



(RESEARCH ARTICLE)



## Analysis implementation of Behavior Based Safety (BBS) with the DO IT method in PT X, Mojokerto 2023

Meilia Eka Nur Khasanah\* and Abdul Rohim Tualeka

*Department of Occupational Safety and Health, Faculty of Public Health, Airlangga University, Surabaya, Indonesia.*

World Journal of Advanced Research and Reviews, 2024, 21(01), 2446–2452

Publication history: Received on 15 December 2023; revised on 06 January 2024; accepted on 08 January 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.21.1.0340>

### Abstract

Occupational Safety and Health (OHS) is imperative across various industries for preventing accidents and Occupational Diseases (PAK) that may lead to disability or death. This study focuses on PT X Mojokerto, a manufacturing subsidiary in the concrete industry and examines the implementation of Behavior Based Safety (BBS). This research is a descriptive qualitative-research with an observational approach using the DO IT (Define, Observe, Intervene and Test). Data collection was carried out by observation, document review and in-depth interviews with several informants. Determination of target behaviors in the implementation of Behavior Based Safety (BBS) at PT X Mojokerto Factory was carried out through discussions with the HSE officer. After determining the focal behavior in the BBS program, observations were made of workers in the designated area. Interventions are conducted to correct risky behaviors identified through observation. The impact of the intervention on the implementation of BBS at PT X Mojokerto can be seen in several aspects. Based on the research, implementation of Behaviour Based Safety (BBS) at PT X Mojokerto has positive contributions towards establishing a secure and healthy workplace. While acknowledging areas that may need refinement.

**Keywords:** Behavior Based Safety (BBS); Intervention; Occupational Safety and Health (OSH); Safety; Workers

### 1. Introduction

Occupational Safety and Health (OHS) in various industrial fields is very necessary. This is done as a form of prevention of possible accidents and Occupational Diseases (PAK) which can cause disability and even death. The application of OHS has been clearly regulated in Law No. 1 of 1970 concerning Occupational Safety and strengthened by Law No. 36 of 2009 concerning Health, especially in articles 164 and 165 concerning Occupational Health.

Based on global data released by the International Labor Organization (ILO), there are cases of Work Accidents (KK) and Occupational Diseases (PAK) in the world which reach 430 million cases per year consisting of 270 million (62.8%) KK cases and 160 million (37.2%) PAK cases and cause the death of 2.78 million workers each year [1]. Meanwhile, data according to BPJS Employment noted that the number of work accidents in Indonesia has increased, in 2017 there were 123,040 cases, in 2018 there were 173,415 cases, in 2019 there were 182,835 cases, in 2020 there were 221,749 cases and in 2021 there was an increase of 5.65% so that the number was 234,270 cases [2]. The implementation of K3 is expected to prevent or minimize these conditions.

Based on data from the National Safety Council (NSC), it is stated that the occurrence of work accidents is caused by 88% unsafe behavior, 10% unsafe conditions and 2% unknown. This is also reinforced by the theory of Heinrich (1980) which estimates that 85% of work accidents occur due to unsafe behavior [3].

\* Corresponding author: Meilia Eka Nur Khasanah

Implementation is oriented towards realizing an Occupational Safety and Health (OSH) culture which can be implemented with the Behaviour Based Safety (BBS) approach [4]. The BBS approach is a form of implementation of the ABC (Antecedent, Behavior, Consequence) model with "The DO IT Process" [5]. The application of this approach is expected to change unsafe behavior into safe behavior to prevent work accidents.

The manufacturing industry sector is one industry that has various potential hazards. PT X Mojokerto is a manufacturing subsidiary engaged in the concrete industry to supply project needs, internal or national, this company produces its own precast concrete. In the production process, there are various potential hazards, such as the risk of machine accidents, exposure to concrete dust, the presence of electrical equipment and the handling of certain chemicals. Seeing these conditions, the integration of BBS in the implementation of OSH at PT X Mojokerto can help form a strong OSH culture, minimize accident risks and create a safe and healthy work environment.

## 2. Material and methods

This research is a descriptive qualitative-research with an observational approach using the DO IT (Define, Observe, Intervence and Test) method for all workers and staff at PT X Mojokerto who will be the subject of observation. Data collection was carried out by observation, document review and in-depth interviews with several informants. The subjects of this study consisted of 3 informants, namely 1 key informant, namely 1 HSE (Health Safety and Environment) officer and 2 main informants, namely 2 HSE inspectors. The subjects in this study are staff who have knowledge and experience related to Behavior Based Safety. The focus of this research reviews the implementation of BBS that has been implemented by PT X Mojokerto in terms of the DO IT method. The research was conducted in the time span of October-December 2023.

