

## NEW APPROACH TO RISK ASSESSEMENT IN THE WORKPLACE

SEKULOVA, K[aterina] & SIMON, M[ichal]

**Abstract:** *For a business to be sufficiently competitive, it must be successful in many areas of its activities. Alongside quality, speed of meeting demands, cost reduction, etc., a big emphasis is placed on safety and creating a healthy work environment. Article describes the current status of the problem and what methods are used in risk assessment. In conclusion, the author describes how to better prevent risks in the workplace.*

**Key words:** *risk, risk assessment, simulation*

### 1. INTRODUCTION

A few people die every day at work in the EU. In addition, there are many accidents and injuries, which means staff sick leave, which is reflected in the productivity of enterprises.

This problem is also a burden on the health-care system and ultimately makes its mark on the psyche of the worker and his environment. Risk assessment is therefore the key to successful management of health and safety at work. Proper management and application of principles of risk prevention can achieve higher performance.

### 2. RISK AND ITS ASSESSMENT

Risk is defined as a greater or lesser likelihood that someone will be harmed. Risk is the expected value of damages. This is a result of the activation of a hazard that results in a negative result, i.e. the damage, and the number of times that the phenomenon occurs and what caused it. The concept of risk assessment is understood as the process of assessing the risks to the safety and health of workers arising from workplace hazards (Paleček, 2003). During this process, we try to find answers to three basic questions:

- What could be causing harm or injury,
- Whether a particular danger can be prevented,
- If the hazard cannot be avoided, what protective measures should be taken to eliminate as much risk as possible.

Risk assessment is a fundamental and necessary step for dealing with any risks in society, particularly those which threaten human health and the environment. However, this can only be understood as a narrowly technical matter, because it is a combination of technical, scientific and humanities disciplines. Risk assessment in decision-making will also affect economic, psychological and often political aspects. If we want to manage or reduce risks, we need to know what they are (Král, 2001).

### 3. RISK ASSESSMENT PROCEDURE

Integrating security and developing it is closely linked to the social and economic development of society and is a priority in most states. Identification and risk assessment is undertaken using various methods and procedures, such as checklists, "What – if", HAZOP, FMEA, FMECA, Event tree, Fault tree, methods for relative prioritization of risks, etc. In most cases they are based on the knowledge and experience of individual

assessors. Therefore it may seem that this is a very complex process. In fact, the issue is not so complex, it is only necessary to have sufficient evidence and information about the environment which is to be assessed (Hnilica & Fotr, 2009).

Do not forget that the source of a hazard can be anything - anything that can cause injury, the causes and sources of injury, human behaviour, dangerous factors, social conditions, management, motivation, structure, etc (Paleček, 2003).

Below are briefly outlined specific steps to risk assessment in the workplace:

- 1) Delimit the working system where the trial is to be conducted - first, a list is prepared of all the places and spaces in a working system, to this is added another list, an overview of activities that are performed in these areas.
- 2) Search for danger - each place or activity is matched with the risks that may arise in that place. This work facilitates the registration of accidents, experience of staff. An aid to this may be a list of examples of hazards (e.g., in the Czech Republic standard ISO 1050 (83 30 10)).
- 3) Risk identification and evaluation - in this step the severity of the potential danger and likelihood of a hazard occurring is evaluated. The resulting level of risk is identified as the product of likelihood and severity of the injury.
- 4) Risk assessment - based on the previous step, we decide whether we accept the risk, or what measures we take to eliminate it or reduce it.
- 5) Removal / reduction of risk – removal of the risk is the most effective measure for disposing of it. It is important also to ensure that the risk is not transferred elsewhere, where there might be more serious consequences. If we cannot completely remove the risk, we use all available resources to maximise its limitation, such as protective equipment, visual and audible signalling devices, motion sensors, etc.
- 6) Regular evaluation of risk - we keep regular checks to ensure the preventive and protective measures are working, and the regular identification of new risks is also undertaken.
- 7) Consideration of the risks identified with the employees - all employees and people moving around the workplace should be familiar with the results of the assessment. Employees are a valuable source of information because they have an overview of the workplace themselves, and thus may help to identify potential problems.

Information gathered should be recorded in order to get it to the right people, and it should also be properly processed (Bilek, 2006). As already mentioned, this method of assessment is based on past experience and estimates of typical examples of

assessors. If any serious injury occurs, it means unnecessary problems for the company:

- Sick leave injured workers - a replacement for the missing worker must be found, this is more difficult when it is a key specialist.
- Training new workers in the event of severe or fatal injuries - the loss of time, increased costs and a slowdown during the process until a new employee begins to perform their work independently and without errors.
- The financial burden of compensation for severe injuries.
- Finally, an unsafe workplace has a negative impact on the psyche of workers and from the outside it may appear untrustworthy.

