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Evaluation of the Implementation of the Occupational Safety and Health Management System (SMK3)

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Abstract. *Occupational Health and Safety (OHS) is a crucial aspect in ensuring worker safety and productivity, especially in the high-risk oil and gas industry. This study aims to evaluate the implementation of the Occupational Health and Safety Management System (SMK3) at the Fuel Terminal of PT Pertamina Patra Niaga Gunungsitoli Nias, using the ISO 45001:2018 framework and Government Regulation No. 50 of 2012. This research applies a qualitatif design, integrating both qualitative. Qualitative data were obtained through in-depth interviews with 7 key informants, including the terminal manager, supervisors, OHS implementation team, department heads, and field workers. Quantitative data were collected from 30 respondents using a structured questionnaire. The findings indicate that, in general, SMK3 has been implemented; however, several unsafe conditions and actions were still observed, such as non-compliance with the use of personal protective equipment (PPE) and limited supervision of safety procedures. Factors such as safety culture, employee participation, and managerial leadership were found to have a significant impact on the effectiveness of SMK3 implementation. The study concludes that although the Gunungsitoli Fuel Terminal shows commitment to SMK3 implementation, reinforcement of the evaluation system and follow-up actions is needed to achieve sustainable zero-accident outcomes.*

Keywords: *Occupational Health and Safety, SMK3, Fuel Terminal, ISO 45001, Mixed Method*

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INTRODUCTION

Occupational safety and health (OHS) is a fundamental aspect of industrial operations, particularly in the energy and oil and gas sectors, which are known to have high hazard potential (Benson et al., 2021; Schneider et al., 2013). This industry involves risky processes such as the storage, transportation, and distribution of highly flammable fuels (BBM), which pose a hazard to both the environment and human safety. Therefore, the implementation of a structured and systematic safety management system is crucial to minimize the potential for workplace accidents and negative environmental impacts. Occupational safety and health generally aims to protect the safety and health of workers and achieve optimal work productivity (Rifqi et al., 2023).

According to Hadi et al. (2025) In Indonesia, awareness of the importance of occupational safety and health is growing, in line with the demands of regulations and international standards. The government, through Government Regulation Number 50 of 2012 concerning the Implementation of the Occupational Safety and Health Management System (SMK3), requires every company with more than 100 workers or with high-risk employees to implement a

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structured SMK3. The primary objective of SMK3 is to create a safe, efficient, and healthy work system through the involvement of all organizational elements, from top management to field workers (Heronasia & Zuraida, 2025; Harum, 2025; Sutanto et al., 2025).

A fuel terminal is an industrial facility that functions for the storage and distribution of Pertamina fuel. Pertamina's products are then shipped to gas stations and industries in the region (Nie, L., & Sugiyanto, 2025; Aditya et al., 2025). This fuel terminal has storage tanks located above and below ground to channel oil to tankers. Work activities at the Pertamina Fuel Terminal, PT Patra Niaga Gunugsitoli, generally include receiving fuel from outside Nias Island, sent via sea transportation, namely ships. The fuel is then distributed from the ship's dock to the storage tanks through special pipes without worker contact (Adlington, 1933). Hutama et al. (2024) and Junaidi et al. (2025) said that, the fuel is then stored in its respective storage areas or tanks. Some products stored in the Pertamina Fuel Terminal tanks include Pertalite, Pertamax, and Bio Solar.

Pertamina's Fuel Terminal also conducts laboratory tests to ensure the quality of fuel products before shipping them to several gas stations on Nias Island and to major companies such as PLN (Pamularso, 2019; Yuliana, 2024). Fuel delivery is carried out using a dedicated land fleet or tanker trucks provided by Pertamina. This work is highly sensitive, especially when exposed to flames, fuel inhalation, which can cause respiratory problems, radiation emissions, engine noise, and the use of sophisticated equipment and machinery that requires specialized methods and expertise, as well as supervision.

The Gunungsitoli Fuel Terminal in Nias has a consistent occupational health and safety system aimed at preventing occupational diseases and accidents, maintaining a safe work environment, providing emergency procedures, providing medical care, and providing personal protective equipment (Hick et al., 2003). Furthermore, an Occupational Health and Safety Committee (K3) has been established to ensure the effective implementation of the SMK3 (Occupational Health and Safety Management System). However, several other factors must be considered to enhance the quality of the SMK3 within the Gunungsitoli Fuel Terminal in Nias.

To achieve K3, an industry or company must have an SMK3 (Occupational Health and Safety Management System). SMK3 stands for Occupational Safety and Health Management System. SMK3 is part of a company's management system that aims to control occupational safety and health (OHS) risks for workers (Alfina & Wahyuningsih, 2025; Yunus et al., 2025). SMK3 encompasses organizational structure, planning, responsibilities, implementation, procedures, processes, and required resources. The implementation of SMK3 aims to prevent and reduce occupational accidents and illnesses, create a safe, efficient, and productive workplace, and increase effectiveness and maintain the company's production activities (Pangkey et al. 2012).

