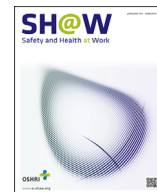




Contents lists available at ScienceDirect

# Safety and Health at Work

journal homepage: [www.e-shaw.org](http://www.e-shaw.org)

## Original Article

# An Intervention Study on the Implementation of Control Banding in Controlling Exposure to Hazardous Chemicals in Small and Medium-sized Enterprises



Jeroen Terwoert<sup>1,2,\*</sup>, Koen Verbist<sup>3,4</sup>, Henri Heussen<sup>3,4</sup>

<sup>1</sup> Centre of Expertise, Dutch Labour Inspectorate, Utrecht, Netherlands

<sup>2</sup> TNO, The Hague, Netherlands

<sup>3</sup> Cosanta BV, Amstelveen, Netherlands

<sup>4</sup> Arbo Unie, Nijmegen, Netherlands

## ARTICLE INFO

### Article history:

Received 21 June 2015

Received in revised form

25 November 2015

Accepted 2 December 2015

Available online 18 December 2015

### Keywords:

hazardous chemicals  
intervention studies  
occupational exposure  
risk management

## ABSTRACT

**Background:** Management and workers in small and medium-sized enterprises (SMEs) often find it hard to comprehend the requirements related to controlling risks due to exposure to substances. An intervention study was set up in order to support 45 SMEs in improving the management of the risks of occupational exposure to chemicals, and in using the control banding tool and exposure model Stoffenmanager in this process.

**Methods:** A 2-year intervention study was carried out, in which a mix of individual and collective training and support was offered, and baseline and effect measurements were carried out by means of structured interviews, in order to measure progress made. A seven-phase implementation evolutionary ladder was used for this purpose. Success and failure factors were identified by means of company visits and structured interviews.

**Results:** Most companies clearly moved upwards on the implementation evolutionary ladder; 76% of the companies by at least one phase, and 62% by at least two phases. Success and failure factors were described.

**Conclusion:** Active training and coaching helped the participating companies to improve their chemical risk management, and to avoid making mistakes when using and applying Stoffenmanager. The use of validated tools embedded in a community platform appears to support companies to organize and structure their chemical risk management in a business-wise manner, but much depends upon motivated occupational health and safety (OHS) professionals, management support, and willingness to invest time and means.

Copyright © 2016, Occupational Safety and Health Research Institute. Published by Elsevier. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

In many small and medium-sized enterprises (SMEs), awareness of the long-term health impacts of exposure to hazardous substances is low. This is despite recent estimates which show that in the European Union alone, 74,000 workers die every year as a result of occupational diseases caused by hazardous substances, and roughly ~10 times more workers get an occupational disease [1]. Worldwide, ~632,500 deaths and > 7 million lost healthy life years can be attributed to occupational exposure to hazardous substances each year [2]. For management and workers in SMEs, however,

given their limited resources, it is not an easy task to comprehend the legal requirements related to controlling risks due to exposure to substances [3]. Besides, it is not an easy task to uncover the company-specific burden of disease related to this exposure, and to show the benefits that may be expected from interventions to reduce exposure.

In various countries, tools have been developed that support companies in preparing risk assessments and in selecting the proper risk management measures. One type of such tool, which has gained substantial interest and adoption worldwide, is control banding. Control banding is a qualitative risk assessment in which

\* Corresponding author. Centre of Expertise, Dutch Labour Inspectorate, Oudenoord 6, 3513 ER, Utrecht, The Netherlands.  
E-mail address: [jterwoert@inspectieszw.nl](mailto:jterwoert@inspectieszw.nl) (J. Terwoert).

categories (“bands”) of hazards are combined with categories (bands) of the exposure potential, in order to arrive at risk estimates and—subsequently—recommended levels of controls [4,5]. Control banding approaches were first developed by the pharmaceutical industry in the late 1980s, and have found considerable application in risk management of substances [4,6]. One more recent application of control banding is to enable companies to prepare preliminary risk assessments for nanomaterials in the absence of firm toxicological and exposure data [5–7]. Control banding may be applied when uncertainty on hazards and exposure is high, but where nevertheless, more or less reliable estimations can be made by grouping the substances used in hazard categories and the activities carried out in exposure categories [6].

Stoffenmanager at [www.stoffenmanager.nl](http://www.stoffenmanager.nl) being one of such tools [8,9] is a web-based, free to use instrument that offers both control banding, i.e., a qualitative risk assessment model for both inhalation and dermal risks—and a validated quantitative model to estimate exposure by inhalation. The first version of Stoffenmanager was launched in 2002. The Dutch Labor Inspectorate has approved the quantitative model as a reliable tool to assess exposure. Moreover, the tool has been adopted in the relevant guidance documents on risk assessment within the framework of the Registration, Evaluation, and Authorization of Chemicals (REACH) legislation, from the European Chemicals Agency (ECHA). Currently, Stoffenmanager has > 25,000 registered users, which have access to an online community which provides information, mutual support, and access to occupational health and safety specialists.

