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Occupational health and safety management with the use of brainstorming method

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Abstract
Health and safety at work issue concerns every employer. Adjusting the work environment to legal requirements and standards is the key to creating health and safety culture. In every functioning OSH system there are various types of problems that employers face. The subject of the article is how to solve the problem of safety in production systems using the brainstorming method. The basic element of creating health and safety culture is an appropriate approach to occupational risk management. Risk assessment in the workplace should take place in teams as it is possible to reliably identify hazards and accurately assess them.

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1. Introduction

Every action that is taken by an enterprise is associated with the selected management element. One of these activities is the systemic management of occupational health and safety (OHS). Regardless of the knowledge, competence and experience of the employers, normative acts impose on them the following:

- planning,
- organization,
- motivating,
- control of activities in the field of health and safety.

It is necessary for the proper implementation and review, and maintenance of the safety policy that determines the proper functioning of an enterprise. One of these elements is proper management of occupational risk occurring in the work environment. In general, the OHS system is a tool that facilitates enterprise management. However, proper protection of employees depends not only on the employer, but also the inspector (manager) of occupational health and safety who creates a unit for occupational health and safety services. The methods he uses can contribute to more effective compliance with the law by employees and increase their awareness of safe and healthy work (K. Y. LO CH., CHING V., KAN C. W. 2014)

2. Management of occupational health and safety

The functioning of a modern organization requires a systematic approach to its operation in individual areas. It is related both to operational activities and to other elements that support the main activities without which it would be impossible to achieve the management goal, namely, profit. As far as quality is concerned, modern management requires a systematic approach to occupational health and safety. Lack of an element of safety in the workplace may result in a lack of conditions and factors that are able to protect employees from injury, death, occupational disease, and company assets from damage or loss (CHOVANEC A., BREZNICA A. 2017).

An inadequate approach to health and safety issues may translate into measurable losses that can be measured by the number of days in which employees were on sick leave (due to an accident, a diseases caused by, e.g., low or high temperature, exceeding the standards of manual transport work etc.) or a financial loss resulting from delays in the implementation of the company's tasks.

A system approach to health and safety can be found in Polish and European standards. As it was indicated in the introduction, safety management consists in the appropriate

anticipation and planning of problems that the company is facing in terms of safety. The right diagnosis of problems makes it possible to organize activities by transferring responsibilities to persons or companies competent for the profile of a given company (health and safety inspector). Such an approach to health and safety issues will make the employer able to motivate employees to work more effectively for the benefit of the enterprise. Controlling activities with the cooperation of the inspector will enable continuous improvement in accordance with the Deming cycle (Fig. 1) (ULEWICZ R., KLIMECKA-TATAR D., MAZUR M., NICIEJEWSKA M. 2015).

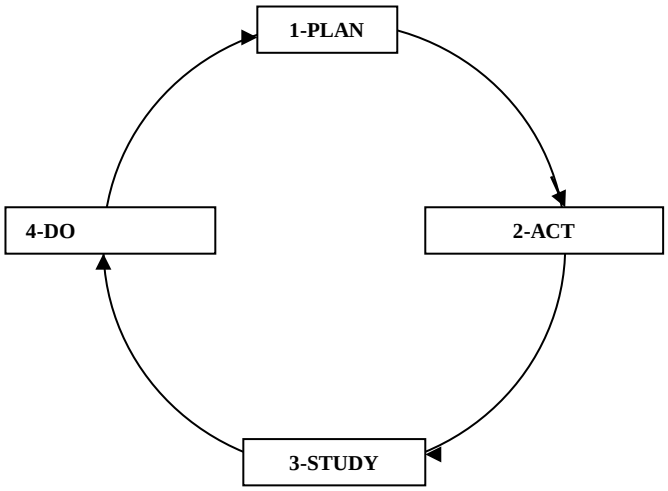

Fig. 1. Deming's continuous PDCA improvement cycle.

Improvement of the safety system is the most effective way to ensure a high level of health and safety. When implementing the system, one needs to pay attention to important elements such as:

• legal requirements that facilitate the creation of tools to care for work safety,

• human resources in the form of experienced management staff. Proper health and safety service through its involvement enables the efficient functioning of the system.

