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# Implementation Of International Maritime Organization Standards In Seaworthiness Supervision Of Indonesian-Flagged Vessels At The Tanjung Priok Main Port Authority Office

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**Abstract**

*This study aims to analyze the effectiveness of implementing International Maritime Organization (IMO) standards in supervising the seaworthiness of Indonesian-flagged vessels at the Tanjung Priok Main Port Authority Office (KSOP), identify the inhibiting factors, and analyze the efforts undertaken by KSOP to ensure compliance with seaworthiness requirements. The study employs a qualitative descriptive approach with a case study at the Tanjung Priok Main Port Authority Office. Data were collected through in-depth interviews, observations, and documentation, and analyzed using the Miles, Huberman, and Saldaña model through data condensation, data display, and conclusion drawing and verification. The results indicate that the implementation of IMO standards is in very good condition. Its effectiveness is reflected in the use of international standards as a reference for inspections, the integration of vessel documents with actual vessel conditions, inspector competence, coordination among stakeholders, digital system support, and the implementation of corrective actions and follow-up verification. The inhibiting factors include time constraints, variations in the quality and completeness of vessel documents, the need for continuous human resource competency development,*



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*multi-stakeholder coordination, and the need for data integration. KSOP's efforts include administrative and technical verification, recording inspection findings, corrective actions, follow-up verification, utilization of information systems, strengthening marine inspector competence, and implementing risk-based inspections. The study recommends strengthening SOPs, data integration, inspector competence, coordination, and continuous improvement to maintain sustainable compliance and enhance maritime safety.*

***Keywords:*** **International Maritime Organization (IMO), Vessel Seaworthiness, Supervision, Tanjung Priok Main Port Authority Office, Maritime Safety, Risk-Based Inspection.**

## INTRODUCTION

Seaworthiness is a fundamental element of maritime safety because it determines whether a vessel is technically, administratively, and operationally fit to sail without creating unacceptable risks to people, cargo, or the marine environment. It encompasses not only the physical condition of a vessel but also certification, crew readiness, emergency procedures, and compliance with safety requirements. In the context of international shipping, harmonization with internationally recognized standards is essential because vessels operate across jurisdictions and ports. Such harmonization facilitates verification, inspection, and enforcement while also influencing the reputation of the flag State, market access, and logistics reliability (IMO, 2024a; UNCTAD, 2024).

Among the key international instruments, the International Safety Management (ISM) Code establishes that maritime safety should be managed through an integrated and documented Safety Management System (SMS), rather than relying solely on technical inspections. The ISM Code requires effective procedures, responsibilities, communication, emergency preparedness, and periodic auditing (ICS, 2024; IMO, 2024b). In addition, the International Convention on Load Lines (ICLL) 1966 regulates safe loading through freeboard and load-line requirements to prevent overloading, structural stress, and reduced stability (IMO, 2023). Therefore, effective seaworthiness supervision must ensure that certificates and technical requirements correspond to the vessel's actual operational condition, rather than merely fulfilling administrative requirements.



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In Indonesia, the Kantor Kesyahbandaran dan Otoritas Pelabuhan (KSOP) plays a strategic role in supervising vessel seaworthiness, including safety certification, safety management, and compliance with maritime safety requirements. This responsibility is particularly important at KSOP Utama Tanjung Priok, one of Indonesia's major trade gateways, where high vessel traffic, limited berthing time, operational pressure, and diverse vessel conditions create complex supervisory challenges. The effectiveness of domestic supervision is also connected to Port State Control (PSC) mechanisms under regimes such as the Tokyo MoU and Paris MoU. PSC reports continue to demonstrate that deficiencies and detentions remain relevant indicators of non-compliance, emphasizing the need for effective flag-State and port-State supervision (Paris MoU, 2024; Tokyo MoU, 2024; UNCTAD, 2023).