Significant efforts have been put in designing Stoffenmanager with a user-friendly interface [8]. As a result of this, and as a result of its active promotion by various stakeholders, including the Dutch Labor Inspectorate, the level of implementation in companies has risen steadily over recent years. However, it has appeared that just ‘offering’ a control banding tool, without providing active support, does not automatically result in its use by SMEs, and even less in a ‘proper’ use. In the context of this article, ‘proper’ use means that the parameters entered in the tool by the user reflect the true exposure scenario that is being assessed, taking into account the applicability domain of the tool.

A review among 755 registered users of Stoffenmanager in The Netherlands showed that only 26% of them had actually entered any data into the tool [10]. The operational analysis of control banding tools, i.e., an analysis of the intended user’s understanding and implementation, has been sparsely represented in the published literature. However, there is an urgent need for this in order to find out if, and to assure that, the intended users are able to prepare complete and reliable risk assessments, and to take the appropriate control measures [4,6]. The few published studies in this field do not seem to justify much optimism in this respect. An extensive usability evaluation of the British, internet based COSHH-Essentials tool ([www.coshh-essentials.org.uk](http://www.coshh-essentials.org.uk)) showed that the intended users got confused by the tool’s focus on tasks rather than substances, as well as by the tool’s structure and interface, while—according to the authors—the tool did not cater for the different user types, with different existing levels of knowledge [11]. However, one might wonder whether tools should either cater for different levels of knowledge, or be easy to use for a wide range of potential users.

A more recent evaluation of the reliability of the Advanced REACH Tool (<https://www.advancedreachtool.com/>), a more sophisticated exposure assessment model [9], showed similar results. Even a selected group of trained occupational hygienists showed that, although at group level the assessor’s results showed good agreement with the ‘gold standard’ defined by the authors, substantial variability was observed between individual assessors’ estimates for an individual scenario [12]. In a number of cases, the

assessors did not appear to be able to implement the information that was explicitly provided with the scenarios to be assessed. Therefore, the authors recommended extensive training prior to using quantitative exposure models such as these [12]. Finally, a recent between-user reliability exercise with five currently used quantitative exposure assessment models, and 146 participants, learned that significant between-user variation occurred in selecting various parameters that have to be entered into these tools [13]. The variability was not likely due to differences in the users’ backgrounds and levels of knowledge in using exposure assessment tools, as there did not appear to be any systematic difference on these aspects. The authors concluded that more needed to be done to ensure consistency, such as providing improved guidance and explanation, and providing training prior to using exposure assessment tools [13]. Moreover, it was concluded that users must understand the limitations of the tools in terms of applicability and output, which is why reading the guidance and supporting material was regarded essential [13].

### 1.1. This research

The developers of Stoffenmanager in the Netherlands—TNO, Arbo Unie, and Ernst & Young/BECO—have recognized the need for a more active approach and support to SMEs, in order to foster an active as well as a proper use of this tool. Therefore, a 2-year intervention project was started, in which active support was provided to a group of 45 participating companies—most of them SMEs. The project aimed at improving the implementation of Stoffenmanager as well as chemical risk management in a wider sense. In order to find hints to enable the development of tailored support to companies willing to optimize chemicals’ management, the central research question addressed within the framework of this project was: “which characteristics of the tool Stoffenmanager itself, of the intended user and of the intended user’s organization determine the success or failure of its active and successful implementation and proper use?”.

## 2. Materials and methods

Most participants used the generic, free to use ‘basic’ version 5.0 of the online Stoffenmanager tool during the project. A small proportion of the participants, i.e., five paint manufacturers, used the sector-specific Stoffenmanager for the paint industry. The project was structured as an intervention, encompassing three phases: preintervention (or preimplementation), intervention, and post-intervention (Fig. 1).

The baseline and effect surveys were carried out by means of telephone interviews. The actual intervention or implementation phase encompassed a mix of individual and collective training and support, in order to provide access to experts as well as to promote mutual exchange of experiences and mutual learning among the participating companies. No control group was used, as this was regarded practically impossible, given the very dynamic environment the companies operated in, involving many continuously changing technical, personal, and organizational factors as well as autonomous developments.

### 2.1. Preintervention phase

In the preintervention phase, the participants were recruited, a method for measuring progress in the participating companies was developed, and the baseline survey was carried out. In the course of the project, five to six industrial hygienists working at TNO and Arbo Unie guided the process and carried out the training and

Download English Version:

<https://daneshyari.com/en/article/1091948>

Download Persian Version:

<https://daneshyari.com/article/1091948>

[Daneshyari.com](https://daneshyari.com)