International Journal of Computer and Information System (IJCIS)
Peer Reviewed – International Journal
Vol : Vol. 06, Issue 02, May 2025
e-ISSN : 2745-9659
https://ijcis.net/index.php/ijcis/index

Analysis of Behavior-Based Safety Criteria with the Rate of Work Accidents at Power Plants Units 3,7 and 8 East Java

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Abstract—*Occupational safety and health are important factors in the steam power generation industry which has a high risk of work accidents. The implementation of behavior-based safety at coal-fired power plants is useful for reducing the incidence of accidents through intervention on worker behavior. This study aims to analyze the relationship between behavior-based safety criteria and the rate of work accidents at PLTU Units 3, 7, and 8 in East Java. This study uses a quantitative approach with a cross-sectional design. Primary data was collected through questionnaires distributed to 178 workers, while secondary data was obtained from company safety reports. The results of the study show that there is a significant relationship between behavior-based safety and the rate of work accidents through the definition factors of safe/unsafe behavior, training, basic performance, reinforcement, feedback, goal setting, and reviews in PLTU Units 3, 7, and 8 workers in East Java. This variable contributes to increasing workers' awareness of safety and reducing the number of work accidents. Meanwhile, the ownership variables) and observation did not have a significant relationship with work accidents, indicating the need for increased active worker participation and the effectiveness of follow-up from safety observations. The conclusion of this study is that behavior-based safety is an effective approach in reducing work accidents at coal-fired power plants, with factors such as safe/unsafe behavior, training, basic performance, reinforcement, feedback, goal setting, and review plays an important role in improving occupational safety. Companies need to strengthen training programs and monitoring worker behavior to achieve the zero accident target.*

Keywords : *Occupational safety, behavior-based safety, work accidents, coal-fired power plants, Behavior-Based Safety (BBS)*

I. INTRODUCTION

Industrial developments in the world have led to a change from simple or traditional technology to advanced technology. Increasingly advanced technologies can pose great dangers, requiring control techniques to reduce the negative impact on the workforce, and the environment [2]. The problems that often arise in the industrialization era with the increasing need for workers and productivity to produce quality products are greatly influenced by health conditions and the availability of worker safety protection, while the number of work accidents with various threats in the field of Occupational Safety and Health in Indonesia is still quite high [8]. This is characterized by the fact that there are still many cases of accidents in the workplace, including health and safety impacts on the workforce [1].

Occupational safety and health (K3) is an important factor in the industry, especially in the steam power plant (PLTU) sector which has a high risk of work accidents. Occupational safety and health (K3) is an effort to prevent accidents and diseases resulting from a job, by focusing on unsafe environmental aspects or unsafe behaviors [11]. Improving occupational safety can be done by implementing behavior-based safety or Behaviour-Based Safety (BBS), which focuses on changing worker behavior to reduce unsafe actions and prevent accidents.

PLTU Units 3, 7, and 8 in East Java are one of the main providers of electrical energy for the Java and Bali regions. In its operations, the risk of work accidents is still quite high, especially due to unsafe behavior (unsafe action) and unsafe conditions (unsafe conditions). Data from PT. Paiton Operation & Maintenance Indonesia (POMI) recorded thousands of findings of unsafe actions and unsafe conditions in the past year, which shows the need for further evaluation of the implementation of behavior-based safety. The implementation of behavior-based safety observations at PLTU Units 3, 7, and 8 in East Java has been carried out since 2018. In 2022, the company noted that there were 7,645 findings of unsafe action and 2,285 findings of unsafe conditions. PLTU Units 3, 7, and 8 in East Java have implemented behavior-based safety observations, but there are still incidents of work accidents caused by unsafe actions and unsafe conditions. Based on data on the implementation of company behavior-based safety observations, there were 5,632 unsafe action findings and 1,387 unsafe condition findings in the January-December 2023

period. Heinrich's (1980, in Geller, 2001) theory of occupational safety states that unsafe behavior is the underlying cause of most near-misses and accidents in the workplace. Therefore, in-depth observations were made among workers regarding unsafe work behavior. Feedback on observation of behavior has been shown to be successful in reducing unsafe behavior among workers. The feedback provided is in the form of oral, graphs, tables and charts.

