc.co.nz
John Wren, PhD, ACC Research - Principal Advisor, ACC, New Zealand
john.wren@acc.co.nz (corresponding author)

Abstract
What is the evidence for health co-morbidity effects on injury treatment and rehabilitation and workers compensation, and the Dairy Sector? What is being done to address the issue?

ACC Research has found that:
- evidence for the existence of health co-morbidity effects on increased injury treatment utilisation and costs is well supported in the literature
- there is a substantive body of literature suggesting that well run workplace based wellness programmes targeting high risk lifestyles provide a positive return on investment in terms of reducing workers compensation costs
- in the 12 month period April 2008 to March 2009, the extra cost to ACC of GP injury treatment consultations where a co-morbidity (widely defined) was present is estimated to have been $12.6 million in that period
- in the July / June 2008/09 Year, extra claims costs to ACC of $100 million have been associated with the presence of diabetes and coronary heart disease.

The New Zealand Institute of Rural Health has identified and described a broad range of health comorbidities effects on farmers in the New Zealand Dairy sector. DairyNZ has sponsored the Dairy Farmer Wellness and wellbeing programme to address the issues, the initiative is now into year 3.

The program is led by the NZ Institute of Rural Health with support from the ACC Workplace Injury Prevention Team. The initiative includes providing opportunities for dairy farmers to participate in a “Health Pitstop” and development of an educational intervention for dairy farmers about health, wellness and injury.

Results of the program include the completion of a physical and emotional wellbeing health assessment by 1,440 self-selected farmers in years one and two at Health PitStop's.
Of those completing the health assessment, the data shows 28% with an obese body mass index, 50% with moderately high or high blood pressure, 78% with total cholesterol randomly checked greater than World Health Organisation acceptable levels.

Examples of depression, anxiety and burnout were cited along with dairy farmers saying they were coping when in fact they were not.

Cardiovascular disease risk factors and emotional unwellness issues have been targeted as the programme moves from research to action.

Follow-up of at-risk farmers has provided an interim measure of programme effectiveness. In addition, an education programme involving members of the consenting community, delivered through a series of three workshops to enhance farmer knowledge of factors affecting their physical wellbeing is being developed to commence delivery during the current year. Specifically, the education component will contain motivations to change, and understanding the effects of food and activity on their health, stress and staying motivated.
Realist analysis applied to an occupational health and safety economic incentive programme for micro businesses in high risk industries

Authors
Kirsten Bendix Olsen, PhD, Centre for Ergonomics, Occupational Safety and Health, Massey University, Palmerston North, New Zealand, K.B.Olsen@massey.ac.nz
Leigh-Ann Harris, MBS, Centre for Ergonomics, Occupational Safety and Health, Massey University, Palmerston North, New Zealand, L.A.Harris@massey.ac.nz
Kristina Gunnarsson, PhD, Department of Occupational and Environmental Medicine, Uppsala University, Sweden, kristina.gunnarsson@medsci.uu.se

Abstract
Occupational Health and Safety (OHS) intervention programmes need to be designed specifically for small businesses (SBs) in order to improve the working environment and health outcomes for people working in SBs. This paper evaluates the implementation of an economic incentive scheme for small businesses in the agriculture industry in New Zealand. It uses realist analysis to establish how the ‘programme theory’ was modified through an implementation process and which parts of the programme theory worked for five farmers that participated in the programme. Thematic analysis of semi-structured interviews and documentation about the programme was used to examine the perception of the contextual factors surrounding SBs in general and SB in particular. The mechanisms that worked for the farmers were identified through a thematic analysis of semi-structured interviews with the farmers. The contextual factors the developers took into account were: SB owners have limited knowledge and capability in OHS; few time and economic resources; they want to be good employers and work with people they trust; they underestimate risk and see their insurance levy as a burden. The programme was therefore based on information provision and economic incentive. The intermediaries added contextual factors that were specific to small farmers: the relative isolation on the farm; desire to interact with other farmers; the farmer’s identity as a farmer; the family’s quality of life is dependent on the farm; fear of prosecution. Implementation of the programme in the agriculture industry added mechanisms like punishment - legal; economical and societal, and social rewards. For farmers, the economic incentive motivated them to join the programme but they also wanted to be good employers and avoid prosecution. Farmers joining the programme were industry leaders. Personal contact to the intermediary was essential for creating awareness of the programme and facilitating the completion of paperwork to gain entry into the programme.

Keywords
Intervention, Evaluation, Programme theory, Occupational Health and Safety, OHS audit scheme

1. Introduction

It is widely accepted that national Occupational Health and Safety (OHS) interventions, like legislation, regulation and incentive programmes, designed to improve the general working environment have difficulty in reaching and being implemented in small businesses and that there is a need to design specific interventions that work in the context of small businesses (SBs) (Baldock et al., 2006; Champoux & Brun, 2003; Fairman & Yapp, 2005; Hasle et al., 2012; Hasle & Limborg, 2006; Legg et al., 2010; Olsen et al., 2010; Olsen et al., 2012). Over the last 10-20 years, governmental agencies in many countries have started to design intervention programmes for SBs. Intervention programmes range from information material (Caple et al., 1997), internet based management tools (Antonsson & Alvarez, 2005) to free consultancy (Caple, 2006) and intervention packages (Hasle, et al., 2012). Many of these programmes have been criticised for not being designed with a proper understanding of the SB’s context and for not being evaluated properly (Legg et al., 2009; Legg, et al., 2010; Walters, 2006). A few OHS researchers have looked to evaluation research in public health for inspiration to develop a theoretical framework for the development and evaluation of OHS interventions that take contextual factors into account (Hasle, et al., 2012; Legg, et al., 2010; Olsen, et al., 2012; Pedersen et al., 2012).

Hasle et al. (2012) developed a design model for OHS intervention programmes targeting SBs where he integrated previous intervention models (Hasle & Limborg, 2006; Olsen, et al., 2012) with realist analysis (Pawson, 2006; Pawson & Tilley, 1997) focusing on the process internal to the SB. The model has been further extended in the present paper to include the programme developer and the organisation or practitioners that disseminate the programme to SBs in figure 1. The programme theory (the larger box in figure 1) starts in the heads of the developers of the programme. It consist of an issue or problem that needs to be changed (e.g. high injury rates in SBs), an idea about mechanisms (e.g. incentives or information) that encourage actors (e.g. SB owners) to implement changes (e.g. systematic hazard management or substitution of a hazardous chemical) that, in turn, will improve the working environment and workers’ health. Further, the programme theory also includes assumptions about the context of SBs - both externally (e.g. customers and suppliers) and internally (e.g. management and time resources). One mechanism does not work under all contextual circumstances, so it is important to identify those circumstances under which mechanisms work and to establish that the mechanism will work under the contextual circumstances surrounding the target group.
The programme passes from the developer to intermediaries who create more specific programme content and make decisions about how to deliver and disseminate the programme. They can, for example, draw on their experience with a specific industry. During this process, they can develop the programme theory and add other types of mechanisms that they think will work. The test is whether the basic programme theory and the modified programme theory works in practice or for whom in the target group it works.

This paper uses the model in figure 1 to analyse a national intervention programme targeting micro businesses (MB) (with less than 10 full time employees) in New Zealand. The programme in focus is the Workplace Safety Discount (WSD) scheme developed by the New Zealand Accident Compensation Corporation or ACC (a crown institution that provides no-fault personal injury cover for all New Zealand residents including work-related injuries) and the Department of Labour (DoL) - now included in the Ministry of Businesses, Innovation and Employment (MBIE). The WSD scheme is an economic incentive programme that offers MBs in high risk industries a 10% reduction on their employee insurance levy if they fulfil certain requirements. The paper examines the ways in which the programme theory relates to the implementation of the WSD scheme in the agriculture industry.

To do so, first the WSD scheme is described, with a short description of the background. The method for data collection and analysis is presented, followed by the results, which illustrate the programme theory that was in the mind of the programme developers (DoL and ACC). We look at how the theory was modified by the organisations and individuals that disseminated and implemented the programme in the agriculture industry, and how it worked for five small farmers. The paper concludes by discussing which parts of the programme theory seemed to work.

2. Workplace Safety Discount scheme
The WSD scheme was introduced in 2006 and applies to MBs with fewer than 10 employees in specific subsectors of agriculture, forestry, construction, road freight, motor trades and inshore fishing. MBs in the specified sectors can apply for a 10 per cent reduction of their ACC levies if they fulfil three requirements: 1) they have to demonstrate from training or prior learning, industry-relevant capability in hazard identification and management, injury and incident investigation, emergency readiness and are training employees; 2) they have to satisfactorily fill in a self-assessment form; 3) they have to accept an audit by an independent auditor approved by ACC, but only 15% of applicants are audited (Accident Compensation Corporation, ND; Department of Labour, 2006). The first requirement can be fulfilled by attending two half-day training courses developed by ACC in co-operation with the industry in focus. The training courses are free, delivered locally by approved industry training organisations and developed in co-operation with ACC and the industry. The self-assessment was developed in co-operation between DoL, ACC and the industry. The auditors are trained by approved ACC trainers. MBs are selected for audits if their self-assessment is unsatisfactory. Additionally, a proportion of applications are randomly selected for audit by ACC employees in the insurance product department. The WSD is promoted primarily by the industry training organisations and secondarily on ACC’s webpage.

The WSD scheme was introduced because the ACC’s Workplace Safety Management Practices (WSMP) programme was perceived to be inaccessible for smaller businesses. Introduced in 2001, the WSMP is an incentive programme involving a voluntary OHS management system audit mainly targeting medium to large business. Depending on how well developed the management system is, the business can achieve primary, secondary or tertiary level accreditation and achieve a 10, 15 or 20 per cent reduction of its insurance levy respectively. However, very few SBs and MBs applied for the WSMP. This was perceived to be due to the requirements of formal and documented OHS management systems (Department of Labour, 2006). DoL and ACC wanted to develop a similar incentive scheme for MBs in high risk industry sectors. The aim of the WSD scheme was for SBs in high-risk sectors to reduce the number and severity of injuries and diseases, and to make on-going improvements in OSH management capability and practice.

2.1 WSD scheme in the agriculture sector
A WSD self-assessment form (that also is the basis for the audit) was developed and tailored for the agriculture industry by ACC’s agriculture programme management team, the industry association and the industry training organisation. FarmSafe (an industry OHS training provider) was chosen as the primary promoter of the WSD programme and provider of two training courses. FarmSafe already delivered two courses: ‘FarmSafe awareness’ (half-day) and ‘FarmSafe plans’ (one day) that would fulfil the requirements for demonstration of industry-relevant capability in hazard identification and management, injury and incident investigation, emergency readiness and training of employees. The requirement to demonstrate this capability could also be fulfilled through specifically designed WSD workshops delivered by FarmSafe and by AsureQuality (an agriculture business advisor).
FarmSafe does not employ trainers per se. Rather; it contracts trainers that are based locally throughout New Zealand farming communities. It mainly relies on these local trainers to make the contact with the farmers. These trainers are independent consultants that base their livelihoods on the delivery of FarmSafe training courses and other consultancies or businesses. Some are farmers themselves. Figure 2 illustrates the WSD programme development and dissemination in the agriculture industry.

Figure 2. The WSD programme development and delivery in the agriculture industry

3. Method and materials
In order to identify the programme theory for the WSD scheme that was developed and modified by the different actors involved in the development and implementation of the scheme, documents justifying and evaluating the WSD scheme were analysed. Additionally, semi-structured interviews were conducted with: one senior manager in the ACC injury prevention department; ACC’s programme manager for the WSD programme; ACC’s agriculture industry programme manager; one ACC injury prevention consultant for the agriculture industry; the Manager of FarmSafe; three FarmSafe trainers; one financial advisor promoting the WSD amongst farmers; five farmers that had applied for the WSD and achieved the discount, and; one WSD auditor.

The interviews were thematically analysed to identify the:

1. mechanisms used by the actors that developed and implemented the WSD scheme and that worked or did not work in relation to encouraging farmers to join the scheme, attend training courses and implement changes to improve the working environment;
2. contextual factors that the different actors brought into the design and development process to shape the scheme, its industry specific elements and dissemination to the farmers.
The contextual factors for each group of actors in the WSD scheme are presented in relation to categories identified by Hasle et al. (2012) through a critical review of the literature. The contextual factors they identified were:

1. factors related to the owner-manager’s role: limited management resources, identity as an entrepreneur, low growth ambition (return of investment is not the most important, low cost is more important), personalised external contacts.
2. social relations in the SB: informal work organisation and work procedures (documenting and writing formal documents are not seen as contributing to the core businesses), social obligations (there are close relations between employer and employees and the SB is often portrayed as a family).
3. the owners’ perception of the working environment: OHS is perceived as peripheral, they underestimate the risks and overestimate their knowledge and practice, and they have an ad hoc and retrospective approach to health and safety.

4. Results

4.1 The programme theory behind the general WSD scheme and its effect

The contextual factors that the creators of the WSD scheme took into account when they created the scheme are presented in Table 1. Some of the factors identified by Hasle at al. (2012) were not considered by the WSD establishers, but several of them were and a more specific national factor that New Zealand MBs perceive their ACC levy as a burden, was included.

The design features of the WSD scheme are listed in the left column of Table 2. The underlying reasons for having the features listed as identified by the scheme designers are in the middle column. The third column lists the three basic mechanisms that should make the MB owners join the scheme and make changes in their business. Tables 1 and 2 show the programme theory that the designers of the scheme had in their head when designing the scheme. One part of the programme theory that is not illustrated well in the tables, and should be mentioned here, is that the scheme is based on the theory that implementing systematic hazard management, investigating injury, preparing for emergencies and training employees should improve the working environment and reduce injuries or improve health. This is not explicitly mentioned.
Table 1. The contextual features of SBs that the creators of the WSD scheme took into account when establishing the scheme

<table>
<thead>
<tr>
<th>Context factors in relation to small businesses considered by the WSD developers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner manager role</strong></td>
</tr>
<tr>
<td>They do not have OHS knowledge.</td>
</tr>
<tr>
<td>They do not have time.</td>
</tr>
<tr>
<td>They do not have money.</td>
</tr>
<tr>
<td>They want to work with people they trust and know.</td>
</tr>
<tr>
<td><strong>Social relations in SBs</strong></td>
</tr>
<tr>
<td>They want to be good employers.</td>
</tr>
<tr>
<td>The owners’ perception of the working environment</td>
</tr>
<tr>
<td>SBs underestimate risks.</td>
</tr>
<tr>
<td>Poor hazard management practice.</td>
</tr>
<tr>
<td><strong>Relation to authorities and the State</strong></td>
</tr>
<tr>
<td>SBs see ACC levy as a burden</td>
</tr>
</tbody>
</table>

(*Factors were extracted from interviews with the ACC injury prevention manager and the Department of Labour (2006))

The uptake of the scheme was lower than expected. In 2011, 3,357 SBs had joined the scheme. This was around a third of what ACC predicted that the uptake would be in 2009 - two years earlier - 9,300 SBs (Department of Labour, 2006; Teng, 2011). However, attendance at the required training courses across the industries has been good. The barrier for applying for the WSD was perceived to be the paperwork required to fill in the self-assessment form (interview with ACC injury prevention consultant, 2011). ACC has not been able to measure the effects on the SBs in terms of reduction in injury claims rates. However, ACC reported that there had been a reduction in the number of injuries among SBs that participated in the scheme (Accident Compensation Corporation, 2009) but has not presented any evidence to support this statement. The ACC Injury prevention consultant said that, in his experience, the main changes that MB owners implemented after attending the training courses was training of staff and implementing hazard management and injury investigation. He did not have any examples of actual changes to the working environment.
Table 2. The design features of the WDS scheme, the designers’ arguments for implementing these features and the basic mechanisms that should create changes

<table>
<thead>
<tr>
<th>WSD design feature</th>
<th>Why? (which contextual features)</th>
<th>Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% levy discount</td>
<td>MB perceive ACC levy as a burden.</td>
<td>Incentive (economic) to join the scheme and to fulfil the scheme’s requirements.</td>
</tr>
<tr>
<td>Demonstrate OHS capability</td>
<td>MB owners have poor OHS knowledge and practice, they need to show that they have good knowledge and practice,</td>
<td>Control</td>
</tr>
<tr>
<td>Training courses</td>
<td>Knowledge is brought to MBs, they want to be good employers and will make changes if necessary,</td>
<td>Information provision</td>
</tr>
<tr>
<td>½ day courses</td>
<td>MB owners do not have much time, ½ day courses are minimal time requirements,</td>
<td></td>
</tr>
<tr>
<td>No course fee</td>
<td>MB do not have much money,</td>
<td>Economic incentive</td>
</tr>
<tr>
<td>Locally delivered</td>
<td>Limited time and money required for travel,</td>
<td></td>
</tr>
<tr>
<td>Delivered by industry providers</td>
<td>They are known by MB owners and trusted.</td>
<td></td>
</tr>
<tr>
<td>Self-assessment of OHS management practice</td>
<td>MB owners need to show they have capability to manage OHS (they generally do not), little time resources, more informal than documenting an OHS management system. (also an encouragement to make change)</td>
<td>Control</td>
</tr>
<tr>
<td>Possibility of an OHS audit</td>
<td>To make sure that MB owners self-assess correctly and do not cheat. Make sure that MB owners make sufficient changes.</td>
<td>Control / Punishment</td>
</tr>
</tbody>
</table>

4.2 Modification of the programme theory in disseminating WSD scheme to agriculture MBs

The ACC agriculture programme manager did not consider the 10% reduction in levy (economic incentive) to be enough to ‘sell’ the scheme to MB farmers, so they looked for other factors that could encourage the farmers to put effort into achieving the 10% discount (interview with ACC agriculture programme manager, 2011). The ACC agriculture programme therefore included other economic incentives or threats to promote the FarmSafe courses.
The ACC agriculture programme manager combined the WSD courses with a campaign called “The Fallen Farmer” that demonstrated the social and economic costs associated with serious injuries to farmers. The campaign was intended to encourage farmers to proactively manage health and safety and attend FarmSafe courses. This campaign built on the perception of the contextual factors that farmers were reactive in relation to OHS, build their identities through their business/farm and attend courses because they want to be a “responsible employer in health and safety” (interview with ACC agriculture programme manager, 2011). The mechanism this campaign built on was the economic and social punishment that the farmers would experience after an accident if they did not proactively manage OHS. This included the threat of being prosecuted by Department of Labour. The WSD training and the self-assessment focuses on basic hazards on a farm. If a farmer is fulfilling all the requirements in the self-assessment, then they should be compliant with health and safety legislation. But in the end the ACC agriculture programme manager considered the main driver for the farmers was maintaining their lifestyle: “we knew the real motivator for the farmer was being able to maintain their own lifestyle. And they care about their families and friends more than they care about themselves”.

To build on other incentives, the ACC agriculture programme, in collaboration with the industry associations, included the WSD assessment as part of the ‘share-milker of the year’ competition. This encouraged participants to deliver ‘very good’ self-assessment forms and to implement good OHS practice (interview with ACC agriculture programme manager, 2011). The ACC agriculture industry programme manager confirmed the contextual factor that farmers did not want to leave their farm, so attended courses that were close to where they lived and were encouraged to attend by colleagues. He also confirmed that farmers do not like paperwork, which they are required to complete if they wish to join the WSD scheme. To overcome this barrier, he had discovered that “Some of the providers... have given farmers a bit more assistance than what we’d like in terms of how to fill in the form” (interview with ACC agriculture programme manager, 2011).

FarmSafe was chosen as one of the main deliverers of the courses needed to fulfil the requirements for documentation of OHS capability and to promote the scheme. How the actors involved in delivering and disseminating the WSD scheme in agriculture perceived the 10% discount is illustrated in Table 3. This table also shows the other incentive mechanism that the trainers used in an effort to make farmers attend courses and join the WSD scheme. Table 4 shows how information was used to encourage the farmers to join the scheme and participate in the courses. It also shows how the threat of punishment was used to make the farmers apply for the discount and use the self-assessment form to document that they had taken all practicable steps to prevent injuries.
Table 3. The view of the actors’ (involved in disseminating WSD in agriculture) about the 10% discount as an incentive - and other incentives they used to make farmers join the training or the scheme

<table>
<thead>
<tr>
<th>Incentive as a mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC agriculture programme manager</td>
</tr>
<tr>
<td>FarmSafe Manager</td>
</tr>
<tr>
<td>Financial advisor</td>
</tr>
<tr>
<td>FarmSafe trainer WSD</td>
</tr>
<tr>
<td>FarmSafe trainer North Island</td>
</tr>
</tbody>
</table>
| FarmSafe trainer South Island | “Since WSD came in, there’s been quite a sell-point for the discount. People have come along probably for the discount more than anything else.”  
“I have implemented the FarmSafe plans myself and my farm runs much more efficient”  
“The other farmers in your area are subscribed to the planned course, you should come and catch up with them on the course” |

Table 4. The way information to farmers was used as a mechanism to make them join the WSD scheme by parties involved in disseminating the programme in agriculture

<table>
<thead>
<tr>
<th>Information as a mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC agriculture programme manager</td>
</tr>
<tr>
<td>FarmSafe trainer WSD</td>
</tr>
</tbody>
</table>
FarmSafe trainer  
North Island

“If you rang farmers up and said “would you like to come to a course and learn about health and safety?” most of them would probably say no…”

In the trainers’ promotion of the WSD scheme, the punishment mechanism (persecution) was more prominent and the economic incentive mechanism was changed from focusing on the discount to focusing on productivity. Further information about what can happen if they do not control hazards was also used. Here the social effect was highlighted. The social benefit of attending courses was also used to promote the training. Generally the 10% discount was perceived as an incentive to take the FarmSafe Plans course and the WSD workshop. But as the ACC agriculture programme manager states, “it does not make economic sense if the time the farmers put into attending the course and the risk it can pose to the farm is taken into account”. It looks like the people directly dealing with the farmers disagree with the programme manager in this respect.

Table 5. The way the threat of punishment was used to make farmers join the WSD scheme by the actors involved in disseminating the scheme in agriculture

<table>
<thead>
<tr>
<th>Punishment as a mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC agriculture programme manager</td>
</tr>
<tr>
<td>“If you get injured you take the farm with you, you lose your lifestyle”. Persecution by Department of Labour.</td>
</tr>
<tr>
<td>Financial advisor</td>
</tr>
<tr>
<td>“And they just have to understand that the Department of Labour have got really big boots if they want to start giving you a kick. … if you’ve done the health and safety workshop, you’ve got a manual, you’ve got a process and if somebody does get hurt, at least you’ve got some form of defence”.</td>
</tr>
<tr>
<td>FarmSafe trainer</td>
</tr>
<tr>
<td>North Island</td>
</tr>
<tr>
<td>“I say to farmers “if you have an accident on your farm or a fatality or a really serious accident, somebody comes out to investigate. They’re going to ask you questions like ‘What have you done to prevent the accident?’ If you can say: ‘Well, we haven’t done much at all.’ You’re in trouble. You’ll be prosecuted... but if you can say you’ve done everything possible and have systems in place...You have a good defence.”</td>
</tr>
<tr>
<td>FarmSafe trainer</td>
</tr>
<tr>
<td>South Island</td>
</tr>
<tr>
<td>“We encourage them to do it by saying if something happens and you have a health and safety plan in place, the Department of Labour will look favourably upon you if you do. The Department of Labour people have said that themselves…”</td>
</tr>
</tbody>
</table>

4.3. Factors that motivated farmers to join the WSD scheme and the effect on OHS on the farm

Table 6 gives a short description of the characteristics of the five farmers that participated in this study. They came from different sub-industries. Four had been in farming for most of their lives. They all based their farm on employing family and a few staff or contractors.
Table 6. Characteristics of the five farmers interviewed in the project

<table>
<thead>
<tr>
<th>Farm type</th>
<th>Nº employees</th>
<th>The farmers’ background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef &amp; horticulture</td>
<td>3 fulltime family, 10 casual</td>
<td>They have always worked on farms, self-taught.</td>
</tr>
<tr>
<td>Dairy 1</td>
<td>4 family, 1 fulltime, 1 part time</td>
<td>Originally milk tank driver, went into share milking then</td>
</tr>
<tr>
<td></td>
<td></td>
<td>became full time. Have courses in farm management and technical courses</td>
</tr>
<tr>
<td>Horticulture</td>
<td>3 family, 1 fulltime, 2 casual, Nov – Feb: a farm, took over after his father 15 casual</td>
<td>Started part-time in horticulture and part-time managing</td>
</tr>
<tr>
<td>Dairy 2</td>
<td>2 family, 3 fulltime</td>
<td>Both (husband and wife) had university degrees, she in agriculture and he in science and business. He grew up on a farm.</td>
</tr>
<tr>
<td>Sheep and beef contractors</td>
<td>2 family</td>
<td>Been a farmer all life</td>
</tr>
</tbody>
</table>

The mechanisms that made them join the WSD scheme are described in Table 7. The 10% discount was clearly an incentive for four of the five farmers, whereas the fifth farmer (dairy farmer 2) saw it as a ‘bonus’. This farmer described that they already had systems in place so they just applied to get the bonus/discount. For all five farmers, either being a good employer or avoiding prosecution was also an incentive to join the scheme - even though dairy farmer 2 did not think it was a real threat to either being inspected or audited. This farmer is the only one that had a university degree in agriculture and that could influence their approach to management and OHS management on their farm. Four of the farmers said that they would not have been aware of the WSD if a FarmSafe trainer had not contacted them and suggested that they apply for the discount. Contact with trainer was the therefore the initial trigger that prompted their participation in the WSD scheme.

Table 7. The five farmers description of which mechanism that made them join the WSD scheme

<table>
<thead>
<tr>
<th>Participant</th>
<th>Incentive discount</th>
<th>10% Information</th>
<th>Punishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef &amp; horticulture</td>
<td>Not a driver for change but for joining the scheme.</td>
<td>Nobody wants accidents.</td>
<td>Some things need to be in place to comply with the law.</td>
</tr>
<tr>
<td>Dairy 1</td>
<td>Don’t like paying ACC.</td>
<td></td>
<td>Read about prosecution in the news.</td>
</tr>
<tr>
<td>Horticulture</td>
<td>Every cent counts.</td>
<td></td>
<td>Be compliant and avoid prosecution.</td>
</tr>
<tr>
<td>Dairy 2</td>
<td>A bonus not an incentive.</td>
<td>Wants to be proactive, Don’t like to be told what to do.</td>
<td>The ‘stick’ only works when inspected or audited.</td>
</tr>
</tbody>
</table>
Table 8 describes whether the farmers ascribed change in OHS on their farm to participation in the courses and joining the WSD scheme. For two of the farmers, the scheme did not influence whether they implemented OHS improvements or not. They simply documented what they already did. Two other farmers did make changes as a result of attending the courses. The last farmer was unclear if the training courses and the scheme initiated change.

