



Ship Watchkeeping Practices in Support of Maritime Safety: Evidence from an Onboard Case Study

Meti Kendek^{1*}, Nenny Nenny¹, Albertha Lolo Tandung¹

¹ Politeknik Pelayaran Barombong, Makassar, Sulawesi Selatan, Indonesia

* Email: metikendek22@gmail.com

Abstract. The shipping industry plays a vital role in supporting global trade, making maritime safety a fundamental aspect of ship operations. Effective ship watchkeeping is essential for maintaining safe navigation through continuous monitoring, effective communication, timely decision-making, and appropriate responses to potential hazards. This study aims to examine the implementation of ship watchkeeping practices and their role in supporting maritime safety through a case study aboard MT Layar Artha Wibawa. A descriptive qualitative approach with a case study design was employed. Data were collected during onboard practical training through direct observation of bridge watchkeeping activities, semi-structured interviews with watch officers and crew members, and documentation of logbooks, watch schedules, checklists, and other operational records. Data credibility was enhanced through source and method triangulation, while analysis followed the stages of data reduction, data display, and conclusion drawing. The findings reveal that ship watchkeeping was implemented through five interconnected stages: pre-watch preparation, watch handover, watchkeeping execution, emergency response, and watch completion. These practices were generally consistent with the Standards of Training, Certification and Watchkeeping for Seafarers (STCW) 1978, emphasizing continuous navigational monitoring, effective communication, systematic documentation, and emergency preparedness. The study also found that physical readiness, situational awareness, communication quality, vigilance, and workload management significantly influenced the effectiveness of watchkeeping. Overall, the findings demonstrate that effective watchkeeping supports maritime safety by integrating procedural compliance, technical competence, and human performance. These findings provide practical implications for maritime education institutions, shipping companies, and other stakeholders in strengthening seafarers' competencies and improving ship safety management practices.

Keywords: *Ship watchkeeping; Maritime safety; Situational awareness; Human performance; STCW Convention*

1. INTRODUCTION

The shipping industry plays a vital role in global trade, making maritime safety a top priority (UNCTAD, 2024). The increasing density of shipping traffic and the dynamics of global trade require every vessel to implement increasingly stringent safety operational standards (Noviyanti & Mokodompit, 2025). In this context, watchkeeping practices are a fundamental element that determines navigational safety, as they are

directly related to the crew's ability to observe, communicate, make decisions, and respond to potential hazards (IMO 2025). Various studies indicate that deficiencies in watchkeeping practices remain one of the contributing factors to maritime accidents related to human error (Nurmala et al., 2024).

Although significant progress has been made in the implementation of navigation technology, vessel monitoring systems, and international safety regulations, the human element remains the dominant cause of most maritime accidents (Fitriah & Fadjri, 2025). Various accident investigations have shown that errors in decision-making, lack of vigilance, fatigue, ineffective communication, and non-compliance with watchkeeping procedures are factors that often contribute to collisions, groundings, and other operational accidents (Nurduhan & Kuleyin, 2024). Therefore, the implementation of ship watchkeeping in accordance with international standards is a fundamental aspect of ensuring maritime safety (Asri et al., 2024). Effective watchkeeping practices help ship crews identify potential hazards, respond appropriately to emergency situations, and minimize the risk of human error (Dita et al., 2026). These conditions demonstrate that the quality of watchkeeping plays a strategic role in supporting the achievement of sustainable maritime safety.

A number of studies indicate that the quality of watchkeeping is closely linked to the level of maritime safety. Compliance with watchkeeping procedures (Bahariyandi, 2023), effective communication among the ship's crew (Supangat, 2024), and the ability to maintain vigilance while on duty have been shown to contribute to reducing the potential for operational errors (Santoso & Yulianto, 2024). Conversely, watchkeeping that does not comply with regulations (Mualimin, 2019), low discipline, and decreased concentration due to fatigue can increase the risk of incidents and accidents on board (Gustian et al., 2025). Although previous studies have identified various factors influencing the effectiveness of watchkeeping, the results obtained still show variation due to differences in respondent characteristics (Yudarto et al., 2026), vessel type (Tjahjanto et al., 2025), operational environments, and research approaches. On the other hand, research specifically examining the contribution of watchkeeping practices during sea training (Prala) for cadets remains relatively limited (Karahlil et al., 2025). Therefore, research is needed to thoroughly examine the role of watchkeeping practices in supporting improved maritime safety, particularly in the context of maritime education and training.

