Analysis of Occupational Safety Policies in the Manufacturing Industry Related to Compliance and its Impact on Occupational Accidents

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ABSTRACT

Occupational safety is a very important aspect in the manufacturing industry, given the high risk of work accidents that can occur in this environment. The manufacturing industry is known for the use of heavy machinery, hazardous chemicals, and complex production processes, which increase the chance of occupational accidents if there is no effective work safety system (Fauzi, 2024). This research uses quantitative and qualitative approaches (mixed methods). The quantitative approach was used to measure the level of compliance with work safety policies and its impact on work accidents. Table 1 shows that the variables of knowledge, motivation and personality have a significant value > 0.05. Table 2 shows that the variables of training and communication do not have a significant relationship with labour compliance in using PPE. Table 3 shows that the PPE availability variable does not have a significant relationship with labour compliance in using PPE. It is important that companies continue to develop and implement comprehensive safety policies, involve workers in the drafting process, and provide ongoing training to create a safer and more productive work environment.

Keywords: Work safety policy, Compliance, Impact of Workplace Accidents

INTRODUCTION

Occupational safety is a very important aspect in the manufacturing industry, given the high risk of work accidents that can occur in this environment. The manufacturing industry is known for the use of heavy machinery, hazardous chemicals, and complex production processes, which increase the chance of occupational accidents if there is no effective work safety system (Fauzi, 2024). According to data from the International Labour Organization (ILO) in 2013, 1 worker in the world dies every 15 seconds due to work accidents. In addition, the ILO also noted that 160 workers
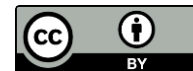
experience occupational diseases every year. The number of deaths due to accidents and occupational diseases (PAK) is 2 million cases every year (SehatNegeriKu, 2014).

Workplace accidents also have far-reaching impacts, including economic losses and reduced productivity. In addition, fatalities due to work accidents are a very serious problem and need to be addressed seriously. Efforts to prevent and improve work safety are very important to reduce the number of work accidents and fatalities (BPJS Tenaga Kerja, 2023).

Safety policies in the manufacturing industry are designed to reduce the risk of occupational accidents and protect the health and safety of workers. Governments and companies are required to implement strict safety standards, such as *Occupational Safety and Health* (OSH), and supervise companies' compliance with these regulations (Sari et al., 2024). However, in practice, the level of compliance with occupational safety policies is often still not optimal. Factors such as lack of socialisation, workers' lack of understanding, and weak supervision are often the cause of the low level of compliance, which in turn contributes to the high number of work accidents in this sector (Nuraini & Wardani, 2015).

Many studies have shown that well-implemented safety policies can significantly reduce workplace accidents. However, there are also many studies that show a gap between established safety policies and their implementation in the field (Amelia, 2024). This gap indicates the need for a more in-depth analysis of the factors that influence compliance with occupational safety policies, as well as their impact on work accidents in the manufacturing industry. By implementing an occupational safety and health (OHS) management system in accordance with the ISO 45001:2018 standard, companies can improve worker compliance and reduce the incidence of accidents (Erna Agustin Sukmandari, 2018; Zulkarnaen & Ramdhan, 2023).

Statistics show that the manufacturing industry has a high contribution to the number of work accidents in Indonesia. In 2020, this sector was recorded to contribute 63.6% of the total work accidents. Accidents that occur are often caused by poorly implemented OHS risk management. Therefore, an in-depth analysis of the factors that influence compliance with safety policies is needed to identify effective corrective measures (Azizah et al., 2021).

This study aims to analyse the extent to which work safety policies in the manufacturing industry are complied with by companies and workers, and to examine the impact of these policies on the number of work accidents. Thus, this study is expected to provide more effective and applicable policy recommendations to improve work safety and reduce the number of accidents in the manufacturing sector.

METHODS

This study uses mixed methods (quantitative and qualitative) to analyse work safety policies in the manufacturing industry, specifically related to the level of worker compliance and its impact on work accidents. The study population included workers and management in manufacturing industries in Padang City. The quantitative sample consisted of 200 workers who work in high-risk areas for occupational accidents, such as production or machine operators, with the following criteria: having worked for at least 1 year, aged 20-50 years, and having attended safety training.

The qualitative sample involved 10-15 key informants from management, such as managers or safety supervisors with at least 2 years of experience, to explore the experiences and challenges of implementing safety policies. Quantitative data were collected through questionnaires, while qualitative data were obtained through in-depth interviews. This approach is expected to provide a comprehensive analysis of the effectiveness of safety policies in the manufacturing sector.

