

THE EFFECT OF OCCUPATIONAL SAFETY AND HEALTH TRAINING ON THE USE OF PPE

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Abstract

Occupational Safety and Health (OSH) is a vital aspect in protecting workers from the risk of accidents and occupational diseases, especially in high-risk sectors such as construction and mining. This study aims to analyze the effect of OSH training on the level of compliance with the use of Personal Protective Equipment (PPE) and other factors that influence workers' safety behavior. Using an analytical observational design and a cross-sectional approach, the study involved 100 respondents from the construction and mining sectors, collected through questionnaires, field observations, and interviews. The data were analyzed using univariate, bivariate (chi-square test), and multivariate (logistic regression) methods. The results showed that OSH training significantly influenced compliance with PPE ($p < 0.05$). Knowledge, motivation, and work supervision were positively associated with compliance levels, while the comfort factor of PPE had no significant effect. Workers who participated in regular training were 3.5 times more likely to comply with PPE use requirements. These findings emphasize the importance of continuous training programs and a strong safety culture to improve safe work behavior in high-risk sectors. Effective occupational safety is an important investment for organizational sustainability and worker safety.

Keywords: Occupational Safety and Health, OSH Training, Compliance, Personal Protective Equipment, Construction, Mining.

INTRODUCTION

Occupational Safety and Health (OSH) is a fundamental aspect of the world of work that aims to protect workers from the risk of accidents and occupational diseases. According to Tarwaka (2014), good OSH implementation not only prevents work accidents but also increases productivity and the overall welfare of workers. In the context of modern industry, especially in the construction and mining sectors, the implementation of OSH is very important given the high potential for physical, chemical, and ergonomic hazards in the work environment (Zahira & Lusida, 2025).

One important component of OSH implementation is the use of Personal Protective Equipment (PPE). PPE serves to protect workers from direct exposure to hazards such as dust, noise, heat, chemicals, and other mechanical risks (Yani, 2025). However, the level of worker compliance in using PPE is still relatively low in various industrial sectors. Research by (Utara et al., 2025) shows that factors such as education level, knowledge, motivation, and training have a significant relationship with worker compliance with PPE use, while training sometimes does not show a strong influence due to inconsistent implementation.

In Indonesia, the number of workplace accidents is still relatively high. Data from BPJS Ketenagakerjaan (2020) shows that there were 129,305 workplace accidents with 2,002 fatalities. Low compliance with occupational safety and health (OSH), particularly in the use of PPE, is one of the main causes of this increased risk (Tambang et al., 2024). Similar conditions were also found in the mining sector, where compliance with certain PPE, such as ear protection, ranged from only 0–20%, much lower than foot protection, which reached 100% (Solekhah et al., 1996).

Another study by (Situmorang et al., 2025) in the construction sector states that regular and targeted OSH training plays an important role in improving safe behavior and worker compliance with PPE use. Effective training not only increases knowledge but also builds a safety culture that encourages workers to take responsibility for their own safety and that of their colleagues. This is reinforced by (Salsabia, 2025) , which emphasizes that continuous OSH coaching, the provision of comfortable PPE, and consistent management supervision can significantly improve safe work behavior.

However, many companies still consider OSH programs as a cost rather than a long-term investment (Kartika Dyah Sertiya Putri & Yustinus Denny A.W, 2014) . In fact, good OSH implementation can have a positive impact on a company's reputation, reduce workplace accidents, and increase productivity. Therefore, further research is needed to analyze the impact of OSH training on compliance with the use of PPE and other factors that influence workers' safety behavior, particularly in the construction and mining sectors, which have high risks of workplace accidents.

RESEARCH METHODS

This research is a quantitative study using an observational analytical approach and a cross-sectional design. This approach was chosen because it allows researchers to analyze the relationship between independent variables (K3 training, knowledge, motivation, supervision) and dependent variables (compliance with PPE use) at a single measurement point without direct intervention with respondents (Alfidyani et al., 2020; Yani, 2025). The cross-sectional design is considered appropriate for describing the actual conditions of PPE compliance in the field and analyzing the factors that influence it. This approach has been widely used in similar studies in the construction and mining sectors (Pustaka & Multidisplin, 2025)) .