This study aims to examine the implementation of ship watchkeeping practices and their role in supporting maritime safety based on findings obtained during the sea training. This study also aims to identify the extent to which watchkeeping practices comply with international standards, the factors that support or hinder their implementation, and their implications for ship operational safety. The research results are expected to contribute to the development of maritime education and training and to provide input for educational institutions, shipping companies, and other stakeholders in improving personnel competence, compliance with operational procedures, and the implementation of safety management systems on board ships.

2. METHODOLOGY

This study employs a qualitative descriptive approach using a case study design. This article builds upon a previous study on the implementation of watch duty on the MT Laya Artha Wibawa (Juliyanto, 2025).

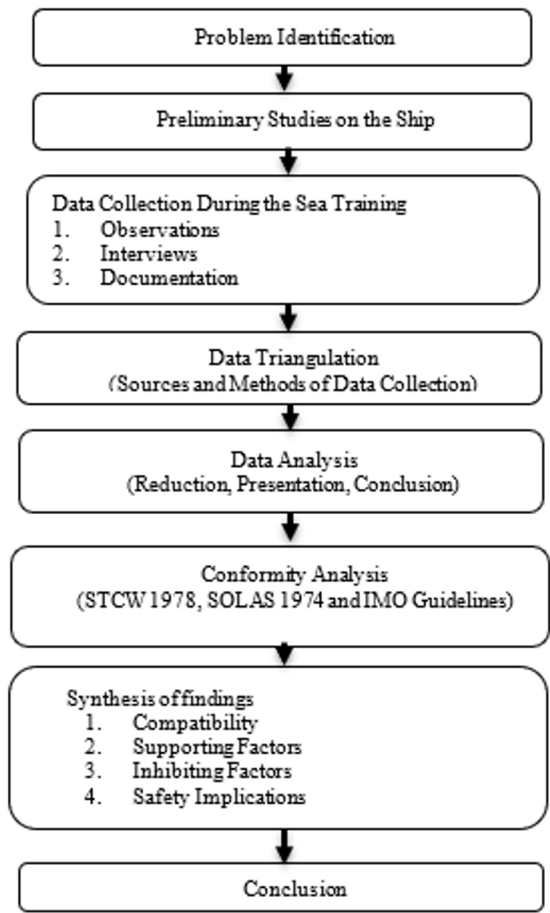


Figure 1. Research Flow Diagram

Figure 1 shows the research flowchart, which employs a qualitative descriptive approach using a case study design. The research began by identifying issues related to the implementation of watchkeeping duties on board ships (Ahyar, 2020). It then continued with a preliminary study during the sea training (cadet) to obtain an initial overview of the ship’s operational conditions and the implementation of watchkeeping duties.

Data collection was conducted during the sea internship through direct observation of watchkeeping activities on the bridge, semi-structured interviews with watch officers and crew members, and a review of logbooks, watch schedules, checklists, and other operational documents. These three techniques were used in an integrated manner to obtain comprehensive data (Bingham, 2023). Data credibility was ensured through

source triangulation and methodological triangulation key strategies in qualitative research designed to enhance confidence in the findings (Vivek et al., 2023).

The data obtained were then analyzed descriptively through the stages of data reduction, data presentation, and drawing conclusions (Miles et al., 2020). The results of the analysis were then compared with international regulations governing watchkeeping, namely the Standards of Training, Certification, and Watchkeeping for Seafarers (STCW) 1978 and its amendments, the International Convention for the Safety of Life at Sea (SOLAS) 1974, as well as guidelines published by the International Maritime Organization (IMO) to assess the level of compliance of watchkeeping operations with international safety standards.

The final stage of the study involves synthesizing all findings to identify the level of compliance of watchkeeping operations with international standards, the factors that support or hinder their implementation, and their implications for maritime safety. The results of this synthesis form the basis for formulating the study's conclusions and recommendations.

