DIJDBM: Dinasti International Journal of Digital Business Management
E-ISSN: 2715-4203
P-ISSN: 2715-419X
DINASTI PUBLISHER
https://dinastipub.org/DIJDBM dinasti.info@gmail.com +62 811 7404 455
**DOI:**https://doi.org/10.38035/dijdbm.v6i5


# The Influence of Maritime Regulations and Company Policies on the Human Factor Accident Rate as an Intervening Variable (Case Study at PT. Marina Logistik Sejahtera)

**Aries Setiadi[1], April Gunawan Malau[2], Ayudhia Pangestu Gusti [3].**
[1]College of Maritime Science,Jakarta, ariessetiadi910@gmail.com.
[2]College of Maritime Science,Jakarta, aprilgunawan22@gmail.com.
[3]College of Maritime Science,Jakarta,ayudhia.pg@gmail.com.

Corresponding Author: ariessetiadi910@gmail.com[1]

**Abstract:** This study aims to analyze the influence of maritime regulations and company policies on accident rates with human factors as an intervening variable at PT. Marina Logistics Sejahtera. The main issue examined is the extent to which maritime regulations and internal company policies can reduce shipping accident rates, as well as how human factors act as a mediator in strengthening the relationship among these variables. The population of this research consists of all crew members working at PT. Marina Logistik Sejahtera, with a total sample of 89 respondents. The sampling technique employed was purposive sampling using the Slovin formula. This study applied a quantitative method with a cross-sectional approach, in which data were collected through a Likert-scale questionnaire. The collected data were analyzed using Partial Least Square - Structural Equation Modeling (PLS-SEM) through several stages, including validity testing, reliability testing, and path analysis. The results indicate that maritime regulations and company policies have a positive and significant effect on both human factors and accident rates. Furthermore, human factors are proven to be an intervening variable that strengthens the influence of maritime regulations and company policies in reducing accident rates. Moreover, company policies have a more dominant effect compared to maritime regulations in shaping human factors and decreasing accident rates. The conclusion of this study is that improving regulatory compliance and strengthening internal policies based on training and crew competence are crucial strategies to reduce accident risks. Based on these findings, it is recommended that the company enhance its safety training system, improve regulatory monitoring mechanisms, and develop a risk management program focused on improving the quality of maritime human resources.

**Keyword:** Maritime Regulations, Company Policies, Human Factors, Accident Rates.

## INTRODUCTION

Maritime transportation has long been the backbone of the movement of people and goods worldwide, particularly in an archipelagic nation like Indonesia, with thousands of islands spread across the archipelago (Putri, 2019). Maritime transportation plays a vital role,

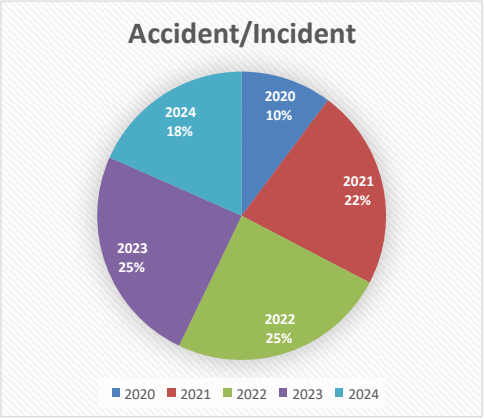
enabling economic interaction between islands and countries, accelerating logistics distribution, and supporting social mobility (Rahman & Wahyuni, 2020). With technological advancements and mobility needs, the government, along with ferry operators, is required to improve infrastructure, services, and shipping safety (Ministry of Transportation, 2022).

One of the key aspects of maritime safety is ship seaworthiness. Seaworthiness encompasses the physical condition of the ship, the readiness of safety equipment, and the crew's ability to carry out operational procedures (Setyawan et al., 2021). In Indonesia, this issue frequently draws public attention, particularly during ship accidents. Contributing factors include inadequate ship maintenance, malfunctioning safety equipment, and inadequate crew training (Andriani, 2019).