Table 8. The five farmers’ descriptions of how WSD and the training courses resulted in change on their farms

<table>
<thead>
<tr>
<th>Participant</th>
<th>Description of the effect of joining the WSD scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef &amp; horticulture</td>
<td>“The WSD scheme did not make us change anything; we just documented what we already did”.</td>
</tr>
<tr>
<td>Dairy 1</td>
<td>It was unclear whether the safety changes they made were driven by their attendance at FarmSafe courses, participation in the WSD scheme or stricter enforcement of the use of quad bikes.</td>
</tr>
<tr>
<td>Horticulture</td>
<td>As a result of the FarmSafe course they implemented a chemical inventory and a special store for chemicals.</td>
</tr>
<tr>
<td>Dairy 2</td>
<td>“I didn’t find it [the application form] useful at all because we’ve done it. I guess if you’d never written your farm policy or farm safety policy then it might be useful because it might make you stop and think things, but no. I mean the ACC thing really hasn’t changed us at all. There was purely the incentive of getting a discount so we did the paperwork”.</td>
</tr>
<tr>
<td>Sheep / Beef</td>
<td>“Plus I know one of the things that we came home and did after doing the course was to make out a plan, you know, what is it ...a thing for employees? ...Health and safety rules, you know...”</td>
</tr>
</tbody>
</table>

5. Discussion and conclusion

The developers of the WSD scheme based the intervention mainly on economic incentive (10% discount on ACC levy) and information provision (2 half-day courses) with an additional threat of punishment/control in the form of a self-assessment and the possibility of an audit. When tailoring the scheme to the agriculture sector and disseminating it to farmers, they included additional incentives like reward for their effort, socialising with their colleagues on the courses and running their farm more efficiently. Further they emphasised that farmers should join the WSD/ manage OHS because they wanted to prevent people from being hurt (building on the farmer’s desire to be a good employer), to avoid leaving the industry and leaving their family in a social and economic crises (the use of the “Fallen Farmer” campaign) and to avoid being prosecuted by Department of Labour. In considering the factors that made the farmers join the scheme, it is clear that the 10% discount was an incentive and that the threat of prosecution and the desire to be a good employer were also important motivators.
Inclusion of the “Fallen Farmer” campaign to promote the scheme worked for the five farmers in the present study.

The ultimate test of the effect of the scheme is whether it resulted in change in the working environment and in the health of the farmers and their employees. For some of the farmers the scheme did result in improvements of the working environment. For others it did not. Whether it was necessary to improve these farmers’ working environments or not cannot be answered by the present research. The farmers themselves perceived that they had a compliant and ‘good’ working environment, so maybe they had made the necessary changes before being aware of the WSD scheme. It was not possible to measure the effect on health in this study.

This study only presents the effect of the WSD scheme on farmers that joined the scheme, so it is not possible to comment about what did not work for farmers that have not joined the scheme. But some factors were mentioned that indicated what made it difficult to reach farmers and make them join the scheme. It appears as if it was difficult to reach farmers that did not know the FarmSafe trainers or other actors promoting the scheme. Further, the farmers that were interviewed in this study appeared to be amongst industry-leaders. The barriers to joining the scheme when knowing about it seemed to be that farmers need to be away from the farm and the ‘paper-work’ involved in applying for the discount.

The approach of tailoring the WSD scheme to the industry by involving intermediaries that know the specific context of the target group seemed to work. This also seems to add additional mechanisms to the intervention. On the other hand, if the people that tailor the intervention build on a limited knowledge of the whole target group and favour the people to whom they already have contact, then this could restrict whom in the target group the programme will work for.

6. References


OHS-model for small enterprises

Authors
Helena Palmgren, PhD, MEd, Head of Development, Finnish Institute of Occupational Health, Helsinki, Finland, ihelena.palmgren@ttl.fi
Simo Kaleva, MSc, Researcher, Finnish Institute of Occupational Health, Helsinki, Finland, simo.kaleva@ttl.fi
Heikki Saarni, PhD, Chief Medical Officer, Finnish Institute of Occupational Health, Helsinki, Finland, heikki.saarani@ttl.fi
Panu Oksa, PhD, MD, Chief Medical Officer, Finnish Institute of Occupational Health, Helsinki, Finland, panu.oksa@ttl.fi
Minna Savinainen, PhD, Specialized Researcher, Finnish Institute of Occupational Health, Helsinki, Finland, minna.savinainen@ttl.fi
Mika Nyberg, MSc, Expert of Training, Finnish Institute of Occupational Health, Helsinki, Finland, mika.nyberg@ttl.fi

Abstract
This paper introduces a new model for good OHS-practice for small enterprises employing less than 20 employees. The model was developed in collaboration between the Finnish Institute of Occupational Health, The Ministry of Social Affairs and Health in Finland, Social Insurance Institution and the labour parties. The model describes the process of good OHS-practice in small enterprises in terms of collaboration between OHS professionals and the representatives of the organization to achieve better health and work ability of the members of the small enterprise.

Keywords
Occupational health services, small enterprises, entrepreneurs, before-after study

1. Introduction
Occupational Health Services (OHS) is the central service system promoting the health and work ability of the working population and preventing work related illnesses and injuries in Finland. It is also the main device for prolonging working careers of the ageing population. Health, work ability and well-being at work have been shown to be positively related to productive work and the success of enterprises (1-6). The main objectives of OHS are stated in Occupational Health Care Act (1383/2001) as follows: The employer, the employee and the OHS provider should in co-operation 1) prevent work-related illnesses and accidents, 2) improve the level of health and safety of work and the work environment, 3) maintain and improve the health, work ability and functional capacity of employees at different stages of their work careers and 4) promote the functioning of the work communities and organizations.
The legislation of Occupational Health Services in Finland date back to 1978. Since then, employers have been obligated by law to organize occupational health services for the employees. The OHS must contain at least preventive services, but also curative services at the general practitioner’s level can be provided. Arranging OHS is voluntary for self-employed and entrepreneurs. OHS expenses are reimbursed by the Social Insurance Institution in accordance with the provisions of the Health Insurance Act. The reimbursement covers 60% of the necessary and reasonable expenses of preventive, and 50% of the medical services.

Since 1978 almost all of the large and medium-sized companies in Finland have arranged OHS for their employees. The coverage of OHS has remained relatively low in small enterprises (SEs), and among entrepreneurs and self-employed. At the moment approximately 64% of small enterprises (SEs) have arranged OHS to their employees. Only 15 to 30% of entrepreneurs and self-employed utilize OHS. Small enterprises make up 93% of all Finnish enterprises and they employ 25% of people working in the private sector. Promoting work ability and occupational health in small enterprises and among entrepreneurs is important also for the future: the majority of the Finnish enterprises will be small enterprises and the number of self-employed is constantly increasing. (7-8.)

In order to ensure entrepreneurs’ and their employees work ability and entrepreneurs’ ability to continue their businesses and cope with their work, the coverage of OHS should be improved. Many of the small business owners do not have sufficient knowledge of OHS and their responsibility to maintain work ability at the workplace. Particularly those not covered by OHS are not aware of its aim and content. Many claim that it is difficult to know what kind of services they should buy. (9-10.) Furthermore, some with occupational health services feel that they do not get enough help from OHS provider in preventing sick leaves and maintaining work ability in their company (11).

The operational model and methods of OHS have been developed in the context of large industries and do not fit well for entrepreneurs and small enterprises. OHS procedures are experienced as bureaucratic and OHS-centered, and not focused on the actual customer needs. In order to develop OHS to answer better to the needs of small businesses and entrepreneurs, an array of research and development efforts have been taken. These studies and projects have procured models and methods that have improved the knowledge of work ability promotion and activated the prevention of work related ill-health. They have also helped OHS personnel to better support their small firm customers and improved the efficiency of OHS. However, until now these methods and models have remained underutilized in the OHS practice.

2. Approach
Acknowledging the importance of health and work ability promotion in small enterprises and to fill the gap in the coverage of OHS for entrepreneurs and small enterprises, a model of good OHS practice for small enterprises employing less than 20 workers was negotiated and developed in collaboration between the Ministry of Social Affairs and Health in Finland,
Finnish Institute of Occupational Health, Social Insurance Institution and Employers and Trade Unions. The model utilizes the results of former research on OHS for small firms and entrepreneurs (10-13).

3. Results
The OHS model for small enterprises focuses on the specific needs of small work places. It is especially meant for such enterprises that do not neccessary have an occupational safety board and therefore lack the formal occupational safety processes. The model aims to develop the collaboration between the small enterprise – both employers and employees – and the OHS. It activates small business owners to take care of their own health and the health and work ability of their personnel. It ensures that all the actors of the small firm are provided with relevant and sufficient information about the goals, contents and methods of OHS. Based on this knowledge, well informed decisions about how to support work ability at the work place in collaboration with OHS can be made and relevant actions taken. For OHS providers the model contributes a new operational framework that systematizes services and helps OHS to better answer to the varying needs of entrepreneurs and SEs. It also offers improved fluency and transparency of the OHS processes.

The OHS-model for small enterprises consists of three phases: 1) negotiation and agreement on OHS for the enterprise; 2) planning the services based on the company situation, conditions and occupational health needs, and starting the collaboration between OHS and the enterprise, 3) the continuing process of OHS and collaboration between OHS and the small enterprise. (Figure 1.)

In the negotiation phase OHS professional – occupational health phycisian or nurse – visits the work place and gives relevant information about the aim, content and processes of OHS to both the employer and the employees or their representatives. He also informs the employer about her/his responsibilities in work ability maintenance and how OHS should be arranged and negotiated in collaboration with the representatives of the employess. During the visit a preliminary workplace survey is conducted and the employer and the personnel are informed about the health related issues of their work and working environment. After the discussions the OHS contract can be made.

In the second phase an action plan of OHS is made in collaboration between OHS personnel and the firm. Occupational health needs of the enterprise are determined through examining the health, work and working conditions of the employees and the entrepreneur and how they may affect the health and work ability. This is done by a) using self-assessments of the employees health, work and working conditons (14), b) conducting health examinations, which utilize the personnel's self-assesments and - if neccessary - c) conducting a more profound work place survey. The results of the examinations and their conclusions are discussed in the work place. Based on the discussion the OHS action plan is made in collaboration with the employer and the representatives of the employees.
From that point on, the systematic OHS process proceeds utilizing self-assessment questionnaires as work ability screening methods and workplace surveys that can be integrated in the workplace risk assessments. In the yearly contact from OHS to the company, the company situation and the health needs are discussed and necessary actions are taken.

4. Implications
The model of good OHS practice for small enterprises will be implemented into the OHS practice in the national implementation project in 2013. The effectiveness of the model and its impact on the coverage of OHS and OHS practice in small enterprises will be examined in a national evaluation study.

Figure 1. OHS process for small enterprises
Negotiation and agreement on OHS for the small enterprise

2. Planning and starting the collaboration between OHS and the small enterprise

3. Continuous OHS in collaboration with the small enterprise
5. References


Participatory practices and understanding of occupational health and safety risks in small businesses

Authors
Bikram Pandey, PhD student, Centre for Ergonomics, Occupational Safety and Health, Massey University, Palmerston North, New Zealand, B.R.Pandey@massey.ac.nz
Ian Laird, Associate Professor, Centre for Ergonomics, Occupational Safety and Health, Massey University, Palmerston North, New Zealand, I.S.Laird@massey.ac.nz
Kirsten Bendix Olsen, PhD, Centre for Ergonomics, Occupational Safety and Health, Massey University, Palmerston North, New Zealand, K.B.Olsen@massey.ac.nz
Peter Hasle, Professor, Centre for Industrial Production, Aalborg University Copenhagen, Denmark, hasle@business.aau.dk
Stephen Legg, Professor, Centre for Ergonomics, Occupational Safety and Health, Massey University, Palmerston North, New Zealand, S.J.Legg@massey.ac.nz

Abstract
Small businesses are characterised by highly hazardous working environment and significant exposure to occupational health and safety risks. Key elements of the strategies on managing these hazards and risks are identification, assessment and control. Understanding of OHS risks by employer and employees is fundamental to such strategies. The local work environment context of employer working alongside employees under similar circumstances provides unique condition for development of a similar/common understanding of OHS risks and participation in their identification and control of hazards and risks in SBs. However, the similar or different understanding of OHS risks between employers’ and employees’ the way it is related to participation in the SBs has been little studied. This study, therefore, using the theoretical framework of Local Theory of Work Environment, explored the (local) understanding of OHS risks between the employer and employees and their participation in identification and control of hazards and risks in light of the local understanding.

A qualitative study based on three small business cases was designed to achieve the aims of this study. This involved ethnographic field observations and semi-structured interviews with the employer and employees in three independently owned restaurants and cafés from the Central North Island, New Zealand. The data were analysed thematically using the techniques of fishbone analysis and developing typologies.

The results showed that the employer and employees understood experiential obvious physical problems associated with immediate effect as OHS risks. Similar or different perception and understanding of casual relation led to establishing similar or different construct of local theory. Legitimization was the reason behind such similarities and differences. The local theory determined what was considered an appropriate approach to identification and control of hazards and risks. Participation formed an important contextual
element for the construct of local theory. Open, lead-through and closed participation emerged as three pre-dominant typologies of participation. The findings imply that hazard management systems in SBs are more or less reactive in nature. Expanding and extending the sphere of legitimisation through greater formalisation of recognition of hazards could establish a more predictive and proactive strategies with increased open participation. This would help adopt more appropriate techniques other than administrative techniques for identification and control of hazards and risks.
An intervention on psychosocial risk (PSR) in an SME

Authors
Johann Petit, PhD, teacher and researcher, Ergonomics Department, ENSC/IPB, University of Bordeaux, France, johann.petit@ensc.fr
Bernard Dugué, PhD, teacher and researcher, Ergonomics Department, ENSC/IPB, University of Bordeaux, France, bernard.dugue@ensc.fr

Abstract
The PSR problem has become a major occupational health issue in Western countries. At the request of an SME which processes fattened ducks, we developed a specific approach taking into account its economic and social environment. We assumed that the PSR could not be dealt with independently of the realities and the production constraints. The initial request, made by the person responsible for occupational health and the head of production, mentioned a deterioration in the working environment in the “stripping” department, where “foie gras” is prepared once removed from the duck. This resulted in an increase in absenteeism (more than 20%), complaints from employees over a long period, a deterioration in mutual aid between employees in the department and a general demotivation.

We proposed a participative methodology (in working groups) targeting the identification and resolution of quality and production problems, ranging from difficulties in producing foie gras of quality to being able to cope with PSR. In particular, we will discuss the method employed:
- Work analyses to identify problems with production and quality,
- Search for links between problems of production, quality and health,
- Participatory ergonomics to try out solutions and evaluate them,
- Reflection on the organization with middle and top management.

The production problems were finally resolved, thereby improving productivity and quality. Beyond these aspects, our biggest challenge was to establish a process allowing more leeway for employees to improve their daily situation, something that supervisors saw as loss of control. Our focus was employee commitment to the process and the positive results have finally proved convincing. Absenteeism has stabilized and was lower a few months after the intervention. Feedback from managers and employees has reported the efficiency of this work-centered approach.

Keywords
PSR, food-processing industry, participatory intervention, empirical research, organization.

1. Introduction
The International Labour Office estimates the cost of PSR in the industrialized countries at 3 to 4% of GDP. Small and Medium sized Enterprises (SME) are also concerned by these health problems. Sometimes, however, SMEs can find it difficult to feel concerned about these issues. PSR are often associated more with large companies and SMEs struggle to recognize it. In addition, the tools that are usually used to deal with it do not sufficiently take into account the specific features of the SME. PSR-related reflections and actions are often guided by approaches developed in the areas of epidemiology and psychology. In companies this means using questionnaires and providing support specifically for individuals judged to be “in difficulty”. While such methods may have found a certain resonance in large companies, identifying the macroscopic causes of problems and setting up tertiary level prevention, it seemed to us that these methods did not help SMEs to fully grasp the issue, especially with regard to the tools that should be used.

Based on a case study in a food-processing company, we will show that it is possible to treat the problems surrounding PSR by focusing on difficulties at work and in particular on problems of quality and production. The results presented here will open up new areas for discussion on methodological aspects and on the need to understand the links between work (when it is “well done”) and health.

2. Material and methods
This is a company of 120 employees, which processes fattened ducks that have been killed and drawn elsewhere. It produces mainly preserved goods such as confits and pâtés, with the majority of its production being cooked and semi-cooked foie gras (literally fat liver). In this paper, we look at the production of foie gras. Before production, the raw livers are stored in freezers. They are thawed then unpacked, according to demand. They are then ready to be prepared for cooking. This preparation consists of sorting them (those that are very damaged will end up in derivative products such as duck mousse), removing the veins and the nerves, and leaving them for 24h in salt solution: these three tasks (sorting, de-veining and salting) take place in the same factory workshop. Next, the foie gras is cut up, put into jars manually and cooked in autoclaves. Depending on the flow of orders, the jars are stored at the factory before being dispatched.

One of the key parts of this process is the de-veining. To a large extent this determines the final quality of the product. When foie gras is eaten, there are two criteria in which the
customer is particularly interested: appearance and taste. If a liver has not been properly de-veined this will have consequences for these two criteria.

A request for an intervention in this company was made via the head of production and the person in charge of "Occupational health". They explained that there was a general deterioration in interpersonal relations in their company and particularly in the de-veining area. This had given rise to an increase in absenteeism (28% when they made their request), frequent disputes between employees and managers or between employees themselves. The terms they used ("difficult relations", "bad atmosphere", "stress", "psychosocial risks") referred back to PSR-based issues which had gone on for about two years. The department heads obviously wanted some help in improving this atmosphere, which they saw as negative. However, from our first contact with these department heads, we realized that in addition to the problems that had already been mentioned, there were also difficulties in relation to production: loss of productivity and increase in the number of quality-related problems. We therefore pointed our study in this direction, starting from the hypothesis that the increase in absenteeism and the worsening of the atmosphere in the department were the result of the difficulties the employees were experiencing in producing top quality work.

In terms of methodology, we worked in stages:

- Analysis of the work in order to produce a diagnosis,
- Working groups to look for solutions to the problems diagnosed,
- Pilot committee to decide on the solutions to be adopted.

We carried out five half-days of observations and 17 interviews, and chaired four working group meetings and three pilot committee meetings, each lasting half a day. Lastly, we spent four days monitoring how the solutions were being implemented.

The de-veining workshop includes 36 people - 33 female operators and 3 line supervisors. This is an activity that requires a great deal of precision in the actions that are performed. Fingers must be slim and agile. This is why only women carry out this task. There are four lines (all set facing one another), with five operators on each line and one to do the sorting.

Figure 2: Process of de-veining
The veins and the nerves are removed using a knife. On the production line, the first female operator opens the liver, the next three remove the veins and nerves and the last one puts the liver back together. These very precise movements are carried out at a very fast pace (one liver every five seconds) and with the focus being very much on quality. The operators work standing up, in a room with no natural light and at a temperature of 4°C, maintained by air ducts placed above the production lines. They work alternate morning and afternoon 8-hour shifts during the season only (mainly from September to December with part-timers also being brought in). As this request was based on a problem of "atmosphere" and strained "interpersonal relations", we first observed that working conditions and environmental conditions were difficult, and the task was a very demanding one.

After carrying out analyses in the field, we started on group work. We held four working group meetings composed of six operators, one line supervisor and one ergonomist. First, we presented our diagnosis on their activities and on what we considered to be the problems. The aim was to validate our diagnosis with the operators themselves, and to expand it. Next, we prioritized the problems and asked the operators to think about possible solutions by trying to evaluate the consequences in terms of working conditions and efficiency (quality and productivity). Between meetings we organized a pilot committee meeting (management, staff representatives, occupational health doctor and ergonomists) and presented the work in progress. The pilot committee then took a decision on which solutions should be implemented and the resources were made available to do this. Solutions were put in place gradually as we wanted to test them out in order to evaluate them. This process therefore took one year to complete.

3. Results

This intervention produced several types of results, which we will discuss in more detail next:

- Results concerning working conditions,
- Results enabling us to define different ways of regulating work on the factory floor,
- Changes in representations of the way cases of PSR were viewed and dealt with, especially by the management team.
First, the group work mainly covered resolving the problems that we had highlighted during observations and those that the employees had mentioned during the interviews. The expression that came up most frequently was "a loss of any meaning in their job" and "suffering", especially in relation to finding it impossible to reject products judged to be of poor quality. Indeed, some months before we arrived, operators were told not to reject livers because of their appearance. Of course it was this limitation put on their activity that was the main cause of their suffering. The deep-seated reason why these operators were driven towards this activity, which they could not in fact carry out, was related to the quality of their work. Their own vision of quality, or at least a common and important aspect of their vision of quality, was to place the customer at the heart of their activities, via the product. Suppressing this vision of quality was tantamount to destroying the way they were able to express their professional competence. They felt that, vis-à-vis their colleagues and the customers, their professionalism, shaped by an image of work well done, was being challenged. This was extremely distressing for the workers.

In the group meetings, the goal of quality marked all the discussions. Before the veins are removed, a foie gras liver must satisfy certain criteria:

- Good overall texture, checked by feeling with the fingers;
- It must be light in color;
- It must weigh between 400 and 600g.

Next, it must no longer contain any veins or nerves, yet it must not be too cut up and crushed. The operators' work is guided mainly by their aim to respect these quality criteria. To this end, the group set out to alter what was preventing them from carrying out quality work. The following table summarizes the main problems covered and the actions that were subsequently carried out to deal with them.

Often, the livers arrived partially frozen. This made it much more difficult to perform the necessary actions and the livers suffered more damage by the end of the process. At our request, management agreed to organize the thawing process better over time, by starting earlier, and checking how the thawing process was proceeding before sending the livers to be de-veined, even if this meant resuming the thawing process.

Each operator developed her own specific actions, not always using the same knife in order to cut more precisely. It was essential to maintain the knives properly (cleaning and sharpening) so that they were in good working order and operators could work quickly, without damaging the liver. To deal with this, the knives were personalized and a board was specially designed to hang them on, and this was placed at the factory floor entrance.

As the livers are not always the same kind (ducks and geese), some may be harder than others, and some knives cut better than others, the operators sometimes have to move down the line while keeping the liver in their hands for the necessary time. They then move back up the line to return to their position. Shortly before our intervention, the line supervisors had forbidden this practice to prevent the women from being too close to one another and
"chatting amongst themselves". This practice, which was essential to maintain quality, was reinstated once management had understood its importance for production efficiency and quality.

Previously, the processing of goose livers was concentrated over a period of two consecutive days of the week. These livers are denser in consistency and they are much more difficult to process. On the third day, the operators were exhausted, their shoulders ached, which often led to absences for sick leave. It has now been agreed to spread these livers across the whole week.

Finally, the line itself was modified by installing standing-seats, foot rests and rests for the lower abdomen. Although this may be a change that is often applied and simple to do, it represented a "minor cultural revolution" on a factory floor where sitting down to work was synonymous with resting.

Next, we worked more specifically on improving regulatory processes. A line supervisor was present at each working group meeting who could therefore state that the difficulties the employees were experiencing had their basis in the work and their desire to do a good job. As more meetings were held, the topic of managing interpersonal disputes gradually gave way to trying to find solutions collectively to day-to-day production problems. This had a secondary effect as the line supervisors realized how little leeway they had for resolving them.
Table 1: Summary of topics and actions

<table>
<thead>
<tr>
<th>Topics</th>
<th>Areas of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Check temperature of livers before they reach the line</td>
</tr>
<tr>
<td></td>
<td>Livers that are not completely thawed must wait</td>
</tr>
<tr>
<td>Work tools</td>
<td>Personalized knives: 2 per operator</td>
</tr>
<tr>
<td></td>
<td>Creation of a knife-holder with named spaces</td>
</tr>
<tr>
<td>Position of operators on production line</td>
<td>Rules allow workers to move up or down the line</td>
</tr>
<tr>
<td>Organization of production</td>
<td>Different organization of goose liver processing (every day)</td>
</tr>
<tr>
<td>Stations on production line</td>
<td>Purchase of standing-seats</td>
</tr>
<tr>
<td></td>
<td>Installation of bars to rest feet and lower-abdomen</td>
</tr>
</tbody>
</table>

Management realized the importance of regulatory processes to ensure that production ran smoothly and to safeguard health. We therefore worked with them on this topic. They confided in us that directives from the group to which the company belonged had forced them to "toughen up" production recommendations for productivity reasons. Our intervention convinced them that it was important to have defined regulatory areas. The management of this SME then negotiated with the group to be allowed, as an experiment, to relax organizational procedures. Weekly meetings were set up for each workshop with operators and line supervisors present, to report on any problems and provide solutions. Within given guidelines, line supervisors were now allowed to make formal decisions. Monthly meetings were put in place with workshop supervisors and the management team to look at any problems that had not been dealt with by the line supervisors. With the same end in view, management organized a training session for the workshop and line supervisors. The aim was to train them in management and in particular to improve their ability to take into account the difficulties associated with the workplace. These sessions were based on their own practices, especially any difficulties they had encountered, and the result was that the management team pledged to give some thought to delegating decision-making power.

Eighteen months after our intervention, we had the opportunity to return to the company to observe the state of operations. The effects of the intervention were perceived very positively by employees and management. The meetings that had been set up were still ongoing, though were held less frequently, and the training session had been very helpful for the line and workshop supervisors. During this time, employees from each workshop had attended meetings and had shown an interest in speaking about their work and being effective in seeking solutions. They said they were once again achieving a certain level of quality, which was confirmed by the figures. Lastly, management said they had had doubts at first about our intervention, thinking that this was not the way to deal with their PSR problems. The results had totally convinced them, however, that the areas for discussion that had been set
up were the solution, both in the medium and the long term, even if this procedure was not able to manage all interpersonal disputes indirectly.

4. Discussion

4.1 Horizontal and vertical regulations

The process of de-veining livers for foie gras requires operators to be constantly managing a range of variabilities. To do this, they must be able, on a daily basis, to modify and adjust their way of working in order to achieve quality and productivity targets. They need to have sufficient leeway to govern their actions and not be prevented from carrying out part of their activity. If it were simply a matter of identifying the person who was preventing the work from being carried out, then this exercise would be a very straightforward one. However, the line supervisors are in a very similar situation to that of the operators. They too have very little room for maneuver to regulate the way the workshop functions. As supervisors, their role is in fact limited to checking whether targets are being met and acting to ensure that they are. Their middle management role, as an intermediary who "hears" the feedback from their subordinates, analyzes it and suggests changes in working conditions so as to improve the situation, is reduced to zero. It is no longer even considered necessary that this work should be carried out by middle managers. Lastly, this mode of operation generates organizational failures. The line supervisors were in such a state of denial, very probably for their own protection, that they had completely blocked out any chance of "hearing" feedback from the shop floor. The organization was therefore preventing itself from improving operating conditions and did not have a vision of quality that recognized the position of the client, thus reducing its capacity for resilience (Hollnagel et al., 2006; Petit & Dugué, 2010), a paradox for a company that placed the client's expectations at the heart of their operation. It was therefore essential to improve this ability to regulate.

We organized the working groups so that discussions focused on aspects of work that had been observed and validated and where it was possible to find solutions that could be put in place. This method is not feasible if participants do not have at least a minimal guarantee that possible solutions will be implemented. In this way, participation in the working groups was an excellent way of developing the ability to define and structure the regulatory process:

• by transforming problems perceived as "individual" into organizational problems,
• by improving the work situation,
• by developing and recognizing technical abilities (Béguin, 2007),
• by building or strengthening links with colleagues (Caroly, 2010),
• by recognizing skills relevant to organizational work and hence outside the scope of traditional career development models and criteria (Castilla & Bernard, 2010).

In this way, we used the working groups to demonstrate that regulation at the lowest relevant level (Petit et al., 2011) is, both for individuals and groups, a resource for developing their power of action, in that they find possibilities for dealing with day-to-day problems which make sense for them but which until that point had not been recognized as such. We
eventually persuaded management to agree that it was essential to allow the system to be regulated as we had done and that to do this, the organization had to change.