• commitment of all employees as its lack may cause a gap in the proper functioning of the system. Activation of all employees in creating safe working conditions from the time perspective can contribute to the increase of quality and work efficiency.

It is worth emphasizing that the essence of managing safety is not only about preventing workers' accidents or dangerous occurrences. It is also associated with events that can cause losses in the company, downtime or device failures. Actions taken by the entrepreneur should contribute to the elimination of the need to pay compensation for the effects of events, or to avoid expensive machinery and equipment (BRAGATTO P. A., ANSALDI S. M., AGNELLO P. 2015).

Obligations resulting from the law and concerning health and safety are an important element of the proper functioning of an enterprise. The catalog of these duties depends on the profile and size of the company. Therefore, a reliable fulfillment of all requirements contained in the law regulations forces the entrepreneur to cooperate with an external health and safety company or employ an occupational health and safety inspector in order to establish health and safety services. Support for safety management processes cannot take place without specialists having appropriate qualifications in the field of occupational health and safety (WINCEK J., SÁVIO SOUSA L., MYERS M. R., OZOG H. 2015).

3. Functioning of OHS services in an enterprise

The activities of health and safety services are presented in the Regulation of the Council of Ministers of October 2, 1997 on the health and safety at work (Journal of Laws of 2004 No. 246, item 2468 with later amendments). It defines 22 tasks related to creating a safety culture in the workplace. The most important of them are:

• preparing and presenting to an periodic health and safety analyzes at least once a year,

• participation in handing over newly built or rebuilt objects to use,

• presenting to an employer applications regarding the ergonomics requirements at workplaces,

• participation in determining the tasks of people managing employees in the field of health and safety,

• participation in determining the circumstances of accidents at work,

• participation in making a risk assessment related to the work performed,

• cooperation with laboratories authorized to perform tests and measurements of harmful factors.

The catalog of tasks to which the Health and Safety Service is burdened means that persons performing these duties cannot be burdened with additional tasks resulting from the functioning of an enterprise. It boils down to the fact that the employer cannot entrust these tasks to an employee already employed on a full-time basis. The level of safety is a derivative of working conditions at specific positions and work places. The most important tasks of the health and safety service presented here indicate that the occupational health and safety inspector performing these activities must often act on behalf of the employer. It is extremely evident in the case of adverse events in the workplace, such as: an accident at work or control of external bodies, e.g.: State Labor Inspectorate, State Sanitary Inspection, Fire Brigade and others.

Health and Safety Service performs a controlling and advisory role in a company and is appointed by employers employing more than 100 employees. However, it should be emphasized that also smaller enterprises must perform the tasks of health and safety services. However, in such a case the employer may entrust these tasks to the employee per-

forming other tasks with the indication that this is done in part-time. In special situations, the employer can perform the tasks of health and safety services, namely when he employs:

• up to 10 employees or,

• up to 20 employees and is classified as a group of activity for which no risk category has been determined higher than in the meaning of the provisions on social insurance for accidents at work and occupational diseases,

• has appropriate qualifications.

If an employer does not have the appropriate qualifications and if he does not employ more than 100 employees, he may entrust the tasks of the OHS services to a specialist external company. It is up to them to carry out the tasks contained in the regulation. It is worth emphasizing, however, that regardless of the established OHS service or an external company, nothing exempts the employer from liability under Art. 207, of the Labor Code, namely for the health and safety at work in the enterprise, the employer is responsible, and only the employer.

Despite the functioning of OHS services at the workplace, an employer should strive to raise the culture of organization and culture of work safety. The employer's approach to safety affects the involvement of the OHS inspector in activities that improve the safety.

4. Activating methods in health and safety management

Including employees in the creation of a health and safety culture is not an easy task for an employer as well as the occupational health and safety inspector operating in an enterprise. The implementation of the objectives of the safety policy and the implementation of all elements of the Labor Code require a lot of commitment from top management. In order to effectively implement tasks related to occupational health and safety, the OHS inspector must use appropriate methods to effectively educate employees about the importance of a safe working environment. One of the basic forms of reaching employees is OSH training. The following ones are distinguished in Polish legislation:

• initial training (every newly-employed employee),
• periodic training (depending on the job position).