However, the implementation of international standards still faces an empirical gap between administrative compliance and substantive compliance. In practice, inspections may be affected by time constraints, variations in document quality, limited inspection resources, differences in stakeholder understanding, and the risk of inspections becoming overly checklist-oriented (Sheriff et al., 2025). Supervision also involves multiple actors, including shipping companies, crews, surveyors, Recognized Organizations (ROs), and government authorities, while digitalization and remote survey methods create additional requirements for verification and audit-trail integrity (Alexandropoulou et al., 2021). Consequently, effective supervision requires competent personnel, reliable data, strong coordination, appropriate procedures, and risk-based inspection rather than uniform administrative checking (Caldeirinha et al., 2022).

The urgency of this research is supported by the actual inspection data at KSOP Utama Tanjung Priok, which recorded 14 seaworthiness inspections in 2023, 9 in 2024, 11 in 2025, and 5 inspections during the current period in 2026. These fluctuations, together with time pressure, variations in document quality, limited inspection resources, multi-stakeholder coordination, and the potential for checklist-based inspections, indicate a gap between existing conditions and the expected implementation of IMO standards. Ideally, supervision should ensure substantive consistency between vessel documents, technical conditions, crew competence, safety management systems, and corrective actions. Therefore, this qualitative descriptive study is important to examine the effectiveness of IMO standards, identify implementation barriers, and analyze KSOP's efforts to ensure seaworthiness. The findings are expected to support improvements in SOPs, inspector competence, coordination, documentation, and risk-based


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supervision, thereby strengthening maritime safety and preventing substandard vessels from operating.

## LITERATURE REVIEW

### Maritime Transportation Management

Maritime transportation management can be understood as a series of planning, organizing, directing, operating, and controlling processes for transporting goods and passengers by sea to achieve effective and efficient services. As maritime transport carries more than 80% of global trade by volume, its management requires strong coordination among shipping companies, ports, logistics operators, and regulators. It is therefore closely associated with connectivity, logistics costs, and supply-chain continuity. In Indonesia, maritime transportation management is also an important component of national maritime development, requiring integration between safety, service quality, regulation, and supervision (UNCTAD, 2024; Rumambi, 2023, 2025).

More specifically, maritime transportation management involves decisions concerning service design, shipping routes and schedules, tariffs and costs, fleet capacity, cargo handling, and integration with hinterland transportation. Contemporary maritime transportation studies increasingly emphasize analytical methods such as route optimization, network design, and inventory routing to improve operational performance and service reliability. Consequently, maritime transportation management extends beyond administrative activities to include data, technology, and operational coordination across sea-side and port operations. It can therefore be viewed as an end-to-end management system based on operations, information, and coordination (Christiansen et al., 2025).

The scope of maritime transportation management covers the entire transportation system, from service planning to performance evaluation. It includes service and network planning, route and schedule determination, fleet and cargo capacity, cost and tariff planning, crew and vessel management, maintenance, cargo documentation, and coordination with ports. Safety, security, regulatory compliance, risk management, and business continuity are also integral because maritime operations are exposed to geopolitical changes, climate risks, market volatility, port congestion, and supply-chain disruptions. Therefore, effective management must balance operational efficiency with safety, compliance, reliability, and resilience (IMO, 2023; UNCTAD, 2023, 2024).


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Contemporary maritime transportation management is increasingly shaped by digitalization and sustainability. Information technology, intelligent shipping, green ports, automation, and data-driven decision-making are being integrated to improve supply-chain visibility, operational efficiency, energy performance, and environmental sustainability. Accordingly, modern maritime transportation management seeks not only to control time, cost, and service quality but also to reduce emissions and support decarbonization. This development positions maritime transportation management as an integrated system that is efficient, safe, compliant, adaptive, and sustainable (Xiao et al., 2024).

In Indonesia, maritime transportation management includes port-service planning, vessel berthing, vessel services, documentation, cargo handling, and monitoring of operational performance, increasingly supported by digital systems such as InaPortNet (Nurjanah et al., 2023). Globally, it encompasses international shipping services, port performance, maritime trade, and cross-border logistics coordination, with increasing emphasis on supply-chain resilience amid tariff volatility, port disruptions, geopolitical changes, and rerouting. Digitalization through single-window systems, port community systems, automation, and improved data management can enhance information sharing and efficiency, although challenges remain regarding system integration, human-resource readiness, and cybersecurity (UNCTAD, 2023; Zeng et al., 2025). Thus, maritime transportation management increasingly involves not only operating transportation systems but also managing organizational and technological change toward more efficient, transparent, secure, and sustainable maritime services.

