

MARITIME TRANSPORT REGULATION AND ECONOMIC LOSSES FROM SHIP ACCIDENTS: A STAKEHOLDER ANALYSIS OF LIABILITY AND COMPENSATION

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Abstract

This study aims to analyze legal liability and the distribution of economic losses arising from maritime transport accidents in Indonesia, framing ship accidents as legal and governance issues involving various stakeholders. The research employs a normative, juridical method utilizing conceptual and case-based approaches, supported by stakeholder analysis. Legal materials include legislation, court rulings, academic literature, and prior research concerning ship accidents, marine pollution, carrier liability, insurance, and compensation mechanisms. An analysis of the MT Samudera Biru 168–MV Rokan Permai, KM Zahro Express, and MT Kharisma Selatan cases reveals that liability for ship accidents extends beyond the fault of the master or operator; it also implicates shipowners, carriers, insurance companies or P&I Clubs, port authorities, regulators, and other parties within the maritime transport ecosystem. The findings indicate that the resulting losses are multidimensional, encompassing damage to vessels and cargo, passenger losses, environmental pollution, and economic impacts on communities and maritime activities. Accordingly, the effectiveness of the liability regime depends not only on identifying fault but also on allocating risk, ensuring adequate compensation, and coordinating stakeholders. The study recommends strengthening stakeholder-based governance and establishing more integrated compensation mechanisms.

Keywords: *Compensation, Economic Loss, Legal Liability, Ship Accidents, Stakeholder Governance.*

A. INTRODUCTION

Maritime transportation constitutes a strategic component of Indonesia's economic infrastructure, serving to connect the archipelago, facilitate the movement of goods and passengers, and underpin trade activities and supply chains. This role positions maritime safety as both a legal and an

economic issue.¹ Ship accidents not only cause damage to vessels and cargo but can also result in broader consequences, including loss of life, disruptions to port operations, environmental damage, revenue loss, and interruptions to distribution networks.² Consequently, the regulation of maritime transportation cannot be viewed merely as a mechanism for assigning fault; it must also be understood as an instrument for the equitable and efficient allocation of risk and the distribution of accident-related costs. In Indonesia, this regulatory framework is primarily established under Law Number 17 of 2008 concerning Shipping, which provides the legal foundation for the governance of shipping activities, including safety and security. The law has undergone several amendments, most recently through Law Number 66 of 2024, which constitutes its third amendment. These legislative developments reflect the continuing need to adapt shipping regulations to evolving operational demands and maritime risks.³

From a legal perspective, a primary issue following an accident is how liability and compensation are assigned to the parties involved. Maritime liability regimes have evolved through a combination of civil liability principles, environmental liability, insurance, and international compensation mechanisms. Zhu and Zhuo⁴ demonstrate that the legal framework for controlling ship source pollution encompasses administrative, civil, and criminal dimensions, yet issues regarding liability limitations and the effectiveness of compensation persist. These issues become critical when the actual losses resulting from an accident exceed the liability limits legally imposed on shipowners. In such scenarios, a potential gap arises between the actual economic loss incurred and the compensation amount available to victims.⁵

¹ Bonny Azwan, Henry Aspan, and T. Riza Zarzani, "Juridical Review of *Criminal Liability for Negligence in Shipping Safety Standards on Motor Sailing Vessels*," in *Proceedings of the International Conference on Islamic Community Studies*.

² Nermin Hasanspahić, Srđan Vujičić, Vlado Frančić, and Leo Čampara, "The Role of the Human Factor in Marine Accidents," *Journal of Marine Science and Engineering* 9, no. 3 (2021): 261. See too, Lia Nuraini, Suryadi Suryadi, Oksep Adhayanto, Dewi Haryanti, Marnia Rani, Pery Rehendra Sucipta, and Muhammad Fajar Hidayat, "Application of the Concept of Eco Liability in Marine Pollution Due to Ship Accidents in Batam Waters Indonesia," in *BIO Web of Conferences*.

³ Indien Winarwati, "Law Enforcement against Marine Pollution Foreign Ships in Indonesia," *CCER* (2020): 178. See too, P. Wołesza, S. Thombre, and R. Guinness, "Maritime Safety—Stakeholders in Information Exchange Process," *TransNav: International Journal on Marine Navigation and Safety of Sea Transportation* 9, no. 1 (2015): 143–148.

⁴ Ling Zhu and Ruixuan Zhuo, "A Survey of the Legal and Policy Framework for Controlling, Compensating and Criminalizing Ship-Source Pollution in Hong Kong," *Marine Policy* 76 (2017): 38–47.

⁵ Valen Nainggolan and Gunardi Lie, "Liability for Compensation of Insurance Parties for Maritime Transport Accidents: Analysis of Decision Number 640/Pdt. G/2014/PN. SBY," *ARRUS Journal of Social Sciences and Humanities* 4, no. 1 (2024): 7–13. See too, Jing Wang, Xiaolan Huang, Menghua Mai, Shuhao Fang, Qiang Zhang, Hui Huang, and Dingding Yang, "Enhancing Maritime

The issue of risk allocation is also closely linked to the existence of insurance and financial security mechanisms. Van Tan⁶ identifies compulsory civil liability insurance and financial security as essential components of compensation systems for ship source pollution. This mechanism essentially shifts a portion of the financial risk from the shipowner to an insurance company or another compensation mechanism. In a broader context, Mukherjee⁷ emphasizes the importance of distinguishing between economic loss and environmental damage within the law regarding ship-source pollution. This indicates that the value of losses resulting from an accident cannot always be easily translated into a measure of legal compensation.

At the international level, liability and compensation systems demonstrate a sharing of risk among shipowners, insurers, and compensation funds. Marchand⁸ outlines the evolution of the international regime through the Civil Liability Convention (CLC), the Fund Convention, the Supplementary Fund, and the Bunkers Convention, including the application of strict liability and limitation of liability. Jacobsson⁹ further notes that the ship source pollution liability regime was established to create a predictable compensation mechanism while limiting the liability exposure of responsible parties. From the perspective of the economic analysis of law, Faure and Yu¹⁰ expand the discussion by questioning how the law should allocate costs and risks to the parties best economically positioned to prevent or bear the losses.