From the point of view of the proper functioning of an enterprise each new employee also undergoes a workplace structure in order to get acquainted with the activities he will perform and with machines and devices.

Properly conducted occupational health and safety training will protect an employee from accidents at work. It is worth emphasizing, however, that these trainings should be carried out properly, i.e., in an accessible way, understandable for an employee. It is difficult to expect a participant's attention for 3 hours (3 x 45 minutes) or 8 hours (3 x 45 minutes). Therefore, it is important that the health and safety inspector knows and applies the basic principles of didactics. Only by applying the methods of giving and activating you can effectively transfer knowledge to the employee. By activating the employee during the training, he allows himself to solve problems that may arise in the work environment.

The OHS service may use other activation methods to effectively implement the safety policy. The authors of the article point to the brainstorming method. It can be used in management processes. Thanks to this method one can avoid many problems that occur in various types of processes, including the process of safety management, which is constantly analyzed and evaluated. In short, this method is implemented by:

• definition of goals,
• selecting a group participating in brainstorming,
• presenting ideas for solving problems and achieving goals by the group,
• selection of ideas,
• filtering and grouping ideas presented by the group,
• making decision analysis,
• selection of applications and implementation.

The methods used by the highest management, including the OHS service, support the management of available human resources. Effective use of them by OHS inspectors facilitates the management process, as well as increases the efficiency of knowledge acquisition by employees and enables solving internal problems arising in the work environment. Including top management and employees to brainstorming can have a positive impact on the culture of work in an organization, including the culture of safety

5. Brainstorming method in the process of health and safety management

The European Community legal act imposes on an employer in Article 6 (1) and (2) that within the scope of his duties the employer should take the measures necessary to ensure the safety and health of workers, including the prevention of hazards related to the performance of official duties, information and training as well as providing the necessary organizational framework and resources (...).

The employer managing the company should:

• prevent hazards,
• assess hazards,
• combat the sources of these hazards.

Regulation of the Minister of Labor and Social Policy of September 26, 1997 (Journal of Laws of 2003, No. 169, item 1650, as amended) § 2 point 7 specifies the occupational risk. It defines them as the probability of occurrence of undesirable events related to work performed, causing losses, in particular the occurrence of adverse health effects for employees as a result of occupational hazards occurring in the work environment or the way of performing work (DOBOSZ M., SAJA P., PACANA A., WOŹNY A. 2016).

The Labor Code in art. 226 points 1 and 2, art. 227 § 1, art. 237 11a §1 point 2 indicates that an employer has a duty to:

• assess and document occupational risk related to the work performed,

• use the necessary preventive measures that reduce occupational risk,

• inform employees about the occupational risk that results from the work performed and about the principles of protection against potential hazards,
• applying preventive measures against occupational diseases and other illnesses/ailments resulting from the work performed by the employee,
• consult with employees and their representatives about occupational health and safety processes, with particular emphasis on occupational risk assessment (SAJA P., WOŹNY A., PACANA A., DOBOSZ M. 2017).

The problem for an employer is that he often does not have enough knowledge and qualifications to make a reliable assessment of the occupational risk. Therefore, this activity is carried out through the health and safety service or an external company (LEVESON N. 2015).

Proper risk assessment is carried out according to the following stages:
• demonstration of all workplaces and their detailed description,
• workplace analysis,
• analysis of available machines and devices at a given workplace,
• identification of hazards related to the place of work and the work post taking into account the previous stages,
• selection of an appropriate risk assessment method,
• making the assessment itself,
• determination of prophylactic measures to reduce the level of doubtful or unacceptable risk,
• determination of corrective and preventive actions (BADRIA A., GBODOSSOUB A., NADEAUA S. 2012).

It is worth noting that the risk assessment should be carried out reliably since its result is shaped by the safety of the work environment through the use of appropriate personal protection measures. Downpipe of the occupational risk assessment can significantly contribute to the increase of dangerous occurrences in the workplace and can increase the frequency of accidents at work (MADLOVA D., GEBHART V. 2016). It should be emphasized that an inappropriate approach to risk assessment or its underestimation in the event of an accident may be questioned by controlling authorities (National Labor Inspectorate) and may result in the imposition of a penalty fine for inappropriate approach to hazards in the workplace (FAISAL K., SAMITH R., SALIM A. 2015).