**Concepts of Effectiveness, International Standards, Seaworthiness, and Port Authority**

Effectiveness refers to the extent to which a program, policy, or activity achieves its predetermined objectives and expected outcomes. It is distinct from efficiency, which focuses primarily on the relationship between inputs and outputs. Effectiveness emphasizes whether activities generate meaningful outcomes, including improved compliance, reduced risks, and better safety performance. In public-sector and regulatory contexts, effectiveness is influenced by governance, coordination, data quality, accountability, and implementation capacity. Therefore, assessing the effectiveness of seaworthiness supervision should consider not only the number of inspections conducted but also the quality of corrective actions, changes in compliance behavior, and reduction of recurring deficiencies (Førsund, 2017; OECD, 2021; Virani & Wal, 2023).


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International standards in this research primarily refer to IMO safety standards, particularly the International Convention for the Safety of Life at Sea (SOLAS) 1974 and its amendments. The relevant aspects include vessel construction and integrity, fire protection, life-saving appliances, navigation safety, safety communication, and safety management through the International Safety Management (ISM) Code. Indonesia has adopted SOLAS through Presidential Decree No. 65 of 1980, while its principles are incorporated into the national shipping framework through Law No. 17 of 2008, as amended by Law No. 66 of 2024. International standards also encompass MARPOL, STCW, and the Maritime Labour Convention, covering environmental protection, crew competence, and seafarers' welfare. Thus, international standards integrate technical, environmental, human-resource, and safety-management requirements (ILO, 2024; IMO, 2022, 2024b).

Seaworthiness refers to the condition in which a vessel is fit and safe to operate according to its route and type of voyage. It encompasses structural integrity, machinery, stability, safety equipment, navigation systems, documentation, certification, and crew competence. Seaworthiness is therefore not limited to the physical condition of a vessel but also includes operational and organizational readiness supported by an effective Safety Management System. Its fulfillment is demonstrated through surveys, inspections, certification, and Flag State and Port State Control mechanisms, which assess both documentary compliance and actual vessel conditions (IMO, 2022, 2024b). Relevant international standards include SOLAS, Load Lines, ISM Code, MARPOL, and STCW, while the IMO Procedures for Port State Control, 2023 and Harmonized System of Survey and Certification (HSSC) provide frameworks for consistent inspection, survey, certification, and follow-up of deficiencies (Sheriff et al., 2024; Boko et al., 2025).

In Indonesia, port authority *(kesyahbandaran)* represents the governmental function exercised by the Syahbandar/KSOP to ensure the safety, security, and orderly operation of maritime activities. Its responsibilities include supervising seaworthiness, crew requirements, documentation, inspections, and compliance before vessels are permitted to sail. Law No. 17 of 2008 establishes seaworthiness requirements and the Surat Persetujuan Berlayar (SPB) as an important legal control instrument, while Law No. 66 of 2024 strengthens the national regulatory framework for shipping safety and seaworthiness. Permenhub No. 15 of 2023 regulates the organization and working procedures of the Main Port Authority Office, and Permenhub No. 28 of 2022 regulates the issuance of SPB. Effective supervision requires an integrated cycle of



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monitoring, inspection, audit, compliance, and enforcement, supported by reliable data, competent personnel, risk-based procedures, and effective coordination. Consequently, KSOP/Syahbandar serves as the institutional link between international safety standards, national regulations, actual vessel conditions, and operational decisions concerning whether a vessel is fit to sail (Bhatia et al., 2026; Kemenhub. RI, 2022; OECD, 2018; Setneg. RI, 2024).