The economic impact of shipping accidents also demonstrates that the concept of loss extends beyond the relationship between the victim and the liable party. Zhang et al.¹¹ show that maritime accidents can result in multidimensional economic losses and environmental damage. The Ever-Given incident illustrates even broader dimensions. Tran et al.¹² demonstrate that

Safety in Offshore Wind Power Engineering: A Holistic Approach to Accident Cause Analysis, Barrier Design, and Mitigation Strategies," *Ocean Engineering* 316 (2025): 119964

⁶ Pham Van Tan, "Compulsory Civil Liability Insurance, Financial Security: An Integral Component of Compensation for Ship-Source Oil Pollution Damage," *International Journal of Maritime History* 33, no. 2 (2021): 435.

⁷ Proshanto Mukherjee, "Economic Losses and Environmental Damage in the Law of Ship-Source Pollution," in *The Environmental Liability of the Shipowner*.

⁸ Pauline Marchand, "The International Law Regarding Ship-Source Pollution Liability and Compensation: Evolution and Current Challenges," in *International Oil Spill Conference Proceedings* 2017, 193–210.

⁹ Måns Jacobsson, "Liability and Compensation for Ship-Source Pollution," in *The IMLI Manual on International Maritime Law*, vol. 3 (2016), 285–342.

¹⁰ Michael G. Faure and Haiyang Yu, "The Liability of Salvors towards Third Parties in Case of Environmental Salvage: Economic Analysis," *Marine Policy* 160 (2024): 105914.

¹¹ Zeguo Zhang, Qinyou Hu, and Jianchuan Yin, "Maritime-Accident-Induced Environmental Pollution and Economic Loss Analysis Using an Interpretable Data-Driven Method," *Sustainability* 17, no. 7 (2025): 3023.

¹² Nguyen Khoi Tran, Hercules Haralambides, Theo Notteboom, and Kevin Cullinane, "The Costs of Maritime Supply Chain Disruptions: The Case of the Suez Canal Blockage by the 'Ever Given' Megaship," *International Journal of Production Economics* 279 (2025): 109464.

shipping disruptions can impose costs on ship operators, cargo owners, supply chains, and maritime infrastructure authorities. Consequently, shipping accidents or incidents can be understood as systemic economic disruptions rather than merely events resulting in private losses.

This complexity necessitates an analysis involving various stakeholders. Yuen et al.¹³ highlight stakeholder participation as a crucial factor in the governance and sustainability of maritime transport. Dominguez et al.¹⁴ have even developed a “Maritime Accident Ecosystem” approach, viewing accidents as the outcome of interactions among various actors, including seafarers, shipping organizations, shipowners, flag states, classification societies, port authorities, insurance companies, and external actors. A similar approach can be found in Celik and Topcu¹⁵, who employed ANP analysis to map stakeholder responsibilities regarding maritime environmental incidents. Meanwhile, an analysis of the Sewol disaster highlights the importance of viewing safety failures as systemic issues involving organizations, regulators, and emergency response mechanisms.¹⁶

In the Indonesian context, this complexity is particularly relevant because maritime transport governance involves numerous institutions with overlapping jurisdictions. Rahayu et al.¹⁷ demonstrate that maritime transport governance in Global South nations, including Indonesia, faces challenges regarding institutional fragmentation, coordination, information asymmetry, and stakeholder incentives. These conditions potentially impact the effectiveness of accident prevention as well as post-accident liability mechanisms.

This study aims to analyze how Indonesia’s maritime transport liability framework allocates risks and compensates losses arising from ship accidents,

¹³ Kum Fai Yuen, Xueqin Wang, Yiik Diew Wong, and Kevin X. Li, “The Role of Stakeholder Participation and Sustainability Integration in Maritime Transport: A Structure-Conduct-Performance Analysis,” *Transport Policy* 99 (2020): 44.

¹⁴ Carine Dominguez-Péry, Rana Tassabehji, Franck Corset, and Zainab Chreim, “A Holistic View of Maritime Navigation Accidents and Risk Indicators: Examining IMO Reports from 2011 to 2021,” *Journal of Shipping and Trade* 8, no. 1 (2023): 11. See too, Jerymianus Gilalo, Mulyadi Mulyadi, R. Yuniar Anisa Ilyanawati, and Jacobus Jopie Gilalo, “Study of the Ruling of the Shipping Court in Burning Boat Accidents That Impact Losses Passenger as Consumers,” *Batulis Civil Law Review* 5, no. 2 (2024): 99.

¹⁵ Metin Celik and Y. Ilker Topcu, “Use of an ANP to Prioritize Managerial Responsibilities of Maritime Stakeholders in Environmental Incidents: An Oil Spill Case,” *Transportation Research Part D: Transport and Environment* 14, no. 7 (2009): 502.

¹⁶ Dohyung Kee, Gyuchan Thomas Jun, Patrick Waterson, and Roger Haslam, “A Systemic Analysis of South Korea Sewol Ferry Accident—Striking a Balance between Learning and Accountability,” *Applied Ergonomics* 59 (2017): 504. See too, Elfrida Ratnawati, Vience Ratna Multi Wijaya, Meta Indah Budhianti, and Bobur Baxtishodovich Sobirov, “Is the Master Civil Liable Based on Sea Freight Arrangements in Indonesia?” *Journal of Human Rights, Culture and Legal System* 4, no. 1 (2024): 209–236.

¹⁷ Lisna Rahayu, Tim Busscher, Taede Tillema, and Johan Woltjer, “Maritime Transport Governance Challenges in the Global South,” *Marine Policy* 163 (2024): 106147.

while evaluating the roles and interactions of relevant stakeholders in accident prevention and post-accident responses. Its contribution lies in integrating legal liability analysis with stakeholder analysis to assess the effectiveness of maritime transport regulations. By examining institutional coordination, insurance mechanisms, liability limitations, and compensation arrangements, this study seeks to identify regulatory gaps and propose improvements that promote effective accident prevention, adequate compensation, and a fairer distribution of economic losses among stakeholders. Based on the introduction, this study will address and answer the following questions:

1. How do legal liability arrangements for maritime transport in Indonesia allocate risk and compensation for losses arising from ship accidents?
2. What broader economic consequences arise from maritime accidents, and how should they be addressed?
3. How can stakeholder analysis be utilized to evaluate the effectiveness of maritime transport regulations in preventing accidents and ensuring the equitable distribution of economic losses among the parties involved?

B. RESEARCH METHODS

This study employs a normative, juridical method, utilizing both conceptual and case study approaches to analyze maritime transport regulations in Indonesia, specifically focusing on legal liability and the distribution of economic losses resulting from ship accidents. The normative, juridical approach is used to analyze legislation concerning navigational safety, carrier liability, compensation, insurance, marine pollution, and liability limitation, while considering relevant international legal instruments regarding maritime liability and compensation. The conceptual approach is employed to link the concepts of legal liability, risk allocation, economic loss, compensation, and stakeholder governance.

