



# Practical tool and procedure for workplace risk assessment: Evidence from SMEs in Estonia



Karin Reinhold\*, Marina Järvis, Piia Tint

Department of Work Environment and Safety, Tallinn University of Technology, Ehitajate tee 5, 19086 Tallinn, Estonia

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## ABSTRACT

This study focuses on a successful risk assessment procedure in small and medium sized enterprises (SMEs) where occupational health and safety resources may be less accessible than in larger companies with more labour force, time, knowledge and technology. An original approach is offered for an easy and unambiguous assessment of occupational hazards (physical, chemical and biological) and evidence from 18 industrial SMEs from different branches of industries are presented. In order to evaluate employers' and employees' attitudes and perceptions towards health and safety, safety interviews in eight enterprises were conducted. The results showed that in most cases participants' attitudes in the enterprises towards contributing to safety were overall positive: developing safety procedures and practices, written work procedures and safety instructions, providing personal protective equipment, etc. The study identified important safety deficiencies such as the absence of a safety policy; insufficient safety training and unrealistic daily required work load. The measurement results showed that conditions of the working environment varied between companies as well as between the branches of industries. The main identified hazards which exceeded occupational exposure limits were: wood dust in wood processing industry, chemicals and noise in wood processing and mechanical industry, and lighting in mechanical, plastic and printing industry. The authors' developed flexible risk assessment tool was successfully implemented in all investigated SMEs and received positive feedback from the enterprises as an applicable and suitable tool for SME's, where skills and resources are limited.

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## 1. Introduction

A number of studies worldwide (Gardner et al., 1999; Jørgensen et al., 2010; Lamm, 1997; Micheli and Cagno, 2010; Stevens, 1999; Tait and Walker, 2000) report that small and medium sized enterprises (SMEs) face special problems in the field of occupational health and safety (OH&S) compared to those in larger companies namely that the risk of occupational hazards is higher and the ability to control risk is lower. Also, studies indicate that exposure to physical and chemical hazards is higher in SMEs than in larger companies (Schlunssen et al., 2001; Sørensen et al., 2007). Although no comparable studies have been reported in Estonia, it is likely that these issues are of similar concern in Estonian enterprises. Some studies also report that OH&S problems in SMEs are more a result of poor management of risk and lack of resources than of the actual magnitude of the hazards present (Micheli and Cagno, 2010; Walters, 2004). In addition, other studies (Brown and Trevino, 2012; Clarke, 1999) suggest that perceptions of senior

managers "attitudes and behaviors in relation to OH&S, well-being of workforce will form the basis for the safety behavior of employees as well as employers" willingness of conducting risk assessment.

Based on European Union (EU) regulations (Council Directive 89/391/EEC (EEC, 1989)), the Estonian Act on occupational health and safety (Occupational Health and Safety Act, 1999) requires employers to carry out systematic and documented workplace risk assessments, and sets a special requirement to the method or tool used i.e. it should be flexible enough to be applicable for a large variety of enterprises. According to Estonian legislation, workplace risk assessment can be conducted by employers using their own resources or by OH&S practitioners.

In recent years, several risk assessment tools have been developed and offered to employers for implementation: standard two-dimensional matrices (BSI, 2004; Harms-Ringdahl, 2001; Rouhiainen and Gunnerhed, 2002), bow-tie models (Ale, 2006; Jørgensen et al., 2010), and risk graphs (Aneziris et al., 2006; Brandsæter, 2002; ISO, 2007) are used. Despite several risk assessment models available, the primary shortcomings in risk assessment reports include the absence of a specific method and

\* Corresponding author. Tel.: +372 6203961.

E-mail address: [karin.reinhold@ttu.ee](mailto:karin.reinhold@ttu.ee) (K. Reinhold).

confusion with principles for risk level estimation, especially in SMEs (Labour Inspectorate, 2010). This indicates the necessity to offer a simpler approach for assessing risks in the workplace in order to motivate employers to assess and manage occupational risks effectively.

The aim of this research was to assess the current working conditions of Estonian SMEs and their compliance with EU OH&S legislation and to draw attention to the importance of risk assessment as an inevitable and practical tool in the successful management of OH&S.

The main objectives were: (a) to identify and assess the common occupational hazards (physical, chemical and biological) in SME's in Estonia; (b) to investigate employers' and employees' attitudes and perceptions towards OH&S; (c) to determine how SME's address OH&S issues, and; (d) to explore the possibility of using a flexible risk assessment (FRA) tool in SME's to provide assistance for employers in order to determine the risk levels from current hazards.