## RESEARCH METHODOLOGY

This study employs a qualitative research approach using historical analysis, framing, filtering, presentation, and conclusion drawing to examine how international standards are implemented in seaworthiness supervision at the Tanjung Priok Main Port Authority Office (KSOP). A qualitative approach was selected to gain an in-depth understanding of supervisory practices, including coordination dynamics, compliance behavior, and implementation challenges that cannot always be measured quantitatively. More specifically, the study applies a descriptive qualitative design to provide a comprehensive and systematic description of the seaworthiness supervision process, including monitoring, inspection, verification, and follow-up, without developing a new theory or exploring lived experiences in depth. This approach is appropriate for identifying what occurs, how and why it occurs, and the contextual factors influencing implementation, while producing practical findings that can support improvements in SOPs, coordination, and risk-based supervision strategies (Creswell & Creswell, 2022; Hall & Liebenberg, 2024).

Data analysis in this study uses the qualitative data analysis model of Miles, Huberman, and Saldaña (2020), which views analysis as an interactive and continuous process from data collection to the formulation of accountable conclusions. Data obtained through interviews, observations, and documentation were systematically analyzed to identify patterns, relationships, and meanings related to the implementation of International Maritime Organization (IMO) standards in seaworthiness supervision at the Tanjung Priok Main Port Authority Office (KSOP). The analysis consisted of three main stages: data condensation, data display, and conclusion drawing and verification (Miles et al., 2020).


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## RESULTS

### Analysis of the Effectiveness of Implementing International Maritime Organization (IMO) Standards in the Supervision of the Seaworthiness of Indonesian-Flagged Vessels at the Tanjung Priok Main Port Authority Office

The effectiveness of IMO standards implementation at the Tanjung Priok Main Port Authority Office can be assessed through six interrelated indicators: regulatory conformity, procedural consistency, inspector competence, substantive compliance, coordination, and follow-up actions. Regulatory conformity is reflected in the use of IMO standards as a common reference, procedural consistency through established inspection and verification processes, and inspector competence through the ability to relate documents to actual technical conditions and vessel seaworthiness.

Coordination strengthens supervision because vessel oversight involves multiple stakeholders, while follow-up actions ensure that inspection findings lead to corrective improvements. Thus, effectiveness can be understood as the capacity of the supervisory system to translate international standards into verifiable safety practices and sustainable compliance.

### Analysis of Factors Hindering the Implementation of International Maritime Organization (IMO) Standards in the Supervision of the Seaworthiness of Indonesian-Flagged Vessels at the Tanjung Priok Main Port Authority Office

**Table 1. Inhibiting Factor Analysis**

| Factor | Barrier Formation | Potential Impact | Management Response |
|---|---|---|---|
| HR | Workload and competency renewal needs | Examination time and depth of analysis | Training, load sharing, knowledge sharing |
| Time | Ship schedules and quick service needs | Risk of overly administrative checks | Risk-based prioritization and initial document preparation |


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| | | | |
|---|---|---|---|
| Documents | Variability of quality/completeness | Clarification and repetition of the process | Standardization of requirements and initial verification |
| Coordination | Many actors and communication channels | Information delay | Clear scheduled coordination and PIC |
| Digital Data | Data integration and consistency | Traceability is not optimal | Strengthening interoperability and validation |
| Changes to the standard | Amendments and technological developments | The need for SOP adaptation | Guidelines and training updates |

*Source: Researcher Data Processing, 2026*

The inhibiting factors identified in this study do not indicate that the supervision system is ineffective; rather, they represent conditions that may reduce efficiency if not properly managed. Consistent with the risk management approach, these factors should be identified and addressed before they lead to safety consequences. Time pressure is particularly important because it may create a dilemma between service efficiency and safety, which can be managed through pre-inspection verification, standardized document checklists, and prioritization of high-risk areas. Human factors are also critical, as inspectors require not only technical competence but also effective communication and decision-making skills. A strong safety culture is therefore essential to ensure that service efficiency does not compromise the primary objective of maritime safety.