We were finally able to set in motion two types of regulation:

- Horizontal regulations which applied between operators, who were able to discuss professional practices and create a common set of guidelines to achieve work well done. This work was done in groups, so that rules governing how to do the work were coordinated across the workforce.
- Vertical regulations which involved sending problems up the levels of the hierarchy, as far as top management if necessary. In the case of the intervention described here, this had the effect of showing how little space was allowed to the line and workshop supervisors for taking decisions.

Lastly, in order to be effective, these two types of regulations have to be based on real aspects of the work concerned.

4.2 Participation
It often happens that when the suggestion is made to put working groups in place, one comes up against reticence or refusals on the part of management or employees. For management, working groups may be seen as a waste of time and an opportunity for employees to make complaints. For employees, working groups may bring to mind negative experiences of participation where their suggestions were not given consideration and where options had already been decided on by management beforehand. Looking beyond these points, in our opinion there are 3 essential conditions to ensure that participation works well:
Have some guarantees of implementation, by decision at local level, even though at the beginning these may be minimal,
Consider participation in an experimental process,
Form working groups fairly early in the intervention.

4.3 Taking time
When organized in this way, the intervention takes on an educational aspect (Dugué et al., 2010). It becomes an opportunity to learn about one’s own work, the work of others, new ways of working, decision circuits and where they are applied, and it is also a time to pass on one’s own ideas to colleagues. In addition, the ergonomists need this time to gain the confidence of the group members and management. Participants wait to see whether the ergonomists will really be able to "bring about change", even though officially the managers have allowed them this leeway. As for management, they want results. So whether we are acquiring confidence or results, one way of achieving these is time. Thus, if insufficient time is allowed for an intervention on PSR, and hence on the organization itself, this would undermine both confidence and results.

4.4 Involving middle management
This work on questioning the allocation of power impacts directly on the problems that middle managers encounter in practice. One of the causes of the absence of regulations and discussion about work is the middle managers' inability to formulate regulations (Reynaud, 2003). Thus it is essential that they are associated with this procedure. The line supervisors have to be able to participate in the working groups as "relevant decision-makers", given the work that is done in these groups. The other middle managers (workshop and production supervisors) must be able to consider the processes and the results produced by the groups in relation to the difficulties they themselves encounter in their work. They are the ones who will carry any challenges to the decision process to senior management and implement any new proposals. Up to this point, analysis of the work of middle management focused on the nature of orders as elements to define the work of their subordinates. It would now be interesting to go further in our understanding of their work by looking at the distribution of powers and decision-making circuits.

4.5 Decision-making circuits and areas as the "subject" of the intervention
This brings us to a discussion of the subject of this intervention on PSR. In our opinion, this is where the heart of the problem lies. Building temporary spaces for regulation is not sufficient. The decision-making circuits and areas must themselves be modified. What working people need most is still the necessary room for maneuver so that they can constantly adjust their work to match a wide range of variabilities. The structure of the organization can be stabilized in such a way that there are improvements in the situations being dealt with. However, once the intervention is over, the work will continue to require attention. By acting on decision-making circuits and areas, this will enable employees and managers to keep some degree of control over regulating work. Guided by the concept of organizational subsidiarity (Petit et al., 2011), ergonomic intervention is able to propose a decisional architecture where decisions are taken at the lowest appropriate level.
5. Conclusion
There are usually two possible points of entry when proposing an action affecting the organization. The first concerns support during organizational change. In this instance, the decision-makers have more or less expressed their willingness to question and modify the organization as it is and, as a rule, a transformation process is then implemented. The second point of entry, and the one most often used, concerns requests that report a problem. Since there is now increasing awareness of PSR due to media coverage, this has encouraged this kind of request. One of the predominant representations that applicants have of PSR is to consider that the endpoint is to provide support for the most "fragile" individuals (Clot, 2009), even though we know full well that interventions of the "stress management" type, on absenteeism for example, are ineffective (Van Rhenen et al., 2007). In this second type of intervention, the action on the organization is not simply a matter of course for the applicants. A considerable amount of work is needed, both on the part of the ergonomists and individuals from the company, to make sure that it is understood that the origins of the problem do not lie only in the fragility of some individuals. In any event, a procedure that aims to act on PSR and hence on the organization cannot be put in place without the involvement of those who are undergoing it and have to make it work. In other words, the individuals and groups who provide structure for the organization, whether or not these methods are official and recognized, must be stakeholders in discussions surrounding the organization.

To conclude, one of the strengths of SMEs is that they retain an ability to react and adapt rapidly to any internal or external complications, which may be linked with the economy, legislation, production, people or social matters. This is sometimes more difficult for a large company where the operational structure can give rise to inertia when changes have to be made. In the case we describe, we can see that for PSR, the situation may be different. The senior and middle management of this SME perceived a problem with interpersonal relations as it manifested itself as such and had consequences which they judged to be significant. However, few links had been forged between the operators and their own work and the consequences of the disputes had been equated with the causes. The main causes of this problem, however, were to be found in the work, especially in what was preventing this work from being carried out (Clot, ), and in what constitutes the strength of an SME, i.e. its ability to regulate when there is such variability in conditions. Finally, giving the workshop back its ability to regulate and thus produce work of quality is a major focus for interventions on PSR in an SME.

6. References


A safety culture intervention: “growing a safety culture” in small forestry businesses

Authors
Don Ramsay, PGDipBusAdmin (Dist), Consultant, iSafety Ltd., PO Box 8154, The Gardens, Dunedin, New Zealand. 9041. don.ramsay@isafety.co.nz
Hillary Bennett, PhD. Consultant, The Resiliency Centre, P O Box 300594, Albany, Auckland, New Zealand. hillary@leadingsafety.co.nz

Abstract
To develop and trial an implementation process for the safety culture assessment tool “Growing a Safety Culture”.

The twelve elements derived from the forestry sector Safety Culture Tree, were printed on an A3 size laminated sheet, one sheet for each crew member, and had four selectable categories for each of the elements. These categories described differing levels of safety performance and each crew member was asked to pick the one that they felt best represented the culture on their site. At the end of the assessment the forms were collected up and returned to a consultant for analysis and feedback.

The number of times each statement has been circled for all members of the crew, for each of the 12 safety culture dimensions was calculated. The results were fed back using a ‘Growing A Safety Culture’ report sheet that used a ‘traffic light’ scoring profile which reflected whether, according to the crew assessment, the dimension was ‘On the right track’ or whether ‘Action was required’.

On this basis the project was rolled out in two forests (forest A and forest B), with 28 predominantly harvest crews, and approximately 200 forestry workers across the lower North Island. The intention was to determine how successful the strategy to roll out the intervention was. How many crews would engage with and complete a project identified from the assessment?

The rollout of the intervention showed that only about a third of the crews actually completed a project, and given the high cost of delivering such an intensive intervention, the strategy needs reviewed if the project is to continue.

Keywords
Forestry, Safety culture

1. Introduction
Harvesting a forest is particularly hazardous work. A report from the Accident Compensation Corporation (ACC, 2011) showed that there were 340 lost time injuries from July 2009 until the end of June 2010. The total cost of these injuries to the sector was $11 million dollars.

One task in forestry operations that contributes to the injury toll; breaking out in cable logging operations, has been examined extensively to determine the culture involved in the work (Prebble 2010). The culture identified includes a poor understanding of the hazards, in some cases a lack of training for the task in hand, risk taking, and poor communication, specifically signalling prior to the movement of the carriage during the in-haul stage of breaking out. Earlier work by Parker (2002) identified poor management of fatigue across the entire sector.

The NZ Forest Owners Association is determined to change this culture and one of the strategies it is using is the roll out of the safety culture initiative, developed by the Department of Labour, ACC, and the forestry sector in 2009.

2. Methods

This report is mainly focussed on the observations from the safety culture project that was rolled out in two separate forests, with 28 predominantly harvest crews, and approximately 200 forestry workers across the lower North Island, late 2011.

A process to implement the programme was agreed with the contractors as follows.

The assessment was to take place in the forest on the contactor’s site. Two safety culture assessors would carry out the assessment after spending time earlier in the day building a relationship with the crew. Building a relationship included spending time down the hill breaking out or tree falling with crew members.

When there was a natural break in the work the assessors would organise to complete the assessment with the crew. This usually takes place during an extended meal break. The assessors explain the background to the safety culture tree, how the assessment tool was developed, and then the formal assessment begins. Each crew member has an assessment sheet to complete; they are told the results are confidential and will not be used to identify anyone, and anyone with literacy issues is assisted to fill in the form.

At the end of the assessment the sheets are collected up by the assessors and sent to a consultant for analysis. Where the crew have scored an element low the consultant highlights the element on the safety culture tree in red or amber.

The report from the consultant is taken back to the crew, usually within a month of completion, and the assessors go through the report with the crew. Elements in red or amber are drawn to the attention of the crew and the assessors talk through options for addressing those elements. A project planning template is also left with the contractor and crew to help them develop a project.
A few weeks later the assessors return to the crew to see what progress they have made with their plan. The strategy is that the contractor and crew will tackle one element and then having successfully completed it, will tackle further elements, and thereby over time, transform their culture.

The project was to run over three months but about half way through the project the method of operation was changed in forest A. The assessments stopped happening in the field and instead the forest owner and the contractors’ agreed that the crew would stop work for half a day and the assessment would take place inside a hall. This helped to relieve the pressure that was created when a truck would arrive to be loaded at the contractor’s site: the crew felt that this should be their top priority, and meant that they tended to rush the assessment.

Forest owner A also introduced a series of workshops into the mix, part way through the programme, which were aimed at encouraging crew members to take part in the programme, and also aimed at helping the contractor or their team leader, to set goals for the project.

3. Theory
Improving the performance and the culture of a business through tackling a problem, learning from the experience, and then building on that experience by tackling additional problems, is the approach used in business improvement programmes like Six Sigma. The broad concept, using a problem solving approach to improve culture, was the approach trailed in this initiative.

4. Results
All 28 contractors and crews identified an element that they felt needed improvement. The elements chosen are shown in the table 1. Although the safety culture tree is made up of 12 elements, the reality is that only a small number of elements are identified by most crews, as the place where their culture needs attention. Elements not targeted in this intervention were Managements’ Leadership of Safety, Continuous Learning, Relationships, and Safety Systems and Procedures.
Table 1. Safety culture elements tackled by contractors

<table>
<thead>
<tr>
<th>Safety culture element tackled by contractors</th>
<th>Forest A</th>
<th>Forest B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Safety systems</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Continuous Learning</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Relationships</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Training and competency</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Rewards</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Resources</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Work Pressure</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Risk taking</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Reporting and Investigation</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Worker Involvement</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Communication</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Feedback on how things went is only available from fifteen crews; nine from forest A and six from forest B. Because no formal evaluation was put in place during the design of the programme; at the conclusion of the programme the two forest owners had to go back to contractors’ and seek results.

Forest owner A contacted contractors who took part in the work, and asked for feedback on what they did, and the outcomes of projects. From the twenty two crews approached for project details, nine crews responded to the forest owner’s request. The remaining crews did not complete a project.

Forest owner B sent one of the assessors back to visit the six crews in the field, to determine their outcomes.

Of the nine contractors who undertook a project in the forest A, three completed the assessment, discussed a project, and then decided not to proceed any further. Of the remaining six contractors the challenges presented by the chosen projects undertaken varied considerably.

In forest B five of the six contractors completed a project and the outcomes are listed as; better communication with crews, necessary training completed, and better accident investigation processes put in place as part of a wider initiative.

Many of the projects had little detail of what was actually done, other than a broad “improved communication” description; however from those in forest A that provided more information, here is an indication of what they did.

4.1 Contractor 1: Resources

This contractor tackled the resources element. The contractor and crew felt they were working in a forest that had a much higher level of hazards than other forests, and the tree
faller had particular concerns for his safety while felling. A visual checking process was in place to ensure his safety but because of the nature of the site he was often out of sight from the tractor driver who was his safety observer. The tree faller requested a radio so that he could keep in touch, even when he was out of sight of the tractor driver, and this item was purchased for him.

4.2 Contractor 2: Resources / Risk Taking
This contractor struggled on occasions to meet production targets due to the nature of the wood he was harvesting. Wood was of small piece size which meant a lot more effort was required to harvest the wood than would be the case in other operations. The contractor and crew discussed purchasing a second loader to bunch and shovel the wood, to improve production, but after weighing up the pros and cons of the decision, decided not to go ahead with the purchase.

In talking to the forest owner they decided that this was a temporary problem and that as they moved on to other blocks the problem wouldn’t be an issue.

4.3 Contractor 3: Work Pressure
This contractor was harvesting on difficult terrain that was steep and unstable. He felt that whenever production pressure came on, e.g. having to make up for lost time due to bad weather, there was a substantial increase in risk to both, not meeting production targets, and also to having injuries. The contractor and crew discussed this with the forest owner and decided that the solution was better long term planning, realistic targets for production, and regular meetings with the forest owner to discuss any variation from the agreed plan before it became an issue.

Other projects tackled by contractors’ in forest A included addressing absenteeism, addressing machine breakdowns, and improving communication and worker involvement, but insufficient details were provided to write up the results.

5. Discussion
With regards to the number of crews that completed a project; this shows that there is considerably more work to be done in identifying what makes a crew engage with a project and see it through to a conclusion.

In forest A, at one of the safety culture assessments, there was perhaps an element of suspicion amongst the participants as to what this project was really about. Was it just a tick the box exercise or was the forest owner really trying to help them? This view probably influenced the contractors’ willingness to take part fully in the work.

There is also a possibility that some contractors were simply not ready for such a project as an illustration printed on the back of the assessment form suggests that safety evolves as a process that embraces engineering solutions, safety systems and then behaviours, in that order. Hopkins (2006) uses the same illustration in his paper but says that whether or not the process is evolutionary is contestable.
However, it is reasonable to propose that many of the elements tackled would be difficult to solve without having good safety systems in place, and could have led to some of the contractors giving up.

Much risk taking for example could be unintentional because the procedures to follow are simply not clear. Addressing the lack-of-procedures issue, means that unintentional risk taking might reduce. However, attempting to reduce risk taking without well established procedures to provide guidance is likely to end in frustration, as each person is left to work out what to do for themselves.

Some contractors felt they were too busy to complete a project.

None of the contractors or crews identified the broader element of safety systems and procedures as something that needed attention. Some twenty projects were based around elements that were directly connected to safety systems and procedures, yet the connection was not made by those taking part. In fact, many contractors felt that their safety system was something they did well. Perhaps this suggests that the safety culture element related to safety systems should be assessed by a systems audit rather than through the safety culture tool.

The major concern however, from the objective of this work, is the fact that while all crews identified an element or area where their safety performance could improve, only a about a third of the crews completed a project. The reasons for the completion rate have not been established, and this needs to be determined if the project is to have a bigger impact on the sector culture.

6. Conclusion

Improving the safety culture in forestry is essential if the sector is to get their safety interventions to work and to reduce injuries. If contractors and their crews can be encouraged to engage with safety, have their say on safety issues, and make improvements in their practices, then the sector will be making progress.

The active involvement of the forest owner in the work encourages contractors to take part, but to get the maximum outcome from the intervention the forest owners will need to address the poor completion rate of contractor projects. This might begin with a survey of contractors to determine their viewpoints on issues they encountered while attempting the project.

7. References


Practical tool and procedure for risk assessment in small and medium sized enterprises. Illustration in SMEs in Estonia

Authors
Karin Reinhold, PhD, Associate Professor, Department of Work Environment and Safety, Tallinn University of Technology, Estonia karin.reinhold@tseba.ttu.ee
Piia Tint, PhD, Professor, Department of Work Environment and Safety, Tallinn University of Technology, Estonia piia.tint@tseba.ttu.ee

Abstract
This study focuses on occupational hazards and the determination of risk levels derived from them. Indoor climate, lighting, noise, and dust are examined. An original approach is offered to assess these occupational hazards in manufacturing using a flexible risk assessment method. The results of measurements of occupational hazards in five industries (mechanical, printing, wood, plastic, and clothing industries) in Estonia are presented. The work conditions in the office-rooms of these 5 industries are also examined as comparison. The connections between the health hazards and possible health damages have been derived in the form of schemes suitable for the use to the employers of small and medium-sized enterprises to carry out risk assessment and determine the risk levels of which the scheme of wood dust is presented in the current paper. The overall purpose of the paper is to draw the attention to the importance of measurements of occupational hazards in industry and to act as a reminder of number of issues of practical relevance to effective workplace risk assessment from which employees and employers can benefit today and in the future.

Keywords
Work environment, occupational hazards, risk assessment, risk levels

1. Introduction
Many researchers (Gardner et al., 1999; Lamm, 1997; Stevens, 1999) claim that small and medium sized enterprises (SMEs) have special problems with the work environment: the risk is higher and the ability to control risk is lower. There are also studies indicating that exposure to physical and chemical hazards are higher in SMEs than large companies (Schlunssen et al., 2001; Soresen et al., 2007) and there is no reason to believe the opposite concerning Estonian enterprises (no appropriate research exists).

Due to EU regulation (Council Directive 89/391/EEC) each member state of the European Union has to establish national legislation to demand risk assessment procedures in enterprises of all sizes (EEC, 1989). In Estonia, the Act on Occupational Health and Safety that requires risk assessment at every workplace was adopted in 1999. Workplace risk assessment can be conducted by the employers using their own resources or by registered practitioners in occupational health (Occupational Health and Safety Act, 1999). This means,
that employers in Estonia are legally obliged to carry out systematic, documented workplace risk assessment, which sets a special requirement to the method used: it should be flexible enough to be applicable for a large variety of enterprises.

2. Material and Methods
The study includes the following activities:

1. To connect risk levels and health complaints, the flexible risk assessment method worked out by the authors in 2002 (Reinhold et al., 2006) is used. The method is based on two-step model (Fig. 1) that could be enlarged to a six-step model, and uses (no/yes) or (corresponds to the norms/does not correspond to the norms) principle. The motivation to use five-step model (Fig. 1) is derived from BS 8800:2004 standard, which also recommends five risk levels and is therefore familiar and comprehensible to understand to employers and OHS specialists. The five-step model suits for SMEs (but not only), where the situation of the work environment is irregular with many different hazards, therefore the level of hazards at workplace varies a large extent and the personnel, having the relevant qualifications are able to orient in the improvement of the work environment. The main target in this activity is the left side of the model, where the risk level is higher. However, a scheme with fewer steps is recommended to use if it is more applicable, especially in enterprises where the safety activities are disorganised and personnel inexperienced, but willing to enhance workplace health and safety.

Fig.1. Two-step and five-step models of flexible risk assessment method

2. The criteria for risk levels of occupational hazards were obtained from regulative norms (Resolution of the Estonian Government, 2007a; Resolution of the Estonian Government, 2007b), standards (EVS, 2007; EVS, 2011), directives (EC, 2003) or scientific literature. Literature scan focused on the impact of the main occupational hazards on workers’ health (Elefteriou, 2002; Evenson, 2002; Dukes-Dobos, 1981; Kauppinen et al., 2006; Powadzka et al., 2002; Schlunssen et al., 2001; Stenton, 2004; Triebig et al., 2009; Virkkunen et al., 2005).

3. Eighteen case studies in companies of different industries were performed. The case studies were conducted in the time period of 2008-2012 (Table 1). All investigated companies were assessed as SMEs - classified in Estonia according to the common classification in Europe (Pilchner et al., 2001; Statistikaamet, 2003): small sized with
10-49 employees and medium sized with 50-249 employees. The enterprises were chosen based on the most relevant industrial branches in Estonia and were located in different parts of Estonia, however major of them in or around the capital and western part of the country. Previously, no risk assessment based on occupational measurements was performed in these companies. During the visits to the companies, main hazards were identified, five physical hazards (indoor air temperature, humidity and velocity, noise, lighting) and dust measured and their risk assessed with flexible risk assessment method (Fig. 2 and Fig. 3). Relevant standard methods were used while performing occupational measurements.

Fig. 2. Dyeing in wood processing industry  
Fig. 3. Welding process in mechanical industry

### 3. Results
The analysis of the main health hazards is based on the measurements summarized in Table 1 and Table 2.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of companies</th>
<th>Number of workers</th>
<th>Illuminance, lx, U* = 10.4%</th>
<th>Dust, mg/m3, U* = 0.001 mg/m3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood processing</td>
<td>5</td>
<td>25…100</td>
<td>525…1040</td>
<td>0.4…1.0 (textile dust)</td>
</tr>
<tr>
<td>Clothing industry</td>
<td>5</td>
<td>50…150</td>
<td>264…1625</td>
<td>1.2…4.4 (paper dust)</td>
</tr>
<tr>
<td>Printing industry</td>
<td>3</td>
<td>20…100</td>
<td>320…1050</td>
<td>2.0…10.0 (wood dust)</td>
</tr>
<tr>
<td>Mechanical industry</td>
<td>2</td>
<td>90…175</td>
<td>88…1256</td>
<td>0.7…2.5 (welding dust)</td>
</tr>
<tr>
<td>Plastic industry</td>
<td>3</td>
<td>25…100</td>
<td>138…742</td>
<td>2.0…6.0 (general dust)</td>
</tr>
<tr>
<td>Office rooms</td>
<td>18</td>
<td>25…80</td>
<td>344…1200</td>
<td>0.02..0.06 (general dust)</td>
</tr>
</tbody>
</table>

Table 1. Summary of the investigated companies and lighting and dust measurements
Table 2. The results of indoor climate and noise measurements

<table>
<thead>
<tr>
<th>Industry</th>
<th>Indoor air temperature, 0C, $U^* = 0.6,0C$</th>
<th>Indoor air humidity, %, $U^* = 2.0%$</th>
<th>Air velocity, workplace, m/s, $U^* = 0.01$</th>
<th>Noise level, dB(A), $U^* = 2.0,dB$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold season</td>
<td>20.3…23.5</td>
<td>44.4…53.0</td>
<td>0.01…0.04</td>
<td>62.1…89.5</td>
</tr>
<tr>
<td>Warm season</td>
<td>22.7…25.6</td>
<td>48.2…53.0</td>
<td>0.01…0.04</td>
<td>66.4…90.3</td>
</tr>
<tr>
<td>Cold season</td>
<td>21.2…24.0</td>
<td>38.2…52.2</td>
<td>0.01…0.04</td>
<td>84.2…94.4</td>
</tr>
<tr>
<td>Warm season</td>
<td>22.5…24.3</td>
<td>44.2…62.4</td>
<td>0.01…0.04</td>
<td>73.0…97.5</td>
</tr>
<tr>
<td>Clothing</td>
<td>印刷</td>
<td>10.8…21.4</td>
<td>31.3…39.9</td>
<td>0.01…0.21</td>
</tr>
<tr>
<td>Wood</td>
<td>14.0…22.4</td>
<td>26.1…40.7</td>
<td>0.01…0.17</td>
<td>46.7…62.4</td>
</tr>
<tr>
<td>Plastic</td>
<td>10.8…21.4</td>
<td>31.3…39.9</td>
<td>0.01…0.21</td>
<td>61.1…83.8</td>
</tr>
<tr>
<td>Offices</td>
<td>18.7…23.0</td>
<td>32.6…47.9</td>
<td>0.01…0.17</td>
<td>46.7…62.4</td>
</tr>
</tbody>
</table>

3.1. Analysis of measurements of indoor climate

The indoor climate measurements were carried out with TESTO 435-2. In most investigated companies, the indoor air temperature was at a justified or tolerable level (13…24°C) or very close to it. Some problems were encountered in the warm season in two companies of the clothing industry, two companies of the wood processing industry and one company of the plastic industry, where the temperature in departments was higher than optimal due to deficiencies in ventilation systems or their lack, however, it still between the limits of permitted temperature. In the cold season, the temperature fell to a lower level than permitted (13°C) in one of the mechanical companies due to deficiencies or lack of a heating system, opened doors and poor insulation of the industrial building. Indoor air temperature in office rooms were in most cases at justified or tolerable level (20…26°C). In two offices, the temperatures in cold season fell under the permitted level (20°C) and were assessed as unjustified risk. These offices were a part of a Quonset style industrial building which lacked an effective heating system. In warm season, the temperatures exceeded the permitted level and were assessed as unjustified risk (26.7°C). Those offices were situated in non-ventilated buildings.

Relative humidity posed a problem during the cold season when the air dried due to heating system and no conditioner system existed to balance the relative humidity of the air (e.g. 26.1% in plastic industry). A certain proportion of the employees complained about lipipitude of eyes, skin xeric and dryness of mucus membranes, which may be caused by the low value of relative humidity during the cold season. However, recommended values in the relevant Estonian standard (EVS, 2007) are 25…60%. In offices, all measurement results fell between recommended values as well.

The values of air velocity were in most cases acceptable (recommended limit value: 0.22 m/s), except in some companies of printing and wood industry, where higher values were detected due to the high-efficiency local ventilation. Some employees complained of
shortage of air during the warm summer days in rooms where the ventilation system was not regulated to produce higher air velocity values in the warm season than in the cold one.

### 3.2. Analysis of measurements of lighting

According to the measurements of lighting (luxmeter YF-170), it is no concern in the clothing industry, wood industry and in workplaces at offices of the companies. Improper lighting conditions were detected in the mechanical, plastic and printing industry. In some companies, observations of the workplaces revealed that some workers did not use the existing local task luminaries. Minor problems were connected with glare (constant and bright illumination from surrounding sources of light) and uniformity of illuminance. It is important to avoid dangerously deceptive shadows, which can be inadvertently produced in the vicinity of machinery.

Some complaints arouse among VDT users in offices, mainly because of the reflection produced by large windows or local lighting sources (desk lamps), which appeared to wash out screen character images, and cause annoyance as well as possible visual fatigue.

According to the standard EVS-EN 12464-1:2011, the recommended illuminance level for the work performed in the preparation department (sheet metal work, drop forging, medium assembly work) is 300 lx. The uniformity values differed from 0.5 to 0.92. Glare was not observed in most workplaces, but flicker was detected in the workplaces which were lighted by mercury fluorescent lamps.

### 3.3. Analysis of measurements of occupational noise

Compared to other studied industries, the noise levels (measured with Voltcraft 320) in the clothing industry present the least concern as none exceeded 85 or 80 dB(A) (permitted and action values according to Estonian legislation (Resolution of the Estonian Government, 2007a). Analyses of the measurements at various frequencies indicate that the noise level at work stations of machines has slightly different patterns, but all peaks were in the area of 500...2000 Hz.

According to the measurements, lower frequencies do not pose a concern in any of the studied industries. Several methods exist for estimating the amount of sound attenuation a hearing protector (HP) provides, among them the octave-band method, which gives the Noise Reduction Rate, is clearly the most common. Choosing suitable HP devices, high frequency protection should be emphasized in the studied cases. A HP device can reduce the exposure significantly - the nominal attenuation, recommended by the manufacturers, varies from 11 dB to 35 dB, depending on the HP device and the frequency contents of the noise.

According to the proposed flexible risk assessment method, the risk of noise exposure of 91.2 dB (Die machine Vipros in printing industry) was determined as inadmissible risk (level IV) and 97.5 dB (Great drill machine in mechanical industry) as intolerable risk (level V), which is in good conformity with the risk calculations according to ISO 9612:2006.
Noise levels in offices were in the range of 46.7…62.4 dB(A). The highest values were caused by the industrial noise in the same building.

Fig. 4. Wood dust and risk criteria (does not apply to carcinogenic wood dust)

3.4. Analysis of measurements of dust
Dust particulates were measured with HazDust EPAM-5000. According to the measurements, the concentration of wood dust in the Estonian wood processing industry varies from 2.0 to 10.0 mg/m³. The processed wood types were mainly birch and juniper. The exposure limit for inhalable wood dust is 2.0 mg/m³, but for all organic dust the exposure limit is 5.0 mg/m³ (Resolution of the Estonian Government, 2007b).