## 3. Results and discussion

The implementation of Behavior Based Safety (BBS) at PT X Mojokerto aims to understand the level of employee sensitivity to unsafe conditions and actions in each work area. The ultimate goal is to create a safe, comfortable, and healthy work environment, so as to minimize the occurrence of work accidents. PT X Mojokerto identified unsafe behavior as the main cause of work accidents, and in response, the company implemented BBS.

In achieving this goal, PT X Mojokerto implements BBS practices, including the use of BBS cards. This card serves as a leading indicator with a target achievement of 48 times per year. Through the BBS card, employees have the opportunity to report behaviors that are deemed unsafe, making a positive contribution to the overall improvement of workplace safety.

Table 1 shows the stages of BBS implementation which is analyzed using the DO IT method referring to on 4 criteria. At the Define stage is done to determine. The observation stage is an effort to monitor BBS targets. Then the intervention stage is carried out to. Then the intervention stage is carried out to improve the risky behavior found from observation of workers at PT X Mojokerto. And the last stage is testing which is carried out to measure BBS efforts.

**Table 1** Results of Overview of BBS Implementation with the DO IT Method

Define	Observe	Intervene	Test	Regulations
Implementation of safety communication program	a. Safety Induction Has been well implemented. Every new visitor (new employee, company visitor, student intern, customer, worker, contractor, etc.) at PT X Mojokerto is required to attend safety induction from HSE.	a. Safety Induction The implementation of safety induction does not involve special intervention because it is an activity that is carried out routinely and becomes an obligation every	a. The implementation of the safety communication program (safety induction, TBM and SMT) has been going well even though sometimes there are still those who come late. b. Workers become more energized	a. ISO 4500:2018, clause 7.4 on communication, b. Law No. 1 of 1970 concerning Occupational Safety, article 9 c. Government Regulation No.50 of 2012 on the implementation of SMK3, sub-

Define	Observe	Intervene	Test	Regulations
	<p>b. Tool Box Meeting (TBM) TBM activities have been carried out routinely every day, but sometimes if the supervisor is unable to attend, the implementation of this TBM is only delivered by the HSE team.</p> <p>c. Safety Morning Talk Safety Morning Talk (SMT) activities at PT X Mojokerto have been carried out regularly every Friday.</p>	<p>time there are new visitors at PT X Mojokerto</p> <p>b. Tool Box Meeting The intervention provided for the implementation of TBM is in the form of yells and fatigue massage.</p> <p>c. Safety Morning Talk Interventions provided in implementing SMT are in the form of applying rewards and punishments seen from attendance attendance</p>	<p>during TBM after doing yells and fatigue massage and workers' awareness to take part in TBM increases, which can be seen from the enthusiasm of workers who ask to always hold TBM before work.</p> <p>c. The participation of all employees in SMT activities has increased with the existence of rewards and punishments.</p>	<p>element 2.4 on OHS information</p>
Orderly Behavior using Personal Protective Equipment (PPE)	Orderly behavior using PPE at PT X Mojokerto is emphasized intensively and is mandatory for all employees.	<p>a. Installation of safety signs is carried out to improve orderly behavior in using PPE.</p> <p>b. Setting sanctions in the form of a fine of Rp 20,000, - for each item of PPE that is not used.</p> <p>c. Supervisors are also given the responsibility to supervise the use of PPE by employees.</p>	<p>a. Installation of safety signs in certain areas that have a high risk of danger has become the center of attention of employees.</p> <p>b. PPE has been used properly and in accordance with its function</p>	<p>a. ISO 4500:2018, clause 8.1 on Operational control</p> <p>b. Law No. 1 of 1970 concerning Occupational Safety</p>
Behavioral Compliance with Work Procedures	Has established work procedures or guidelines that apply to all company work units, which are adjusted to the Occupational Safety, Health and Environment Management System (SMK3L).	The intervention provided involves the application of several instruments, namely work permit, Job Safety Analysis (JSA), Tool Permit (SIA), Person Permit (SIO), Hazard Identification, Risk Assessment and	The employees have understood and understood the work procedures so that when working in a predetermined area and require work permits, they automatically submit a work permit to HSE.	<p>a. ISO 4500:2018, clause 8.1 on Operational control</p> <p>b. Law No. 1 of 1970 concerning Occupational Safety</p> <p>c. Government Regulation No. 50 of 2012 element 6.1.5 on</p>

