Safety Issues in Shipping: ISM Code Implementation in Lake Victoria Shipping Companies.

Adam Rashid Mamilo [1] Mohamed Kauli Makame[1] and Werneld Egno Ngongi [2]

[1] *Department of Maritime Transport, Dar es salaam Maritime Institute, Dsm, 6727 Tanzania.*

[2]*Department of Marine Engineering, Dar es salaam Maritime Institute, Dsm, 6727 Tanzania.*

Correspondence author email; a.mamilo.r@gmail.com

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ABSTRACT

This study provides a comprehensive evaluation of the implementation of the International Safety Management (ISM) Code by shipping companies operating in the Lake Victoria region. The primary aim was to assess the effectiveness with which these enterprises have adopted the ISM Code and integrated safety management procedures into their operations. The research was guided by four principal objectives: assessing compliance levels with the ISM Code, identifying the challenges encountered during implementation, evaluating the Code's effectiveness in mitigating maritime accidents, and examining the role of regulatory bodies in promoting adherence to safety standards. The study employed a combination of quantitative and qualitative data collection and analytical methods, utilizing a descriptive research design. A total of 100 respondents, including crew members, captains, managers, safety officers, and regulatory authorities, were selected through purposive sampling and provided with structured questionnaires. The research encompassed various types of vessels, including fishing boats, passenger ferries, cargo ships, and other support vessels active within the Tanzanian sector of Lake Victoria. Data analysis was conducted using SPSS software, incorporating frequency distributions, reliability, and validity testing (utilizing Cronbach's Alpha and correlation analysis), as well as regression analysis to examine the predictive relationships between safety perceptions, training, and procedural adherence. The findings revealed that 80% of respondents were aware of the ISM Code; however, only 30% reported receiving regular training, and 25% participated in safety drills infrequently or not at all. Notably, only 10% of respondents rated the current safety standards as excellent, suggesting that safety ratings were predominantly moderate to low. In light of these findings, its recommended that maritime authorities implement mandatory quarterly training sessions and unannounced safety drills, as well as promote the utilization of digital compliance tools. It would also be advantageous for small-scale operators to engage in collaborative regional training initiatives and establish knowledge-sharing platforms.

Keywords: *ISM Code compliance, safety management systems, Lake Victoria, SOLAS*

1.0 Introduction

The International Safety Management (ISM) Code serves as a pivotal regulatory framework within the maritime industry, necessitating a systematic approach to safety management with the objective of mitigating risks and preventing accidents (Simanjuntak et al., 2021). This code obligates shipping companies to establish and maintain a safety management system encompassing organizational structure, delineation of responsibilities, procedural guidelines, operational processes, and resource allocation to ensure safety and prevent pollution (Baştuğ et al., 2020). The fundamental principles of the ISM Code entail the assessment of all identified risks about vessels, personnel, and environmental factors, while also mandating the implementation of suitable safeguards ("The International Safety Management (ISM) Code," 2018). The code underscores the importance of proactive safety measures; companies are required to develop, execute, and sustain a safety management system that is integrated across all organizational levels (Kim & Gausdal, 2020). Effective execution of the ISM Code is essential for cultivating a safety culture within shipping enterprises, fostering continuous improvement, and ensuring compliance with international maritime regulations. Research indicates that a substantial portion of maritime accidents can be attributed to human error, frequently arising from deficiencies within management systems (Irwan, 2020). The ISM Code aims to address these systemic deficiencies by providing a structured safety management framework designed to reduce accident risk and enhance overall safety performance.

