



# A novel tool for evaluating occupational health and safety performance in small and medium-sized enterprises: The case of the Quebec forestry/pulp and paper industry



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## ABSTRACT

Efforts to prevent work-related injuries have met with tangible success in industrialized countries. In Quebec, workplace accidents and occupational illness have declined sharply since the end of the 1990s. However, there is still considerable room for improvement in small and medium-sized enterprises (SMEs). Expert specialists in accident prevention in SMEs are overloaded. Their interventions are repetitive and not personalised. Few tools are available for accelerating the process of evaluating occupational health and safety (OHS) performance.

The aim of this research project was to address this deficiency by proposing a novel OHS performance evaluation tool better adapted to SMEs. For this purpose, research was carried out in two distinct phases. The first phase led to the theoretical model on which the tool is based. The second phase was carried out using an action research approach. The proposed tool was designed and improved during this phase, through field-testing and the involvement of a Quebec industrial partner.

In spite of the limitations of this research, we have succeeded in developing a new tool with software support adapted specifically for the evaluation of OHS performance in SMEs. Upon completion of the project, a tested and improved version of the tool was delivered to the industrial partner. Experts in accident prevention have found the tool to be reliable and helpful. It has accelerated the identification of deficiencies in OHS management in several SMEs and has helped specialists to develop personalized and better-focused plans of action.

## 1. Introduction

Efforts to prevent work-related injuries have met with tangible success in industrialized countries. In Quebec, workplace accidents and occupational illness have declined sharply since the end of the 1990s, with a drop of 50,000 in the number of injuries recorded annually from 1997 to 2013, in spite of an increase in the number of hours worked.

Although this trend is well received, there is room for improvement. The Quebec accident prevention legislative regime has been found to be one of the least effective in Canada and the USA (Block et al., 2003). In addition, the situation is similar at all scales of operation (MacEachen et al., 2010; Masi et al., 2014).

In Canada, a small business is defined as a company employing fewer than 100 workers, while a medium-sized business employs from 100 to 499 workers (Statistics Canada, 2013). In Quebec, small businesses represent 98% of all companies and employ 67% of the active population (Statistics Canada, 2013). In Quebec and around the world, the workplace accident rate is higher and occupational health and

safety (OHS) performance is poorer in small and medium-sized enterprises (SMEs) than in large companies (Champoux and Brun, 2003; Vickers et al., 2005). The rates of fatal accidents recorded in association with SMEs are as much as eight times higher than for large companies (Mendeloff et al., 2006). Non-fatal accidents are also more frequent, as much as 50% more (Fabiano et al., 2004).

Improvement of OHS performance can be achieved only by establishing preventive activities that lead to reductions in work-related injuries on the short to medium term. For the improvement of OHS performance, there is at least some consensus in the literature regarding the importance of factors related to the following six categories:

- The commitment of upper management (Abudayyeh et al., 2006; De Koster et al., 2011; Hallowell et al., 2013; Mirabi et al., 2014).
- Risk management (De Koster et al., 2011; Hallowell et al., 2013; Mirabi et al., 2014; BSI, 2007). Improved OHS performance in SMEs is not possible without control of occupational risks.
- Training of personnel in good workplace practices (Hallowell et al.,

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2013; BSI, 2007).

- Leadership by upper management (Hinze et al., 2013; Mirabi et al., 2014; Stadnyk et al., 2011).
- Safe behaviour, in particular compliance with safety regulations and participation in the identification and elimination of hazards (Liu et al., 2014; Mirabi et al., 2014; Sgourou et al., 2010).
- Considering prevention as a continuous improvement (Kaizen) initiative. Although continuous improvement of OHS performance is a less-discussed subject, OHS management systems (OHSMS) are based essentially on this concept (BSI, 2007).

Improving OHS performance is no small challenge. Little information is available on the factors that lead to tangible improvements in the SMEs context (Masi et al., 2014).

As we have shown previously (Tremblay and Badri, 2018), none of six OHS performance evaluation tools identified in a systematic review of the literature are particularly well suited to the SME context. This conclusion is based on evaluation of four criteria: validity, reliability, simplicity and type of performance indicators used. The development of evaluation tools containing a choice of indicators more suitable for SMEs and offering better inter-judge reliability would be a welcome advancement in the field of OHS.

