

Analysis of Optimization of the Use of Personal Protective Equipment in the Loading and Unloading Process of Goods at Sorong Port

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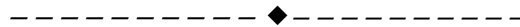
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Abstract

This study aims to analyze the optimization of the use of Personal Protective Equipment (PPE) in the loading and unloading process at the Port of Sorong, Southwest Papua, in line with the Regulation of the Minister of Manpower and Transmigration Number PER.08/MEN/VII/2010. With a qualitative descriptive approach, data were collected through observation and in-depth interviews with workers, supervisors, and port management. The results of the study indicate that although PPE has been provided in accordance with the standards, the level of worker compliance is still low, mainly due to discomfort and lack of awareness of the importance of work safety. In addition, suboptimal supervision and unclear sanctions also contribute to low compliance. This study recommends increased supervision, stricter implementation of sanctions, and the provision of more ergonomic PPE to improve occupational safety and operational efficiency at Sorong Port.

Keywords: *PPE, Loading and Unloading, Work Safety, Sorong Port.*



A. INTRODUCTION

Sorong City has officially become the Capital of West Papua Province since the end of 2022, based on Law Number 29 of 2022 (Law (UU) Number 29 of 2022 concerning the Establishment of West Papua Province, 2022) . This increase in status was followed by a significant surge in transportation flows and economic activities in the region, especially in the port sector. Data from the Central Statistics Agency (BPS) of Sorong City shows that in 2022, there were 1,987 ship visits, an increase from 1,925 visits in 2021 (Tungkup, 2022) . This increase reflects the increasing volume of passenger and goods mobilization at Sorong Port, which includes stevedoring, cargodoring, and receiving/delivery activities.

The loading and unloading process at the port, which involves stevedoring workers (TKBM), is a crucial element in ensuring smooth port operations. TKBM is responsible for various important activities that affect port efficiency, including the duration of ships in port. Efficiency in the loading and unloading process is a key factor in reducing ship waiting times at the port, which averages 63 hours (Susetyo et al., 2019) . With the increasing number of ships and the volume of goods to be handled, the need for skilled and efficient workers is increasingly urgent (Djunuda & Samaluddin, 2023) .

However, the issue of occupational safety for TKBM is a major concern, especially regarding the use of Personal Protective Equipment (PPE) which has been

regulated in the Regulation of the Minister of Manpower and Transmigration of the Republic of Indonesia Number PER.08/MEN/VII/2010 (Regulation of the Minister of Manpower and Transmigration of the Republic of Indonesia Number PER.08/MEN/VII/2010, 2010) . The use of heavy equipment such as cranes in loading and unloading activities increases the potential risk of work accidents (Akbar et al., 2023) . Although PPE is available, research shows that many workers do not use it effectively, often due to lack of awareness or discomfort (Afolabi et al., 2021; Alamneh et al., 2020) . Surveys of construction workers, for example, show that even though they understand the importance of PPE, the level of use remains low (Adhikari & Wagle, 2022) .

Compliance with PPE use is essential to minimize work injuries. PPE functions as a protective device that can isolate workers from various hazards, although it does not completely eliminate the risk of accidents or illnesses. Research has highlighted that the use of PPE is an important strategy in preventing injuries due to exposure to workplace risks, such as chemicals, physical agents, and mechanical risks (Baye et al., 2022; Ludwika & Rifai, 2024) . The importance of ongoing training and education on the use of PPE is also emphasized as a key factor in increasing compliance and effectiveness of these protective measures (Alao et al., 2020; Henry et al., 2022) .

The availability of PPE in the workplace has a significant correlation with the level of worker compliance. Workers who have easy access and good quality PPE tend to be more compliant in their use (Azizah et al., 2021; Nurdian et al., 2022; Yudha et al., 2023) . However, in addition to availability, knowledge, training, and supervision also play an important role in increasing compliance. Research shows that effective supervision and clear policies can increase the use of PPE among workers (Cahyani & Widati, 2021; Iskandar, 2022) .

Based on the importance of occupational safety and the impact of suboptimal use of PPE, this study aims to analyze the optimization of PPE use in accordance with Ministerial Regulation Number PER.08/MEN/VII/2010 in the loading and unloading process at Sorong Port. The results of this study are expected to provide a significant contribution in increasing compliance with the use of PPE, which ultimately supports occupational safety and increases operational productivity at the port.