PT. Marina Logistik Sejahtera, as a domestic shipping company, faces quite complex safety dynamics. Data shows a fluctuating number of incidents over the past five years: 5 cases in 2020, increasing to 11 in 2021, reaching a peak of 12 in 2022–2023, and then declining to 9 in 2024. This trend demonstrates a risk pattern influenced by technical, human, and environmental factors, with equipment failures dominating throughout the period

**Table 1. Accident/Incident Data of PT. Marina Logistik Sejahtera 2020-2024**

| Year | Accident/Incident |
|---|---|
| 2020 | **5** |
| 2021 | **11** |
| 2022 | **12** |
| 2023 | **12** |
| 2024 | **9** |




A detailed analysis of incidents shows that in 2020, all cases were caused by technical failures, such as problems with the steering gear pump shaft, bow thruster, and turbocharger. This illustrates the weakness of preventative maintenance, which should be a priority. In 2021, incidents increased, with a combination of technical failures, illnesses due to COVID-19, and ship collisions caused by human error. This shift indicates that the human factor is becoming more prominent in contributing to accidents.

In 2022, incidents remained high, with equipment failures accounting for 92% of the incidents, such as propeller, ramp door, and liferaft failures. Although the pandemic subsided, weak ship maintenance policies increased the likelihood of a repeat accident. The following year, 2023, the number of incidents remained high (12 incidents), but this time, there were actual work-related accidents involving crew, such as falls overboard and injuries caused by mooring lines. This confirms the increasing role of human factors in safety risks.

2024 saw a decrease in cases to nine, with a more diverse pattern of causes: six technical cases, two environmental cases due to weather, and one near miss. Although human factors were not dominant, the weak environmental risk mitigation demonstrated the interconnectedness between human and external factors. This pattern indicates that navigational safety is influenced not only by technical conditions but also by crew preparedness to deal with extreme weather.

The pattern of these incidents reveals a gap between regulations and actual implementation on the ground. Maritime regulations such as SOLAS, the ISM Code, and the ISPS Code should be instruments for accident prevention through maintenance standards and safety procedures. However, in reality, weak implementation results in recurring technical failures. Regulations remain merely administrative formalities without effective enforcement.

In addition to regulations, company policies also play a crucial role. Internal policies should outline regulations to be more applicable, encompassing preventative maintenance, crew training, and health management. However, in the case of PT. Marina Logistik Sejahtera, maintenance policies remain reactive, as evidenced by the numerous recurring technical failures. Cases of illness due to Covid-19 and workplace accidents also highlight weak crew management and personal safety procedures.

The human factor is both a key and intervening variable in the relationship between regulations, policies, and accident rates. In 2021, illnesses due to Covid-19 and human error were significant causes. In 2023, work-related accidents directly affected crew members. This demonstrates that weaknesses in regulations and policies ultimately lead to human error, whether in the form of negligence or physical limitations of crew members.

This empirical phenomenon aligns with previous studies that suggest human error contributes 70–85% to maritime accidents (Hasanspahić et al., 2021; Galieriková, 2019; Maternová et al., 2023). However, most studies still focus on individual errors without linking regulations and company policies as structural determinants. Therefore, research on the influence of maritime regulations and company policies on accident rates, with the human factor as an intervening variable, is relevant. This study is expected to provide both theoretical and practical contributions to improving maritime safety in Indonesia, particularly at PT. Marina Logistik Sejahtera.

## METHOD

This research is quantitative, employing a survey method, emphasizing the analysis of measurable and objective data through statistical calculations (Sekaran & Bougie, 2020). Surveys were chosen due to their non-interventional nature: the researchers did not treat respondents in a special way, but rather collected data through questionnaires. Furthermore, this research is a case study, focusing on a single object: the accident rate at PT. Marina Logistik Sejahtera over a specific period. This approach ensures homogeneity among respondents while allowing for deeper exploration of perceptions regarding the research object.

The study population included all crew members at PT. Marina Logistik Sejahtera in 2024, totaling 114 people from 9 ships. Their job composition includes: 10 captains, 20 helmsmen, 8 oilers, 8 cooks, 12 windshield wipers, 24 boy waiters, 6 welders, 8 sailors, 2 shipmasters, 2 machinists, and 2 second machinists. With this number, the sample determination used the Slovin formula from Taro Yamane (Ridwan & Kuncoro, 2020) with a precision level of 5%. The calculation results in n = 88.72 or rounded to 89 respondents as the research sample.