**Analysis of the Efforts of the Tanjung Priok Main Port Authority Office (KSOP Utama Tanjung Priok) to Ensure that Indonesian-Flagged Ships Comply with Seaworthiness Requirements in Accordance with International Maritime Organization (IMO) Standards**

KSOP's efforts can be understood as a layered control system consisting of prevention through information and initial inspections, detection through document and technical examinations, correction through corrective actions, and verification through re-inspection or validation of completion evidence. This approach reflects a shift from purely administrative compliance toward risk- and outcome-oriented supervision, where IMO standards provide the


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baseline while historical data and field conditions determine the depth of inspection. Strengthening follow-up is also essential by assigning each finding a status, responsible person, deadline, completion evidence, and verification, thereby establishing a continuous improvement cycle in ship safety supervision.

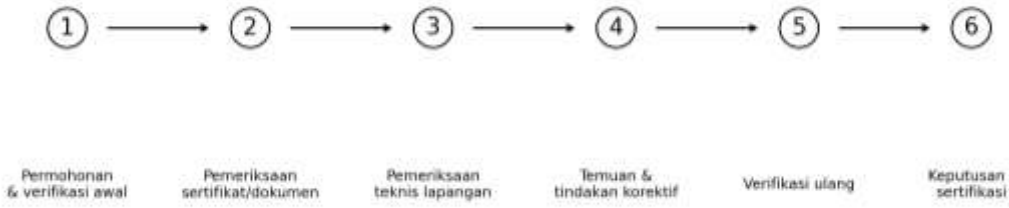



***Figure 1. Feasibility monitoring flow used as a research analysis model.***
***Source: Processed by researchers based on research focus***

## DISCUSSION

### Effectiveness of the Implementation of International Maritime Organization (IMO) Standards in the Seaworthiness Supervision of Indonesian-Flagged Ships at the Tanjung Priok Main Port Authority Office (KSOP Utama Tanjung Priok)

The effectiveness of IMO standards in this study is reflected in KSOP's ability to translate international norms into practical inspection processes within the national context. The IMO ISM Code establishes international standards for the safe management and operation of ships and pollution prevention; therefore, implementation should extend beyond certificate verification to include safety management systems and risk control. The very good condition identified in the draft is consistent with effective inspections that connect administrative evidence with actual ship conditions. Yan et al. (2022) found that Port State Control serves as a safety net and can remain effective when inspection procedures are adapted to operational conditions. Almorza et al. (2024) further emphasized risk classification and additional indicators, supporting the use of historical data, ship type, technical condition, and previous deficiencies to determine inspection priorities.

Hidayatullah et al. (2024), in their study of ships at Tanjung Priok Port, also showed that ISM Code implementation is related to emergency preparedness, safe working conditions, maintenance, and equipment inspection, reinforcing the substantive meaning of seaworthiness. Conceptually, effectiveness can be assessed through the relationship between inputs, processes,


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outputs, and outcomes: human resources, regulations, data, and facilities support inspections; inspections produce certification status and findings; and the desired outcome is safer and more controlled ship operations. Therefore, the very good condition indicated in the draft should be supported by outcome-based evidence, including consistent follow-up, reduced recurring deficiencies, quality of corrective actions, readiness of safety equipment, and alignment between the safety management system and actual operational practices.

**Factors Hindering the Implementation of International Maritime Organization (IMO) Standards in the Seaworthiness Supervision of Indonesian-Flagged Ships at the Tanjung Priok Main Port Authority Office (KSOP Utama Tanjung Priok): Document and Data Quality**

Document quality is fundamental to effective supervisory decision-making. Complete but inconsistent documents can create risks similar to incomplete documentation because inspectors must verify the accuracy of the information. Therefore, data quality should be assessed in terms of completeness, accuracy, consistency, currency, and traceability.

Digitalization can help address these issues when systems integrate ship data, certificates, inspection results, and follow-up status. SIMKAPEL, based on a service-oriented architecture, can support interoperability and e-certification. For KSOP, this implies that digital systems should support decision-making processes rather than merely serve as document repositories. Zeng et al. (2025) also identified digitalization as an important component of maritime transformation while highlighting barriers such as organizational readiness and integration. This supports the need for digitalization of supervision to be implemented gradually, in a standardized manner, and accompanied by competency development.