The presence of high concentrations of wood dust in the workplace air is a great concern especially due to the fact, that the assessment of occupational risk and exposure to wood dust is difficult. This difficulty arises due to the inconsistency and controversy surrounding many factors. First, the size and shape of dust particles, which decide where the particles precipitate in the respiratory tract, and about their adverse, particularly carcinogenic influence. Second, differences in the structure, composition and influence of various types of wood, taking into account the division into hard- and softwood. Third, the establishment of
the safe maximum level of dust concentration in the air of the work environment (Baran and Teul, 2007).

High levels of wood dust are considered as inadmissible risk according to the flexible risk assessment method.

In the clothing and mechanical industries, dust does not present a hazard of high risk level since the values of dust are lower than the proposed limits; in the plastic industry, some departments were identified where the amount of total organic dust was higher than the proposed limit - the highest value measured was 6.0 mg/m³ (the exposure limit: 5.0 mg/m³). An example of the risk criteria is given in Fig.4, where besides exposure limit values, the size of the particles is considered (dust between 2.5…10 microns is capable of penetrating deep into the alveoli (Aw et al., 2007)). Similar schemes of risk criteria were compiled for all the investigated hazards (indoor climate, noise, lighting and dust).

4. Discussion

All results were presented in front of the management and occupational health and safety (OHS) personnel in the companies. For workers, special meetings were organized to introduce the hazards and their risk level in their work procedures. In some cases, workers were not fully motivated to understand the importance of risk assessment. Workers should realize that if the OHS personnel alone are actively implementing the measures of safety improvement, there will be no good results. The spread of information in the organization and the positive attitude for safety among workers is extremely important.

The flexible risk assessment method was assessed suitable and transparent by the work environment specialists and the management of the companies. The workers emphasized the benefits of illustrative characteristics to get the first information about occupational hazards and the risks through the schemes of the flexible method.

5. Conclusions

1. A systemic approach to occupational safety is the key optimizing workplace safety in enterprises. A consistent method for assessing the occupational hazards is recommended. Flexible risk assessment method can be one of the recommended methods for small and medium-sized companies.

2. Using the Estonian experiment, five or four risk levels to characterize risks in a work environment are sufficient and unsophisticated for the employer to understand and use. Preferably, risk assessment should be performed by a person with the necessary technical competence. If the company lacks competence, registered practitioners in occupational health might be another option.

3. In the investigated Estonian enterprises, most of the hazards were under control. Noise is one of the main health hazards present in many industries. In the studied enterprises, the noise level exceeded the norms in several cases. The employers should attempt to find additional technical measures to lower the noise levels and encourage the workers to use the personal protective equipment properly. Wood dust in wood processing industry is another worrisome hazard evaluated as inadmissible
risk according to the flexible risk assessment method. Wood dust, depending on the type of wood, needs further investigation to develop suitable control measures.

4. In many of the investigated enterprises, the management’s attitude towards OHS was stimulating and supportive and the management showed eagerness to enhance workplace safety. However, in several cases it was suggested that the employers should improve the dissemination of information to workers on safety matters, particularly on the results of risk assessment, on the occurred accidents and incidents in the enterprise in order to remind them of the importance of following the safety measures for achieving a safe workplace.

6. References


buildings addressing indoor air quality, thermal environment, lighting and acoustics. Estonian Centre for Standardisation, Tallinn.


"Chemicals. Take care of yourself and others – from knowledge to practice" - Teaching chemical safety at sea through film

Author
Anne Ries, Senior Consultant, M. Sc., EurOSHM, Seahealth, Copenhagen, Denmark, alr@seahealth.dk

Abstract
To avoid accidents and illness seafarers need to have knowledge about how to handle chemicals safely. There are courses for employees ashore that teach them about the hazards and how to handle chemicals safely. But reaching seafarers aboard Danish flagged ships that sails around the world and where seafarers of different nationality board the ships in ports in different countries is impractical through a course ashore. This paper describes how Seahealth Denmark through a film and an accompanying instructor's booklet provide knowledge to seafarers (different target groups) in a way that is accessible and mirrors their everyday work life. Through this educational package we aim at heighten employees’ awareness of the need to take care of themselves and others when working with chemicals. The educational package consists of a film for all seafarers who work with chemicals and an instructor's booklet for the supervisor. In the film we chose to show a tugboat with a crew of 4 including the master and their daily tasks with chemicals. We believe that small ships will associate with this size of ship as they have the same kind of work and similar type of chemicals. Small enterprises – such as smaller shipping companies – have special challenges such as smaller budgets, and often generally less well-educated employees. For this reason, it is particularly helpful to such enterprises that the education program is provided for free. In autumn 2012, the Danish Maritime Authority will follow up, not only to check whether or not the crews have seen the film, but also to ask questions about whether they have understood how they should work safely with chemicals in practice.

Keywords
Chemical safety training, Educational film, Shipping, Seafarers

1. Introduction and background
Many of the chemicals that seafarers use on board ships are dangerous and it is possible to trace many accidents and illnesses back to exposure to chemicals in the working environment. The short-term effects of mishandling chemicals may be: Caustic burns, poisoning, irritation (skin/eyes), dizziness and nausea. Long-term effects may be: Allergy, cancer, damage to brain/central nervous system, infertility and liver or kidney damage. Planning work that involves chemicals requires a great deal of knowledge and the supervisor on board a ship should have this knowledge to supervise the seafarers on how to perform their work safely. Furthermore, it is important that everybody using chemicals is aware of the
risks to health and that they are well-versed in the precautions to be taken in order to avoid injury or short and long-term harm.

Danish legislation requires workers to be trained when working with chemicals. Seahealth made a film about safe handling of chemicals approximate 10 years ago. Since ship-owners and the Danish Maritime Authority ³ have pointed out that the film did not address the challenges of working with epoxy-paint which is a common activity at sea. Furthermore the film did not address the issue of employing foreign crew which is now very common on board both small and larger Danish flagged ships.

For this reason, in the summer of 2012, Seahealth, Denmark published a new education programme on working safely with chemicals for employees and supervisors on board Danish flagged ships. The educational programme consists of a film for the employees that work with chemicals and an instructor’s booklet intended as a supplement to the film for the supervisor. The programme is called “Chemicals. Take care of yourself and others - from knowledge to practice”.

In this paper, I will address which methods we used and which considerations we had with regards to communicating important information to seafarers about safe use of chemicals in their everyday work which includes small ships.

I will focus on the selection and deselection we have made in the process to reach workers and their supervisors. We are playing on emotions by showing different families, 2 patients and an occupational medical doctor to underline the seriousness. Furthermore I will describe the way we try to meet people so they get the feeling that “this could be me” by showing seafarers from many different countries who are working in normal work situations on different ships types and sizes including small ships.

However, before I discuss these themes, it is important to describe the legal and political context within which the film was produced. The Danish parliament decided in 1988 that the level for health and safety aboard Danish flagged ships should be the same as that ashore. Consequently, the regulation for handling chemicals on Danish flagged ships is now generally the same as ashore but there are still some differences in the practical requirements. This is for example the case around safety training for employees working with chemicals. E.g. on shore workers that work with chemicals containing epoxy or isocyanat have to participate in a two-day safety course. To implement the same requirements on board would be very costly and nearly impracticable because there are many foreign crewmembers aboard Danish flagged ships (over 50%) who board the ships all over the world.

Education is a key issue for the Danish Trade unions. There is an agreement between trade unions, ship owners and the Danish Maritime Authority that all seafarers who aboard work

³ The Authority that regulates Occupational Health and Safety at sea.
with all kinds of dangerous chemical products such as epoxy or isocyanat, paint, cleaning agents, oils etc. are obliged to have an on board education in handling chemicals safely. Instead of seafarers working with epoxy or isocyanat should take a course ashore in Denmark. To fulfill this educational requirement the trade unions, the ship owners and the Danish Maritime Authority asked Seahealth, Denmark to design, develop and produce an educational package that could be taught to all seafarers onboard Danish flagged ships that handle dangerous chemicals.

Seahealth, Denmark[^4] where the author of this paper is employed is a sector Occupational Health and Safety (OSH) Service providing OHS knowledge and tools for Danish flagged merchant ships. It is a private organisation with a board with equal representation of ship owners and the trade union representatives. The ship owners finance the organisation. Their fee is based on their numbers of employees.

With a fuller understanding of the context within which the film was made, it is time to turn our attention to the methodological choices we made and why we made them.

### 2. Material and methods used in developing the educational package

As mentioned earlier, Seahealth Denmark chose to develop some new educational materials about work with chemicals, as the existing educational material (a film) had become outdated.

The overall aim of creating new educational material was to motivate the crew to prevent short and long term (adverse) effects when handling chemicals. This was also the challenge in order to reach smaller shipping companies and the seafarers on their ships.

In connection with Seahealth’s project, the board and the managing director served as a steering committee for the educational film project. Especially the chairman of the board, who is also the managing director for the trade union for ratings and the vice-chairman, who is the managing director for the Shipsowners’ Association for small ships, played a central role in the decision making throughout the project.

A focus group was established to give input and feedback on the instructor’s book and the manuscript and the film. The focus group had representation from the ships owners, the Danish ship owners association, the trade unions, the Danish Maritime Authority and crewmembers from the ships where the film was made.

I was the project leader and my job was to design the education packed and to write the instructor’s booklet. I need to organize the process, plan the filming on the different ships and work together with the focus group. Furthermore, I coordinate the setup and release of the education packed. A colleague from Seahealth functioned as a consultant especially on the

[^4]: Seahealth do not provide service for fishing boats as there is an Occupational Health and Safety Service for fishing vessels in Denmark too.
The ideas for what the film should be about and who should participate was discussed with the focus group and the film company. The manuscript for the film and the production was made in cooperation with the film company. The booklet was made in cooperation with a design and publishing company.

The project began in December 2010. To build on experience from existing training in safe handling of chemicals I attended the onshore, two-day course about how to handle chemicals which contain epoxy or isocyanate. We wanted to see which educational means they used in the course and how they motivated the participants to seek not only the general hazards information but also further necessary information on the many different chemicals. On shore (in contrast to aboard ships where it is mainly unskilled seafarers who works with the chemicals), it is mainly skilled craftsman who participate in the course. A textbook accompanies the course. Although our main target groups are different, we tried to convert some of the pedagogical methods with onshore workers, to the new educational material we were preparing for seafarers.

It was important that the film was able to “speak” to the educational level that most ratings have, corresponding to primary school. As a supplement to the film, we put together an instructor’s booklet which provided more in-depth explanations. The instructors are officers, who, through their education and training, have achieved a higher educational level than the ratings. This is good because we can benefit from this and it gives the possibility to give more necessary knowledge by using them as instructors on board.

I chose to develop an instructor booklet for two reasons because it is not possible to communicate enough knowledge in a film to secure a safe handling of chemicals on board ships and to use the instructors skills and roll on board to supplement the knowledge provided in the film. A draft instructor’s booklet was developed in spring 2011, based on the education book from ashore (mainly about epoxy and isocyanate products), the OSH regulation on chemicals, former guidance for oil products used on ships and guidance about chemicals used for cleaning ashore. We also drew heavily upon my expertise within the field, over a period of more than 25 years. I have worked as an inspector, first onshore in the Danish Working Environment Authority, later, in the Danish Maritime Authority and finally, as a work environment consultant at Seahealth.

2.1 The Selection Process
When we made the film we gave a lot of thought to who our main target group was. In addition, the length of the whole film was to be only 30 minutes. We had a story to tell, but we knew that we would have to make some pragmatic choices. We would not be able to cover everything and we wanted to be sure that we could hold the target groups’ attention. For this reason, we asked ourselves these guiding questions:
   1. Which adverse effects from working with chemicals need to be described?
   2. Which work situations are the most common, when working with chemicals on board?
   3. How do we address different ships types and sizes? (We needed to be aware that different ship types and sizes played a role in how chemicals could be used and
which challenges there were for seafarers in their handling of chemicals. The type and sizes of the ship also plays an important roll in how the seafarers see themselves.)

4. How do we address that seafarers come from different countries, have varying educational backgrounds, language skills and expectations of work on board?

5. Who should be the actors in the film?

6. How can we use the supervisor as instructor with the special role in training on board, to give more knowledge to the seafarers about safe handling of chemicals as he or she is also part of the crew?

2.1.1 Setting the Scene
We chose to communicate good practices about handling chemicals on board by telling different stories about how to handle chemicals safely (question 1). The film was made on board four different ships. We chose ships of different sizes and types in order to show how a variety of environments were affected by safety concerns regarding chemicals 5 (question 3).

We chose not to use actors (as in the previous film) but to depend on actual employees from different countries and job descriptions relevant for seafarers on Danish flagged ships (question 5). We felt it was important to include seafarers from the Philippines specifically, as many of the seafarers working on Danish flagged ships are from the Philippines (question 4).

In our stories, we chose to presented possible consequences of handling chemicals if preventive measures were not taken. As mentioned, our time was limited, so we decided to focus on one or two health effects from chemicals that could be relevant for all employees. We used employees in the film who actually suffer from these illnesses, to make the consequences easier to understand and as realistic as possible. We also tried to portray seafarers who were interested in and were able to find information about handling specific chemicals (question 1).

We portrayed different normal work situations, choosing the most common, so that these scenarios would be recognizable to as many seafarers as possible (question 2).

We also chose to film the chemicals they actually used on the ship while filming. In other words, we did not bring chemicals on board, because we wanted to show real-life situations. However this was a challenge in planning the film (question 2).

The supervisor has a special role in the practical planning the work and that the work is done safely. We chose to portray the supervisor ideally in the film, using this role as the “good example” (question 6).

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5 We also wanted a chemical tanker but it turned out to be impossible because of the explosion danger in connection with the movie equipment.
Furthermore the safety committee on board has a special role in overall planning. It is up to the committee to choose the less harmful chemical for the job, making risk assessments and making sure that the work can be done safely by using the right technical equipment or personal protective equipment. We also chose to portray this committee in an ideal manner, demonstrating and confirming safe practice and well-informed decision-making (question 2).

In general, we were careful not to “tell our story” by showing practices on board that contradicted safe use of chemicals on board. Some educational films, in an attempt to be entertaining, portray mistakes in safe practice, so that viewers can spot the mistakes. We chose a different tactic (question 2).

It is always necessary to consider how we can “meet people” on their level and to encourage them to seek information on the chemicals they handle. We did this by showing different crew members and different normal work situations but also by referring to the adverse consequences if they did not take care of themselves and others. It was our goal that viewers would be able to identify with their colleagues and the situations portrayed in the film. They should be able to recognize the similarities between their work on board and that which was portrayed in the film and think, “This could be me”. It is not unimportant to add that it is mandatory to for seafarers sailing on Danish flagged ships to see the film and we were well aware that both carrot and stick were part of our communication toolbox (question 4).

These were some of our considerations about how to reach our audience, and in the next section I will summarise what the film and the booklets contains and how it was distributed.

3. Results
The new education material consists of a film for all employees and an instructor’s booklet (as a reference book for the supervisor) and in the back of the booklet there is a CD with power points from the booklet (question 6). All employees should be able to understand the film.

We primarily focused on one health effect, skin irritation or allergy, because this is a common health effect from working with chemicals and you can get this from chemicals used both in the accommodation (cleaning agents) the engineroom (oils and chemicals for cleaning) and on deck (paint). It is not a life shortening disease but it can be invalidating and you can lose quality of life and maybe the consequence could be that you cannot keep your job (question 1).

We chose to have 3 parts in the film so they only have to see the part that is relevant for their job on board (question 2). The 3 parts are:
1. Paint on deck (18 minutes)
2. Oil and chemicals in the engine room (18 minutes),
3. Cleaning products in the accommodation (20 minutes).

The whole film all sections takes 31 minutes.
We succeeded in having different types and sizes of ships shown in the film: Passenger ships (special tasks in the accommodation), cargo ships and special ships - 3 large ships and 1 small ship (question 3).

In the film one of the ships is a tugboat with a crew of four. We believe that small ships will associate with this size of ship as they have the same kind of work and the same chemicals in smaller amounts. You will find this in the part about the engine room where we show work with oil and chemicals and also painting on the tugboat (question 3).

We also succeed getting different employees from different countries to participate in the film (question 4 and 5).

Different employees, different tasks and different ships – we hope this will contribute to the feeling “this could be me”.

Layout and illustrations in the booklet was made in cooperation with a design company and we have also made a film-trailer on you-tube.

The draft film and instructor’s booklet was sent to the Danish Maritime Authority for approval. In the beginning of May 2012 it was approved to fulfil the Notice A from the Danish Maritime Authority chapter IIA regulation 6.3 and chapter IIB regulation 5.5.

Unfortunately we do not have any figures on how many seafarers on Danish ships are suffering from short or long term effects from working with chemicals. The Danish seafarers are mainly officers and it is the foreign seafarers who are exposed to the various chemicals on board. On shore in Denmark, there are figures telling us that for instance skin irritation and allergies from working with detergents is common.

Since the educational material has just been launched, it is impossible to know how much impact is has or will have, nevertheless we have had an increase in our consulting in this topic and more specific we have had a hand full of new small shipping companies to sigh in for one of our related products our Chemicals database.

In the next section you will find a discussion on how we think it will work also with reflections to small ships.

4. Discussion
In Denmark, the larger shipping companies set the standard for quality shipping and help small companies by sharing knowledge and tools on occupational health and safety. Therefore, the film and instructor’s booklet is sent out to all Danish flagged ships for free, just like the other tools we provide. This means that small companies get tools they otherwise can not afford.
We also believe that the large shipping companies should set the standard and the small companies would then want to follow the same quality demands where it is possible because it is part of the shipping business.

I think that the combination of the film and the instructor’s booklet will help the ships to get the necessary knowledge and I hope that the presentation of the adverse consequences of mishandling chemicals will motivate them to seek more knowledge about the actual chemicals they are going to work with.

We often want to give too much information and knowledge but we have chosen to make a relatively simple film and supply it with an instruction booklet for the supervisor.

As my expertise lies in the practical hand’s and experience with creating information for seafarers this paper is about the choices we have made and I hope I can benefit form other conference participants who has insights about communication or pedagogy to discuss the methodological choices we have made, such as the consequences of using real sailors, or portraying actual people who are sick – probably in a discussion about pedagogy or communications theory or even ethical consideration.

In the conclusion I will inform about what is going to happen in the near future in connection with education material.

5. Conclusions
In autumn 2012, the Danish Maritime Authority will follow up on their inspections, not only to check that crews have seen the film, but also to ask questions about whether they have understood how they should work safely with chemicals in practice.

We have also sent a request to the shipsowners to put the description for this educational material into their International Safety Management system (ISM). This system is mandatory for all Danish flagged ships sailing world-wide and is audited by the authorities including Port state control and the class companies (insurances).

The shipowners’ association for the small ships have a magazine they send out to their members and they will bring an article about the film and instructor’s booklet and the purpose of these. We believe that this will contribute to facilitate its use on small ships.

We believe that knowledge about how to properly handle chemicals is the way to avoid short and long term effects. While we can not give all the details that are necessary to handle a specific chemical properly in this film and booklet, we can hopefully inspire seafarers to seek the appropriate information when handling a new chemical.

6. References
Film trailer: http://www.youtube.com/watch?v=U8L3sRbvPRk

The other references are only in Danish:


Prevalence and risk factors for work-related shoulder pain among informal garment workers in the northeast of Thailand

Authors
Pornnapa Suggaravetsiri, PhD, Assistant Professor, Faculty of Public Health, Khon Kaen University, Khon Kaen 40002, Thailand. porsug@kku.ac.th
Sunisa Chaiklieng, PhD, Assistant Professor, Faculty of Public Health, Khon Kaen University, Back, Neck and Other Joint Pain Research Group, Khon Kaen University, Khon Kaen 40002, Thailand. csunis@kku.ac.th
Rungtip Puntumetakul, PhD, Associate Professor, Back, Neck and Other Joint Pain Research Group, Khon Kaen University, Khon Kaen 40002, Thailand.

Abstract
This cross-sectional analytic study was designed to investigate the prevalence of work-related shoulder pain (SP) and the associated risk factors with SP among informal garment workers. There were 446 informal garment workers in the Northeast of Thailand who entered to this study. Data was collected by the face-to-face interview with the structured questionnaire and the survey form of work environments. The SP prevalence was estimated from six months period. The associations between SP and studied factors were identified by bi-variate analysis and multiple logistic regression analysis. Risk factors were indicated by adjusted odds ratio (ORadj) and 95% confident interval (95% CI) at p-value <0.05.

The results showed that, among 446 informal workers, most workers were female (94.84%), mean of age was 37.64 years (S.D. = 6.85), mean of work experience was 10.61 years (S.D. = 7.53). The six month-prevalence of SP was 46.86% (95% CI= 42.21-51.51). From bi-variate analysis, the significant risk factors for SP were work experience <10 years (OR= 1.45; 95% CI= 1.01-2.11; p-value = 0.049), member of family had SP (OR= 1.63; 95% CI= 1.07-2.49; p-value= 0.022), repetitive work (OR = 1.93; 95% CI= 1.27-2.29, p-value= 0.002), prolonged sitting (OR = 1.62; 95%CI= 1.05-251; p-value= 0.029) and no change posture every hour (OR = 2.04; 95%CI= 1.30-3.22; p-value= 0.002). The multiple logistic regression analysis by controlling the confounders, age and gender, identified that the correlated risk factors with SP were work experience <10 years (ORadj = 1.52; 95% CI= 1.03-2.24; p-value = 0.037), no change posture every hour (ORadj = 2.14; 95% CI= 1.31-3.48; p-value= 0.002).

The finding of high prevalence of work-related SP identifies the heath impact of informal garment workers in this study. The related risk factors for SP comprised of personal factors, work characteristics and work behavior of informal workers. The recommendations from findings are the surveillance of the shoulder pain and back pain among informal garment workers and the ergonomic training to workers. Moreover, the prospective cohort study to identify work environmental factors for SP among garment workers is suggested.
Keywords
Informal garment workers, shoulder pain, risk factor, ergonomic, prevalence

1. Introduction
Thailand is classified as a developing country. The National Statistical Office Thailand reported that the majority of Thai workforces are informal sector workers, 24.6 million from of total employed 39.3 million (National Statistical Office Thailand, 2011). Informal sector of garment workers certainly traditional work practices with static postures and prolonged sitting, which might be the cause of musculoskeletal disorders (MSDs). Moreover, the incidence of illnesses of the musculoskeletal system and connective tissue caused the upward trend of problems worldwide (Roquelaure et al., 2006, Bernard, 1997). The loss of working time and increased costs of treatments for chronic diseases as low back pain and upper limbs disorder included shoulder pain are the major concern of industrial sector and also the small enterprises. The causes of back and shoulder pain are multi-factorial factors which were still discussed upon the nature of work, person and environment (Chiu et al., 2002, Fredriksson et al., 2002, Spyropoulos et al., 2009). This study, therefore, aimed to investigate the prevalence of work-related shoulder pain (SP) and the associated risk factors with work-related SP among informal garment workers.

2. Materials and methods
This study design was a cross-sectional analytic research and designed to investigate the SP among informal garment workers. Area study was in the North-eastern region of Thailand, in Province of Khon Kaen, Burerum and Nong Kai. The sample size was calculated by estimation the proportion of the populations, upper, middle and lower zone of North-eastern region of Thailand. There were 446 participants from a simple random sampling method. They were considered eligible for inclusion in this study if they were informal garment workers with age >=18 years and had at least 6 months work experience. Participants were excluded if they had injuries or any disorders related to thoracic spine such as rheumatoid arthritis, degenerative disc disease, etc., and unwillingness to participate. Data were collected by interviews with structured questionnaires applied from the Standardized Nordic questionnaire (SNQ) (Kuorinka et al., 1987) and work ergonomics questionnaires (Chaiklieng et al., 2010), and survey form for work environments. Data were analysis by STATA Version 10 (Khon Kean University’s Copy Rights). Descriptive statistics and inferential statistics were used and risk factors were identified significantly by bi-variate and the multiple logistic regression analysis at p<0.05. The odds ratio (OR) and 95% confident interval of OR (95%CI) for bi-variate and the adjusted odds ratio (OR_adj) and 95%CI of OR_adj indicated the associated risk factors with SP.

3. Results

3.1 Demographic characteristics of informal sector workers and prevalence of work-related shoulder pain
The results showed that, among 446 informal garment workers, most workers were female (94.84%), mean of age was 37.64 years (S.D. = 6.85), mean of work experience was 10.61 years (S.D. = 7.53). Work hour was 8-12 hours/day (mean = 8.76 hours/day). Most workers had the repetitive movement (69.28%, 95% CI= 64.98–73.58) and prolonged sitting at sewing machine >8 hours per day (68.16%, 95% CI= 63.82-72.50). The severity level of work-related SP was mostly at medium level (64.15%, 95% CI= 58.85-69.45). The seven day-prevalence of work-related SP was 38.79% (95% CI= 34.25-43.33) and the six month-prevalence of SP was 46.86% (95% CI= 42.21-51.51).

3.2 The relationship between risk factors with shoulder pain
The bi-variate analysis identified five factors significantly (p-value < 0.05) associated with the SP among informal garment workers. The significant factors were working experience, member of family had SP, the repetitive movement during working, prolonged sitting until finish work (>2 hours) and no change posture every 1 hour (see Table 1). From multivariate analysis, controlling variables of age and gender in the model, the risk factors significantly related to SP were factors of working experience and no change posture each hour. The informal workers who had working experience <10 years increased risk occurrence at 1.52 times higher than the one had >= 10 years (95% CI of adjusted OR 1.03 to 2.24; p = 0.037) as well as workers who had no change posture every one hour was at the higher risk occurrence at ORadj =2.14 (95% CI of ORadj = 1.31 to 3.48; p = 0.002) (details shown in Table 2).

Table 1. Bi-variate analysis of relation between risk factors and shoulder pain (SP) among informal garment workers (n = 446).

<table>
<thead>
<tr>
<th>Variables /factors</th>
<th>Shoulder pain</th>
<th>OR (95% CI)</th>
<th>p-value</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Yes number (%)</td>
<td>No number (%)</td>
<td></td>
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<td>Age (year)</td>
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<td>143 (50.18)</td>
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<td>94 (58.39)</td>
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<td>10 (43.48)</td>
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<td>227 (53.66)</td>
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<td>106 (48.40)</td>
<td>1.45 (1.01-2.11)</td>
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<td>131 (57.71)</td>
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Table 2. Multivariate analysis of relation between risk factors and shoulder pain (SP) among informal garment workers (n = 446).

<table>
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<th>OR\textsubscript{adj}</th>
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<td>1.00</td>
<td></td>
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</tr>
</tbody>
</table>

* Significant at p-value <0.05

4. Discussion
This study showed the high prevalence of work-related SP during six-month period (46.86%). This indicates musculoskeletal health impact among informal sector workers with repetitive work and static posture which were supported by epidemiological data (Kamwendo & Moritz, 1991, Gagnon et al., 1995). Consistent with other studies reported that upper limbs disorders and low back were the major problems, found in various types of works. Many studies found that the repetitive movement, prolong sitting in static posture on working caused repetitive strain injuries affecting the chronic musculoskeletal illness (Fernandes et al., 2011, van Vuren et al., 2007). Moreover, the severe of disorders at shoulder exhibits by the dose-response correlated with working posture (Holmstrom et al., 1992).