In general, the implementation of the Occupational Safety and Health Management System (OHSMS) is often overlooked and receives little attention, as evidenced by the continued occurrence of workplace accidents (da et al., 2019; Robson et al., 2007; Arocena & Núñez, 2010). Each industrial work activity has different characteristics and characteristics influenced by weather, limited working hours, workers who lack high competence, and the use of work tools that endanger occupational safety and health. The implementation of the Occupational Safety and Health Management System (OHSMS) can serve as a reference that regulates various activities within it and manages OHS systematically and comprehensively within a complete management system, thus minimizing the risk of workplace accidents, from the highest to the lowest levels of impact. Implementing K3 according to procedures will foster trust and confidence in the safety and security guarantees of construction service users.

So it is very important to conduct a comprehensive evaluation of the implementation of the Occupational Safety and Health Management System (SMK3), therefore the researcher is interested in conducting research with the title "Evaluation of the Implementation of the Occupational Safety and Health Management System (SMK3) at the Fuel Terminal of PT Pertamina Patra Niaga Gunungsitoli Nias North Sumatra.

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METHODS

Research Design

This research utilized a convergent mixed-method design, integrating qualitative and quantitative data to generate a comprehensive evaluation of SMK3 implementation at the Fuel Terminal of PT Pertamina Patra Niaga Gunungsitoli, Nias. The mixed-method approach was chosen because Occupational Health and Safety performance cannot be adequately understood through numerical indicators alone; it also requires in-depth exploration of behavioral, managerial, cultural, and contextual factors that influence safety outcomes in daily operational settings. The qualitative component aimed to uncover real experiences, perceptions, decision-making practices, and cultural responses toward SMK3 among actors at different levels of the organizational hierarchy. Meanwhile, the quantitative component aimed to measure the level and consistency of implementation using structured indicators aligned with national regulatory frameworks. Both data streams were collected in the same period and later integrated during interpretation to provide a more nuanced understanding, enabling validation of quantitative findings with field-based narratives and real-world practices.

Population and Sampling

The study population included all personnel involved directly or indirectly in fuel terminal operations, ranging from high-level management to field workers. Considering the dual approach of data collection, two sampling strategies were employed: Purposive Sampling (Qualitative): Used to select informants who held strategic roles, decision authority, or practical involvement in SMK3. This ensured that data came from individuals who possessed experiential knowledge and responsibility in safety management. Incidental Sampling (Quantitative) Applied for questionnaire respondents consisting of employees available during data collection and willing to provide information honestly and voluntarily. This approach was considered appropriate for evaluating general perception trends within the terminal rather than achieving statistical generalization. The sampling logic ensured both representation of structural stakeholders (policy-level actors) and operational actors (workforce exposed to daily hazards).

Participants

A total of seven key informants participated in the qualitative interviews. They comprised:

Role	Representation	Purpose in Study
Terminal Manager	Top Management	Policy authority, resource allocation, evaluation perspective
Supervisor	Mid-level control	Monitoring compliance, operational oversight
OHS Implementation Team Member	Safety Specialist	SMK3 technical execution, documentation, awareness enforcement
Department Head	Operational Decision Maker	Translating policy to practice, workforce supervision
Two Field Workers	Operational workforce	Real implementation experience, behavioral practices, challenges

This distribution enabled a multi-layered perspective, capturing differences between managerial commitment and field-level execution.

For quantitative data, 30 employees were involved as questionnaire respondents. They represented various units, working durations, and levels of OHS exposure. Inclusion criteria included being an active worker, understanding work procedures, and willingness to respond honestly. Exclusion applied to administrative staff not engaged in operational processes to avoid bias.

Data Collection Techniques

Data were collected over June–August 2025, allowing observation of the routine safety cycle. Three complementary data collection techniques were used:

Semi-structured interviews were conducted face-to-face in a private environment to ensure openness and comfort. Using semi-structured format allowed flexibility for probing emerging insights while maintaining thematic coverage. Interviews explored implementation mechanisms, policy dissemination, hazard identification, training, supervision, evaluation, and management review practices. Each interview lasted 40–70 minutes, recorded with consent, and accompanied by field notes documenting expressions, environment, and contextual cues.

A structured questionnaire consisting of closed-type items was distributed to 30 respondents. The instrument evaluated SMK3 implementation across five domains; (1) planning, 2) implementation, 3) monitoring, 4) evaluation, and 5) management review. Responses used a three-point scale (Good – Moderate – Poor) to reflect perceived implementation quality. Questionnaires were completed during work breaks with supervision to ensure clarity while maintaining privacy in answers.

Policy manuals, HIRA/IBPR reports, SOP archives, training attendance records, audit documents, and incident logs were examined to verify reported practices. Field observation was conducted unobtrusively to assess real behavioral patterns such as PPE adherence, signage visibility, emergency access readiness, and safety climate indicators. This triangulation safeguarded against self-reported bias.

Instruments

Interview questions were constructed referencing ISO 45001:2018 and PP No. 50/2012 to ensure alignment with recognized SMK3 standards. The guide comprised thematic blocks covering; (1) formulation and communication of policy; (2) risk assessment and hazard identification practice; (3) training implementation and competency building; (4) PPE compliance and enforcement mechanism; (5) emergency protocol preparedness; (6) performance monitoring and audit response; (7) management review and continuous improvement

The questionnaire used structured statements representing SMK3 indicators. Items were validated conceptually by two safety experts and piloted among non-study workers. Minor refinements were made for readability and contextual interpretation to prevent misperception or technical language complexity. The use of a simple scale was intentional to reflect workforce comprehension level and prevent response fatigue.

