J-OSH
Journal of Occupational Safety and Health
https://journal.stikespemkabjombang.ac.id
Volume 01 Number 01
March 2026
e-issn: xxxx-xxxx

Association between unsafe actions, unsafe conditions, and occupational safety and health management system implementation at pt x in a construction supervision services project in the Phr Rokan Working Area, Minas-Petko, 2026

Muhamad Mustofa

Universitas Kepanjen Malang, Indonesia

Submitted:
1 March 2026
Accepted:
15 March 2026

Cresponding Author:
Muhamad Mustofa
Universitas Kepanjen Malang

Email:
muhamad.mustofa@universitaskepanjen.ac.id

ABSTRACT

Occupational accidents remain a major concern in construction and oil and gas operations, where unsafe actions and unsafe conditions are frequently identified as important workplace risk factors. This study aimed to examine the associations of unsafe actions and unsafe conditions with implementation of the Occupational Safety and Health Management System (OSHMS; SMK3) among PT X workers in a Construction Supervision Services Project in the PHR Rokan Working Area, Minas-Petko. A quantitative cross-sectional design was used. Ninety respondents were recruited through convenience sampling, and data were collected using a questionnaire. Structural Equation Modeling-Partial Least Squares (SEM-PLS) was performed using SmartPLS version 4. The model showed that unsafe actions were significantly associated with OSHMS implementation (path coefficient = 0.661; $t = 13.344$; $p < 0.001$), as were unsafe conditions (path coefficient = 0.622; $t = 11.356$; $p < 0.001$). The R^2 value for OSHMS implementation was 0.800, indicating that the two predictors jointly accounted for 80.0% of the variance in the dependent construct. These findings indicate strong statistical relationships between unsafe actions, unsafe conditions, and OSHMS implementation. Strengthening safety supervision, routine inspections, workforce competence, reporting and follow-up mechanisms, and safety culture may support more effective occupational risk control. Because of the cross-sectional design and convenience sampling, the findings should be interpreted as associative rather than causal.

Keywords: Unsafe Action, Unsafe Condition, Occupational Safety and Health Management System, Occupational Safety, Construction.

Copyright © 2026 by *Mustofa, et al,* published by UPPM STIKES Pemkab Jombang is licensed under CC BY 4.0
https://doi.org/10.33023/jikep.v11i3.3417

INTRODUCTION

Occupational accidents remain a major concern across industrial sectors, particularly construction and oil and gas, where work activities are characterized by relatively high levels of risk. Beyond their direct consequences for workers, occupational accidents can adversely affect productivity, operating costs, corporate reputation, and project continuity. The International Labour Organization (ILO) has reported that millions of workers worldwide experience occupational accidents and work-related diseases each year, creating substantial social and economic burdens.

In Indonesia, occupational accident cases have shown an increasing trend in recent years. Data from BPJS Ketenagakerjaan recorded 265,334 occupational accident cases in 2022, increasing to 370,747 cases in 2023 and 462,241 cases in 2024. This trend indicates that accident-prevention efforts require continued strengthening through the effective implementation of occupational safety and health management systems in the workplace.

Unsafe actions are among the factors associated with occupational accidents. Tarwaka (2017) defines an unsafe action as worker behavior or an act that does not comply with established safety procedures and may increase the likelihood of an accident. Examples include failure to use personal protective equipment (PPE), non-compliance with work procedures, rushing during task execution, and performing work without adequate consideration of existing hazards and risks.

Unsafe conditions are another important factor associated with occupational accidents. According to Ramli (2010), an unsafe condition is a workplace condition that can increase accident risk, including unserviceable equipment, poor housekeeping, inadequate lighting, and insufficient control of workplace hazards.

PT X is a construction supervision services company supporting project and maintenance activities in the PHR Rokan Working Area, Minas-Petko. Given its role in supervising construction activities, effective implementation of the Occupational Safety and Health Management System (OSHMS; SMK3) is essential to support a safe working environment. Safety observations conducted from January to April 2026 continued to identify unsafe actions and unsafe conditions in work areas, indicating the need to evaluate the level of OSHMS implementation.

An Occupational Safety and Health Management System provides a systematic framework for controlling occupational safety and health risks. Effective OSHMS implementation is expected to support the reduction of unsafe actions and unsafe conditions and thereby minimize occupational accident risk. Accordingly, empirical assessment is needed to examine the relationships among unsafe actions, unsafe conditions, and OSHMS implementation in construction-project settings.

This study aimed to analyze the associations of unsafe actions and unsafe conditions with OSHMS implementation among PT X personnel working on the Construction Supervision Services Project in the PHR Rokan Working Area, Minas-Petko.

