

## **Bridging the Transportation Safety Gap in Lake Toba: Business Liability, Bankruptcy Risk, and Regulatory Governance After the KM Sinar Bangun Disaster**

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### **Abstract**

*The safety of water transportation in Lake Toba is closely connected to public protection, regional economic activities, and tourism development. The sinking of KM Sinar Bangun on June 18, 2018, exposed weaknesses in lake transportation management and supervision, particularly regarding passenger capacity, manifests, safety equipment, and regulatory compliance. This study analyzes the effectiveness of crossing ship safety management and supervision in Lake Toba after the tragedy and identifies gaps between the regulatory framework and its implementation. This research employs an empirical legal method using a law-in-action approach. Primary data were obtained through interviews and field observations at major crossing ports, particularly Tigaras and Simanindo, while secondary data were collected through legal and literature studies, including transportation regulations and official investigation documents. The findings indicate improvements in passenger capacity control, mandatory manifests, operating-hour restrictions, weather monitoring, institutional supervision, and departure procedures. Nevertheless, safety implementation remains suboptimal. Significant gaps persist in land-to-ship communication, safety equipment readiness, continuous supervision, institutional coordination, and compliance by operators and passengers. These findings demonstrate that transportation safety involves not only technical and regulatory aspects but also business responsibility, institutional governance, law enforcement, and safety culture. Strengthening safety therefore requires integrated technology-based monitoring, enforcement, institutional, and operator accountability.*

**Keywords:** Lake Toba, Transportation Safety, Business Liability, Regulatory Governance, Bankruptcy

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## **INTRODUCTION**

The safety of water transportation is a fundamental aspect of implementing the national transportation system, especially in archipelagic countries such as Indonesia, which depend heavily on water transportation modes. In this context, lake transportation not only serves as a means of community mobility but also supports economic and tourism activities in the region. Therefore, implementing safe and orderly water transportation is an important prerequisite for protecting service users and supporting sustainable regional development.

However, various water transportation accidents show that safety has not been fully prioritized in field practice. One case that reflects this condition is the tragedy of the sinking of KM Sinar Bangun. In the waters of Lake Toba on June 18, 2018. This incident not only caused a large number of casualties but also revealed fundamental weaknesses in the lake's transportation safety system, ranging from overloading and the absence of passenger manifests to a lack of onboard safety facilities.

Normatively, Indonesia already has a fairly comprehensive regulatory framework for shipping safety, including Law Number 17 of 2008 concerning Shipping and Government Regulation Number 20 of 2010 concerning Transportation in Waters. The regulation covers key aspects such as ship feasibility, crew certification, passenger manifest obligations, and shipping safety standards. Conceptually, this regulation reflects the state's efforts to ensure the safety of water transportation.

However, the existence of these regulations does not necessarily guarantee effective implementation in the field. The KM Sinar Bangun tragedy shows a significant gap between applicable legal norms and the operational practices of water transportation. From a legal perspective, this condition reflects the suboptimal function of law as an instrument of

*regulation, protection, and enforcement*, so that the law has not been able to carry out its role as *a tool of social engineering*.

Furthermore, the weak implementation of regulations cannot be separated from the problem of institutional governance in the water transportation sector. Ineffective oversight from relevant authorities, including transportation agencies and port managers, shows weaknesses in the control and enforcement system. This condition is exacerbated by indications of irregular practices in the licensing and supervision process, which can create space for violations of safety standards.

In addition to institutional factors, the problem of lake transportation safety is also influenced by social and cultural factors. Low public and ship operator awareness of the importance of safety has led to overloading and the normalization of neglecting safety standards. In the long term, this creates a culture of non-compliance that further worsens water transportation safety.

Previous research by Farah Khairyina, titled “Development of a Safety Assessment System for Tourist Bus Transportation,” did not focus on the regional context relevant to the current study; meanwhile, research by Suharto titled “A Study on Visitor Security and Safety in Relation to Destination Image (Case Study: Gembira Loka Zoo)” focused on visitor safety and security rather than the transportation facilities themselves; and research by Burhan Dwi Ardiansyah, titled “Inspection of Tourism Transportation Safety Aspects at SD Muhammadiyah Sidoarum, Sleman Regency,” focused on a specific group elementary school children rather than the broader general public.