**Synthesis of Findings and a Model for Strengthening Supervision**

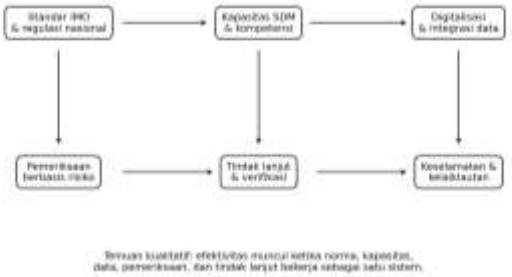


*Figure 2. Conceptual model of strengthening seaworthiness monitoring.*
*Source: Researcher synthesis based on research data and literature 2022–2026.*



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The research synthesis indicates that supervisory effectiveness is not determined by a single factor. International standards provide normative direction, while human resource competence provides implementation capacity. Digitalization supports information management, risk-based inspection establishes priorities, and follow-up mechanisms ensure that inspection findings lead to meaningful improvements.

This model can serve as a framework for strengthening the supervision management system at the Tanjung Priok Main Port Authority Office (KSOP Utama Tanjung Priok). Its key principle is integration: standards must be connected to SOPs, SOPs to competency, inspections to data, and findings to follow-up actions. When all components operate consistently, supervision can shift from an administrative approach toward a more substantive, risk-based, measurable, and safety-outcome-oriented system.

**Implications for Public Service Management**

The effectiveness of seaworthiness supervision is closely related to the quality of public service management at KSOP Utama Tanjung Priok. As a service and supervisory institution, KSOP is expected to provide services that are not only timely but also ensure procedural certainty, transparency, consistent application of requirements, and maritime safety. Therefore, service performance should be assessed not only by processing time but also by the accuracy of inspections, completeness of document and ship-condition verification, consistency of SOP implementation, clarity of inspection results, resolution of deficiencies, and traceability of decision-making. In busy port operations, risk-based inspection and integrated information systems can improve efficiency while maintaining effective supervision. Thus, public service management should integrate speed, process quality, certainty, transparency, and safety outcomes to ensure that operational efficiency remains aligned with the primary objective of maritime safety.

**Implications for Risk Governance**

Risk-based supervision has important implications for the governance of ship seaworthiness oversight, as it enables KSOP Utama Tanjung Priok to allocate inspection resources proportionally according to risk levels, considering inspection history, technical condition, ship type and size, operational characteristics, age, recurring deficiencies, and safety management performance. This approach makes supervision more adaptive and focused on higher-risk areas


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without reducing mandatory safety standards. Its effective implementation requires reliable inspection data, competent personnel, consistent recording systems, and clearly documented risk criteria and procedures. By integrating risk identification, assessment, inspection prioritization, corrective follow-up, and periodic evaluation into a continuous cycle, risk governance can strengthen KSOP's accountability and support more targeted, consistent, adaptive, and safety-oriented seaworthiness supervision.

**Implications for Marine Inspector Competence**

Marine inspectors are key actors in ship seaworthiness supervision, as inspection quality depends on their ability to relate safety standards to actual onboard conditions. Their competence should cover international standards such as SOLAS, MARPOL, Load Lines, STCW, and the ISM Code, as well as national regulations, enabling them to assess technical conditions, safety equipment, operational procedures, and safety management systems beyond mere administrative compliance. Continuous development through technical training, regulatory updates, refreshment training, case studies, and learning from previous findings, near misses, and accidents is essential. In addition, inspectors require analytical, risk-assessment, communication, documentation, objectivity, and decision-making skills, particularly when determining the significance of findings and appropriate corrective actions. Digital literacy is also increasingly important for verifying and evaluating electronic data on ships, certificates, inspections, findings, and follow-up actions. Thus, strengthening marine inspector competence requires an integrated combination of technical knowledge, regulatory understanding, risk-analysis skills, field experience, and digital literacy to support objective, adaptive, well-documented, and accountable seaworthiness supervision.