The aim of this research project was to design a novel tool for the evaluation of OHS performance, one adapted to the SMEs context and meeting the needs of experts in this field. The remainder of this article is divided as follows: Section 2 is devoted to describing and defining the problem and the elements that led us to focus on the SMEs case. Section 3 is devoted to the methodology and a description of the adopted action research approach, which involved an industrial partner in order to allow us to deliver a tool well adapted to the industrial context studied. Section 4 presents the results of the research carried out. The results and the limitations of the research are discussed in Section 5, and our conclusion is provided in Section 6.

## 2. The research problem

The problem investigated in this research may be summed up in terms of four essential elements that emerged from our review of the literature. Each of these key elements is described below.

### 2.1. Improving OHS performance: A major challenge

OHS performance is a complex concept comprising several elements such as management commitment, risk management and employee training (BSI, 2007). In order to be effective, the approach to improving OHS performance must be based on a continuous improvement effort (BSI, 2007). In other words, an employer who wishes to improve his performance must not only put these elements in place, he must above all ensure that they are efficient and allow proper control of risks. Periodic evaluation of the OHS performance management system is an indispensable part of the approach. However, this practice is often neglected in SMEs (MacEachen et al., 2010).

### 2.2. Constraints under which SMEs operate

As mentioned above, SMEs make up the vast majority of businesses in Quebec and are more risky workplaces than large companies. They encounter major difficulties with OHS (Breslin et al., 2010) and their OHS ratings are inferior. Among the causes of this difference in performance are insufficient financial resources, lack of knowledge, and difficulty in finding and hiring personnel qualified in OHS. One option available to managers of Quebec SMEs wishing to improve their OHS performance is the prevention-mutual.

### 2.3. Problems of availability of expert specialists in prevention

In the context of a prevention-mutual, the consultant's work consists of, among other things, evaluating the prevailing OHS management situation in the client businesses (SMEs) affiliated with the mutual. The consultant then advises the business managers concerning the actions to be taken in order to improve the situation. Since the points potentially requiring improvement are numerous, the consultant has no choice other than direct observation of company operations on site. Identification of shortcomings and possibilities for improvement is thus a laborious process. Specialists in this field work long hours and still do not find the time to meet the specific needs of each client business. Interventions inevitably become repetitive and not specially tailored.

### 2.4. Performance evaluation tools are poorly adapted to SMEs

Experts in OHS and accident prevention have few tools at their disposal to help them with their task. Conventional tools for evaluating OHS performance are based on reactive indicators (e.g. frequency or severity of recorded injuries). Although simple enough to measure, this type of indicator turns out to be of little aid for identifying OHS deficiencies (Hinze et al., 2013). In order to obtain more accurate evaluations of the OHS performance of a business, researchers and industrial professionals are turning their attention increasingly to proactive indicators (e.g. the percentage of employees trained in OHS or the frequency of workplace inspections). These are descriptors of the effectiveness of preventive processes within a company. In other words, they make it possible to identify problems before they appear in the form of accidents or incidents (Sinelnikov et al., 2015). In fact, proactive indicators represent a mine of information for the OHS expert. However, they remain shrouded in mystery (Delatour et al., 2014). The scientific literature is scant on their use in existing OHS performance evaluation tools (Wright et al., 2005; Roy et al., 2008; Lingard et al., 2011; Amick et al., 2011; Liu et al., 2014; Li et al., 2015). While such tools do exist, none has been designed specifically for specialists working with SMEs.

In summary, there are several reasons why OHS performance is poorer in SMEs than in large companies. The prevention-mutual offers to employers at least the possibility of professional support in their quest to improve OHS performance. However, experts are not able to meet current demand and the effectiveness of their interventions suffers as a result. The OHS performance evaluation tools available to help them are rarely if ever adapted in any appreciable way to the SMEs context. Fig. 1 illustrates the elements of the problem.

The identified elements of the problem raise the principal research question:

- Would a new OHS performance evaluation tool adapted to the SMEs context allow interventions better tailored to the needs of the client?

This principal question raises two secondary questions:

- Which OHS performance indicators should be integrated into this tool?
- What features would make the tool better suited to meeting the needs of consultants and better adapted to the Quebec SMEs context?

## 3. Research methodology

### 3.1. Action research in an industrial setting

The framework for this project was an action research model. The aim of action research is to change practices in a setting. It implies, among other things, the twofold goal of solving a problem and advancing scientific knowledge (Liu, 1997; Badri, 2015). In other words, action research is a joint effort of industrial partners and researchers in

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