

IMPACT OF BEHAVIORAL SAFETY (BEHAVIOURAL-BASED SAFETY – BBS) ON THE MODIFICATION OF DANGEROUS BEHAVIORS IN ENTERPRISES

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Marta Niciejewska¹ – *orcid id: 0000-0002-9530-3455*

Matevž Obrecht² – *orcid id: 0000-0001-8301-7382*

¹Czestochowa University of Technology – **Poland**

²University of Maribor – **Slovenia**

Abstract: In enterprises, accidents happen mainly due to improper and dangerous behavior of employees. The approach called Behavioral Safety (BBS) assumes that the most effective attempts to modify dangerous employee behavior are based on influencing people abuse. As a consequence, change in behavior leads to a change in the way of thinking and attitude. In the other words, as a result of using behavioral methods for a long time, employees create a safe attitude that in the future translates into further safe behavior. Mutual control of employees during work is not accepted in Poland and positively perceived by participants of the work process. It is difficult to change the mentality and habits of people. Increasingly, employee behavior control systems are implemented in medium and large enterprises. Shaping a positive attitude of the employee to such systems and methods is a long and time-consuming work that lies with the employer and OSH supervisor. Presented studies have shown that a fairly large proportion of employees do not understand the positive effects of using behavioral safety methods. There is a great need to shape awareness of safe behaviors among Polish employees using behavioral safety, i.e. safety based on mutual observation of behaviors. This paper contains the results of the first stage of the study aimed at modifying undesirable behavior among employees using the implemented BBS system.

Keywords: Behavioral-Based Safety, BBS, Occupational Hazards, Occupational Health and Safety.

1. WHAT IS BBS (BEHAVIOURAL-BASED SAFETY)? - INTRODUCTION

In many organizations, creating awareness in the field of occupational health and safety (OHS) is limited to compulsory training. In everyday work, shaping this awareness often takes the form of superiors' orders and prohibitions. This approach to broadly understood work safety does not give measurable effects in the form of even a reduction in the number of accidents at work. There are still a lot of accidents in Poland, (although in 2018 there was a 4.6% decrease compared to 2017) at work, the main cause of

which is seen in the human factor, especially inappropriate behavior of employees during the performance of tasks at their workplace (GUS, 2018; PIP, 2019). In addition, the fatal accident rate places Poland in fourth place from the end in Europe (Eurostat, 2019), and the value of benefits from accident fund in Poland is increasing (PIP, 2019). There are many methods and tools by which employers try to shape the awareness of safe work among their employees. Increasingly, in medium and large enterprises observe, for example, employee involvement in matters related to the safety of employee tasks - identification of occupational hazards, assessment of occupational risk and all preventive measures as well as promoting safe behavior at work (Niciejewska and Klimecka-Tatar, 2017; Skowron-Grabowska and Sobociński, 2018; Ulewicz et al., 2015). One of the concepts that affects the elimination of undesirable behaviors in the work process is Behavioral-Based Safety (BBS). This is safety based on behavioral observation. It was developed by behaviorists who assumed that people learn from the effects of their behavior, with a tendency to repeat such behaviors that brought them pleasure, and to refrain from those that brought harm. Motivation and other actions aimed at changing the employee's attitude towards safety at work have gone to the background.

As more effective, researchers have indicated influencing the behavior of others, in line with Geller's principle, which is "change in behavior leads to a change in mindset and attitude" (Taylor and Alvero, 2012). According to this concept, the use of behavioral methods for a long time in relation to employees should shape a safe attitude, which will pay off in the future with further safe behaviors (Szczygielska, 2014). The BBS concept is based primarily on mutual observation of employees and paying attention to potential dangerous behavior in others. Behavioral audit and dialogue are the bases of BBS concept.

Behavioral audit, often called "medicine for dangerous behavior", is a very helpful tool in building employee awareness in the field of occupational health and safety (OHS). It is based on observation of behavior, gestures and working methods adopted by the employee. It is supported by an audit form, which should always be created for a specific industry and work specifics in a given enterprise (Boczkowska and Przyjaniecka-Sikora, 2014). Such a behavioral audit should be carried out by the supervisor at the very beginning of using the BBS concept in the enterprise. At the moment when this tool fits strongly into the safety culture of the enterprise, then it is worth expanding the concept program by introducing behavioral linear observations - "employee observes the employee" (Jasiulewicz-Kaczmarek et al., 2015). The BBS concept involves identifying, measuring and modeling behavior, and thus reducing the number of accidents at work. In addition to technical and systemic safety, behavioral safety is the third element of a comprehensive approach to work safety in an enterprise.