**Implications for Data Integrity**

Data integrity is increasingly important in ship certification and seaworthiness supervision as information systems and digital administration become more widely used. Data on ship identity, certificate status, inspection results, deficiency history, technical conditions, and corrective actions directly support supervisory decisions; therefore, inaccurate, outdated, or inconsistent data can lead to decisions that do not reflect actual ship conditions. Maintaining data integrity requires accuracy, consistency, currency, completeness, traceability, data validation, audit trails, access controls, and regular updates. Digitalization should therefore strengthen


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traceability and accountability by enabling information to be tracked from its original source through inspection findings, corrective actions, and verification, rather than merely accelerating data storage and exchange. Ultimately, effective digital supervision should provide accurate, up-to-date, secure, consistent, and accountable information as a reliable basis for maritime safety decisions.

**Implications for Continuous Improvement**

Effective seaworthiness supervision should not stop at identifying deficiencies and completing corrective actions but should generate organizational learning to continuously improve supervision and maritime safety. Inspection findings, near misses, audits, non-conformity reports, and re-inspection results can be analyzed to identify recurring weaknesses, determine root causes, and improve SOPs, inspection mechanisms, supervision, and training needs. Thus, each inspection provides not only a decision on the ship's current condition but also valuable input for improving the supervisory system.

Continuous improvement requires verification to ensure that corrective actions produce meaningful results and prevent recurrence. Periodic evaluation of deficiency trends, re-inspection results, corrective-action effectiveness, and competency needs can guide updates to SOPs, coordination, information systems, and training programs. Accordingly, the supervision cycle should follow **finding → root-cause analysis → corrective action → verification → evaluation → learning**, enabling KSOP to strengthen the consistent implementation of IMO standards and continuously improve maritime safety.

## CONCLUSION

**Effectiveness of IMO Standards Implementation**

Based on the data analysis, the implementation of International Maritime Organization (IMO) standards in seaworthiness supervision at KSOP Utama Tanjung Priok shows a very good level of effectiveness. This is reflected in the use of international standards as a key reference for inspections and in linking document and certificate compliance with the ship's actual technical and operational conditions. The effectiveness is also demonstrated through a continuous process involving inspection, identification and recording of deficiencies, corrective actions, and verification, rather than merely checking administrative documents.


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The findings indicate that effectiveness depends on the integration of marine inspector competence, information quality, inter-agency coordination, digital systems, risk-based inspection, and consistent follow-up. IMO standards provide the international baseline, while national regulations establish the legal and procedural framework for their implementation. Therefore, effectiveness should ultimately be assessed through safety outcomes, including actual ship condition, safety management implementation, inspection quality, identification of deficiencies, and the consistency of corrective-action verification. Continued evaluation, competency development, data utilization, and improvement of follow-up mechanisms are essential to maintain compliance and support sustainable maritime safety.

**Factors Hindering the Implementation of IMO Standards**

The study identifies several factors that may hinder the implementation of IMO standards in seaworthiness supervision at KSOP Utama Tanjung Priok, including time pressure, variations in document quality, the need for continuous human resource development, multi-stakeholder coordination, and data integration. These factors do not necessarily indicate a failure of the supervisory system but rather operational conditions that must be managed to maintain consistent and objective inspections. Risk-based inspection, adequate preparation, standardized documentation, and effective prioritization can help balance service efficiency with the need for thorough safety supervision.

Document quality and data integration are also important because inconsistent or outdated information may require additional verification and delay inspection processes. Meanwhile, continuous competency development is needed to ensure marine inspectors can keep pace with evolving regulations, technology, and maritime risks. Effective coordination among stakeholders, supported by clear roles, communication, and structured follow-up mechanisms, is equally essential. Overall, these challenges should be treated as opportunities for continuous improvement through risk-based supervision, document standardization and digitalization, competency development, stronger safety culture, and integrated coordination, thereby strengthening the consistent implementation of IMO standards and the effectiveness of seaworthiness supervision.


