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## The Effect of Ism Code Implementation and Crew Competence on Safety Awareness which Impact on Prevention of Work Accidents by Ship Crew at PT Asia Maritim Temas

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**Abstract:** This study aims to analyze the impact of ISM Code Implementation and Crew Competence on Safety Awareness and its effect on Work Accident Prevention among crew members at PT Asia Maritim Temas. The main issue faced is the low level of safety awareness and the high number of work-related accidents among crew members, which affects the operational safety of the vessels. This research employs a quantitative approach with a cross-sectional design, involving 155 ship officers selected through saturated sampling. Data collection was done using questionnaires, and the data were analyzed using SmartPLS to examine the direct and indirect effects between the variables. The results show that ISM Code Implementation has a significant effect on Safety Awareness and Work Accident Prevention ( $t$ -value = 3.750), while Crew Competence also has a significant effect on Safety Awareness and Work Accident Prevention. Both variables also have an indirect effect on Work Accident Prevention through Safety Awareness. The conclusion of this study is that the implementation of the ISM Code and the enhancement of crew competence can improve safety awareness, which in turn can prevent work accidents on board. It is recommended to strengthen the implementation of ISM Code and safety training programs for crew members. Future research could explore this topic in more depth using a qualitative approach to better understand the challenges and perceptions of crew members regarding the implementation of safety measures.

**Keyword:** ISM Code Implementation, Crew Competence, Safety Awareness, Work Accident Prevention.

### INTRODUCTION

The development of the logistics sector, particularly maritime transportation, plays a crucial role in supporting international trade and the distribution of goods. Indonesia, as an archipelagic nation with over 2,200 public ports, holds significant potential in this sector. PT Temas Tbk, with its subsidiary PT Asia Marine Temas, is a key player in this industry. PT Asia Marine Temas manages 700 active sailors and 32 container vessels serving over 60 ports

throughout Indonesia. With its business growth and fleet expansion, PT Temas Tbk. continues to strive to increase its transport capacity and logistics services to support the distribution of goods nationally and internationally. However, along with this expansion and increased capacity, the logistics sector, particularly maritime transportation, faces significant challenges related to occupational safety, both onboard ships and in ports. Workplace accidents involving crew members are an issue that requires serious attention, given their impact on company performance and the safety of workers. Therefore, the implementation of an effective safety and risk management system is essential to mitigate workplace accidents.

To prevent further workplace accidents, it is crucial to improve compliance with the International Safety Management Code (ISM Code), which focuses on ship operational safety. This includes training crew members on safety procedures, the use of personal protective equipment (PPE), and routine maintenance of ship equipment and facilities. Furthermore, adding warning signs in accident-prone areas, monitoring the proper operation of equipment, and implementing better communication systems between crew members can also minimize the likelihood of accidents. Higher safety awareness and maintained competence will help build a safer work environment, which in turn will reduce the number of workplace accidents and improve the company's operational efficiency.

Recorded workplace accident data illustrates various incidents that occurred among PT Asia Marine Temas' crew throughout 2024. These accidents involved a wide range of incidents, ranging from injuries resulting from falls, being struck by heavy objects, being hit by rust fragments, to direct contact with machinery or equipment that caused serious injuries. The apparent phenomenon is that many accidents occur due to a lack of attention to safety procedures, for example when lifting heavy loads, operating equipment without adequate protection, or a lack of vigilance against sharp objects and rust. To prevent further workplace accidents, companies need to focus on improving safety training for ship crews, implementing strict procedures for the use of personal protective equipment (PPE), and routinely inspecting and maintaining the tools and facilities used. Awareness of the importance of safety must continue to be cultivated through more intensive safety education programs and stricter supervision in the field.

Overall, the main problem identified in the implementation of the ISM Code was a lack of oversight and discipline in the application of procedures. In Crew Competence, the main problem was a lack of comprehensive technical training and skills in the safe use of equipment. Meanwhile, Safety Awareness faced challenges in terms of compliance with existing safety procedures, as well as the need for improved communication and consistent use of personal protective equipment. Improved training, stricter supervision, and strengthening the safety culture on board are essential to address these issues.