The results of numerous studies carried out in Europe and around the world confirm the effectiveness of the BBS concept. The use of behavioral methods to reduce dangerous behaviors effectively eliminates such behaviors, reducing, among others the number of accidents at work. Dangerous behavior modification programs have been promoted in the United States and Canada for many years. For example, the American scientist and researcher Thomas R. Krause showed that the implementation of such a program in a real and measurable way reduces the number of accidents at work and that there is a close correlation between the results of program implementation and the level of safety culture (McAfee and Winn, 1989). Research conducted by Zohar in Israeli enterprises

at the beginning of the 21st century also confirmed the effectiveness of programs modifying dangerous behavior (in one of the surveyed companies, just after the introduction of BBS, a rapid increase in the level of safe behavior was observed). The frequency of accidents at work has dropped almost three times, the number of people using personal protective equipment has increased, and the safety culture has increased. It turned out that these positive changes persisted long after the project was completed in the studied enterprise. Other results of experiments carried out by foreign companies regarding the impact of BBS on the modification of hazardous behavior have also shown a positive impact on employees' awareness of occupational health and safety (Snyder, 2012, Tuncel et al., 2006). Dangerous behavior modification programs have proved to be an effective accident prevention tool. Such programs can be used not only in enterprises that have an implemented occupational health and safety management system and provide support improving the system. They also work well in companies that do not have such a system, but they want to improve the safety culture. In addition, the industry branch is not relevant. Hazardous behavior modification programs based on BBS work well in many industries - construction, cement production, urban road building projects, transport, IT broadly understood, etc. (Li, Xie et al., 2018; Fang et al., 2020; Nunu et al., 2018; Zhang et al., 2019; Guo et al., 2018; Wang et al., 2018).

American literature criticizes these programs, because dangerous behavior in enterprises, as well as their causes and consequences, are entirely attributed to employees. Employers put all responsibility on employees, not including communication as the basis for shaping the appropriate level of OSH in the company. Changing the behavior of employees is not possible without the involvement of employers in the field of health and safety. Willingness to invest in safe and ergonomic working conditions as well as flexibility of employers in making positive changes in organizational factors is the basis in shaping pro-safe behavior among employees (Przyjamecka-Sikora et al., 2010).

Polish enterprises are also beginning to implement programs for the modification of dangerous behavior based on BBS, and despite the fact that the approach to the issue of safety based on safe behavior is nothing new, in Poland there is an increase in the number of consulting companies that provide services in the field of behavioral audits. It is worth mentioning that the approach to the issue of safety based on pro-safe behavior appeared already in the 1940s of the last century. Based on the work of H. W. Heinrich, it could be stated that only 10% of accidents at work and occupational diseases are the result of improper working conditions and more than 88% - dangerous behavior of employees (Pęciłło, 2010). In Polish enterprises, researchers have come to similar conclusions. Every business that has been subjected to experiment modifying dangerous behavior based on the BBS, recorded in the first phase (that is, immediately after the implementation of the program) a sharp decline in the number of registered dangerous behavior, and in the next phase (after a long time since the implementation of the program) stabilization and gradual reducing the number of registered risk behaviors. Lack of supervision, lack of awareness of threats and time pressure and the associated fast work pace were recognized as the main causes of dangerous behavior in Polish enterprises (Pęciłło 2011). They are the result of the most often poorly conducted trainings in the field of occupational health and safety. Studies on the quality of life have shown that employees feel a great need to increase the quality and number of trainings, raise qualifications and receive detailed instructions before starting work. The respondents also pointed out that the reasons and circumstances of accidents at work were not

discussed with employees. Equally badly assessed by respondents was the involvement of the management in the safety of employee tasks performed by employees. As already mentioned, in all surveyed enterprises, after the implementation of programs modifying dangerous behavior based on BBS, there was a clear increase in employees' awareness of occupational health and safety, improved communication between the management and other employees in the area of health and safety, as well as a sense of employee responsibility for the safety of both themselves and other participants of the work process (Pęciłło 2011). It follows that programs for the modification of dangerous behavior based on BBS are effective and bring measurable results. At the same time, it should be emphasized that further penetration of Polish enterprises in this subject is desirable, taking into account the number of employees and the specifics of the industry.

2. METHODOLOGY OF RESEARCH

In the paper, the results of the analysis of available information from reports and publicly available reports on the subject matter have been presented – case study. The results have been enriched by empirical research - results from surveys conducted on the basis of a questionnaire in one of the SMEs in the furniture industry. About 42 employees took part in the study, including management and production staff. All respondents answered the same questions contained in the anonymous survey questionnaire. The 24 questions in the survey questionnaire concerned the following areas:

- organizational culture prevailing in the examined enterprise,
- safety culture existing in the examined enterprise,
- identification of the dangerous behavior causes in the respondents' opinion,
- identification of the dangerous behavior among employees in their opinion.

The aim of the study was to determine whether BBS influences the modification of potentially dangerous behavior of employees while performing work. This paper presents the results of the first stage of research, obtained before the implementation of the BBS system.

