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INNOVATIVE METHODS OF IMPLEMENTING HEALTH AND SAFETY SOLUTIONS AT THE QUALITY CONTROLLER'S POSITION

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Abstract: The aim of the paper is to present issues related to the implementation of innovative solutions in the field of occupational health and safety in the enterprise and in the position of quality controller. By presenting the instrumentation of the OHS management system and the "new approach" to issues related to the implementation of the PN-ISO 45001:2018-06 standard, it is possible to define a new paradigm of the management system also in occupational risk assessment. When discussing the effects and actions of arduous and harmful factors at a given workplace, the methods of occupational risk assessment and analysis should be specified.
Keywords: implementation of health and safety systems, innovation, occupational risk, occupational risk assessment, hazards at the workplace.

1. INTRODUCTION

The instruments that are in force and are used by employers to improve the safety and health of employees include current legal provisions of fundamental importance regarding the management of occupational health and safety in organizations. All countries belonging to the European Union recognize the framework directive 89/391/EEC concerning the introduction of measures to improve the safety and health of workers at work. The provisions of the directive have been included in the Labor Code and a number of accompanying executive acts. The "new approach" to the issues of occupational health and safety introduced by the framework directive has a significant impact on the functioning of enterprises in this area. According to it, the task of employers is not only to comply with the regulations, but also to actively participate in the creation of occupational health and safety by applying the best preventive measures in certain circumstances.

1.1. The legitimacy of implementing innovative health and safety systems in relation to the PN-ISO 45001:2018-06 standard

With regard to the provisions of the framework directive and the continuous improvement of approved solutions to protect the safety and health of workers, the need for innovative occupational health and safety management systems should be implemented. Their primary objective is the continuous and controlled improvement of performance in the area of occupational health and safety, in particular the reduction and prevention of accidents at work as well as work-related diseases and the provision of healthy and safe workplaces. An important role in the implementation of the provisions of the directive is played by standards that present the issues of occupational health and safety management in a systemic manner, facilitating the implementation of activities leading to the improvement of working conditions. An important role in the promotion and implementation of occupational health and safety management systems is played by the ISO 45001:2018 standard, which contains requirements and guidelines for the occupational health and safety management system, the Polish version of which (PN-ISO 45001:2018-06) was published in 2019. The implementation of an occupational health and safety management system in accordance with the standards of ISO 45001:2018 should approve the development of the imperatives of applicable law and other requirements to which the company has committed itself, as well as the development of the analyzed occupational health and safety objectives. The management system paradigm presented in the ISO 45 001 standard presents the following elements:

- management leadership and employee participation, which are important to ensure effective health and safety management;
- action planning to identify risks and opportunities as well as goals and plans to achieve them;
- support, including the provision of resources, competencies, awareness raising, ensuring effective communication and information on the health and safety management system;
- operational activities, including operational planning of activities and supervision of management processes and emergency response;
- assessment of actions taken, including monitoring, measurement, analysis and evaluation of the results achieved, internal audit and management review;
- improvement as the basis for analysis of non-conformities and corrective actions.

It is noteworthy that the environment (called context in the new standard) of the organization is clearly taken into account, which has a significant impact on the shape of the entire system and the decisions made in it. The structure of the basic chapters in connection with the PDCA model and taken from the ISO 45001 standard.

The dynamics presented in the OSH management paradigm to achieve the intended results depends on many factors, among which the following should be mentioned:

- leadership and commitment of top management in defining responsibilities and authorities in the field of health and safety;
- development and promotion of safety culture,
- communication;
- consultation and participation of employees;

- providing the necessary resources;
- health and safety policy consistent with the overall strategic objectives and directions of the organization's development;
- the effectiveness of the processes of identifying threats to safety and health and limiting the risks associated with them and the effective use of opportunities;
- continuous assessment of performance and monitoring of the health and safety management system in order to improve them;
- integration of health and safety management processes with business processes;
- defining health and safety goals resulting from the adopted health and safety policy, taking into account risks and opportunities;
- compliance with legal requirements and other requirements adopted in the organization.