B. METHOD

This study uses a qualitative descriptive approach that aims to gain an in-depth understanding of the application of personal protective equipment (PPE) in the loading and unloading process of goods at Sorong Port. This approach was chosen to explore how regulations related to PPE, especially the Regulation of the Minister of Manpower Number PER.08/MEN/VII/2010, are applied in the field and the challenges faced in its implementation. The study was conducted at Sorong Port, Southwest Papua, during June to July 2024. Data were collected through direct observation of the loading and unloading process and in-depth interviews with workers, supervisors, and port management. The analysis method used was qualitative descriptive supplemented by Fishbone analysis to identify and analyze the root causes of

occupational safety problems. The objects of this study include Port Operational Officers, the labor management company PT. Pelindo IV, and stevedoring workers. By combining qualitative descriptive methods and Fishbone analysis, this study aims to provide a comprehensive overview of PPE usage management at Sorong Port and offer solutions to improve compliance and effectiveness of PPE usage.

C. RESULTS AND DISCUSSION

1. Implementation of Minister of Manpower Regulation Number PER.08/MEN/VII/2010 in the Loading and Unloading Process of Goods at Sorong Port

This study aims to analyze how the implementation of the Regulation of the Minister of Manpower and Transmigration Number PER.08/MEN/VII/2010 concerning Personal Protective Equipment (PPE) is applied in the loading and unloading process at Sorong Port. Through interviews with various parties directly involved in loading and unloading activities, such as the Head of Traffic and Sea Transportation, Assistant Manager of Management Systems, HSSE and Customer Development, and stevedoring workers (TKBM), it was found that this regulation has been implemented with varying levels of compliance.



Figure 1. Briefing Before Starting Loading and Unloading Activities

Availability of PPE and Worker Awareness: Interview results show that PPE such as helmets, safety shoes, and vests have been provided in accordance with the Indonesian National Standard (SNI). However, additional protective equipment such as eye, ear, respiratory, and hand protection are still not fully available. Nevertheless, some workers still do not use PPE consistently, mainly due to discomfort and lack of awareness of the importance of work safety. Observation results show that around 60% of workers do not use complete PPE, indicating that the implementation of this regulation is still not optimal.



Figure 2. Interview with Source

Supervision and Enforcement of Rules: Although briefings before loading and unloading activities have been conducted to emphasize the importance of using PPE, supervision in the field still needs to be improved. Sanctions given to workers who do not comply with the rules on the use of PPE tend to be light, such as verbal warnings and temporary bans from activities in the loading and unloading area. This results in low worker compliance with the use of PPE in accordance with regulations.

2. Factors of Suboptimal Use of Personal Protective Equipment (PPE) in the Loading and Unloading Process of Goods at Sorong Port

Although the use of safety equipment is emphasized, it turns out that there are still employees who do not use safety equipment properly. This description will use *Fishbone Analysis* to describe the causal factors consisting of human factors, equipment, rules, and the environment. The *Fishbone Analysis* illustration can be seen in the following image.

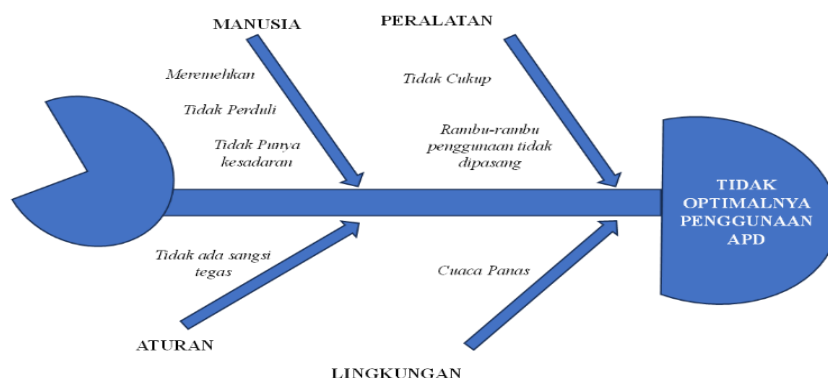


Figure 3. Fishbone Diagram of Suboptimal Factors of PPE Use by Loading and Unloading Workers at Indonesian Ports

- a. **Human Factors:** Low awareness and understanding of the importance of using PPE is one of the main causes of the suboptimal implementation of this regulation. Some workers consider PPE as a barrier due to discomfort, especially in hot and non-ergonomic working conditions.
- b. **Equipment Factors:** Limited availability of PPE, especially for eye, ear, and respiratory protection, is a major constraint. The available protective equipment is often uncomfortable to wear for long periods of time, which makes workers reluctant to use it consistently.
- c. **Regulatory Factors:** The absence of strict sanctions for violations of PPE use makes workers feel free to not follow safety procedures. Suboptimal supervision and the absence of severe consequences for violations of regulations are the main inhibiting factors.
- d. **Environmental Factors:** Hot working conditions in ports often cause discomfort for workers when using PPE. This discomfort affects workers' compliance with the use of PPE, even though they are aware of the importance of work safety.