The brainstorming method used to assess occupational risk can effectively contribute to increasing the level of safety in the company. The authors of the articles conducted an experiment that confirmed this assumption. The subject of this experiment was occupational health and safety inspectors who assessed the occupational risk on the selected stand of the warehouseman. The assumptions of the experiment were such that the occupational risk was estimated by any method by one OHS inspector employed on a full-time basis and by a team of health and safety inspectors from an outsourcing company. Both one employee and the risk assessment team received the same job description of the employee and a list of machines and devices available to the employee (JARDINE C., HRUDEY S., SHORTREED J., CRAIG L., KREWSKI D., FURGAL C., MCCOLL S. 2003).

The warehouseman deals with accepting (collecting goods from cars), storing and issuing goods (assistance in loading goods to a customer's car or XYZ company cars). He distributes the goods in storage rooms (stacking goods on shelves) and removes them from shelves. It makes an inventory of the goods on a current basis. He prepares the goods for collection (this work involves the use of sharp tools). He takes care of securing the goods against fire, theft, flooding, pests and destruction. He organizes and controls stored items and goods, establishes actions with superiors related to the purchase and sale of goods. The warehouseman runs a computer database for monitoring the status of resources (keeping warehouse records). He cares for cleanliness in storage rooms and for order in front of the building.

The basic position of the warehouseman's work is a one-storey building (warehouse) whose floor is located at the level of the adjacent ground. The unloading ramp has a positive effect on the work of the warehouse keeper, as transport of goods from delivery vans or to customers' vehicles is facilitated. The warehouse room has been equipped with:
• manual trolley for transporting goods (pallet truck),
• forklift,
• shelves of a stable structure.

An employee, when performing his duties, has at his disposal:
• pallet truck,
• forklift,
• drill,
• driver,
• computer.

The warehouseman has instructions at his disposal:
• manual transport work,
• storage of materials,
• first aid,
• fire,
• OHS instructions for drills, screwdrivers.

The information provided about the work of the warehouseman made the occupational health and safety inspector identify 20 kinds of hazards present in the workplace. The OHS team has selected 22 of them. Therefore, at the stage of hazard identification the team pointed to more risks than a single health and safety service employee. Lack of identification of any hazard at the workplace may affect the safety level of this employee. Tab. 1 indicates those hazards that were not identified by the health and safety inspector. It is worth paying attention to important hazards at the warehouseman's work, such as cold or hot microclimate and changing weather conditions. Due to the nature of work as a warehouse keeper, the employee will perform service activities at different times of the year and in different weather conditions. Due to the use of machines, he is exposed to additional hazards resulting from, e.g. atmospheric discharge or electric shock as a result of short circuit after flooding the electric pallet truck or forklift truck.

Table 1. Hazards that the health and safety inspector has not identified in his professional risk assessment for the position of a warehouseman

Hazard	Source of hazard (reason)	Possible hazard outcomes	Protection measures against hazards
Cold or hot microclimate	Outdoor air temperature, bad thermal insulation of the warehouse, heating only during working hours, work on the ramp (winter, summer)	Overheating, heat stroke, cold, hand arthritis	Installing additional storage heating, storage insulation, air conditioning installation, suitable outfit.
Variable weather conditions	Collection of goods from delivery vans at square	Overheating, heat stroke, cold	Suitable outfit

The next step after hazard identification was the selection of a suitable risk assessment method. The literature on the subject and norms distinguish several methods of estimating occupational risk. The occupational health and safety inspector assessing occupational risk independently applied the PHA method, while the OSH team of inspectors chose the Risk Score method. It is worth noting that these methods are slightly different from each other. The PHA method includes two elements of risk assessment indicators. In the case of the Risk Score method, there are three of these elements (Tab 2.). The problem of choosing the right assessment method is crucial for the whole assessment. According to the authors of the article, the number of indicators is important for the final risk assessment. The more indicators when choosing the assessment method, the more accurate the estimation of occupational risk.