Data Processing

Interview recordings were transcribed verbatim and cleaned to remove fillers without altering meaning. Field notes were integrated into transcripts as contextual annotations. Document review findings and observation sheets were compiled systematically. Questionnaire responses were entered into a master matrix and categorized based on scoring outcomes.

Data integrity was maintained through double-checking of transcription accuracy, independent coding verification by two researchers, and cross-referencing between interviews, field notes, and documentary evidence to avoid interpretive bias.

Data Analysis

Transcripts were analyzed using thematic analysis. Coding began with open coding to extract meaningful statements, followed by axial coding to merge similar codes into conceptual groups. Selective coding generated central themes describing SMK3 implementation reality. Themes were examined against regulatory requirements to identify strength areas and weak compliance points. Divergence between managerial claims and worker experiences was critically analyzed to identify systemic constraints. Quantitative data were processed using descriptive

statistics, generating frequency distribution and percentage to determine the dominant implementation category. Results represented workforce perception rather than causal inference due to the descriptive nature of the tool. Convergence occurred during the interpretation phase. Quantitative trends (majority reporting moderate implementation) were compared with qualitative evidence indicating limited worker involvement, lack of detailed IBPR coverage, inconsistent training depth, and supervision constraints. Integration strengthened analytic credibility, producing a holistic understanding of implementation conditions and enabling evidence-based recommendations.

Ethical Considerations

The study received permission from terminal management prior to data collection. Participants were informed about study objectives and procedures, and both verbal and written consent were obtained. The identity of informants was anonymized using codes to maintain confidentiality. Participation was voluntary without coercion, and respondents were free to withdraw at any time. All recordings, documents, and datasets were securely stored and used strictly for research purposes.

RESULT AND DISCUSSION

Pertamina's Fuel Terminal serves as the primary storage and distribution point for diesel, Pertalite, Pertamax, and other fuel products to various gas stations and industrial consumers in the Nias region. Its operations are managed according to strict occupational safety and health (K3) standards, given the high risk of fire and workplace accidents inherent in the oil and gas industry. In terms of infrastructure, the Fuel Terminal is equipped with storage tanks, a fire extinguishing system, a fuel quality laboratory, an operational office, and dock access for loading and unloading fuel from tankers. The terminal's human resources consist of various functions, including field operators, maintenance staff, a safety and environmental (HSE) team, and administrative and management personnel.

Table 1. Informant Characteristics

Name	Age	Gender	Years of Service	Position
Mr. F	48 Years	Male	6 Years	Terminal Manager
Mr. K	46 Years	Male	10 Years	Supervisor
Mrs. S	38 Years	Female	7 Years	K3 Implementation Team
Mr. R	40 Years	Male	4 Years	Head of Department
Mr. KR	39 Years	Male	5 Years	Employee
Mr. D	29 Years	Male	3 Years	Employee

Table 2. Interview Results with Terminal Manager

No	Question	Informant's Answer
1	Does the Gunungsitoli Fuel Terminal have an official document related to OHS (K3) policy? Who prepared it?	Yes, we have an official OHS policy document issued by Pertamina Patra Niaga central management. The document is then adjusted to local terminal conditions and prepared by the internal OHS team together with the Terminal Manager, under the supervision of the regional HSSE (Health, Safety, Security, and Environment) division.
2	How are the OHS goals and objectives formulated at this terminal?	OHS goals and objectives are formulated based on risk evaluation, central policies, and input from audits and inspections. This process is carried out annually and involves management and OHS representatives. However, active participation from workers still needs improvement.
3	Has a comprehensive Hazard Identification and Risk Assessment	Yes, HIRA is conducted regularly. The last comprehensive HIRA was carried out around early 2024. However, not all

	(HIRA/IBPR) ever been carried out? If yes, when was the last time?	parts of the terminal are documented in detail, especially in rarely used areas.
4	How are workers or the OHS team involved in the OHS Management System (SMK3) planning process?	The OHS team is involved in preparing the annual work plan and weekly OHS discussions. Workers are usually involved through small forums or during toolbox meetings, but so far, their involvement is more in the implementation stage, not in the initial planning.
5	Are there laws and regulations used as references in OHS planning at this terminal?	Certainly, we refer to Minister of Manpower Regulation No. 5 of 2018 on OHS Management System (SMK3), as well as Pertamina's internal standards and several regulations from SKK Migas. However, implementation is not yet uniform across all work procedures.
6	How is the OHS policy and program socialized to all employees?	Socialization is carried out through notice boards, daily safety briefings, and internal WhatsApp groups. However, the delivery method is still one-way and not interactive.
7	What OHS training is routinely provided to employees and contractors?	Basic OHS training, PPE usage, fire extinguishing, and first aid training are routinely conducted. Contractors also receive a safety induction before starting work. However, advanced training is still rarely conducted.
8	How is risk control implemented in the field (e.g., PPE usage, engineering controls)?	PPE usage is mandatory and monitored, but sometimes workers lack discipline. Technical controls are in place, such as gas sensors, but there are still areas with weak supervision.
9	Are there emergency procedures available? Has a drill ever been conducted?	Yes, written procedures and evacuation routes are available. Drills are conducted at least once a year, but execution still needs improvement in terms of coordination and scenario realism.
10	How is compliance with safe work procedures and PPE usage supervised?	Supervision is carried out by supervisors and the OHS team. However, the number of supervisors is limited, so not all activities can be fully monitored.
11	What indicators are used to measure OHS performance at this terminal?	Indicators include the number of workplace accidents, OHS audit results, PPE compliance rate, and the number of findings from routine inspections.
12	Is an internal OHS audit conducted regularly? If yes, who conducts it?	Yes, internal audits are conducted every 6 months by the regional HSSE team. We also receive audits from central management. However, follow-up on audit findings is sometimes slow.
13	How are safety inspection results used to improve the work system?	Inspection results are recorded and discussed in weekly evaluation meetings. Some findings are followed up immediately, but others are delayed due to budget or manpower constraints.
14	Is a survey or measurement of workers' perceptions regarding OHS conducted?	Not routinely. It was conducted once last year in the form of a job satisfaction questionnaire, but the results have not been fully utilized in policymaking.
15	How is workplace accident recording and reporting carried out and stored?	Recording is done digitally in Pertamina's HSSE system. Every incident is reported to central management and recorded in monthly reports. However, sometimes there are delays in inputting data from the field.