Data processing was performed using SmartPLS 4 to simplify analysis and accelerate the development of accurate results. The data processing stages included editing, which is an initial check of the completeness and consistency of respondents' answers, and coding, which is assigning codes to similar answers to facilitate tabulation. Data tabulation was then performed, which is the systematic arrangement of the data in tabular form to facilitate analysis and interpretation of the research results.

Data analysis used path analysis with hypothesis testing, considering that this study has two independent variables, one mediating variable, and one dependent variable. This approach allows researchers to simultaneously test the direct and indirect effects between variables. Therefore, this method is suitable for examining the role of human factors as a mediating

variable in the relationship between maritime regulations, company policies, and accident rates at PT. Marina Logistik Sejahtera.

In addition, a Root Cause (Fishbone) analysis was used in this study to find the root cause of the accident rate problem on board PT. Marina Logistik Sejahtera ships using the Root Cause Analysis (RCA) approach. Based on the Miles & Huberman model (Sugiyono, 2016), the analysis process was carried out through data reduction, data presentation, and drawing conclusions verified with a Fishbone Diagram. This diagram groups the causes of the problem into five main categories: Man, Machine, Method, Material, and Environment, which are then broken down to the most fundamental cause level. The results of the analysis are presented in a problem-solving table, which contains problem identification, root cause, solutions (temporary and main), PIC (person in charge), time limits, and implementation progress. With this method, the study was not only able to identify the dominant factors causing accidents, but also provided more systematic and applicable solution directions to improve work ethics and shipping safety.

## RESULTS AND DISCUSSION

The description of the respondents of this study includes 89 crew members of PT. Marina Logistik Sejahtera who were selected through a Google Form questionnaire via WhatsApp. Based on the results of primary data processing (2025), the majority of respondents were male (92.1%) and only 7.9% were female, reflecting the dominance of men in the shipping industry which demands physical strength, mobility, and readiness to face work risks. In terms of age, most respondents were in the range of 35–40 years (77.5%), followed by those aged over 40 years (15.7%) and young people aged 21–35 years only 6.7%, which indicates that the workforce in this sector is more dominated by mature age groups with adequate work experience, while the regeneration of young workers is still low. Educational characteristics show that the majority of respondents were Diploma graduates (73.0%), followed by Bachelor's (13.5%), High School/Vocational High School (11.2%), and Master's (2.2%), which indicates that companies recruit more workers with vocational backgrounds to meet the technical needs of ship operations. In terms of work experience, the majority of crew members have worked for 1–3 years (67.4%), then less than 1 year (16.9%), and more than 3 years (15.7%), indicating that most crew members are still in the early to mid-career stages so that the learning process and adaptation to maritime safety standards are ongoing, while the number of experienced senior crew members is relatively limited to support knowledge transfer in the field.

### Evaluation of Measurement (Outer) Model

### Validity Testing

All research variable indicators show loading factor values above 0.6, thus they can be declared valid. Maritime Regulations (X1) confirms that the aspect of shipping safety is the strongest indicator (0.915), while marine environmental protection is relatively lower (0.891) although still significant. In the Company Policy variable (X2), the HR training & development dimension appears as the most dominant (0.951), indicating the company's focus on improving crew competency. Human Factors (Y) shows Unsafe Acts as the strongest indicator (0.969), confirming the dominance of unsafe behavior towards accident risk. Meanwhile, the Accident Rate (Z) is dominated by variations in accident types (0.973) rather than simply frequency (0.922). Thus, these validity results show that all indicators used in the study are able to represent their latent constructs accurately.