The case study approach is applied through an analysis of three maritime accident cases in Indonesia: the MT Kharisma Selatan, the KM Zahro Express, and the collision between the MT Samudera Biru 168 and the MV Rokan Permai. The MT Kharisma Selatan case is used to analyze liability for marine pollution, environmental damage, and compensation mechanisms.¹⁸ The KM Zahro Express case is used to examine carrier liability, passenger safety, and victim compensation under Law Number 17 of 2008. Meanwhile, the MT Samudera Biru 168–MV Rokan Permai case is used to analyze the liability of the ship entrepreneur and the distribution of losses resulting from a ship collision.

¹⁸ Bambang Sugeng Ariadi Subagyono, Maradona Maradona, Hilda Yunita Sabrie, Mochamad Kevin Romadhona, Bambang Suheryadi, Zahry Vandawati Chumaida, and Ajeng Anggraeni, "Regulatory Framework on Ocean Threats–Transportation Law Analysis to Multiple Oil-Spill Cases in Indonesia," *Transactions on Maritime Science* 13, no. 2 (2024).

Furthermore, a stakeholder analysis is employed to map the roles, interests, authority, and responsibilities of shipowners, operators, crew members, insurers/P&I Clubs, port authorities, regulators, cargo owners, passengers, and affected communities. The data are analyzed using qualitative, descriptive, and prescriptive approaches to evaluate the effectiveness of the regulatory framework in equitably allocating risks and economic losses.

C. RESULTS AND DISCUSSION

1. The Distribution of Legal Liability Reflects a Multi-Stakeholder Maritime Governance Structure

Legal liability for ship accidents in Indonesia cannot be attributed solely to the shipmaster as the party directly controlling the vessel. Instead, the liability structure reveals a distribution of obligations among several actors, primarily shipowners, ship operators or shipping companies, masters and crew members, and authorities exercising supervisory functions. This finding aligns with the "Maritime Accident Ecosystem" perspective, which views accidents as the outcome of interactions between individuals, the ship organization, internal and external environments, and the broader regulatory framework.¹⁹

This indicates that the safety obligation is an ex-post responsibility, whereas compensation constitutes an ex-post responsibility. Prior to an accident, the company and the vessel operator are obligated to ensure seaworthiness, equipment completeness, crew competence, and compliance with safety requirements. Following an accident, this obligation shifts to a responsibility to manage the situation and provide compensation for losses. Sudiro and Braventa²⁰ identify seaworthiness as a crucial element of the maritime safety system, linking it to the requirements for obtaining a Port clearance.

The case of the MT Kharisma Selatan demonstrates that safety responsibility extends to the relationships between the vessel, the company, the cargo owner or operator, and the port authority. According to the KNKT report, the MT Kharisma Selatan capsized at Mirah Wharf, Tanjung Perak Port, on December 18, 2007, subsequent oil spill response measures included the

¹⁹ Anung Adityatjahja and Akhmad Ndori, "Criminal Liability of Ship Masters for Maritime Accidents: Analysis of Article 359 and Shipping Regulations," *ANTHOR: Education and Learning Journal* 5, no. 4 (2026): 2645–2651. See too, Lynda Asiana and Hari Purwadi, "Principle of Obligation to Pay in Terms of Pollution at Sea," in *3rd International Conference on Globalization of Law and Local Wisdom (ICGLOW 2019)*.

²⁰ Amad Sudiro and Yohanes Richardson Braventa, "The Ship Entrepreneur's Responsibility for the Collision of the MT Samudera Biru 168 with the MV Rokan Permai Based on Law Number 17 of 2008 Concerning Shipping (Case Study: Decision of the Surabaya District Court Number 315/Pdt. G/2019/PN. Sby)," in *3rd Tarumanagara International Conference on the Applications of Social Sciences and Humanities*.

deployment of oil booms and skimmers, as well as salvage operations. This case illustrates that when an accident results in pollution, the scope of liability expands, encompassing not only damage to the vessel or cargo but also environmental impact and response costs. Subagyono et al.²¹ place the MT Kharisma Selatan case within the broader context of threats to the marine environment and Indonesia's legal framework for transportation. Analyses of various oil spill cases highlight the importance of identifying the parties liable for damages arising from maritime accidents. Consequently, marine pollution gives rise to multi-layered liability, involving administrative, civil, and, under certain circumstances, criminal dimensions.²²

These findings from Indonesia align with international literature. Zhu and Zhuo²³ indicate that the regulatory regime for controlling ship source pollution comprises three primary layers: pollution prevention, civil liability, and criminal sanctions. They also emphasize the importance of raising civil liability limits as a means of preventing and deterring environmental violations. Marchand²⁴ highlights how the international regime evolved through a combination of the 1992 CLC, the 1992 Fund Convention, the Supplementary Fund, and the Bunkers Convention to expand protection for victims of ship-source pollution. Jacobsson²⁵ further notes that the liability and compensation regime for ship-source pollution was established to identify liable parties while simultaneously providing compensation mechanisms for victims. Meanwhile, Van Tan²⁶ identifies mandatory civil liability insurance and financial security as crucial components, given that shipowners often lack the financial capacity to cover the full extent of losses resulting from large-scale pollution.

²¹ Bambang Sugeng Ariadi Subagyono, Maradona Maradona, Hilda Yunita Sabrie, Mochamad Kevin Romadhona, Bambang Suheryadi, Zahry Vandawati Chumaida, and Ajeng Anggraeni, "Regulatory Framework on Ocean Threats—Transportation Law Analysis to Multiple Oil-Spill Cases in Indonesia," *Transactions on Maritime Science* 13, no. 2 (2024).

²² Indra Yudha Koswara and Hana Faridah, "Enforcement of Criminal Law on Marine Traffic Negligence in Indonesia: Perspectives of Law No. 17/2008," *Transactions on Maritime Science* 12, no. 2 (2023). See too, Hulya Yilmaz and Saliha Karadayi-Usta, "Social Sustainability through Human-Centered Risks Management in Maritime Industry: A Shipbuilding Case Study with Actors' Analysis," *Ocean Engineering* 332 (2025): 121398.

²³ Ling Zhu and Ruixuan Zhuo, "A Survey of the Legal and Policy Framework for Controlling, Compensating and Criminalizing Ship-Source Pollution in Hong Kong," *Marine Policy* 76 (2017): 38.