According to The Keil Centre (2000) there are 9 criteria for Behavior-Based Safety which is based on the ABC (Antecedent-Behaviour-Consequence) behavior change model, there are several factors that contribute to safe and unsafe behavior in the workplace, such as ownership, definition of safe and unsafe behavior, training, observation, basic performance, positive reinforcement, feedback (feedback), goal setting, and periodic review. Behavior-based safety also identifies external factors that influence worker behavior. These external factors include management systems that cannot be used as role models [7].

The concept of Behaviour-Based Safety (BBS) has been widely applied in various industries to improve occupational safety. According to Geller (2001), the application of BBS can reduce the number of work accidents through observation and direct intervention on worker behavior. According to Heinrich (1980) it is also stated that 88% of work accidents are caused by unsafe behavior, while only 10% are caused by unsafe conditions [11]. In this case, accident prevention can be carried out with a control hierarchy. The hierarchy of control includes elimination, substitution, design, administration, and Personal Protective Equipment (PPE) [8].

This study aims to analyze the relationship between behavior-based safety criteria and the rate of work accidents at PLTU Units 3, 7, and 8 in East Java. This research is focused on workers at PLTU Units 3, 7, and 8 in East Java who are involved in the operation and maintenance of power plants.

II. RESEARCH METHODS

This study uses a quantitative approach with a cross-sectional design that aims to analyze the relationship between behavior-based safety criteria and the rate of work accidents at PLTU Units 3, 7, and 8 in East Java. The population in this study includes all workers involved in the operation and maintenance of power plants. The sample was selected using the purposive sampling method, with the criteria of inclusion of workers who are actively involved in risky work activities. The number of samples was determined based on the Lemeshow formula with a 95% confidence rate. The sample in this study was 178 workers.

Independent variables in this study include various aspects of behavior-based safety, such as ownership, definition of safe and unsafe behavior, training, observation, basic performance, positive reinforcement, feedback, goal setting, and periodic review). Meanwhile, the dependent variable measured was the rate of work accidents, which was obtained based on work incident reports during 2023.

Data collection is carried out through two main sources, namely primary and secondary data. Primary data were obtained through questionnaires distributed to respondents to measure the implementation of behavior-based safety in the work environment. Meanwhile, secondary data was collected from the company's occupational safety report, which recorded the number and type of work accidents during the study period.

Data analysis was carried out in three stages. First, descriptive analysis was used to describe the characteristics of respondents as well as the distribution of research variables. Second, multivariate analysis with logistic regression was used to determine the variables that had a significant influence on the rate of work accidents. Crosstab tabulation is a statistical technique that describes two or more variables that are entangled by combining two or more variables [6]. In this study, crosstab analysis with chi square test was used to test the relationship between independent and dependent variables with a significance level of 0.05.

III. RESULTS AND ANALYSIS

3.1 Respondent Characteristics

The characteristics of the respondents can be known from the department and the work time schedule. The respondent departments participating in the study were calculated based on the placement of the employee's position/working group at the time of the study. The distribution of respondents by work division at PLTU Units 3, 7, and 8 in East Java can be seen in Table 1.

Table 1. Distribution of Respondent Characteristics by Department

Department	Frequency	%
HSSC	21	11,8
HCFC	11	6,2
Production	13	7,3
Engineering	8	4,5
Finance	2	1,1
IT	4	2,2
Maintenance	23	12,9
FA	1	0,6
Purchasing	5	2,8
Contractor	66	37,1
Total	178	100

Based on the distribution of respondent characteristics in Table 1, it is known that respondents

who work at PLTU Paiton Units 3, 7, and 8 in East Java work the most in the contractor section.