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16	How is the evaluation process of SMK3 implementation carried out? Is it done regularly?	Evaluations are conducted every 3 months in the form of SMK3 evaluation meetings. However, the documentation of evaluation results is not yet well organized.
17	Who is involved in the OHS evaluation process?	Terminal management, the OHS team, and representatives from regional HSSE. Worker involvement is still limited to indirect reporting.
18	Is accident or incident trend analysis included in this evaluation?	Yes, we analyze accident data trends. Unfortunately, not all data is optimally utilized in developing prevention strategies.
19	How are evaluation results used to improve the OHS program at the terminal?	Most are used to improve procedures and re-procure PPE. However, long-term recommendations are often delayed due to other operational priorities.
20	How is management's commitment to improving OHS at the Gunungsitoli Fuel Terminal?	Management shows commitment through training provision and basic budget allocation, but it needs improvement in direct supervision and field involvement.
21	Does top management conduct a review of SMK3? If yes, how often is it done?	Yes, it is conducted at least once a year through an annual evaluation meeting with central management.
22	What aspects are reviewed in management meetings related to OHS?	Aspects reviewed include OHS goal achievements, audit results, training completion, and workplace accidents.
23	Are there examples of policy or procedure changes resulting from management review?	Yes, last year there was a change in SOP regarding fuel spill handling, based on the emergency response drill evaluation which showed inefficient coordination.
24	What are the main challenges in implementing and improving SMK3 at this terminal?	The main challenges are limited human resources, low awareness among some workers, and the perception that OHS is only the responsibility of the OHS team, not a shared responsibility.
25	In your opinion, how effective is the implementation of SMK3 at the Gunungsitoli Fuel Terminal?	In my opinion, the implementation is at a moderate level. Many aspects are already functioning, but there is still a gap between policy and field practice.
26	Do you have suggestions or recommendations for improving OHS in the future?	More practical and regular training is needed, increased involvement of all parties in OHS programs, and strengthening of reporting systems and faster, more structured follow-up actions.

Table 3. Interview Results with Supervisor

No	Question	Informant's Answer
1	Does the Gunungsitoli Fuel Terminal have an official document related to OHS (K3) policy? Who prepared it?	Yes, we have an official OHS policy document prepared by the regional HSSE team and further adjusted at the terminal level together with the local OHS team.
2	How are the OHS goals and objectives formulated at this terminal?	Usually carried out at the beginning of each year by reviewing accident data, audits, and HIRA results. The process is led by management and HSSE, but the local OHS team also provides input.

3	Has a comprehensive Hazard Identification and Risk Assessment (HIRA/IBPR) ever been carried out? If yes, when was the last time?	We as the local OHS team are heavily involved, but workers' involvement is still limited to daily risk reporting, not in policy-making.
4	How are workers or the OHS team involved in the OHS Management System (SMK3) planning process?	Yes, Minister of Manpower Regulation No. 5 of 2018 is the main reference. Also SKK Migas regulations and Pertamina's HSSE standards.
5	Are there laws and regulations used as references in OHS planning at this terminal?	Through morning safety talks, banners, internal emails, and sometimes joint drills. However, effectiveness depends on employees' attendance and enthusiasm.
6	How is the OHS policy and program socialized to all employees?	Routine training includes first aid, fire extinguishing, and PPE usage. Contractors are required to join a safety induction.
7	What OHS training is routinely provided to employees and contractors?	It is already in place, PPE use is mandatory. Supervision is carried out by field supervisors, but sometimes monitoring is not comprehensive due to limited personnel.
8	How is risk control implemented in the field (e.g., PPE usage, engineering controls)?	There are written procedures and we have conducted drills, the latest was about 6 months ago. However, drills still need improvement in terms of coordination.
9	Are there emergency procedures available? Has a drill ever been conducted?	We conduct daily supervision. However, not all violations are formally recorded, sometimes they are only given verbal reminders.
10	How is compliance with safe work procedures and PPE usage supervised?	Number of work incidents, accuracy of reporting, audit results, and PPE usage are the indicators we use.
11	What indicators are used to measure OHS performance at this terminal?	Yes, audits are conducted by the regional HSSE team every 6 months. We at the local team are responsible for preparing documents and following up on findings.
12	Is an internal OHS audit conducted regularly? If yes, who conducts it?	Weekly inspection results are discussed during toolbox meetings. Some are immediately followed up, but some are delayed.
13	How are safety inspection results used to improve the work system?	Not routinely. It was once conducted by the central team, but has not become an annual practice.
14	Is a survey or measurement of workers' perceptions regarding OHS conducted?	We record it in the internal HSSE system. Initial reports from the field are usually manual or via WhatsApp, then officially entered.
15	How is workplace accident recording and reporting carried out and stored?	Quarterly evaluations are conducted, we take part in preparing reports. However, not all findings are followed up immediately.
16	How is the evaluation process of SMK3 implementation carried out? Is it done regularly?	Terminal management, the OHS team, and regional HSSE. Employees are only indirectly involved through data or reports.
17	Who is involved in the OHS evaluation process?	Yes, but the analysis is still simple. It has not reached long-term statistical trend analysis.
18	Is accident or incident trend analysis included in this evaluation?	Some results are used to revise SOPs or procure equipment, but realization depends on priorities and budget.