²⁴ Pauline Marchand, "The International Law Regarding Ship-Source Pollution Liability and Compensation: Evolution and Current Challenges," in *International Oil Spill Conference Proceedings 2017*.

²⁵ Måns Jacobsson, "Liability and Compensation for Ship-Source Pollution," in *The IMLI Manual on International Maritime Law*, vol. 3 (2016), 285–342.

²⁶ Pham Van Tan, "Compulsory Civil Liability Insurance, Financial Security: An Integral Component of Compensation for Ship-Source Oil Pollution Damage," *International Journal of Maritime History* 33, no. 2 (2021): 435.

This also demonstrates that the concept of liability cannot be divorced from insurance mechanisms.²⁷ Insurance does not replace the legal liability of the shipowner or carrier but serves as a financial mechanism to ensure that such obligations can be fulfilled. This finding aligns with Van Tan,²⁸ who states that compulsory civil liability insurance is an integral part of the oil pollution compensation system. In the Indonesian context, this is particularly relevant to tanker accidents, such as that involving the MT Kharisma Selatan, where potential losses may exceed the individual shipowner's capacity to pay.²⁹ Faure and Yu³⁰ add another dimension by showing that even salvors can face third-party liability if negligent salvage operations result in additional losses. However, they also emphasize that liability risks should not be set so high as to eliminate the incentive to undertake socially beneficial salvage operations. These findings highlight the importance of a legal framework capable of distinguishing between risk creation and risk reduction.

Thus, the analysis reveals that while Indonesia's liability system normatively recognizes the distribution of responsibility among multiple actors, its application still tends to focus on identifying the party directly at fault. The AME perspective, stakeholder participation, and governance approach indicate that accidents should be understood as systemic events.³¹ Consequently, the research finds that legal liability in ship accidents is a multi-layered responsibility encompassing operational, organizational, regulatory, environmental, and financial dimensions, with the level of each stakeholder's liability determined by their authority, obligations, contribution to risk, and causal relationship to the incident.

Another important aspect is the need to establish clear criteria for determining the proportionate liability of each stakeholder based on their

²⁷ Mohd Kamarulnizam Abdullah and Irma Rachmawati, "Advancing Protection and Indemnity Insurance (P&I Clubs): Strengthening Legal Protection for Indonesian Carriers," *LITIGASI* 24, no. 1 (2023): 130–150.

²⁸ Pham Van Tan, "Compulsory Civil Liability Insurance, Financial Security: An Integral Component of Compensation for Ship-Source Oil Pollution Damage," *International Journal of Maritime History* 33, no. 2 (2021): 435.

²⁹ Dewa Gede Sudika Mangku, Elly Kristianti Purwendah, Endah Rantau Itasari, and Bernadeta Resti Nurhayati, "Compensation for Oil Pollution Due to Tanker Accidents in the Indonesian Legal System in a Justice Value Perspective," *International Journal* 9 (2020): 663.

³⁰ Michael G. Faure and Haiyang Yu, "The Liability of Salvors towards Third Parties in Case of Environmental Salvage: Economic Analysis," *Marine Policy* 160 (2024): 105914.

³¹ Carine Dominguez-Péry, Rana Tassabehji, Lakshmi Narasimha Raju Vuddaraju, and Vikhram Kofi Duffour, "Improving Emergency Response Operations in Maritime Accidents Using Social Media with Big Data Analytics: A Case Study of the MV Wakashio Disaster," *International Journal of Operations & Production Management* 41, no. 9 (2021): 1544. See too, Lisna Rahayu, Tim Busscher, Taede Tillema, and Johan Woltjer, "Maritime Transport Governance Challenges in the Global South," *Marine Policy* 163 (2024): 106147. See too, Qingji Zhou, Yiik Diew Wong, Hong Xu, Vinh Van Thai, Hui Shan Loh, and Kum Fai Yuen, "An Enhanced CREAM with Stakeholder-Graded Protocols for Tanker Shipping Safety Application," *Safety Science* 95 (2017): 140–147.

respective functions and contributions to an accident. Without a consistent assessment framework, liability allocation may become fragmented, particularly when operational failures interact with organizational decisions and regulatory shortcomings. A stakeholder-based assessment can help distinguish direct negligence from failures arising from inadequate supervision, internal safety management, or institutional coordination. This approach supports more consistent liability determinations while ensuring that responsibility corresponds to each party's actual role in creating or managing maritime risks.³²

Furthermore, the effectiveness of maritime liability arrangements depends on the availability of reliable evidence and effective coordination during accident investigations. Information concerning vessel conditions, operational decisions, safety compliance, and emergency responses is essential for establishing causal relationships and determining the extent of responsibility.³³ Cooperation among investigating authorities, shipping companies, insurers, and other relevant stakeholders can therefore improve the accuracy of liability assessments and reduce disputes over compensation. This institutional coordination is particularly important in complex incidents involving multiple parties, where incomplete information may delay claims and undermine the effectiveness of the compensation process.³⁴

2. Maritime Accidents Generate Multidimensional Economic Losses Requiring Integrated Compensation Mechanisms

Losses resulting from ship accidents are multidimensional in nature and extend beyond physical damage to the vessel or the loss of cargo. Such losses may encompass property damage, cargo loss or damage, salvage costs, cleanup expenses, environmental damage, loss of community income, disruption to port operations, and indirect economic losses. These findings align with Zhang et al.³⁵ demonstrated that maritime accidents can result in

³² Metin Celik and Y. Ilker Topcu, "Use of an ANP to Prioritize Managerial Responsibilities of Maritime Stakeholders in Environmental Incidents: An Oil Spill Case," *Transportation Research Part D: Transport and Environment*. See too, Pengfei Chen, Yamin Huang, Junmin Mou, and P. H. A. J. M. Van Gelder, "Probabilistic Risk Analysis for Ship-Ship Collision: State-of-the-Art," *Safety Science* 117 (2019): 108–122. See too, Carine Dominguez-Péry, Rana Tassabehji, Franck Corset, and Zainab Chreim, "A Holistic View of Maritime Navigation Accidents and Risk Indicators: Examining IMO Reports from 2011 to 2021," *Journal of Shipping and Trade* 8, no. 1 (2023): 11.

³³ Rusniah Ahmad and Irma Rachmawati, "Implementation of Protection and Indemnity for Indonesian Ship a Compliance to Common Law System," *International Journal of Applied Business and Economic Research* 14, no. 6 (2016): 1–19.