3. DISCUSSION

The research findings indicate that watchkeeping on the MT Layar Artha Wibawa is carried out through five main stages: preparation before the watch, handover of the watch, execution of the watch, handling of emergencies when necessary, and conclusion and handover of the watch to the next Officer of the Watch (OOW). These five stages are carried out sequentially and continuously, forming an operational cycle that supports the continuity of navigational watchkeeping while the vessel is in operation. This procedure aligns with the provisions of the Standards of Training, Certification, and Watchkeeping for Seafarers (STCW) Section A-VIII/2, which stipulates that navigational watchkeeping must be maintained continuously to ensure the safety of navigation (IMO, 2025).

During the preparatory phase before the watch, the Officer of the Watch (OOW) first ensures that they are physically fit for duty. In addition, the OOW reviews operational information related to the ship's condition and checks the readiness of personal protective equipment and navigation equipment before assuming watch duties. Following this, the watch handover is conducted by conveying critical information regarding the ship's position, weather conditions, the surrounding vessel traffic situation, the operational status of navigation equipment, and various other conditions that could potentially affect navigational safety. This handover process aims to ensure that all critical information is fully communicated so that continuity of surveillance and situational awareness among watch officers is maintained. This practice aligns with STCW regulations, which emphasize the importance of comprehensive information sharing during watch changes (IMO, 2025), and is supported by research by Bahariyandi (2023), which shows that an effective watch handover is a key factor in maintaining navigational safety.

The watchkeeping phase is at the core of all operational activities on the bridge. While on duty, the Officer of the Watch (OOW) continuously monitors the radar and the Automatic Identification System (AIS), conducts visual lookouts, observes shipping traffic and weather conditions, and identifies potential collision risks. All activities and operational conditions that occur during the watch are also systematically recorded in

the logbook. These various activities are carried out simultaneously to ensure situational awareness is maintained so that navigational decisions can be made quickly and accurately in accordance with the conditions at hand.

These findings are consistent with the research by Nurmala et al. (2024), which shows that the consistent implementation of watchkeeping on the bridge plays a role in preventing collision hazards through continuous navigation monitoring. If, during watchkeeping, abnormal conditions or situations that could endanger maritime safety are identified, the officer on watch immediately takes action in accordance with applicable procedures. These actions include notifying the Master, coordinating with relevant personnel, activating alarms when necessary, and implementing emergency response procedures in accordance with the vessel's operational regulations. These procedures underscore the importance of the crew's readiness to respond to any potential hazards in order to ensure the safety of navigation. Their implementation is also in line with the provisions of the 1974 International Convention for the Safety of Life at Sea (SOLAS) and the guidelines of the International Maritime Organization (IMO), which emphasize the importance of a swift and coordinated response to emergencies on board a vessel (IMO, 2025).

Overall, the study's findings show that the implementation of watchkeeping duties aboard the MT Laya Artha Wibawa is not only carried out to meet operational requirements but also plays a vital role in ensuring maritime safety. This is evident from the continuous monitoring of navigation, effective communication among watch officers, systematic recording of operational activities, and readiness to respond to emergencies. These findings are consistent with Asri et al. (2024), who emphasize that conducting watchkeeping duties in accordance with standards makes a significant contribution to vessel operational safety.

Vessel Watchkeeping as the Foundation of Maritime Safety

The findings indicate that watchkeeping on the MT Laya Artha Wibawa is carried out through a structured operational cycle consisting of pre-watch preparation, watch handover, watch execution, emergency response, and watch conclusion. This sequence reflects the principles of STCW Part A-VIII/2, which requires the continuous maintenance of safe navigational watchkeeping to ensure navigational safety (IMO, 2025). The implementation of these sequential stages demonstrates that effective watchkeeping is achieved through the continuity of operational activities, in which each stage supports the next to maintain situational awareness and safe navigation throughout the watch period.