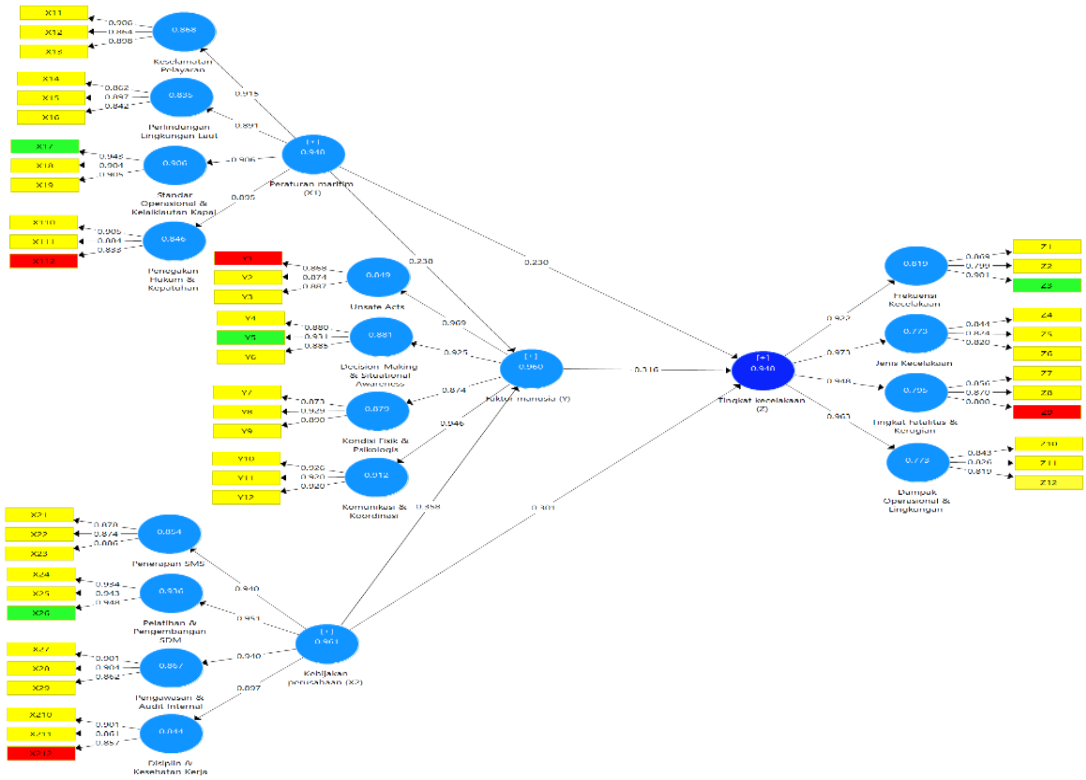


**Figure 2 Research Results Matrix**

## Cross Loading / Discriminant Validity)

The results show that the correlation value of each indicator with its original variable is higher than that of other variables, thus fulfilling the requirements of discriminant validity. This means that each indicator truly measures the construct that it is supposed to measure and there is no overlap between variables. For example, indicator X18 is higher in Maritime Regulations than in other variables, and the same thing occurs with indicators X25 in Company Policy, Y10 in Human Factors, and Z3 in Accident Rate. This confirms that the four constructs in this study are unique, separate, and independent, making them suitable for use in further analysis.

## Average Variance Extracted / AVE

Based on the AVE value for all research variables above 0.5 (Maritime Regulations = 0.639; Company Policy = 0.699; Human Factors = 0.697; Accident Rate = 0.637), it can be concluded that the construct has good convergent validity. This value indicates that more than 63% of the indicator variation can be explained by each latent construct, the remainder is influenced by other factors outside the model. In other words, the indicators used truly reflect the latent variables consistently and are able to capture the essence of the construct being studied.

## Reliability Test: Cronbach's Alpha & Composite Reliability

The results of the reliability test show that all variables have Cronbach's Alpha and Composite Reliability values above 0.7 (X1 = 0.955; X2 = 0.965; Y = 0.965; Z = 0.955). This means that the indicators used in each construct have excellent internal consistency. With high reliability, it can be ensured that the measurement of variables in this study is stable, consistent, and able to provide the same results when repeated measurements are carried out. Thus, the measurement model can be declared reliable and ready to be used for testing on the structural model (inner model).

