WEBSITE “SAFER” AND ITS ROLE IN THE PREVENTION OF HAZARDS CAUSED BY NOISE, VIBRATION AND OTHER PHYSICAL AGENTS IN THE WORKING ENVIRONMENT

Leszek Morzynski and Grzegorz Szczepanski
Central Institute for Labour Protection – National Research Institute,
Czerniakowska 16, 00-701 Warsaw, Poland
email: lmorzyns@ciop.pl

Physical agents like noise, vibrations, electromagnetic fields, optical radiation as well as cold or hot microclimate are common in the working environment. According to statistical data, a few hundred thousand of workers in Poland work in hazardous conditions caused by these harmful agents, especially by noise. Lack or improper prevention of these hazards can lead to occupational diseases of workers or to industrial accidents. The basis for successful hazards prevention is the education of workers and employers. It requires information and educational materials, suitable for users with different level of knowledge in the field of occupational health and safety. To provide these materials to the public in the Central Institute for Labour Protection – National Research Institute created a website called “SAFER”. It consists of information and educational materials as well as internet tools, prepared by experts and related to particular physical agents. The structure, content and directions of future development of the website is presented on the example of noise and vibration hazards.

Keywords: noise, vibration, prevention, education, website

1. Introduction

Physical harmful agents [1] like noise, vibrations, electromagnetic fields, optical radiation as well as cold or hot microclimate are common in the working environment. According to the data of the Central Statistical Office [2], the number of people employed in hazardous conditions caused by these physical agents, especially noise, exceeds 250,000. These data do not include enterprises employing less than 10 people, therefore it is estimated that the number of people employed in hazardous conditions caused by physical harmful agents can be twice as large. Working in such conditions in absence of appropriate prevention may cause workers’ occupational diseases. For example, in 2016, 133 cases of hearing loss caused by noise in the working environment and 16 cases of hand-arm vibration syndrome were found in Poland [3].

Occupational risk caused by the harmful physical agents that are common in the working environment should be limited by undertaking appropriate preventive actions. The basis of successful hazards prevention is knowledge about the health effects of human exposure to harmful agents and about methods of their reduction. Lack of this knowledge, especially in microenterprises and small enterprises, leads to a number of irregularities in the field of occupational health and safety (OSH). Inspections in enterprises show lack of measurements of harmful agents in the working environment, incorrect assessment of exposure to individual agents, lack of or incorrect selection of personal protective equipment. In addition, the occupational risk resulting from exposure to particular physical agents is incorrectly estimated, which does not allow for planning appropriate preventive actions and warning workers of the consequences of exposure to mentioned above agents. Workers’
training in the field of OSH also does not take into account the issues related to hazards occurring at work.

In order to provide employers and employees with easy access to knowledge necessary for correct prevention of hazards in the work environment, the SAFER (in polish: BEZPIECZNIEJ) website dedicated to the physical factors of the work environment was launched at Central Institute for Labour Protection – National Research Institute (polish abbr.: CIOP-PIB). This website, constantly updated and expanded, consists of information and educational materials as well as small internet tools. These materials are prepared by subject-matter experts in a given field and are suitable for users with different level of knowledge in the field of occupational health and safety. In the following part of the article the structure and content of the website is presented on the example of noise and vibration hazards.

2. Structure and content of the website

Website SAFER is a part of Institute’s web portal (www.ciop.pl). Access to the website is provided by the drop-down menu on main web page of the portal. Website can be also accessed directly on www.ciop.pl/beczieczniej

The basic structure of the website is presented in Fig. 1. Currently the website contains information on six physical agents: noise (audible), vibration (hand-arm and whole body), electromagnetic fields, optical radiation (with the exception of laser radiation), microclimate (hot and cold) and static electricity. The content of the website regarding each factor is divided into three categories: content-related materials, educational materials and internet tools. The other categories contain elements facilitating the acquisition of knowledge presented in content-related materials and supporting its use in practice.

![Figure 1: Basic structure of the website SAFER.](image)

The content-related materials have been divided into sections (Fig. 2) describing for a given physical agent: hazards to health or life, legislation, sources of exposure in the working environment, measurement methods and principles of exposure assessment, and methods of eliminating and limiting exposure. This information is supplemented with bibliography and a short glossary of terms.

In the Hazards section, hazards associated with a given harmful agent and its impact on the human body is described and discussed. For example, for noise, this section first provides statistical data on noise in the working environment in Poland. Next, the organ of hearing (ear) and hearing, the impact of noise on the hearing organ and the consequences of its damage (hearing losses) are described. Finally, data on hearing loss among employees is presented.
The *Legislation* section lists and discusses the most important legal provisions related to a given harmful agent. The obligations of employers and employees resulting from these provisions are given and discussed.

The *Sources* section discusses the typical source of a given threat in the working environment. In the case of noise, the noise sources were divided into groups according to different criteria. Examples of industrial sources, sources of impulse noise and sources of musical noise with typical noise levels are given.

In the section *Measurements and assessment* for noise, the basic values describing noise in the working environment are discussed, starting from basic concepts such as sound pressure and frequency, trying to explain their meaning in a simple manner to a wider audience. Next, the principles of assessing exposure to noise and occupational risks related to it are described, taking into account action and limit values.

The section *Methods of eliminating and limiting exposure* discusses the basic issues related to the elimination or limitation of a given harmful agent or exposure to it using technical means and organizational methods. For noise, apart from the issues related to the reduction of noise at the source and collective protection measures, a lot of space was devoted to hearing protectors. The section also discusses the principles of medical prophylaxis to detect early symptoms of hearing loss.

The *Bibliography* is divided into three parts. The first contains articles published in journals issued by the Institute (along with their full contents). The second part deals with books issued by the Institute. The third part contains a list of supplementary literature. The *Glossary* contains short definitions of basic terms related to a given harmful agent.

The category of educational materials includes training materials, presentations and short information materials related to a given harmful factor, in the form of PDF files. These materials can be viewed directly on the site or downloaded by the user and then used for training or information activities in the company.
Internet tools are small programs supporting the practical use of knowledge contained in content-related materials. These programs, written in JavaScript and run in the browser window, are used to support the calculation of the values characterizing the given hazard and to support the risk assessment. Figure 3 presents an example of an internet tool for determining the noise exposure level. The user, using the appropriate keys, can set the values of the A-weighted equivalent continuous sound pressure level and exposure time (blue bar) and read out the noise exposure level calculated by the program. At the same time, the program assesses occupational risk for various groups of employees (in general, adolescent and pregnant women). The results of the risk assessment are shown on the right in the form of coloured bars.

3. Summary and future work

The SAFER website presented in the article is an important source of information for employers and employees, especially from small enterprises, for whom easy access to free and reliable sources of knowledge is important in the aspect of improving occupational health and safety. The ongoing work of updating and extending the website will allow users to provide a wider and useful compendium of knowledge on the physical factors of work environment hazards. Due to social changes taking place in Poland, resulting in particular from greater access to the Polish labour market for people from the European Union and neighbouring countries, an English version of the SAFER website is being prepared, presenting the most important issues on harmful physical agents in the working environment for employees and employers who do not use Polish. In the future, key information on physical hazards in the work environment will also be presented in other languages used by the most-represented foreign employees in Poland.

ACKNOWLEDGMENTS

This paper has been based on the results of a research task carried out within the scope of the fourth stage of the National Programme “Improvement of safety and working conditions” partly supported in 2017–2019 – within the scope of state services – by the Ministry of Labour and Social Policy. The Central Institute for Labour Protection – National Research Institute is the Programme’s main co-ordinator.

REFERENCES