1.2. Occupational health and safety management

An integral part of every company is to adapt the issues related to occupational health and safety to the factors resulting from company management. According to the definition, “Occupational safety is a set of conditions that should be maintained in the workplace so that employees can perform their tasks safely and without harm to health. Work safety includes all technical, organizational and economic measures aimed at preventing the risk of accidents, as well as reducing the number of accidents that occurred despite preventive measures. Prevention of accidents is one of the most important tasks in the workplace due to their social perception.

It should be emphasized that the scope of the subject of occupational health and safety in the organization is changing along with the development of the economy, technology and science. In each organization there are characteristic hazards that may cause the probability of an accident. Therefore, companies take steps to ensure adequate safety for employees at a given workplace and to reduce occupational risk to a minimum.

The overriding goal of every company is to ensure appropriate working conditions for its employees, so that they meet the basic criteria of increasing efficiency and improving the quality of work. In order to achieve the set goals, organizations implement an orderly occupational health and safety management system as the basis for ensuring appropriate safety conditions for employees in the company.

The occupational health and safety management paradigm is part of the overall enterprise management system, which includes (Wolniak, 2020):

- organizational structure,
- planning,
- responsibility,
- rules of conduct,
- procedures, processes and resources.

These paradigms are needed to develop, implement, execute, review and maintain occupational health and safety policy. These guidelines concern the management of occupational risk that occurs in the work environment and is related to the company's operations.

The system includes elements whose cooperation serves the appropriate use of resources in order to achieve the set goals. The design and functioning of the system, also related to its effectiveness, must be adapted to the knowledge and skills of the designers, as well as a number of factors, including the type of production and the associated risks and the size of the enterprise.

Organizations interested in implementing an occupational health and safety management system in an effective way should rely on innovative management system solutions, as well as carefully observe practices that lead to the improvement of occupational health and safety (Tabor, 2021).

As previously presented, in Poland, the requirements and guidelines for occupational health and safety management systems are defined in the PN-ISO 45001:2018-06 standard introduced in 2018. Occupational health and safety management systems - requirements and guidelines for use. Based on the standard presented above, the most important elements of this system should be quoted:

- top management commitment and occupational health and safety policy;
- planning activities, which consists of setting general and specific goals and drawing up plans for their implementation; occupational risk assessment and identification of legal requirements applicable to the company are elements of the system that should enable the acquisition of information necessary for the proper setting of goals;
- implementation and operation, including:
  - providing the resources needed to implement and operate the system,
  - ensuring appropriate competences and training as well as shaping awareness and motivating employees,
  - communication,
  - documenting the occupational health and safety management system,
  - control of works and activities related to significant hazards,
  - readiness to respond to accidents at work and breakdowns;
- checking the functioning of the system, including monitoring and auditing as well as corrective actions;
- management review and continuous improvement.

Summing up the considerations regarding the benefits of implementing an occupational health and safety management system for the company, the following should be mentioned:

- economic, resulting from the minimization of losses due to the elimination of accidents and occupational diseases,
- improvement of occupational health and safety, better image of the company among customers, business partners and society,
- reducing the number of sick leaves,
- increasing the amount of working time devoted to production due to the improvement of occupational health and safety,
- active involvement of employees in the self-monitoring program - increased awareness and motivation of the staff,
- interest in work in connection with improving the quality, efficiency and safety of work,

- better organization of work and improvement of the information system in the course of production and problems of everyday work of employees,
- occupational risk assessment carried out in a useful and clear way,
- preventing potentially accidental events,
- adaptation to legal requirements in the field of health and safety,
- reduction of employee insurance costs".

2. RESEARCH AREA

The company's quality control engineer is responsible for the supervision and inspection of goods at every stage of production. The purpose of his work is to set standards for good quality products, i.e. to prevent the creation of poor quality products. Quality control engineers work in the following specializations:

- designer of control and measurement stations
- Quality Assurance System Specialist
- technical control engineer.