Several previous studies have focused on regulatory and technical aspects of shipping safety, such as ship feasibility standards and safety operational procedures. However, research that specifically examines the relationship between regulatory implementation, institutional governance, and social factors in the context of lake transportation safety is still relatively limited. In addition, studies that integrate legal perspectives with empirical realities in lake transportation have not been carried out comprehensively.

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Based on this description, a research gap remains: studies on water transportation safety have not yet thoroughly examined the gap between the regulatory framework and implementation practices, especially in the context of lake transportation. Therefore, this study aims to comprehensively analyze how water transportation safety regulations are implemented and identify the factors that cause systemic failures in ensuring the safety of lake transportation.

This research offers novelty by examining water transportation safety not only from a normative-regulatory perspective, but through an integrative approach that combines legal analysis with empirical reality in the field. In contrast to previous research that tended to focus on the technical aspects of shipping safety and regulatory compliance, this study emphasizes the gap analysis between the applicable legal framework and its implementation practices in the context of lake transportation.

The novelty of this research also lies in disclosing systemic factors that contribute to failures in implementing water transportation safety, including institutional aspects, supervision, and the social and cultural dimensions of the community. Using the KM Sinar Bangun tragedy in the Lake Toba area as a case study, this study not only identifies weaknesses

in law enforcement but also analyzes how interactions among actors, institutional structures, and compliance cultures contribute to systemic failures in ensuring transportation safety.

Thus, this research makes a theoretical contribution by strengthening the perspective of law in action in the study of transportation law, as well as a practical contribution in the form of recommendations to strengthen water transportation safety governance that is more effective, accountable, and grounded in empirical realities in the field.

## RESEARCH METHODS

This research uses the empirical legal research method. This is an approach that treats law not only as a written norm (law in books) but also as a social practice that lives and develops in society (law in action). This approach was used to comprehensively analyze how ferry safety management and supervision were implemented in practice, as well as to assess their effectiveness in improving water transportation safety standards after the KM Sinar Bangun disaster in the Lake Toba area.

The research was carried out in the Lake Toba area, focusing on major crossing ports, such as Simanindo Port and Tigaras Port, which are operational routes for crossing ships. This location was selected because it is where the event occurred and is a center of lake transportation activities with high passenger mobility.

This study uses primary and secondary data. Primary data were obtained directly through interviews and field observations. In-depth interviews were conducted with civil servants directly involved in managing and supervising lake transportation, including port officers, ship crews, and community members who use water transportation services. Meanwhile, observations were conducted to assess the ship's operational conditions, the availability of safety facilities, and the supervision mechanisms implemented in the field.

Secondary data were obtained through a literature study that included primary legal materials, secondary legal materials, and supporting documents. Primary legal materials include Law Number 17 of 2008 concerning Shipping, Government Regulation Number 51 of 2002 concerning Shipping, and Government Regulation Number 20 of 2010 concerning Transportation in Waters. The official documents used include reports on the results of investigations from the National Transportation Safety Committee related to the KM Sinar Bangun accident, as well as data related to the number of passengers and ship cargo at the time of the incident. In addition, this research also uses secondary legal materials in the form of scientific literature, such as journals that discuss shipping safety and legal liability in water transportation accidents.

Data collection was carried out through three main methods, namely interviews, observations, and documentation studies. To ensure data validity, this study uses triangulation by comparing data from various sources and methods to produce more accurate and scientifically accountable findings.

The collected data is then analyzed using qualitative methods. The analysis categorizes, interprets, and links empirical data to applicable legal provisions. This approach aims to identify gaps between legal norms and implementation practices in the field, as well as to assess the effectiveness of management and safety supervision of crossing vessels in Lake Toba.

The results of the analysis are then used to formulate conclusions about the effectiveness of implementing water transportation safety policies, as well as to identify factors that affect the success or failure of implementing safety standards. Thus, this research is expected to contribute not only theoretically to the development of empirical legal studies, but also practically to the formulation of more effective water transportation safety policies.