³⁴ Lisna Rahayu, Tim Busscher, Taede Tillema, and Johan Woltjer, "Maritime Transport Governance Challenges in the Global South," *Marine Policy* 163 (2024): 106147.

³⁵ Zeguo Zhang, Qinyou Hu, and Jianchuan Yin, "Maritime-Accident-Induced Environmental Pollution and Economic Loss Analysis Using an Interpretable Data-Driven Method," *Sustainability* 17, no. 7 (2025): 3023.

environmental and property losses influenced by various factors related to the vessel, the accident itself, personnel, and environmental conditions. In the Indonesian context, the case of the MT Samudera Biru 168 and MV Rokan Permai illustrates that losses resulting from a collision can be framed within the relationship between the aggrieved party and the carrier. Sudiro and Braventa³⁶ explain that the losses arising from the collision and subsequent fire in this case raised questions regarding liability for compensation. They linked the resolution of compensation to Article 100, paragraph (3) of Law Number 17 of 2008, while associating the carrier's liability regarding cargo with Articles 40 and 41.

This highlights a distinction between the determination of liability and actual compensation capacity. Legally, a party may be held liable yet lack the financial capacity to cover the entirety of the losses. The issue becomes even more complex when environmental pollution is involved. Mukherjee³⁷ specifically points out that economic loss stemming from environmental damage represents one of the most complex issues within the legal regime governing ship, source pollution. The core issue is not merely whether the loss is real, but also whether, and to what extent, such a loss can be categorized as compensable economic loss.

The case of the MT Kharisma Selatan serves as a significant illustration. KNKT reports indicate that following the vessel's capsizing, various countermeasures were implemented to prevent and mitigate the spread of oil, including the deployment of oil booms, the use of oil skimmers, and salvage operations. Consequently, the economic costs associated with the accident were not limited to the initial damage sustained by the vessel but continued to accrue throughout the emergency response, vessel recovery, oil cleanup, and environmental restoration processes. Subagyo et al.³⁸ highlight the importance of a legal framework in determining liability for losses resulting from oil spills. This demonstrates that the allocation of losses cannot be based solely on the value of damaged assets but must also account for environmental damage and the public interest. In the case of the MT Kharisma Selatan, for instance, the response to the spill involved not only the vessel's operators but

³⁶ Amad Sudiro and Yohanes Richardson Braventa, "The Ship Entrepreneur's Responsibility for the Collision of the MT Samudera Biru 168 with the MV Rokan Permai Based on Law Number 17 of 2008 Concerning Shipping (Case Study: Decision of the Surabaya District Court Number 315/Pdt. G/2019/PN. Sby)," in *3rd Tarumanagara International Conference on the Applications of Social Sciences and Humanities*.

³⁷ Proshanto Mukherjee, "Economic Losses and Environmental Damage in the Law of Ship-Source Pollution," in *The Environmental Liability of the Shipowner*.

³⁸ Bambang Sugeng Ariadi Subagyo, Maradona Maradona, Hilda Yunita Sabrie, Mochamad Kevin Romadhona, Bambang Suheryadi, Zahry Vandawati Chumaida, and Ajeng Anggraeni, "Regulatory Framework on Ocean Threats—Transportation Law Analysis to Multiple Oil-Spill Cases in Indonesia," *Transactions on Maritime Science* 13, no. 2 (2024).

also the KPLP (Sea and Coast Guard), Pertamina, private companies, and salvage teams. This illustrates how economic and operational burdens can be distributed among multiple stakeholders even before the compensation claim process is concluded.

At the international level, Marchand³⁹ notes that the 1992 CLC, the 1992 Fund Convention, the Supplementary Fund, and the Bunkers Convention were designed to establish a tiered compensation system. This model is significant as it demonstrates the existence of additional mechanisms to compensate victims when losses exceed the shipowner's liability limits. Jacobsson⁴⁰ further explains that the international liability and compensation regime was established to ensure a more systematic link between polluter liability and the payment of compensation. Van Tan⁴¹ reinforces these findings by demonstrating that compulsory insurance and financial security are necessary because pollution incidents can result in losses on a scale that shipowners cannot bear on their own. Within the framework of this study, insurance is understood as a risk transfer mechanism rather than a means to eliminate liability. The shipowner remains the primary party liable, while the insurer or P&I Club ensures that a portion of the financial risk can be transferred and claims paid in accordance with policy terms and applicable legal regimes.

A further issue concerns the limits of compensability regarding "pure economic loss." Mukherjee⁴² points out that the legal link between environmental damage and economic loss is not always easily established. For instance, when marine pollution causes fishermen to lose income, questions arise regarding the causal relationship between the pollution and that loss. Similarly, when port operations are disrupted, companies facing delays may suffer economic losses even if their physical assets remain undamaged. Such situations reveal a potential "compensation gap" between actual economic losses and those that are legally compensable. Zhang et al.⁴³ strengthen the argument that losses arising from maritime accidents must be understood in multidimensional terms. Their research employs an interpretable machine learning approach to link accident factors with environmental and property

³⁹ Pauline Marchand, "The International Law Regarding Ship-Source Pollution Liability and Compensation: Evolution and Current Challenges," in *International Oil Spill Conference Proceedings* 2017.

⁴⁰ Måns Jacobsson, "Liability and Compensation for Ship-Source Pollution," in *The IMLI Manual on International Maritime Law*, vol. 3 (2016), 285–342.

⁴¹ Pham Van Tan, "Compulsory Civil Liability Insurance, Financial Security: An Integral Component of Compensation for Ship-Source Oil Pollution Damage," *International Journal of Maritime History* 33, no. 2 (2021): 435–441.

⁴² Proshanto Mukherjee, "Economic Losses and Environmental Damage in the Law of Ship-Source Pollution," in *The Environmental Liability of the Shipowner*.

⁴³ Zeguo Zhang, Qinyou Hu, and Jianchuan Yin, "Maritime-Accident-Induced Environmental Pollution and Economic Loss Analysis Using an Interpretable Data-Driven Method," *Sustainability* 17, no. 7 (2025): 3023.

losses. The findings indicate that vessel size, crew size, the type of vessel or accident, and environmental factors can all influence the magnitude of the loss. From a legal perspective, these findings are significant as they demonstrate that loss assessment should not rely on overly simplistic approaches.