Based on the literature review, previous studies have extensively discussed the implementation of the ISM Code in various aspects, such as its effectiveness in improving ship safety (Arnob, 2023; Bhattacharya, 2012), crew and management perceptions of its implementation (Nurhasanah et al., 2023; Siregar et al., 2023), and its impact on safety culture (Arnob, 2023). Furthermore, there are also studies that focus on supporting and inhibiting factors for ISM Code implementation, including lack of crew understanding and training constraints (Ndori et al., 2023; Wahyuni et al., 2018). However, studies that specifically link ISM Code implementation and crew proficiency levels to safety awareness and its impact on occupational accident prevention are still limited, especially in the context of a specific maritime company such as PT Asia Maritim Temas.

Furthermore, existing research has focused more on the general impact of the ISM Code on operational safety, but has not yet thoroughly examined the role of crew competency in increasing safety awareness, which has a direct impact on preventing workplace accidents. Several studies that have highlighted aspects of crew competency and training have focused more on improving understanding of safety procedures, but have not examined how the

combination of ISM Code implementation and crew competency can shape an effective safety culture (Desfiaranti et al., 2023; Mok et al., 2023). Therefore, this study aims to fill this research gap by exploring the relationship between ISM Code implementation, crew competency, and safety awareness, and how these three variables contribute to reducing the risk of workplace accidents in the maritime industry.

## **METHOD**

In writing this thesis, the research method used is a survey method with a quantitative approach. According to Arikunto (2016:12), "The quantitative method is an objective research approach, encompassing the collection and analysis of quantitative data and using statistical testing methods." This research method is based on scientific methods that are rational, empirical, and systematic. Rational means that research is conducted in ways that are reasonable, so that it can be reached by human reasoning, while empirical and systematic refer to data collection based on experience and carried out in a structured manner.

The population in this study was the entire crew of PT Asia Maritim Temas vessels operating in Indonesian waters in 2024, with 20 vessels transiting Jakarta's waters daily. Therefore, the study population included 155 respondents, consisting of ship officers, primarily Chief Engineers (KKM) and engineers.

The sample used in this study was taken using a non-probability sampling technique, namely saturated sampling. This technique was chosen because the population size was relatively small, namely 155 people. Saturated or census sampling, according to Riduwan (2012), is a sampling method in which all members of the population are used as samples. This technique allows researchers to obtain more complete and representative data from the entire population. In this case, the researchers used 155 ship officers to ensure that all relevant variables were covered, so that the research results could reflect the actual conditions of the group being studied. The obtained data were then processed using SmartPLS 3 for statistical analysis, including path analysis and hypothesis testing.

## **RESULTS AND DISCUSSION**

### **Research Result**

The respondents who completed the questionnaire were ship crew members, primarily officers on PT. Asia Maritim Temas vessels. The questionnaire distribution yielded 155 respondents who met the specified criteria. Based on the data presented in Table 4.1, the majority of respondents were female (56.8%) and most were aged between 21 and 30 years (95.5%), indicating the dominant age group in this employment sector.

Regarding ship officers, particularly Chief Engineers (KKM) and machinists, the data reflects that the majority of ship crew members have diverse educational backgrounds, with 43.2% holding a diploma. This education is relevant considering that KKM and machinists require high technical skills and knowledge of operating ship engine systems, which are generally obtained through vocational or technical education. The relatively young age of the majority of respondents reflects the high enthusiasm of the workforce in this sector in carrying out ship operational tasks, which is crucial for maintaining ship efficiency and safety and implementing safety procedures in accordance with international standards, such as the ISM Code.

### **Evaluation of Measurement (Outer) Model**

The results of data processing with the PLS Algorithm produce an outer model image as shown below.