These findings indicate that the effectiveness of vessel monitoring lies not only in compliance with operational procedures but also in the integration of continuous monitoring, effective communication, accurate documentation, and timely responses to operational changes. During the watch handoff, the transfer of navigational information allows the Officer of the Watch (OOW) to maintain situational awareness, while continuous monitoring using radar, AIS, and visual lookout facilitates the early identification of potential navigational hazards. These operational practices illustrate how procedural compliance translates into practical actions that support safe ship operations.

These findings are consistent with previous research emphasizing that effective supervision depends on the integration of procedural compliance, continuous monitoring, and operational discipline. Nurmala et al. (2024) reported that consistent

bridge supervision helps reduce the risk of collisions through continuous navigation monitoring, while Asri et al. (2024) highlighted that adherence to supervision procedures plays a crucial role in preventing maritime accidents. Similarly, Bahariyandi (2023) emphasizes that effective handoffs during supervision minimize the loss of critical navigational information and enhance situational awareness among successive supervisors.

Taken together, the current findings and previous studies indicate that ship supervision should not be viewed merely as a routine operational obligation but as an integrated safety management process. The effectiveness of supervision depends on the interaction between standard operating procedures and the competence of bridge personnel in maintaining situational awareness, communication, and decision-making during the navigation process. These findings expand upon previous studies by providing empirical evidence from practical onboard training that illustrates how the application of STCW principles contributes to navigational safety in actual ship operations.

Human Factors in Vessel Watchkeeping

Current findings indicate that the effectiveness of vessel watchkeeping aboard the MT Layar Artha Wibawa is influenced not only by compliance with operational procedures but also by several human factors, specifically physical readiness, communication effectiveness, situational awareness, vigilance, and workload management. These factors were observed to interact during the monitoring process and directly influence the Officer of the Watch's (OOW) ability to monitor navigational conditions, identify potential hazards, and respond appropriately to changes in operational situations.

The findings indicate that effective surveillance depends on a balance between technical competence and human performance. Although navigation equipment such as radar and the Automatic Identification System (AIS) provides important information, the ability of bridge personnel to interpret that information, communicate effectively, and make timely decisions ultimately determines the effectiveness of navigation surveillance. Consequently, maintaining physical fitness, sustained vigilance, and effective communication are fundamental to ensuring safe vessel operations.

These findings are consistent with Santoso and Yulianto (2024), who identified situational awareness as a key component of Bridge Resource Management in ensuring navigational safety. Similarly, Supangat (2024) emphasizes that effective communication among bridge personnel strengthens coordination and reduces the likelihood of operational errors during vessel operations. Furthermore, Nurduhan and Kuleyin (2024) demonstrate that maritime accidents are often caused by the interaction of various human factors including decision-making errors, communication failures, and fatigue rather than by technical failures alone. This interpretation is further supported by Gustian et al. (2025), who highlight fatigue management as a critical strategy for maintaining crew alertness and reducing the potential for human error resulting from excessive workloads and insufficient rest.

Overall, these findings indicate that effective vessel monitoring cannot rely solely on compliance with established procedures or the availability of advanced navigation technology. Rather, successful monitoring requires the integration of technical competence, effective communication, situational awareness, physical readiness, and fatigue management. This study expands on previous research by demonstrating how

these human factors interact in actual onboard operations and collectively contribute to maintaining navigational safety during vessel surveillance.

Implications for Improving Maritime Safety

The findings of this study have important implications for maritime education and vessel operational management. The implementation of watchkeeping on the MT Laya Artha Wibawa demonstrates that effective watchkeeping depends not only on adherence to established procedures but also on the bridge personnel's ability to maintain situational awareness, communicate effectively, and respond appropriately to changes in operational conditions. These findings indicate that the development of watchkeeping competencies should emphasize practical experience in addition to theoretical knowledge.

For maritime educational institutions, the findings highlight the importance of strengthening simulator-based learning and practical onboard training to provide cadets with realistic operational experiences. Training programs should incorporate scenarios involving the handover of watchkeeping duties, collision avoidance, emergency response, and Bridge Resource Management (BRM) to enhance decision-making skills and operational readiness. These recommendations are consistent with Karahlil et al. (2025), who emphasize that maritime curricula must integrate realistic operational scenarios to improve cadets' watchkeeping competencies and situational awareness.

