



Review

Assessment of occupational health and safety performance evaluation tools: State of the art and challenges for small and medium-sized enterprises

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ABSTRACT

Occupational health and safety (OHS) is poorer in small and medium-sized enterprises (SMEs) than in large corporations. Fatal accidents are up to eight times more frequent in SMEs and non-fatal injuries are as much as 50% more likely to occur. In order to improve the OHS status of SMEs, the constraints under which these businesses operate must be taken into account.

In this critical review of the literature, we present an overview of research and industrial practices relating to OHS performance evaluation, and therefore of the information-gathering tools developed or adapted for this purpose, with emphasis on the SME context. The goal of this work is to identify avenues of research that are likely to yield practical means of meeting the challenge of integrating OHS into SME culture.

Our principal conclusion is that the particularities of the SME context have not attracted the attention of any significant number of researchers in the subject area of OHS. The development of tools that offer a broader choice of performance indicators to OHS specialists intervening in SME settings would contribute significantly to improving accident prevention in the workplace.

1. Introduction

In industrialized countries, concerted efforts to prevent work-related injuries have met with tangible success. Specifically in Québec, the number of cases has dropped by 50,000 between 1997 and 2013 (CSST, 1997, 2013). Although this is reassuring, we note that the performance of small and medium-sized enterprises (SMEs) has improved somewhat less (MacEachen et al., 2010; Masi et al., 2014).

In Canada, a small business is defined as a company with a staff of fewer than 100 employees (Statistics Canada, 2013). In Québec, such businesses represent 98% of all businesses and employ 67% of the workforce (Statistics Canada, 2013). Workplace fatal accidents are up to eight times more frequent in SMEs (Mendeloff et al., 2006) and non-fatal accidents are as much as 50% more likely to occur (Fabiano et al., 2004). This poorer OHS performance in SMEs is noted throughout the industrialized world (Champoux and Brun, 2003; Vickers et al., 2005).

The scientific literature contains no standard definition of OHS performance, each author proposing his or her own (Liu et al., 2014). Some researchers describe the concept as the performance of a management system in terms of OHS (Wu et al., 2008). Others have defined it as the ability of businesses to prevent occupational injuries (De Koster et al., 2011). Some researchers define a good OHS

performance as a lesion-free record (workplace accidents and occupational illnesses or injuries) over a long period of time (Pedro and Miguel, 2003). Since the occurrence of injury is largely random (Reiman and Pietikäinen, 2012), this definition has its limitations (Delatour et al., 2014). A business might be lesion-free for a long period of time due to the coincidence of favourable circumstances. In such cases, it is not clear that OHS performance is actually superior, nor does the sporadic occurrence of a few lesions necessarily indicate that OHS performance has deteriorated.

For the purposes of this study, a definition of OHS performance based on two specific criteria has been adopted:

- A business performs well if its OHS management is effective (De Koster et al., 2011; Liu et al., 2014; Sgourou et al., 2010; Wu et al., 2008).
- OHS management is effective if it leads to reduction or elimination of occupational injuries and illnesses on the short to medium term (Pedro and Miguel, 2003).

For several years now researchers have been attempting to identify the factors that explain why OHS performance differs so much between SMEs and large corporations. We note that four factors appear to be the

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principal obstacles to closing this gap. To begin with, SMEs have fewer financial and human resources at their disposal (Masi et al., 2014). Under conditions of economic uncertainty, managers of SMEs are reluctant to spend time and resources on problems that do not arise on a regular basis, and this would certainly include OHS issues (MacEachen et al., 2010; Agumba and Haupt, 2012). A second consideration is that few managers of SMEs are particularly sensitized to OHS or have significant knowledge or know-how in this realm (Masi et al., 2014). A third consideration is that OHS is not generally a well-established value or priority in SME culture. Managers often have biases and inflexible perceptions and beliefs regarding OHS (MacEachen et al., 2010). And finally, SMEs tend to be more isolated than other businesses. Assistance such as firms specialized in OHS could provide to SMEs is often regarded as too technical and too costly (Masi et al., 2014).

Given the definition of OHS performance that we are using, improvement will be manifested necessarily as implementation of preventive activities that lead to reductions in occupational lesions on the short to medium term. Several elements favour this implementation and the resulting improvements. Those discussed in the literature are summarized in the six points below:

- There is a consensus surrounding the importance of the commitment of upper management (Abudayyeh et al., 2006; De Koster et al., 2011; Hallowell et al., 2013; Mirabi et al., 2014).
- Risk management is an indispensable element of OHS performance (De Koster et al., 2011; Hallowell et al., 2013; Mirabi et al., 2014; BSI, 2007; CSA, 2006). In effect, a business cannot improve its OHS performance without controlling occupational risks. The risk management process generally comprises five phases: (1) risk identification, (2) risk analysis, (3) risk control, (4) follow-up and (5) monitoring of the corrective measures taken (Badri et al., 2012).
- Training of staff in good practices to adopt in the workplace (Hallowell et al., 2013; BSI, 2007; CSA, 2006).
- Leadership by production managers (supervisors, etc.) is identified as an important element for improving OHS (Hinze et al., 2013; Mirabi et al., 2014; Stadnyk et al., 2011). According to other authors, two aspects of leadership are the most important: (1) favouring the participation of workers and (2) being communicative and attentive to the preoccupations of workers (Simard and Marchand, 1997).
- Safe behaviour including compliance with safety rules and participation in the identification and elimination of hazards (Liu et al., 2014; Mirabi et al., 2014; Sgourou et al., 2010; LSST, 2016).
- Considering prevention from a continuous improvement perspective. Although continuous improvement of OHS is a less-discussed subject, OHS management systems (OHSMS) are based essentially on this concept (BSI, 2007; CSA, 2006).