3.2 Work Time Schedule

The Work Time Schedule in this study is categorized into daily and shift based on the work time system. The daily working time system is from 07.00 - 16.00, while the shift work time system is divided into three times (morning, afternoon, and night). Morning shift time is at 07.00-15.00, afternoon shift at 15.00-23.00, and night shift at 23.00-07.00. The distribution of respondents according to the work time schedule of PT Paiton Operation & Maintenance Indonesia employees can be seen in Table 2.

Table 2. Distribution of Respondent Characteristics Based on Work Time Schedule

Work Time Schedule	Frequency	%
Daily	119	67
Shift	59	33
Total	178	100

Based on Table 2 above, it can be seen that the most work time schedule is daily with 119 workers (67%).

3.3 The Relationship between the Ownership Factor and the Near-Accident Event

Table 3. Chi-square Test Ownership Output at PLTU Units 3, 7, and 8 in East Java

Chi-Square Test			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	19.898a	13	0.098

Based on the table above, it is known that the value of Asymptotic significance (2-sided) in the Pearson Chi-Square test is 0.098 ($\alpha > 0.05$), then H0 is accepted and Ha is rejected which means that there is no significant relationship between ownership and the near-accident incident in PLTU workers in Units 3.7, and 8 in East Java.

3.4 The Relationship between the Safe/Unsafe Definition Factor and Near-Accident Events

Table 4. Chi-square Test Output of Safe/Unsafe Definition at PLTU Units 3, 7, and 8 in East Java

Chi-Square Test			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	20.832a	8	0.008

Based on the table above, it is known that the value of Asymptotic significance (2-sided) in the Pearson Chi-Square test is 0.008 ($\alpha \leq 0.05$), so H0 is rejected and Ha is accepted, which means that there is a significant relationship between the definition of safe/unsafe and the near-accident incident in PLTU workers in Units 3.7, and 8 in East Java.

3.5 The Relationship Between Training Factors and Near-Accident Events

Table 5. Output of Chi-square Test Training at PLTU Units 3, 7, and 8 in East Java

Chi-Square Test			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	26.697a	15	0.031

Based on the table above, it is known that the value of Asymptotic significance (2-sided) in the Pearson Chi-Square test is 0.031 ($\alpha \leq 0.05$), so H0 is rejected and Ha is accepted, which means that there is a significant relationship between training and near-accident events in PLTU workers in that it.

3.6 The Relationship between Observation Factors and Near-Accident Events

Table 6. Output of Chi-square Test Observation at PLTU Units 3, 7, and 8 in East Java

Chi-Square Test			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	44.321a	35	0.134

Based on the table above, it is known that the value of Asymptotic significance (2-sided) in the Pearson Chi-Square test is 0.134 ($\alpha > 0.05$), then H0 is accepted and Ha is rejected which means that there is no significant relationship between observation and the near-accident incident in PLTU workers in Units 3.7 and 8 of East Java.

3.7 The Relationship between Basic Performance Factors and Near-Miss Events

Table 6. Output of Chi-square Basic Performance Test at PLTU Units 3, 7, and 8 in East Java

Chi-Square Test			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	19.563a	9	0.021

Based on the table above, it is known that the value of Asymptotic significance (2-sided) in the Pearson Chi-Square test is 0.021 ($\alpha \leq 0.05$), then H0 is rejected and Ha is accepted, which means that there is a significant relationship between basic performance and the near-accident event in PLTU workers in Units 3.7, and 8 in East Java.

3.8 The Relationship between Feedback Factors and Near-Accident Events

Table 7. Output of Chi-square Feedback Test at PLTU Units 3, 7, and 8 in East Java

Chi-Square Test			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	31.979a	15	0.006

Based on the table above, it is known that the value of Asymptotic significance (2-sided) in the Pearson Chi-Square test is 0.006 ($\alpha \leq 0.05$), so H0 is rejected and Ha is accepted, which means that there is a significant relationship between feedback and near-accident events in PLTU workers in Units 3.7, and 8 in East Java.

