

AUDITING OF SAFETY MANAGEMENT SYSTEM IN ESTONIAN MEDIUM-SCALE ENTERPRISES

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Safety auditing is a systematic method to evaluate the company's safety management system. The main task of auditing is to establish whether the correct types of safety methods are used and whether they are effectively implemented. The safety auditing in Estonian enterprises is only in the beginning stage. The paper gives the results of safety auditing in three medium-scale enterprises in Estonia. There are differences in the safety level between the companies situated in towns and country-side. Economically developed enterprises have possibilities to pay also more attention to safety matters.

KEYWORDS: safety auditing, safety management system, risk assessment, chemical hazard

INTRODUCTION

Safety auditing is a method to evaluate a company's safety management system. Auditing should cover all the activities aiming to ensure adequate control of the hazards affecting people. The main task of auditing is to see whether the correct types of safety methods are in use and whether they are effectively implemented. Safety auditing is one part of the company's general management activities and is a similar procedure to the auditing of quality and environmental management systems.

Several methods have been developed for supporting safety auditing. These methods are questionnaires, interviews, observations and document reviews.

The safety activities' level determines also the level of safety culture in enterprises.

The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management. Furthermore, organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and confidence in the efficacy of preventive measures (ACSNI, 1993).

The Occupational Health and Safety Standard OHSAS 18001 have not been translated into Estonian yet and therefore it is not used by the companies. The impact of OHSAS 18001 is also not seen in the regulations of occupational safety and health on the national level in Estonia.

STANDARDIZATION IN OCCUPATIONAL SAFETY AND HEALTH SAFETY POLICY AND PLANNING

The occupational health and safety legislation in Estonia is based mainly on two documents: European Directive 89/381/EEC (general policy) and British Standard 8800 (risk assessment). According to BS 8800 (1996), a status review should compare the company's current arrangements with the applicable legal requirements, organization's current safety guidelines and the existing recourses directed to safety activities.

The standard BS 8800 (1996) suggests that (in the safety policy) the management shows commitment to the following subjects:

- health and safety are recognized as an integral part of business performance;
- a high level of health and safety performance is a goal which is achieved by using the legal requirements as the minimum and where the continual cost-effective improvement of performance is the way to do things;
- adequate and appropriate resources are provided to implement the safety policy;
- the health and safety objectives are set and published at least by internal notification;
- the management of health and safety is a prime responsibility of the management;
- the policy is understood, implemented and maintained at all levels in the organization;
- employees are involved and consulted in order to gain commitment to the policy and its implementations;
- the policy and the management system are reviewed periodically and the compliance of the policy is audited on a regular basis;
- it is ensured that employees receive appropriate training and are competent to carry out their duties and responsibilities.

ORGANIZATION AND COMMUNICATION

Safety policy and safety plan set the framework for health and safety activities. Organizing the activities means that clear tasks and responsibilities are determined to all hierarchical levels, from top management to every employee. Besides this, organization's safety related decisions and desires must be effectively communicated to the personnel.

Line managers and safety experts are usually those who are responsible for putting the safety policy and plan into practice. The role of the different personnel groups must be clear before the activities can be realized. Small and medium-sized enterprises (SMEs) are often in different situation compared to large-scale companies. SMEs can seldom employ trained health and safety experts, such as a full-time working environment specialist or medical personnel.

According to the Estonian Act on Occupational Safety and Health (Töötervishoiu ja tööohutuse seadus, 1999), the employer is obligated to organize occupational health services for the employees and to bear the costs incurred. Presently, only entrepreneurs or private medical companies may provide the occupational health service. It means that SMEs cannot have their own medical department at the enterprises.

ROLE OF THE TOP MANAGEMENT

Organizational and safety culture are strongly influenced by the top management. The top management is responsible for the effectiveness of organization's safety performance. Organizational failures are caused by management which allows human failures – due to knowledge, attitude, fitness or ability – to take place. These failures then cause or permit unsafe acts and contribute to unsafe mechanical and physical conditions (Heinrich et al., 1980).

ROLE OF THE DESIGNER

Health and safety considerations are often inadequate when work, workplaces and production processes are designed. The designer's responsibility to carry out adequate health and safety considerations is now written in legislation in many countries. Due to this the guidelines on how to improve safety in design has improved. As an example, the basic concepts and general principles for safety in design of machinery are presented in the Estonian Standard EVS-EN 1050-2000.

ROLE OF THE SAFETY PERSONNEL

The safety personnel in Estonian enterprises consist of working environment specialists and working environment representatives.