## RESULTS AND DISCUSSION

### **Lake Toba Transportation Overview and Its Significance**

Lake Toba is the largest volcanic lake in the world, with a surface area of about 1,130 km<sup>2</sup> and a depth of more than 500 meters. This lake formed from the supervolcanic eruption of Toba about 74,000 years ago, with a Volcanic Explosivity Index (VEI) of 8, making it not only geologically valuable but also strategically significant for social, economic, and tourism development in the North Sumatra region. In the context of regional development, Lake Toba has been designated as a priority area for national tourism development. Hence, transportation activities in this region play a crucial role.

Water transportation in Lake Toba serves as the backbone of community and tourist mobility, especially in connecting the mainland area with Samosir Island as a center of tourism activities. The crossing route between Tigaras Port in Simalungun Regency and Simanindo Port on Samosir Island is one of the main routes with high passenger and freight traffic. Transportation activities on this route not only serve tourists but also support logistics distribution, labor mobility, and the economic activities of local communities that depend on water transportation access.

Functionally, lake transportation in this region plays a multidimensional role: it provides regional connectivity, supports the tourism sector, and drives the community's micro-economy. The high dependence on water transportation makes safety a crucial issue, because disruptions to the transportation system not only affect mobility but also the economic stability and sustainability of social activities around the lake.

However, implementing water transportation in Lake Toba faces complex challenges, especially related to the lake's geographical conditions and natural characteristics. Lake Toba has relatively unstable weather dynamics, with sudden changes in wind and waves, especially during certain periods. In addition, the lake's extreme depth increases shipping safety risks and complicates evacuation in the event of an accident.

This condition demands a water transportation management system that not only addresses operational aspects but also follows strict, integrated safety standards. In practice, transportation on Lake Toba still involves various types of fleets, ranging from traditional wooden boats to more modern ferries. This diversity reflects disparities in safety and oversight standards, which can create vulnerabilities in the water transportation system.

Furthermore, the complexity of transportation in Lake Toba is also influenced by institutional and governance aspects that are not fully optimal. Supervision of ship operations, compliance with safety standards, and coordination between related agencies still face various obstacles. This shows that the problems of water transportation in this region are not only technical, but also related to the effectiveness of policy implementation and institutional governance.

Thus, water transportation in Lake Toba is strategically important but also vulnerable to various safety risks. Therefore, comprehensive management based on the principles of safety, accountability, and effective supervision is needed to ensure the sustainability of the transportation system and protect service users. Analysis of this condition is important as a basis for evaluating the effectiveness of water transportation safety policies in the Lake Toba area.

### **Evaluation of Existing Conditions of Management and Safety After the KM Sinar Bangun Tragedy**

The sinking of KM Sinar Bangun on June 18, 2018, in the waters of Lake Toba became an important catalyst for reforming the region's water transportation safety system. This incident not only caused many casualties but also exposed structural weaknesses in lake

transportation management and supervision, prompting increased government attention to shipping safety.

The sinking of KM Sinar Bangun On June 18, 2018, the incident became a turning point in awareness of the importance of shipping safety in Lake Toba. The incident, which killed 21 passengers, with 3 people found dead and 161 others declared missing, has triggered significant improvements in the lake's transportation management and oversight system.

After the tragedy, the government began implementing various policies and improvement measures through the Office of Municipal Affairs and the Lake Toba Crossing Port Authority, which oversees shipping safety. These efforts reflect a shift from a previously permissive approach to one more regulatory and oriented toward safety standards. These changes include strengthening aspects of operational supervision, controlling ship cargo capacity, and improving safety equipment standards.

Based on the results of field observations at Tigaras Port This study found several improvements in implementing safety standards, especially in controlling the number of passengers according to ship capacity, the obligation to use passenger manifests, and increased supervision of the ship's operational feasibility. In addition, efforts are underway to improve safety support facilities, such as providing safety equipment and strengthening structured ship departure procedures.

However, a deeper analysis shows that these improvements have not fully demonstrated optimal effectiveness. There are still indications that safety policies are only partially implemented and have not been fully integrated into the water transportation management system. From a policy-implementation perspective, this condition shows a gap between formulated policies and their implementation in the field, especially in the consistency of supervision and ship operators' compliance with safety standards.

