DALARNA UNIVERSITY

Working papers in transport, tourism, information technology and microdata analysis

Young Peoples' Entrance to the Workplace – Introduction to Occupational Health and Safety

Ing-Marie Andersson
Kristina Gunnarsson
Ann Hedlund
Gunnar Rosén
Editor: Hasan Fleyeh

Nr: 2016:02

Working papers in transport, tourism, information technology and microdata analysis
ISSN: 1650-5581

Young Peoples' Entrance to the Workplace – Introduction to Occupational Health and Safety

Ing-Marie ANDERSSON[1]

Kristina GUNNARSSON[2]

Ann HEDLUND[1]

Gunnar ROSÈN[1]

1. School of Technology and Business Studies, Dalarna University, SE 79188 Falun, Sweden

2. Department of Occupational and Environmental Medicine, Uppsala University, SE 751 85 Uppsala, Sweden

Abstract

Negative outcomes of a poor work environment are more frequent among young workers. The aim of the current study was to study former pupils' conditions concerning occupational health and safety by investigating the workplaces', safety climate, the degree of implementation of SWEM and the their introduction programs.

Four branches were included in the study: Industrial, Restaurant, Transport and Handicraft, specialising in wood. Semi-structured dialogues were undertaken with 15 employers at companies in which former pupils were employed. They also answered a questionnaire about SWEM. Former pupils and experienced employees were upon the same occasion asked to fill in a questionnaire about safety climate at the workplace.

Workplace introduction programs varied and were strongly linked to company size. Most of the former pupils and experienced employees rated the safety climate at their company as high, or good. Employers in three of the branches rated the SWEM implemented at their workplaces to be effective.

The Industry companies, which had the largest workplaces, gave the most systematic and workplace introduction for new employees. There are no results from this study explaining the fact that young workers have a higher risk for workplace accidents.

Key words:

Introduction to the workplace, Safety climate, Systematic work environment management system, SWEM, Young workers.

Ing-Marie Andersson
Professor i Arbetsvetenskap, Högskolan Dalarna
e-post: ima@du.se

Kristina Gunnarsson
Med Dr. Arbets-och miljömedicin, Institutionen för medicinska vetenskaper, Uppsala Universitet
kristina.gunnarsson@medsci.uu.se

Ann Hedlund
Lektor i Arbetsvetenskap, Högskolan Dalarna
e-post: ahd@du.se

Gunnar Rosén
Professor i Arbetsvetenskap, Högskolan Dalarna
e-post: grs@du.se

Preface

The report is a part of an AFA Insurance funded project aimed to identify how training in health and safety issues in vocational schools and the introduction to working life is organized. A long-term aim is that the young people get a good start in a safe and attractive work.
It has been a collaboration between Dalarna University, Sweden and Department of Occupational and Environmental Medicine, Uppsala University, Sweden.

Borlänge in February 2016

Authors

Contents

1 Introduction

Negative outcomes of poor work environment and risky work are more frequent among young workers compared to older [1, 2]. The rate of accidents at work is up to 40% higher among young workers in Europe [3]. However, young workers are more exposed to non-permanent injuries [4]. A global literature review concluded that young men in particular had higher non-fatal injury rates than older men, but that the opposite was true for fatal accidents at work [5].

A study from the Norwegian construction industry found that the risk for injuries among young workers was increased independent of company size and discipline but the injury types compared to older workers were a little different. Physical as well as psychosocial factors such as vibration, heavy lifting, physical work demands and control over work pace could however tone down the effect of age. The authors found no link between safety climate and the risk for injury [6].

A literature review stated that management system can prevent accidents and create a better occupational health and safety in companies. Despite this have low employee influence and accidents occurred in companies with certified management system. To be successful, management, employees and union had to work together on these issues [7]. Another review study based on twenty-three articles concerning occupational health and safety management systems fund in general positive effects but the weak quality of many of the studies did not gave base for a recommendations either in favour or against occupational health and safety management systems [8].