## Structural Model Evaluation (Inner Model)

BeThe following are the results of data processing using the Smart - PLS 3.0 application:

**Table 2 Direct and Indirect Influences**

| Hypothesis | Influence | Original sample (O) | T statistics (\|O/STDEV\|) | P values | Note |
|---|---|---|---|---|---|
| H1 | Maritime regulations (X1) -> Human factors (Y) | 0.238 | 2,812 | 0.005 | Significant |
| H2 | Company policy (X2) -> Human factors (Y) | 0.358 | 3,383 | 0.001 | Significant |
| H3 | Maritime regulations (X1) -> Accident rate (Z) | 0.230 | 2,392 | 0.017 | Significant |
| H4 | Company policy (X2) -> Accident rate (Z) | 0.301 | 4,531 | 0,000 | Significant |
| H5 | Human factor (Y) -> Accident rate (Z) | 0.316 | 3,492 | 0.001 | Significant |
| H6 | Maritime regulations (X1) -> Human factor (Y) -> Accident rate (Z) | 0.075 | 1,969 | 0.050 | Significant |
| H7 | Company policy (X2) -> Human factor (Y) -> Accident rate (Z) | 0.113 | 2,455 | 0.014 | Significant |

**Hypothesis 1: Direct Effect of Maritime Regulations on Human Factors**

The results of the study indicate that Maritime Regulations (X1) have a positive and significant effect on Human Factors (Y) (coefficient 0.238; T-statistics 2.812; p-value 0.005), which means that increased regulatory compliance boosts the quality of human resources, including discipline, professionalism, and crew compliance with SOPs.

This finding is in line with research by Batalden & Sydnes (2014) which emphasized the role of the ISM Code in strengthening safety management, although human compliance remains a challenge; Hidayatullah, Budiarto, & Kiryanto (2024) who found that the implementation of the ISM Code in Tanjung Priok improved crew understanding despite weak emergency preparedness; Ananda, Mulyatno, & Jokosisworo (2023) who highlighted the importance of inspection, training, and maintenance; Meilinasari et al. (2021) who proved that the ISPS Code improves ship safety; Galieriková (2019) who revealed that the majority of maritime accidents were caused by human error; and Wróbel et al. (2021) emphasized the importance of regulations in reducing operator errors on remote-controlled vessels. Thus, maritime regulations have proven to be instrumental in shaping safe behavior and crew compliance at PT. Marina Logistik Sejahtera.

**Hypothesis 2: Direct Influence of Company Policy on Human Factors**

Data analysis shows that Company Policy (X2) has a significant effect on Human Factors (Y) (coefficient 0.358; T-statistic 3.383; p-value 0.001), which means that the more structured the company policy, the better the discipline, SOP compliance, and crew reliability.

This is supported by Djunaidi et al. (2021) who emphasize safety resilience to strengthen long-term capacity; Rikardo, Saleh, & Nurrahman (2023) who found that OHS policies increase crew compliance in using PPE; Siregar et al. (2021) who emphasize the importance of placing certified seafarers; Hendrawan (2020) who stated that OHS programs improve occupational safety; Ratmoko et al. (2024) who link basic training and organizational communication with crew safety; and Sumali et al. (2019) who highlight that compensation systems and shipworthiness influence crew satisfaction and motivation. Thus, company policy is proven to be a driving force in the formation of safety-oriented human factors at PT. Marina Logistik Sejahtera.

**Hypothesis 3: Direct Effect of Maritime Regulations on Accident Rates**

The results of the study show that Maritime Regulation (X1) has a significant effect on the Accident Rate (Z) (coefficient 0.230; T-statistic 2.392; p-value 0.017), which indicates that the implementation of regulations reduces the risk of incidents.

These results are in line with Batalden & Sydnes (2014) who stated that the ISM Code reduces the number of accidents; Hidayatullah, Budiarto, & Kiryanto (2024) who emphasized that regulations improve understanding of emergency procedures; Ananda, Mulyatno, & Jokosisworo (2023) who found that regular inspections reduce technical risks; Meilinasari et al. (2021) who proved that the ISPS Code improves ship safety; Hasanspahić et al. (2021) who stated that 80–85% of maritime accidents in Europe originate from human error which can be reduced by regulations; and Maternová et al. (2023) who emphasized that regulations are effective in reducing accident fatalities. Thus, maritime regulations have proven to be a strategic risk controller in reducing the number of ship accidents at PT. Marina Logistik Sejahtera.