Define	Observe	Intervene	Test	Regulations
		Determine Control (HIRADC).		work permit system
5R program in the workplace	<p>a. The 5R implementation is classified as excellent 91.60% and exceeds the annual target of 90% with the QHSE dashboard indicator - 5R Value.</p> <p>b. Holding a 5R competition between shelters in the production area to encourage employee enthusiasm and participation, although the program is no longer running.</p>	<p>a. Installation of 5R safety signs in the work area</p> <p>b. Providing 5R assessment checklist forms in designated areas</p> <p>c. Organizing 5R socialization during Safety Morning Talk (SMT) and Tool Box Meeting (TBM) activities</p> <p>d. K3 workers make rounds to transport garbage scattered in several areas of the factory</p> <p>e. Documenting the results of 5R implementation</p>	The implementation of 5R in the workplace is well implemented as seen from the efficient work environment, there are before and after photos on the 5R program and the 5R assessment at QHSE from the beginning of 2023 until now always exceeds the specified target of 90%.	<p>a. ISO 4500:2018, clause 8.1 on operational control</p> <p>b. Permenaker RI No. 5 of 2018 concerning Safety</p> <p>c. PP No.50 of 2012 concerning the implementation of SMK3</p>
BBS Card Filling	<p>a. This program has been implemented, but not on a regular basis.</p> <p>b. Recording of BBS card results has been done routinely every month.</p> <p>c. Constraints in the BBS filling process because the workers take too long to fill in the cards and need to take the cards again after filling them in.</p>	<p>a. Socialization during SMT and TBM activities</p> <p>b. There is a regular filling schedule, namely on Tuesdays and Fridays</p> <p>c. Conduct safety patrols with several divisions by carrying BBS cards</p>	<p>a. The number of safe actions/conditions tends to decrease, while unsafe conditions increase.</p> <p>b. The ratio of work accidents in the period 2023 shows a result of zero (0).</p>	<p>a. ISO 4500:2018, clause 8.1 on operational control</p> <p>b. Permenaker RI No. 5 of 2018 concerning Safety</p>

### 3.1. Target Behavior (Define) Based Safety (BBS) Implementation at PT X Mojokerto

Determination of the target behavior (define) in this study was carried out by discussion with the HSE officer of PT X Mojokerto. There are several behaviors that are targeted in the application of BBS, including the safety communication program (safety induction, tool box meeting and safety morning talk), the behavior of using Personal Protective Equipment (PPE), compliance with work procedures, the 5R (Reduce, Reuse, Recycle, Replace, Replant) program in the workplace, and filling out the BBS card.

Figure 1 BBS Cards

### 3.2. Observatvion (Observe) Results of the Target in the Implementation of Behavior Based Safety (BBS) at PT X Mojokerto

After determining the focus behavior in the BBS program, observation or monitoring of workers in the designated area is carried out. The results of observations of the application of safety induction look good, with the use of barcodes and videos to provide understanding to new visitors. Tool box meeting is conducted regularly, with interventions in the form of chants and fatigue massage to increase employee participation. Similarly, Safety morning talk has also been implemented regularly with different activities each week. Orderly behavior using PPE is emphasized, and the installation of safety signs is an important part of the intervention to increase employee awareness.

The 5R program has been implemented with the aim of reducing the risk of work accidents and improving the layout of the workplace to create a comfortable working environment and increase productivity. Based on the HSE report, 5R implementation reached 91.60%, exceeding the annual target of 90%, measured through the QHSE dashboard. The program implementation is divided into three assessment areas: office, field, and warehouse/workshop. Each area has a 5R assessment form that is filled out monthly according to field conditions. Although the 5R competition between shelters is no longer running, this activity previously had a positive impact on employee awareness regarding the importance of 5R practices.



Figure 2 Dashboard QHSE

BBS card filling at PT X Mojokerto is used to detect unsafe acts in the work area and this program has been running for 2 years. The results of the filling record the occurrence of unsafe actions and unsafe conditions as evaluation material

even though this program has not been implemented as expected. For the recording of the results of the BBS card, it has been carried out routinely every month. This is driven by the reporting targets that must be met.

### 3.3. Interventions (Intervene) Carried out in the Implementation of Behavior Based Safety (BBS) at PT X Mojokerto

Various interventions were carried out to correct the risky behaviors identified through observation. Interventions involved the application of rewards and punishments in safety morning talk, the installation of safety signs, the use of personal protective equipment (PPE), and the use of instruments such as work permits, Job Safety Analysis (JSA), Tool Permits (SIA), Person Permits (SIO), and Hazard Identification, Risk Assessment and Determine Control (HIRADC).