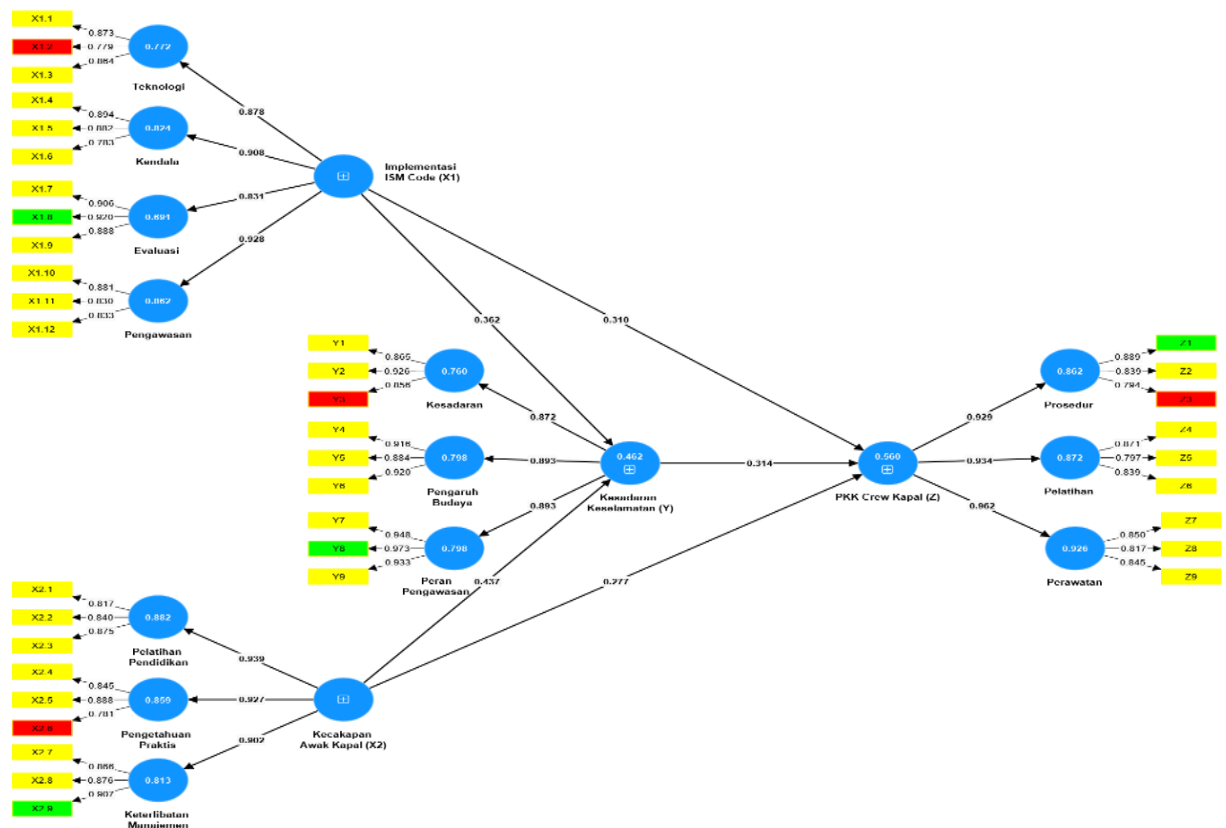


Figure 1 Outer Model Results

### Convergent Validity

Based on the results of the outer loading analysis, all indicators of the variables studied have an outer loading value of more than 0.6, which indicates that all indicators are reliable in measuring the intended construct. In the ISM Code Implementation variable (X1), the Compliance Monitoring dimension has the highest factor loading (0.928), while Effectiveness Evaluation has the lowest factor loading (0.831). In the Crew Competence variable (X2), the Education Training dimension shows the highest factor loading (0.939), while Management Involvement has the lowest factor loading (0.902). In the Safety Awareness variable (Y), the Safety Culture Influence dimension has the largest contribution (0.893), while Collective Individual Awareness has the lowest contribution (0.872). On the other hand, in the Ship Crew Work Accident Prevention variable (Z), the Maintenance Care dimension has the highest factor loading (0.962), while Security System Procedures has the lowest factor loading (0.929). Overall, these results indicate that although there are variations in the contribution of each dimension to the main variable, all indicators used in this study are valid for measuring the intended construct, with each indicator showing a factor loading value of more than 0.6, which confirms the validity of all indicators in this research model.