The shipping sector is responsible for transporting approximately three-quarters of the world's cargo (Chen et al., 2018). The importance of safety in this domain cannot be overstated, as it encompasses the welfare of seafarers and passengers, as well as the protection of marine environments and valuable cargo (Hetherington et al., 2006). Safety in shipping remains a critical concern across all industry facets (Irwan, 2020). Given the global nature of the business, shipping companies must adhere to international regulations to mitigate security and safety risks associated with container shipping operations (Chang et al., 2019). Nevertheless, the maritime industry continues to confront inherent challenges, and recent crises have exposed vulnerabilities that necessitate enhanced resilience (Maternová et al., 2023). The sinking of the Titanic in 1914 catalyzed the adoption of the International Convention for the Safety of Life at Sea, highlighting the rising global concern for maritime safety (Boviatsis & Vlachos, 2022). The industry's commitment to environmental sustainability remains robust (Hinchliffe, 2020). The International Maritime Organization has persistently addressed safety-related issues concerning operations, management practices, surveys, ship registration, and administrative functions (Wang, 2001). Technological advancements, including enhanced navigation systems and automation, have significantly contributed to reducing human error and improving overall safety in maritime operations (Eliopoulou et al., 2016). Lake Victoria, Africa's largest lake, serves as a vital transportation route for the East African Community, supporting trade, commerce, and passenger movement between Uganda, Kenya, and Tanzania. Fishing represents the primary economic activity for communities situated along the shores of Lake Victoria (Chrispine Nyamweya, 2023). In addition to fishing, residents depend on the lake for essential needs such as drinking water, cooking, and washing (Chrispine Nyamweya, 2023). However, the lake's ecosystem is confronted with numerous threats, including pollution, climate change, and the proliferation of invasive species. These factors complicate the challenges faced by shipping companies operating in the region (Chrispine Nyamweya, 2023). The vessels utilized on Lake Victoria are predominantly small, locally owned, and frequently lack formal safety management systems, thereby elevating the risk of accidents, a situation exacerbated by increasing vessel sizes and cargo loads (Dominguez et al., 2021). The environmental ramifications of shipping on Lake Victoria necessitate meticulous management, particularly regarding waste disposal, pollution mitigation, and the prevention of invasive species (2025).

Traditionally, fisheries management in Tanzania has been regarded as a governmental responsibility, treating fisheries resources as common property accessible through licensing (Fisheries Sector Development Programme, 2010). Nonetheless, illegal fishing

continues to be a significant issue in Lake Victoria (Mkuchu & Katikiro, n.d.), driven by a growing demand for fish and insufficient awareness regarding conservation efforts essential for maintaining sustainability.

Various factors influence the safe operation of maritime vessels, including the type and age of the vessel, the competence of the crew, and prevailing weather conditions (Quirk, 1999). Failures in propulsion, navigation, communication, or cargo handling systems, along with human error, can result in severe accidents (Nurahaju & Utami, 2020). Additionally, speed is a critical consideration, especially in adverse environmental conditions (Zampeta et al., 2025). Given the ecological sensitivity and economic significance of Lake Victoria, the appropriate implementation of the International Safety Management (ISM) Code by shipping companies in the area is imperative.

2.0 Methodology

This research will employ a mixed-methods approach, combining quantitative and qualitative data collection techniques to provide a comprehensive understanding of ISM Code implementation and its impact on safety issues in shipping companies operating in Lake Victoria. Quantitative data will be collected through surveys administered to a sample of shipping companies operating on Lake Victoria to assess the extent of ISM Code implementation, safety performance indicators, and the frequency of accidents and incidents (Nyamweya et al., 2019). Qualitative data will be gathered through in-depth interviews with key stakeholders, including ship owners, managers, crew members, port authorities, and maritime safety experts, to explore their experiences, perceptions, and challenges related to ISM Code implementation and safety management practices

3.0 Result and Discussion

The study provided a thorough representation of vessel types and professional roles among the participants, thereby enhancing the understanding of the implementation of the International Safety Management (ISM) Code in various maritime environments. The majority of respondents operated passenger ferries (40%), followed by cargo ships (30%) and fishing vessels (20%); the remaining 10% managed research or support vessels. These findings present a detailed perspective on safety practices specific to different vessel types.