METHODS

This study employed a quantitative, descriptive-analytical design with a cross-sectional approach. The cross-sectional design was used to examine the relationships among unsafe actions, unsafe conditions, and OSHMS implementation at a single point in time.

The study was conducted at PT X within the Construction Supervision Services Project in the PHR Rokan Working Area, Minas-Petko. The study population comprised all 169 PT X workers. Based on sample-size considerations and the adequacy requirements for SEM-PLS analysis, 90 respondents were included. Participants were recruited using non-probability convenience sampling.

Data were collected using a questionnaire covering three study constructs: unsafe actions, unsafe conditions, and OSHMS implementation. All items were measured on a five-point Likert scale, with higher scores representing more favorable perceptions of the construct being assessed.

Data were analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS) in SmartPLS version 4. The analytical procedure included evaluation of the measurement (outer) model through construct validity and reliability testing, evaluation of the structural (inner) model using the R-squared (R^2) value, and hypothesis testing through bootstrapping at a 5% significance level.

RESULTS

Respondent Characteristics

Table 1. Distribution of Respondents by Job Function/Department

No.	Job Function/Department	n	Percentage (%)
1	Construction	24	26.7
2	Safety/HSE	22	24.4
3	Quality Control	20	22.2
4	Project Control	10	11.1
5	Equipment	5	5.6
6	Quantity Surveyor	5	5.6
7	Material Control	2	2.2
8	Trainer	2	2.2
	Total	90	100

Source: Author's analysis, 2026.

Table 2. Distribution of Respondents by Age

No.	Age	n	Percentage (%)
1	< 35 years	18	20.0
2	35-45 years	31	34.4
3	46-55 years	33	36.7

No.	Age	n	Percentage (%)
4	> 55 years	8	8.9
Total		90	100

Source: Author's analysis, 2026.

Table 3. Distribution of Respondents by Educational Attainment

No.	Educational Attainment	n	Percentage (%)
1	Diploma (D3)	28	31.1
2	Bachelor's degree (S1)	56	62.2
3	Master's degree (S2)	6	6.7
	Total	90	100

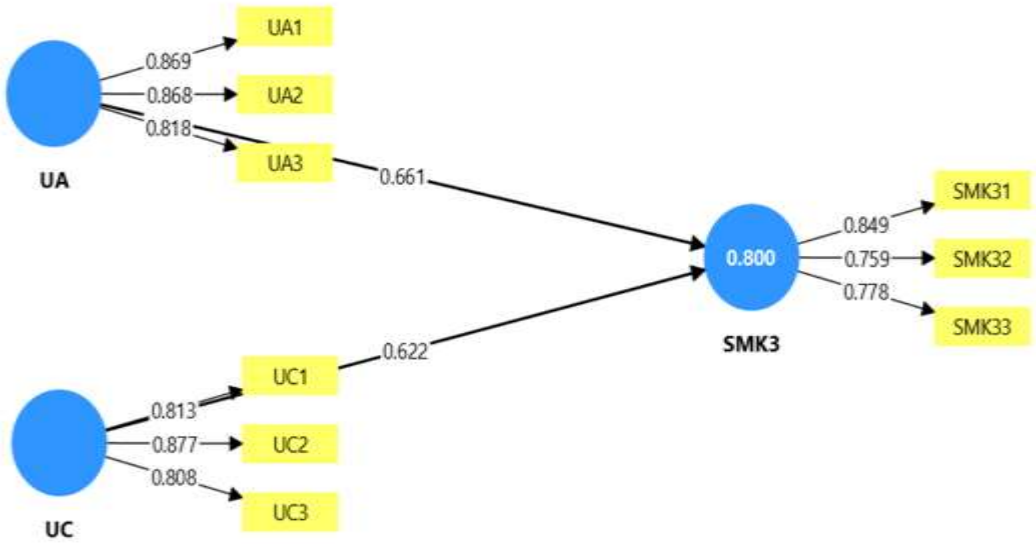
Source: Author's analysis, 2026.

As shown in Tables 1-3, respondents represented multiple work functions involved in construction supervision and maintenance activities at PT X. Most respondents were within the productive working-age groups and held diploma or bachelor's-level qualifications, reflecting the technical and supervisory nature of the project workforce.

Measurement Model Evaluation

The measurement (outer) model was evaluated to assess construct validity and reliability using outer loadings, Average Variance Extracted (AVE), Cronbach's alpha, and composite reliability.

Figure 1. SmartPLS Structural Model Results



Source: SmartPLS analysis, 2026.