### Construct Reliability

The results of the construct reliability analysis indicate that all variables in this study meet the required reliability criteria. The Cronbach's alpha value for each variable is above 0.7, indicating acceptable internal consistency. In addition, the composite reliability value for each variable is also above 0.7, with the highest value found in the Safety Awareness (Y) variable, which reached 0.944. No composite reliability values were found that exceeded the upper limit of 0.95, so it can be concluded that there is no indicator redundancy that can affect the relationship between indicators. Thus, this measurement model can be considered reliable and all indicators are reliable in measuring the intended construct consistently.

### Construct Validity

Based on the average variance extracted (AVE) analysis, all variables in this research model have an AVE value of more than 0.50, which meets the minimum limit for construct validity. The AVE value for the ISM Code Implementation variable (X1) is 0.582, Crew Competence (X2) is 0.622, Safety Awareness (Y) reaches 0.655, and Crew Work Accident Prevention (Z) is at 0.623. All these AVE values indicate that the indicators in this research model are valid and can effectively measure the intended construct, which strengthens the reliability of the constructs tested in this study.

### Discriminant Validity

The results of the discriminant validity test using the heterotrait-monotrait ratio (HT/MT Ratio) show that the ratio value of each variable is below 0.9, which indicates that the indicators in this research model have been discriminated well. The ratio value between the variables ISM Code Implementation (X1) and Crew Competence (X2) is 0.487, between ISM Code Implementation (X1) and Safety Awareness (Y) is 0.590, and between Crew Competence (X2) and Crew Work Accident Prevention (Z) is 0.647. All of these values indicate that each construct in this research model has clearly separated indicators and can be measured specifically, confirming that this model has valid discrimination between the existing constructs.