Internationally is a well-developed systematic work environment management system (SWEM) seen as a fundament for the creation of safe work places and this has therefore been implemented in national legislations with the aim to create safe work places. Within the European Union is this defined in Council Directive of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work (89/391/EEC) [9]. In Sweden are the provisions of the Swedish Work Environment Authority on Systematic Work Environment Management [10], seen as central for the organization activities to minimize risk. The provision applies for all enterprises and comprises to have a work environment policy at the enterprise, make risk analysis, plans for dealing with the risks identified, safety meetings, safety representative and routines for reporting injuries and incidents. The manager's duty is to manage SWEM and to care for the employees' health and safety. The degree of implementation of those provisions varies with the size of the organization so that small companies in general have a lower level of implementation [11]. An investigation performed by The Swedish Work Environment Authority [12], confirmed that there is often a lack of knowledge in small-scale

enterprises about work environment, risk assessment, and prevention of risks in the work environment.

There are a lot of different questionnaires to measures safety climate but one, Nordic Safety Climate Questionnaire (NOSACQ-50), are developed by a group of Nordic occupational safety researchers and based on relevant theories and empirical studies. They defined safety climate as workgroup members' shared perceptions of management and workgroup safety related policies, procedures and practices. The questionnaire is for instance relevant to use in research with the aim to evaluate the safety climate status in industrial settings [13].

The questionnaire (NOSACQ-50) has been used in a Swedish study to evaluate the safety climate at four industrial companies. It was concluded that the level of safety climate perceived as good/high among those who participated in the evaluation. It also showed that those who work shifts and do not have a managerial position perceive the level of safety climate as less positive compared to other groups that were studied. On the other hand those who have a managerial position and don't work shifts perceive the level of safety climate as higher compared to the other groups [14].

In the vocational schools, pupils have got training in occupational health and safety. Nevertheless young workers have difficulties to implement the knowledge in practice [15]. A Swedish study focused on how well pupils in vocational education were prepared to meet risks in occupational health and safety (OHS). The first part of the study reviled that pupils in four different vocational programs had limited knowledge about OHS [16]. The second part of the study identified what kind of training pupils received in vocational education about OHS. That study demonstrated that teachers based the training on their own previous experiences in the workplace. Most of the supervisors at workplace based learning (WPL) did not receive information from the schools as to what should be included in OHS issues at WPL [17].

With the knowledge that young people are overrepresented in the statistics concerning negative outcome from poor work environment is it of interest to study what young pupils encounter when they enter the labour market. Do they come to workplaces with a well organised work environment management system and with a well-developed safety climate?

With this as a background in a third part of the study have youngsters who recently had finalized their studies in vocational schools been contacted and visited at their current workplaces.

.

2 Aim

The aim was to study the former pupils' conditions concerning occupational health and safety by investigating the workplaces' regarding:

- safety climate
- systematic work environment management system
- the former pupils' introduction at work

3 Subjects and methods

3.1 Study group

The study group consisted of 17 former pupils employed in work they were educated for, 15 employers in the companies where the former pupils were employed, and 14 experienced employees at the same workplace. The former pupils graduated from upper secondary schools in spring term 2013 in following programs: Industrial technology program, Restaurant management and food program, Transport program, and Handicraft program (in which pupils specialized in wood) (Table 1).

3.2 Recruitment

The participating former pupils had also participated in the study "Knowledge and experiences of risks among pupils in vocational education" [16]. At that occasion they also got information about this follow-up study focusing on their first job and they all accepted to participate. The former pupils were asked by telephone if they had got any job and if they still wanted to participate in the study. One to two former pupils representing each program and school were then selected to participate. After that the workplaces were contacted and asked to participate. The employers were asked to pick out one experienced employee to participate in the study. At the visit the former pupil, the employer and the experienced employee at the workplace were orally informed about the study. They also got written information including contact information to the responsible researchers. The workplaces were all located in the middle area of Sweden.

Table 1. Study population divided in employed former pupil, employer, and experienced employee. (M) for male and (F) for female. Kind of workplace and number of employees in each workplace are specified.