The working environment specialist is usually a line management level person, whom the employer has authorised to perform occupational health and safety duties, while the representative is elected by employees in occupational health and safety issued.

In Estonia, the working environment representative's main tasks and responsibilities are determined by the Estonian Act on Occupational Safety and Health. In small and medium-sized companies, the safety manager and the safety representative often have other duties besides their health and safety tasks. The working environment specialist's role is to act as an expert who is aware of the health and safety legislation and performs different tasks concerning the safe working environment at the company. The duties of the working environment specialist are as follow: to promote health and safety activities, to control training needs and to incentive the safe performance, to improve performance evaluation and to increase the status and recognition of the safety function. The representative's main task is to follow the status of safety at the workplace as well as to report to the management on the potential health and safety hazards. A safety representative can stop the work that includes an obvious and immediate health danger, but otherwise the representative's enforcement power is quite limited.

The safety personnel are often in a very difficult position in a company. The working environment specialist's ability to access top management is not self-evident. They are often unable to get support for safety and health policies and programs. Safety and health of workers is not considered to be as important as the production questions by the employers.

ROLE OF THE WORKING ENVIRONMENT COUNCIL

In Estonian enterprise with at least fifty workers, a working environment council shall be set up at the initiative of the employer and shall comprise an equal number of representatives designated by the employer and representatives elected by the workers. A working environment council is a body for co-operation between an employer and the workers' representatives which resolves occupational health and safety issues in the enterprise. They should prepare an annual action plan, evaluate the needs for internal safety inspections, assess the company's safety policy and make suggestions for how the company's safety training and safety communication procedures should be improved. In Estonia, the role of safety committee is more advisory than executive. But as safety committees include employer participation, they probably have more decision-making power than a safety representative alone.

ROLE OF THE OCCUPATIONAL HEALTH SERVICES (OHS) PERSONNEL

In most industrialized countries, the employer must provide occupational health services to the personnel. Finland is one of the best examples, where the system of OHS provides both medical treatment and preventive measures. According to Walters (1996), about 85% of the Finnish employees are covered by an OHS system, which is the highest proportion in Europe.

In those European countries where the OHS personnel consist only of persons in the medical profession, the preventive activities are not so common (Walters, 1996).

According to the Estonian Act on Occupational Safety and Health, the services provided by the occupational health professionals (an occupational health physicians, an occupational health nurse, an occupational hygienist, a psychologist or an ergonomist) are considered to be occupational health services (OHS). These services providers are all call "occupational health specialists". The aims of OHS are to establish a safe work environment, to prevent work-related diseases, as well as to maintain and promote workers' health and work capacity. According to the law, the statutory requirements are met, if the employer acquires the services from any of the individual specialists. Multidisciplinary provision of occupational health service is not required (Martimo, 2004).

The OHS infrastructure in Estonia is still weak. The problems related to the effectiveness of the present OHS system in Estonia are mainly caused by insufficient coverage of the services. In Estonia, the proportion of the work force covered by OHS is not known exactly. Only a minority of employees have access to the specialist of occupational health (Martimo, 2004).

ROLE OF THE EMPLOYEE

The employer is always responsible for ensuring the health and safety at work. In principle, the employee's task is only to obey employer's instructions and not to take any unnecessary risks; but this kind of rule-based safety attitudes seldom exists any more. Nowadays, employees have more decision-making possibilities regarding their own

work and often they also participate in the design of their own work methods and work environment.

The employee's role in health and safety has changed simultaneously with the changes in management and leadership styles. The employees will become responsible for their own actions at work and they will also be responsible to a greater extent for running the safety system (Successful, 1997).

SAFETY COMMUNICATION

In order to achieve the desired objectives, every person needs to make decisions concerning his or her work practices, work contents, work environment, the organization of work, the enterprise and life in general. The decisions need an information basis in order to be rational and in order to lead to the desired results. The information basis consists of relevant information disseminated and received through various channels, as well as the experience and tacit knowledge cumulated by each person in the course of years (Lehtinen, 2002).

The EU Frame Directive stipulates that enough information material on various risk and hazards of the work environment must be available for the workplaces and workers as well. There should be close collaboration among those actors who have regular contact to the workplaces. The most important elements in information dissemination are interpreting, understanding and making use of the information (Lehtinen, 2002).

Information dissemination system and communication in the field of occupational health and safety is the most problematic area that has to be development in a company in Estonia. Usually there is not enough and relevant information available and that the two-way information flow is inadequately arranged.