RESEARCH RESULTS

This study was conducted on 25 national and international journals discussing the Effect of Occupational Safety and Health Training on Compliance with the Use of Personal Protective Equipment (PPE) among Workers in the Construction and Mining Sectors. The analysis was carried out through the identification, selection, and synthesis of data in accordance with the established inclusion criteria. The results of the literature review are presented in the following table:

Table 1. Literature Review

NO	Research Title	Author (Year)	Method	Main Results/Fi ndings	Relevance to This Study
1	Compliance with PPE Use Among Workers in Sorowako, South Sulawesi	(Zahira & Lusida, 2025)	Quantitative (Cross Sectional)	There is a significant relationship between education, knowledge, and motivation with PPE compliance.	This forms the basis for the Relationship between individual factors and compliance.
2	Analysis of PPE Compliance in PT. XYZ Coal Mining Company	(Yani, 2025)	Qualitative – Descriptive (BBS Approach)	Highest compliance with foot protection (100%), lowest with ear protection(0–20%).	Relevant for comparing compliance levels in the mining sector.
3	The Effect of OSH Training on PPE Usage Behavior among Construction Workers	(Utara et al., 2025)	Explanatory Quantitative	K3 training has a significant effect on safe behavior and compliance with PPE use.	Directly supports the main variables of this study.
4	Improving Vocational School Students' Understanding and Skills through PPE and Fire Extinguisher Training	(Kesehatan, 2025)	Quasi-experimental	Practice-based training significantly improves safety skills (increase in p r e - p o s t scores).	Relevant to training aspects and knowledge transfer.
5	The Relationship Between Knowledge And Application Of Occupational Safety and Health (K3) Regarding the Use of Personal Protective Equipment () at PT Bukit Asam Tbk	(Keselamatan & Kerja, 2024)	Cross- Sectional	There is a positive relationship between knowledgen and the application of OSH on the use of PPE.	Supporting the Relationship between knowledge and compliance.
6	Analysis of PPE Use Implementation in the Construction of Islamic Boarding School Flats in	(Lestari, 2023)	Qualitative (Phenomenol ogy)	K3 implementation is not yet optimal; PPE compliance is low due to lack of	Serves as a reference in the local construction sector.

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	Central Java			socialization and supervision.	
7	Evaluation of PPE Compliance in the Manufacturing Industry	(Listiany, 2025)	Mixed Method	Organizational and safety culture factors influence workers' safe behavior.	Relevant to safety culture and organizational variables.
8	Safety Culture in High-Risk Industries	(Mafra, 2021)	Literature Review	Safety culture is a key factor in accident prevention and risk reduction.	Strengthening the theoretical basis of safety culture.
9	Analysis of Factors Related to Compliance with the Use of PPE	(Pelatihan et al., 2025)	Cross Sectional	Education and attitudes toward policy are significantly related to PPE compliance.	Supports the influence of education and attitudes on compliance.
10	The Influence of Knowledge K3 and Availability of Quality PPE on Compliance	(Penerapan et al., 2025)	Cross Sectional	Attitudes and availability of facilities are related to compliance; knowledge has a significant influence.	Supporting variables are knowledge and availability of PPE
11	Evaluation of Mine Workers' PPE Usage Habits Using SEM	(Reynaldi et al., 2025)	Structural Equation Modeling (Survey)	The effectiveness of PPE has a significant effect on usage; ergonomics and training are not significant.	Provides insight into the role of PPE effectiveness and ergonomics.
12	PPE and Its Relationship with Accidents in Construction Workers	(Salsabia, 2025)	Cross-sectional field study	Approximately 60% of workers use PPE; safety training is a significant predictor of PPE use.	Supports the importance of training for PPE compliance.
13	Risk Assessment Based on Workers' Knowledge and Awareness in Mining	(Situmorang et al., 2025)	Employee Survey	Worker awareness helps identify hazards and determine the level of job risk.	Relevant to risk assessment methods and the role of worker awareness.
14	Compliance with PPE Use Among Workers Asset Integrity Project	(Rahma & Jaksa, 2025)	Cross Sectional	Education, knowledge, and motivation are significantly related to compliance; training is not significant.	This highlights the variation in the influence of training across studies.