Study program in school	Visited employed pupil, n	Workplace	Employees N	Visited employer n	Visited experienced employee n
Industrial technology	1 (M)	Metal industry	19	1 (M)	1 (M)
	1 (M)	Metal industry	1500	1 (M)	1 (M)
	1 (M)	Mine	366	1 (M)	1 (M)
	1 (M)	Metal industry	34	1 (M)	1 (M)
Restaurant management and food	1 (F)	School canteen	50	1 (F)	1 (F)
	1 (M)	Ski resort	31	1 (F)	*
	1 (M)	Hotel	37	1 (M)	1 (F)
	1 (F)	Catering	4	1 (F)	1 (F)
	1 (M)	Restaurant	4	1 (M)	1 (M)
Transport	1 (F)	Freight company	8	1 (M)	1 (M)
	2 (M)	Freight company	4	1 (M)	1 (M)
	1 (M)	Freight company	3	1 (M)	1 (M)
Handicraft, specializing in wood	1 (M)	Wood industry	61	1 (F)	1 (M)
	1 (M)	Wood industry	8	1 (M)	1 (M)
	2 (M)	Wood industry	30	1 (M)	1 (M)

*Missing data

3.3 Study design

Every workplace included in the study was visited early spring 2014 by two of the researchers for 2-3 hours. The former pupil and an experienced employee were asked to fill in The Nordic Safety Questionnaire (NOSACQ-50) about the occupational safety climate at the workplace [18]. The questionnaire content questions in seven dimensions: Management safety priority, commitment and competence; Management safety empowerment; Management safety justice; Workers' safety commitment; Workers' safety priority and risk non-acceptance; Safety communication, learning, and trust in co-worker safety competence; and Workers' trust in the efficacy of safety systems [13]. The employer was asked to fill in a questionnaire about how the company organised their SWEM. The questionnaire is developed by the Swedish Work Environment Authority to help companies to evaluate their SWEM. It includes questions concerning the following areas:

Collaboration; Work environment policy; Routines; Allocation of work environment tasks and skills; Employees' skills; Risk assessment; Investigate ill health; Accidents and incidents; Actions and action plan; Follow-up actions; and Occupational Health Services [19]. The employer was also asked about the routines to introduce new employees.

3.4 Analytical procedure

3.4.1 Safety climate

The data has been treated and analysed according to the NOSACQ-50 method, option 2 [20]. The questionnaire was answered on a Lichert scale 1-4.

When developing NOSACQ-50 the following guidelines for interpreting the results within every dimension were established: Mean value above 3.30 indicates a high level of safety climate, mean value between 3.30 and 3.00 indicates a relatively good level of safety climate in need of minor improvements, mean value between 2.99 and 2.70 shows rather low level of safety climate which require improvements, and mean value below 2.70 demonstrate low level of safety climate and thereby great needs of improvements [14].

3.4.2 Systematic work environment management system (SWEM)

The answers from the employers were transferred to the Swedish Work Environment Authority web based questionnaire. For each participant was reported a value for each question and automatically calculated an average on a scale from 1-5. The result was shown in a bar with red, orange and green colour for each question. Red (value 1) no SWEM was implemented, orange (value 1.1-3.5) SWEM was partly implemented, and green (value 3.6-5) SWEM was implemented and gave effect.

3.4.3 Introduction of new employees

The information about routines of introduction to new staffs are described as a result from dialogues with managers at the different workplaces

3.4.4 Statistical analysis

Data from The Nordic Safety Questionnaire (NOSACQ-50) have been analysed statistically on dimension level and the SWEM-questionnaire from the Swedish Work Environment Authority on question level. Since there was an uncertainty about distribution non-parametric tests has been used [21]. Comparisons between former pupils and experienced employees, were analysed using Mann-Whitney Test; between branches, one test including former pupils and experienced employees and another one including employers, using Kruskal-Wallis test; and between former

pupils and experienced employees at respectively work place using Wilcoxon Signed Ranks Test. The employees (former pupils and experienced employees) opinion about the total safety climate was calculated as average of the seven dimensions (scale 1-4). The employers' opinion about their total SWEM was calculated as average of 14 questions (scale 1-5). In order to compare the groups was the average for the employers converted to scale 1-4. Comparisons between employers and former pupils respectively experienced employees within the work places were analysed using Wilcoxon Signed Ranks Test. Kruskal-Wallis Test and Friedman Test were used to analyse the comparison between former pupils, experienced employees and employers.

