Working environment and observance of occupational health and safety regulations – case study

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Abstract. Safety culture can be seen from many aspects. Some people in their definitions place emphasis on observable indicators of safety culture, while others concentrate more on the identification of basic principles of safety culture, which affect the „safe behaviour” of organisation members. Safety culture seen as a part of organisation’s culture is reflected in rules, values, attitudes and behaviour of its employees. One of the areas of the improvement of working environment is the optimisation of workstations in line with ergonomics principles. The areas of the improvement of ergonomic working conditions include: the amount of energy expenditure, static load connected with the work performed, the repeatability of working movements, the type and availability of personal protective equipment. The paper has presented a part of the work safety audit carried out in June 2016 in a mining-related heavy industry company from Silesian voivodeship. The results of the presented survey show that creating appropriate working environment affects occupational health and safety not only in the area of optimisation of protection against hazards, but also building desired employee’s behaviour.

1. Introduction

Working environment, which can be defined as: „the entirety of the conditions in which work is carried out”, depends on various material (physical) and non-material (social) factors affecting, among others, the safety and health of employees and, consequently, work efficiency and effectiveness” [1].

Today one of the first activities to create suitable working environment is building desired safety culture [2]. The notion of safety culture was first used by a group of consultants of the International Atomic Energy Agency (IAEA) after the nuclear catastrophe in Chernobyl in 1986 [3].

Safety culture can be seen from many aspects. Some people in their definitions place emphasis on observable indicators of safety culture, while others concentrate more on the identification of basic principles of safety culture, which affect the „safe behaviour” of organisation members. Safety culture seen as a part of organisation’s culture is reflected in rules, values, attitudes and behaviour of its employees. The definition of safety culture according to the Health and Safety Executive, which seems to reflect well the characteristics of this area of organisation’s culture, is as follows: „OHS culture is a result of the individual and group values, attitudes, perception, competence, behaviour patterns as well as style and quality of safety management in an organisation” [4].

Building safety culture and, within its scope, desired working environment uses numerous activities concerning OHS. Such activities usually include, first of all, an appropriate qualitative choice of personal protective equipment, developing and perfecting OHS procedures or improving the ergonomics of workstations and working conditions. To measure working conditions the following are among others used [5, 6, 7]:

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checklists,  
- measurements of physical working environment,  
- accident reports,  
- audits.

Using these tools usually helps to improve current working conditions and, consequently, improves the health and safety of employees in a given environment.

One of the areas of the improvement of working environment is the optimisation of workstations in line with ergonomics principles. The areas of the improvement of ergonomic working conditions include: the amount of energy expenditure, static load connected with the work performed, the repeatability of working movements, the type and availability of personal protective equipment. Appropriately prepared manuals of procedures, and their availability and intelligibility are also an important part of appropriate working conditions and employees’ behaviour at their workstations [8].

Physical workload can be measured with the amount of energy expenditure during the entire shift, understood as the sum of the energy used to perform individual activities [9]. The assessment of energy expenditure includes: the assessment of dynamic load, which is expending energy by the body in relation to the effort, the assessment of static load resulting from the position of the body at work, or the assessment of the repeatability of movements.

Workstation instructions prepared in an appropriate manner are not sufficient for the desired behaviour of employees [10]. They should be available and clear and enable continuous improvement of learned procedures. Therefore, the quality of instructions and familiarity with them can also be an important indicator for the assessment of safety culture level, including OHS. They can also be a key factor conditioning employees’ safe behaviour and observance of OHS regulations.

2. Description of the survey
As part of the work safety audit carried out in June 2016 in a mining-related heavy industry company from Silesian voivodeship, a survey amongst experts in selected areas of occupational safety management was carried out. An anonymous questionnaire was used as a research tool. The respondents were randomly selected amongst blue-collar/production workers. This article will present a fragment of the above survey, concerning the impact of the selected working environment elements on the observance of OHS regulations. The aim of this fragment of the survey was to define potential areas of irregularities and necessary changes in the process of OHS management in the subject company [11].