These findings also have practical implications for shipping companies. Maintaining compliance with the STCW Convention must be accompanied by continuous monitoring, effective communication during watch handoffs, proper workload distribution, and fatigue management to sustain crew performance during navigation. Strengthening these aspects can improve bridge resource management, reduce the potential for human error, and support the implementation of an effective ship safety management system.

Overall, current findings indicate that vessel surveillance should be viewed as an integrated operational system rather than merely a routine navigational task. Effective surveillance is achieved through the interplay of procedural compliance, technical competence, situational awareness, communication, documentation, and human performance. This integrated perspective is consistent with the findings of Asri et al. (2024), Nurmala et al. (2024), Santoso and Yulianto (2024), and Gustian et al. (2025). At the same time, this study expands the existing literature by providing empirical evidence from practical training aboard the MT Laya Artha Wibawa, demonstrating how the integration of these elements contributes to maintaining navigational safety in actual ship operations.

4. CONCLUSION

This study shows that watchkeeping on the MT Laya Artha Wibawa is carried out through systematic stages, namely preparation before the watch, handover of the watch, execution of the watch, emergency response, and conclusion and handover of the watch. All of these stages are generally in accordance with the principles of the Standards of Training, Certification, and Watchkeeping for Seafarers (STCW) 1978, which emphasize the importance of continuous navigation monitoring, the provision of accurate information during watch handover, effective communication, systematic

recording of operational activities, and preparedness in the face of emergency conditions.

The research findings also indicate that the effectiveness of watchkeeping operations is determined not only by compliance with operational procedures but is also influenced by human factors, such as physical readiness, situational awareness, communication quality, vigilance, and workload management. The integration of these various aspects helps watch officers identify potential hazards, make appropriate navigational decisions, and minimize the risk of human error, thereby supporting safer ship operations.

This study provides empirical evidence that watchkeeping is a critical component of a ship's safety system that integrates compliance with procedures, technical competence, and human resource performance. These findings contribute to the body of research on the implementation of international watchkeeping standards in ship operations and provide insights for maritime education institutions, shipping companies, and other stakeholders in enhancing seafarers' competencies, strengthening the application of Bridge Resource Management (BRM), and optimizing safety management systems to support improved maritime safety.

References

- [1] Ahyar, e. a. (2020). *Penelitian Kualitatif Dalam Analisis Fenomena Maritim. Jakarta: Pustaka Maritim.*
- [2] Asri, H., Rachman, S., & Asri, M. A. (2024). Penerapan P2TL dan Dinas Jaga Laut Untuk Mencegah Kecelakaan di Laut pada MT. *Star Valiant. Ranah Research Journal of Multidisciplinary Research and Development*, 6(6), 2703-2708. doi:<https://doi.org/10.38035/rtrj.v6i6.1135>
- [3] Bahariyandi, R. (2023). *Optimalisasi Prosedur Serah Terima Jaga Sebelum Melaksanakan Jaga di Kapal MT. Nectar. Politeknik Ilmu Pelayaran Semarang: Skripsi.*
- [4] Bingham, A. J. (2023). From Data Management to Actionable Findings: A Five-Phase Process of Qualitative Data Analysis. *International Journal of Qualitative Methods*. doi:<https://doi.org/10.1177/16094069231183620>
- [5] Dita, D. A., Huda, S., & Nugraha, B. (2026). Analisis Kesesuaian Pelaksanaan Dinas Jaga Dengan Ketentuan Rest Hours & Fitness For Duty Berdasarkan STCW Section A-VIII/2. *Jurnal Teknologi dan Manajemen Industri Terapan*, 5(2). doi:<https://doi.org/10.55826/jtmit.v5i2.1774>
- [6] Fitriah, R., & Fadjri, T. A. (2025). Kajian Implementasi Sistem Manajemen Keselamatan (ISM Code) dalam Upaya Mencegah Kecelakaan Pelayaran di Indonesia: Tinjauan Literatur. *Jurnal Cakrawala Bahari*, 8(2), 13-28. doi:<https://doi.org/10.70031/jkb.v8i2.163>
- [7] Gustian, H. D., Junadi, & Qamaruddin. (2025). Manajemen Kelelahan sebagai Strategi Peningkatan Kinerja dan Keselamatan Pelaut di Industri Maritim Indonesia. *Jurnal Ilmiah Wahana Pendidikan*, 11(8), 317-327. Retrieved from <https://jurnal.peneliti.net/index.php/JIWP/article/view/12809>.
- [8] International, M. O. (2025). Comprehensive Review of the STCW Convention and Code - FAQs. Retrieved from