3.5 Ethics

This study was approved by The Regional Ethical Committee in Uppsala, Sweden

4 Results

4.1 Safety climate

Independent of branch rated former pupils and experienced employees safety climate at their company as good, except from former pupils in wood industry who rated it relatively good (Fig. 1). There were no significant differences between former pupils and experienced employees, or between different branches.

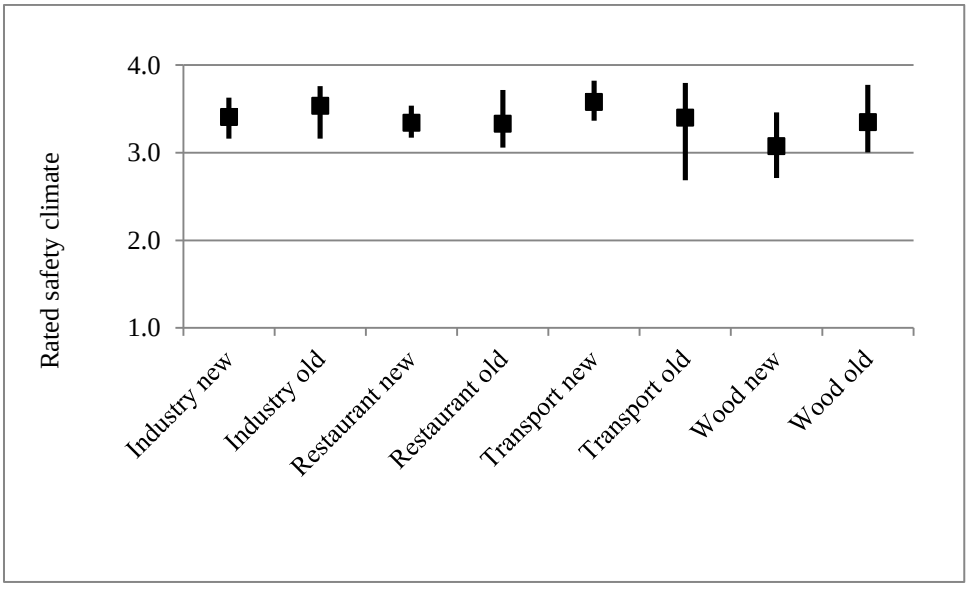

Fig. 1. Former pupils (new) and experienced employees (old) rating of safety climate at their company divided into branches (mean values and distribution).

Statistical analyses on dimensional level gave some significant results. The rating of "Management safety empowerment" and "Safety communication, learning, and trust in co-worker safety competence" was the same for the whole group of old and new employees ($p < .05$). Looking at paired old and new employees at each work place gave the significant result ($p < .001$) in the dimension "Workers' safety priority and risk non-acceptance", which were rated the same. There was a significant difference ($p < .05$) between how employees (the total amount of former pupils and experienced employees) in different branches rated the dimension "Workers' trust in the efficacy of safety systems". Employees in Industry rated the trust highest, closely followed by Transport. Restaurant and Wood rated significantly lower values.

4.2 Systematic work environment management system (SWEM)

The employers rating showed that workplaces in three of the branches had implemented SWEM giving effect (Fig. 2). All transport workplaces had partly implemented SWEM. The differences on branch level were significant ($p < .05$). Employers in Industry rated highest, followed by Wood and Restaurant while Transport was much lower.