According to the safety policy, the following safety related information is the minimum that should be communicated within the organization:

- the meaning and purpose of the safety policy;
- lessons learned from the accidents;
- comments and ideas for improvement;
- the results of the occupational hygiene measurements;
- significant findings from the risk assessments.

Line management (engineers) can show visible commitment, by carrying out regular walk through visits in order to investigate the occupational hazards, participating at the meetings of safety committees, analyzing the work accidents and occupational diseases. Besides the management safety tours, there should be other face-to-face discussions. These can include monthly or weekly meetings where managers and engineers discuss health and safety with their teams and where the employees can have opportunity to make their own suggestions.

The company encourages communicating not only within the organization, but also with the public. For instance, companies handling large amounts of hazardous chemicals usually must inform also the public on the potential hazards. The general information

on occupational health and safety, and on occupational accidents and the safety situation in the working environment, on the developments in work life in general, should reach the whole working-aged population, including the authorities, politicians, decision-makers.

METHOD

One of the most common methods for assessment of safety management system in the company is Diekemper & Spartz (D&S) method (Diekemper, 1970), first introduced in the United States of America.

The original D&S method is a very rough method, and it does not help the auditor to assess the individual safety activities very thoroughly. This means that there is a lot of space for the expertise of the auditor. The D&S method also suggests certain activities which may not always be the most suitable solutions for every company. In many cases, the company can arrange its activities in another way, but equally effectively.

The method used in the present study has been modified by Kuusisto (Kuusisto, 2000).

The modified D&S method addresses 30 activities.

These are categorized into the following activity areas:

- **A** – organization and administration
The activities assessed in the area (altogether 9): statement of safety policy, assignment of responsibilities; direct management involvement; safety instructions to hazardous tasks; workplace design; emergency and disaster control plans; plant safety rules; measurement of safety activities; safety organizational structure; health care.
- **B** – industrial hazard control
The activities (6) assessed in the area: housekeeping-storage of materials etc.; machine guarding; general safety of work environment; maintenance of equipment, hand tools, etc.; material handling – manual and automated; personal protective equipment.
- **C** – fire control and industrial hygiene
The activities (5) assessed in the area: chemical hazard control references; storage of flammable and explosive materials; ventilation-fumes, smoke and dust control; skin contamination control; fire measures.
- **D** – supervisory participation, motivation and training
The activities (7) assessed in the area: line manager safety training; training of new employees; job hazard analysis; training for specialized operations; internal self-inspections; safety promotion and publicity; employee/supervisor safety contact and communication.
- **E** – accident investigation, statistics and reporting procedures.
The activities (3) assessed in the area: accident investigation by line personnel; accident cause analysis and statistics; near-accident investigation (Kuusisto, 2000).

The assessment is carried out in four levels system: level 1 (poor); level 2 (fair); level 3 (good); level 4 (excellent).

For example in the case of accident investigation: level 1 (poor) – no accident investigation made by the line management; level 4 (excellent) – the investigation of every accident is made within 24 hours of its occurrence; reports are reviewed by the department manager and/or plant manager.

Another example: chemical hazard control references; level 1 (poor): no knowledge or use of reference data; level 4 (excellent): data is available and posted in the workplace where it is needed. Employees have read and understood the contents of the data.

MATERIALS

Safety management system was assessed at three (3) Estonian enterprises during January 2005 – May 2005. The investigated companies were selected from the manufacturing industry: one of them is situated in the more developed area, the capital of Estonia (Tallinn); the second near-by the capital (30 kilometres from town) and the third in the country-side (200 kilometres from the capital, on a separate island). Case study technique included data collection from the companies using questionnaires, interviews, observations and document reviews. The interviews were carried out with the safety personnel, the employer, the members of working environment council, line managers and the workers.

The most direct way of assessing how an organization functions is to ask the people who work there. Checklists were developed in order to gather information about worker's knowledge in the field of occupational health and safety, relevant legislation and requirements as well as worker's opinions and perceptions, attitudes towards using protective equipment, safety routines and to assess the safety management systems. The workers working in industrial departments and office rooms assessed the influence of hazards in the work environment, but also the safety system and safety policy in the company.

The 3 enterprises were chosen from different branches of industry: printing industry in Tallinn (Case I), mechanical factory near the capital (Case II) and a plastics processing factory in the country-side (Case III).

CHARACTERIZATION OF INVESTIGATED ENTERPRISES

The Case study I was carried out in the printing industry, which is located in the capital of Estonia – Tallinn. This is one of the biggest printing factories in Estonia and it provides work to 170 workers. More than half of the Estonian newspapers and magazines and a big part of advertising publications are printed in this factory. The factory is situated in the suburb of Tallinn, in the new premises (removed two years ago from the old house in the centre of the town).