Table 4. Outer Loading Values

Construct	Indicator	Outer Loading
Unsafe Action	UA1	0.869
	UA2	0.868
	UA3	0.818
Unsafe Condition	UC1	0.813
	UC2	0.877
	UC3	0.808
OSHMS Implementation	SMK31	0.849
	SMK32	0.759
	SMK33	0.778

Source: SmartPLS analysis, 2026.

Table 5. Average Variance Extracted (AVE)

Construct	AVE
Unsafe Action	0.726
Unsafe Condition	0.694
OSHMS Implementation	0.654

Source: SmartPLS analysis, 2026.

Tables 4 and 5 show that all indicators had outer loading values above 0.70 and all constructs had AVE values above 0.50. In addition, the composite reliability values for all constructs exceeded 0.70. These results indicate that the measurement model met the established criteria for convergent validity and internal consistency reliability.

Structural Model Evaluation and Hypothesis Testing

Table 6. R-squared Value

Dependent Construct	R^2
OSHMS Implementation	0.800

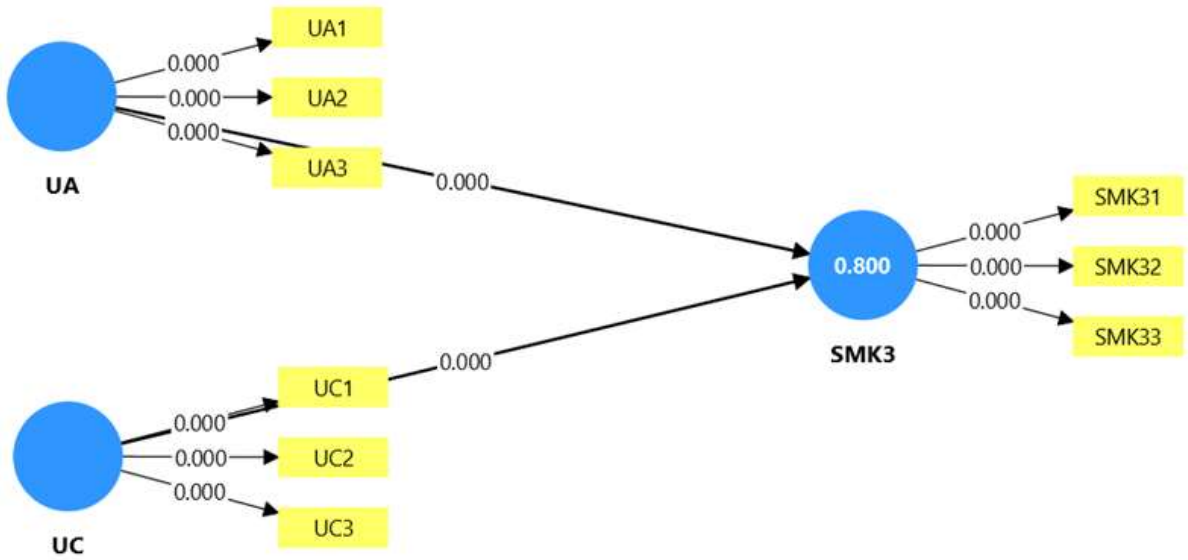
Source: SmartPLS analysis, 2026.

Table 7. Path Coefficients and Hypothesis Testing

Relationship	Path Coefficient	t-statistic	p-value	Decision
Unsafe Action → OSHMS	0.661	13.344	< 0.001	Supported
Unsafe Condition → OSHMS	0.622	11.356	< 0.001	Supported

Source: SmartPLS analysis, 2026.

Figure 2. SmartPLS Bootstrapping Results



Source: SmartPLS analysis, 2026.

Table 6 shows an R^2 value of 0.800 for OSHMS implementation, indicating that unsafe actions and unsafe conditions jointly accounted for 80.0% of the variance in OSHMS implementation in the specified model, while the remaining variance was attributable to factors outside the model.

The hypothesis-testing results in Table 7 showed that unsafe actions were significantly associated with OSHMS implementation (path coefficient = 0.661; t = 13.344; $p < 0.001$). Unsafe conditions were also significantly associated with OSHMS implementation (path coefficient = 0.622; t = 11.356; $p < 0.001$).

DISCUSSION

Association Between Unsafe Actions and OSHMS Implementation

The findings demonstrated a statistically significant association between unsafe actions and OSHMS implementation, with a path coefficient of 0.661, a t-statistic of 13.344, and $p < 0.001$. Therefore, the first hypothesis was supported, indicating a significant relationship between unsafe actions and OSHMS implementation at PT X.