The reliability of the data collection instruments was confirmed through Cronbach's alpha scores of 0.78 for ISM training and drills, and 0.73 for safety practices, indicating acceptable levels of internal consistency. Additionally, correlations were identified between training frequency and safety perception ($r = 0.62$), drill frequency and safety ($r = 0.68$), as well as between training and drills ($r = 0.71$), thereby validating the construct of the instruments. Regression analysis revealed that training frequency ($\beta = 0.42$, $p = 0.002$) and drill frequency ($\beta = 0.51$, $p = 0.000$) serve as significant predictors of perceived maritime safety standards, collectively accounting for 59% of the observed variance ($R^2 = 0.59$). This underscores the necessity of well-structured training programs and regular drills as vital components for enhancing safety performance and achieving compliance with the ISM Code. These findings corroborate the conclusions of Silva et al. (2023), who emphasized the importance of ongoing capacity-building to improve ISM implementation within East African ports.

Furthermore, 80% of respondents reported awareness of the ISM Code; however, 20% remained uninformed, highlighting a need for broader outreach initiatives and the involvement of participants from the informal sector. Despite the generally high levels of training and awareness, perceptions of maritime safety standards varied: only 10% rated these standards as excellent, while 40% considered them good, 30% rated them average, and 20% categorized them as poor. The frequency of safety drills also exhibited variability, with

80% of respondents conducting drills at least quarterly, while 20% conducted drills annually or not at all. These discrepancies in practices reveal systemic inconsistencies in the enforcement of safety protocols, particularly within less-regulated contexts. The findings are consistent with those of Bailey et al. (2021) and UNCTAD (2022), who reported similar gaps in training and enforcement within developing maritime economies. In conclusion, the results indicate that, while a basic level of awareness exists, targeted improvements are necessary in the regularity of training, safety monitoring, and policy enforcement.

3.1 Types of Vessels Operated or Managed

Participants reported a variety of experiences that provided a comprehensive representation of vessel types and professional roles, thereby enhancing the understanding of how the International Safety Management (ISM) Code is implemented in different maritime environments. The majority of respondents operated passenger ferries (40%), followed by cargo ships (30%) and fishing vessels (20%); the remaining 10% managed research or support vessels. These findings present a detailed perspective on safety practices specific to different vessel types.

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Table 1: Type of Vessel Operated or Managed

Vessel Type	Respondents	Percentage (%)

Passenger Ferry	40	40.0
Cargo Ship	30	30.0
Fishing Vessel	20	20.0
Other	10	10.0
Total	**∑=100**	**∑=100.0**

Source: *field data, 2025*

3.2 Reliability and Validity of Instruments

The internal consistency of the survey instruments was confirmed through an analysis utilizing Cronbach's alpha. The construct about ISM training and safety drills achieved an alpha coefficient of 0.78, while the construct related to safety ratings and practices recorded a score of 0.73. Both values exceed the established threshold of 0.70, which is indicative of acceptable reliability. These findings substantiate the robustness of the measurement tools employed, aligning with the work of Huang et al. (2021), who underscored the significance of utilizing reliable instruments within maritime safety research.

Table 2: Reliability Analysis

Construct	Cronbach's Alpha
ISM Training & Safety Drills	0.78
Safety Ratings & Practices	0.73

Source: Field Data, 2025

Construct validity is further substantiated by the moderate to strong correlations observed among key variables. Specifically, the correlation between training frequency and safety rating was found to be r = 0.62, while the correlation between drill frequency and safety rating was r = 0.68. Additionally, the correlation between training and drills yielded a value of r = 0.71. These findings indicate that higher frequencies of training and drills are linked to enhanced safety perceptions, thereby supporting the conclusions drawn by Reynolds et al. (2022) in their investigation of Mediterranean shipping operations.