The exposure to work environmental hazards at home workplace with inappropriate workstations and the lower standard conditions of light intensities and discomfort seat were indentified at most workplaces in this study. Shoulders upward raise, wrists deviation, static and prolonged posture resulted in muscle strain injuries, back and limbs disorders (Chaiklieng & Homsombat, 2011, Chaiklieng & Suggaravetsiri, 2012, Kamwendo, & Moritz, 1991). The results confirm the epidemiological surveillance, both in domestic and international level, that reported the ill health absence from work among workers was upper limbs disorders the incidence had been increasing every year (Bernard, 1997, Roquelaure, 2002, van Vuuren et al., 2007).

5. Conclusions
The high prevalence of work-related SP indicates health impact of garment workers in the small enterprise from this study. The related risk factors for SP were the personal factors, work characteristics and work behavior of workers. A health promotion program and the ergonomic training should be provided to prevent chronic shoulder pain among the informal garment workers. Moreover, the information is very useful for the prospective cohort study to identify work environmental factors for work-related SP among garment workers. The employers should be aware of work safety in workplace of informal small enterprise for workers in compliance with the Labour Protection Act of Thailand.

6. References


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BACKS Tool: A prospective study in identifying associated factors with predictive values of occupational chronic low back pain in a developing country

Authors
Jenn Zhueng Tam, National University of Malaysia Medical Centre, Kuala Lumpur, Malaysia
Sharifa Ezat Wan Puteh, National University of Malaysia Medical Centre, Kuala Lumpur, Malaysia
Noor Hassim Ismail, National University of Malaysia Medical Centre, Kuala Lumpur, Malaysia

Abstract
Occupational back pain confirmation has been challenging as one (60%-80% of individuals) would have experience at least an episode of back pain at some stages of their lives. There has yet to be an agreed consensus or criteria to define work-relatedness in Malaysia, a South East Asia country with a large number of small and medium sized enterprises (SME). These is because guidelines or criteria are important in view of absence of objective definition would have significant impact on our decision-making process, assessment, investigations, treatment and rehabilitation on disabling chronic back pain. BACKS questionnaire was designed to assist physicians in determining occupational low back pain among employees in a developing country from the aspect of reliability and validity.

Data will be collected and stepwise linear regression analysis will be used to develop a temporary model for the BACKS Tool questionnaire. The registry of the spinal related injuries or claims were identified, accessed and patients medical records such as working or house addresses as well as contact numbers were identified from the registry. The interview and assessment were conducted after the Medical Boards were conducted in the various government hospitals around the country. Each identified employee with history of chronic back pain was given the BACKS Tool prototype and the adapted Netherland questionnaire to be filled by the identified workers.

A total 220 respondents were included in the study. Among the associated factors of chronic occupational back pain analyzed via the stepwise linear regression were high physical demand (OR: 1.425; 95%CI: 0.394 to 1.082), low psychological demand (OR: 0.807; 95%CI: 0.305 to 0.771), job task involved in twisting for more than 20° (OR: 1.306; 95%CI: 0.274 to 0.767), young employees (OR: 0.858; 95%CI: 0.012 to 0.003) and high Pain Visual Analog Score (OR: 1.114; 95%CI: 0.061 to 0.636) that were reported by the respective employees. The regression above explained 67.2% of the associated relationship with chronic occupational back pain. The criterion validity reported sensitivity of 90.9% and specificity of 95.5%.
In search of determining work-relatedness among employees with occupational back pain versus those due to aging, a screening tool has to be developed to assist in providing scientific assessments that would improve employee satisfaction during educational promotion and counseling. Questionnaires and assessments tool in determining chronic occupational back pain have to be based on current medical standards in developing heterogenous country such as Malaysia.

**Keywords**
Chronic back pain; work-relatedness; work; factors; questionnaire
Fatigue in dairy farming – a New Zealand response using change laboratories

Authors
Rupert Tipples, PhD, Senior Lecturer, Department of Agricultural Management & Property Studies, Lincoln University, Lincoln, Canterbury, New Zealand Rupert.Tipples@lincoln.ac.nz
Roberta Hill, PhD, Partner, WEB Research, Lincoln, New Zealand roberta.hill@webresearch.co.nz
Ken Wilson, MEdAdmin, Partner, WEB Research, Wellington, New Zealand ken.wilson@webresearch.co.nz
Jill Greenhalgh, MApplSc, Research Officer, Centre of Excellence in Farm Business Management, Lincoln University Jill.Greenhalgh@lincoln.ac.nz

Abstract
Fatigue at work can kill or cause serious injury. Besides a high accident rate, in New Zealand dairy farming fatigue has also been implicated in many other problems including causing high staff turnover and reducing the cognitive powers of staff. Having to rush and being fatigued were serious barriers to safety (Lovelock and Cryer, 2009). To the outside observer these would be good reasons to change dairy farming’s basic systems.

Research and experience has shown that Once-a-Day (OAD) milking, instead of the historical Twice-a-Day (TAD) milking, gave more sleep, better choices and work organisation, and less stress. But OAD has not been welcomed nor promoted by industry leadership. How then to ‘intervene’ in the established practices of the dairy farm and family so that they are motivated to alter their current behaviours and become safer, healthier, and less fatigued and stressed?

Using Cultural Historical Activity Theory (CHAT) and Developmental Work Research (DWR) tools and processes, Lincoln University/WEB Research are addressing fatigue and stress in the Dairy industry and plan to overcome farmer resistance to cultural change. The change laboratory is a central component of DWR.

The ethnographic fieldwork (on farms and across the industry) is complete and workshops with interviewees to explore possible long term, practical solutions to the problems of overwork, fatigue and stress in dairying are underway. Results from these two stages will be reported to the conference, together with initial attempts at changing industry practice.

Significance is high. Dairy farming produces 26% of NZ’s Total Merchandise Exports

Keywords
Fatigue, Dairy farming, CHAT, DWR, Change Laboratories
1. Introduction

By 2009, following a rapid expansion of the New Zealand dairy farming industry as a result of relatively favourable economic conditions, dairy exports reached 26 per cent of Total Merchandise Exports. Thus they became the single largest commodity type exported from New Zealand and a huge part of the New Zealand economy (NZIER, 2010). These exports were produced by a national herd of 4.5 million cows on 1.64 million effective hectares of land, in 11,735 individual herds (NZ Dairy Statistics, 2010-11), and occupied some 30,000 dairy farm staff (Tipples & Trafford, 2011).

In 2007 Dairy InSight had found that dairy farming was not attractive compared to other industries; that its hours were long; that its staff turnover was high, and recruitment and the retention of employees was problematic. Further, the accident rate of dairy farming was reported as the third worst in terms of injuries per person employed.

2. Our initial experiences of the problem of fatigue from long hours of work

Issues, which aroused our interest in the problem of fatigue included one interviewee, who was Once-a-Day (OAD) milking, who recounted how he had realised, after changing to OAD milking, how he had used to drive his farm bike too fast and came off regularly. With OAD and working less hours he knew it was too fast and slowed down, thus reducing the likelihood of further accidents and injury. In another case an academic colleague, while completing dairy farming practical work, after thirty plus years as a ‘Sheep/Beef’ farmer, collected two speeding tickets on his way home from milking after a blameless driving career of over thirty years. Furthermore, that fatigue impaired his cognitive functioning so that he had difficulty doing one of his hobbies - Sudoku problems. Another Master’s student studying community change, resulting from the introduction of large scale dairy farming into mid Canterbury, seemed sluggish and unresponsive while carrying out daily milking as part of her dairy farm work, but ‘came back to life’ after giving up dairy farm work to concentrate full time on finishing her thesis. We also heard of numerous cases of worn out dairy staff leaving, causing high staff turnover, and adding to recruitment and retention problems.

Long hours are nothing new in dairy farming. Doig had reported 65 per cent of dairy farmers were working an average of 70 hours per week in busy periods, with permanent employees working 65 hours per week (1937-8), and McMeekan notes the debilitating effects of tiredness on his school colleagues who were obliged to start the day by milking (McMeekan, 1960). However, that was in the time before extensive mechanisation of milking and the introduction of modern rotary milking parlours. In the 2006 Census of Population some 29 per cent of all full time workers worked at least 50 hours per week, three quarters of whom were men (Fursman, 2008). Those in rural areas were disproportionally represented amongst long hours workers from their industry (Agriculture) and their occupation (Farmers and Farm Managers). In dairy farming, specifically, 61 per cent reported working more than 50 hours per week in the 2006 Census, twice the proportion for all full time workers (Wilson & Tipples, 2008). The percentage working more than 70 hours per week increased from the 1991 to 2001 Censuses to reach 32 per cent, but then fell to 27 per cent in 2006, possibly as result of the Holidays Act 2003 increase to 4 weeks annual leave. Meanwhile the industrial
The norm for all workers has remained at 40 hours per week, with an average modal value of 40-49 hours in the 2006 Census.

The implications for safety and health from long hours and consequent fatigue have been highlighted by Lovelock and Cryer (2009). They report long work hours as a known risk factor for injury for those working in agriculture. Also, sub-contracting which is common in dairy farming, was “…a practice associated with poorer occupational health and safety conditions…” (p. 15). Further, time pressures due to increased seasonal workloads, or machinery breakdowns, were major stressors. The most prevalent barriers to safety reported in two studies were: “Having to rush and being tired and/or fatigued…” (p.16), which could be added to by pressures from other people.

The availability of more time in dairy farming from OAD milking led to more sleep, feeling more rested and able to work, with less rush and less stress. It also gave more flexibility when and how to do things which equalled more logical organisation and method, with bigger blocks of time available, helping get jobs completed, giving more job satisfaction, better quality farming, and a safer farm environment (Verwoerd and Tipples, 2007). However, OAD was not an acceptable strategy for most dairy farmers and Fonterra, who were still attached to maximising milk production. Only milking Once-a-Day was not being a real dairyman. OAD protagonists felt under siege from the Twice-a-Day (TAD) core, when observed at the 2007 Once-a-Day Milking Conference in Hamilton (LIC, 2007). OAD is almost only chosen by dairy farmers who own their own property, sharemilkers are forced to be production focused by their contracts (Gatley, 2010).

Others also thought that the hours of work in dairy farming were far too long. Richard Kyte, a dairy farmer and Kellogg Farm Leadership Scholar, suggested increasing the use of wage labour to reduce fatigue and increase efficiency in dairy farming. For a 600 cow unit, it would cost $50,000, but would have the advantage of reducing the hours worked by all staff. Also it would free the share-milker to train others and to introduce new farming systems. Then there would be free time for other things and a chance to put family first. He concluded it had promising potential outcomes for a counter cultural business strategy. However, he recognised that: “To introduce more labour into the system you must be able to capture increased productivity…” (Kyte, 2008, p. 11). That idea we now call Kyte’s Paradox, that you have to spend more on waged staff to reduce individual farm staff’s hours of work and thus fatigue.

2.1 Dairy safety and health
Dairy farming is a dangerous industry. All active accident claims for ‘Agriculture’ cost ACC $NZ 59 million for the financial year ending 30 June 2010. Of them dairy farming claims were 41 per cent of that ($NZ 24 million) for 48 per cent of the total farm workforce. New dairy farming claims for accidents to ACC have been falling, but because of previous accidents with on-going injury claims, the proportion of active claims from dairy farming was increasing at approx. 1% per year (1 July 2004 – 30 June 2009). Only then did the overall accident expenditure begin to fall, so it may be argued that Health and Safety initiatives are
beginning to have an effect. Perhaps the new Ministry of Business, Innovation and Employment safety programme *Agriculture Sector Action Plan to 2013 – Workplace Health and Safety Strategy for New Zealand to 2015* will help to reduce claims further (Department of Labour, 2012). However, we must take into account Lovelock and Cryer’s caution that farmers are very resistant to OHS initiatives they have not been party to (Lovelock & Cryer, 2009), which explains why many previous initiatives have been unsuccessful.

2.1.1 *Our Accident Incident Analysis*

As an early part of our farmer fatigue project for the Farmer Wellness and Wellbeing programme we obtained data from ACC of all dairy industry accidents. From them we drew a number of conclusions. There was a positive correlation between increasing herd size and an increasing number of ACC claims/accidents. These accidents tended to peak in Spring at the busiest season at calving, then decline and level off in Summer, with the lowest levels being in June in Winter in the ‘dried-off’ season. In terms of time of day there was a bimodal distribution of day timing with peaks at: 09.00 -11.00 and 14.00 -16.00, or just after breakfast and after lunch. In terms of age accidents peak for 20-24 year olds, when there is perhaps a mismatch of confidence/ maturity, and for 35-39 year olds, who are perhaps stressed/tired sharemilkers /equity partners/higher level managers (Tipples & Greenhalgh, 2011).

2.1.2 *Some research questions*

How was dairy farming coping with more cows, more farms and more land in grass, but apparently a lot less people working in dairying according to Census data 1991- 2006 (Wilson & Tipples, 2008). Has the greater level of farm labour productivity that was being sought been achieved? Anecdotal comment suggests that the industry has been disappointed by productivity improvements. Are dairy staff working harder and longer? The answers to these questions are not immediately clear, so we must look at the data.

Linked employer-employee data of the number of taxable employment relationships in dairy farming suggest the number of employees climbed, from around 10,000 in 1999 to just over 22,000 at the end of 2008, while the number of staff in the dairy industry according to Census data of those who declared dairying as their major occupation has been falling.

Some of the difference is explained by the LEED count including all taxable employment relationships, while the Census data only includes those for whom dairy farming is their main occupation. The Census data suggests a peak of the occupation at 1996 of some 30,000 persons, falling to some 25,000 only ten years later at the 2006 Census. As a result of the Christchurch earthquakes in 2010-2111 the 2011 Census of Population was cancelled, so there is no comparable data for a more recent time. Part of the difference is explained by the growth in the number of denizens (Standing, 2011), non-resident aliens (migrants), doing dairy farm work on limited term visas, which by 2011 had settled at some 1,700 dairy workers(Tipples & Rawlinson, 2012).

2.1.3 *Research Gaps*
Our initial research identified a number of research gaps which impeded studying problems of fatigue in the dairy farming sector:

1. Lack of good dairy farming employment, contracting, accident and death data
2. Dependence on a migrant labour force - does migration policy make the dairy industry more/less safe, or migrants' situations more/less precarious?
3. Does the dairy industry’s lack of willingness to comply with legislative/policy rules adversely affect attitudes to safety (Lovelock and Cryer, 2009)? How can they be improved?
4. There is a strong dairy culture which makes changing anything very difficult (e.g. OAD milking) – how can changes which last be achieved?
5. Long lasting worthwhile collective social initiatives such as dairy employer groups, like the Amuri Dairy Employers Group, which had attempted to reduce the hours of young staff, are hard to find – what is needed to sustain them?
6. If excessively long hours and consequent fatigue are the problem, how might dairy farm systems be changed in such a way as to reduce hours worked, while retaining dairy farm production and productivity, and providing a safer system of work?

3. The research approach chosen
To begin to explore these questions, especially in relation to the problem of fatigue in the dairy industry, an approach was made to Mark Paine (DairyNZ) who is responsible for the expenditure of Public Good Funds derived from the commodity levy applying to the dairy industry. This task was formerly carried out by Dairy InSight. In early 2010 Paine had written in InsideDairy of making a better work place for dairy farming, with concerns to improve the wellness and wellbeing of the dairy workforce. The response was positive and we were asked to participate in DairyNZ’s Farmer Wellness and Wellbeing programme at the beginning of September 2010. The agreed research strategy for our part of the programme was that the research would be divided in three parts reflecting differences in regional dairy farming. First, we would study Canterbury, a relatively new area of large scale dairy farming based on irrigation (2012-13), close to our research base. Then we would research the Waikato, the heart of traditional New Zealand dairy farming. Finally, if the project had continued funding, we would look at Southland which had different systems again.

For our research we had chosen an inter-disciplinary expansive learning approach based on a Finnish ‘change laboratory’ process (Engstrom, 1987; Seppänen, 2000). This incorporated:

**Phase 1: Fieldwork** (or ethnography), and background literature review and data analyses, to gather socio-cultural historical data on full range of activities that make up Canterbury dairying system, on- and off-farm, based on Cultural Historical Activity Theory (CHAT). (2011)

**Phase 2: Change lab workshops** to
(a) identify opportunities for long-term systemic change; and
(b) reframe mental models, practical tools, policies, based on Developmental Work Research (DWR). (2012)
Phase 3: Trials, active engagement to build a commitment and mechanisms for roll-out to both the dairy industry and rural health sector. (2012-3?)

As the change laboratory process had underpinned WEB Research's work for some time (Hill et al., 2011), they were contracted to carry out the field research and initiate the expansive learning approach advocated.
The research process is described in Figure 1, which outlines the processes of the Change Laboratory. Participants from all parts of the activity system (in this case the dairy farm) were brought together in a sequence of 9 half-day workshops to identify the systemic causes of the visible problem. It should be noted that the research process hinged on farmers and related personnel in the change labs deciding what the underlying systems issues about fatigue were and then developing and implementing their own industry based systems solutions. The change lab process is to motivate the collective generation of novel solutions to intractable barriers to altered behaviours. The researchers have a dual focus therefore, the outputs, and, generating the collective will to act in the participants. Both continue to be our focus. The Change Laboratories participants came largely from those interviewed in the first phase of the study, who were typical of Canterbury dairying both on-farm and off-farm (see Figure 2). These participants are the active operatives in the expansive learning process. The research team were essentially the facilitators of the process, providing new resources and helping to focus discussions. The key unit of analysis was the individual dairy farming activity, with the farming system at the centre.

4. Results

4.1 What we did in Canterbury (2011) – Initial Results
We visited a range of farms in January, May, and June 2011 across Canterbury using a range of farming technologies. We interviewed dairy farmers, sharemilkers, farm workers and supervisors; also we interviewed off farm: DairyNZ Consulting Officers, a banker, an accountant, a vet, and an irrigation specialist with current dairying client bases; also health professionals etc., and we heard of overwork, work-related stress, injury and clinical depression. Throughout we tried to triangulate on and off farm data to ensure its validity. Several themes were distilled from the initial enquiries and then fed into the Change Laboratory process as required to stimulate the participants’ discussions:
• What motivates dairy farmers, sharemilkers, herd managers to work 16-19 hour days, weeks on end; and, from July – December, with no meaningful break?
• One answer: young, highly-motivated, entrepreneurial men and women are building complex, demanding pathways to find a route to farm ownership
• Taking on large debt creates ‘a huge amount of pressure’ when combined with their attitudes to risk, and a lack of business and financial skills
• Corporate pressure, investors’ expectations leading to new trend away from ‘farming animals to farming land’; with less importance given to animal husbandry and staffing issues, more to ‘the bottom dollar’
• With ‘more cows, more land, more irrigation’, supervisors have ‘more to do’. Managing more people, a more diverse workforce e.g. herd managers and workers with English as second language
• Long hours, rosters that require dairy workers, supervisors to work e.g., 11 days on, 3 days off. By 7th day ‘people start fading’. Impacts quality and productivity of work, including staff relationships
• Relationship stresses between dairy farming couples appear inextricably tied up with the business and work practices of dairy farming
• Industry pressure to be highly productive, manage debt, be seen to be a ‘successful operator’ can have a negative impact on farmers’ self-esteem as they participate in bench-marking exercises and compare themselves unfavourably with their peers. This stress can lead to lowered productivity and depression.

Fig. 2 Dairy farming activities represented at the Canterbury Change laboratories in the first part of 2012
4.2 The Change Laboratories – Later Results

In their stories and dialogue so far, the change lab participants have largely mapped the mental models and practices of the farmer(s), farm family and employees, as well as those who influence on-farm activity, in dairying activity in Canterbury in this new environment.

Participants have provided detailed accounts of their direct and indirect experiences of fatigue and stress on Canterbury dairy farms, ranging from those involved in financial activity in the sector (rural banking, insurance and accounting) to the activities of farm owner-operators, sharemilkers, farm managers, operations managers and employees. Participants have also described aspects of Fonterra’s activities from their experiences as farmers, a Fonterra Area Manager and as a regional leader of the Fonterra Shareholders’ Council. DairyNZ consultants and staff have talked about their roles, experiences and practices in the industry, particularly in Canterbury. Department of Labour staff have also described policy and regulatory activity on the topic of fatigue, stress and accidents on-farm.

Other influences on on-farm activity have been mapped in greater or lesser detail, drawing on discussions within the change lab sessions and outside these sessions, either in the fieldwork phase or in informal discussions. These include the activities of the Dairy Women’s Network and Young Farmers’ Network.

Building on the Phase 1 ethnographic findings, the first four change lab sessions laid the foundations for participants’ later design of long-term systems solutions to the fatigue, stress, accidents and injuries, which were intended to change mental models and practices both on and off-farm in the industry. The fifth change lab session built on these foundations, enabling WEB Research to complete the first cut of a socio-cultural historical analysis of dairying in Canterbury. Such analysis suggests that some of the core cultural values, practices and behaviours of the earlier farming form (family farming) have been preserved in subtly altered ways in the mental models and practices of new forms of ‘farmers’ who have created a new, industrialised form of dairying (scale farming). At the same time, these mental models and practices have been shaped by off-farm activities ranging from the contracting of milk supply; enculturating newcomers to the industry; ‘disciplining’ on-shore industry around optimising production and farming effectiveness and efficiency; and so on.

In the sixth change lab session, which was held at the end of Year 2 of the contract in May 2012, participants examined in detail the differing career pathways of those entering, or in, dairying with the goal of owning a farm; and those who do not have that goal. We looked at the on-farm and off-farm mental models and practices that underpin those two pathways, and possible connections with the fatigue, stress and incidence of accidents and injuries that are prevalent in Canterbury dairying. Two more change lab sessions were held at the beginning of the new contract between DWN and Lincoln University (Year 3). The participants worked in two groups to identify elements of possible future systemic solutions for adoption by dairy farmers, the dairy workforce (including their families), as well as by other industry stakeholders including Fonterra, DairyNZ, rural finance and other farm advisers, rural health professionals, and farming communities.
In the change lab discussion and analysis it was evident that the referent of the terms ‘dairy farmer’ and ‘dairy farming’, as culturally and historically constructed, are altering. The mental models, tools, own rules, a community of practice and division of labour of what might have been understood to be a traditional dairy farm, and dairy farming, are all taking on new forms, which appear to include:

- A traditional dairy farm supporting the lifestyle of one or two families; such is typically owned by baby boomers who have not yet yielded ownership or control. Some steps towards the involvement of the next generation may have been taken;
- A form of dairy farming characterized by a single family ownership but arrived at not through inheritance but as the result of 10 to 15 years of single-minded hard work along the path to ownership;
- Dairy farming but no expectation of ever achieving ownership;
- Scale dairy farming using a range and mix of ownership and investment forms.

The point here is that the cultural and historical constructs for justifying and rationalising some of the industry’s habits and practices can no longer be relied on to ‘discipline’ the people working in the industry, and the industry itself. The possibility of dairying as a sustainable and endurable way of life has diminished in the face of a focus upon production, science and the use and management of debt finance.

If there had been a time when the farmer and employee could have been said to have had a ‘shared object’ (*endure because you are on the path to ownership - one day you will be like me*), then that is no longer the default case (a ‘shared objective’ is a technical term within CHAT, and is used to describe a collective motivation to act). Was it possible to construct a shared object between the farmer activity system and the employee activity system? The people in the room came up with suggestions for actions that might lead to the construction of a shared object between a farmer and an employee. A shared object might enable a shift from the current outcomes to future outcomes.

**Fig. 3 Possible Current and Future Outcomes of the Change Lab Process**

<table>
<thead>
<tr>
<th>Current outcomes</th>
<th>Future outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased profits</td>
<td>Increased productivity</td>
</tr>
<tr>
<td>High levels of fatigue and stress etc.</td>
<td>Reduced stress and fatigue</td>
</tr>
<tr>
<td>‘Dirty dairying’</td>
<td>‘Decent dairying’</td>
</tr>
<tr>
<td>Relationship break-ups</td>
<td>Mutually beneficial productive farm</td>
</tr>
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5. Where was the research at the end of 2012?

Our participants have been very supportive of the process and activity, but there have been difficulties getting participants together every time on a 3 week cycle from February to August 2012. These have been for good reasons such as pre-planned holidays and overseas trips,
dairy committee meetings, pregnancy, and because the Change Laboratories were not in the accepted list of an individual’s KPIs. The Change Lab cycle was completed during calving, with an appreciably well attended meeting in Ashburton in spite of the busyness of the season. We believe this was a show of the group’s confidence in our process, further exemplified by the desire to achieve a concrete outcome from the previous deliberations. The group focused on three questions at the Ashburton meeting and tried to develop tools to help farmers create the new shared object. The key questions were: ‘What a decent dairy farm has?’ ‘What a decent dairy farm does?’ and ‘What characterises a decent employee?’

It is inappropriate to discuss further detailed results at this stage as they are still emerging and we do not want to prejudge what the Change Laboratory team will eventually agree to trial and implement, but we are very encouraged by the seriousness with which all participants have addressed the subject in Canterbury of ‘dairy fatigue’ and sought realistic ways to alleviate the problem. Now we have also begun the ethnographic study of Waikato dairy farming and are finding a longer established more traditional dairy culture in contrast to Canterbury’s. Our research programme continues.

6. Acknowledgement
This research was funded by dairy farmers, first through the New Zealand Institute for Rural Health (2010-2), and then Dairy Women’s Network (2012- ), as part of DairyNZ’s Farmer Wellness and Wellbeing Programme (2010-2017).

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Abstract

Working risk factors and musculoskeletal disorders (MSDs)

Authors
Milan Tucek, Assoc. Prof., M.D., Ph.D., Institute of Hygiene and Epidemiology, Charles University in Prague and General University Hospital in Prague, First Faculty of Medicine, Studničkova 7, 128 00 Praha 2 (Prague), Czech Republic, milan.tucek@if1.cuni.cz
Jana Hlavkova, M.D., National Institute of Public Health, Prague, Czech Republic

Abstract
In the Czech Republic, as in the most European countries, the musculoskeletal disorders (MSDs) represent a major problem. Their frequency has been continually increasing to the degree that they currently rank as the second most frequent cause of temporary working disability. The MSDs represent 48% (607 cases) of the officially recognized occupational diseases (incidence 30.3/100 000 employees) and are the most frequent category of occupational diseases in the Czech Republic in 2011, with carpal tunnel syndrome being the most frequent occupational disease of them all (Czech National Registry of Occupational Diseases).

The authors present 10 years data from the Czech Republic official national system of hazard identification and risk/exposure assessment (“Categorization of working operations”) used as a basic tool for effective risk management in enterprises (database of 74 731 subjects/enterprises in 2011).

Working population in the Czech Republic currently totals about 4.5 million people. Of them, about 117 thousand are exposed to vibrations (≈ 2.6% of total work force), about 739 thousand are exposed to overload by physical work (≈ 16% of total work force), and about 600 thousand are working in a bad working posture (≈ 13% of total work force). It follows that almost 30% of the Czech total work force is exposed to a risk factor for MSDs.

The key pertinent enactments (Act No. 258/2000 Dig. on the public health protection and the amended new Labor Act No. 262/2006 Dig.) created basic legislative framework enabling to tackle the work risk factors which are undoubtedly among the important causes of the unfavorable increasing trend in MSDs in the working population. These enactments prescribe employers’ obligation to prepare the proposal that must comprise a comprehensive assessment of potential health risks associated with work and working conditions, results of objective measurements of intensity of these factors (4391 measurements/exposure assessments to risk factors associated with potential MSDs in 2011), numbers of employees working under individual categories (males and females), and the ways of ensuring health protection.
The goal of the “Categorization” is to get objective and comparable data for risk assessment, optimization of working conditions, rational measures and handling problems.