Furthermore, challenges in managing lake transportation safety are also linked to limited supervision resources, both in personnel numbers and technical capacity. This affects supervision on an ongoing basis, so potential violations of safety standards can still occur. In addition, behavioral factors among service users and ship operators who do not fully understand the importance of safety also hinder policy implementation.

Thus, an evaluation of existing conditions shows that although there have been improvements after the KM Sinar Bangun disaster, efforts to improve the safety of water transportation remain limited. In Lake Toba, these efforts still face various challenges in institutions, resources, and compliance culture. Therefore, it is necessary to strengthen the implementation of more comprehensive and sustainable policies to ensure that safety standards are not only normative, but also effective in practice.

a. Operating Hours and Supervision

Based on the interview with the Head of the KSOPP Agency, one fundamental improvement implemented is the establishment of stricter ship operating hours. Based on field data, passenger ship operations at Tigaras Port are now limited to 08.00-19.00 WIB. These restrictions aim to avoid night cruising, when visibility is low and the risk of accidents increases. In addition, the supervision system is improved through a 12-hour shift work pattern. This ensures that KSOPP officers on duty in the field directly supervise every ship departure. This supervision includes checking the ship's technical feasibility, verifying the number of passengers, and ensuring safety equipment is available before allowing the ship to sail.

b. Passenger Capacity Restrictions

A crucial factor in shipping safety is compliance with the vessel's maximum capacity. Based on regulations implemented after the tragedy, the Port of Tigaras now imposes strict capacity limits for each type of vessel:

- a. Small boat: maximum  $\pm 35$  people
- b. Large/wooden vessels: maximum 120 people
- c. Ferries: maximum of more than 100 people

A strict rule accompanies this regulation: if the capacity is full, the ship must depart and may not take on more passengers. This policy is a direct response to overloading, one of the triggering factors in the KM Sinar Bangun tragedy, where a ship with a capacity of around 35 people was carrying 185 passengers and dozens of motorcycles.

c. Weather and Natural Conditions Monitoring

Lake Toba has dynamic weather characteristics and can change quickly. To anticipate the risk of severe weather, KSOPP is now implementing a stricter extreme weather protocol, which means that operations will be stopped during extreme weather.

1. The maximum wind safety limit is 15 km/h for wooden boats and 22 knots and above for ferries
2. August to September is the season of big waves, so surveillance is tightened
3. If the weather is bad, the fare is refunded, and passengers are diverted to safer ferries

This protocol is important because during the KM Sinar Bangun tragedy, the weather in Lake Toba deteriorated suddenly, with strong winds and large waves hitting the old wooden ship, which was unstable due to overload and additional deck modifications.

d. Strengthening Transportation Regulatory Agencies

After the tragedy, the institutional structure of transportation supervision in Lake Toba was strengthened. Previously, the Simalungun Transportation Agency was the main authority, but now the supervisory structure is strengthened by the presence of various institutions:

1. KSOPP (Office of Municipal Affairs and Crossing Port Authority)

It is a technical implementation unit under the Ministry of Transportation, tasked with supervising, regulating, and enforcing laws on safety, security, and port services in the port area to ensure the smooth running of sea transportation; its main office is located in Balige. KSOPP issues Sailing Approval Letters (SPB), inspects ships, and stores passenger data as part of the national safety system.

2. Personnel Officer at Tigaras Port

- a. 3 people in administration
- b. 2 supervisors at the front
- c. 2 officers for the ferry
- d. 2 officers for wooden boats

3. Limited Liability Company (PT) Pembangunan Prasarana Sumatra (PPSU)

It operates under the Ministry of Transportation, which manages ferries for official crossings. This institutional strengthening reflects the government's commitment to building a more solid and structured supervisory system, so that it no longer depends on one institution alone.

e. Passenger Data Collection System

One important innovation after the tragedy is the implementation of a stricter passenger data collection system. Based on field observations, when purchasing tickets, passengers are now required to show a valid identity, including:

- a. Name
- b. Age

- c. Gender
- d. Address
- e. Vehicle license plate number (if you are carrying a motorcycle)

This data is then submitted to the ship supervisor and stored by KSOPP as part of the national safety system. Registering passenger identities through *accurate manifests* is a valuable lesson from the KM Sinar Bangun tragedy, where conditions on the ground became very complicated due to a poor administrative system. The lack of well-recorded passenger identities made the evacuation and search process technically challenging for the SAR team, especially after it was discovered that the wreck lay at a depth of about 450 meters.