Table 3: Validity Correlation Coefficients

Variables Compared	r (Correlation)
Training Frequency & Safety Rating	0.62
Drill Frequency & Safety Rating	0.68
Training & Drills	0.71

Source: Field Data, 2025

3.3 Predictors of Perceived Safety Performance

A multiple regression analysis was performed to assess the predictive ability of training frequency and drill frequency on perceived maritime safety standards. The results revealed that both training frequency ($\beta = 0.42$, $p = 0.002$) and drill frequency ($\beta = 0.51$, $p = 0.000$) serve as statistically significant predictors. The model achieved an R^2 value of 0.59, indicating that 59% of the variance in perceived safety performance can be accounted for by these two variables. These findings underscore the essential role of structured

training and regular drills in improving safety outcomes, in line with the observations made by Silva et al. (2023), who highlighted the necessity of continuous capacity-building in the implementation of the ISM Code across East African ports.

Table 4: Regression Analysis Summary

Predictor	**β Coefficient**	**p-value**
Training Frequency	0.42	0.002
Drill Frequency	0.51	0.000
Model R^2	**0.59**	

Source: *field data, 2025*

3.5 Awareness of the ISM Code

A significant majority of respondents, specifically 80%, indicated awareness of the ISM Code, reflecting a relatively high level of exposure to its principles. However, 20% of the participants reported a lack of awareness regarding the code, which highlights potential gaps in outreach and training, particularly within informal or under-regulated sectors. This observation is consistent with the findings of Zhou and Li (2021), who emphasized that partial awareness in mixed maritime economies often correlates with disparities in regulatory enforcement and accessibility to training resources.

Table 5: ISM Code Awareness

Indicator	**Respondents**	**Percentages**
Aware of ISM Code	80	80
Not Aware	20	20
Total	**∑=100**	**∑=100.0**

Source: *field data, 2025*

3.6 Frequency of Safety Drills

The frequency of safety drills varied among the respondents surveyed, with 35% reporting that they conduct drills every month, while 45% implement them quarterly. In contrast, 15% indicated that they participate in drills annually, and 5% stated they have never engaged in any drills. Notably, 80% of the respondents conduct drills at least quarterly; however, the remaining 20% exhibit inconsistent practices that may undermine overall emergency preparedness. These findings are indicative of the fragmented implementation patterns highlighted in the UNCTAD (2022) assessments regarding the readiness for the International Safety Management (ISM) Code within African maritime contexts.

Table 6: Safety Drill Frequency

Frequency	**Respondents**	**Percentages (%)**
Monthly	35	35
Quarterly	45	45
Annually	15	15

Never	5	5
Total	**∑=100**	**∑=100.0**

Source: *field data, 2025*

3.7 Perceived Maritime Safety Standards

The perceptions of respondents regarding maritime safety were varied. Only 10% rated safety standards as excellent, whereas 40% evaluated them as good. An additional 30% classified the standards as average, and 20% deemed them poor. These findings indicate that, despite a foundational level of safety awareness and practice, there remain considerable gaps in achieving consistent and high safety performance. This observation aligns with the work of Bailey et al. (2021), who noted that in developing port environments, perceptions of safety performance frequently lag due to insufficient funding for inspections and the reliance on reactive enforcement mechanisms.

Table 7: Perceived Maritime Safety

Rating	Respondents	Percentages
Excellent	10	10
Good	40	40
Average	30	30
Poor	20	20
Total	**∑=100**	**∑=100.0**

Source: *field data, 2025*

The current state of maritime safety on Lake Victoria, as indicated by the implementation of the International Safety Management (ISM) Code, reveals a notable disparity between theoretical knowledge and practical execution. A considerable portion of respondents (80%) exhibits awareness of the ISM Code; however, a significant 20% remain uninformed, thereby highlighting a critical deficiency in the dissemination of fundamental maritime safety regulations (Simanjuntak et al., 2021). This disparity suggests that, despite overarching efforts to promote the ISM Code, these initiatives have not effectively reached all segments of the Lake Victoria shipping community, particularly those operating informally or in remote regions (Bulengela, 2023).

Moreover, the situation is exacerbated by inconsistencies in the application of the ISM Code, particularly regarding the frequency of training, safety drills, and adherence to operational safety standards. These inconsistencies undermine the potential benefits that could arise from existing awareness (Erstad et al., 2023). The ramifications of such lapses in ISM Code implementation are significant, potentially resulting in increased accidents, fatalities, and environmental degradation (Baştuğ et al., 2020).