Unsafe actions refer to worker behaviors or acts that deviate from established safety procedures and may contribute to occupational accidents. Tarwaka (2017) describes such actions as including failure to use PPE, disregard of work procedures, work practices that do not conform to standard

operating requirements, and task execution without adequate attention to workplace hazards and risks.

Within PT X, OSHMS implementation includes safety briefings, safety inspections, observation of safe work behavior, and routine supervision of field activities. These mechanisms provide organizational controls through which unsafe behaviors can be identified, addressed, and followed up. Given the cross-sectional design, the present findings should be interpreted as associations rather than evidence of a causal effect.

The finding is consistent with Agustiya et al. (2020), Aprilianti et al. (2022), and Bahri et al. (2022), who reported close relationships between safe work behavior and occupational safety and health management practices. Collectively, these studies suggest that stronger safety-management implementation is associated with lower tendencies toward unsafe work behavior.

Association Between Unsafe Conditions and OSHMS Implementation

Unsafe conditions were also significantly associated with OSHMS implementation, with a path coefficient of 0.622, a t-statistic of 11.356, and $p < 0.001$. Thus, the second hypothesis was supported.

Ramli (2010) defines unsafe conditions as workplace conditions that may contribute to occupational accidents, including conditions related to equipment, work areas, materials, or the broader work environment that do not meet applicable safety requirements. Without adequate controls, such conditions may increase accident risk.

At PT X, unsafe conditions are addressed through safety inspections, field observations, unsafe-condition reporting, monitoring of equipment condition, and work-area controls such as safety signs and barricades. These activities form part of OSHMS implementation and are intended to reduce exposure to hazards within the project environment.

This finding is aligned with Heinrich's domino theory, which conceptualizes accidents as events that may arise from a combination of unsafe acts and unsafe conditions. From this perspective, systematic control of workplace conditions is an important component of an effective OSHMS.

Combined Association of Unsafe Actions and Unsafe Conditions with OSHMS Implementation

Unsafe actions and unsafe conditions jointly explained 80.0% of the variance in OSHMS implementation ($R^2 = 0.800$), indicating substantial explanatory power within the specified model. The findings suggest that both constructs are closely associated with OSHMS implementation in this construction-project setting. Because the study was cross-sectional and used convenience sampling, however, the results should not be interpreted as establishing temporal or causal relationships.

At PT X, OSHMS implementation is operationalized through programs such as toolbox meetings, safety briefings, safety observations, field inspections, reporting of unsafe actions and unsafe conditions, and periodic evaluation of safety findings. These programs are intended to strengthen safety culture and increase worker awareness of occupational safety and health requirements.

Based on the findings, PT X should maintain and further strengthen OSHMS implementation through more robust safety supervision, workforce competency development, and continuous

risk-control practices. Such measures may support reductions in unsafe actions and unsafe conditions and contribute to lower occupational accident risk.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study examined the associations among unsafe actions, unsafe conditions, and OSHMS implementation at PT X within the Construction Supervision Services Project in the PHR Rokan Working Area, Minas-Petko. The principal findings were as follows:

1. Unsafe actions were significantly associated with OSHMS implementation ($t = 13.344$; $p < 0.001$).
2. Unsafe conditions were significantly associated with OSHMS implementation ($t = 11.356$; $p < 0.001$).
3. Unsafe actions and unsafe conditions jointly accounted for 80.0% of the variance in OSHMS implementation ($R^2 = 0.800$).

Overall, the findings underscore the importance of strengthening OSHMS implementation and systematic controls for unsafe actions and unsafe conditions to support a safer and more productive work environment. Owing to the cross-sectional design, these findings represent statistical associations and should not be interpreted as causal relationships.

Recommendations

PT X is encouraged to continue improving the effectiveness of its OSHMS by strengthening safety supervision, developing worker competence, conducting periodic safety inspections, and reinforcing safety culture. The company should also enhance the reporting, tracking, and follow-up of unsafe-action and unsafe-condition findings as part of its accident-prevention strategy.

Future studies should consider probability-based sampling, larger and more diverse samples, and additional variables such as safety culture, safety leadership, safety climate, and worker competence to develop a more comprehensive explanatory model of OSHMS implementation.

REFERENCES

Abdullah, K., Jannah, M., Aiman, U., Hasda, S., Fadila, Z., Taqwin, M., Masita, K. N. A., & Sari, M. E. (2021). *Metodologi penelitian kuantitatif*. CV Widina Bhakti Persada Bandung.