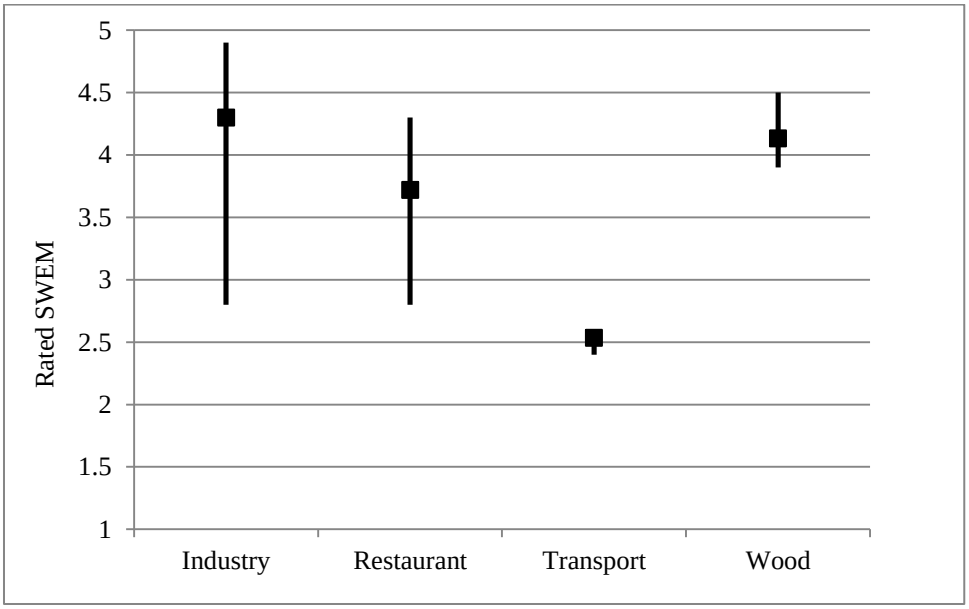

Fig. 2. Employers rated systematic work environment management (SWEM), (mean values and distribution).

4.3 Safety climate related to systematic work environment management (SWEM)

No significant differences have been found between former pupils, experienced employees, and employers. There are indications that experienced employees rated the safety climate higher than the employers rated SWEM at the same workplace.

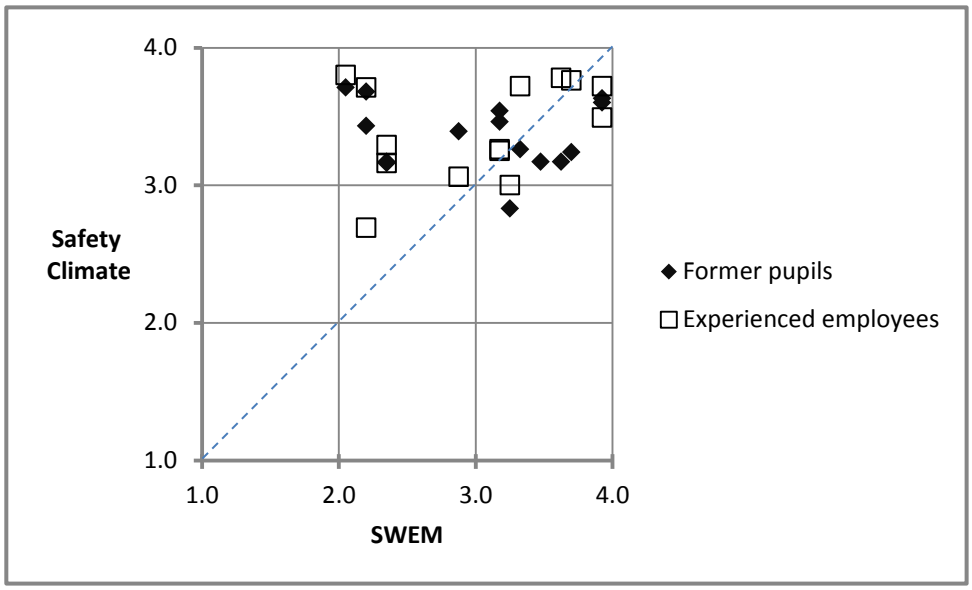

Fig. 3. Safety climate versus the implementation of a systematic work environment management system.

4.4 Introduction of new employees

The results are presented for each of the four branches.

4.4.1 Metal industry companies

One bigger company gave a special course in risks at the workplace. The manager also participated in the introduction course. At the same company the new employee had a medical examination which was followed up every year. At the other companies experienced employees gave the introduction by following a special program. The main focus was on safety knowledge connected to each machine. In some case the manager gave more general safety information about the company risks.