### **Gap Analysis: The Gap between Regulation and Implementation in the Field**

Although various improvement efforts have been made in the wake of the KM Sinar Bangun tragedy, this study shows that a significant gap remains between the safety standards set out in regulations and their implementation in the field. This gap reflects the limited effectiveness of water transportation safety policies, especially in ensuring that legal norms are applied consistently in operational practices. This condition is crucial because Lake Toba is not only a national priority tourism destination but also vital infrastructure that supports the mobility and economic activities of local communities.

#### **f. Limitations of Land–Ship Communication Systems**

One of the main findings of this study is the limited communication system between the port supervisor and the ship's captain during the voyage. Based on field observations, no integrated, real-time communication system allows continuous monitoring of ship conditions. This indicates a fundamental weakness in the operational monitoring system that could increase the risk of accidents at sea.

From a transportation safety perspective, communication systems are crucial to supporting *early warning systems* and emergency response. The lack of effective communication between land and ship limits authorities' ability to provide early warnings of extreme weather changes, accurately monitor ship positions, and coordinate evacuation rapidly and in a structured manner in an emergency. Thus, limitations in communication systems are not only technical but also directly affect the effectiveness of shipping safety management.

Normatively, various regulations in the field of water transportation and international best practices have emphasized the importance of an integrated communication system in supporting shipping safety. The system at least includes the use of radio communication devices (*Very High Frequency / VHF*) for voice communication between ships and ground stations, a tracking system based on *the Global Positioning System (GPS)* to monitor the ship's position in real-time, as well as emergency devices such as *the Emergency Position Indicating Radio Beacon (EPIRB)* which sends location signals automatically in the event of an accident.

In addition, safety standards also require the captain to report periodically to the port authority regarding the ship's position, condition, and voyage status within a certain time interval. However, the study results show that the communication system in the Lake Toba area is still not operating optimally. This indicates a gap between the expected safety standards and the factual conditions on the ground.

The limitations of this communication system ultimately reflect weak integration among technology, supervision, and safety policy implementation. Without an adequate communication system, supervision of ship operations becomes ineffective, increasing the potential for violations of safety standards. Therefore,

strengthening the land-ship communication system is urgently needed to improve water transportation safety sustainably.

g. Lack of Completeness of Standard Safety Equipment

Although shipping safety regulations require safety equipment on every passenger ship, field observations show that compliance with these standards in the Lake Toba area is still not optimal. This limitation is especially evident in traditional wooden vessels that are still in operation and generally do not fully meet the safety standards stipulated in legislation.

1. One of the main findings in this study is the limited availability of *life rafts* as part of the main safety equipment in emergencies. Conceptually, a lifeboat has a more comprehensive function than an individual life jacket because it can accommodate several passengers at once and provide better protection in emergency conditions in open waters. However, the study shows that not all ships are equipped with adequate liferafts. Most ships still rely on individual buoys as the only means of survival, without the support of an integrated collective evacuation system.

In addition to their limited number, the quality and operational readiness of lifeboats are also major concerns. In some cases, the available lifeboats are disproportionate to the ship's passenger capacity and may not be well maintained or ready for use in an emergency. This condition shows a gap between the safety standards set in regulations and their implementation in the field, especially in meeting technical specifications and maintaining safety equipment.

Given Lake Toba's extreme depths and unstable weather dynamics, lifeboats are crucial for mitigating accident risk. Rescue rafts serve not only as buoyancy devices but also as protective means that can reduce the risk of hypothermia due to low water temperatures, provide a more stable space for passengers in high wave conditions, and increase victims' visibility during search and evacuation by rescue teams.

