

Efforts to Minimize Work Accidents at PT. Behavior Based Safety (BBS) MethodNaufal Nibraas Nabiih Harijadi¹, Ardhan Firman Mardiyansyah², Vanesa vanes³,Zahra syifa⁴, Nanda dwi cahyani⁵, Epy handayani⁶, Gilang ramadan⁷

Kalimantan Institute of Technology

18221075@student.itk.ac.id¹, 18221031@student.itk.ac.id², 18221045@student.ac.id³,18221037@student.itk.ac.id⁴, 18221029@student.ac.id⁵, 18221023@student.itk.ac.id⁶,18221024@student.itk.ac.id⁷**Keywords**Behavior Based Safety,
DO IT, Work accidents**Abstract**

PT. X is a company engaged in the automotive sector, focusing on truck repair. The purpose of this report is to minimize work accidents through a behavior-based safety (BBS) approach at PT. X. The Behavior Based Safety (BBS) program is an approach to safety based on human behavior. It aims to increase employee awareness, involvement, and responsibility to create a safe working environment. The BBS program at the company aims to improve employee compliance and change work behaviors. The method used in the behavior-based safety approach is called DO IT. The DO IT method consists of 4 steps: Define, Observe, Intervene, and Test. The research was conducted using a qualitative method involving in-depth interviews with workshop management, direct observation, and analysis of documents related to BBS implementation. The results of the research indicate that the implementation of BBS will significantly contribute to improving the performance of the automotive workshop.

Corresponding Author: Naufal Nibraas Nabiih Harijadi

Email: 18221075@student.itk.ac.id

**INTRODUCTION**

Occupational safety and health are things that need to be considered to avoid work accidents. According to Izral and Solikhin, work safety is an effort or activity to create a safe work environment and prevent all forms of accidents that might occur. Meanwhile, according to Triyono, occupational health is defined as the degree/level of an individual's physical and psychological well being (the degree of physiological and psychological well being of the individual). Occupational safety itself still needs special attention, because the number of occupational accidents in Indonesia is still quite high (Abdalla et al., 2017).

PT. X is a company operating in the automotive sector located in East Kalimantan, Balikpapan to be precise KM 6. PT. The most frequent work accidents at PT. Accidents that often occur include being pinched, scratched or torn by machines when repairing trucks. Based on the results of interviews, work accidents often occur due to dangerous worker behavior, such as not wearing PPE when working, not being serious and joking while working, or workers not complying with applicable SOPs. PT. X has not implemented prevention that can reduce work accidents such as providing PPE, SOP, and organizational structure. Unsafe behavior is the biggest contributor to work accidents (Reason, 2017). Based on research conducted by the National Safety Council (NSC) in 2011, the results show that the cause of work accidents is 88% due to unsafe behavior, 10% due to unsafe conditions.), and 2% have no known cause. Work accidents can be minimized by changing or improving worker behavior with the Behavior Based Safety (BBS) approach (Guo, Goh, & Wong, 2018). Behavior based safety is an approach method for unsafe behavior and can improve safety management and prevent work accidents (Li, Lu, Hsu, Gray, & Huang, 2015).

RESEARCH METHODS

The BBS approach is used to improve occupational safety and health in a company. BBS emphasizes or focuses more on human behavior/motivation which can lead to potential work accidents. The method that can be used to define and improve dangerous behaviors is the DO IT method. This research was conducted using qualitative methods and data collection by means of interviews and direct observation.

RESULTS AND DISCUSSION

The methods used for data collection were interviews and observation. Interviews were conducted directly with workers or employees who carry out operations or maintenance or repair work on trucks (Guibrinet, 2019). Observations were carried out directly by researchers while the workshop was operating (Mc Sween-Cadieux, Dagenais, Somé, & Ridde, 2017). Data collection was carried out to support the BBS approach and DO IT method.

1. Define

The first step in the DO IT method is define. The purpose of this step is to determine or define employee behavior targets that you want to update or improve. When carrying out this step, you will find several potential dangers or work accidents that have occurred (Reason, 2016). Analyze what work problems or accidents occurred at PT. The definitions found when making improvements can be seen in Table 1.