4.4.2 Restaurant companies

There is a more general opinion among managers in the restaurants that the school provide necessary knowledge about risks. At one workplace, management had a general review of the risks of all groups of new employees before the facility opened for the season. Two companies informed about the risks at the workplaces kitchen and one showed evacuation routs. It also exist

that the employee received written information about risks and how to avoid them and then had to sign after reading through the text. Other risks raised by the manager were alcohol policy and how to handle oils in connection with water.

4.4.3 Transport companies

The transport companies are often very small. The owners' own children have gone with the truck since they were young and several managers believed they have good knowledge of current risks. When they are finished with their training and become new drivers they were introduced by working together with experienced drivers in the beginning. One manager also informed about driving safely and not rushes on the road. He also raised the risk of overweight in a sedentary job.

4.4.4 Wood companies

Two of the companies systematically informed about risks with the machines and one used a checklist regarding occupational health and safety issues. One of the companies pointed out that they offered protective shoes, stating that it reduced the risk of injury. At another company they went first through the entire company and after that it was an introduction by the supervisor at the specific workplace. The introduction included both professional skills and risks.

5 Discussion

Regardless of the business, need all workplace a good culture and a well-organized work environment. To find out if this applies to former students new jobs these questions are studied using two different surveys, the Nordic Safety Questionnaire and SWEM questionnaire [18, 19]. Safety climate was rated by both former pupils and experienced employees as good. This is in line with the results from another Swedish study of four industrial companies [14]. The similarity in perception between former pupils and experienced employees could be an effect of the systematic way of introduction. But it could also be influenced by the culture in the company and the experienced employees' participation in the introduction.

Workers' trust in the efficacy of safety systems varied between the four branches. The high trust within the industry companies may be explained by the systematical introduction of new employees. Even though the introduction was not systematic in transport companies the employees had high trust which could be a result of the regularly courses in drivers' certificate of professional competence. The lower trust among employees in restaurant companies could be linked to the incomplete introduction of new employee. Also employees in wood companies perceived low trust in the efficacy of safety systems. In Swedish injury statistic, wood companies

report high rate of severe accidents [22]. This is well known in the branch and could be an explanation for the low trust.

The companies with low self-rating of SWEM were to great extent companies with less than ten employees. This is in line with investigations performed by The Swedish Work Environment Authority [12] concerning lack of knowledge in OHS.

The indication that experienced employees rated the safety climate higher than the employers rated SWEM at the same workplace strengthen that the connection between safety climate and SWEM is not distinct. Even if safety climate rated as high there is no guaranty that SWEM is implemented and gives effect.

In accordance with Frick, 2011 can a management system be successful to prevent accidents if management, employees and union work together [7]. When this cooperation already starts when the future employees are in education there are good chances to reduce accidents for the youngsters. An additional positive effect is that the manager can through contact with the school partially affect the content of the education at school.

The industry companies, which had the biggest workplaces, gave the most systematic and including introduction of new employees. Also the wood companies had a similar introduction. Both those branches are working with a wide range of risky machines, which can cause serious accidents. This is in accordance to Holte's result that big companies had more formalized routines and systems for introduction of new staff [23]. As the introduction in the transport companies were performed by an experienced driver during daily work in the lorry was the effect dependent on him and thereby no guarantee for a systematic introduction. At the restaurant companies the focus was more on specific items, which means that other important parts in SWEM could be missed.

5.1 Methodological consideration

The companies participating in the study were located in the middle part of Sweden in towns as well as in rural areas, which can be considered to provide a spread in the material. The researcher discussed the analyses with respect to how well data and analyses addressed the aim of the study. However, the study group was rather small but the response rate could be considered as good. A small study group do not give opportunity for generalisations of the result.

5.2 Acknowledgement

The authors would like to thank AFA Insurance for foundation and former pupils, employers and employees at participating companies.