3. RESULTS AND DISCUSSION

As part of the planned research on the implementation of BBS, two studies have been conducted. The first part was conducted in May 2019 before the project has carried out, while the second was conducted in November 2019.

All employees in the enterprise during this period took part in both studies. The design of the implemented BBS system has been simplified so that it can be implemented without any problems in a small-sized enterpris. The BBS system implementation has been divided into the following tasks:

1. Kick off meeting which discussed the principles of implementing the BBS project.
2. Conducting the first survey among employees and management using a questionnaire.
3. Preparation and familiarization of employees with observation cards and selection from the so-called employee group main observers.
4. Behavior observation implementation.
5. Results and report from observation cards.
6. Conducting a second survey among employees and management after the entire stage of implementing the BBS project using a questionnaire.

7. The results of the BBS project implementation in a small enterprise in the furniture industry.

The results obtained during the survey of employees of the SME sector in the furniture industry showed certain trends characteristic for the management and production line employees. The organizational culture prevailing in the studied enterprise (current state) in the opinion of the employees of the production line and management is based on market culture with a fairly significant emphasis on the culture of the hierarchy. The desirable state, however, already differs in the assessment of these two groups of respondents. Employees would like to work in a culture of clan with elements of market culture, but also culture of adhocracy and obvious hierarchy (Table 1).

Table 1

Organizational culture in the opinion of employees - current and desirable state

Type of organizational culture	Current state	Desirable state
Clan Culture	17.08%	29.63%
Adhocracy culture	16.45%	22.90%
Market Culture	35.80%	24.45%
Hierarchy culture	30.67%	23.02%
Total	100%	100%

Source: Own study

In turn, the management of the current state of the organizational culture prevailing in the enterprise responds and would not change the dominant market culture and hierarchy. The current status corresponds to the one desired by the respondents-managers (Table 2). However, it should be remembered that the ideal organizational culture for an enterprise is the fairly equal configuration of four types of cultures. According to the literature on the subject, an enterprise should have an organizational culture focused on the market, with elements of clan culture that identifies employees with the enterprise and has a positive impact on the so-called the atmosphere in the company. In addition, the company should remember about the culture of adhocracy, which cares for the development of the company in the field of technology, technology, while not forgetting the elements of the hierarchy culture, which formalizes and standardizes certain processes in the company.

Table 2

Organizational culture in the opinion of management - current and desirable state

Type of organizational culture	Current state	Desirable state
Clan Culture	14.3%	14.3%
Adhocracy culture	19.7%	19.7%
Market Culture	40.2%	40.2%
Hierarchy culture	25.8%	25.8%
Total	100%	100%

Source: Own study

Answers to questions about the prevailing safety culture in the surveyed company revealed a number of irregularities, which in the opinion of the respondents-employees

should be improved. The factors that shape the safety culture in a company and have a decisive impact on its level in the respondents' opinion are:

- Management involvement in broadly understood matters related to work safety (73.8% of respondents),
- Management involvement in current production problems (69% of respondents),
- Employee participation in hazard identification and occupational risk assessment including suggestions and advice (64% of respondents).
- Providing interesting initial, periodic, instructional and specialist training (44% of respondents).

These factors were also least rated by employee-respondents. Therefore, there is a great need to improve these areas in order to raise the level of safety culture in the studied enterprise.

Respondents also indicated the reasons for potentially dangerous behavior. Almost 67% of the surveyed employees indicated the poor organization of work, especially the lack of order at work stations, for the reasons for dangerous behaviors that can lead to accident events. Bad employee habits related to work organization are not noticed by the management, which did not indicate this factor in the questionnaire. Every fourth surveyed employee also indicates the lack of appropriate breaks at work, which affects the dangerous behavior of employees. The respondents also indicated that the instructions for using machines and devices as insufficiently legible and understandable, which may affect their behavior when performing employee tasks (56% of respondents). Which proves that the machine and system documentation was not properly prepared (Holubova, 2016; Kielesińska and Prístavka, 2019; Niciejewska and Klimecka-Tatar, 2018). Next, the respondents indicated the behaviors that in their opinion are most often shared by themselves or their colleagues and negatively affect safety at work (Fig. 1)