The first section of the paper outlines the materials and methods used in the research and the concept of the FRA tool is briefly described. The next section presents an analytical overview of occupational hazards, employers' and employees' awareness and perceptions towards safety. In the last sections, the authors present the main obstacles, ongoing problems and critical aspects of the current OH&S systems in Estonian SMEs.

## 2. Methods

The study adopted a mixed-methods approach, using multiple case studies. According to Creswell (2003), mixed methods are especially advantageous when studying OH&S since they draw on recognized quantitative data (accident and illness rates, risk levels, auditing results) in combination with qualitative concepts (awareness, attitudes and behaviour, risk perception, etc.).

The current research employed qualitative methods (case studies, on-site observations, document analyses, focus group discussions and interviews) and quantitative measurements of occupational hazards in order to explore how risks are managed in the SMEs surveyed.

### 2.1. Case studies

Case studies were conducted during 2008–2012 and data were gathered from 18 SME's from five industry sectors: the wood

processing industry (5), the textile/clothing industry (5), the mechanical industry (2), the plastic processing industry (3), and the printing industry (3) (see Table 1). Case studies were chosen to illustrate and better understand current work environment conditions and the problems of conducting risk assessment in SME's where resources are limited. In addition, the case studies were intended to explore how Estonian SME's address OH&S issues, the possible obstacles encountered in managing OH&S, as well as exploring senior managers' and employees' attitudes and perception, their commitment to safety, which may influence the overall safety performance in the enterprises.

All the enterprises surveyed were typical SMEs – classified in Estonia according to the European classification (Pichler et al., 2000; Statistikaamet, 2003): small enterprises with 10–49 employees and medium sized enterprises with 50–249 employees. The enterprises were selected to represent the most common industrial sectors in Estonia and were located in different regions of Estonia, however majority of them were in or around the capital and western part of the country where the main production area is located.

The study concentrated on physical, chemical and biological hazards since those were reported most often by SME's during previous studies (Reinhold and Tint, 2009) or identified as a problem during recent inspections by Labour Inspectorate (Labour Inspectorate, 2009). The data were gathered from on-site observations, risk assessment, health and safety documentation analysis, safety rules and procedures scrutiny as well as safety interviews with senior managers and focus group discussion with employees. During the visits, in addition to conducting risk assessment with the FRA tool, physical hazards (indoor climate, noise, lighting), chemicals and dust exposures were measured (see Table 1). Relevant standard methods were used while performing the environmental measurements.

#### 2.1.1. Safety interviews with the senior management and employees

At the beginning of the study, the management attitude towards health and safety in each company was briefly assessed based on their interest in the research, their supportive intentions to provide adequate information about the company and their appreciation of workers' health through available safety measures and further ambitions to enhance and improve workplace safety. Eight companies from the eighteen were randomly selected to assess employers' and employees' attitudes and perceptions

**Table 1**  
Summary of investigated companies.

Industrial branch	No. of investigated companies	No. of workers in the company	Main health hazards measured	Data collection methods performed
Wood process-sing industry/ furniture manufacturing, production of windows and doors/	5	25..200	Indoor climate, lighting, noise, wood dust, chemicals (formaldehyde, toluene, xylene, butanol, styrene, benzene)	Observation; risk assessment and measurements; semi-structured interviews; focus group interviews; documents analysis
Textile/clothing industry/	5	50..225	Indoor climate, lighting, noise, textile dust	Observation; risk assessment (measurements); semi-structured interviews; focus group interviews; documents analysis
Printing/printing of periodicals, commercial catalogues, printing of newspapers/	3	24..140	Indoor climate, lighting, noise, paper dust, isopropanol	Observation; risk assessment (measurements); semi-structured interviews; focus group interviews; documents analysis
Mechanical industry/ manufacturing and repair of various metal products, welding/	2	90..175	Indoor climate, lighting, noise, welding dust, chemicals (O <sub>3</sub> , CO, CO <sub>2</sub> , NO–NO <sub>2</sub> )	Observation; risk assessment (measurements); semi-structured interviews; focus group interviews; documents analysis
Plastic industry/manufacture of plastic packing goods, rubber elements and details/	3	25..180	Indoor climate, lighting, noise, general dust, hydrogen fluoride	Observation; risk assessment (measurements); semi-structured interviews; focus group interviews; documents analysis
Office rooms	18	15..80 (no. of workers in the office)	Indoor climate, lighting, noise, chemicals (formaldehyde, CO <sub>2</sub> )	Observation; risk assessment (measurements); semi-structured interviews; focus group interviews; documents analysis

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