<https://www.imo.org/en/mediacentre/hottopics/pages/comprehensive-review-of-the-stcw-convention-and-code-faqs>.

- [9] Juliyanto, M. D. (2025). *Kajian Umum Dinas Jaga Guna Menjamin Keselamatan di Atas Kapal MT Layar Arthawibawa*. Politeknik Pelayaran Barombong: Karya Ilmiah Terapan.
- [10] Karahlil, M., Lützhöft, M., & Scanlan, J. (2025). Factors impacting curricula in maritime simulator-based education. *WMU J Marit Affairs*, 545-573. doi:<https://doi.org/10.1007/s13437-024-00351-8>
- [11] Miles, M. B., Huberman, M. A., & Saldana, J. (2020). *Qualitative Data Analysis* (4th ed.). *Sage Publications*.
- [12] Mualimin, M. F. (2019). *Identifikasi Kelalaian Dinas Jaga Pada Saat MV. Andhika Paramesti Sandar di Pelabuhan*. Politeknik Ilmu Pelayaran Semarang: Skripsi .
- [13] Noviyanti, & Mokodompit, E. A. (2025). Regulasi Industri Maritim: Analisis Kebijakan, Tantangan Global, Dan Implikasi Terhadap Keberlanjutan Sektor Pelayaran. *RIGGS: Journal of Artificial Intelligence and Digital Business*, 4(4), 6670-6680. doi:<https://doi.org/10.31004/riggs.v4i4.4411>
- [14] Nurduhan, M., & Kuleyin, B. (2024). Cluster-based Visualization of human element interactions in marine accidents. *Ocean Engineering*, 298.
- [15] Nurmala, E., Hartati, D. V., Jamil, T. M., Hermanto, F., & Munziri, A. (2024). Implementation of Bridge Watchkeeping to Avoid Collision Hazards on the MV. Tanto Bersinar 1. *Jurnal Transportasi dan Bahari*. doi:<https://doi.org/10.62554/cs4eak46>
- [16] Santoso, W., & Yulianto. (2024). Situational Awareness (SA) in Bridge Resources Management (BRM) for Ship Navigation Safety. *Journal of Maritime Engineering*, 3(4). doi:<https://doi.org/10.58192/ocean.v3i4.2976>
- [17] Supangat. (2024). Peran Manajemen Kapal dan Komunikasi dalam Mendukung keselamatan dan Operasional di Pelabuhan. *Jesya*, 7(1). doi:<https://doi.org/10.36778/jesya.v7i1.1457>
- [18] Tjahjanto, R., ada, w., & Purnomo, J. (2025). Optimalisasi Dinas Jaga Untuk Mencegah Terjadinya Bahaya Tubrukan di MV. Francisca. *Jurnal Venus*, 13(1). doi:<https://doi.org/10.48192/vns.v13i1.743>
- [19] UNCTAD. (2024). *Review of Maritime Transport 2024*.
- [20] Vivek, R., Nanthagopan, Y., & Piriyyatharshan, S. (2023). Beyond methodology: Theoretical foundations of triangulation in qualitative and multi-method research: A literature review. *sppstudios*, 53-62. doi:<https://doi.org/https://doi.org/10.61727/ssspj/2.2023.53>
- [21] Yudarto, A. I., Gunarti, M. R., Kusumawati, E., Robbi, S. D., & Sianturi, I. (2026). Pengaruh Penerapan Keselamatan dan Kesehatan Kerja Terhadap Anak Buah Kapal di Kamar Mesin. *Journal of Innovative and Creativity*. Retrieved from Journal Homepage: <https://joecy.org/index.php/joecy>

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