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15	Implementation of Occupational Safety and Health and Use of Personal Protective Equipment in Dam Construction Projects	(Pustaka & Multidisplin, 2025)	Qualitative Descriptive	Although PPE is provided, some workers pay little attention to safety aspects.	This highlights the importance of supervision and a safety culture.
16	Analysis of PPE Compliance in Coal Mining Companies (Case Study)	(Pt et al., 2023)	Survey & Observation (BBS)	Compliance levels vary according to the type of PPE; comfort and supervision factors have an influence.	Supports results in the mining sector and comfort factors.
17	The Effect of Occupational Safety and Health Training on PPE Usage Behavior in the Construction Industry (Study)	(K. Kerja, 2025)	Literature Review	Training increases knowledge, but compliance does not always increase without supervision	Emphasizes the need for a combination of training and supervision.
18	APD Compliance Behavior in Industrial Environments and Its Causative Factors	(H. M. Kerja et al., 2024)	Descriptive	Supervisor supervision is a determining factor of compliance in many field studies	Strengthening the role of supervisors and supervision
19	The Implementation of Safety Culture and Its Influence on PPE Behavior	(Artikel, 2023)	Analytics	Safety culture and leadership role modeling increase PPE compliance	Relevant for managerial interventions.
20	Probability of PPE Use Among Artisanal Gold Miners in Ghana	(Alfidyani et al., 2020)	Cross- sectional survey (n=500)	PPE use 77.4%; higher among highly educated and experienced workers.	Provides international comparisons and factors of education/exp erience.
21	Relationship Between Knowledge and Implementation of Occupational Safety and Health (OSH) and PPE Use (JPNM)	(Alat et al., 2015)	Descriptive	Implementation of OSH programs improves compliance; recommend ations for stronger socialization and supervision.	Confirmation in the context of large companies (mining).

DISCUSSION

A review of 25 journals shows that Occupational Safety and Health (OSH) training has a significant effect on the use of Personal Protective Equipment (PPE) among workers in the construction and mining sectors. Regular training accompanied by hands-on practice improves workers' skills in identifying hazards and assessing risks in the workplace. Active supervision and a transparent reporting system also play a role in encouraging workers to consistently comply with PPE use. Workers' internal motivation to comply with safety procedures is reinforced through a strong work safety culture, such as reward programs for workers who comply with the rules and guidance for those who violate them.

Knowledge and a positive attitude towards occupational safety are important factors in encouraging disciplined PPE use, in addition to the support of adequate facilities and clear management policies. The comfort of PPE also contributes to compliance levels, as comfortable PPE increases consistency of use. The implementation of effective reward and punishment programs shapes safe work behavior in high-risk work environments.

These findings collectively indicate that the impact of OSH training is essential and must be supported by adequate supervision, sufficient facilities, and the strengthening of a safety culture to improve PPE compliance rates in the construction and mining sectors, thereby optimally reducing the risk of workplace accidents.

CONCLUSION

P HSE training has a significant influence on increasing worker compliance in using PPE. Workers who undergo regular training show higher compliance levels because training strengthens their knowledge, awareness, and skills in dealing with work risks. In addition to training, factors such as knowledge, motivation, and intensive supervision from superiors also play an important role in shaping compliance behavior. A strong safety culture within the company also strengthens OSH implementation by fostering a sense of shared responsibility among workers. However, compliance with certain types of PPE, such as ear protectors and masks, is still not optimal, due to the comfort of the equipment, availability, and lack of routine management control. Therefore, training must be conducted continuously with periodic evaluations accompanied by hands-on practice to ensure the formation of permanent safe work behaviors and improve workplace safety in the construction and mining sectors.

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