### Inner Model Results (Structural Model)

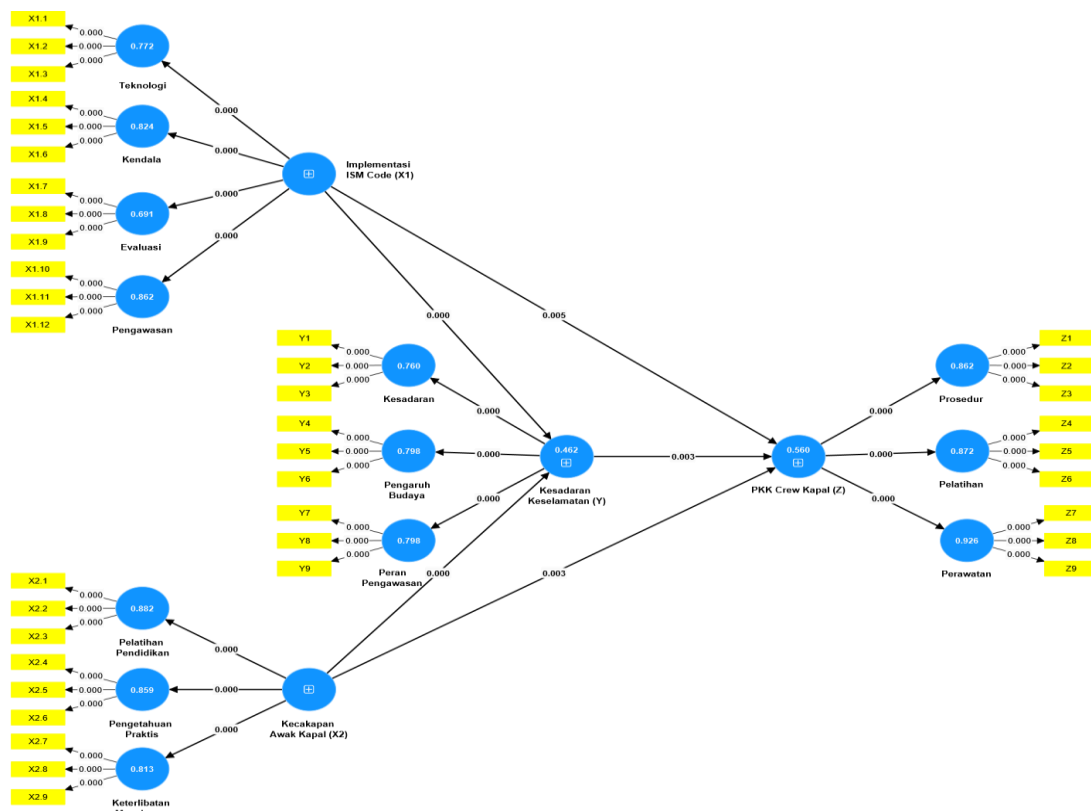


Figure 2 Inner Model Results

### Multicollinearity

In the structural model analysis, the results of the multicollinearity test indicate that there are no multicollinearity problems in this research model. Based on the Variance Inflation Factor (VIF) value, all variables have a VIF value of less than 3, which means that there is no strong relationship or correlation between independent variables that can interfere with the precision

of the model. The VIF values for the variables ISM Code Implementation (X1), Crew Skills (X2), Safety Awareness (Y), and Crew Work Accident Prevention (Z) are all below 3, which indicates that this model does not have multicollinearity problems and the model quality is acceptable.

**Coefficient of Determinant (R-Squared)**

The R-squared (R<sup>2</sup>) value indicates the model's ability to explain the variability of the dependent variable. The Safety Awareness (Y) variable has an R<sup>2</sup> value of 0.462, indicating that the model has moderate ability to predict safety awareness. Meanwhile, Crew Occupational Accident Prevention (Z) has an R<sup>2</sup> value of 0.560, meaning that approximately 56% of the variation in occupational accident prevention can be explained by the ISM Code Implementation, Crew Competence, and Safety Awareness variables. This indicates that the model has moderate to strong predictive power in explaining variations in both dependent variables.

**Effect Size (f-Squared)**

Effect size (f<sup>2</sup>) analysis shows that the Crew Competence variable (X2) has a strong influence on Safety Awareness (Y) with an f<sup>2</sup> value of 0.285, which means that crew competency plays a major role in increasing safety awareness on board. Meanwhile, the influence of ISM Code Implementation (X1) on Safety Awareness (Y) and Crew Work Accident Prevention (Z) shows a moderate influence, with f<sup>2</sup> values of 0.195 and 0.146, respectively. This indicates that although the ISM Code has a contribution to safety and accident prevention, its influence is lower compared to crew competency.

**Predictive Relevance (Q<sup>2</sup> and Q<sup>2</sup>\_predict)**

The Q<sup>2</sup> test demonstrates the predictive relevance of the research model. The Safety Awareness variable (Y) has a Q<sup>2</sup> value of 0.295, which is categorized as medium predictive relevance, while the Prevention of Ship Crew Occupational Accidents (Z) has a Q<sup>2</sup> value of 0.336, which also indicates medium predictive relevance. Both variables have moderate predictive ability, indicating that this model has a fairly good ability to predict relevant future outcomes. The Q<sup>2</sup>\_predict value is higher for the Prevention of Ship Crew Occupational Accidents (Z), reaching 0.485, indicating better predictive ability for this variable. Overall, this research model shows moderate predictive relevance and can be used to predict changes in the dependent variable.

**Research Hypothesis Test Results**

**Table 1 Hypothesis Test Results**

Hypothesis	Influence	Original sample (O)	T statistics ( O/STDEV )	P values	Note
H1	_ISM Code Implementation (X1) -> Safety Awareness (Y)	0.362	4,464	0.000	Significant
H2	Crew Skill (X2) -> Safety Awareness (Y)	0.437	4,912	0.000	Significant
H3	_ISM Code Implementation (X1) -> PKK Ship Crew (Z)	0.310	2,836	0.005	Significant
H4	Crew Skill (X2) -> PKK Ship Crew (Z)	0.277	3,014	0.003	Significant
H5	Safety Awareness (Y) -> PKK Ship Crew (Z)	0.314	2,932	0.003	Significant
H6	_ISM Code Implementation (X1) -> Safety Awareness (Y) ->	0.114	2,380	0.017	Significant