19	How are evaluation results used to improve the OHS program at the terminal?	Management supports in terms of budget and training, but direct supervision is still lacking in intensity.
20	How is management's commitment to improving OHS at the Gunungsitoli Fuel Terminal?	Conducted once a year. We submit quarterly reports as review material.
21	Does top management conduct a review of SMK3? If yes, how often is it done?	Conducted once a year. We submit quarterly reports as review material.
22	What aspects are reviewed in management meetings related to OHS?	Accident data, audits, training results, and HIRA achievements are usually discussed.
23	Are there examples of policy or procedure changes resulting from management review?	A revision of the hot work SOP was once carried out after an evaluation of a minor incident last year.
24	What are the main challenges in implementing and improving SMK3 at this terminal?	Limited supervisory personnel, some workers still neglect PPE, and budgets are sometimes diverted to other matters.
25	In your opinion, how effective is the implementation of SMK3 at the Gunungsitoli Fuel Terminal?	Honestly, it is still at a moderate level. Procedures exist, but not all are fully implemented.
26	Do you have suggestions or recommendations for improving OHS in the future?	Increase case-based training, strengthen reward–punishment systems, and encourage all levels to feel responsible for OHS.

Table 4. Interview Results with the K3 Implementation Team

No	Question	Informant's Answer
1	Are you involved in the planning of OHS (K3) policies and programs at the departmental level?	Honestly, Sir/Madam, we are not directly involved at the early stage when the OHS policy is drafted. Usually, the meetings are attended by superiors and people from HSSE. We are only informed later through briefings.
2	How do you align the department's work program with the company's OHS policies?	Usually, we just follow the rules and SOPs provided. If there are new activities or changes in work, we make sure they comply with the applicable OHS SOPs. But sometimes, the implementation also depends on the situation in the field.
3	How is hazard identification and risk assessment carried out in your department?	HIRA (IBPR) was once carried out together at the beginning of the year. At that time, we were asked to provide input, especially those of us who work directly in high-risk areas. But after that, there were rarely follow-up discussions about the results.
4	How do you ensure that all your team members understand and follow OHS procedures?	Usually through morning safety talks, and we also remind each other in the field. But frankly, not everyone complies immediately. Sometimes we have to scold our own colleagues if they refuse to wear PPE.
5	What form of supervision do you carry out on daily OHS implementation?	We supervise each other. If someone violates an SOP, we immediately remind them. But if they keep being stubborn after repeated reminders, then we report it to the supervisor.
6	How do you deal with violations of OHS rules by team members?	Usually, we give a polite warning first. But if the violation is repeated, especially if it's dangerous, then we have no choice but to report it. Because it is also our responsibility.

7	Do you receive regular OHS performance reports from the implementing team?	Not directly. Sometimes we are informed about audit results or the number of incidents if any. Usually delivered during the weekly briefing.
8	Do you have specific indicators to assess OHS performance in your department?	We don't have official indicators. But we consider safe work without incidents, compliance with PPE, and no reprimands as our own measure.
9	How do you use OHS data to improve operations in your department?	If there is data on accidents or near misses, we use it as a lesson. For example, if an incident occurred due to broken equipment, we ask for more frequent inspections or SOP changes.
10	Do you conduct internal evaluations of OHS-related incidents?	If an incident occurs, we usually discuss it within the team. It is also conveyed during safety talks so it won't happen again. But the evaluation is still simple, not yet supported by complete data.
11	What follow-up actions do you take regarding OHS audit or inspection findings in your department?	If there are findings, they are usually followed up immediately, such as cleaning the work area, replacing PPE, or repairing equipment. Sometimes we are also asked to help prepare evidence that corrections have been made.
12	Has there ever been a significant change in your department as a result of OHS evaluations?	Yes, for example, the hot work SOP was changed because of a minor incident last year. Since then, permits have become stricter and supervision more frequent.
13	How often are you involved in OHS management review meetings?	We have never directly joined management meetings. Usually, the results are delivered through superiors or supervisors. We only receive the information, without direct discussion.
14	What examples of OHS improvements or innovations have you proposed?	I once suggested adding convex mirrors at the warehouse corner because there were often near-collisions. Thankfully, within a few weeks, they were installed.
15	What is your opinion on the company's commitment to improving OHS?	The company seems to care, but sometimes the response is slow. For example, when we request new PPE, it takes a long time to arrive. But in terms of training and socialization, they are still carried out regularly.
16	What are your expectations for the implementation of SMK3 in the future?	I hope all workers will be more aware of the importance of OHS, not just because they are afraid of being reprimanded. I also hope that supervision and supporting facilities can be more complete.
17	What are the biggest challenges in integrating SMK3 with terminal operations?	The hardest part is sometimes work is rushed to meet targets, so OHS SOPs are violated to finish faster. There are also still some people who underestimate OHS rules, even though the risks are serious.