The systemic dimension of maritime economic loss is evident in ship accidents that disrupt supply chains. Tran et al.⁴⁴ examining the Ever Given incident, demonstrate that a single maritime accident can generate widespread costs affecting ship operators, supply chains, inventories, and infrastructure authorities. Thus, economic losses may extend beyond the bilateral relationship between victims and responsible parties, propagating through broader economic networks. From a stakeholder perspective, Yuen et al.⁴⁵ found that stakeholder participation influences sustainability integration and organizational performance in maritime transport. This finding highlights the importance of preventive measures, as effective stakeholder involvement in safety and sustainability planning can reduce accident risks and limit the economic losses that must be addressed through compensation mechanisms after an incident.

Rahayu et al.⁴⁶ provide an Indonesian context, showing that maritime transport governance faces challenges regarding fragmentation, inter, actor coordination, and the relationships between port-to-port, within, port, and port, to, hinterland subsystems. Such fragmentation has direct consequences for the distribution of losses. When authority is dispersed, the processes of identifying liability, gathering information, assessing losses, and paying compensation can become increasingly complex. Bei et al.⁴⁷ also demonstrate that accident governance involves dynamic interactions among the government, shipping companies, and ship crews. They found that the costs associated with crew safety behavior and government incentives can influence the effectiveness of accident governance. This indicates that loss allocation should not merely be ex post in nature but should also create ex ante incentives, giving stakeholders an economic rationale to invest in safety.

⁴⁴ Nguyen Khoi Tran, Hercules Haralambides, Theo Notteboom, and Kevin Cullinane, "The Costs of Maritime Supply Chain Disruptions: The Case of the Suez Canal Blockage by the 'Ever Given' Megaship," *International Journal of Production Economics* 279 (2025): 109464.

⁴⁵ Kum Fai Yuen, Xueqin Wang, Yiik Diew Wong, and Kevin X. Li, "The Role of Stakeholder Participation and Sustainability Integration in Maritime Transport: A Structure-Conduct-Performance Analysis," *Transport Policy* 99 (2020): 44.

⁴⁶ Lisna Rahayu, Tim Busscher, Taede Tillema, and Johan Woltjer, "Maritime Transport Governance Challenges in the Global South," *Marine Policy* 163 (2024): 106147.

⁴⁷ Honghan Bei, Jiashuo Zhang, and Tianren Yang, "Analysis of Maritime Accident Governance Behaviors Based on Evolutionary Game Theory and System Dynamics," *Ocean Engineering* 335 (2025): 121737.

Medda et al.⁴⁸ demonstrate that shipping accidents, particularly those involving dangerous goods, can cause fatalities, environmental damage, and substantial economic losses, highlighting the importance of adequate liability and financial security mechanisms for high-risk maritime activities. In Indonesia, this approach can help distinguish losses borne directly by responsible parties, transferred through insurance, or addressed through additional compensation mechanisms. Faure and Yu⁴⁹ further emphasize the need to balance deterrence and compensation, as excessively low liability thresholds may fail to internalize accident costs, while excessive liability may discourage socially beneficial activities, such as rescue operations. Accordingly, Indonesia's maritime liability framework should ensure that parties creating risks bear proportionate costs while preserving incentives for other stakeholders to undertake damage mitigation and rescue efforts.

Zhu and Zhuo⁵⁰ similarly indicate that raising civil liability limits can enhance the deterrent effect against environmental pollution. However, the results of this study suggest that increasing liability alone is insufficient. A damage assessment mechanism is required that can transparently identify environmental losses, economic losses, clean-up costs, and loss of income. In other words, the effectiveness of a compensation regime hinges on a combination of liability rules, financial security, claims procedures, evidentiary standards, valuation methods, and stakeholder coordination.

Thus, the analysis reveals that the distribution of economic losses arising from ship accidents in Indonesia continues to face issues of fragmentation and a compensation gap. Economically tangible losses cannot necessarily be fully compensated through existing legal mechanisms. These findings align with Mukherjee⁵¹ regarding the challenges of economic loss compensability, Van Tan⁵² on the importance of financial security, Marchand⁵³ on tiered compensation systems, and Rahayu et al.⁵⁴ on governance

⁴⁸ Andrea Medda, Patrizia Serra, Marco Mandas, and Gianfranco Fancello, "A Risk Prediction Model for Maritime Accidents," *WMU Journal of Maritime Affairs* 23, no. 3 (2024): 415–436.

⁴⁹ Michael G. Faure and Haiyang Yu, "The Liability of Salvors towards Third Parties in Case of Environmental Salvage: Economic Analysis," *Marine Policy* 160 (2024): 105914.

⁵⁰ Ling Zhu and Ruixuan Zhuo, "A Survey of the Legal and Policy Framework for Controlling, Compensating and Criminalizing Ship-Source Pollution in Hong Kong," *Marine Policy* 76 (2017): 38–47.

⁵¹ Proshanto Mukherjee, "Economic Losses and Environmental Damage in the Law of Ship-Source Pollution," in *The Environmental Liability of the Shipowner*.

⁵² Pham Van Tan, "Compulsory Civil Liability Insurance, Financial Security: An Integral Component of Compensation for Ship-Source Oil Pollution Damage," *International Journal of Maritime History* 33, no. 2 (2021): 435.

⁵³ Pauline Marchand, "The International Law Regarding Ship-Source Pollution Liability and Compensation: Evolution and Current Challenges," in *International Oil Spill Conference Proceedings 2017*.

⁵⁴ Lisna Rahayu, Tim Busscher, Taede Tillema, and Johan Woltjer, "Maritime Transport Governance Challenges in the Global South," *Marine Policy* 163 (2024): 106147.

fragmentation in Indonesia. Consequently, this study concludes that effective economic loss allocation requires a shift from a purely fault-based, bilateral compensation model toward a multi-stakeholder risk, allocation model in which shipowners/carriers, insurers or P&I Clubs, operators, regulators, and other stakeholders play distinct yet complementary roles in preventing, bearing, and recovering from losses caused by maritime accidents.⁵⁵

3. Stakeholder Analysis of Regulatory Effectiveness and Equitable Loss Distribution

The stakeholder analysis reveals that liability for maritime transport accidents in Indonesia cannot be understood solely through the relationship between the party at fault and the party suffering the loss.⁵⁶ As shown in Table 1, various actors play distinct roles ranging from accident prevention, vessel management, and oversight to the provision of compensation. These actors include shipowners, ship operators, masters and crew, insurance companies or P&I Clubs, port authorities, regulators, flag states, classification societies, cargo owners, passengers, and affected communities. These findings align with Dominguez et al.,⁵⁷ who view maritime accidents as part of a “Maritime Accident Ecosystem”, necessitating an analysis of causes and consequences that considers the relationships between actors. Yuen et al.⁵⁸ also demonstrate that stakeholder involvement and coordination are crucial components of maritime transport governance.