Hypothesis	Influence	Original sample (O)	T statistics ( O/STDEV )	P values	Note
	PKK Ship Crew (Z)				
H7	Crew Skill (X2) -> Safety Awareness (Y) -> PKK Ship Crew (Z)	0.137	2,477	0.013	Significant

**The Impact of ISM Code Implementation on Safety Awareness**

The analysis results show that the implementation of the ISM Code has a significant effect on safety awareness with a T-statistic of 4.464 and a standard coefficient of 0.362. These two data indicate that a more effective implementation of the ISM Code will increase safety awareness among crew members. This illustrates that the implementation of a strong safety management system plays a significant role in building a better understanding of the importance of safety.

This study found that effective implementation of the ISM Code helps improve crew safety awareness by fostering a more stringent safety oversight system and more consistent procedures. With strict oversight of the ISM Code, crew members are more exposed to the importance of safety procedures and improve their compliance with existing regulations.

The relationship between ISM Code Implementation and Safety Awareness indicates that effective ISM Code implementation can improve crew members' understanding and awareness of occupational safety. The better the ISM Code implementation, the higher the level of crew members' safety awareness, which will contribute to improved safety on board.

Research by Ghosh & Abeyesiriwardhane (2021) shows that the ISM Code plays a significant role in increasing safety awareness through improved safety procedures on ships. Ndori, Sutajaya, & Widiatmaja (2023) emphasize the importance of crew training to improve safety awareness through the implementation of the ISM Code. Arnob (2023) also suggests that the ISM Code contributes to increased safety awareness through better training and a safety culture. Mok et al. (2023) found that the implementation of the ISM Code directly leads to improved safety awareness among crew members. Desfiaranti et al. (2023) support that the implementation of the ISM Code improves crew members' skills in preventing accidents through better safety awareness.

**The Influence of Crew Competence on Safety Awareness**

The analysis results show that Crew Competence has a significant effect on Safety Awareness with a T-statistic of 4.912 and a standard coefficient of 0.437. These two data support that increasing crew competency in safety knowledge and technical skills will increase safety awareness on board.

The findings of this study indicate that crew members' proficiency, both in technical skills and safety knowledge, plays a significant role in strengthening their safety awareness. Better trained and knowledgeable crew members tend to have a higher awareness of the importance of occupational safety, which in turn leads to more disciplined implementation of safety procedures.

There is a strong correlation between crew competence and safety awareness. Improving crew competence in safety and risk management significantly increases their awareness of hazards on board. Therefore, better-trained crew members are more likely to be aware of safety risks and take action to reduce the likelihood of accidents.

Research by Arnob (2023) shows that crew safety training is highly influential in building a stronger safety culture. Mok, D'agostini, & Ryoo (2023) also found that improving crew skills can reduce accidents by increasing safety awareness. Ghosh & Abeyesiriwardhane (2021) support that crew safety skills contribute to reducing accident incidents. Desfiaranti et al.

(2023) suggest that crew skills in safety procedures play a significant role in preventing workplace accidents. Wahyuni et al. (2018) also found that good safety knowledge has a direct impact on increasing safety awareness.

### **The Impact of ISM Code Implementation on Preventing Work Accidents for Ship Crews**

The results of the analysis show that the implementation of the ISM Code has a significant effect on preventing ship crew work accidents with a T-statistic of 2.836 and a standard coefficient of 0.310. This indicates that a more effective implementation of the ISM Code can reduce work accidents on ships by improving safety standards and compliance with existing safety procedures.

These findings emphasize that proper implementation of the ISM Code, which involves stricter safety procedures and more effective supervision, contributes to the reduction of occupational accidents on ships. Implementing the ISM Code improves control over potential hazards and risks, which in turn contributes to preventing occupational accidents.