The quantitative research instrument used a closed-ended questionnaire with a Likert scale of 1-5 covering safety training, use of personal protective equipment (PPE), compliance with safety procedures, and frequency of occupational accident incidents. The questionnaire aimed to measure the level of manufacturing workers' compliance with safety policies and the relationship between compliance and occupational accidents. Qualitative data were obtained through semi-structured interviews with managers and safety supervisors to explore the experiences, perspectives and factors that influence worker compliance and its impact on safety. The quantitative approach provides a statistical overview of compliance and accident incidence, while the qualitative approach provides in-depth insights into the implementation of safety policies in the manufacturing industry.

The questionnaire data will be analysed using descriptive and inferential statistics. Descriptive statistics show the level of compliance with safety policies and the number of workplace accidents, while inferential statistics, such as linear regression or correlation tests, examine the relationship between the two. Thematic analysis will be used to analyse data from in-depth interviews. This involves coding the data, grouping themes, and overall interpretation to find out how management and employees view the safety policy.

To conduct ethical research, the researcher will ask all respondents to provide clear consent about the purpose of the study, data confidentiality, and respondents' rights. The researcher will maintain the identity of the respondents and only use the data collected for the purpose of the study.

RESULTS

A. Analisis Univariat
1. Person Component

Table 1. Person Component

Variables	Percentage	P-value
Knowledge (Good Category)	87,5	0,48
Motivation (Good category)	96,6	1,00

Knowledge, and motivation variables do not have a significant relationship with labour compliance using PPE. Table 1 shows that the variables of knowledge, motivation and personality have a significant value > 0.05.

2. Behaviour Component

Table 2. Components of Behaviour

Variables	Percentage	P-value
Training (PPE use category)	79,5	0,55
Communication (Good Category)	87,5	0,72

Table 2 shows that training and communication variables do not have a significant relationship with labour compliance using PPE. Training and communication variables have a significant value > 0.05.

3. Envirement Component

Table 3. Behaviour Component

Variables	Percentage	P-value
PPE availability (complete and good)	94,3	0,61
Attitude about the policy (good)	93,2	0,04

Table 3 shows that the PPE availability variable does not have a significant relationship with labour compliance in using PPE. Attitude towards the policy has a low strength of association with compliance using PPE. Workers who have a good attitude towards the policy on PPE are more compliant in using PPE than those who have a poor attitude.

B. Bivariate Analysis

1. Personnel

Table 4. Personnel Occupational Safety Policies in the Manufacturing Industry Related to Compliance and Impact on Occupational Accidents

Variabel	Percentace (%)	p-value
Knowledge (good category)	87.5	0.48
Motivation (good category)	96.6	1.00

Based on table 4, it is known that the knowledge and motivation variables do not show a significant relationship with compliance with the use of PPE. This can be interpreted that even though workers have high knowledge and motivation, other factors may be more dominant in encouraging compliance.

2. Behaviour

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Table 5. Safety Policy Behaviour in the Manufacturing Industry Related to Compliance and Impact on Occupational Accidents

Variabel	Percentace (%)	p-value
Training (PPE use category)	79.5	0.55
Communication (good category)	87.5	0.72

Based on Table 5, work safety policy behaviours in the manufacturing industry related to compliance and impact on workplace accidents, neither training nor good communication are significantly related to compliance with PPE use. This suggests that while information and instructions are provided, they may not be sufficient to significantly improve compliance.

3. Environment

Table 6. Occupational Safety Policy Environment in the Manufacturing Industry Regarding Compliance and Impact on Occupational Accidents

| Variabel	Percentace (%)	p-value
PPE availability (complete and good)	94.3	0.61
Attitude towards policy	93.2	0.04

Based on Table 6, the work safety policy environment in the manufacturing industry in relation to compliance and impact on workplace accidents, the availability of PPE that is complete and in good condition also does not have a significant effect on compliance, indicating that the provision of facilities alone is not sufficient to ensure compliance. However, workers' attitudes towards safety policies showed a significant effect, indicating that acceptance and positive attitudes towards safety policies are more effective in improving compliance.

DISCUSSION

A. Analisis Univariat

1. Occupational Safety Theory

Risk Management Theory: This theory emphasises the importance of identifying, assessing and controlling risks in the workplace. In the context of safety policy, risk management serves to minimise the likelihood of workplace accidents (Safetysign, 2018). Compliance Theory: This theory explains how compliance with safety policies contributes to accident reduction. Compliance can be influenced by factors such as training, communication and organisational culture (Atmoko, 2013; Erwantiningsih, 2019).
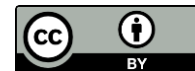
2. Research Results

Policy Analysis: Research shows that clear and structured safety policies can improve worker compliance. For example, industries that implement strict safety procedures have higher compliance rates. Compliance Impact: Data shows that companies with high levels of compliance with safety policies have a lower incidence of accidents. This can be measured through a decrease in the number of workplace accidents and injuries. Determining Factors: Research has also found that factors such as safety training, management involvement, and effective communication play a major role in improving worker compliance.