**Hypothesis 4: Direct Effect of Company Policy on Accident Rate**

Company Policy (X2) was proven to have a significant effect on the Accident Rate (Z) (coefficient 0.301; T-statistic 4.531; p-value 0.000), which means that audit policies, PPE provision, and crew supervision have a significant impact on reducing accidents.

This is in line with Djunaidi et al. (2021) who emphasized safety resilience as a long-term prevention strategy; Rikardo, Saleh, & Nurrahman (2023) who found that OHS policies increase crew compliance; Hendrawan (2020) who emphasized that policies in the form of training and health checks reduce the risk of accidents; Siregar et al. (2021) who emphasized the importance of competent seafarers; Ratmoko et al. (2024) who highlighted the role of communication and basic training; and Sumali et al. (2019) who stated that shipworthiness policies and compensation systems maintain motivation and reduce the risk of accidents. Thus, company policies at PT. Marina Logistik Sejahtera function as strategic accident control tools.

**Hypothesis 5: Direct Influence of Human Factors on Accident Rate**

The Human Factor (Y) was proven to have a significant effect on the Accident Rate (Z) (coefficient 0.316; T-statistics 3.492; p-value 0.001), which means that improving crew quality has an impact on reducing accidents.

This finding is consistent with Hasanspahić et al. (2021) who found 80–85% of maritime accidents due to human error; Chowdhury et al. (2024) who stated 65.8% of accidents originated from engine room activities; Galieriková (2019) who confirmed 70% of maritime accidents were triggered by decision errors; Satya Putraman et al. (2019) who proved the human factor was dominant in ship collision accidents in Surabaya; Cahyasusila & Pratama (2022) who found unsafe acts as the biggest cause of ship accidents; and Wahyuni & Setiawan (2021) who confirmed that human error had a significant effect on ship accidents. Thus, the human factor is the last bastion of accident prevention at PT. Marina Logistik Sejahtera.

**Hypothesis 6: Indirect Effect of Maritime Regulations on Accident Rates through Human Factors**

Maritime Regulations (X1) also have an indirect effect on the Accident Rate (Z) through the Human Factor (Y) (coefficient 0.075; T-statistics 1.969; p-value 0.050), which means that regulations work by encouraging crew discipline, compliance, and awareness.

These results are in line with Batalden & Sydnes (2014) who stated that the ISM Code improves crew discipline; Meilinasari et al. (2021) who emphasized that the ISPS Code strengthens human resource competencies; Ananda, Mulyatno, & Jokosisworo (2023) who emphasized that routine training and inspections improve human resource quality; Hidayatullah, Budiarto, & Kiryanto (2024) who stated that regulations encourage crew preparedness; Wróbel et al. (2021) who emphasized the importance of regulations despite

technological advances; and Maternová et al. (2023) who stated that regulations reduce accident fatalities by controlling human error. Thus, maritime regulations serve a dual purpose: directly reducing accidents and indirectly through improving human factors at PT. Marina Logistik Sejahtera.

**Hypothesis 7: Indirect Effect of Company Policy on Accident Rate through Human Factors**

Company Policy (X2) has an indirect effect on the Accident Rate (Z) through the Human Factor (Y) (coefficient 0.113; T-statistic 2.455; p-value 0.014), which means that internal policies improve human factors, then reduce accidents.

This is in line with Djunaidi et al. (2021) who stated that policies strengthen human resource resilience; Rikardo, Saleh, & Nurrahman (2023) who emphasized that OHS policies influence changes in crew behavior; Hendrawan (2020) who found that OHS programs influence safety behavior; Ratmoko et al. (2024) who stated that basic training and effective communication improve crew safety through human factors; Siregar et al. (2021) who highlighted the importance of competent seafarer placement policies; and Sumali et al. (2019) who emphasized that compensation policies and shipworthiness reduce the risk of accidents. Thus, company policies work effectively through improving human factors as a safety mediator at PT. Marina Logistik Sejahtera.

Based on the results of the root cause analysis using the Fishbone Diagram approach, it is clear that the human factor (Man) is the most dominant aspect influencing operational safety on ships. Low crew discipline in implementing safety standards and minimal involvement in technical and emergency training indicate weak human resource preparedness in dealing with emergency situations. This problem is not only related to technical skills, but also concerns the lack of internalization of safety culture in the work environment. Therefore, the development of routine training programs, performance evaluations based on safety indicators, and fostering discipline and safety awareness are the main solutions that must be prioritized. Without changes in crew behavior and mindset regarding the importance of safety, improvements in aspects of machinery, materials, methods, and the environment will be ineffective.