Table 1 Define the truck repair process

No	Mechanical Behavior	Risk	Prevention
1	The mechanic did not wear <i>safety gloves</i>	Scratched hands	Use PPE in the form of <i>safety gloves</i>
2	The mechanic does not wear <i>safety shoes</i>	Pinched legs, legs crushed by tools/machines,	Use PPE in the form of <i>safety shoes</i>
3	The mechanic did not wear <i>a safety helmet</i>	Stumbling and Bumping	Use PPE in the form of <i>a safety helmet</i>
4	The mechanic joked so he couldn't focus while working under the car	His head was hit by a car, crushed by a car, and his hands were scratched	Providing strict training and SOPs
5.	Mechanics do not use <i>jack stands</i>	Hit by a car	Use a jack stand which is safer and more suitable for the weight being held

2. Observe

After determining the target behavior, the next thing to do is observe. The aim of observing is to observe or observe the type of work that has been determined (Briesch, Volpe, & Floyd, 2018). Based on table 1, there are several unsafe behaviors that occur during the process of repairing engines on trucks, such as workers not using PPE properly, workers joking while working, workers not using jack stands to support the car when carrying out repairs under the car (Briesch et al., 2018). Based on the results of interviews, workers do not use PPE because they feel lazy and uncomfortable, especially when working, plus there is no supervision of workers so that no one reprimands workers who do not use PPE, this will become an unhealthy habit or culture in the work environment.

This is supported by the absence of facilities in the form of PPE and safety signs around the work environment. Another influence is that there is no clear organizational or management structure, so there is no supervision or place to make complaints or record work accidents (Afolabi, de Beer, & Haafkens, 2021). There are other unsafe behaviors such as workers using bottle jacks as a substitute for jack stands, which is clearly an unsafe action

that can be a factor in work accidents. In this observation, it is known that the organization influences the work process, especially the Behavior Based Safety approach as explained in table 2 below.

Table 2 Influence of Company Organization

No	Influence of Company Organization	There is	There isn't any	Information
1.	Provision of K3 Equipment (PPE)		✓	There is no PPE that has been provided by the company organization to mechanics
2.	SOP/ K3 Procedures		✓	There are no SOPs and K3 procedures provided by the company organization to mechanics
3.	K3 supervision		✓	There is no supervision carried out by the company towards the workforce, so the workforce works in unsafe conditions
4.	Policies provided by the Company to increase motivation K3 culture to the workforce		✓	There is no policy provided by the Company to increase K3 cultural motivation for the workforce, such as salary increases and penalties

3. Intervene

After carrying out observations and all observation data, the results were obtained

There are several dangerous behaviors, namely operators not using PPE, mechanics joking while working, not using jack stands to support the car (Yuliana & Ardhyaksa, 2019). Next, interventions are carried out to improve risky behavior from the results of observations. Intervene aims to provide suggestions or recommendations for risk control so that workers do not experience work accidents or work-related diseases (PAK) (Choudhry, 2014). Proposed improvements are divided into 3, namely antecedents, behavior, and consequences. Based on the results of observations and interviews, it was found that PT. X has not implemented these three forms of improvement (Bob Hardian Syahbuddin, Wachid Yoga Afrida, Fatimah Azzahro, & Achmad Nizar Hidayanto, 2020). In creating an intervention program, it is best to involve workers in the area that will be intervened. When creating an intervention program, it must also be determined how long the intervention will be carried out for the expected changes to occur (Trivedi-Bateman & Martingano, 2023). Changing behavior is not easy, it usually takes time and patience. One of the intervention techniques in BBS is the ABC intervention model, namely Antecedents (A), Behavior (B), and Consequences (C) interventions.

Almost all working mechanics do not use PPE. Based on the interview results, mechanics do not use safety helmets because they are lazy and uncomfortable. Mechanics also don't wear safety shoes because they are uncomfortable and it is difficult to take off their shoes when they want to take a break or go to the bathroom. Mechanics also don't use safety gloves because they are uncomfortable and feel hot. There are several proposed improvements to the antecedents, namely providing briefings, installing safety signs, and providing strict and clear SOPs. The purpose of the briefing activity is to remind mechanics to always remind mechanics to always wear safety helmets, safety shoes and safety gloves by following applicable procedures and regulations. Checks also need to be carried out so that the PPE used by mechanics remains in a condition suitable for use, so that the PPE used by mechanics can provide maximum protection. Safety signs also need to be installed as a

reminder to mechanics to always use PPE. PT. While . There are several suggestions for consequences, namely giving warnings or warning letters to mechanics who violate them. If this is exceeded, warnings can be given up to three times, then the company will provide follow-up action.