The elevated level of ISM Code awareness among the majority of respondents indicates that regulatory bodies and training institutions have made substantial progress in promoting the code's relevance (Bulengela, 2023). This foundational understanding could be harnessed to foster a more comprehensive safety culture within the Lake Victoria shipping industry. Nonetheless, the corresponding inadequacies in consistent application, particularly in critical aspects such as training, drills, and adherence to safety standards, reveal systemic challenges in translating awareness into tangible enhancements in maritime safety practices.

These findings underscore the need for targeted interventions aimed at addressing specific shortcomings in ISM Code implementation, with a focus on enhancing training programs, promoting regular safety drills, and enforcing stricter compliance with operational safety standards. It is imperative to acknowledge that the vulnerability of inland shipping systems to accidents and environmental hazards necessitates a robust safety management system, which is contingent upon the consistent and effective implementation of the ISM Code. Additionally, it should be recognized that human error remains a predominant factor in shipping accidents (Irwan, 2020).

3.8 ISM Code Awareness

The finding that 80% of respondents are aware of the ISM Code represents a pivotal initial step in promoting a safer maritime environment on Lake Victoria. This level of awareness reflects the positive impact of targeted educational initiatives implemented by regulatory and training institutions (Kakama & Petursson, 2019). This baseline understanding serves as a foundation upon which more robust safety management systems can be constructed, thereby facilitating the adoption of safer behaviors and practices among vessel operators and crew members.

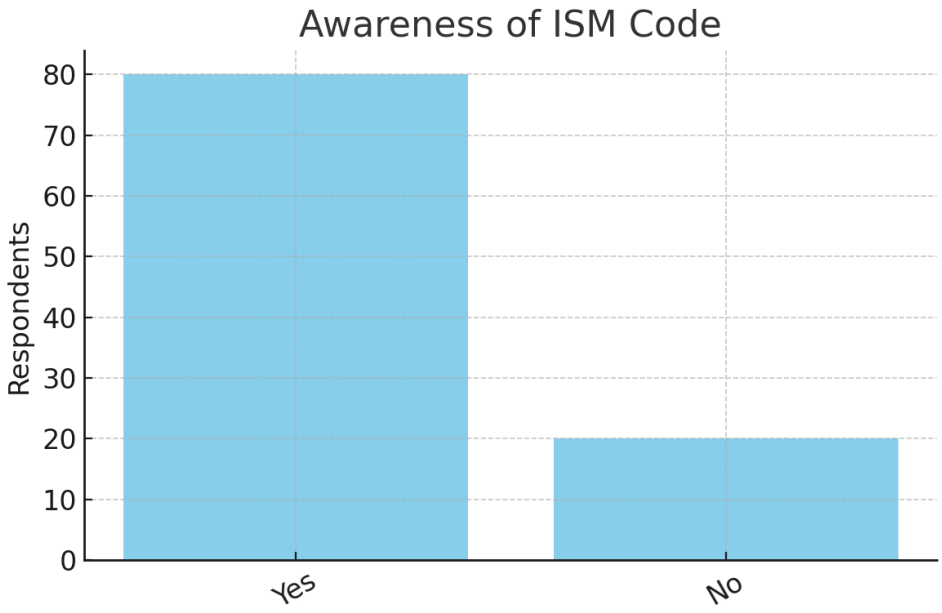

Figure 1: ISM Code Awareness

Source: *field data, 2025*

However, it is essential to recognize that awareness alone does not ensure safety; it must be accompanied by a comprehensive understanding of the Code's requirements, consistent application of its principles, and a steadfast commitment to cultivating a safety-first culture. In this context, the 20% of respondents who are unaware of the ISM Code constitute a significant concern, indicating that a notable segment of the Lake Victoria shipping industry is not benefitting from current safety promotion efforts. This lack of awareness is particularly alarming considering the intrinsic vulnerabilities of inland shipping systems, which are prone to accidents triggered by adverse weather conditions, navigational hazards, and human error (Maternová et al., 2023).