Experience shows that all forms of prevention which act on humans are relatively inefficient, if they are not constantly given due attention by responsible staff (Král, 1994).

#### 4. PROJECT OPTIMIZATION OF MULTIDISCIPLINARY DESIGNING AND MODELLING OF A VIRTUAL FIRM'S PRODUCTION SYSTEMS

In 2008 the project was submitted to the Grant Academy of the Czech Republic called Optimization of multidisciplinary designing and modelling of a virtual firm's production systems. Doctoral students from three technical and economics universities were involved in this project. The author of this article deals with ergonomics in the project, its impact on the health of workers and occupational illnesses. Tecnomatix Jack software from SIEMENS is used, which is an ergonomic tool for simulation and optimization of ergonomically compliant workplaces. This software serves as a tool for visualization and visual presentation of solutions from ergonomic studies.

Fig. 1 shows the current procedure for identifying hazards and dealing with them. The causes of such accidents can be sought after creating it. The experience and knowledge of the assessor plays a great role in analyzing the environment. In many cases, a wide range of issues are found that may pose a greater risk and lead to injury, but some risks can be hidden or overlooked.

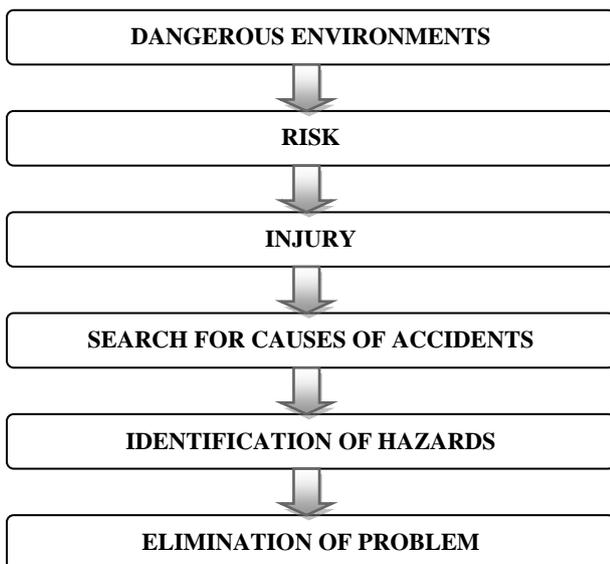


Fig. 1. A procedure for hazard identification

Fig. 2 presents the proposed new method for dealing with potential hazards in the workplace.

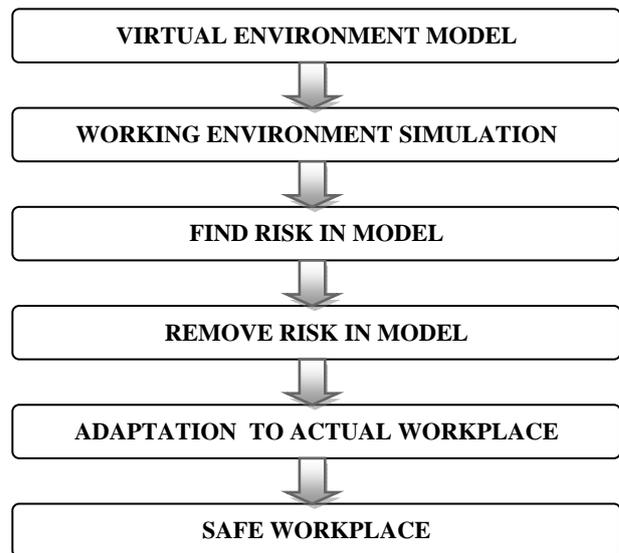


Fig. 2. Proposal for hazard identification, using simulation

A model workplace is created. When simulating the working process it is possible to detect risks which might occur in the workplace. In such a model it is then possible to determine the causes and adjust the safety requirements of the actual workplace.

#### 5. CONCLUSION

Current methods of risk assessment are based on the experience of the evaluators and/or manuals and typical examples of possible accidents that may occur in the workplace or have ever occurred in the past. Such methods, however, only refer to something that has already taken place, and can only prevent the same situation from happening in the future. But they cannot determine future developments, or whether more complicated problems will occur, or even if the same problems will occur but in different places. The solution to anticipating these situations and to looking further into the future is the use of simulation models that can identify and evaluate potential risks. So the aim is to evaluate the risks before they actually occur and thus create a healthy and safe working environment.

#### 6. ACKNOWLEDGEMENTS

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