Furthermore, modern rescue rafts are generally equipped with emergency equipment such as flares, whistles, food and drinking water supplies, and other safety support devices that can increase passengers' chances of survival in emergencies. Therefore, the limited availability and quality of lifeguard rafts not only reflect weaknesses in meeting technical standards, but also show that the implementation of the overall shipping safety policy has not been optimal.

Thus, the incomplete provision of safety equipment, especially rescue rafts, is a key indicator of the gap between regulations and practice in the field. This condition emphasizes the need to strengthen supervision, enforce safety standards, and increase ship operators' awareness of the importance of providing adequate safety equipment as part of efforts to protect passenger safety.

2. Limitations of Supporting Safety Equipment: In addition to the limitations of *life rafts*, this study also found that the completeness of supporting safety equipment on crossing ships in the Lake Toba area still does not meet the standards set in shipping safety regulations. Supporting safety equipment includes a throwing buoy (ring buoy), rescue rope (rescue line), emergency signal devices such as flares (flares), first aid boxes (P3K), fire extinguishers (APAR), and emergency lighting systems (*emergency lighting*).

Functionally, these tools play a very important role in supporting a rapid response to emergencies. *Ring buoys* and *rescue lines* function as an initial means of rescue for victims who fall into the water. At the same time, emergency signal devices help increase the visibility of ships or victims to other parties and rescue teams. On the other hand, having complete, well-maintained P3K boxes is crucial for providing early treatment for accident victims, while fire extinguishers help prevent potential fires on ships. The emergency lighting system is an important element in maintaining passenger visibility and safety when the main electrical system fails.

However, the evaluation results show that the availability and condition of these tools in the field remain inadequate in terms of quantity, quality, and operational readiness. Some ships are not fully equipped, while others are found to be unready for use. This condition shows weaknesses in meeting technical safety standards, which should be the main prerequisite in water transportation operations.

From a policy implementation perspective, these findings confirm a significant gap between the legal norms governing safety standards and operational practices on the ground. The gap is caused not only by limited facilities but also by weak supervision, poor law enforcement, and low compliance with safety regulations by ship operators. Thus, water transportation safety in Lake Toba is not solely a technical problem; it is also closely tied to governance and safety culture.

The KM Sinar Bangun tragedy should be a turning point for fundamental reforms to the lake transportation safety system. However, without strong political commitment, stronger coordination among supervisory agencies, and greater collective awareness among operators and service users, improvement efforts may prove unsustainable. This condition can ultimately open up opportunities for similar accidents to occur again in the future.

Therefore, strengthening the implementation of safety standards requires not only improved regulations but also consistent supervision, increased institutional capacity, and the internalization of a safety culture as an integral part of the water transportation system. Without these measures, lake transportation as a vital means for the community around Lake Toba will remain vulnerable to safety risks.

## CONCLUSION

Based on the study results, it can be concluded that the implementation of water transportation safety management and supervision in the Lake Toba area after the KM Sinar Bangun tragedy has shown normative and operational improvement efforts. The improvements include tightening passenger capacity monitoring, implementing manifests, and improving safety regulations by the relevant authorities. However, policy implementation remains suboptimal.

This study found a significant gap between shipping safety regulations and field practices. These gaps are reflected in limitations in the land-ship communication system, incomplete main and supporting safety equipment, and weak operational supervision of crossing ships. From a policy implementation perspective, this condition shows that the communication, resources, and supervision dimensions have not been operating effectively, resulting in low compliance with safety standards.

In addition to technical factors, lake transportation safety problems are also influenced by institutional aspects and safety culture. Weak coordination between highways, limited supervision capacity, and low awareness among ship operators of the importance of safety widen the gap between legal norms and implementation. This shows that the problem of water transportation safety is not only regulatory, but also systemic and multidimensional.

Therefore, it is necessary to strengthen the implementation of a more comprehensive policy by improving technology-based communication systems, strictly enforcing safety equipment standards, strengthening supervisory functions, and building a sustainable safety culture. Without these measures, water transportation in Lake Toba will remain vulnerable to accident risk, which could threaten public safety as well as the sustainability of the tourism sector and the local economy.

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