Implementation of the 5R program involves steps such as installation of safety signs, provision of 5R assessment checklist forms, and socialization of 5R in safety morning talk and tool box meeting activities. BBS card filling received intervention through socialization in safety morning talk and tool box meeting forums, as well as safety patrol activities. BBS card filling is scheduled every Tuesday and Friday and is carried out through safety patrol activities with several divisions. Workers can fill out BBS cards when they encounter safe or unsafe actions. BBS cards are also provided in the office, especially at the HSE desk, to make it easier for workers or staff to get involved in filling out BBS cards.



Figure 3 5R Safety Sign in the Work Area

### 3.4. Impact (Test) of the Intervention on the Implementation of Behavior Based Safety (BBS) at PT X Mojokerto

The impact of the intervention on the implementation of BBS at PT X Mojokerto can be seen in several aspects. The safety communication program is running well, with increased employee enthusiasm in tool box meeting and safety morning talk. Orderly behavior using PPE increased, as seen from the use of appropriate PPE and effective installation of safety signs.

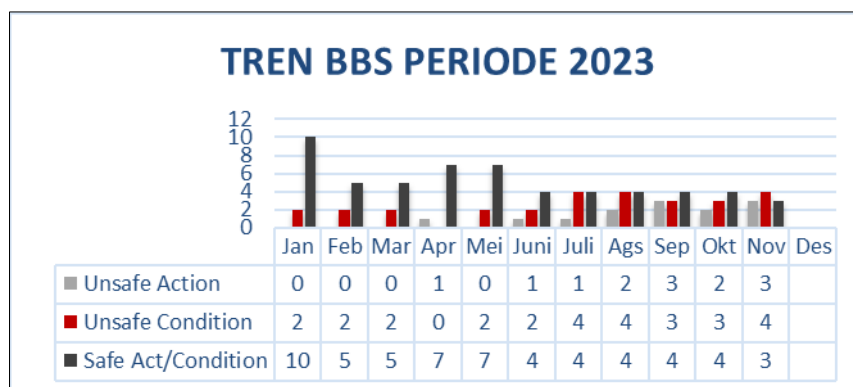


Figure 4 BBS Trend Chart 2023 Period

Compliance with work procedures is also well monitored, with the use of work permits, JSA, SIA, SIO, and HIRADC implemented according to procedures. The 5R program in the workplace achieved a good level of success, exceeding

the specified target. Although there was a decrease in the filling of BBS cards in some months, the impact was zero, with the workplace accident ratio percentage showing very low results.

---

#### **4. Conclusion**

The implementation of Behaviour Based Safety (BBS) at PT X Mojokerto has positive contributions towards establishing a secure and healthy workplace. While acknowledging areas that may need refinement, the outcomes underscore the effectiveness of BBS in mitigating the potential for workplace accidents and enhancing employees' awareness of Occupational Health and Safety (OHS) practices. Therefore, there are several suggestions for improvement which include increasing the frequency of BBS card filling to ensure continuous monitoring of work behavior, providing additional incentives or recognition to active workers in filling BBS cards, advocating the use of digital platforms for ease of filling and reporting BBS cards, evaluating the effectiveness of rewards and punishments with adjustments if needed, and conducting continuous evaluation of the effectiveness of the interventions that have been carried out.

---

#### **Compliance with ethical standards**

##### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

---

#### **References**

- [1] ILO. Nine Business Practices for Improving Safety and Health Through Supply Chains and Building a Culture of Prevention and Protection. United Nation Global Compact. 2021.
- [2] BPJS Ketenagakerjaan. The Number of Work Accidents Tends to Increase, BPJS Employment Pays Compensation of Rp1.2 Trillion. 2019.
- [3] Destari, N., Widjasena, B., and Wahyuni, I. Analysis of the Implementation of OSH Promotion in Efforts to Prevent Work Accidents at PT X (Building Construction Project Y Semarang). *Journal of Public Health*, [Online]. 2017; 5(1):397-404.
- [4] Ministry of Labor, R. I. Indonesia National Occupational Safety and Health Profile 2022. 2022.
- [5] Baharuddin, A., Fachrin, S. A., & Putri, W. E. Implementation of Behavior-Based Safety Using the DO IT Method at Pertamina Makassar City. *Scientific Journal of Industrial Engineering*. 2023; 2(1):1-10.