3.9 The Relationship between the Reinforcement Factor and the Near-Accident Event

Table 8. Chi-square Test Reinforcement Output at PLTU Units 3, 7, and 8 in East Java

Chi-Square Test			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.329a	9	0.032

Based on the table above, it is known that the value of Asymptotic significance (2-sided) in the Pearson Chi-Square test is 0.032 ($\alpha \leq 0.05$), then H0 is rejected and Ha is accepted, which means that there is a significant relationship between reinforcement and near-accident events in PLTU workers in Units 3.7, and 8 in East Java.

3.10 The Relationship between Goal Setting Factors and Near-Accident Events

Table 9. Chi-square Test Goal Setting Output at PLTU Units 3, 7, and 8 in East Java

Chi-Square Test			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	20.991a	12	.05

Based on the table above, it is known that the value of Asymptotic significance (2-sided) in the Pearson Chi-Square test is 0.05 ($\alpha \leq 0.05$), then H0 is rejected and Ha is accepted, which means that there is a significant relationship between Goal Setting and the near-accident incident in PLTU workers in Units 3.7, and 8 in East Java.

3.11 The Relationship Between Review Factors and Near-Accident Events

Table 10. Output of Chi-square Test Review at PLTU Units 3, 7, and 8 in East Java

Chi-Square Test			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	33.004a	15	.005

Based on the table above, it is known that the value of Asymptotic significance (2-sided) in the Pearson Chi-Square test is 0.05 ($\alpha \leq 0.005$), then H0 is rejected and Ha is accepted, which means that there is a significant relationship between the Review and the near-accident incident in PLTU workers in Units 3.7, and 8 in East Java.

3.12 Identifying the Number of Accidents at PLTU Units 3, 7, and 8 in East Java

The number of accidents at PLTU Units 3, 7, and 8 in East Java is always recorded and investigated, work accidents that occur along with the total working hours of employees every year. The following are the numbers of work accidents over the last three years (2020-2022) at PLTU Units 3, 7, and 8 in East Java.

Table 11. Work Accident Rates at PLTU Units 3, 7, and 8 in East Java

Information	Unit	Year		
		2022	2021	2020
Accident gets medical attention	n cases	4	2	1
Accidents make work hours disappear	n cases	1	0	0
Death	n cases	0	0	0
Mortality rate	/ 1,000,000 working hours	0	0	0
LTA Levels	/ 1,000,000 working hours	0,34	0	0
Number of hours worked	People's working hours	2.904.107	2.629.144	3.490.100

Work accidents can be categorized into three types, namely accidents that require medical treatment, accidents that cause loss of working hours, and accidents that lead to death. Accidents with medical treatment require help from the medical team, while accidents that result in lost working hours leave employees unable to work for more than 2x24 hours. Death due to work accidents occurs when an employee loses his life on the job.

The Lost Time Accident (LTA) rate measures accidents that cause workers to be unable to work in a span of 2x24 hours per million hours of work in a year. The death rate is calculated based on the number of workers who lose their lives due to work accidents in one million hours of work per year. Working hours are calculated based on the total number of employees working in a day multiplied by 8 hours, and then recapped annually.

3.13 Identifying Behavior Factors of Unsafe Actions

Table 12. Distribution of Unsafe Actions at PLTU Units 3, 7, and 8 in East Java

Criterion	Frequency	%
Working conditions tired/sick	21	11,8
Working not according to SOP/instructions	11	6,2
Doing work beyond ability, expertise, and experience	13	7,3
Lifting excessive weights	8	4,5
Doing a job without authority	2	1,1
Not complying with safety signs	4	2,2
Not using PPE procedures	23	12,9
Never had an accident	1	0,6
Total	178	100

Based on the table above, it can be seen that unsafe actions at work are most caused by tired or sick conditions, which are experienced by 24 workers (13.5%). In addition, 12 workers (6.7%) worked outside of their abilities, skills, and experience. Non-compliance with safety signs was recorded in 8 workers (4.5%), while 7 workers (3.9%) did not follow SOPs or work instructions. Other factors include lifting excessive loads (2.8%), not using PPE according to procedures (2.2%), and working without authority (0.6%).