On the other hand, issues related to machinery, materials, methods, and the environment still need to be addressed in parallel to create a comprehensive maritime safety system. A preventive maintenance system must be implemented to ensure safety equipment is always ready for use, while material requirements planning needs to be based on real data to eliminate PPE and spare parts stock constraints. Regularly updating SOPs and comprehensive socialization will ensure crews have clear work guidelines, while the provision of real-time weather monitoring technology and recreational facilities can help mitigate external risks while maintaining crew mental health. With the synergy of these various solutions, PT. Marina Logistik Sejahtera can reduce accident rates, improve operational efficiency, and strengthen the company's reputation as a shipping service provider that prioritizes safety and marine environmental sustainability.

## CONCLUSION

Maritime regulations have a positive and significant impact on human factors.Improving the implementation of regulations, particularly through routine ship inspections and procedural compliance, directly improves crew discipline, professionalism, and readiness to face emergency situations, thereby ensuring the quality of human factors.

Company policies have a positive and significant impact on human factors.The consistent implementation of safety training and crew competency improvement policies has been proven to strengthen the safety culture on board, improve crew performance, and foster work behavior that is more compliant with operational standards.

Maritime regulations have a positive and significant impact on accident rates.The implementation of strict maritime regulations, especially shipworthiness inspections, helps reduce the potential for technical risks and human error, thereby reducing the number of shipping accidents.

Company policies have a positive and significant impact on accident rates.Internal policies that encourage planned maintenance, K3 programs, and periodic evaluations have been proven to reduce the likelihood of accidents by minimizing operational risks on ships.

Human factors have a positive and significant influence on accident rates.Crews who have a quick understanding of emergency conditions, accompanied by adherence to SOPs, contribute greatly to reducing accidents, because good response capabilities can prevent the impact of incidents from spreading.

Maritime regulations have a positive impact on accident rates through human factors.Regulations that increase crew professionalism and compliance indirectly reduce the number of accidents, because a well-trained and disciplined crew will be better able to implement safety systems effectively.

Company policies have a positive impact on accident rates through human factors.Company policies that emphasize crew training, health, and well-being not only improve human factors, but also simultaneously strengthen accident prevention efforts, as crews are more prepared, alert, and skilled at dealing with risks.

## REFERENCE

Ananda, R. D., Mulyatno, I. P., & Jokosisworo, S. (2023). Analisis penerapan ISM Code di kapal penumpang Pelabuhan Tanjung Priok. Jurnal Teknik Perkapalan, 11(2), 57–64.

Batalden, B.-M., & Sydnes, A. K. (2014). Maritime safety and the ISM code: A study of investigated casualties and incidents. WMU Journal of Maritime Affairs, 13(1), 3–25. https://doi.org/10.1007/s13437-013-0051-8

Cahyasusila, A. B., & Pratama, M. H. B. (2022). Analisis faktor manusia pada kecelakaan kapal di wilayah Indonesia. Jurnal Education and Development, 10(2), 385–392.

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), Modern methods for business research (pp. 295–336). Lawrence Erlbaum Associates.

Chowdhury, M. N., Shafi, S., Arzaman, A. F. M., Teoh, B. A., Kadhim, K. A., Salamun, H., … & Xuan, A. N. S. (2024). Navigating human factors in maritime safety: A review of risks and improvements in engine rooms of ocean-going vessels. International Journal of Safety and Security Engineering, 14(1), 1–14. https://doi.org/10.18280/ijsse.140101

Djunaidi, Z., Tantia, A. A., & Wirawan, M. (2021). Analysis of the safety resilience implementation in the maritime industry at public and private companies: A case study in Indonesia. Safety, 7(56). https://doi.org/10.3390/safety7030056

Galieriková, A. (2019). The human factor and maritime safety. Transportation Research Procedia, 40, 1319–1326. https://doi.org/10.1016/j.trpro.2019.07.183

Ghozali, I., & Latan, H. (2015). Konsep, teknik, aplikasi menggunakan Smart PLS 3.0 untuk penelitian empiris. BP Universitas Diponegoro.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2–24.