The positive influence found between ISM Code Implementation and Workplace Accident Prevention indicates that strict implementation of the ISM Code can reduce accidents by ensuring safety procedures are followed and supervision is carried out properly, thereby minimizing potential risks on board.

Research by Mok, D'agostini, & Ryoo (2023) shows that a well-implemented ISM Code reduces work-related accidents on ships through increased safety awareness and better supervision. Bhattacharya (2012) also found that the ISM Code helps reduce work-related accidents by strengthening ship safety management. Retno Gunarti & Sugiharto (2019) support that the implementation of the ISM Code can reduce work-related accidents through proper maintenance and effective supervision. Desfiaranti et al. (2023) also found that a good ISM Code improves crew skills in preventing accidents on ships. Ghosh & Abeyesiriwardhane (2021) also noted that the implementation of the ISM Code directly leads to a reduction in work-related accidents.

### **The Influence of Crew Skills on the Prevention of Crew Occupational Accidents**

The results of the analysis show that Crew Competence has a significant effect on the Prevention of Crew Occupational Accidents with a T-statistic of 3.014 and a standard coefficient of 0.277. These results indicate that the higher the crew competence, the lower the likelihood of occupational accidents on board, because they are better prepared to identify and manage safety risks.

These findings confirm that crew members' safety and risk management skills significantly influence their ability to prevent workplace accidents. The better trained crew members are, the greater their ability to identify hazards and take appropriate preventative measures, which in turn reduces the incidence of workplace accidents on board ships.

Crew competence has been shown to significantly influence workplace accident prevention. Crew members who are more skilled in safety procedures and better educated about the risks involved will be more diligent in carrying out their duties, thereby minimizing workplace accidents.

Research by Ghosh & Abeyesiriwardhane (2021) found that crew safety skills significantly contribute to reducing workplace accidents. Retno Gunarti & Sugiharto (2019) also support the impact of crew safety training on reducing workplace accidents. Bhattacharya (2012) showed that improving crew skills is directly related to improving workplace safety on ships. Desfiaranti et al. (2023) also confirmed that crew skills in safety procedures contribute to preventing workplace accidents. Siregar et al. (2023) added that crew skills play a significant role in reducing the number of accidents on ships through their improved knowledge and skills.

### **The Influence of Safety Awareness on Preventing Work Accidents among Ship Crews**

The analysis results show that Safety Awareness has a significant effect on the Prevention of Work Accidents among Ship Crews with a T-statistic of 2.932 and a standard coefficient of 0.314. This indicates that increasing safety awareness among ship crews is directly related to reducing work accidents. The higher the awareness of safety procedures, the lower the likelihood of accidents.

These findings emphasize the importance of safety awareness as a key factor in preventing work-related accidents on ships. A strong awareness of the importance of following safety procedures, along with a thorough understanding of the risks, makes crew members more careful and disciplined in maintaining their own safety and that of the ship's environment.

There is a significant positive relationship between safety awareness and occupational accident prevention. This indicates that with increased safety awareness, crew members will be more committed to complying with established safety procedures, which in turn reduces the rate of occupational accidents on board.

Research by Wahyuningtyas, Ariyani, & Sugiharto (2023) shows that high safety awareness contributes to increased compliance with safety procedures and reduces workplace accidents. Hadiwijaya (2023) also emphasized that safety awareness is a key factor in improving compliance with existing safety standards in the field. Siregar et al. (2023) found that safety awareness works as a strong predictor in reducing accidents on ships. Albab & Faidal (2024) suggested that safety knowledge and awareness have a significant influence on safety behavior in the workplace. Simanjuntak et al. (2024) support these findings by emphasizing that safety awareness plays a role in reducing the risk of workplace accidents, both in the maritime sector and other industries.

### **The Impact of ISM Code Implementation on Preventing Work Accidents for Ship Crews through Safety Awareness**

The results of the analysis show that the implementation of the ISM Code has a significant effect on preventing work accidents among ship crews through safety awareness with a T-statistic of 2.380 and a standard coefficient of 0.114. This indicates that the effective implementation of the ISM Code not only plays a direct role in preventing work accidents, but also increases safety awareness, which in turn has an impact on reducing accidents.