Some authors point out that improving the OHS performance of an SME is not achieved in the same manner as in a large corporation (Masi et al., 2014). First, in order for OHS management in an SME to be effective, the approach must be simple, low-cost and meet the needs of the workers and managers (Hasle and Limborg, 2006; Sinclair et al., 2013). The elements most emphasized are commitment of upper management and risk management (Walker and Tait, 2004) while the most crucial is the approach to convincing the decision-makers to make a stronger commitment to OHS management (Hallowell et al., 2013; Hasle and Limborg, 2006). Improving OHS thus requires a concerted effort focused on several elements within a business. Weakness or absence of any of these will have a proportionate impact on OHS.

Evaluation of performance may be defined as the process of quantifying the effectiveness of actions (Neely et al., 1995). This allows better targeting of strategic or operational goals, assessment of progress made and comparison with competitors (*benchmarking*). Performance evaluation is an essential component of OHS management (Liu et al., 2014). It allows monitoring of implementation processes, activity

development and results (Sgourou et al., 2010). In other words, performance evaluation facilitates improvement of performance through clear identification of weaknesses and suitable corrective measures.

Considering the differences between small and large businesses, as much in terms of the elements that allow improved performance as in terms of obstacles encountered only in the SME setting, we recognize that the evaluation of OHS performance must be adapted to the size of the business.

OHS performance evaluation is carried out essentially using performance indicators. A performance indicator is the measurement of an element considered important within a given model (Wreathall, 2009). Two types of indicator are recognized, namely reactive and proactive (Roy et al., 2008). In conventional practice, OHS performance is evaluated using reactive indicators (Sinelnikov et al., 2015). These allow assessment of the impact of actions undertaken to manage OHS (Juglaret, 2012). The most commonly used reactive indicators are accident frequency and the seriousness index.

There are several advantages to using reactive indicators. They are simple, cost very little to obtain, and are easy to interpret (Roy et al., 2008). They constitute valid measurements of OHS performance (Lingard et al., 2011), meaning that they provide a view of the actual performance of a business. Competitive and comparative analyses are also possible, since the underlying formulae are standardized (Sgourou et al., 2010) and trends can be monitored (Lingard et al., 2011). An SME that sees continued improvement in its reactive indicators knows that it is on the right path with regard to accident prevention. When based on large volumes of data, they are highly useful, especially for assessing the effectiveness of preventive actions (Cadieux et al., 2006). Nevertheless, OHS performance evaluation based solely on reactive indicators is incomplete in several ways (Reiman and Pietikäinen, 2012). To begin with, their reliability is questionable. They are not sensitive enough to detect short-term improvement or deterioration (Roy et al., 2008). In addition, under-reporting of injuries reduces their precision, and they generally do not include near misses or incidents (Roy et al., 2008). Furthermore, they provide information about OHS performance prior to the period of measurement. They do not provide a current view or any means of anticipating future performance, and hence any basis for timely implementation of corrective measures (Cadieux et al., 2006). Another factor to consider is the *shotgun* effect of these indicators (Hinze et al., 2013). They do not indicate what specific operations to target in order to improve accident prevention. When a reactive indicator suggests poor performance, a manager might undertake several actions without knowing which if any will address the actual problem. Finally, decisions based on these indicators can lead to an “accident cycle” (Cadieux et al., 2006; Lingard et al., 2011), meaning that responses to poor performance, while effective, diminish as improvements are achieved, and the number of accidents increases again. Over the long term, such fluctuations in preventive measures are counterproductive to OHS improvement (Cadieux et al., 2006).

Proactive indicators are measurements of the progress achieved by giving priority to specific preventive activities (Reiman and Pietikäinen, 2012). An example would be the frequency of workplace inspections. This type of indicator focuses on preventive actions in place and those that should be implemented. Their use has a strong influence on worker behaviour (Hallowell et al., 2013; Roy et al., 2008), for example through better follow-up of preventive action plans. A manager can thus set priorities (Roy et al., 2008).

Proactive indicators also have their drawbacks. First of all, the information they contain is highly specific (Reiman and Pietikäinen, 2012). The frequency of OHS inspections, expressed as some number per month, provides no information relating to the quality of the inspections or to non-compliances noted. The validity of an evaluation based on proactive indicators thus depends on the relevance of the initial choices. The view of the situation may be incomplete. These indicators are not easily measured and are subject to biases, and evaluations based on them tend to be lengthy and subjective (Reiman and

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