Case study II was carried out in the mechanical factory near the capital, producing two-wheeled trailers for passenger cars. The number of workers: 136. The company is situated in 3 different places (the distance between them is max 30 km). The selling department is situated in Tallinn, the capital. The worst building, walls made only of silica brick, is used for carrying out the welding process (6 workplaces).

Case study III was carried out on Saaremaa island (located in the west of Estonia), at the company, that is producing rubber products for German car industry. The quality control of these products (package rings included) needs very good eye-sight from the workers. Therefore, only the girls at the age 18–25 years not wearing eye-glasses were hired to work in the control-rooms.

The risk assessments in these factories were carried out during 2003–2005. The main occupational hazards were investigated and measured as well as some proposals for the improvements possibilities were given to the management of the enterprises.

RESULTS

The results of the implementation of the D&S model for external safety audit were carried out by the researchers of Tallinn University of Technology is given in Table 1.

For the improvements has been done a lot in the field of occupational safety and health at the one of the factories (Case study II) during last two years. The interest from the side of management is obvious. The other factory (Case I) has also invested very much to the improvement of premises. The cooperation in the field of work environment between the factory and researchers (Tallinn Technical University) has continued over a year.

An important finding was that the most difficult is to implement the changes in the factory in countryside (Case III), far from the more industrially developed capital. There

Table 1. Results of auditing of safety system in 3 factories (Case I – printing industry; Case II – mechanical industry; Case III- plastics industry). *Maximum score is 20 for each area. Maximum total score is 100*

Category	A*	B*	C*	D*	E*	Total score
Case study I	12,7	15,0	11,0	11,4	9,3	59,4
Case study II	10,5	10,0	10,0	9,2	6,7	46,4
Case study III	8,9	12,5	10,0	11,4	6,7	49,5

*A – organization and administration: statement of safety policy, direct management involvement, safety instructions to hazardous tasks, workplace design, measurement of safety activities, safety organization, health care;

*B – industrial hazard control: housekeeping, machine guarding, material handling, personal protective equipment;

*C – fire control and industrial hygiene: storage of flammable and explosive materials, ventilation – fumes, smoke and dust control, fire control measures;

*D – supervisory participation, motivation and training: training of line supervisor, new employees, job hazard analysis, training for specialized operations;

*E – accident investigation, statistics and reporting procedures: accident investigation, accident cause analysis and statistics, near-accident investigation.

were very little interest and motivation to deal with occupational health and safety issues. At the same time, some easiest improvement-proposals were given to the management of the company and the most important is the positive attention to the suggestions from the researchers.

ORGANIZATION AND ADMINISTRATION

In Case studies I–III each included an interview with the company's safety personnel. In the Case study I also the interview with the executive manager of the company and the working environment council was carried out. After the interview with the safety manager (personnel-manager in the case study I) a short walk-through of the production plant was done. The employees were occasionally interviewed during the walk-through. Also the safety related documents, e.g. the policy; the safety training manuals were reviewed.

The company in Case I manufactured printed documents (newspapers, advertisements, magazines). The manufacturing process operated in three shifts. The premises where the factory operated were new (2 years old). The company had no safety manager; the duties were directed to the personnel manager, who had also the responsibility for fire safety, environmental safety and security system's management. During the closing meeting of the audit (in May 2005) it was pointed out that there were too much different tasks on the shoulders of the personnel manager. The executive manager did not agree with the conclusion this time. At the present time the personnel manager is looking for another job.

The main types of accidents in the company were slips, pinching of fingers, back injuries. The company's employees were quite experienced on the work (half of them worked in the factory for 10–20 years). Younger (male) persons with 1–2 years experience were carrying out quality control of newspapers – the job demands very good eye-sight. The company has also the design department. They worked only in day-time.

Case II – the most of the personnel were working only on the day shift. The newest part of the company was built in 2000, but also old store premises were used for carrying out welding process. The full-time safety manager has a long work experience (10 years).

The production of the company is: manufactured trailers and other machinery connected to them.

The number of accidents showed a decreasing trend. The workers were complaining on back injuries caused by lifting tasks. Injuries of fingers were typically caused by sharp pieces of sheet metal.

None of three companies had prepared a written safety policy. In all three companies management reviewed the accident reports.