There have been methods for measurement and evaluation of individual factors elaborated and unified criteria established:

- Basic ergonomic criteria for workplaces (some space parameters and arrangement, height of the manipulating plane, tolerable manipulating forces, the distances to reach for frequent and occasional movements etc.).
- Criteria and limits for total physical load in women and men based on physiological criteria – energetic output and a whole-shift men heart rate (short-term and long-term limits), ban of risk work for pregnant women and limitation of work load in youngsters.
- General limits for heavy load handling for men and women, specific criteria for youngsters, pregnant women, nursing mothers, and the mothers by the ninth months after delivery. These limits are based on limitations of the weight of the loads to be manipulated, cumulative weights per a shift and frequency of manipulations according to the weight of individual loads in women. Further, limits for pushing and pulling forces for manipulation with simple engineless tools are set.
- Great attention is paid to the assessment of monotonous long-term overload of the locomotor system, especially of the upper extremities. Limits are based on physiological criteria. The following parameters are controlled (by surface integrated EMG):
  - mean imposed strength expressed as % of Fmax (percentage of the maximum value of muscle force)
  - number of movements with respect to the imposed strength
  - the frequency of great and supralimit muscle forces above 55% of Fmax, and 70% of Fmax, respectively. With this, maximum manipulations are limited with respect to the overload of upper extremities.
- Working posture is defined as a neutral working posture. The terms conditionally acceptable and unacceptable working position are also used. (The respective postures are enumerated.) These postures are limited by the time spend in a particular position during a shift (30 or 160 minutes) and by a time spent in these non-physiological working positions.
- In the field of mental and sensory work load, basic criteria are enumerated and defined, which has been proven to be associated with MSDs monotony, time pressure, forced pace, demanding interpersonal activities, risk for own health or health of other people, shift and night work.
- Attention is paid to the most important criteria for work with videodisplay unit (VDU).

Although the system of categorization of working operations was prepared for all enterprises there are special situation, needs and expectations in small and medium size enterprises (SMEs). Czech national system of categorization of working operations should be adapted or modified more to the real situation in SMEs because it was created especially for the stable workplaces and doesn’t well reflect changeable character of work in small businesses. SMEs are rarely covered by occupational health services (OHSs) because of the costs of services
ensuing for the employers, the lack of providers of these services or an unfavorable geographic location of the enterprise. There are still differences in coverage by OHSs between workers in SMEs on the one hand, and larger companies on the other. The need for OHSs in SMEs and among the self-employed is more urgent than in big enterprises and the provision of OHSs in SMEs is more dependent on the individual initiative of employees and employers than in large companies. The high rate of turnover in SMEs makes the problem still more difficult. Authors emphasize consultative role of OHSs in the hazard identification and risk/exposure assessment especially for the SMEs.

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Keywords
Working risk factors, risk assessment, categorization of working operations, musculoskeletal disorders, prevention, SMEs, OHSs
The harvest trail: occupational risk in Australian agriculture and the international labour market

Authors
Elsa Underhill, PhD, Deakin University, Melbourne Australia
Malcolm Rimmer, Professor, LaTrobe University, Melbourne Australia

Abstract
International backpackers are important in the Australian ‘guest worker’ labour market. Typically young graduates in their early 20s, they seek both paid employment and an adventure before returning to careers in their home countries. Australian agriculture relies heavily on transient labour to undertake short-term harvesting work available all year across the country. Paid by piece rates under arduous conditions at the hottest time of the year, such work is unattractive to local employees. Hence labour is scarce to pick perishable goods. Recognising that backpackers can fill this gap, the Australian government introduced a scheme known as ‘The Harvest Trail’. A government guide is published, providing backpackers with advice on how to find harvesting work. The scheme offers backpackers a strong inducement by giving an automatic one year extension beyond the one year limit that normally exists on their working visa. To make the scheme operate, the government pays designated labour agencies for every backpacker they place with a farm. Farmers need only contact the agency and their labour supply needs are filled. At first glance the scheme appears to be a creative win-win situation.

This paper argues that reality is different. The farm sector is the most hazardous of all industries in Australia, and the health and safety protection offered to transient labour is often poor. Inexperienced backpackers are placed quickly with farms but without sufficient training to enable the safe performance of work using dangerous farm machinery. This paper looks at the way the employment relationship for casual seasonal labour exacerbates risk. Drawing upon focus groups of backpackers, short-term migrants, farmers and labour market intermediaries involved in ‘the Harvest Trail’, it examines how the Australian government encourages young backpackers to take dangerous work without recognising the risks inherent in the work and protecting these workers from them.
Factors influencing the motivation of small enterprises to participate in OHS initiatives

Authors
Laura Veng Kvorning, National Research Centre for the Working Environment, Denmark, lkv@nrcwe.dk
Peter Hasle, Centre for Industrial Production, Aalborg University, Copenhagen, Denmark, hasle@business.aau.dk

Abstract
Small enterprises have limited resources to prioritise occupational health and safety (OHS) and programmes have been developed to support these enterprises and regulators and other stakeholders struggle to motivate them. In this paper we analyses through a ‘realistic evaluation’ analytical approach the factors influencing small enterprises in the construction industry to engage in an OHS programme. A new Danish programme focusing on prevention of the long-term effects of physical strain in the musculoskeletal system is studied. The programme provides financial support as well as guidance from advisors from the Danish Working Environment Authority to implement new OHS approaches.

The study uses a design, encompassing qualitative data from the enterprises participating in the programme.

The results of the study show that the introduction to the programme influenced the motivation of the enterprises to engage in the programme. There was a high motivation to participate when the enterprises did so voluntarily and comparable a low motivation where participation was considered compulsory. The guidance and the economic incentive also influenced the motivation and to ensure that the programme leads to a process of sensemaking that will make the enterprises change behaviour. Few enterprises would apply without this support. However when motivation was externally forced, the process of sensemaking was hard to reach. The sensemaking process depended to a great extent on the acknowledgement of the need of the new OHS instrument or aid as well as on three contextual factors; relevant projects and instrument/aid; characteristics of the manager; and the workplace culture. The acknowledgement of the need of the programme increases the possibility of whether the enterprises will put the programme into action. The contextual factors of the enterprise, the industry and the society might set limits on the efficacy of programme mechanisms and should be taken into account.

Keywords
Workplace intervention, construction industry, musculoskeletal disorders, regulation, qualitative methods, realist evaluation
1. Introduction

Regulators, practitioners and researchers struggle to engage with small enterprises and they have looked at different possibilities for designing programmes (Breslin et al., 2010; MacEachen et al., 2010). By small enterprise we will in this study focus on enterprises with 20 or fewer employees. To motivate small enterprises, the occupational health and safety (OHS) programmes have to consider the characteristics of small enterprises (Hasle and Limborg, 2006). Literature reveals that personal values and priorities of the owner influence the workplace culture, the social relations and the attitude of the enterprise (Eakin et al., 2000; Hasle and Limborg, 2006; Walters, 2001). The owner is often also the manager and most often the same person is handling all management issues, including OHS (from now on referred to as ‘owner-manager’). Thus, it is a matter of motivating the owner-managers to participate in OHS activities as they play an important role in any change of procedure within the enterprise (Eakin, 1992; Hasle and Limborg, 2006). In order to develop relevant programmes an outline of the underlying assumptions and conceptions of programmes is useful to know how to bring about the intended outcomes.

The objective of the paper is to provide a better understanding of the mechanisms motivating small enterprises to engage in OHS intervention programmes and improve their OHS by studying a new Danish OHS programme (Hasle et al., 2012). The research question is: Which mechanisms influence the motivation of managers of small enterprises to apply for and implement the programme and which contextual conditions influence this process?

The paper’s starting point is to build on existing literature on intervention programmes for small enterprises, followed by a description of the Danish programme and an outline of the methods used for data collection. Subsequently, a description of the analytical approach ‘Realistic Evaluation’ and the results are presented. Finally, the discussion of the findings as well as the conclusion answering the research question is revealed.

1.1. Intervention programmes for small enterprises

OHS programmes have tried to incorporate the specific needs of small enterprises in terms of the workplace structure, the culture and stakeholders, but many programmes have limited success and are difficult to sustain (Champoux and Brun, 2003; Hasle and Limborg, 2006; Walters, 2003; Legg et al., 2010).

Many small enterprises have limited resources to prioritise OHS (Walters, 2001; Hasle et al., 2012) and they often find it difficult to meet the demands from authorities and comply with legislation (Balock et al., 2006; Vickers et al., 2005). The literature has revealed that small enterprises compared to larger enterprises have a lack of financial and managerial resources as well as general preference for informal and non-formalized approaches to preventive OHS activity (Arocena and Nunez, 2010; Champoux and Brun, 2003; Mayhew, 1997; Mayhew and Quinlan, 1997; Rigby and Lawlor, 2001; Walters and Lamm, 2003; Walters, 2004). Small enterprises have distinctive features compared to larger enterprises (MacEachen et al., 2010; Hasle et al., 2012). One feature is that small enterprises often are involved in
different social and personal relations which make it possible to create informal organisation of work. Another is the dilemma that on the one hand they often fight for survival due to a high degree of external uncertainty and on the other hand they have the strength that they have the ability to respond quickly to changing economic conditions (MacEachen et al., 2010). In the perception of OHS many owner-managers often tend to underestimate risks and overestimate their own knowledge of the necessary control measures and OHS becomes a peripheral issue (Hasle et al., 2012). The owner-managers are often guided more by personal and cultural beliefs than by national guidelines (Hasle and Limborg, 2006; MacEachen et al., 2010). OHS is often seen as a problem that has to be solved when it occurs and many owner-managers do not recognise the need for a systematic OHS approach. It therefore seems to be important to focus on simple and low cost solutions and on action-oriented methods combining OSH with other management goals and it should be based on trust and dialogue (Hasle and Limborg, 2006; Lamm, 2000).

As analysed by Hasle et al. (2012), a new Danish programme has taken the special features and challenges into account when designing an OHS programme targeting small enterprises and this paper explores this programme.

1.2. The Danish OSH programme
In 2011, in order to meet the needs of small construction enterprises, the Danish government through the so-called Prevention Fund launched a new programme called Prevention Packages focusing on prevention of the long-term effects of physical strain in the musculoskeletal system (Hasle et al., 2012). A Prevention Package consists of a simple guideline with a description of the implementation of new tools to find solutions to the problems the enterprise face depending on their needs and the enterprises have the opportunity to apply for two different Prevention Packages: one focusing on heavy lifting and the use of technical lifting aids and another one focusing on improved planning through a systematic approach. The enterprises are supported financially and the budget covers salaries to the participants and for some costs during the implementation process. They are also supported by an advisor from the Danish Working Environment Authority. Small enterprises (less than 9 employees) can apply and the implementation process is defined to last three to six months.

As a part of the programme, the Danish Working Environment Authority made a campaign where inspectors through dialogue supervise construction enterprises and if necessary encouraged them to apply for a Prevention Package. Apart from this campaign the Prevention Fund as well as employer organisations and unions informed about the opportunity to apply. For further details about the programme see Hasle et al. (2012).

2. Material and methods
The study consists of a design encompassing qualitative data which consists of 9 case studies selected on the basis of a telephone survey (the cases are listed in table 1). The enterprises were visited when they were in the middle of the process and the owner-managers were interviewed and where possible we attended meetings with the advisors. The
interviews lasted on average 1 hour and were audio-taped, transcribed verbatim and thematically coded in accordance with the key themes of the interviews using the software programme Nvivo (Computer software, 1999).

The qualitative data was organised thematically and a content analysis was performed.

Table 1: characteristics of the case enterprises

<table>
<thead>
<tr>
<th>Trade</th>
<th>Owner’s experience</th>
<th>Number of employees</th>
<th>Employee turnover</th>
<th>Employed bookkeeper</th>
<th>Physical workplace</th>
<th>Prevention Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpenter</td>
<td>14 years</td>
<td>5</td>
<td>Reduced from 12 employees</td>
<td>Yes, part time assistant</td>
<td>Workshop and office</td>
<td>Both</td>
</tr>
<tr>
<td>Various construction work (sewer work)</td>
<td>23 years</td>
<td>1 employee</td>
<td>Reduced from 22 employees</td>
<td>No</td>
<td>Workshop and office at home</td>
<td>“Planning”</td>
</tr>
<tr>
<td>Carpenter</td>
<td>20 years</td>
<td>8</td>
<td>Reduced from 11 employees</td>
<td>Yes, assisting wife full time</td>
<td>Workshop and office at home</td>
<td>Both</td>
</tr>
<tr>
<td>Carpenter</td>
<td>7 years</td>
<td>2</td>
<td>No changes</td>
<td>No</td>
<td>Office at home</td>
<td>“Planning”</td>
</tr>
<tr>
<td>Carpenter</td>
<td>10 years</td>
<td>3</td>
<td>No changes</td>
<td>No</td>
<td>Workshop and office</td>
<td>“Planning”</td>
</tr>
<tr>
<td>Bricklayer</td>
<td>6 years</td>
<td>6</td>
<td>Increased after 5 years alone</td>
<td>No</td>
<td>A small storage for equipment</td>
<td>“Heavy lifting”</td>
</tr>
<tr>
<td>Electrician</td>
<td>Not known</td>
<td>4</td>
<td>Not known</td>
<td>No</td>
<td>Workshop and office</td>
<td>“Heavy lifting”</td>
</tr>
<tr>
<td>Bricklayer</td>
<td>17 years</td>
<td>5</td>
<td>Increased after 1-2 years alone</td>
<td>Not known</td>
<td>Workshop and office at home</td>
<td>“Heavy lifting”</td>
</tr>
<tr>
<td>Carpenter</td>
<td>5 years</td>
<td>6</td>
<td>Increased from 1 employee</td>
<td>Yes, part time assistant</td>
<td>Office at home</td>
<td>“Heavy lifting”</td>
</tr>
</tbody>
</table>

3. Analytical approach
Much of the current research on motivation is focusing on what motivates people to work whereas the role of motivation in work environment activities has not been explored much (Bjorklund, 2001; Hedlund et al., 2010). No single motivation theory can provide a sufficient explanatory model. Instead, it is often necessary to use several theories of motivation (Hedlund et al., 2010).

In the understanding of motivation, the focus in this paper is on the change of action in the specific target group. The motivation of the small enterprises and the mechanisms that
initiate action are analysed through an organizational change perspective where the individuals act according to the process of making sense of the world around them (Weick, 2000; Weick et al., 2005).

This process depends on whether the enterprises have an intention to act that is either intrinsic or extrinsic. If the intention intrinsic it means that the individual finds improvements of the work environment important and will undertake a change process for its own sake in order to explore and learn (Hedlund et al., 2010).

On the other hand if the intention to act is the result of external inducements it can be described as extrinsic and the change is performed in order to meet an outcome separate from the individual. This could be to exhibit a behaviour that is socially acceptable or to meet external standards e.g. by taking responsibility and showing interest in the improvement of the work environment (Hedlund et al., 2010).

This notion of motivation as the intention to act is analysed by using realistic evaluation as the analytical approach (Pawson and Tilley, 1997; Pawson, 2006). A realist design is based on a theory of the causal explanation of how mechanisms in contexts result in outcomes (Pawson, 2006: p 17-37). According to this theory “programmes work (have successful 'outcomes') only in so far as they introduce the appropriate ideas and opportunities ('mechanisms') to groups in the appropriate social and cultural conditions ('contexts')” (Pawson and Tilley, 1997: p 57).

By cultural conditions is meant that programmes are embedded in contexts referring to not only a spatial or geographical or institutional location, but also initiated by sets of social rules, norms, values and interrelationships gathered in specific places. The context sets limits on the efficacy of programme mechanisms which should be understood as the stakeholders’ choices (reasoning) and their capacity (resources) to put these into practice. Realist evaluation then includes investigation of the extent to which the pre-existing social contexts ‘enable’ or ‘disable’ the intended mechanism of change. To make the change happen is depending on whether the people desiring change have the ability to bring it about (Pawson and Tilley, 1997).

Interventions are based on hypotheses and assumptions about how change processes and causal relations are connected to the programme activities which can be outlined in a theory of change or a programme theory (Rossi et al., 2004; Pawson, 2006: p 17-37).

The programme theory and underlying assumptions of the change process of the Prevention Packages are illustrated in figure 1. The introduction to the programme makes the enterprises aware of the programme and the mechanisms or instruments such as the economic incentive trigger them to apply. Then a process of sensemaking takes place which will lead to an intention to act (can be either extrinsic or intrinsic). The context sets limits on the efficacy of programme mechanisms and the enterprises’ ability to put the programme into action.
4. Results

Regarding the introduction of the programme, some case enterprises were contacted through the Danish Working Environment Authority and some of these owner-managers felt a pressure from the Authority to apply. Thus the cause of applying was to accommodate the authority’s request and fear of getting an enforcement notice or a fine. Other case enterprises appreciated the visit from the Authorities and regarded the programme as a good opportunity to improve OHS. One factor expressed was the experience of responsibility which could both be related to the conditions for the employees and to the expectations from the Authorities or other stakeholders. The responsibility can thus be interpreted as both intrinsic and extrinsic motivation depending on what is done for the enterprise’s sake and to meet other stakeholders’ requirements. The opportunity to develop a fruitful dialogue with the authorities about OHS was for some enterprises interesting and for others it was important to set an example for other enterprises to follow and even be an instructive experience for the Authorities and other stakeholders.

To further illustrate the factors motivating the small enterprises to participate in the programme, we would like to draw attention to two case studies and explore the steps in the programme theory (figure 1). The cases were selected as illustrative examples of to what extend the change process happen as assumed in the programme theory. In the first case the owner-manager was driven by an intrinsic motivation whereas the owner-manager’s motivation in the other case had an extrinsic character. Both cases applied for the Prevention Package focusing on improved planning.

4.1. The intrinsic case

The owner-manager is educated as bricklayer with an additional exam in sewer work and a later degree as a construction technician and has had the enterprise for 23 years. Earlier they were up to 22 employees and today the enterprise only consists of the owner-manager and one employee (trained in the enterprise). The owner-manager has a workshop storing equipment and office both at his private house. He has no bookkeeper but do the office work himself. He has a positive attitude towards the Authorities and uses them and the employer organisation for counselling. He is familiar with standardized procedures due to the legal requirements related to sewer work.
The mechanism that triggered the owner-manager’s motivation was a newsletter from the employer organisation where they encouraged enterprises to apply. To him improved planning e.g. when making offers for new projects or tasks a systematic approach is valuable and a reduction of time waste could be possible as every project would be planned in detail including a list of relevant equipment for carrying out the task. This would especially be relevant if he wants to expand the enterprise and once again employ more personnel.

The economic incentive also played a role and if no support was given the owner-manager doubt that he would have applied. The support from the advisors from the Danish Working Environment Authority also played an important role. The owner-manager wanted to be at the forefront of OHS in terms of meeting the expectations of the authority.

The primary motivation is therefore intrinsic as he was inspired by the written information in the newsletter and considered the possibility important for himself and his enterprise. Extrinsic factors such as being at terms with authorities and the financial support also play a role but are not the main reason to trigger his interest.

The owner-manager sees potential benefits of the programme in the long run and the intention to act is thus based on a long-term goal and not depending on e.g. a specific project or circumstance. The possibility of improved planning and change of work routines is thus improved because the owner-manager’s ability to change and the contextual conditions promote the programme mechanisms to trigger the process which is illustrated in figure 2.

4.2 The extrinsic case
The owner-manager is educated as carpenter and has had the enterprise for 7 years. The turnover has been relatively stable for a long time with 1-2 employees and no apprentices. Today the enterprise consists of the owner-manager and two employees with a seniority of
approximately one year. The owner-manager has an office at his private home and no
bookkeeper is employed, but his wife helps him.

The owner-manager is not a member of any employer organization and he has no problem
with the Authorities but almost never has any contact with them. He delegates the work to his
employees often via telephone or they meet at the construction site or at the office as is most
convenient.

He was introduced to the programme through an inspection from the Danish Working
Environment Authority. The inspector noticed some problems regarding equipment and
issued an enforcement notice. According to the owner-manager, the inspector was about to
issue another one but told the owner-manager about the possibility of applying for a
Prevention Package. He saw this as an opportunity to remedy the problem and chose to
apply even though he did not recognise that he had any OHS problems. The application was
approved and the advisors from the authority (different ones from the inspection) came to
support the enterprise as included in the programme. The owner-manager experienced the
dialogue with the advisors good and meaningful but he found it difficult to implement the
systematic approach as the owner-manager is satisfied with his current OHS practice e.g.
renting technical aid if needed and planning depending on the project. Additionally he finds it
difficult to develop an OHS planning form because of lack of IT skills even though the
advisors gave him a template. All in all he could not see that the benefits of developing a
more systematic OHS approach would outweigh the drawbacks of changing practice. The
result was that no action took place. An explanation could be that the motivation was
extrinsic and the context limited the efficacy of programme mechanisms to put the
programme into action which is illustrated in figure 3.

Figure 3: Flow of motivation in the extrinsic case

To sum up there was high motivation to participate where the enterprise did so voluntarily
(intrinsic motivation) and low motivation where participation was considered compulsory
(extrinsic motivation). The financial support and the guidance though increased the possibility
of a change process. The sensemaking process depended to a great extent on the acknowledgement of the need of the new OHS instrument or behaviour change.

The two cases are chosen as illustrative examples and often it is not that obvious whether the motivation is extrinsic and intrinsic. To expand the understanding of the mechanisms influencing motivation, the next section will present the findings from the other case studies.

4.3. Contextual factors influencing the process of sensemaking

Contextual factors such as the owner-manager’s experience within the enterprise seem to be important for the sensemaking process. If the owner-manager has worked many years without any employees and only had a few years of experience with employees, there seems to be a tendency of a low interest in improvement of the OHS practice. On the other hand if the owner-manager has worked many years with employees, there seems to be a higher sense of acknowledging OHS as an important issue. The owner-manager tends to develop greater responsibility for the wellbeing of the employees and investment in e.g. technical aids. These owner-managers recognise the profitability of healthy employees in terms of low sickness absence and commitment to the enterprise. When asked about the legal OHS demands, some owner-managers explain that they find it difficult to meet all the demands. Legal demands do not only concern OHS standards but all kinds of obligations and responsibilities for an employer such as maternity or sick leave, insurances, annual auditing. Many owner-managers find it difficult to find the time to take care of all of them and there seems to be a difference between the owner-managers with and without a bookkeeper. The owner-managers in the case studies are educated as skilled construction workers and often office work becomes a challenge or a burden to overcome. This contextual factor has an important impact on the process of sensemaking. As in case two the limited IT qualifications become a barrier and a reason for rejecting the need for the content of the Prevention Package. Subsectors in construction have different conditions as the technical professions such as electricians have a basic training and a daily use of standardized procedures whereas it to a higher degree are up to carpenters and bricklayers discretion to decide how to handle their projects.

Another important factor in the process of sensemaking is the physical context of the enterprise e.g. whether there is a workshop or not. This factor is important because the physical environment sets the limits of the possibilities of a collective or relational sensemaking within the enterprise. This means for example that if they at the enterprise need to talk about the way they want to implement the programme or what kind of technical aids they want, they have to meet somewhere to talk about it. In the cases where they only meet at the construction site, there is a lack of acknowledgement of the necessity of more systematic OHS practice.

4.4. Mechanisms influencing the process of sensemaking

The process of sensemaking depends to a large extend on the initial motivation to apply for a Prevention Package as illustrated by the two case studies. But in some of the other case studies some other factors were also identified as important. One main mechanism or driving
factor was whether there was a relevant task or project to use or to develop a new OHS practice. This was especially a main factor in the enterprises implementing the Prevention Package focusing on heavy lifting and use of technical aid. The process of sensemaking was easier to start if the enterprise had a relevant project or a task to try out the new work routine/to develop OHS system. When the owner-manager heard from the advisors about the possibility of renting a technical aid specially designed for a task the owner-manager immediately acknowledged the benefit of this OHS improvement. Otherwise if there were no relevant project or task suitable for a new work routine or to develop OHS systems the process of sensemaking was difficult to start or never happened. A promoting factor was when the technical aid was demonstrated either “in real life” or on a photo/video. The owner-manager and the employees could thereby see the use of the technical aid. Depending on both the owner-manager’s and advisors’ experience and knowledge about the possible instruments or technical aids, the enterprises were introduced to different options. If they both lacked knowledge about the options the process of sensemaking was difficult to start or never happened.

If the motivation was extrinsic the owner-manager did not prioritise the development of new OHS systems if the workload was heavy. Otherwise if they were not busy at the enterprise e.g. in the winter season the development of OHS systems seemed to be easier. The workload did not play a significant role when the motivation was intrinsic because the owner-manager incorporated the new OHS instrument into the on-going task or project.

5. Discussion
When launching the programme all small construction enterprises in Denmark had the opportunity to apply for financial support to implement the programme. However only some enterprises applied and only some of those actually had an intention to change their OHS practice.

Through the analysis it is clear that the introduction to the programme play a key role in terms of how to motivate small enterprises. This covers whether the packages are introduced by the Danish Working Environment Authority, the employer organisation or by a personal network. When contacted by the Danish Working Environment Authority the desire to participate was contingent on the owner-managers’ perception of the inspectors. Some owner-managers felt they were forced to participate whereas others saw it as a great opportunity to develop their workplace and OHS skills. The economic incentive and the guidance were both important drivers for most enterprises and most owner-managers desire a good dialogue with the Authorities. When the workplaces had applied for a Prevention Package, the motivational factors that made them actually change work routines were depending on the sensemaking of the new OHS instrument. If the owner-manager does not acknowledge the need of change it does not matter what incentives or methods to use. On the other hand if the owner-manager acknowledges the need for the OHS instrument it seems that costs and time means less. To illustrate these relations the analytical model is expanded as shown in figure 4.
To make change happen depends on whether the motivation is extrinsic or intrinsic as the former is a major constraint for active implementation. Therefore the instigator of the programme plays a crucial role as well as the introduction to the programme. It is difficult to influence the context in terms of the characteristics of the sector and the specific enterprise, but the policy makers have to consider the introduction to the programme and with which instruments small enterprises should be reached. In the case of the Prevention Packages it is not enough that the enterprises are offered financial and guiding support. If the programme is considered to be imposed on the enterprise, the motivation will be extrinsic and active participation will be low. This motivation might be changed during the implementation process, the study does not explore that, but to reach a process of sensemaking the shortcut is to create intrinsic motivation. A possible avenue is to use trusted intermediaries to disseminate the information about the programme. In this case it was mainly the employer organisation and personal networks, although it seems as some inspectors also managed to create interest without imposing the programme.

The advisors guiding the enterprises should also be trained to support the enterprises in the sensemaking process. This covers providing relevant material and guidelines such as different practical skills (e.g. IT skills) and tools to help the enterprises find the solutions of their problems. The programmes targeting small enterprises need to be adjusted to the specific workplace setting and the social conditions such as social rules, norms, values and interrelationships. This can be done in the specific enterprise in the sense that the advisors needs to be aware of such differences. This also concerns a good cooperation with the employer organisations and unions as they might be able to influence the sector in a broader scale as shown in the analysis. This is of course depending on the respect and reputation the particular organisation.
The context of the specific enterprise to a large extent sets limits on the efficacy of programme mechanisms. By this we mean the stakeholders’ choices (reasoning/sensemaking) and their capacity (resources) to put these into practice.