Agustiya, H., Listyandini, R., & Ginanjar, R. (2020). Faktor-faktor yang mempengaruhi tindakan tidak aman (unsafe action) pada pekerja. *Promotor Jurnal Mahasiswa Kesehatan Masyarakat*, *3*(5), 473. http://ejournal.uika-bogor.ac.id/index.php/PROMOTOR

Alfarisie, M. S., & Kurniawan, D. (2024). Faktor-Faktor Yang Berhubungan Dengan Perilaku Tidak Aman (Unsafe Action) Pada Pekerja Workshop PT Maju Selaras Instrumindo. *Jurnal* Techlink, *8*(2), 15-24.

Alfiana, I., Fachrin, S. A., & Ahri, R. A. (2024). Hubungan Pengetahuan, Sikap, Dan Self Efficacy Dengan Kecelakaan Kerja Di PT. Pelindo Petikemas New. *Window of Public Health Journal*, 573-580.

Ali, H., Sastrodiharjo, I., Saputra, F., & Raya, J. (2022). Pengukuran Organizational Citizenship Behavior: Beban Kerja, Budaya Kerja dan Motivasi (Studi Literature Review). Jurnal Ilmu Multidisplin, 1(1), 83–93. https://greenpub.org/JIM/article/view/16

Amilia, S. (2020). *Faktor yang berhubungan dengan tindakan tidak aman (unsafe action) pada pekerja proyek pembangunan gedung Integrated Laboratory for Plant and Natural dan gedung Integrated Laboratory for Health Science (Studi di PT Hutama Karya dan PT* Nindya *Karya)* (Skripsi, Universitas Jember). Universitas Jember Repository.

Andriani, L., & Rizaldi, A. R. (2024). Pengaruh Dukungan Rekan Kerja Dan Motivasi Kerja Terhadap Kinerja Karyawan Pada Yakes Telkom Makassar. *Jurnal Ilmiah Manajemen Emor (Ekonomi Manajemen Orientasi Riset)*, *8*(1), 15-27.

Annisa E. (2019). Faktor Yang Berhubungan Dengan Tindakan Tidak Aman Pada Pekerja Bagian Produksi Di PT. Pupuk Iskandar Muda Aceh Tahun 2019. (Doctoral Diss Inst Kesehat Helv [Internet]. 2019; *Available* from: http://repository.helvetia.ac.id/id/eprint/2229

Aprilianti, A., Sumiaty, & Hasan, C., (2022). Faktor yang Berhubungan dengan Tindakan Tidak Aman (Unsafe Action) pada Tenaga Kerja di PT. Maruki Internasional Indonesia Makassar. *Window of Public Health Journal*, *3*(1), 70–81. https://doi.org/10.33096/woph.v3i1.347

Aprilisa, W. (2023). *Faktor Yang Berhubungan Dengan Tindakan Tidak Aman (Unsafe Action) Pada Pekerja Di Unit Produksi Tonasa Iv= Factors Related To Action Unsafe action For Workers In The Tonasa Iv Production Unit* (Doctoral dissertation, Universitas Hasanuddin).

Ariyanti, D. A. S., Widaninggrum, S., & Salma, S. A. (2024). Perancangan Sistem Reward dan Punishment untuk Meningkatkan Awareness Pekerja Terhadap Kesehatan dan Keselamatan Kerja pada Divisi SRMS di KLU Menggunakan Metode Analytichal Hierarchy Process (AHP). *Innovative: Journal Of Social Science Research*, *4*(5), 7340-7350.

Bahri, S., Damayanti, E., Rahmi, J., Putro, W. G., & Adha, M. Z. (2022). Faktor–Faktor Yang Berhubungan Dengan Unsafe Action Pada Pekerja Proyek Pembangunan Rsud Bogor Utara Oleh PT. Jaya Semanggi Enjinering. *MAP (Midwifery and Public Health) Journal*, *2*(1), 94-103.

Basari, S. K. (2017). *Dasar-dasar keselamatan dan kesehatan kerja* (Cet. 1; hlm. 208). Yogyakarta: K-Media. ISBN 978-602-6892-26-3.

BPJS Ketenagakerjaan (2025). Occupational Accident Cases in 2024. Retrieved from https://satudata.kemnaker.go.id/data/kumpulan-data/2447

Ramli, S. (2010). *Sistem Manajemen Keselamatan dan Kesehatan Kerja OHSAS 18001*. Jakarta: Dian Rakyat.

Tarwaka. (2017). *Keselamatan dan Kesehatan Kerja: Manajemen dan Implementasi K3 di Tempat Kerja*. Surakarta: Harapan Press.