Whether management actively directs the safety measures was somewhat difficult to determine. In case I, the working environment council was established and it had monthly meetings on safety issues discussing. In case I all employees go through a pre-employment physical health survey before they begin to work. The health care services were obtained from the local hospital (case I and II). The plastic company only planned to send the workers to the medical services after the reviewing the risk assessments' results.

INDUSTRIAL HAZARD CONTROL

In Case I the housekeeping was at a good level. The storage of materials was well done and the walking and working surfaces were mainly clean and free. The cleaners were working in the company all the day. In Case III, cleaners were working only in certain places, were dust was not allowed in the production process, but generally the employees had to clean their workplaces themselves after the work-day. The worst housekeeping was noticed in the Case II (the floor was not clean and also the raw materials and products were stored in the walking area).

In all companies, the machine guards were in place and hazards seemed to be in control.

There were some manual handling tasks in the companies. Most of the products were transported using trucks.

All companies claimed that they provided adequate personal protective equipment to their employees. Typical safety equipment included safety glasses, ear plugs, gloves, and safety shoes. The personal protective equipment was not always used (Case III).

FIRE CONTROL AND INDUSTRIAL HYGIENE

Chemical hazards were in control in the printing industry (Case I). The safety cards for used chemicals were located in the personnel manager's office. Although they were not available at workplaces and employees were not trained in using them. The labelling of chemicals helped to understand the risks connected with the chemicals used in cleaning the rolls of printing machines.

The chemicals safety cards were also available by the leading engineer in the plastics manufacturing company (Case III). The company, producing trailers, uses very few chemicals. The chemical hazards there were mostly connected with welding process and bad smell from inside working trucks using diesel fuel.

In Case I, the persons interviewed, stated that the storage of flammable liquids had been done according to the fire regulations, so only a few days stock of these materials was stored at the workplace.

Ventilation was quite well arranged in Case I. Great attempts were taken by the Case II for improvement the ventilation in welding activities, but some re-arrangements are still possible for cleaning the air in the breathing zone of workers. The workers were not quite satisfied with the local ventilation systems. The respirators were used during the welding. The quality of the air was measured during the risk assessment by the accredited laboratory. Constant health control was provided for welders (Case II).

None of the companies used large amounts of hazardous chemicals.

The companies were well prepared for prevention of fire risk. All the companies had sprinklers installed in the fire hazardous areas and there were adequate number of fire extinguishers available.

Some of the employees were trained in using fire extinguishers.

It was stated that in emergency situations the fire crew of the company was responsible for fire fighting until the city fire department arrives.

SUPERVISORY PARTICIPATION

The working environment specialists and representatives had received the safety training; they participate in regular safety walk-through (Case I). Certain workers had also received Red Cross first-aid training.

In most cases, new employees were trained by senior workers.

Job hazard analysis was carried out and detailed descriptions of jobs' health and accident hazards were available in written form at every workplace. In most cases, truck driving and welding were seen as special and potentially hazardous tasks. Training for specialized operations was given in all companies.

In some companies, posters were used for promoting safety (Case I and III).

The accident statistics were not posted on wall-boards (Case I–III).

There were need for improvement of safety communication between employers and the employees.

ACCIDENT INVESTIGATION, STATISTICS AND ANALYSIS

All companies followed their accident rates. The review was done monthly by the personnel-manager (Case I). No of the companies investigate near-accidents.

In the company in Case III, the obligations of safety manager were directed to the head-engineer, but it was too difficult to him; so after 3 months, the O-rings department manager took over the duties in work safety.

COMPARISON WITH THE RESULTS IN OTHER COUNTRIES

The total scores in the companies (6 cases) in the USA (Kuusisto, 2000) were between 81.6 and 95.2 and in Finland (3 cases) they were between 61.8 and 90.2. The lowest score (61.8) was calculated in the company (28 workers) which main activities were renting, cleaning and repairing of plastic textiles. The number of workers in the other companies investigated in Finland and USA was between 100 and 2900. This shows that the improvements in the area of work safety are always the most difficult to carry out in small companies.

The comparison of the results in the Estonian companies (Table 1, score between 46, 4–59, 4) shows that the safety matters in the enterprises of the previous Soviet country have to be taken more seriously particularly by the management of the companies.

CONCLUSIONS

Safety policy and safety plan that set the framework for health and safety activities in enterprises are not available in written form in Estonian companies.

In addition, the information about hazards connected with used chemicals is not available at workplaces and the workers are not trained to use the chemical safety cards. There is a need for raising the awareness of workers in the field of occupational health and safety by compilation the relevant guidelines and fact sheets.

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