6. Conclusion

The paper argues that the Prevention Packages can lead to a change of OSH practice if the process is triggered by different mechanisms. One mechanism is the way the enterprises become aware of the programme and the incentives to improve the working conditions. The programme mechanisms of providing financial support and additionally guidance by advisors from the Danish Working Environment Authority can lead to engagement of the small enterprises. By providing financial support and knowledge about solutions and methods to improve OHS, the small enterprises find it easier to engage in such a programme. However the participation depends on whether the programme is promoted by trusted stakeholders or more an enforced participation.

The specific content of the programme is also relevant and often depending on the owner-managers ability to understand the use of the programme and whether they consider it useful and beneficial. The crucial point is to motivate the owner-managers to an intrinsic intention to act. By intrinsic motivation a process of sensemaking in terms of an acknowledgement of a need for developing OHS systems and new practices is then easier to reach. To what extend these mechanism are put into action depends on the contextual factors such as the workplace setting. Through the analysis we will argue that this understanding is depending on the workplace settings (contextual factors). The workplace setting may set limits on the efficacy of programme mechanisms and how the Prevention Packages lead to a change of OSH practice. The contextual factors identified are the characteristics of the enterprise as well as the sector such as the needed practical skills, attitude towards the authorities, etc. Additionally the process is influenced by contextual factors such as relevant task or project, available instrument/aid and a good timing in terms of general workload.

Of interest would be to explore to what extend the intrinsic versus extrinsic motivation leads to a long-term improvement of the working conditions. Based on a better understanding of these two forms of motivation an exploration of how programmes can be designed with an increased possibility for intrinsic motivation. Additionally the observed sensemaking and implementation process results in behaviour change that remains after a period of time needs to be explored.
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SYTY2000® Self-assessment - a comprehensive approach to entrepreneur's well-being at work

Authors
Susanna Visuri, Finnish Institute of Occupational Health, Turku, Finland, susanna.visuri@ttl.fi
Leena Niemi, Finnish Institute of Occupational Health, Turku, Finland
Heikki Saarni, Finnish Institute of Occupational Health, Turku, Finland
Paula Naumanen, Finnish Institute of Occupational Health, Kuopio, Finland
Henri Wibom, Regional Organization of Enterprises in South-West Region, Turku, Finland
Riitta Hamalainen, Regional Organization of Enterprises in South-West Region, Turku, Finland

Keywords
Health and work environment, micro-scale enterprises, self-employed, risk assessment

Abstract
In Finland, occupational health care (OHC) covers about 90% of employees but only 10-30% of those who are working in micro-scale enterprises employing less than 10 persons (MSE). The reason for this is that MSE do not know what OHC is and what they can benefit from it. Also the costs of OHS are often seen to be too high. On the other hand OHC itself experiences that the workload of services for MSE is too high compared with the money these are able to pay. Also OHC's limited resources can be seen as a preventive factor for marketing their services to MSE.

A self assessment form was developed to increase awareness of self-employed and MSEs about healthy working conditions and lifestyle. The two-sided form includes statements about physical and psychological strains of work, work environmental health and safety risks, physical and psychological symptoms of illness, and health behaviour. The form activates self-employed and MSE to start making improvements either by themselves or with the support of OHC. The form is also applicable for the use of OHC. In the hands of OHC this form acts as a follow-up and selection tool by which clients health, health behaviour and working conditions can be followed. The form is available in the internet (www.syty2000.fi) in Finnish, Swedish and English.

MSE:s and entrepreneurs are more health-aware and are increasingly taking care of themselves and buying OHC for themselves. The self-assessment form offers a reliable method to evaluate work environmental risks, health and health behaviour of entrepreneurs. It also helps OHC to focus on support-needing clients without forgetting regular follow-up of other clients' health and working conditions.
The self-assessment form was developed together with entrepreneurs and with the Regional Organization of Enterprises. From the beginning, the developed self-assessment form has based on the needs and thoughts of entrepreneurs. The use of this self-assessment has activated MSE's and self-employed to take care of their own health and working conditions. The OHC has changed their activities from curative to more preventive direction and this made possible to point its' resources to those who really need support. This new way to do things has also released OHC resources for new clients and at the same time the cost-benefit ratio of OHC has increased.
Small steps in everyday life - a way to promote entrepreneurs health at work

Authors
Susanna Visuri, Finnish Institute of Occupational Health, Turku, Finland, susanna.visuri@ttl.fi
Leena Niemi, Finnish Institute of Occupational Health, Turku, Finland
Heikki Saarni, Finnish Institute of Occupational Health, Turku, Finland
Paula Naumanen, Finnish Institute of Occupational Health, Kuopio, Finland
Henri Wibom, Regional Organization of Enterprises in South-West Region, Turku, Finland
Riitta Hamalainen, Regional Organization of Enterprises in South-West Region, Turku, Finland

Keywords
Well-being at work, micro-scale enterprises, work environment, health promotion, intervention

Abstract
Micro-scale enterprises employing < 10 persons, incl. self-employed are forming 95 % of all enterprises in Finland. In these enterprises, hectic business life with long working hours takes entrepreneur's full attention and their own wellbeing is often forgotten. The entrepreneurs should be awaked to notice their own well-being as the key factor of successful business.

A year-long health promotion programme to micro-scale enterprises, "Living with whole heart", was conducted in 2011. This pilot intervention focused on promotion of four main factors related to entrepreneurs' well-being at work: healthy nutrition/eating, physical health and its' maintenance, safe working environment and time management. During the intervention open-access events were organized from each of these themes to entrepreneurs and their employees. Also theme-related articles were published in business newspapers and in the internet along with these events. Entrepreneurs' local associations were activated to support also the wellbeing of their members. The effectiveness of the intervention was asked after the programme by a web-based questionnaire.

"Living with whole heart" - programme reached entrepreneurs well. Entrepreneurs experienced that this kind of health promotion programme responded to their needs of getting "ready to use" information. They had made improvements on their health behaviour, such as changed their dietary habits or started to exercise more regularly. Also some of the entrepreneurs had done improvements on their work environment. Most of the local associations of entrepreneurs had adopted a new role to promote health of their members.
Activation of entrepreneurs' own activity to take care of their health and work environment should be primary step to their wellbeing at work when micro-scale enterprises are in question. Associations of entrepreneurs can be successful messengers of the importance of health in this sector. Networking of micro scale enterprises with local health service providers such as occupational health services and health and sport organizations is needed to facilitate the continuity of health supporting activities in these small enterprises. Flourishing entrepreneurship, successful enterprises and the whole society need wealthy entrepreneurs.
Innovative strategies for better regulation of health and safety arrangements in small firms: one step forwards, two steps back?

Author
David Walters, Professor of Work Environment and Director of Cardiff Work Environment Research Centre (CWERC), Cardiff University

Abstract
In the last twenty five years both the structure and organisation of work and its political and policy contexts have undergone marked change in most advanced economies. An increased profile for smaller firms has been emblematic of these changes. Such emergent trends have helped raise a host of issues concerning the efficacy of arrangements to manage OHS in these firms and in the increasingly fractured and precarious forms of work with which they are often associated. Innovative approaches to improving these arrangements and their outcomes for workers in small firms have featured significantly on regulatory and practitioner agendas as a consequence.

At the same time, among politicians and policy makers, a parallel set of concerns have emerged, in which calls for greater freedoms from regulatory and administrative burdens for such firms have been made, to support their contribution to the economy. That there are some tensions between these two perspectives is obvious.

This contribution seeks to explore these tensions with an examination of innovative strategies in the use of supply chain relations to support better operation of health and safety arrangements among lower tier suppliers of goods and services. It does so by setting these strategies within the wider environment of moves towards ‘new governance’ and ‘better regulation’ in the European Union and its member states. In so doing it seeks a better understanding of the effects of context for the support for improved OHS for workers in small firms in current economic and political climes.
Abstract

Health co-morbidity effects on injury treatment and rehabilitation, and why SMEs should be concerned

Author
John Wren, PhD, ACC Research - Principal Advisor, ACC, New Zealand
john.wren@acc.co.nz

Abstract

What is the evidence for health co-morbidity effects on injury treatment and rehabilitation and workers compensation? Why should SMEs be concerned?

In this study of a random sample of 337,665 people continuously registered over a three year period with a range of primary care practices in New Zealand from 1 July 2008 to 30 June 2011:

- the presence of a health co-morbidity was found to have a strong statistically significant association with increased service utilisation and costs independent of, and additional to, normal health cost effects typically associated with age, gender, ethnicity and socio-economic status
- those with one or more health co-morbidities when compared to those without evidence of a health co-morbidity, were found to be statistically significantly associated with:
  - making 28% more claims
  - receiving lump sum payments that are 346% higher
  - having medical treatment costs that are 59% higher
  - paid 39% more weekly compensation, and
  - overall, incur 59% more total ACC costs across all cost categories.

It is estimated that 10.7% of Total ACC expenditure in any one year can be directly attributed to the presence of the most common co-morbidities in the population examined in this study.

Based on aggregate total cost data in the 2011 ACC Annual Report, the amount of additional payment to claimants that can be directly attributable to the current presence of health co-morbidities in the population is $276M.

Why should SMEs be concerned? Workers who have a co-morbidity have a 30% higher risk of becoming permanently unable to work. Pre-existing disability due to serious or chronic illness or previous injury is a risk factor for becoming unemployed, experiencing low job retention following temporary incapacity, and reduced rate of return to work. For SMEs the loss of this work capacity can threaten the viability of the business.
Development of a participatory workplace environment improvement program for migrant workers in Japan

Authors
Etsuko Yoshikawa, MSN, Assistant professor, Department of Nursing, Tokyo Ariake University of Medical and Health Science, Tokyo, Japan yoshikawae@tau.ac.jp
Toyoki Nakao, Working environment measurement experts, Tokyo Occupational Safety and Health Center, Tokyo, Japan tnakao@toshc.org
Ippei Mori, PhD, Associate Professor, Mie University Graduate School of Medicine, Mie, Japan i-mori@doc.medic.mie-u.ac.jp
Toru Yoshikawa, MD, Center Chief, International Cooperation Center, The Institute for Science of Labour, Kawasaki, Japan t.yoshikawa@isl.or.jp
Kazutaka Kogi, PhD, Research Adviser, The Institute for Science of Labour, Kawasaki, Japan k.kogi@isl.or.jp

Abstract
The purpose of this study was two-fold: (1) develop a workplace environment improvement program using a participatory approach adjusted to migrant workers and (2) discuss the effectiveness of this program in small and micro-sized enterprises.

We organized a training program using the participatory action-oriented training (PAOT) method for migrant workers in a glass-recycling factory. The factory employed 40 workers including 25 migrant workers from eight countries. The training program consisted of three serial workshops held at three-month intervals. Sixteen migrant workers from seven countries attended the program. The trainers of the program acting as facilitators of the participatory steps used a newly developed training toolkit including a locally adapted action checklist and presentation slides. The types of improvements achieved through the program were analyzed.

Based on the proposals in the first and second workshops, the participants implemented planned improvements. The average number of improvements in which one worker was involved amounted to five. During the six-month period, twenty-three improvement plans were implemented by the migrant workers themselves. According to the results of the evaluation questionnaire, almost all the participants agreed that the low-cost improvements done were effective for improving safety and health at work and that the group discussion was a good way to find practical ideas. They also noted that the program led to improved communication among workers from different countries.

The participatory approach for improving the working environment of migrant workers could be effective in small-sized workplaces through repeated group discussions at serial workshops. The discussions in small groups helped migrant workers improve communication
among them and with the management. It is suggested to spread participatory workplace improvement activities for reducing work-related risks for migrant workers.

Keywords
Participatory approaches, Migrant workers, Occupational safety and health, Workplace environment improvements, participatory action-oriented training (PAOT)

1. Introduction
Concern is growing about the working environment of migrant workers who are generally employed in small and micro-sized enterprises. According to the white paper on Immigration Control, in Japan the number of alien registrations as of the end of 2010 was around 2.1 million, and the number of illegally overstaying foreign nationals as of 2010 was estimated to be about 80,000 people (The Ministry of Justice, 2011). According to the national statistics, “Situation of Notified Foreign National Employment Status”, around 0.7 million of foreign workers also work in Japan (Ministry of Health, Labour and Welfare, 2012). These enterprises are often underserved in terms of instituting occupational safety and health with economic difficulties and a lack of technical knowledge for taking valid preventive measures. Migrant workers are faced with serious barriers, associated not only with language problems but also with the limited access to occupational safety and health services (Mori et al., 2012).

Recent trends in workplace intervention include comprehensive and integrative approaches. An important element in these interventions is the participatory approach, which implies control and empowerment for those involved. A participatory approach is likely to ensure an appropriate risk assessment, which is an important prerequisite for a focused intervention (Tsutsumi et al., 2009). Managers and workers in the workplace well understand both problems and their solutions (Kompier et al., 1998). A participatory approach can encourage managers and workers to take advantage of opportunities they have for making practical improvements (Kogi, 2012).

The purpose of this study was to develop a workplace environment improvement program using a participatory approach adjusted to migrant workers and to discuss the effectiveness of this program in small and micro-sized enterprises.

2. Methods
We organized a training program using the participatory action-oriented training (PAOT) method (Khai et al., 2011) for migrant workers in a glass-recycling factory. The factory employed 40 workers including 25 migrant workers from eight countries. The program applied the six principles of PAOT methodology: to build on local practices, focus on achievements, link working conditions with other management goals, use learning by doing, encourage exchange of experiences and promote people’s involvement. The training program consisted of three serial workshops held at three-month intervals (Fig.1). Sixteen migrant workers from seven countries attended the program with managers.
The technical area consisted of three parts: material handling and storage, workstation and machine safety and a healthy and comfortable work environment. Before these technical inputs, participants attended simple games concerning the technical areas. In each workshop, the participants discussed existing good examples having improved safety and health at their workplace and then agreed through group work on action plans for improving their own workplace. The trainers of the program acting as facilitators of the participatory steps using a newly developed training toolkit that included a locally adapted action checklist and presentation of slides incorporating good examples taken from the factory. The technical presentation was held in five different languages. The types of improvements achieved through the program were analyzed.

Fig 1. Safety and health training plan for the glass-recycle factory

3. Results
We organized all the three workshops for migrant workers after their work hours. Based on the proposals in the first and second workshops (Table 1), the participants implemented planned improvements.

Table 1. The results of the group discussion in the first PAOT workshop

<table>
<thead>
<tr>
<th>3 good points</th>
<th>3 points to be improved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Canteen is non-smoking</td>
<td>1. Controlling noise</td>
</tr>
<tr>
<td>2. Storage for tools</td>
<td>2. Set up local exhaust system</td>
</tr>
<tr>
<td>3. Wear helmet</td>
<td>3. Divide between passageway and workplace</td>
</tr>
<tr>
<td></td>
<td>4. Equip first aid box</td>
</tr>
<tr>
<td>1. Air condition and elevator</td>
<td>1. Make enough space and passageway</td>
</tr>
<tr>
<td>2. Listening to music while working</td>
<td>2. Clean-up workplace</td>
</tr>
<tr>
<td>3. Many foreign workers working</td>
<td>3. Eliminate noise</td>
</tr>
</tbody>
</table>
The average number of improvements in which one worker was involved amounted to five. During the six-month period, twenty-three improvement plans were implemented by the migrant workers themselves (Table 2).

Table 2. The improvement after the first and second PAOT workshop

<table>
<thead>
<tr>
<th>After first workshop</th>
<th>After second workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attach the guards to moving parts (2)</td>
<td>Tumble-protection to the stairs (1)</td>
</tr>
<tr>
<td>Keeping storages in order (12)</td>
<td>Home for gloves at glass-selection line (5)</td>
</tr>
<tr>
<td>Attach dangerous signs (2)</td>
<td>Rearrange locker room in order (5)</td>
</tr>
<tr>
<td>Make home for helmets (3)</td>
<td>Make home for helmets (5)</td>
</tr>
<tr>
<td>Use chairs while working (11)</td>
<td>Use ear plug (8)</td>
</tr>
<tr>
<td>Painting walls (3)</td>
<td>Make passageway wider (4)</td>
</tr>
<tr>
<td>Clean up carefully (13)</td>
<td>Clean up carefully (4)</td>
</tr>
<tr>
<td>Make a fence at the dangerous area (3)</td>
<td>Alerting dangerous case to colleagues frequently (4)</td>
</tr>
<tr>
<td>Use personal protective equipments (14)</td>
<td>Rearrange workplace (3)</td>
</tr>
<tr>
<td>Quit listening music while operating a tractor (2)</td>
<td>Use boots and winter clothes (6)</td>
</tr>
<tr>
<td>Safety operating of tractor (4)</td>
<td>Use goggle (7)</td>
</tr>
<tr>
<td>Communicating with different foreigners (15)</td>
<td></td>
</tr>
</tbody>
</table>

( ) is number of workers involved the improvement

After the first workshop, nearly all participants indicated promoting communication among workers as an improvement point. However, throughout all the workshops, other improvements were related to safety behavior and to a well-organized workplace. In other words, some improvements involved changing the workplace environment while other improvements required workers to change their work habits.

The managers also played an important role in making practical improvements based on the discussion at the workshops, such as attaching clear emergency signs and proving adequate personal protective equipment (earplugs, gloves, boots and helmets).
According to the results of the evaluation questionnaire, almost all the participants agreed that the low-cost improvements enacted were effective for improving safety and health at work and that the group discussion was a good way to find practical ideas. They also noted that the program led to improved communication among workers from different countries or between managers and workers. The final evaluation at the final workshop indicated that the participants agreed on the effectiveness of the workshop and were planning to attend the training program in the following year.

4. Discussion
This paper described practical experiences in Japan focused on reaching the migrant workers employed at the small-sized workplaces and promoting their involvement in the improvement of their safety and health within the workplace. The migrant workers improved their workplace environment based on group discussions using an action checklist and good example photo sheets. Because these visual materials were designed based on local good examples at their workplaces, migrant workers were able to understand easily each step and strengthen their self-help initiatives. The stepwise progress promoted sharing positive experiences and reinforcing local networks toward sustained collaboration.

Occupational safety and health activities for migrant workers can be effective even in small-sized workplaces through repeated workshops using a participation-oriented training kit, which illustrates good examples in their own company. Moreover the group discussion was effective for finding how to improve the workplace, and to promote communication among migrant workers. The positive participation of both managers and workers in participatory action-oriented training could reduce work-related injuries among migrant workers. These positive experiences resulted in a practical success story to improve the safety, health and working conditions of migrant workers involved in the small-sized workplaces.

5. Conclusions
The participatory approach for improving the working environment of migrant workers could be effective in small-sized workplaces through repeated group discussions at serial workshops. The discussions in small groups helped migrant workers improve communication among them and with the management. Participatory workplace improvement activities for reducing work-related risks for migrant workers are viable and effective strategies and should be adopted by small-sized workplaces.

6. References


Locally adjusted development of Participatory Action-Oriented Training (PAOT) Toolkits for different workplaces by the Japan-Korea Occupational Health Network

Authors
Toru Yoshikawa, Institute for Science of Labour (ISL), Kawasaki, Japan
Myung Sook Lee, Korean Industrial Health Associations (KIHA), Seoul, Korea
Toyoki Nakao, Tokyo Occupational Safety and Health Center (TOSHC), Tokyo, Japan
Kuck Hyeun Woo, Soonchunhyang University (SU), Gumi, Korea
Etsuko Yoshikawa, Tokyo Ariake University of Medical and Health Science (TAU), Tokyo, Japan
Moon Hee Jung, Hanyang University (HU), Seoul, Korea
Jungsun Park, Korea Occupational Safety & Health Agency (KOSHA), Seoul, Korea
Jae Hoon Roh, Yonsei University College of Medicine (YUCM), Seoul, Korea
Kazutaka Kogi, Institute for Science of Labour (ISL), Kawasaki, Japan

1. Background
Awareness is growing about the need to develop locally adjusted training toolkits that can support participatory steps for practical workplace improvements\(^1\)\(^-\)\(^3\). This is particularly programmes aimed at reducing work-related risks in small enterprises\(^4\). Learning from positive experiences in Asian countries, our Japan-Korea Participatory Occupational Health Network has developed Participatory action-oriented training (PAOT) toolkits for different target groups through joint workshops held alternatively in Japan and Korea. We examined the effectiveness of the workshop-style methods for developing training toolkits in each local context. The locally adjusted process of designing a PAOT toolkit is discussed to identify the widely applicable steps for developing participatory toolkits applicable in the local content of small enterprises.

2. Methods
We examined effective types of training kits through annually held Japan-Korea workshops (from 2009 to 2012) of occupational health trainers. Total 122 trainers from two countries participated in the four workshops. Participatory ways of designing new training toolkits for different target groups of small and medium-sized enterprises were tested and their relevance to different languages and cultures was verified. Each workshop consisted of a factory visit, group work sessions and training sessions for using the new toolkits (Figure 1). The practicality of the toolkits including action checklists and presentation slides was assessed through the training results.
3. Results and discussions

As practical ways of developing new, locally adjusted training toolkits, the participating trainers agreed on three common steps: 1) collecting local good examples demonstrating feasible solutions for reducing work-related risks, 2) editing a new action checklist and presentation slides reflecting low-cost examples in multiple technical areas, and 3) structuring the toolkit so as to facilitate concrete proposals for improving existing workplace conditions in these multiple areas. A two-day workshop including training rehearsals utilizing a new toolkit was found useful for completing the design process and assessing their effectiveness. By repeating the two-language workshops since 2009, it was confirmed important to focus on immediate improvement actions and use many photographs and PowerPoint files for making full use of visual effects. It was further proven essential to rely on basic principles of occupational hygiene and ergonomics incorporated into the checklist and presentation files. The constraints concerning different languages and cultures could be minimized by using these visual tools and communicating by means of visual displays. The workshop sessions proved useful for adjusting the new toolkit to local needs and locally feasible improvements. The tested design process proved effective for developing industry-specific PAOT toolkits for their direct use in participatory training aimed at reducing work-related risks in small enterprises. Essential points for spreading PAOT programmes in Korea and Japan were discussed through workshop (Table 1).

Table 1. Essential points for spreading PAOT programmes for small enterprises in Korea and Japan

- Increasing the number of the participants
- Generating concrete outputs from each workshop
- Coherent continuation of the PAOT workshops to enhance mutual exchanges of PAOT experiences
- Joint development of training contents for trainers
- Utilizing a check-sheet for self-evaluation of PAOT training events
- Securing financial support
4. Conclusions
The serially held workshops demonstrated the usefulness of a brief workshop for developing new PAOT toolkits for facilitating immediate workplace improvements in small enterprises. The emphasis placed on local good practices, the composite design of a new action checklist and presentation files and their use by trainers in participatory training sessions was particularly important. It is suggested to promote inter-country collaboration in developing training toolkits effective in different local conditions of these enterprises.

5. References


Running head: aging workers in SMEs and the influence on corporate’s internationalization

Authors
Tina Zahel, Hanze University of Applied Sciences, Groningen, International Business School, Zernikeplein 7, AA 9704 Groningen, 0049-179-9100-165 t.zahel@gmx.net
Franz Josef Gellert, Hanze University of Applied Sciences, Groningen, International Business School, Zernikeplein 7, AA 9704 Groningen, 0031-50-595-2347, f.j.gellert@pl.hanze.nl (corresponding author)

Abstract
During the past years a significant change in terms of the age distribution of workers was being observed in the majority of European countries. The ‘Ageing of Europe’ phenomenon describes the higher life expectancy of European inhabitants and the decreasing fertility and mortality rates. At the same time small and medium sized enterprises are increasingly confronted with handling international business relationships due to the growing internationalization process. They face more intense market competition which provides opportunities for growth, enhanced competitiveness, performance and long-term sustainability. SME managers are required to take action by adapting internal structures to the diversified needs of an older workforce. Though, internationalization implies time taking effort in an increasing involvement in international markets and dealing with growing diversified international work forces.

Our research investigates whether older workers support corporation’s internationalization activities and what factors influence employees’ performance maintaining foreign relationships.

The research was conducted in Germany, the Netherlands and United Kingdom by distributing questionnaires to SMEs in the selected countries. For the research purpose an adequate sample size of 60 small and medium sized companies, 20 of each specific country, was selected. The companies had to meet the European definition criteria of small and medium sized enterprises. This means that they may not exceed the limit of 250 employees and that they may either possess an annual turnover of max € 50 million or a total balance sheet of max € 43 million (European Commission, 2005).

Furthermore, 6 companies involved in different business areas were selected for the purpose of unstructured interviews to highlight the main aspects of the survey results in more detail. The division of companies in the 3 selected European countries aimed to be as equal as possible to gain best valid results for each country. Data were analyzed by simply searching for answer patterns. Findings revealed that older workers remain able to keep international relationships running.
SME managers do not perceive that older employees are less suitable for maintaining foreign relationships. However, older employees tend to show less developed language skills, cultural awareness and flexibility. In the future, SMEs in Europe should develop key qualification analyses for their employees to see where skills and experiences of current employees are. Language trainings and mixed-aged international work teams should help older employees to overcome deficits in international business relationship maintenance.

**Keywords**
Aging Workers, SMEs, Internationalization

1. **Introduction**
The past years, a significant change in population’s age distribution was being observed in the majority of European countries. The ‘Ageing of Europe’ phenomenon describes the higher life expectancy of European inhabitants and the decreasing fertility and mortality rates. At the same time small and medium sized enterprises (SMEs) are increasingly confronted with handling international business relationships due to the growing internationalization process. SMEs face more intense market competition which provides opportunities for growth, enhanced competitiveness, higher performance and long-term sustainability.

Though, internationalization implies time taking effort in an increasing involvement in international markets and dealing with growing diversified international work forces. Taking this into account, two questions arose as follows:

1) *In which way does the demographic change in terms of age distribution influence the international business relationships which are maintained by small and medium sized enterprises in Germany, the Netherlands and the United Kingdom?*

2) *How should companies change internal employee structures in order to avoid the problems caused by the ageing in Europe phenomena?*

Primarily, the literature on international relationships is reviewed to create a theoretical framework and to achieve a deeper understanding of an ‘ageing Europe’ and ‘internationalization in SMEs’. It will display perceptions concerning ageing work populations and their influences on the labour market. Additional statistical data prepared by the federal governments and private statistical institutions will provide an overview about the age distributions in the three countries under investigation.

We continue with the methodology and the results section. The results will be analyzed in order to answer the initially asked research questions.

Finally, a conclusion and detailed recommendation section for SMEs will be presented. Theoretical and practical implications are discussed at the end of the conclusion chapter.
2. Theoretical background
This chapter reviews critically existing literature on ageing in Europe and internationalization in SMEs. Furthermore, publications of the European government will shed a light on the ageing population trend in Europe.

2.1 Ageing in Europe
According to Carone and Castello (2006), the ageing population is characterized by decreasing fertility, mortality rates and a higher life expectancy among the European population. In this report the countries under investigation are Germany, the Netherlands and the United Kingdom which are faced with a growing proportion of elder people (Eurostat 2011) combined with decreasing birth rates. The main reasons for these developments are the progress made in the health care sector and in the field of social protection systems during the past decades and the changing family life decisions young people make nowadays (SHARE, 2010). Due to a risen average education time parents are aged much older at the birth of their first child nowadays and additional factors like life style changes contribute to the declining fertility rates. In contrast, an increase of birth rates has been visible in the United Kingdom since 2001.