Table 2. Risk estimating indicators in PHA and Risk Score methods

Method	Indicator 1	Indicator 2	Indicator 3
PHA	S – size of damage	P – probability of damage	–
Risk Score	S – possible outcomes	E – exposure to hazard	P – probability of damage

The effect of hazard identification in the workplace and selection of the risk assessment method are assessed. Based on the available formulas, it is verified whether the hazard in the warehouse is acceptable or unacceptable and requires immediate corrective action in order to bring the risk to an acceptable level.

The effect of hazard identification in the workplace and selection of the risk assessment method is that later it is evaluated. Based on the available models, it is verified whether the hazard in the warehouse is acceptable, or unacceptable and if it requires immediate corrective action to bring the risk to an acceptable level.

In the case of analyzed occupational risk assessments, there are differences in the estimation by the occupational health and safety inspector and the team of occupational health and safety inspectors. Table 1 presents only those hazards that have been estimated differently. It is worth highlighting that the table does not take into account these unacceptable hazards which were estimated by both a team of inspectors and one health and safety inspector.

It is worth noting that a team of occupational health and safety inspectors estimated that 4 risks are at an unacceptable level. In the case of one OHS inspector estimating occupational risk, these risks are at an acceptable level. This clearly indicates that the scope of corrective and preventive actions is more complete in the team than in the case of an inspector who independently assessed occupational risk.

Table 3. Indicators estimating the risk in the PHA and Risk Score methods selected by the Health and Safety Inspector and the Health and Safety Inspector Team

Name of occupational risk factor	Risk Score OHS team of inspectors	PHA OHS Inspector
A hit, crush by falling objects	N	D
A hit against stationary objects	N	D
A crash by stationary objects	N	D
Overloading of the musculoskeletal system	N	D

It may seem that risk assessment is a simple task. However, a number of variables that affect the outcome of the risk result in an incorrect assessment. From a safety point of view, it is essential that health and safety inspectors identify the hazards thoroughly, use the available knowledge and literature, use interviews with employees and use different assessment methods.

The experiment showed that the team assessing occupational risk better and more accurately assessed the hazards and chose a more accurate assessment method than an independent health and safety inspector. The brainstorming applied by the OHS team resulted in the final result of occupational risk contributing to increasing the level of employee safety as a warehouse keeper through the use of additional personal protective equipment and the introduction of additional guidelines, procedures and instructions.

Of great importance for the brainstorming method used was that health and safety inspectors had different experience in the field of health and safety, which gave them a different view on the identification of hazards at the warehouse. The exchange of opinions and selection of hazards made it possible to make the right choice of method and better assessment than in an independent health and safety service employee. Actions taken by health and safety services should be consulted, if they work themselves, they should be discussed with the employer or employees' representative, trade unions or the social labor inspector (NIELSEN K. J. 2014).

6. Conclusions

Building a health and safety system is based on the knowledge and experience of many people. The right approach to health and safety management affects the quality and productivity of work. However, organizational problems and work safety problems that are diagnosed in an enterprise disrupt the work process. Therefore, an employer creates health and safety service, which is to counter potential hazards in the workplace. The use of various methods by the occupational health and safety inspector, including didactic methods (giving and activating) in the systemic management of occupational safety causes the employees to acquire knowledge in a larger way. The use of the activating method in the form of brainstorming effectively affects the process of estimating occupational risk. It should be emphasized that an independent OHS employee can also apply this method in the risk assessment process. Perhaps an employer, management or employee representative should be invited to the group of participants.

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职业健康和安全管理，采用头脑风暴法

關鍵詞
OHS管理
职业风险
头脑风暴法。

摘要
工作中的健康和安全问题涉及每个雇主。根据法律要求和标准调整工作环境是创建健康安全文化的关键。 在每一个有效的职业安全与卫生制度中，雇主都面临各种各样的问题。
文章的主题是如何解决使用头脑风暴法的生产系统的安全问题。建立健康安全文化的基本要素是职业风险管理的适当途径。工作场所的风险评估应该在团队中进行，因为可以可靠地识别危害并对其进行准确评估。