These findings confirm that effective implementation of the ISM Code, which includes strict supervision and more consistent application of safety procedures, can improve safety awareness among crew members. This increased awareness then contributes to the prevention of occupational accidents, as crew members are more prepared and disciplined in following established procedures.

A positive influence was found between ISM Code Implementation and Workplace Accident Prevention through Safety Awareness, indicating that better safety management systems and compliance with the ISM Code increase crew safety awareness, which in turn reduces workplace accidents on board ships.

Research by Mok et al. (2023) states that effective implementation of the ISM Code plays a role in reducing workplace accidents by increasing safety awareness. Ghosh & Abeywardhane (2021) also found that effective safety technology and management through the ISM Code can improve safety awareness on ships. Arnob (2023) supports these findings by emphasizing the importance of ISM Code implementation in improving safety culture, which in turn influences workplace accident prevention. Desfiaranti et al. (2023) also stated that implementing the ISM Code improves crew members' skills in preventing accidents. Wahyuni et al. (2018) confirmed that training and implementation of the ISM Code can reduce workplace accidents by strengthening crew members' safety awareness.

### **The Influence of Crew Competence on the Prevention of Crew Occupational Accidents through Safety Awareness**

The results of the analysis show that Crew Competence has a significant effect on the Prevention of Work Accidents of Ship Crew through Safety Awareness with a T-statistic of 2.477 and a standard coefficient of 0.137. This indicates that crew competence in terms of technical skills and safety knowledge, combined with higher safety awareness, can contribute significantly to the prevention of work accidents.

The findings of this study indicate that crew members' skills in handling various emergency situations and managing safety risks are crucial for accident prevention. The more skilled and educated the crew members are, the higher their safety awareness, which ultimately improves accident prevention measures on board.

The positive relationship found between Crew Competence and Occupational Accident Prevention through Safety Awareness indicates that improving crew competency in safety and risk management increases their awareness of potential hazards. This increased awareness leads to a reduction in occupational accidents on board ships.

Research by Ghosh & Abeysiriwardhane (2021) shows that effective safety training for crew members directly reduces workplace accidents. Retno Gunarti & Sugiharto (2019) also support that crew members' safety and technical skills significantly contribute to reducing workplace accidents. Bhattacharya (2012) found that improving crew members' skills is closely related to improving workplace safety on board. Desfiaranti et al. (2023) stated that proper implementation of the ISM Code improves crew members' skills in preventing accidents. Siregar et al. (2023) also emphasized that crew members' safety skills directly reduce the incidence of workplace accidents on board ships.

## CONCLUSION

ISM Code implementation has a positive impact on Safety Awareness: Monitoring of ISM Code compliance (factor loading 0.928) is the dominant factor in increasing safety awareness, more significant than effectiveness evaluation (0.831).

Crew Competence has a positive impact on Safety Awareness: Educational training (factor loading 0.939) has the greatest contribution to increasing safety awareness, greater than management involvement (0.902).

The implementation of the ISM Code has a positive impact on the prevention of work accidents.: Compliance monitoring (factor loading 0.928) plays a major role in preventing work accidents, with a smaller effectiveness evaluation (0.831).

Crew skills have a positive impact on preventing work accidents.: Educational training (factor loading 0.939) has a strong influence in reducing work accidents, while management involvement (0.902) has a smaller influence.

Safety Awareness has a positive influence on Workplace Accident Prevention: Safety culture (factor loading 0.893) has a significant influence on work accident prevention, while collective individual awareness (0.872) is smaller but remains significant.

The implementation of the ISM Code has an impact on preventing work accidents through safety awareness.: Compliance monitoring (factor loading 0.928) plays an important role in building safety awareness which contributes to the prevention of work accidents.

Crew Competence Influences Work Accident Prevention Through Safety Awareness: Educational training (factor loading 0.939) plays a major role in increasing safety awareness that prevents work accidents, with practical knowledge (X2.9, 0.907) being the most influential indicator.

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