Table 5. Interview Results with Department Heads

No	Question	Informant's Answer
1	Are you involved in the planning of OHS (K3) policies and programs at the departmental level?	Yes, usually I attend coordination meetings with the HSSE team and management when planning the annual OHS program. But for bigger or strategic policies, they usually come from headquarters first, then we adjust them in the field.

2	How do you align the department's work program with the company's OHS policies?	We try to ensure all activities in the field follow the applicable SOPs and OHS policies. Sometimes we have to adjust to operational conditions, but as much as possible we don't go beyond the established OHS rules.
3	How is hazard identification and risk assessment carried out in your department?	HIRA is usually done together with the OHS team, at least once a year or when there's new work. I also ask field staff to provide input since they know the actual working conditions.
4	How do you ensure all team members understand and follow OHS procedures?	We always start work with a briefing. I also ask supervisors and the OHS team to help monitor and educate employees. If there are new SOPs or changes, we make sure to inform the team.
5	What form of supervision do you carry out on daily OHS implementation?	I also go directly to the field if there's a high-risk activity. In addition, we have a regular inspection schedule. Sometimes I also do random checks so that employees stay disciplined.
6	How do you respond to violations of OHS rules by team members?	If the violation is minor, we just give a warning first. But if it's repeated or dangerous, then I issue a formal warning. Sometimes I also ask the OHS team to retrain the person.
7	Do you receive regular OHS performance reports from the implementing team?	Yes, I get monthly reports from the supervisor and the OHS team. Usually, the content includes near misses, incidents, and training attendance rates.
8	Do you have specific indicators to assess OHS performance in your department?	We use indicators such as zero accidents, compliance with PPE usage, and internal audit results. If there is a declining trend, that becomes our concern.
9	How do you use OHS data to improve operations in the department?	We use the data for evaluation. For example, if there is an incident in a certain area, we review the SOP or add supervision there.
10	Do you conduct internal evaluations of incidents related to OHS?	Yes, every time there is an incident or near miss report, we conduct a quick evaluation so it doesn't happen again. I usually ask the team to make a written report as well.
11	What follow-up do you take on OHS audit or inspection findings in the department?	If there are findings, I immediately ask the team to fix them. Sometimes we also gather the work team to discuss together. If needed, we revise the SOP.
12	Has there ever been a significant change in your department as a result of OHS evaluation?	Yes. In the past, we changed the layout of the work area because the emergency access was deemed insufficient. After that, we immediately changed the route and installed additional signs.
13	How often are you involved in OHS management review meetings?	Usually once a year we attend management review meetings, especially during the annual program review. But if there's a major incident, we can be called at any time.
14	What example of OHS improvement or innovation have you proposed?	I once suggested installing automatic temperature sensors in tanks, because previously it was done manually and prone to negligence. Now it has been installed and is safer.
15	What is your opinion about the company's commitment to improving OHS?	The company's commitment is quite good, but sometimes the obstacle lies in the budget or slow procurement of equipment. But in terms of policies and support, it's already fine.

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16	What are your hopes for the implementation of the OHS management system (SMK3) in the future?	I hope all employees become more aware that OHS is not just a formality. Also, training and simulations should be conducted more frequently and realistically.
17	What is the biggest challenge in integrating the OHS management system (SMK3) with terminal operations?	The biggest challenge is aligning the understanding between OHS and operational targets. Sometimes work is time-pressured, so OHS aspects are neglected. Yet both are equally important.

Table 6. Interview Results with 2 Field Workers

No	Question	Informant's Answer
1	Do you know about the occupational safety policies or regulations at this terminal?	Informant 1: Yes, I know there are safety rules. Usually conveyed during briefings or posted on the notice board. Informant 2: I know, although I don't memorize all the contents. But the important ones like wearing PPE, we do follow.
2	Have you ever been involved in hazard or work risk identification activities?	Informant 1: Once, when there was an area inspection, we were asked for input. But not regularly. Informant 2: I haven't been directly involved, mostly just giving info to the supervisor if I see something dangerous.
3	How are you informed or given understanding about occupational safety programs?	Informant 1: Through morning briefings and sometimes training from the OHS team. Informant 2: Usually through supervisor instructions, also banners and videos during training.
4	Do you understand the purpose of the OHS programs or training held at the terminal?	Informant 1: Yes, so we can work safely, without accidents. We learn what's dangerous. Informant 2: The purpose is so all workers can go home safely. Training is important, but sometimes the schedule is tight.
5	To what extent do you feel involved in planning or formulating safety actions?	Informant 1: I don't think we're very involved, just told to follow. Informant 2: Not directly involved, but sometimes if we report hazards, they respond.
6	What safety procedures do you carry out before starting work each day?	Informant 1: Safety talk first, check tools, make sure the area is safe. Informant 2: We usually check the surroundings, inspect PPE, and join the supervisor's briefing.
7	Do you always use complete personal protective equipment (PPE) while working?	Informant 1: Yes, I wear it completely. The boss always reminds us. Informant 2: Often, but sometimes when it's too hot, I take it off for a bit. But usually I get warned.
8	How easy is it to understand and follow safe work instructions (SOP) in your job?	Informant 1: Generally easy, but sometimes the language is too technical. But we can ask the boss if unclear. Informant 2: Once we're used to it, it's fine. But for new SOPs, it needs explanation.
9	Have you attended any training or briefing related to safety? What was the material?	Informant 1: Yes, about using fire extinguishers, first aid, and hot work hazards. Informant 2: I joined fire safety and first aid training. There was also an evacuation drill.
10	What action do you take if you find hazardous or unsafe working conditions?	Informant 1: Report directly to supervisor. Sometimes I also tell coworkers. Informant 2: I stop working first, then look for someone who can check. I don't continue if it's not safe.