Based on the Regulation of the Minister of Manpower and Transmigration of the Republic of Indonesia Number PER.08/MEN/VII/2010 concerning Personal Protective Equipment, employers/companies are required to provide PPE for workers/laborers in the workplace that complies with SNI and is provided free of charge. By comparing the situation at the workshop with the provisions in the Regulation of the Minister of Manpower and Transmigration of the Republic of Indonesia Number PER.08/MEN/VII/2010, it can be seen that the workshop does not follow the applicable standards, namely providing complete and free PPE to workers. The sanctions given are in accordance with Law No. 1 of 1970 concerning Occupational Safety and Health Chapter 100,000.00 (One Hundred Thousand Rupiah).

Some mechanics appear to be joking when carrying out repairs on trucks, causing the mechanic to lose focus and become careless. Mechanics who are not focused while working can cause unsafe actions such as tripping, being hit, or even causing the mechanic to be crushed by machinery or equipment (Stemn, 2019). Intervention is provided so that mechanics do not joke around while working. Proposed improvements to the antecedents include providing briefings, installing safety signs, and providing training to mechanics. Briefing is carried out before starting operations. The purpose of the briefing activity is to serve as a reminder not to joke while working. Safety signs regarding the possibility of being hit by machines or equipment or work processes that use large and heavy tools or machines. There is a suggestion regarding behavior, namely that company management must be able to familiarize workers with always wearing PPE and complying with applicable SOPs during the work process. There are several suggestions for consequences, namely giving warnings or warning letters to mechanics who violate them. If this is exceeded, warnings can be given up to three times, then the company will provide follow-up action.

Mechanics don't use jack stands to support the car when they want to repair the bottom of the car, the mechanic even replaces the jack stand with a bottle jack as a substitute for supporting the car. Proposed improvements to the antecedents include providing briefings and providing jack stands. Briefing activities are carried out before starting operations. The purpose of the briefing activity is as a reminder for mechanics to always prioritize work safety and health by not replacing the jackstand with another replacement support tool, even if it can function while no one knows if the replacement does not function or experiences an error that causes work accidents for mechanics. There are several suggestions for consequences, namely giving warnings or warning letters to mechanics who violate them. If this is exceeded, warnings can be given up to three times, then the company will provide follow-up action.

Based on the Regulation of the Minister of Manpower of the Republic of Indonesia Number 8 of 2020 concerning Occupational Safety and Health of Lifting Aircraft and Transport Aircraft that work carried out under jacks must use a lock or support device (jackstand), by making adjustments to the situation in the workshop it was found that the workshop did not comply. The applicable regulations are replacing the jack stand with a bottle jack. The function of the two pieces of equipment is different so the function cannot be confused or used as a substitute. The sanctions given are in accordance with Law No. 1 of 1970 concerning Occupational Safety and Health Chapter 100,000.00 (One Hundred Thousand Rupiah).

From the interview results, it can be seen that the company's organizational commitment to improving the K3 culture at work locations is very lacking, starting with the absence of PPE provided for mechanics, the unavailability of SOPs and strict supervision and company management to increase motivation for the K3 culture in the form of achievement (award in the form of a salary increase) and judgment (punishment in the form of salary cuts) in other words, the influence of company organization is one of the biggest factors why mechanics work in unsafe conditions.

4. Test

The final step in the BBS method is the test. The test here is to measure the impact of the intervention carried out by continuously observing and recording risk behavior during the intervention process. This stage can be carried out in parallel with the intervention stage, if it is seen that the intervention carried out is not effective then a new intervention or new strategy can be carried out. The aim of this stage is to see the effectiveness of the intervention program created, but do not rush to decide that an intervention program is not effective, as the author stated previously that changing behavior may take longer than expected. There could also be other factors that influence workers' risk behavior so that intervention programs become less effective. If this is the case, then what needs to be done is to add other forms of intervention to strengthen the ongoing intervention program. (Vincenzo & Kriswanto, 2023).

Based on the results of observations, it is known that several suggestions and improvements can be made. Work process at PT. The management in increasing mechanical motivation in the form of achievement (rewards in the form of salary increases) and judgment (punishment in the form of salary cuts), another suggestion could be in the form of establishing a structured organizational structure so that each work process has a person in charge. The improvements explained in the intervention point above need to be carried out in order to reduce work accidents and increase productivity. There also needs to be support from the company so that mechanics or workers can be motivated and enthusiastic in implementing improvements and enthusiastic about working.