⁵⁵ Mohd Kamarulnizam Abdullah and Irma Rachmawati, “The Development of the P&I Club as a Protection for Indonesian Carrier,” *DEVELOPMENT* 24, no. 1 (2023). See too, Huske Dwi Gustian, “Analysis of the Impact of Low Seafarer Competency on Maritime Accident Trends: Empirical Evidence from 2023–2025,” *Jurnal Ilmiah Multidisiplin Indonesia (JIM-ID)* 5, no. 08 (2026): 2235–2251.

⁵⁶ Ioanna Koromila, Olga Aneziris, Zoe Nivolianitou, Angeliki Deligianni, and Evangelos Bellos, “Stakeholder Analysis for Safe LNG Handling at Ports,” *Safety Science* 146 (2022): 105565.

⁵⁷ Carine Dominguez-Péry, Rana Tassabehji, Franck Corset, and Zainab Chreim, “A Holistic View of Maritime Navigation Accidents and Risk Indicators: Examining IMO Reports from 2011 to 2021,” *Journal of Shipping and Trade* 8, no. 1 (2023): 11.

⁵⁸ Kum Fai Yuen, Xueqin Wang, Yiik Diew Wong, and Kevin X. Li, “The Role of Stakeholder Participation and Sustainability Integration in Maritime Transport: A Structure-Conduct-Performance Analysis,” *Transport Policy* 99 (2020): 44–53.

Table 1. Stakeholder Analysis of Liability for Maritime Transport Accident

Stakeholder	Main Role	Interests	Authority/Responsibility	Potential Risks/Losses	Position in Liability Distribution
Shipowner	Shipowner and provider of operational resources	Asset protection and business sustainability	Ensuring that the ship is seaworthy, safe, and managed in accordance with applicable regulations	Ship damage, third-party claims, compensation, pollution	Main stakeholder in civil liability
Ship operator/ship entrepreneur	Managing and operating the ship	Operational efficiency and profit	Ensuring that ship operations comply with safety standards	Operational losses, passenger/cargo claims, third-party claims	Potentially liable party
Master & crew	Operating the ship and making operational decisions	Navigation safety and personal safety	Navigation, compliance with procedures, and emergency response	Injury, death, accidents due to human error	Liability may be individual, particularly in cases of negligence
Cargo owner/provider	Delivering and receiving transported goods	Security and accuracy of delivery	Ensuring that cargo information and condition comply with applicable requirements	Loss or damage to cargo	May become a claimant or contribute to the risk
Passenger	User of maritime transportation services	Safety and compensation	Complying with safety requirements during the voyage	Injury, death, loss of belongings	Primary claimant for passenger losses
Insurance company / P&I Club	Providing financial protection	Risk and claims management	Providing coverage and paying claims in accordance with the policy/regulations	Exposure to substantial compensation claims	Financial risk bearer, not necessarily the party directly at fault
Port authority	Supervising activities and safety at the port	Safety and order of navigation	Supervising departures, arrivals, and safety aspects	Risk of supervisory failure and accident impacts	Regulatory/governance responsibility
Government regulator	Establishing and enforcing shipping regulations	Public safety and legal certainty	Establishing safety standards, licensing, and supervision	Systemic risk resulting from weak regulation/enforcement	Institutional responsibility
Flag State	State where the ship is registered	Compliance of the ship with international standards	Conducting flag-state oversight of the ship	Risk of supervisory failure	Regulatory responsibility
Classification Society	Assessing the technical condition and seaworthiness of the ship	Technical integrity and ship safety	Survey, inspection, and certification within its scope	Technical risks resulting from failure to identify the ship's condition	Indirect/conditional responsibility
Coastal communities	Parties socially and economically affected	Environmental protection and livelihoods	No direct authority over ship operations	Loss of income, ecosystem damage, disruption of economic activities	Affected stakeholder / potential claimant
Marine environment	Affected public asset	Ecosystem protection and restoration	Protection through environmental law mechanisms	Pollution, ecosystem damage, loss of ecological services	Object of protection and source of economic loss

Based on this mapping, shipowners and ship operators occupy a pivotal position due to their influence over vessel management, maintenance, crewing, and operations. This aligns with the findings of Sudiro and Braventa⁵⁹ regarding the collision between the MT Samudera Biru 168 and the MV Rokan Permai, which identified the ship entrepreneur as a key party regarding liability under Law Number 17 of 2008 concerning Shipping. At the operational level, the master and crew also play a crucial role, as navigational decisions and the execution of safety procedures can influence the occurrence of accidents. The KM Zahro Express case, analyzed by Wijaya and Martono⁶⁰ demonstrates that passenger safety is closely linked to the responsibilities of the sea transport operator.

A further finding concerns the distinction between parties bearing legal liability and those bearing financial risk. Insurance companies and P&I Clubs, while not necessarily the parties that caused the accident, play a vital role in providing financial guarantees and settling claims. Van Tan⁶¹ emphasizes that civil liability insurance and financial security are essential components in ensuring the availability of compensation for ship-sourced pollution. Jacobsson⁶² similarly identifies compensation mechanisms as a critical element of the maritime liability regime. Consequently, insurance companies and P&I Clubs are best characterized as parties that facilitate the transfer and assumption of financial risk, rather than as parties automatically liable for the cause of the accident.

The roles of regulators, port authorities, flag states, and classification societies also warrant attention. Although these actors are generally not primary parties in loss claims, their authority regarding oversight, certification, inspection, and the enforcement of safety standards can influence the level of

⁵⁹ Amad Sudiro and Yohanes Richardson Braventa, "The Ship Entrepreneur's Responsibility for the Collision of the MT Samudera Biru 168 with the MV Rokan Permai Based on Law Number 17 of 2008 Concerning Shipping (Case Study: Decision of the Surabaya District Court Number 315/Pdt. G/2019/PN. Sby)," in *Proceedings of the 3rd Tarumanagara International Conference on the Applications of Social Sciences and Humanities* (TICASH 2021) 2021, 173–179.

⁶⁰ Felix Adbert Wijaya and H. K. Martono, "Sea Transport Responsibility for Victims Caused by Explosion of Ferry Ship KM Zahro Express Based on Law Number 17 of 2008 Concerning Shipping (Study Case: 323/PID. SUS/2017/PT. DKI)," in *Proceedings of the 2nd Tarumanagara International Conference on the Applications of Social Sciences and Humanities* (TICASH 2020) 2020, 783–790.