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11	Have you ever seen or been aware of safety inspections in your work area?	Informant 1: Yes. Usually the OHS team walks around with a checklist. Informant 2: Yes, often. Sometimes they come unannounced, so we must always be ready.
12	How do you report if there is an incident or unsafe condition in your work area?	Informant 1: If there's an incident, report verbally to the boss first, then it's written down. Informant 2: We usually report to the supervisor first, then it's forwarded to the OHS team.
13	To what extent do you know about recording or reporting hazard incidents at this terminal?	Informant 1: Never officially. But I was once asked for feedback after training. Informant 2: I've never been invited to a discussion, but sometimes I give input directly to the supervisor.
14	Is there a reward or sanction system related to compliance with occupational safety?	Informant 1: I think there's some recording, but I don't know the details. Informant 2: I've seen an incident form. But usually the boss handles it.
15	Have you ever received information about safety evaluation results?	Informant 1: Yes. My colleague once got a reward for consistently wearing PPE. Informant 2: Yes, diligent workers usually get praise or small rewards. But violators may get warnings.
16	Have you ever received information about safety evaluation results?	Informant 1: Yes, during briefings, but not in detail. Informant 2: Yes, usually delivered in general terms, like audit or inspection results.
17	After an incident/near miss, have you seen improvements or follow-ups?	Informant 1: Yes. Once after a near slip, a warning sign was installed, and the floor dried. Informant 2: Yes, once equipment leaked, the next day it was replaced.
18	Are employee opinions or complaints considered in OHS system evaluation?	Informant 1: Sometimes, if we deliver it properly. But not all are followed up immediately. Informant 2: Depends on who we tell. If it's a concerned boss, usually it's noted.
19	How often are there evaluations or checks of working conditions in your area?	Informant 1: About once a month routinely. But sometimes also after an incident. Informant 2: I think quite often, since supervisors also frequently monitor.
20	In your opinion, is the current OHS system sufficient to protect workers from accidents?	Informant 1: Sufficient, as long as we comply. But some still disobey. Informant 2: Pretty good already. But needs improvement in supervision and facilities.
21	Have you ever heard of any procedure or policy changes after OHS meetings?	Informant 1: Yes. Usually conveyed during briefings if there's an updated SOP. Informant 2: Yes, once there was a change in tank filling procedure, and we were informed.
22	How is communication from management to workers regarding OHS system improvements?	Informant 1: Through supervisors or the OHS team. But sometimes info arrives late. Informant 2: Communication works, but sometimes too brief so we don't fully understand.
23	To what extent do you see management's commitment to improving occupational safety?	Informant 1: The commitment exists, but realization is sometimes slow. Informant 2: I think they are quite serious, but not all worker suggestions are responded to quickly.
24	What are your hopes for the occupational safety system in the future?	Informant 1: Hopefully it will be stricter and have rewards for compliance. Informant 2: I want more frequent training and better facilities.

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25	If you were given the opportunity to give suggestions to management, what one thing would you change or improve in the OHS system?	Informant 1: I'd like work procedures to be written more clearly and easy to understand. Informant 2: I'd like supervisors to visit the field more often, so everyone complies.

Table 7. Analysis of Informant Answers Regarding the Implementation of SMK3

Informant	Conclusion
Pertamina Manager	In its implementation, the Occupational Health and Safety Management System (SMK3) has been carried out with several achievements, such as mandatory use of PPE, routine training, and the availability of emergency response procedures. Dissemination of OHS policies and programs is conducted through briefings and internal media, but it is still one-way in nature. Basic training such as fire extinguishing, first aid, and PPE use has been conducted, but advanced training and capacity-building are not yet consistent. Risk control and supervision of compliance with safe work procedures have been implemented, but are limited by the number of supervisory personnel. Emergency response simulations are conducted annually, but improvements are still needed, particularly in coordination and response speed.
Supervisor	Dissemination of OHS policies and programs is carried out through daily safety talks, communication media such as banners and emails, as well as emergency response simulations. However, their effectiveness varies depending on workers' discipline and enthusiasm. OHS training is routinely provided to employees and contractors, covering first aid, PPE, and fire extinguishing. Contractors are required to attend safety induction. Risk control, such as PPE use and technical engineering, has been implemented, but supervision is not optimal due to limited personnel. Emergency response procedures are available and simulations are conducted, but coordination and readiness still need improvement. Supervision of PPE use and compliance with procedures is often conducted informally or verbally.
OHS Implementation Team	OHS implementation in the field is ongoing, but still relies on individual awareness and informal peer-to-peer supervision. Regular dissemination is done through daily safety talks, and most workers understand the importance of PPE and safe work SOPs. Nevertheless, violations still occur, especially during peak workloads. Enforcement of discipline regarding OHS violations is gradual, starting with verbal warnings and escalating to reporting to supervisors.
Head of Department	The implementation of OHS procedures is maintained through routine briefings, field supervision, and the involvement of supervisors and the OHS team. The head of department actively ensures that information on new SOPs and policies is always communicated to the team. Supervision is conducted through routine inspections and direct field checks. Enforcement of OHS violations is carried out gradually, from coaching to formal warnings. This shows leadership awareness of the importance of consistency in implementing OHS in the workplace.
Worker 1	Safety procedures are implemented properly, including safety talks, use of PPE, and equipment checks. The informant also participates in safety training and knows how to handle hazardous situations, although compliance among other workers sometimes remains a challenge.
Worker 2	Although the informant understands the importance of PPE and SOPs, implementation is not always disciplined (e.g., removing PPE when