3.14 Identifying Unsafe Behavior Factors

Table 13. Distribution of Unsafe Conditions Frequency at PLTU Unit 3, 7, and 8 in East Java

Criterion	Frequency	%
PPE is lacking/damaged/not provided by the company	6	3,4
Less supportive working environment (noise, hot temperature, poor ventilation/light, dusty)	17	9,6
Improper placement of materials/work tools	13	7,3
No danger signs/safety signs in the company environment	9	5,1
Incomplete/unclear SOP for work/machinery/tools	9	5,1
Never had an accident	124	69,7
Total	178	100

Based on the table above, it can be seen that unsafe actions at work are most caused by tired or sick conditions, which are experienced by 24 workers (13.5%). In addition, 12 workers (6.7%) worked outside of their abilities, skills, and experience. Non-compliance with safety signs was recorded in 8 workers (4.5%), while 7 workers (3.9%) did not follow SOPs or work instructions. Other factors include lifting excessive loads (2.8%), not using PPE according to procedures (2.2%), and working without authority (0.6%).

3.15 Identifying Incidents of Near Work Accidents of Employees at PLTU Units 3, 7, and 8 in East Java

Table 14. Distribution of the Frequency of Near-Death Incidents of Employee Work Accidents at PLTU Units 3, 7, and 8 in East Java

Category	Frequency	%
Yes	35	19,7
Not	143	80,3
Total	178	100

Based on the table above, it can be seen that as many as 35 workers (19.7%) experienced near-accident incidents. Meanwhile, as many as 143 workers (80.3%) did not experience near-accident incidents.

Occupational safety and health (K3) is a fundamental aspect in high-risk industries, including Steam Power Plants (PLTU). One of the methods used to reduce the number of work accidents is the application of Behavior-Based Safety (BBS). This method focuses on employee behavior interventions to create a safer work environment.

Based on the data obtained from the results of the study, there are nine main factors in behavior-based safety consisting of ownership, definition of safe/unsafe behavior, training, observation, basic

performance, reinforcement, feedback, goal setting, and review.

The sense of ownership of occupational safety grows through management's commitment to implementing Behaviour Based Safety (BBS), including socialization and routine training. BBS observation is a tangible manifestation of this commitment. Ideally, ownership has a close relationship with the accident rate, but the results of safety culture measurements by PKTK3 University of Indonesia at PLTU 3, 7, and 8 show that safety culture is at the "Proactive" level. One aspect with low scores is "Safety Value Alignment"**,** which shows the weak commitment of individuals to safety. Although the safety culture and mindset are good, ownership does not have a significant relationship with the rate of work accidents. This shows that even though companies have implemented the K3 program, the active participation of workers in program ownership is still less than optimal. However, there is still a tendency that safety programs are more effective if they are accompanied by material incentives (results-oriented behavior).

The definition of safe and unsafe behavior is one of the factors that has a significant relationship with the rate of work accidents. The Occupational Safety and Health (K3) Policy affirms the company's goals and commitments to improve safety through the Behavior Based-Safety (BBS**)** program. The program aims to prevent incidents and injuries by increasing workers' awareness of safety and turning unsafe behaviors into safe ones. The implementation of BBS at PLTU Units 3, 7, and 8 in East Java aims to identify risks, provide education on safe measures, and encourage a culture of safety through a reward and sanction system. The company has a PI-03-20-16 procedure as a BBS observation guide to reduce accidents due to unsafe behavior.