Each production plant is obliged to have a system for controlling and measuring the quality of manufactured products. The task of the designer of control and measurement stations is to adjust the system to the type of product and production process. The quality control engineer is required to understand the entire production process, including the operation of the machinery, the materials from which the products are made and the intended use of these products and regulations regarding all of these matters. On the basis of the collected information, it develops a process control system at each stage of the process, until the appearance of the final product in a ready-to-use state, properly marked and packaged. It should be remembered that in order to assess the quality of a given raw material, semi-finished product or final product, it is necessary to define this quality, i.e. to set standards under which we estimate how a given product should look like and what this "quality" means in its case. The given guidelines are the scope of responsibility of the quality control engineer in the company. Therefore, it defines what conditions must be met in order to consider that a given product is of good quality, i.e. what materials it should be made of, what technology should be used and what machines should be used, what are the ISO guidelines and European standards regarding the controlled product. Therefore, the engineer develops all instructions necessary to monitor the quality of a given product, and then supervises the implementation of instructions and procedures and ensures that they are followed so that the quality of the product is constantly high (Střihavková et al., 2021).

The technical control engineer has full supervision over the entire product manufacturing process and the quality of materials and the final product, as well as their compliance with the technical documentation. The tasks of the employee at this position also include quality measurements and the selection of appropriate measurement devices. All the above-mentioned activities are subject to assessment on the basis of appropriate documentation describing the correct production and quality measurement system.

The range of possibilities of working as a quality controller depends on the tasks entrusted to him. Therefore, a person employed in this position can work both in

offices and in production halls, warehouses or laboratories where the materials used are tested.

3. RESULTS AND DISCUSSION

When proceeding to determine the factors related to the assessment of occupational risk at the position of a quality controller, the concept and scope of the undertaken issues should be clarified. One of the key tasks to be performed by the employer in running a business is to define the principles of risk management. In this process, the risk associated with performing activities in the company is assessed and eliminated or limited in an orderly manner in order to achieve permanent benefits. In addition, this process should be carried out in a continuous manner, become an indivisible part of the company's operation and cover all its activities. Thus, occupational risk management plays a decisive role in the process of supervision over workstations, providing the necessary information to plan procedures aimed at improving working conditions and ensuring the safety of employees. Occupational risk, in accordance with the Regulation of the Minister of Labor and Social Policy of September 26, 1997 on general work safety regulations, is "the probability of occurrence of undesirable events related to the work performed, causing losses, and in particular the occurrence of adverse health effects for employees as a result of occupational hazards occurring in the environment work or how work is done". The definition shows that "the process of occupational risk assessment is a systematic study of the working environment in order to identify and determine all hazards that may cause injury and deterioration of health, and to determine protective measures to eliminate or reduce the level of risk". Quick and efficient assessment of occupational risk is guaranteed by the methods of occupational risk assessment and analysis (Saja et al. 2017; Siwiec et al. 2021) . There are many methods that differ in the way they work. We distinguish two types of methods:

- quantitative method - when we have a significant amount of statistical data concerning e.g. type, number and causes of accidents at workplaces or occupational diseases,
- qualitative method - when we do not have enough statistical data necessary to estimate occupational risk. In these methods, appropriate values are assigned to the risk indicators.

The risk assessment and analysis methods include:

- ALARP method (As Low As Reasonably Practicable),
- Preliminary Hazard Analysis (PHA),
- Risk matrix:
  - risk matrix 2,
  - Risk Matrix 3,
  - Risk Matrix 4 (according to Allgemeine Themen),
  - Matrix 5 (according to DIN V 19250),
  - BS 8800 risk matrix,
  - Risk matrix 6 (according to R. Studenski),
  - risk matrix (according to the PN-N-18002:2011 standard),
  - JSA (Job Safety Analysis).
- Risk indicators:

- RISK SCORE,
- Risk indicator 2 (according to Allgemeine Themen),
- The five-step method (FIVE STEPS),
- CAP risk indicator,
- Risk index 555.