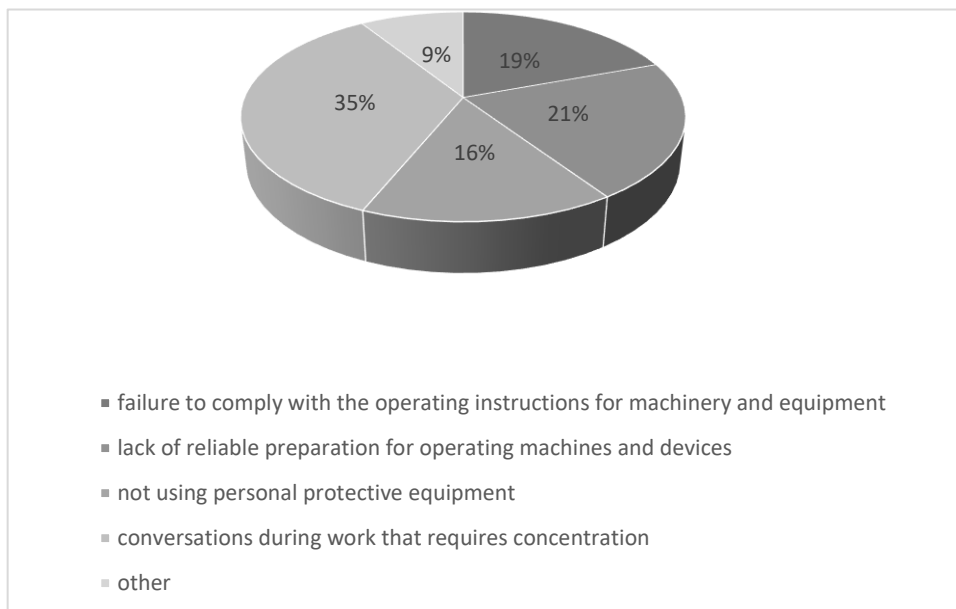


Fig. 1. Employee behavior negatively affecting work safety

Respondents for the most common behaviors that negatively affect safety at work, indicated discussions and conversations during the performance of tasks that require high concentration (35%). Almost every fifth respondent indicated the lack of reliable preparation for the operation of machines and devices and non-compliance with the

instructions for their use as undesirable behavior that negatively affects the safety of work in the enterprise (in the order of 21% and 19%).

During the project, employees were acquainted with the principles of behaviors observation, the form of observation cards, and how to record improper behaviors. The big problem was to explain that this kind of behavior observation (filling in cards) is not a form of complaint and has no unethical overtones. In order for the form of recording negative behavior to be comfortable for employees, it was decided that it would be anonymous in both dimensions - the anonymous observer as well as the observed person.

Appropriate and reliable communication, full of understanding and acceptance, in the implementation of the BBS system is the basis for achieving success. In addition, management's commitment to this project on a partnership basis rather than authoritarian basis is very much needed. Developing trust in the implementation of such projects, both between management and employees, as well as employees themselves is the primary need. Preliminary results from reports from observation cards showed that the biggest problem for employees was reporting negative behaviors that occurred among other participants of the work process. The problem of direct attention to other employees about negative behavior during work also comes to the fore. Initially, these reprimands resulted in moderate conflicts among employees. The program for the modification of dangerous behaviors by implementing the BBS system did not initially give the expected results. For the first two months, it aroused great controversy among project participants, despite reliable information about it and the substantive preparation of employees. In the third month of the project, employees began to get used to the imposed form of modification of dangerous behavior. Over time, conflicts occurred less frequently when direct attention was drawn to dangerous behavior. Reporting of negative events (potential causes of accidents at work) took place in an atmosphere of acceptance and understanding. After preliminary results from observation card reports, it can be stated that the BBS system positively effect on the dangerous behavior modification, causes growth of employees' awareness about the need for such actions and measurable effects. All results presented in detail from the implemented BBS project will be presented in the subsequent papers of the author.

4. CONCLUSION

Work safety improvement through the use of a "behavioral" approach is primarily based on the identification and analysis of risky behaviors, recognizing their causes and modifications (both employees and management). Behavior is modified by removing the causes of dangerous behavior and motivating employees to behave safely. The most commonly used method to determine the causes of employees' dangerous behavior is to observe and analyze behavior. After the stage of observation and analysis of negative behaviors, one should go to the second stage, namely strengthening positive and desirable employee behaviors. It is only when these two stages are completed in the company that the future will bring desirable, positive and measurable effects that will translate into raising the level of work safety culture in the company. As the results show, modifying negative behaviors based on the BBS system is not easy. Employees and observers see the greatest difficulties in misunderstanding the essence of the whole process. Informing about dangerous behavior of employees and paying them attention directly during work is perceived as unethical behavior in many cases. Behavioral safety is often treated as reporting and complaints. In addition, very often BBS is

treated unidirectional, i.e. towards the employee-recipient of information. BBS should be a two-way process, and additionally it should be a process that works not only on the horizontal line of the organizational structure but also on the vertical line of the organizational structure, including management staff. It should be noted that the main problem is communication, both between employees and supervisor. Considering the obtained research results, during the BBS implementation procedure, it should be stated that there is a great need to shape awareness of safe behavior among employees of the smallest business entities. While in medium and large enterprises BBS programs are increasingly implemented, in small-size enterprises it is still an unrecognized topic, which is controversial for employees. Detailed results of research conducted by the author of the article will be published in subsequent scientific papers.

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