Figure 1 (Eurostat 2012) shows the population pyramid of the 27 European member states in 1990 and 2010. The pyramid reflects the significant change in fertility rates and the growing proportion of older people. While the number of individuals aged 30 and younger has declined from 1990 to 2010, the population aged 40 and older has undoubtedly increased.

Figure 1. Population Pyramid 1990-2012 (Eurostat database, 2011)
Figure 2 (Eurostat 2012) illustrates the change of the European population aged 65 or above from 1990 to 2010, expressed in percentage points. A significant increase can be observed in Germany. The German population aged 65+ has risen by 5.8 percentage points between 1990 and 2012. In contrast, the Dutch population aged 65+ has risen by almost 2.5 percentage points and the 65+ population in the United Kingdom has risen by only 0.8 percentage points. On average, the population of the 27 member states of the European has risen by 3.7 percentage points. While the Netherlands and the United Kingdom provide percentage point changes below this number, Germany exceeds the European average change.

Figure 2. Change in the share of the population aged 65 years or over between 1990 and 2009, percentage point change (Eurostat, 2011)
Although Germany is the most populous country in the European Union with 82 million inhabitants in January 2010, its fertility rate counts only 1.42 children per woman (Central Intelligence Agency 2009). This rate is one of the lowest in the world. The population is expected to decline to 70 million inhabitants in 2060 (Destatis, 2010).

In comparison, the United Kingdom had a fertility rate of 1.92 children per woman in 2010 and represents the second highest fertility rate in the European Union near replacement level. Replacement level is defined by 2 children per woman. The population of the UK is expected to rise to 76.8 million inhabitants by 2050 (Destatis, 2010). In 2009, 62 million inhabitants were counted. However, the future population will be formed by fewer younger people and more from the older age groups as noted by Gellert (2008).

The Netherlands showed a fertility rate of 1.79 children per woman in 2009 and a total population of 16,575 inhabitants. The population aged above 65 will rise from currently 13 percent to 25 percent in 2040 while the total population will be expected at a level of 17.2 million inhabitants. The current Dutch population is the youngest in ageing Europe. Therefore, a gradual decline is expected in the years after 2040 when the fertility rate stagnates below replacement level.

The projections of Eurostat (2011) anticipate that the ageing in Europe process will continue in the next decades.
2.2 Internationalization in SMEs

During the past decades, internationalization and the associated benefits of achieving and maintaining competitiveness became an important goal and at the same time a challenge for SMEs in Europe. The literature shows various definitions of the term internationalization relating to the activities of SMEs. According to Stokes & Wilson (2006), “internationalization includes investments, cross-border clustering and any activity that facilitates the exchange of knowledge and technology between small and medium sized firms.” In this context, internationalization does not define purely the export of final products or services into foreign countries or establishing a company branch abroad. Using foreign supply relationships is mentioned by Stokes and Wilson (2006) as the most widespread form of internationalization and is used by about 30 percent of all SMEs across Europe.

Concerning the location of foreign relationships it is mentioned by Graham, Hooley and Wilson (1998) that “firms initially target nearby countries and subsequently enter foreign markets with successively greater ‘psychic distance’ in terms of cultural, economic and political differences and also in relation to their geographic proximity.” However, this pattern refers to all types and sizes of companies in general and therefore location aspects of foreign business relationships have to be proved particularly for small and medium sized enterprises during this research project.

Although the internationalization process provides opportunities for growth and competitiveness for SMEs, it is seen as a challenging undertaking in many respects. The interpersonal and intercultural communication competences of SME owners, managers and employees are according to Lewis (2006) involved in the process of maintaining internationalization issues. These are crucial competences for sharing expertise, information and knowledge which in turn characterizes the benefits of belonging to business groups and networks.

Another challenging aspect of the internationalization process is described by the added degree of diversity that internationalization causes. Diversity in general means the dissimilarities in organizations, groups, networks and working places (Gellert, 2008 p. 22), the range of differences that occur in any group of people interacting with each other. With the growing internationalization diverse cultures converge in companies and this cultural diversity has to be managed appropriately in order to use synergies and to reach business advantages out of diverse groups. On the other hand diversity in organizations can even bring along negative results; Williams and O'Reilly (1998) state that “increased diversity, especially in terms of age, tenure and ethnicity, typically has negative effects on social integration, communication and conflict.” Williams and O'Reilly (1998) researched over four decades about diversity and its complexity in workforces and conclude that increasing diversity can complicate the ability of groups to act stable over time and may also neglect the specific necessities of group members. However, these aspects have to be examined in the context of small and medium sized enterprise in order to be able to identify generalizations for this specific size of companies.
2.3 Combination of demographic and internationalization aspects
Up to the present, no specific studies were found that deal with the influence of ageing in Europe on international business relationships of SMEs. The results of the aforementioned literature review suggest that the two significant large-scale changes –demographic and internationalization- may converge in Europe’s companies nowadays. Therefore, a combined view should merit more attention of managers as even older workforces and more pressure and competition through the growing internationalization process are expected in the next years. Measures should be established to avoid potential problems and to achieve a smooth running of international relationships with the trend of older workforces in small and medium sized enterprises in Europe.

3. Methodology
We used in our research study a mixed method approach which allowed us to combine questionnaires and interviews to cover aspects of demographic changes as well as of internationalization in SMEs.

3.1 Sample
We selected in total 60 small and medium sized companies (20 of each in Germany, The Netherlands and the United Kingdom). Companies had to meet the European criteria of small and medium sized enterprises. This means that they may not exceed the limit of 250 employees and that they may either possess an annual turnover of max € 50 million or a total balance sheet of max € 43 million (European Commission, 2005).

Six companies involved in different business areas have been selected for the purpose of unstructured interviews to highlight the main aspects of the survey results in more detail. Furthermore, the division of companies in the three selected European countries aimed to be as equal as possible to gain best valid results of each country. We received 18 valid questionnaire results of each country and we could conduct 2 unstructured interviews per country.

3.2 Characteristics of interviewed companies
All interview companies met the earlier described criteria of being a small or medium sized European enterprise. International relationships are mainly maintained with customers from all over Europe. Two interview partners stated that they maintain very important relationships with suppliers in the United States. The 6 interviewed companies are active in the following branches of economic activities:

- sports retail
- aircraft repair service
- beverage trade
- recruiting services
- online marketing / travel websites
- IT services
The companies employ diverse numbers of employees aged 50+ and have therefore different levels of experience in managing older workforces. Two companies do not employ any person older than 50 years, two companies employ about 50 percent employees above 50 years and two thirds of the last company's employees are composed of persons aged 50+.

All interview persons are managers or even owners of the company and therefore provide a wide overview about the business, internal processes and employee structures.

3.3 Instruments

3.3.1 Questionnaire design
The questionnaire was in English. For the German companies the questionnaire was translated into a German version with a word-by-word translation. This was proved and acknowledged by a colleague of us, who is a lecturer of the International Business School of the Hanze University in Groningen and who is a native speaker of the German language and also an expert in English.

The questionnaire was opened by a short description of the research project. The description aimed to introduce the respondent into the topic and the purpose of research. The description was followed by four close-end general questions 1-4 dealing with attribute variables of the respondent's company: The country where the company is located, the number of employees that are currently employed, the percentage of employees who are older than 50 years and the percentage of employees who are younger than 30 years. These questions aimed to find out about the current age structures in the participating SMEs and to filter the country where the company is located. Furthermore, the companies could be filtered by small or medium sized nature.

A pilot testing with two test companies aiming the feasibility and validity of the questionnaire was successfully conducted prior to the data collection period.

3.3.2 Interview design
The semi-structured interviews six companies were selected for an interview with a duration of approximately 10-15 minutes. The interviews with the German and Dutch SMEs were conducted face to face at the location of the companies. In contrast, the two interviews with the SMEs in the United Kingdom were held via telephone. Furthermore, the interviews were partly conducted parallel to the questionnaires, taking the tight time frame for this project into consideration.

The semi-structured interview form was chosen to guarantee that several aspects of research were covered in all interviews to compare the results. On the other hand, the interviews should provide new insights into the research topics to explore the research questions in more detail and to align the interview to the flow of conversation.
3.4 Analyses
Responses from the questionnaires were analyzed by inserting the answers into an excel sheet as well as we did for the outcomes of the interviews.

3.4.1 Analysis of semi-structured interviews
In order to gain a deeper insight into the aspects of ageing in Europe and internationalization and how these aspects are related to specific branches of economic activities, semi-structured interviews were conducted with 6 small and medium sized companies in total. 2 interviews were conducted with SMEs of each research country to guarantee equally divided results.

The main outcomes of these interviews are presented in the following sub chapters.

4. Results
62 questionnaires returned back in total. 23 out of these 62 questionnaires were according to question 1 filled in by German SMEs, meaning 37 percent. The Dutch participation was slightly lower with 34 percent of the questionnaires or 21 completed questionnaires. 18 questionnaires returned from SMEs in the United Kingdom, representing 29 percent of the total results. While the distribution of questionnaires was nearly equally divided to the 3 countries, the division of returned questionnaires was slightly different. However, the results still represent an acceptable level of equality among the focused countries.

4.1 Age distribution of employees
In order to evaluate how the current age structure in the participating companies is distributed the questions 4 and 5 focused on this topic. The majority of companies, namely 27 out of 62, employ currently less than 10 percent persons aged 50+. Only 3 companies employ more than 50 percent older employees.

In contrast, 23 out of 62 companies stated that between 10 percent and 30 percent of their employees are younger than 30 years. Additional 23 companies employ even between 30 percent and 50 percent employees of this age group. Only 6 companies reported that less than 10 percent of all their employees are younger than 30 years and in 10 companies more than half of the workforce is currently aged below 30.

4.2 International relationships

4.2.1 Countries
In order to identify the most important international relationships that small and medium sized enterprises in Europe maintain nowadays, it was of crucial importance to ask for the head countries of the important foreign business partners. The results of question 5 show that the United States, Germany and the Netherlands are on the top of the list, mentioned by at least 9 of the participating survey companies. They are followed by the United Kingdom, France and the statement ‘all over Europe’ with at least 6 recurred remarks. The statement of more than 1 important foreign relationship country was possible in the questionnaire while the
statement of the own company’s country (Germany, The Netherlands or the United Kingdom) would have resulted in an invalid survey. This has not been the case.

Therefore, the most important intercontinental business relationships are maintained with the United States with 9 remarks, followed by China and Japan (3 remarks). Figure 8 shows an overview about the most mentioned foreign relationship countries with at least 3 remarks. Additionally, 21 times other countries have been mentioned once or twice: South Korea, Belgium, Australia, Israel, Norway, Madagascar, Ethiopia, Ghana, India, Ireland, Italy, Turkey, Portugal, Poland and Denmark.

4.2.2 Business groups
The foreign business relations mentioned in questions 5 have been more specified through question 5a. The majority of foreign business relationships are maintained with customers as 39 out of the 62 responding SMEs stated (62.9 percent). 18 out of 62 companies maintain their most important international business relationships mainly with suppliers (29 percent) and a minority, namely 5 out of 62 SMEs stated that the most important foreign relationships are held with intermediaries (8.1 percent).

4.2.3 Challenges with foreign business relationships
Question 6 focused on the general problems that SMEs perceive regarding the maintenance of their foreign relationships.

5 out of 62 participants did not answer this question. 26 respondents stated that they do not perceive any problems concerning their international business relationships at all, mainly because of rich experience in maintaining foreign relations or very similar cultures of the foreign business partners.

The remaining 32 respondents that represent half of the total number of respondents perceive at least some minor problems with their international business relationships. The most often mentioned problem regarding international relationships was ‘cultural differences’. This aspect was mentioned by 18 out of 62 respondents as a problematic issue. When this aspect was described in more detail, the following aspects were mentioned:

- punctuality
- differing senses of urgency
- different standards and contract expectations
- communication problems

4.3 Perception of older employees’ performance in maintaining foreign business relationships
The questions 7 and 7a were aimed to establish the performance of older employees in maintaining international business relationships. This question is the first one in the questionnaire that combines the aspects of internationalization and the demographic change in Europe.
14 out of 62 respondents answered the question 7 ‘In your perception, would older employees (age 50+) tend to be less suitable for maintaining foreign business relationships than younger ones?’ with ‘Yes’ (22.6 percent). The other respondents stated ‘No’. None of the participants skipped the question.

To gain an understanding of the reasons behind the ‘Yes’ -answers, question 7a was designed. This question asked for the reasons why employees aged 50+ are generally perceived as less suitable for the maintenance of foreign relationships.

6 participants out of the 14 respondents that answered the basis question 7 with ‘Yes’ stated that language problems of the older employees are the reason for less suitability regarding foreign relation maintenance. 2 respondents specified this answer with ‘English language’; the others did not mention a concrete language. The language aspect already mentioned in question 6 in context with general problems while maintaining foreign relationships is reflected in this more specific generational focus.

8 respondents mentioned flexibility problems. In 5 cases these flexibility problems include either a lack of physical or motivational flexibility in terms of travelling abroad or flexibility to adapt to different standards or requirements in a foreign country. Flexibility in terms of adaption to different cultures was mentioned by 4 respondents.

Furthermore, problems of technological nature were mentioned 3 times. The respondents stated that older employees tend to show less understanding of e.g. new media and internet communication than younger ones. The nature of influence this aspect has on the company's foreign relationships was not mentioned.

In some cases even ‘No’-answers were commented in the answers of question 7a. These respondents highlighted the advantage that older employees possess in terms of experience.

### 4.4 Appraisal of the ‘Ageing in Europe’ phenomenon and future outlook from the SME perspective

Question 8 asked for the changes deriving from the demographic change that SMEs expect for their business in future. This question was skipped by 8 out of 62 respondents.

11 respondents do not see any changes for their company deriving from demographic changes. Either they already employ a relatively old workforce or they do simply not perceive changes that could derive from an aging workforce.

21 respondents mentioned the increasing competition for young, well-educated employees with appropriate skills as an important change factor for their company. The respondents concern themselves with the question how suitable people can be recruited in times of this increasing competition and how additional attraction for these persons could be created. In their opinion, finding suitable employees will be much more complicated in future.
Other frequently mentioned aspects were the problems directly related to expected older workforces. For example, an inevitable awareness for health problems was stated and the necessity of integrating an increasing number of older employees into the workforce. Life learning programs aiming to increase the employability were suggested by a respondent. In several cases respondents stated that the extent of influence caused by the demographic change is strongly dependant on the type of business. More specific, one respondent noted that in the event business probably no changes deriving from aging trends will appear as most employees quit their jobs aged below 50. The specific job is physically too exhausting for older generations.

The demographic change will lead to older workforces with increasing treasuries of knowledge and experience as already described by the literature. Survey respondents noted that these collections have to be used efficiently. In contrast, it was stated that current older employees will face difficulties to adapt to the changes in technology: ‘More training is needed to keep older employees up-to-date with technology’. The current generation that will age in future will overcome these problems by already being prepared to these changes through the foresighted education nowadays.

Furthermore, another perspective was mentioned with the identification of new business possibilities and opportunities through ‘ageing in Europe’. An aging society brings new market opportunities that focus on an older generation. In this context, the respondents see advantages deriving from an experienced older workforce.

4.5 Perceived consequences of the demographic changes on SMEs

The ageing in Europe phenomenon was described briefly in each interview by the interviewer. The expected consequences of the demographic trend were quite different in the interviews. The increasing competition for suitable employees was mentioned by two interview persons as an important change aspect. In their opinion this is applicable to all branches but especially for branches where ‘highly qualified employees are required’. In contrast, another manager stated that in the relative young cities in the Netherlands the problem of a smaller pool of suitable young candidates is not expected to appear during the next years.

Furthermore, higher and longer paid salaries for older experienced staff members and more absenteeism as a result from the older and therefore less healthy workforce were mentioned. The demographic change will lead to older workforces with less flexible employees regarding retraining, information technology and social media.

4.6 Older employees’ contribution to international business relationships

All 6 managers mentioned that older employees are in their perception not necessarily less (or better) suitable for maintaining international relationships. The degree of suitability for maintaining foreign relation depends on the nature of relationships and other aspects like the specific skills of the employees, mainly language skills. 3 managers mentioned the language aspect in the context of older employees’ contribution to foreign relations. One manager
perceives older employees as possessing less developed language skills than younger ones while the other ones do not notice any relationship between employee age and knowledge of languages.

Several managers stated during the interviews that older employees can even perform better than younger ones in international relationship management due to their experiences, impartiality and solid beliefs.

All managers see differences between the current older generation and the future older generation. The current young generation is described as well prepared for the increasing degree of internationalization and the resulting requirements concerning technology, education and flexibility. This is due to the more international orientated education nowadays in their perception. Therefore, the current older generation focuses more difficulties in these aspects as future older generation will do. In contrast, one manager perceive older employees to be more suitable for maintaining computer technology based problems as they have a more intensive and better foundation of the program roots. Furthermore, he mentioned that the current university education in the United Kingdom is poorer than the education in the past in his opinion.

4.7 Optimal age distribution in work teams
Concerning the idea of an ideal aged work team, 4 out of 6 managers mentioned that mixed teams consisting of about 50 percent older and 50 percent younger employees would be optimal for their company. This composition would combine the experience and knowledge of the older employees with the enthusiasm and up-to-date education of the younger employees in an optimal way creating synergies. Two managers prefer more equally aged teams which results from very specific types of business. The manager dealing with travel websites prefers exclusively younger employees because of required technical skills while the manager of the hunting sports retail store prefers older employees with hunting experiences built up over decades.

4.8 Internal employee structures considered by SME managers in future
In order to find out how SMEs would react to demographic changes in future, an interview question was designed that focus on future employee decisions. 5 out of 6 managers will consider employing young professionals from abroad if the demographic change leads to increasing competition on the domestic market for young professional employees. One Dutch manager would not consider employing anyone from outside the Netherlands as he prefers a homogeneous workforce. If competition for young professionals will increase, he would consider employing older employees. Two interview persons already employ a much diversified workforce consisting of employees from 6 different countries inside and outside of Europe. They are convinced that due to the high integration into the internationalization process of their business employees from different countries would fit optimal into the company.
As long as they provide the essential skills and experiences for the company, all managers would employ older employees instead of younger ones if the competition trend will last in future.

5. Conclusion
The paper tried to figure out: *In which way does the demographic change in terms of age distribution influence the international business relationships which are maintained by small and medium sized enterprises in Germany, the Netherlands and the United Kingdom? And how should these companies change internal employee structures in order to avoid the problems caused by the ageing in Europe phenomena?*

The statistical data provided by the European Commission has evidenced that declining fertility and mortality rates have lead to a significant older population in all 3 research countries over the past decades. However, Germany shows by far the largest percentage point change from 1990 to 2010 concerning the European population aged 65+, followed by the Netherlands. The United Kingdom forms the rear end light with the lowest percentage point change but still shows an increased population aged 65+.

The Ageing in Europe phenomenon leads to encouraged labour market participation of workers aged between 55 and 64 and this trend is expected to continue in future. The primary research of this project has discovered that managers of small and medium sized enterprises in the 3 focused countries perceive increasing competition for young professionals at the employee candidate market as the most severe internal change for SMEs in future. Furthermore, through the increasing participation of older workers life experience and knowledge treasuries will stay longer in companies. Managers who do not perceive internal changes deriving from ageing in Europe already deal with a relatively old workforce in most cases.

The most important foreign relationships of the 68 companies that participated in this research are maintained with European border countries, mostly customers. If international relationships have been mentioned outside of Europe, the United States dominated in this context, followed by Asian countries. Problems concerning the maintenance of these relationships mainly occur in terms of different opinions regarding contracts and punctuality between diverse cultures and language problems.

SME managers do not generally perceive older workers as less suitable for the maintenance of the company's foreign relationships. It is strongly dependant on the business specific knowledge and the skills of the employee if foreign relationships are maintained successfully. However, when asking in more detail about the skills of older workers that are in general important for foreign relations, older workers tend to be perceived as having less developed language and technology skills in comparison to younger ones who undergo a more international school and university education nowadays. Furthermore, older workers are observed as having less physical or motivational flexibility in terms of travelling abroad and less flexibility to adapt to different cultures than younger generations.
The more international orientated education nowadays will result in a future generation of older workers that will be more aware about the important internationalization process than the current older generation. For the current workforce in SMEs mixed employee age structures are recommended as both generations will learn from each other and therefore use synergies for the optimal maintenance of foreign relationships. Older employees should be trained in terms of language, current technology and cultural awareness to close gaps that result from different orientated educations between younger and older generations.

5.1 Limitations
Due to the fact that the selected companies are located in 3 different countries in Europe, the time frame for this project was limited to 8 weeks and there were no financial resources available, distributing questionnaires by Email seemed to be the lowest-cost and the most time effective alternative for conducting the research. Therefore, expected difficulties derived from a quite low response rate of the questionnaires sent by Email or already from refusal of permission to send companies the questionnaires.

The response rate of the questionnaires was about 25 percent (62 out of approximately 250 distributed questionnaires returned back). This rate is higher than the average return rate of corporate questionnaires. Almost all called companies gave their permission to send them the questionnaire. However, 75 percent of the questionnaires did not return.

The same challenges were expected for the qualitative data collection that was aimed to be conducted by face to face and in case of SMEs in the United Kingdom by telephone interviews. All 6 selected companies were interested to conduct the interview.

5.2 Recommendations

5.2.1 Improvement of applicant management and applicant marketing
As observed from the provided statistical data, fewer young professionals will apply for jobs in the next years resulting from the demographic change. As a result, there will be increasing competition for talented applicants in future. Small and medium sized companies should implement a systematic applicant relationship management to ensure that the most suitable candidates apply for their vacant job positions. Job advertisements should be placed in a way that they create awareness of young, international orientated professionals who bring the appropriate education and skills for the specific position. The internet is an excellent platform which provides numerous job websites where companies have the possibility to place job advertisements. At the same time job candidates can offer their profiles for suitable employers. It is crucial that possible candidates are aware of the key advantages of the companies in general and of the specific position and vice versa as different expectations from both parties can be avoided early in this manner.

Companies that maintain international relationships and are willing to employ persons aged 50+ should emphasize the international focus of their business and the key skills applicants
should possess in this context. This is important because the outcome of this research has shown that the Generation 50+ provides much diversified individuals in terms of language skills, flexibility, cultural awareness and the general attendance to travel for business purposes.

As the job demand will be decreasing during the next years and decades due to the demographic changes, especially visible in Germany and the Netherlands in this research, it is recommended to focus on active applicant search as well. There are social media platforms like ‘LinkedIn’ or ‘XING’ that allow companies to select possible job candidates from a pool of profiles. Companies can enter applicant criteria into the system and will receive a number of preselected candidate profiles. They can contact the candidates directly via the platform. Furthermore, through the internet communication candidates often show first communication and social media skills that could be required by companies.

In countries with an expected decreasing number of young professionals it is of importance to save the existing knowledge and competences within the company. SMEs should build up analyses of job experiences and competence profiles to detect which employees are most valuable for the maintenance of the company’s international relationships due to their rich experiences. A possible lack of key competences can be revealed early in order to take appropriate measures like an intensified number of training programs (see next sub chapter). Furthermore, with the help of graphs and tables managers are able to compare the performances and knowledge of their employees with other employees cross-sectional or over time.

The current research has shown that the current generation aged below 30 is perceived as a very international oriented generation, caused by the internationalization process during the past years. This generation will take their cultural awareness, language skills, social media experience and open-mindedness through their entire working life. Employees aged 50+ should be given more training opportunities to develop their skills regarding international business relationships. Managers should attend to form work teams consisting of mixed aged individuals as young professionals can learn from the experience of older colleagues. On the other hand, older employees can learn from the increasing international-orientated education from the young professionals.

Training opportunities especially for the older workforce should be offered in 3 different categories:

In order to maintain foreign relationships as effective as possible, research has evidenced that appropriate knowledge of the language of business partners is essential – with a small exemption of SMEs in the United Kingdom that are in an advanced position with English as a widespread business language.

Especially in small enterprises it is not always realizable to organize language training programs inside the company, due to reasons of limited space. Therefore, it is advised to
give employees the opportunity and financial support to attend external language trainings during official work times. Companies should work together with supporting government organizations like the IHK in Germany that offers individual tailored training programs. In the age of increasing internationalization, technology skills are essentially important for companies. Especially communication technology, e.g. internet and email programs, is indispensable as foreign relationships are often mainly maintained via internet or telephone.

Older employees are described as less experienced with new communication technologies in this context. The current older generation should be offered effective trainings to catch up gaps regarding technology aspects. Companies that employ mixed aged workforces should take care of mixed working teams so that older employees can effectively learn from the knowledge of the younger colleagues. In SMEs with general older workforces, external organized trainings should be offered. It is important that older employees are given the opportunity to attend external trainings by their managers.

SME managers are advised to take care about the cultural awareness of their employees relating to the countries where foreign business relationships are maintained in the company. Special training sessions can help employees to understand the culture of their business partners in order to act adequately in specific situations. As each business aims different goals and focuses on different key aspects in foreign relationships, external trainings would not necessarily be suitable for trainings in this context. SMEs should organize this kind of trainings on their own.

6. References


Offshoring: a matter of bridging cultural differences

Authors
Björn Ziemer, Hanze University of Applied Sciences, Groningen, International Business School, Zernikeplein 7, AA 9704 Groningen
Franz Josef Gellert, Hanze University of Applied Sciences, Groningen, International Business School, Zernikeplein 7, AA 9704 Groningen, 0031-50-595-2347, f.j.gellert@pl.hanze.nl (corresponding author)

Abstract
Business models and business processes are undergoing tremendous changes because markets are changing, competition becomes stronger and consumer behavior is changing too. The chance for small and middle-sized enterprises (SMEs) to survive in rapidly growing dynamic market environments is a challenge. Therefore, SMEs perceive a need to search for new business opportunities by thinking about networking and building alliances or offshoring/outsourcing of their business processes. Offshoring/outsourcing is currently mostly related to IT processes that can be managed cheaper and more effectively outside the own company and the domestic market. SMEs are running a higher risk than bigger companies do when they offshore/outsource their business processes. Research and practice in the area of outsourcing/offshoring has been biased by experiences of large firms.

In our paper we focus on small and medium-sized enterprises (SMEs) that have found their way into offshoring relations. The relations are built from either an economic or emotional point of view. We were particularly interested in how North-West European and Asian owner/managers build, maintain, and--when necessary--exit their relationships. Therefore, we reviewed existing literature and conducted 16 semi-structured interviews in The Netherlands, Germany, UK, Denmark and Sweden. The semi-structured interviews consisted of questions drawn from the research of Lee et al. (2008) about trust between partners in offshore business, and associated with Bharadwaj et al. (2010)’s division of contract life cycle in outsourcing. Interviews were conducted with either a founder, director, or manager applying a semi-structure so that interviewees could express their feelings and emotions additionally. By following the framework of trust, the details of the interviews were structured by starting with a company overview and ending on an interview conclusion that illuminates the current company’s thinking on outsourcing/Offshoring and their related activities.

Results suggest that trust is of the essence in the relationship building process and that trust needs to be understood and managed in multi-cultural relations. The development of trust goes through different levels or stages of a process. As a starting point, trust can be built on positive experience, personal embeddedness, openness, honesty and integrity, sharing benefits and risks, commitment and patience (Stel 2011). Additionally, trust can be built on two levels, either on a formal or an informal level.
We can also conclude that for practical reasons partners in offshore relationships need to be educated and trained how to build trust in multi-cultural relations and that the firms’ cultures need to be taken into account, too.

Keywords
Trust, Relationship quality, Cultural differences, Outsourcing, Offshoring