6 Conclusion

In order to decrease the risks at work the focus of the study was to investigate the workplaces regarding safety climate, SWEM and the former pupils' introduction at work.
As introduction to work often is performed by more experienced employees it is of great importance that the company have a good safety climate and implemented SWEM with good effect. Because small companies often have less knowledge and developed OHS-systems it is urgent that new employees in those companies have good own knowledge about OHS including SWEM from vocational school.

7 References

1) Breslin FC, Tompta E, Zhao R, Pole JD, Amick BC, Smith PM, Hogg-Johnson S (2008) The relationship between job tenure and work disability absence among adults: A prospective study. Accid Anal Prev **40**,368-375.

2) McCabe B, Loughlin C, Munteanu R, Tucker S, Lam A (2008) Individual safety and health outcomes in the construction industry. Canadian Journal of Civil Engineering **35**,1455-1467.

3) Schneider E (Ed). Young workers—Facts and figures [Internet]. European Agency for Safety and Health at Work. 2007 [cited 2015 November 12]. Available from: https://osha.europa.eu/en/publications/reports/7606507

4) Breslin C, Koehoorn M, Smith P, Manno M. Age related differences in work injuries and permanent impairment: a comparison of workers' compensation claims among adolescents, young adults, and adults. Occup Environ Med 2003; 60:e10. Available from: http://www.occenvmed.com/cgi/content/full/60/9/e10

5) Salminen S (2004) Have young workers more injuries than older ones? An international literature review. J Safety Res **35**,513-521.

6) Kjestveit K, Tharladsen J, Holte K A (2011) Young and strong: What influences injury rates within building and construction? Safety Science Monitor **15**, 1-15.

7) Frick K (2011) Worker influence on voluntary OHS management systems – A review of its ends and means. Saf Sci **49**, 974–987.

8) Robson LS, Clarke J, Cullen K, Bielecky A, Severin C, Bigelow PL, Irvin E, Culyer A, Mahood Q (2007) The effectiveness of occupational health and safety management system interventions: A systematic review. Saf Sci **45**, 329–353.

9) European Union. Directive 89/391 - OSH on the introduction of measures to encourage improvements in the safety and health of workers at work - "Framework Directive" [Internet] European Agency for Safety and Health at Work. [Cited 2015 November 12]. Available from https://osha.europa.eu/en/legislation/directives/the-osh-framework-directive/1

10) Swedish Work Environment Authority. Provision about Systematic Work Environment Management. 2001. [Cited 2015 November 12] Available from:

https://www.av.se/globalassets/filer/publikationer/foreskrifter/engelska/systematic-work-environment-management-provisions-afs2001-1.pdf

11) Antonsson A-B, Birgersdotter L, Bornberger-Dankvardt S (2002) Small enterprises in Sweden Health and safety and the significance of intermediaries in preventive health and safety. National Institute for Working Life, Sweden, Arbete och Hälsa No 1.

12) Blomqvist A, Johnsson H (2003) Undersökning om Systematiskt arbetsmiljöarbete (Investigation about Systematic Work Environment Management). Swedish Work Environment Authority, Stockholm, Sweden Report 2 [In Swedish].

13) Kines P, Lappalainen J, Lyngby Mikkelsen K, Olsen E, Pousette A, Tharaldsen J, Tómasson K, Törner M (2011) Nordic Safety Climate Questionnaire (NOSACQ-50): A new tool for diagnosing occupational safety climate. Int J Ind Ergon **41**, 634-646.

14) Bergh M (2013) En utvärdering av säkerhetsklimatet bland några av IPS medlemsföretag (Evaluation of safety climate among IPS member companies). COWI AB, Gothenburg Sweden 2013 Report 003, [In Swedish, abstract in English].

15) Schulte PA, Stephenson C M, Okun A H, Palassis J, Biddle E (2005) Integrating Occupational Safety and Health Information Into Vocational and Technical Education and Other Workforce Preparation Programs. Am J Public Health **95**, 404-411.

16) Andersson I-M, Gunnarsson K, Moberg M, Rosén G (2014) Knowledge and Experiences of Risks among Pupils in Vocational Education. Saf Health Work **5**, 140-146.

Högskolan Dalarna, 791 88 Falun. Telefon 023-778000. www.du.se