Hasanspahić, N., Vujičić, S., Frančić, V., & Čampara, L. (2021). The role of the human factor in marine accidents. Journal of Marine Science and Engineering, 9(3), 261. https://doi.org/10.3390/jmse9030261

Hendrawan, A. (2020). Program kesehatan dan keselamatan kerja di atas kapal. Jurnal Sains Teknologi Transportasi Maritim, 2(1), 1–10.

Hidayatullah, M. R., Budiarto, U., & Kiryanto, I. (2024). Implementasi ISM Code pada kapal di Pelabuhan Tanjung Priok. Jurnal Teknik Perkapalan, 11(2), 49–56.

Maternová, A., Materna, M., Dávid, A., Török, A., & Švábová, L. (2023). Human error analysis and fatality prediction in maritime accidents. Journal of Marine Science and Engineering, 11(12), 2287. https://doi.org/10.3390/jmse11122287

Meilinasari, F., Febriansyah, G., & Syahdana, R. (2021). Optimalisasi penerapan ISPS Code untuk meningkatkan keselamatan dan keamanan di atas kapal MV. CK Bluebell. METEOR STIP Marunda, 14(2), 67–74. https://doi.org/10.36101/msm.v14i2.196

Putri, L. (2019). Analisis risiko keselamatan pelayaran pada kapal barang di pelabuhan Indonesia. Jurnal Transportasi Laut, 6(1), 45–53.

Rahman, H., & Wahyuni, E. (2020). Evaluasi implementasi keselamatan laut di pelabuhan Tanjung Priok. Jurnal Maritim Indonesia, 7(2), 101–112.

Kementerian Perhubungan. (2022). Laporan tahunan keselamatan pelayaran 2022. Direktorat Jenderal Perhubungan Laut.

Setyawan, B., Hidayat, R., & Santoso, F. (2021). Implementasi human error reduction dalam operasi kapal niaga. Jurnal Teknik Perkapalan, 9(3), 75–84.

Andriani, S. (2019). Faktor manusia dalam kecelakaan pelayaran di Indonesia. Jurnal Keselamatan Laut, 5(2), 33–42.

Ridwan, T., & Kuncoro, P. (2020). Analisis pengaruh human error terhadap kecelakaan kapal di pelabuhan. Jurnal Transportasi dan Keselamatan, 8(1), 55–64.

Satya Putraman, D. C. S., Artana, K. B., & Pitana, T. (2019). Analisis human error pada kecelakaan kapal di Pelabuhan Tanjung Perak Surabaya menggunakan HFACS. Jurnal Teknologi Perkapalan, 14(3), 95–103.

Sekaran, U., & Bougie, R. (2020). Research methods for business: A skill-building approach (7th ed.). John Wiley & Sons Ltd.

Siregar, V. S., Haryati, S., & Rizqi, M. D. (2021). Pengaruh kebijakan perusahaan mengenai penempatan pelaut berijazah kompetensi kelas III sebagai juru mudi dan juru minyak terhadap pengembangan karir pelaut di atas kapal milik PT Tanto Intim Line. METEOR STIP Marunda, 14(2), 100–129.

Sugiyono. (2016). Metode penelitian pendidikan: Pendekatan kuantitatif, kualitatif, dan R&D. Alfabeta.

Sumali, B., Barasa, L., & Gunawan, A. (2019). The influence of ship's seaworthiness and compensation system towards ship's crew job satisfaction at PT. Humpuss Bulk Transportation Jakarta. International Review of Management and Marketing, 9(5), 38–45. https://doi.org/10.32479/irmm.8534

Wróbel, K., Gil, M., & Chae, C.-J. (2021). On the influence of human factors on safety of remotely-controlled merchant vessels. Applied Sciences, 11(3), 1145. https://doi.org/10.3390/app11031145

Wahyuni, E., & Setiawan, R. (2021). Pengaruh human error terhadap kecelakaan kapal. Jurnal Transportasi Laut, 8(2), 120–135.