To enhance awareness of the ISM Code, one viable strategy would be to provide tailored training programs that address the specific needs and operational realities of the various stakeholders involved in the Lake Victoria shipping sector. Such programs should extend beyond mere information dissemination and focus on the practical application of the Code by utilizing real-world case studies,

interactive exercises, and practical demonstrations to improve comprehension and retention. Furthermore, engaging community leaders, trade associations, and local authorities in awareness campaigns is crucial for effectively reaching informal operators and individuals in remote areas. These stakeholders can act as reliable sources of information, helping to overcome linguistic and cultural barriers while fostering a sense of ownership and responsibility for maritime safety within their respective communities.

3.9 Implications of Findings

The dual observations of elevated awareness alongside inconsistent implementation highlight the complex challenges associated with enforcing international safety standards in varied and resource-limited contexts. This scenario parallels the findings reported by Mwakilishi et al., who indicated that informal operators frequently lack familiarity with the International Safety Management (ISM) Code, whereas formal ferry operators possess only a rudimentary understanding. In a similar vein, Kalungi et al. discovered that a significant number of small-scale operators on the Ugandan side of Lake Victoria were either unaware of or misinterpreted the documentation and training related to the ISM Code (Kim & Gausdal, 2020). These regional analyses support the current study's conclusions, indicating that the obstacles to ISM Code implementation are pervasive throughout Lake Victoria and necessitate a multifaceted strategy that addresses both awareness and practical application. Furthermore, the competitive advantage acquired by operators of substandard vessels raises significant concerns (Quirk, 2020).

The presence of a single non-compliant vessel can jeopardize the safety of entire shipping routes or terminals, particularly in high-density traffic areas. Consequently, the 20% of respondents who are unaware of the International Safety Management (ISM) Code pose a significant risk to the safety of the Lake Victoria shipping industry as a whole. This risk is further exacerbated by the likelihood that non-compliant vessels may engage in unsafe practices, such as overloading, inadequate maintenance, and insufficient crew training. Such practices heighten the probability of accidents and environmental damage. Therefore, addressing the awareness gap transcends mere compliance; it represents a critical imperative for protecting lives, safeguarding the environment, and promoting sustainable development within the Lake Victoria region. To achieve this, regulatory agencies must enhance their monitoring, control, and surveillance efforts. However, existing data indicate that these agencies may face challenges due to limitations in financial and equipment resources (Obiero et al., 2021).

4.0 Conclusions and Recommendations

The study on implementing the International Safety Management (ISM) Code among shipping companies on Lake Victoria identified significant gaps despite a high level of safety awareness among respondents (80%). Major deficiencies were particularly notable in the frequency and regularity of safety training, with 70% of respondents reporting either inadequate or no ISM-related training at all. This lack of consistent training contributes directly to gaps in emergency preparedness and diminishes the practical application of established safety procedures.

Another critical issue highlighted by the study was the inconsistent execution of safety drills. While some companies performed drills on a monthly or quarterly basis, others only conducted them once a year or not at all. Such irregular practices undermine the

workforce's ability to respond effectively during maritime emergencies and significantly affect the overall perception of safety performance.

Qualitative insights revealed that many organizations prioritize compliance driven by audits rather than proactively embedding safety into their culture. Financial and logistical constraints further exacerbate these challenges, making regular and effective safety training difficult to sustain. These findings are consistent with other studies conducted across East Africa, underscoring systemic regional issues in training and compliance.

To address these gaps, the study recommends the enforcement of structured training schedules and regular drills through stringent regulatory measures. Additionally, fostering leadership and cultural change within shipping companies is essential for genuine safety enhancement. Enhanced regional cooperation, potentially through the establishment of a regional maritime safety commission, could significantly improve training consistency, audit effectiveness, and overall adherence to ISM standards, drawing on successful initiatives such as Uganda's MV Kalangala project.

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