The results of the survey showed factors present in the respondents’ working environment and affecting the observance of OHS regulations. The respondents assessed whether a given factor was present in their working environment, and if any factor was chosen, they had to rate on the scale from 1 (does not affect) to 5 (affects very significantly) to what extent it affected the observance of OHS regulations and, consequently, safe work.

What is important for further conclusions, it should be noted that in the subject company strong safety culture was diagnosed [3]. For the purposes of assessing a culture level not only was the accident rate taken into account, but also the type and number of OHS training courses, a communication system in this area, indication systems used or workstation tidiness. In the following chapter the results of the survey concerning selected working environment elements will be presented.

3. Overview of survey results
In the opinion of more than half of the respondents physical workload affects the observance of OHS regulation to a large or a very large extent (4.0 and 5.0). The difficulty degree of the work carried out (measured with energy expenditure level), the load resulting from unnatural (forced) positions of the body, as well as the repeatability of the same working movements with simultaneous engagement of limited number of muscle groups may in the respondents’ opinion result in violating OHS rules and consequently accidents (or near misses).

In the case of energy expenditure connected with performed work, the problem is recognised by 68% of the respondents (figure 1), in the case of static load by as much as 81% (figure 2), and in the
case of the repeatability of the same working movement – 71% of the respondents (figure 3). None of the respondents thought that the amount of workload did not affect the observance of OHS regulations (although in the case of static load 7% of the respondents answered “does not affect”, and in the case of the repeatability of the same working movement – the result was 5%).

**Figure 1.** Influence of energy expenditure connected with performed work on observance of OHS regulations.

**Figure 2.** Influence of static workload on observance of OHS regulations.
**Figure 3.** Influence of load connected with repeatability of working movements on observance of OHS regulations.

**Figure 4.** Influence of quality of personal protective equipment on observance of OHS regulations.
Figure 5. Influence of availability of personal protective equipment on observance of OHS regulations.

Figure 6. Influence of workstation instructions on observance of OHS regulations.

As much as 82% of the respondents thinks that personal protective equipment – their quality (figure 4) and its availability (figure 5) – to a large extent (4.0) and a very large extent (5.0) affect the observance of OHS regulations. The results of the survey indicate that a major proportion of the employees is aware the significance of personal protective equipment for work safety. The personnel of the surveyed company notice also efforts taken by the employer, who takes improving working conditions into consideration (limiting, minimising harmful effects of working environment elements) through, among other, legible workstation instructions, which according to more than 80% of the respondents affect the observance of OHS regulations to a large and a very large extent.
4. Summary of survey results

Summing up the results of the above survey it can be concluded that the presented working environment elements affect significantly the observance of OHS regulations by the employees of the chosen heavy industry production company, in which, what must be stressed, there are numerous hazards and exposures at the surveyed workplaces. At the same time the survey results also indicate high awareness of the significance of the influence of the working environment quality on safe behaviour and the observance of OHS regulations. It can also show that a safety culture level, as indicated by the subject literature [12], is clearly reflected in employees’ awareness and behaviour in respect of occupational health and safety.

As a result of the respondents’ answers (figures 1, 2, 3, 4, 5, 6) the following conclusions can be reached:

- in the opinion of 68% of the respondents applied physical workload – energy expenditure, affect the observance of OHS regulations to a large and a very large extent (4.0 and 5.0 answers). Therefore it can be stated that a vast majority of the respondent is aware that excessive workload can cause accidents or near misses,
- as much as 82% of the respondents thinks that personal protective equipment as well as its availability affect the observance of OHS regulations to a large and a very large extent (4.0 and 5.0 answers), which can indicate that a major proportion of the surveyed company’s employees understands its significance for health protection,
- however, the working environment element that affects the observance of OHS regulations workstation instructions. As much as 83% of the respondents thinks that this element affects the observance of OHS regulations to a large and a very large extent (4.0 and 5.0 answers).

The results of the presented survey show that creating appropriate working environment affects occupational health and safety not only in the area of optimisation of protection against hazards, but also building desired employee’s behaviour.

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