⁶¹ Pham Van Tan, "Compulsory Civil Liability Insurance, Financial Security: An Integral Component of Compensation for Ship-Source Oil Pollution Damage," *International Journal of Maritime History*.

⁶² Måns Jacobsson, "Liability and Compensation for Ship-Source Pollution," in *The IMLI Manual on International Maritime Law*.

accident risk. Dominguez et al.⁶³ incorporate these institutional actors into the maritime accident ecosystem. In the Indonesian context, Rahayu et al.⁶⁴ highlight challenges such as fragmented governance, inter-agency coordination issues, information asymmetry, and incentive-related problems. These findings establish that the effectiveness of accountability depends not only on substantive regulations but also on the quality of coordination among stakeholders.

Table 2. Stakeholder Mapping Based on Levels of Influence and Interest

Category	Stakeholder	Characteristics
High Power – High Interest	Shipowner, ship operator, regulator, port authority	Have significant influence over safety, operations, and determination of liability and therefore need to be intensively involved
High Power – Lower Interest	Flag State, classification society, relevant government authorities	Possess important authority, but their involvement may depend on the type and location of the accident
Lower Power – High Interest	Passengers, cargo owners, coastal communities	Highly affected by accidents but have limited capacity to determine operational decisions
Supporting / Risk Bearing Stakeholders	Insurance companies and P&I Clubs	Do not necessarily determine the cause of an accident, but play an important role in bearing and processing financial risks
Operational Stakeholders	Masters and crew	Directly involved in ship operations and safety, particularly in navigation and emergency response

As shown in Table 2, shipowners, ship operators, regulators, and port authorities possess a relatively high level of influence, as they can affect both operational decisions and safety oversight. Conversely, passengers, cargo owners, and coastal communities have a significant stake in safety and compensation but exert more limited influence over decisions that cause or prevent risks. This situation reveals an imbalance between those who control the risks and those who bear the consequences.

This imbalance becomes even more apparent when accident-related losses are viewed from a multidimensional perspective. Mukherjee⁶⁵ demonstrates that economic losses resulting from ship-source pollution are not limited to physical damage but can also encompass economic losses linked to

⁶³ Carine Dominguez-Péry, Rana Tassabehji, Franck Corset, and Zainab Chreim, "A Holistic View of Maritime Navigation Accidents and Risk Indicators: Examining IMO Reports from 2011 to 2021," *Journal of Shipping and Trade* 8.

⁶⁴ Lisna Rahayu, Tim Busscher, Taede Tillema, and Johan Woltjer, "Maritime Transport Governance Challenges in the Global South," *Marine Policy* 163 (2024).

⁶⁵ Proshanto Mukherjee, "Economic Losses and Environmental Damage in the Law of Ship-Source Pollution," in *The Environmental Liability of the Shipowner*.

environmental degradation. Zhang et al.⁶⁶ further indicate that maritime accidents can simultaneously generate environmental and socio-economic losses. In the Indonesian context, Subagyono et al.⁶⁷ highlight the importance of identifying liable parties and establishing mechanisms to address losses caused by oil pollution.

Thus, the stakeholder analysis reinforces two key research findings. First, legal liability within the maritime ecosystem is distributed, with varying levels of responsibility corresponding to each actor's role and degree of control. Second, economic losses resulting from ship accidents are multidimensional; consequently, compensation mechanisms must account not only for damage to the vessel and cargo but also for losses suffered by passengers, the environment, and affected communities. This approach does not disregard the principle of fault or applicable legal provisions. Rather, it broadens the analysis by examining who controls the risk, who bears the loss, and how compensation can be effectively administered. Therefore, stakeholder governance can serve as a supporting framework to assess whether maritime liability systems have resulted in a proportionate distribution of risks and losses.⁶⁸

D. CONCLUSION

This study demonstrates that legal liability for ship accidents in Indonesia cannot be attributed solely to the master or crew members as the parties operating at the operational level. Based on an analysis of the MT Samudera Biru 168–MV Rokan Permai, KM Zahro Express, and MT Kharisma Selatan cases, legal liability involves a broader ecosystem of stakeholders, including shipowners, ship operators, masters and crew, insurance companies or P&I Clubs, port authorities, regulators, classification societies, cargo owners, passengers, and affected communities. The allocation of such liability must take into account the respective parties' authority, obligations, contributions to risk, and causal relationships.

Research also indicates that the economic losses resulting from maritime accidents are multidimensional. These losses extend beyond damage to the vessel and its cargo to encompass passenger casualties, environmental

⁶⁶ Zeguo Zhang, Qinyou Hu, and Jianchuan Yin, "Maritime-Accident-Induced Environmental Pollution and Economic Loss Analysis Using an Interpretable Data-Driven Method," *Sustainability* 17

⁶⁷ Bambang Sugeng Ariadi Subagyono, Maradona Maradona, Hilda Yunita Sabrie, Mochamad Kevin Romadhona, Bambang Suheryadi, Zahry Vandawati Chumaida, and Ajeng Anggraeni, "Regulatory Framework on Ocean Threats—Transportation Law Analysis to Multiple Oil-Spill Cases in Indonesia," *Transactions on Maritime Science* 13, no. 2 (2024).

⁶⁸ Muchamad Huzaeni and Achmad Hasan Basri, "Legislative Policy and Accountability for Pollution Crimes by Ship Operations in Indonesian Waters," *Indonesian Journal of Law and Society* 4 (2023): 51. See too, Kum Fai Yuen, Xueqin Wang, Yiik Diew Wong, and Kevin X. Li, "The Role of Stakeholder Participation and Sustainability Integration in Maritime Transport: A Structure-Conduct-Performance Analysis," *Transport Policy* 99 (2020): 44–53.

damage, rescue and cleanup costs, lost revenue, and disruptions to broader economic activities. Although Indonesia's legal framework provides a basis for liability and compensation, gaps remain regarding the accommodation of indirect losses, environmental damage, and systemic economic losses. Therefore, a more integrated, stakeholder-based governance approach is required. Liability systems should not focus solely on assigning blame after an accident occurs; they must also address risk prevention, insurance mechanisms, compensation capacity, and inter-stakeholder coordination. Such an approach is expected to foster a more proportionate distribution of risk while enhancing protection for victims and the environment.

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