BBS also supports the Sustainable Development Goals (SDGs**),** especially SDG 3 (Health and Well-being) by creating a safer work environment, as well as SDG 8 (Decent Work and Economic Growth) which contributes to the well-being of workers and companies. Through the online application, workers can report safe or risky behavior, which is then analyzed for corrective action.

Training has a significant relationship with the rate of employee work accidents. Work safety carried out at PLTU Units 3, 7, and 8 has been proven to contribute to reducing the number of work accidents. Training is an important effort to prevent work accidents by improving employees' knowledge and skills about occupational safety (K3). At PLTU Units 3, 7, and 8 in East Java, Behavior Based Safety (BBS) training is provided to employees and contractors to improve their understanding and skills in conducting safety observations.

This training is based on the ABC (Activator-Behavior-Consequence) theory which emphasizes that socialization before the implementation of BBS can be a trigger for safe behavior in the workplace. Employees who understand the concepts of unsafe act, unsafe condition, near miss, incident, and accident will be more careful at work, so as to reduce the risk of accidents.

In addition, employees are also given training related to Permit to Work (PTW) or work permits, which aim to ensure that work is carried out safely and efficiently. PTW includes work procedures that must be approved by the Recipient in Charge (RIC) and the reviewer before work begins. The RIC is responsible for the renewal of the work permit in the event of a change in methods or occupational hazards. The company also routinely conducts PTW refresher training every three years to ensure employee understanding is maintained. The results showed that the better the quality and frequency of training, the higher the awareness of workers of the risks and preventive measures that need to be taken.

Basic performance has a significant relationship with the rate of near-misses of employees' work accidents. Baseline performance is used to measure the effectiveness of occupational safety (K3) programs through work accident statistics. Performance indicators help lower accident rates and create a safe and productive work environment. At PLTU Units 3, 7, and 8 in East Java, the increase in the number of Behavior Based Safety (BBS) **observations** and the decrease in the findings of unsafe actions indicate the success of the program. Employees can monitor the progress of observations through the POSH application. The socialization of the K3 program is carried out offline through counseling and displayed on safety boards, banners, and safety signs. Before implementation, the new program is discussed by the internal team and reviewed by management. Routine evaluations are carried out for continuous improvement in the implementation of the K3 program.

Observation did not have a significant relationship with near-miss rates, as an individual's awareness of safety was already high. At PLTU Units 3, 7, and 8 in East Java**,** the BBS system is implemented through the POSH (POMI Safety & Health) application, where employees are required to make occupational safety observations. If a risky action is found, the observer must stop the work and report it for action.

The POSH app records observations based on eight indicators, including worker reactions, PPE use, work procedures, and environmental conditions. If there is a dangerous action, immediate corrective action is taken**,**

with sanctions for workers or visitors who do not comply with the rules. The Dupont Sustainable Solution (2023) and PKTK3 University of Indonesia (2024) survey put the company's safety culture at the Independent and Proactive levels**,** showing that employees continue to work safely even without observational intervention.

Feedback has a significant relationship with the rate of near-misses of an employee's work accident. Feedback is a response to communication that serves as an indicator of the activeness and success of a program. Lack of information and poor communication can increase the risk of work accidents and affect employee performance. At PLTU Units 3, 7, and 8 in East Java**,** the HSSC Department routinely conducts walk-downs or K3 inspections twice a week (Tuesday & Friday) with the participation of representatives of each department. The inspection lasted for 1 hour, with the first 45 minutes to identify and record unsafe acts and unsafe conditions, and the next 15 minutes to report to the Safety team.

The results are stored in the POSH app for follow-up. Follow-up includes improvement of work procedures, equipment improvements, and employee training. The feedback from these inspections helps create a long-term safety culture and serves as a reference for the development of the K3 program in the future. This feedback is a measure of the success of the program, where there are more findings related to unsafe acts and unsafe conditions, it is hoped that a culture of safety can be realized and survive in the long term. In addition, feedback also serves as a basis for the development of future safety programs.