	feeling hot). However, in general, the informant follows procedures correctly and responds appropriately when facing unsafe conditions.

Table 8. Univariate Analysis

No	SMK3 Implementation	f	%
1	Good	1	6.7
2	Moderate	13	86.7
3	Poor	1	6.7
	Total	15	100

Based on interviews, it was discovered that the OSHMS planning at the PT Pertamina Patra Niaga Gunungsitoli Fuel Terminal is based on official documents prepared in accordance with national regulations. However, direct worker participation in policy development and planning remains very limited, and the IBPR documentation is not yet fully comprehensive. In Heinrich's Occupational Safety Management theory (1931), reinforced by OHSAS 18001, planning is a crucial initial stage in an OSH management system, including hazard identification, risk assessment, and risk control, which must be developed in a participatory and documented manner. This result may occur because the planning role is largely assumed by management and the HSSE, while implementers only receive one-way information. The lack of discussion forums or involvement in the development process results in workers not feeling ownership of the OSH program (Grunberg et al., 1996; Kvorning et al., 2015). Management reviews, as part of the continuous improvement cycle, were also deemed suboptimal. Most respondents stated that these activities are still limited to formal reporting and have not yet become a strategic forum for formulating OSH improvement policies. Evaluation and measurement results are not always integrated into the comprehensive review process, often missing opportunities for systematic improvement (Unterkalmsteiner et al., 2011; Hayden et al., 2006). The lack of concrete action from the review results shows that the role of top management in supporting SMK3 still needs to be strengthened, both in terms of commitment, resources, and decision-making that is responsive to evaluation results and operational conditions.

CONCLUSION

The planning of the Occupational Health and Safety Management System (SMK3) at the Gunungsitoli Fuel Terminal of PT Pertamina Patra Niaga has been implemented in accordance with national regulations and internal policies. However, worker involvement in the planning process remains limited, and documentation of hazard identification and risk assessments is not yet comprehensive. The implementation of the SMK3 includes safety talks, the use of personal protective equipment (PPE), basic training, and emergency response simulations. However, implementation is not yet fully disciplined, supervision is informal, and follow-up training is not yet consistent. The SMK3 is measured using indicators such as workplace accidents, internal audits, and the level of compliance with procedures. However, follow-up on the measurement results is not optimal, implementation involvement is still low, and the reporting system is not effectively integrated. SMK3 evaluations are conducted quarterly, but they are not systematically documented and have not been used as a strategic basis for managerial decision-making. Evaluation results have not been fully followed up due to budget constraints and a lack of worker involvement. SMK3 reviews are conducted annually by top management, with several outcomes, including revisions to SOPs and operational policies. However, this review did not address all operational aspects, and cross-functional participation remained low due to the perception that OHS is solely the responsibility of a specific team. Based on the results of the quantitative research, 13 people (86.7%) stated that implementation was moderate, 1 (6.7%) stated that implementation was good, and 1 (6.7%) stated that implementation was poor. This demonstrates that OHSMS implementation at the Gung Sitoli Fuel Terminal is at a moderate stage, where OHSMS implementation has been implemented but still requires quality improvements in planning, implementation, measurement, evaluation, and review.

SUGGESTION

Management is expected to increase the involvement of all levels of workers in the planning, implementation, and evaluation of the Occupational Health and Safety Management System (SMK3). Improving the capacity of supervisory human resources, strengthening the work safety culture, and optimizing documentation and audit follow-up are crucial to fostering a participatory and sustainable OHS system. All workers are expected to increase their awareness and concern for the importance of implementing occupational safety procedures. Workers also need to actively participate in OHS activities, provide input, and consistently implement SOPs as part of a safe work culture. The government, through relevant agencies such as the Ministry of Manpower and regional Manpower Offices, is expected to strengthen oversight of OHS management system implementation, provide support in the form of training and mentoring, and update regulations to be more adaptive to field conditions and industry needs. Higher education institutions are expected to develop curricula and conduct applied research that supports strengthening OHS capacity in the industrial sector. Collaboration between academia and industry is also crucial to bridge theory and practice in developing improved OHS systems. This research can serve as a basis for further studies on the implementation of OHSMS in various other sectors and regions. Future researchers are encouraged to combine quantitative and qualitative approaches in greater depth and explore the influence of organizational culture and leadership factors on the success of OHS management systems.

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