3. Policy Implications

It is important to develop and implement a comprehensive safety policy to reduce the risk of occupational accidents. Continuous training for workers and managers is required to ensure a deep understanding of safety procedures (Prodia Occupational, 2023). Worker involvement in the development of the safety policy can increase ownership and compliance with the policy.

A clear safety policy provides the necessary guidance for workers to understand risks and mitigation measures. This research found that policies supported by regular training and effective communication programmes can create a strong safety culture. When workers feel that they are adequately informed and supported, they are more likely to comply with safety procedures (Lestari et al., 2019). Some of the factors that contribute to worker compliance include:

a. Continuous Training: Workers who receive regular safety training are better prepared for risky situations.
b. Management Involvement: Management that is actively involved in the safety programme not only shows commitment, but also motivates workers to comply with the policy.
c. Effective Communication: Clear information on safety policies and the consequences of violations increases awareness and compliance.

Compliance with safety policies is critical in reducing the risk of accidents in the manufacturing industry. By understanding the theory and research results, companies can develop more effective strategies to improve work safety and create a safer work environment (Devianti et al., 2022).

4. Impact of Occupational Accidents

A decrease in the incidence of accidents in companies that implement good safety policies indicates that these policies have a direct impact on worker safety. This is in line with risk management theory, which states that effective identification and management of risks can reduce the likelihood of accidents. By reducing accidents, companies not only protect workers, but also reduce costs associated with injuries and lost productivity.

B. Bivariate Analysis

The results showed that not all factors assumed to influence workers' compliance in using Personal Protective Equipment (PPE) had a significant relationship. Only the attitude towards policy variable was shown to have a significant relationship with compliance, while other variables such as knowledge, motivation, training, communication, and availability of PPE did not have a significant relationship with workers' compliance in using PPE.

1. Personnel Component:

Knowledge: Most workers have good knowledge about work safety, but this is not directly proportional to compliance in the use of PPE. This finding suggests that knowledge alone may not be enough to encourage worker compliance. In this situation, other factors such as daily habits and behaviours may better influence workers' attitudes towards compliance.

Motivation: High motivation also did not have a significant effect on compliance in PPE use. While motivation is an important indicator, this result implies that environmental factors or risk perception may influence compliance more.

2. Behavioural Components:

Training and Communication: Although most workers had received good safety training and communication, the results showed that neither had a significant effect on PPE compliance. This may be because training and communication tend to focus on delivering information rather than creating behaviour change. In this case, improving the effectiveness of training may be needed, for example through practical approaches or periodic repetition involving direct evaluation of workers' practices.

3. Environmental Component:

PPE Availability: The availability of PPE that is complete and in good condition does not affect compliance. This may be due to a low perception of risk or the lack of perceived consequences of not using PPE.

Attitude Towards Policy: Workers' positive attitude towards work safety policies was the only factor that had a significant relationship with compliance. This finding suggests that a favourable attitude towards safety policies can be a strong driver for compliance in PPE use. In this context, building awareness of the importance of the policy and the risks posed by non-compliance can increase worker compliance.

C. Research assumptions

Based on the above results, some assumptions can be made by researchers:

1. Assumption of Importance of Positive Attitude towards the Policy: The researcher assumes that workers' positive attitudes towards safety policies play a greater role in motivating compliance than other factors such as knowledge or training. This may be due to a deeper internal acceptance of the importance of the policy, which in turn strengthens workers' intention to comply.
2. Assumptions about Training Effectiveness: The researcher assumes that the training and communication currently provided may not be fully effective in creating the desired behaviour change. Therefore, a more interactive and sustainable training approach is needed, so that safety messages are more embedded in workers' daily practices.

3. Assumptions on the Effect of Risk Perception on Compliance: The researcher also assumed that low risk perception may contribute to non-compliance in the use of PPE, despite good knowledge and availability of PPE. Therefore, improving risk perception may be an effective strategy to influence compliance in PPE use.

4. Assumed Role of Compliance in Reducing Occupational Accidents: The researcher assumes that increased compliance with PPE use will result in a decrease in workplace accidents in a manufacturing environment. Although not directly measured in this study, this assumption is based on the principle that PPE serves as a direct protection against the risk of occupational accidents.

CONCLUSIONS

Compliance with safety policies is a key factor in reducing the incidence of accidents in the manufacturing industry. Risk management and compliance theory suggests that clear and structured policies, supported by effective training, can increase awareness and safe behaviour among workers. The results show that companies with high compliance levels experience a significant reduction in workplace accidents. Therefore, it is important for companies to continue developing and implementing comprehensive safety policies, involving workers in the drafting process, and providing ongoing training to create a safer and more productive work environment.

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