Reinforcement or strengthening of safe behavior is significantly related to the incidence of near work accidents. Reinforcement in Behavior-Based-Safety (BBS) can be in the form of rewards and punishments to motivate workers to behave safely. Although there was no significant relationship between feedback and near-miss, awards and sanctions were still used as a strategy to increase K3 commitment.

At PLTU Units 3, 7, and 8 in East Java, the implementation of BBS has fluctuated. Initially, workers who conducted BBS observations were rewarded, but when the award was stopped, participation decreased. To overcome this, the company makes BBS part of the KPI assessment. Workers who routinely observe at least 1x/month will get additional KPI values and benefits, while those who do not carry out are not subject to sanctions, but the KPI value is fixed.

The company also sets BBS observation and safety walkdown as Key Performance Indicators (KPIs) for management and non-staff. Management is required to conduct a safety walkdown at least 1x/month, while non-staff must conduct BBS observations at least 1x/month to improve work safety.

The results of goal setting research have a significant relationship with the incidence of near-work accidents. The Occupational Safety and Health (K3) Commitment is carried out by implementing correct work practices according to the principles of K3 and meeting the requirements in accordance with applicable regulations. Commitment in K3 has a relationship with worker productivity when the K3 commitment is high, then worker productivity will also increase and the work process runs effectively and efficiently [4].

The Occupational Safety and Health (K3) policy at PLTU Units 3, 7, and 8 in East Java applies to all employees and contractors, including Pearsonel protection, risk identification, improvement of safe behavior, and compliance with electricity safety regulations and the Electricity Safety Management System (SMK2). Management is also committed to conducting observations, inspections, periodic audits, and involving employees in K3 improvements.

The company's commitment to K3 is manifested in policies installed in strategic locations so that employees are easily known. Standard Operating Procedures (SOPs) are implemented to ensure workers are disciplined, work safely, and adhere to a safety culture to reduce work accidents. PLTU Units 3, 7, and 8 also implement Behavior Based Safety (BBS) Observation, where management and workers actively observe behavior and working conditions. The HSSC department provides the BBS application, conducts training, and assists other departments in the implementation of the BBS to run effectively and on target.

The review has a significant relationship with the rate of work accidents. Program reviews and evaluations are essential to identify deficiencies, measure success, and ensure continuous improvement. The BBS observation program is evaluated through employee KPIs and safety committees based on monthly achievements. BBS assesses two main categories, namely work actions and working conditions. Work actions include worker reactions, positions, personal protective equipment, equipment, procedures, and neatness, while work conditions include equipment, work area structure, environment, and neatness.

PLTU Units 3, 7, and 8 routinely carry out K3 evaluation and reporting every month in the Monthly Management Meeting. If there is a change in procedures, management will conduct socialization to all workers. Periodic review or evaluation of behavior-based safety programs is one of the main factors in the success of the K3 program. From the results of the study, it was found that companies that actively

evaluate the implementation of occupational safety tend to have a lower accident rate.

VI. CONCLUSION

Based on the results of the analysis, it is concluded that behavior-based safety includes aspects such as the definition of ownership, safe/unsafe aspects such as the definition of ownership, safe/unsafe behavior, training, observation, basic performance, reinforcement, feedback, goal setting, review in the K3 program. Unsafe actions and conditions at PLTU Units 3, 7, and 8 are caused by a less supportive work environment and the physical condition of workers such as fatigue. Antecedent factors such as reinforcement, training, feedback, safe/unsafe behavior, basic performance, goal setting, and review have been shown to be related to the rate of work accidents, while ownership and observation do not have a significant relationship with the rate of work accidents at PLTU Units 3, 7, and 8 in East Java in 2023.

THANKS-YOU NOTE

The author would like to thank Sahid University Surakarta, the supervisor, as well as PT POMI and the workers at PLTU Units 3, 7, and 8 who have participated in this research. Thank you also to family, friends, and colleagues who provided support. Hopefully this research will be useful for the development of occupational safety policies in the future.

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