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**KSOP's Efforts to Ensure Seaworthiness**

KSOP Utama Tanjung Priok ensures ship seaworthiness through a series of supervisory measures that combine administrative verification, technical inspection, safety standards, recording of deficiencies, corrective actions, and re-verification. This process ensures that documentation and certificates are valid and supported by the ship's actual technical and operational conditions. Information systems and data integration further support supervision by providing access to ship identities, certificates, inspection histories, deficiencies, and follow-up status. However, effective digitalization requires accurate and up-to-date data, validation, access control, and traceability.

Risk-based supervision also helps prioritize inspection resources according to the ship's technical condition, inspection history, operational characteristics, and compliance profile without reducing safety standards. Its effectiveness is supported by competent marine inspectors, effective communication with ship operators, and regular SOP updates. Overall, KSOP's approach integrates standards, human resources, data, inspection, follow-up, and safety outcomes into a continuous supervisory cycle, enabling the authority to maintain ship compliance while responding to changing international standards and maritime safety conditions.

**Synthesis of the Research Conclusions**

**Table 2. Summary of Conclusions**

| Problem Formulation | Core Conclusion | Strengthening Direction |
|---|---|---|
| PF 1 | The implementation of IMO standards is very good and is implemented through document checks, technical, SMS, and follow-up. | Strengthening outcomes and effectiveness indicators. |
| PF 2 | The main obstacles are operational and manageable. | HR, data, time, coordination, and standardization. |



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| | | |
|---|---|---|
| PF 3 | KSOP uses inspection, verification, correction, digitization, and coordination. | Risk-based inspection dan traceability. |

*Source: Researcher Data Processing, 2026*

Overall, the study indicates that the implementation of IMO standards at KSOP Utama Tanjung Priok is in very good condition based on the draft data, with areas for further improvement in data integration, risk-based inspection, continuous competency development, and follow-up of findings. This conclusion should be regarded as a draft conclusion and must be adjusted based on the actual primary data before the final thesis is completed.

## RECOMMENDATION

### For the Tanjung Priok Main Harbormaster and Port Authority Office (KSOP Utama Tanjung Priok)

The recommended measures include strengthening risk-based inspection systems by utilizing inspection history, ship type, technical condition, and safety information; establishing a structured follow-up mechanism that records the status of findings, responsible personnel (PIC), deadlines, evidence of completion, and verification; enhancing the integration of SIMKAPEL and related data sources to ensure traceability of documents, inspection histories, and follow-up status; conducting regular competency development programs for marine inspectors and relevant personnel on developments in IMO standards, digitalization, and inspection techniques; and maintaining a balance between service efficiency and thorough inspection through document pre-verification and risk-based prioritization.

### For Marine Inspectors/Ship Inspectors

For Marine Inspectors/Ship Inspectors, it is important to maintain substantive inspections that link documentation with the ship's physical condition, develop consistent practices for documenting inspection evidence so that decisions are traceable and accountable, utilize the ship's historical data as supporting information for determining inspection areas, and conduct knowledge sharing on recurring findings, safety cases, and regulatory changes.


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**For Shipping Companies and Seafarer Agencies**

Ship operators should prepare documents and evidence of compliance in advance of inspections, ensure that the Safety Management System (SMS) is effectively implemented in daily operations rather than merely maintained as a manual, continuously maintain equipment, conduct drills, develop crew competence, and ensure the readiness of safety equipment, while promptly addressing inspection findings with clear supporting evidence and maintaining open and transparent communication with KSOP.

**For Information System Development**

For Information System Development, it is essential to improve data interoperability among units involved in inspections, provide dashboards for monitoring inspection and follow-up status, implement audit trails, data validation, and access controls, and ensure that digitalization remains integrated with physical inspections rather than replacing substantive inspection processes.

**For Future Research**

For Future Research, it is recommended to conduct studies using broader primary data, including interviews conducted across multiple periods and observations involving different types of ships; integrate qualitative findings with quantitative indicators such as the number of deficiencies, the time required to resolve findings, recurring deficiencies, and detention status; examine the relationship between the quality of domestic maritime supervision and Port State Control outcomes for Indonesian-flagged ships; and develop a risk-based effectiveness evaluation model that can be applied across different KSOP offices.

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