• Risk graphs:
- Risk graph 1 (according to DIN V 19250),
- Risk graph 2 (according to Mayser Polymer Electronic).

• Analysis FMEA (Failure Mode and Effects Analysis),
• Checklist method,
• Fault Tree Analysis (FTA),
• Event Tree Analysis (ETA),
• Cause Consequence Analysis (CCA),
• Human Reliability Analysis (HRA).

The most commonly used indicator method for assessing occupational risk is the RISC SCORE Risk Index, in which the probability of event consequences specified in the risk definition is detailed and presented by two risk parameters, i.e. exposure to the threat and the probability of the event occurrence. This method is used to assess positions and work processes in which there is a frequent change in the exposure of employees to work environment factors. In this method, the risk description is calculated on the basis of the equation: R = S - E - P. Individual parameters are assessed on several-stage scales. This method meets the requirements of international standards.

Based on the above considerations, it should be stated that the risk assessment is aimed at monitoring the state of occupational health and safety, providing information necessary to implement corrective and preventive actions in the enterprise. The main purpose of occupational risk assessment is to prevent the effects and remove occupational hazards. This process should cover all jobs.

When describing the scope of duties at the position of a quality controller, one should also take into account unfavorable factors, such as harmful or onerous at work in the position of a quality controller. These include, among others, all factors related to staying indoors, as well as the production process, i.e. noise, dust, chemical substances. Because this work is also associated with cooperation with other people, an engineer of this specialization is exposed to conflict-prone situations. Most often it is individual and independent work, usually performed in an 8-hour day system, unless the production process requires supervision also in the evening or at night.

The necessary information to conduct an occupational risk assessment at the workplace includes:

- location of the workplace,
- description of the technological process,
- description of tasks to be performed, activities performed by the employee,
- required licenses, training and qualifications for the position,
- characteristics of machines, tools and devices operated at the workplace,
- appropriate protective clothing and personal protective equipment at the workplace,

- raw materials, materials, preparations used at the site and the hazards they pose,
- standards and legal regulations concerning the analyzed position.

The occupational risk assessment itself requires:

1) Identification of hazards at the workplace:
   Identification of hazards appearing at the workplace is essential in the correct occupational risk assessment. Hazards may be identified on the basis of collected information necessary for occupational risk assessment, or the hazards may be identified using the checklist method, which may be prepared, for example, on the basis of lists of harmful or dangerous factors.
2) Estimation of occupational risk at the workplace.
   Risk estimation consists in determining two values:
   - probability of the threat occurring,
   - the severity of the harmful consequences of these hazards.

   Before starting a risk assessment, an appropriate occupational risk assessment method should be used. Occupational risk assessment can be performed in a variety of ways, preferably one that does not require specialist knowledge. It is crucial that the result obtained is suitable for determining the acceptability of risk and planning corrective and preventive actions.

4. SUMMARY AND CONCLUSION

The application of innovative solutions regarding the implementation of standards related to occupational health and safety in the company contributes to raising standards at every workplace. The need to ensure appropriate standards during the work performed by the employee creates the need to implement occupational risk assessment, and thus requires a comprehensive analysis of the workplace. Occupational risk assessment plays a decisive role in the process of supervision over workstations, thus providing the necessary information regarding the planning of corrective actions aimed at improving working conditions and ensuring safety.

The use of occupational risk assessment forces the employer to take corrective measures both in the entire workplace and in individual positions.

Conclusions resulting from the occupational risk assessment are very useful in the training of the crew. This applies to both initial general and on-the-job training as well as periodic training.

A properly conducted occupational risk assessment is the basis for taking actions aimed at preventing diseases and accidents caused by hazards appearing at the workplace.

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