CONCLUSION

Based on the results of interviews and observations, work accidents often occur due to operators' disobedient behavior, such as not using PPE and not following the company's applicable SOPs, because PT. X wants to minimize unsafe operator behavior, so that work accidents can be minimized by providing safety signs, briefings and providing K3 SOPs, K3 training and providing complete PPE for mechanics. The purpose of the briefing activity is to remind mechanics to always wear safety helmets, safety shoes and safety gloves by following applicable procedures and regulations, provide K3 training to increase knowledge and skills that can reduce work accidents, provide SOPs to serve as guidelines for monitoring safety and health of workers in the work environment. So it can increase mechanic motivation to carry out work in safe conditions.

REFERENCES

- Abdalla, Safa, Apramian, Spenser S., Cantley, Linda F., Cullen, Mark R., Mock, Charles N., Nugent, R., Kobusingye, O., & Smith, K. R. (2017). Occupation and risk for injuries. *Injury Prevention and Environmental Health*. 3rd Ed. The International Bank for Reconstruction and Development/The World Bank.
- Afolabi, Funmilayo Juliana, de Beer, Paul, & Haafkens, Joke A. (2021). Can occupational safety and health problems be prevented or not? Exploring the perception of informal automobile artisans in Nigeria. *Safety Science*, 135, 105097.
- Bob Hardian Syahbuddin, Bob Hardian Syahbuddin, Wachid Yoga Afrida, Wachid Yoga Afrida, Fatimah Azzahro, Fatimah Azzahro, & Achmad Nizar Hidayanto, Achmad Nizar Hidayanto. (2020). The Implementation of Multiple Information Security Governance (ISG) Frameworks Strategy and Critical Success Factors in Indonesia's Oil and Gas Industry: Case Study of PT X. *Jurnal Sistem Informasi (Journal of Information System)*, 16(2), 43–56.
- Briesch, Amy M., Volpe, Robert J., & Floyd, Randy G. (2018). *School-based observation: A practical guide to assessing student behavior*. Guilford Publications.

- Choudhry, Rafiq M. (2014). Behavior-based safety on construction sites: A case study. *Accident Analysis & Prevention*, 70, 14–23. <https://doi.org/10.1016/j.aap.2014.03.007>
- Guibrunet, Louise. (2019). What is “informal” in informal waste management? Insights from the case of waste collection in the Tepito neighbourhood, Mexico City. *Waste Management*, 86, 13–22. <https://doi.org/10.1016/j.wasman.2019.01.021>
- Guo, Brian H. W., Goh, Yang Miang, & Wong, Karen Le Xin. (2018). A system dynamics view of a behavior-based safety program in the construction industry. *Safety Science*, 104, 202–215. <https://doi.org/10.1016/j.ssci.2018.01.014>
- Li, Heng, Lu, Miaoja, Hsu, Shu Chien, Gray, Matthew, & Huang, Ting. (2015). Proactive behavior-based safety management for construction safety improvement. *Safety Science*, 75, 107–117. <https://doi.org/10.1016/j.ssci.2015.01.013>
- Mc Sween-Cadieux, Esther, Dagenais, Christian, Somé, Paul André, & Ridde, Valéry. (2017). Research dissemination workshops: observations and implications based on an experience in Burkina Faso. *Health Research Policy and Systems*, 15, 1–12.
- Reason, James. (2016). *Managing the risks of organizational accidents*. Routledge.
- Reason, James. (2017). *The human contribution: unsafe acts, accidents and heroic recoveries*. CRC Press. <https://doi.org/10.1201/9781315239125>
- Stemn, Eric. (2019). Analysis of injuries in the Ghanaian mining industry and priority areas for research. *Safety and Health at Work*, 10(2), 151–165. <https://doi.org/10.1016/j.shaw.2018.09.001>
- Trivedi-Bateman, Neema, & Martingano, Alison Jane. (2023). Addressing challenges to carrying out intervention programs with youth populations: Successes and strategies. *Journal of Research on Adolescence*, 33(4), 1435–1446. <https://doi.org/10.1111/jora.12886>
- Yuliana, Lina, & Ardhyaksa, Dhanar. (2019). Analysis Of Unsafe Action And Unsafe Condition Based On Occupational Health And Safety Reporting Programs. *Journal of Global Research in Public Health*, 4(2), 78–86. <https://doi.org/10.30994/jgrph.v4i2.40>