3. Challenges and Efforts to Optimize the Implementation of Occupational Safety at Sorong Port

Although regulations related to PPE have been implemented, challenges in supervision, availability of adequate protective equipment, and increasing worker awareness still need to be addressed.

Tighter Supervision and Strict Sanctions: To improve compliance, there needs to be tighter supervision and strict sanctions for workers who violate PPE rules. This will help ensure that all workers comply with established safety protocols.

Increased Education and Training: Regular training emphasizing the importance of PPE use and emergency situation simulations should be increased. This will help improve workers' understanding of the risks they face and the importance of personal protection.

Procurement of More Ergonomic PPE: Port managers need to ensure that the PPE provided is more comfortable and meets the ergonomic needs of workers. This will increase worker compliance in using the protective equipment provided.

Safety Campaigns and Worker Involvement: Intensive safety campaigns and involving workers in the PPE evaluation and selection process can help increase awareness and compliance with the use of personal protective equipment. By involving workers, the PPE selected is expected to be more in line with their needs and comfort.

The discussion of this research shows that the implementation of the Regulation of the Minister of Manpower and Transmigration Number PER.08/MEN/VII/2010 concerning Personal Protective Equipment (PPE) in the loading and unloading process of goods at Sorong Port still faces various obstacles that cause its implementation to be less than optimal. Although PPE such as helmets, safety shoes, and vests have been provided in accordance with the Indonesian National Standard (SNI), the availability of additional protective equipment such as

eye, ear, respiratory, and hand protection is still inadequate. This gap between regulation and implementation is a serious concern, especially in the context of occupational safety which is critical in high-risk environments such as ports.

The results of this study are in line with findings showing that supervision and law enforcement related to work safety are often ineffective, thus affecting compliance with the use of PPE. (Solechan, 2019; Verawaty et al., 2021) . Around 60% of workers at Sorong Port do not use complete PPE, indicating that awareness of the importance of occupational safety is still low. This non-compliance can increase the risk of work accidents, which in turn can have a negative impact on worker productivity and welfare.

The discomfort factor in using PPE is also a major reason for low compliance. Research shows that the quality and comfort of PPE greatly influences the level of worker compliance in using it. Non-ergonomic PPE designs, non-breathable materials, or inappropriate sizes often interfere with workers' comfort and mobility, making them reluctant to use them consistently. This is compounded by the lack of close supervision and adequate management support. Good supervision and a strong safety culture in the workplace can increase worker compliance with PPE use, even in uncomfortable conditions (El-Sokkary et al., 2021; George et al., 2023) .

In addition, the lack of education and training on the use of PPE and the importance of occupational safety is also a factor causing low compliance. Risky behavior such as not using PPE is often related to a lack of knowledge and understanding of the importance of safety (Lestari et al., 2023) . Better education and intensive training are needed to increase worker awareness. Unsupportive working environments, such as hot conditions in ports, also contribute to low compliance. In situations like this, it is important for companies to not only provide comfortable PPE, but also create a work environment that supports compliance with safety rules.

Further analysis using Fishbone identified the main factors causing suboptimal use of PPE, namely human factors, equipment, rules, and environment. Low worker awareness, limited availability of PPE, lack of strict sanctions, and uncomfortable working conditions are the main obstacles. To address this issue, increased supervision, stricter sanctions, provision of more ergonomic PPE, and increased education and training for workers are required.

Overall, this study confirms that greater efforts are needed to ensure effective implementation of occupational safety regulations at Sorong Port. Increased supervision, stricter implementation of sanctions, and the provision of PPE that is more comfortable and meets workers' ergonomic needs are important steps that must be taken. In addition, ongoing education and training should be integrated into safety policies to increase worker awareness and compliance. With these steps, it is hoped that work safety at Sorong Port can be more assured, and the risk of work accidents can be minimized.

D. CONCLUSION

The implementation of the Regulation of the Minister of Manpower and Transmigration Number PER.08/MEN/VII/2010 concerning Personal Protective Equipment (PPE) in the loading and unloading process of goods at Sorong Port is still not optimal, with various obstacles that hinder its effectiveness, such as limited availability of additional PPE, low awareness and compliance of workers towards the use of PPE, and lack of supervision and strict enforcement of sanctions. These factors indicate the need for increased supervision, provision of more ergonomic PPE, and increased occupational safety education and training to ensure that safety regulations can be implemented more effectively and the risk of work accidents can be minimized in the port environment.

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