Jurnal Venus
Volume 13 Number 1, 2025, pages 48-57
p-ISSN: 2338-4611, e-ISSN: 2798-0995

Analysis of Lifeboat Maintenance on the MV Sakti

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ABSTRACT

Lifeboats are among the most important life-saving appliances on board, and the International Convention for the Safety of Life at Sea (SOLAS) 1974 requires them to be maintained, inspected, and exercised so that they are ready for immediate use. This study analyses the implementation of lifeboat maintenance on the bulk carrier MV Sakti and evaluates its conformity with SOLAS requirements. A descriptive qualitative design was used, with data collected through direct observation, interviews with officers and ratings involved in lifeboat maintenance, and a review of regulations and literature during the authors' sea practice from 10 December 2020 to 10 September 2021. During a drill held in February 2021 at Biringkassi Port, South Sulawesi, one day before an inspection by a marine inspector, the lifeboat could be lowered normally, but the release hook jammed and could not be released from the falls. The jamming was caused by thick rust on the hook plate, formed by cement cargo dust that had not been cleaned off. The interviews showed that weekly maintenance focused on greasing the davit wires and davits, while small components such as the hook plate were neglected, and that lifeboat drills were held too rarely for the problem to be detected. The study concludes that lifeboat maintenance and drills on the MV Sakti had not been fully implemented in accordance with SOLAS. Planned maintenance of all release gear components according to the weekly checklist, regular cleaning of cement dust, more frequent drills, and crew training are recommended.

Keywords: Lifeboat, Release Hook, SOLAS 1974, Ship Maintenance, MV Sakti

ABSTRAK

Sekoci merupakan salah satu alat keselamatan terpenting di atas kapal, dan International Convention for the Safety of Life at Sea (SOLAS) 1974 mewajibkan sekoci dirawat, diperiksa, dan dilatihkan agar selalu siap digunakan sewaktu-waktu. Penelitian ini menganalisis pelaksanaan perawatan sekoci di kapal curah MV Sakti dan mengevaluasi kesesuaiannya dengan ketentuan SOLAS. Penelitian menggunakan metode deskriptif kualitatif dengan pengumpulan data melalui observasi langsung, wawancara dengan perwira dan anak buah kapal yang terlibat dalam perawatan sekoci, serta kajian regulasi dan literatur selama praktik laut penulis sejak 10 Desember 2020 hingga 10 September 2021. Pada latihan yang dilaksanakan pada Februari 2021 di Pelabuhan Biringkassi, Sulawesi Selatan, satu hari sebelum pemeriksaan oleh Marine Inspector, sekoci dapat diturunkan dengan normal, tetapi releasing hook macet dan tidak dapat dilepaskan dari tali dewi-dewi. Kemacetan tersebut disebabkan oleh karat tebal pada hook plate yang terbentuk akibat debu muatan semen yang tidak dibersihkan. Hasil wawancara menunjukkan bahwa perawatan mingguan lebih difokuskan pada pemberian pelumas pada wire dan dewi-dewi, sedangkan komponen kecil seperti hook plate terabaikan, serta latihan sekoci jarang dilaksanakan sehingga masalah tersebut tidak terdeteksi. Penelitian ini menyimpulkan bahwa perawatan dan latihan sekoci di MV Sakti belum sepenuhnya dilaksanakan sesuai dengan SOLAS. Disarankan perawatan terencana terhadap seluruh komponen release gear sesuai daftar periksa mingguan, pembersihan debu semen secara rutin, latihan yang lebih sering, serta pelatihan awak kapal.

Kata Kunci: Sekoci, Releasing Hook, SOLAS 1974, Perawatan Kapal, MV Sakti

Article Info
Received January 1, 2025
Revised February 21, 2025
Accepted March 31, 2025

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Citation: Lestari, E., Rachman, S., Sunusi, M. S., & Rifani, M. (2025). Analysis of lifeboat maintenance on the MV Sakti. *Jurnal Venus*, *13*(1), 48–57. https://doi.org/10.48192/vns.v13i1.742

1. INTRODUCTION

Sea transport plays a very important role in the distribution of goods in Indonesia as a maritime nation. It has a large carrying capacity, can travel long distances, reaches areas that cannot be served by land or air transport, and offers relatively low freight rates. However, shipping is not free of risk, and ship accidents can be caused by internal factors or by external factors such as bad weather. The availability and readiness of life-saving appliances on board are therefore essential for the safety of the crew and for the quality of shipping services.

A lifeboat is a life-saving appliance in the form of a boat, generally fitted with an engine, that can carry more persons than other survival craft. SOLAS requires lifeboats and their launching appliances to be in good working order and ready for immediate use, and specifies regular drills, inspections, and maintenance (International Maritime Organization [IMO], 2014). Release gear is a critical component: accidents during lifeboat drills involving on-load release hooks led to improved designs and monitoring devices for release hooks (Chang et al., 2014) and to mandatory requirements for the maintenance, thorough examination, and testing of release gear (IMO, 2016). Life-saving appliances are also a regular focus of port state control inspections, and deficiencies in safety equipment can lead to ship detention (Shen et al., 2021; Chen et al., 2022).

On the MV Sakti, the lifeboat was scheduled for inspection by a marine inspector in February 2021 while the ship was at anchor at the loading port of Biringkassi, Pangkep, South Sulawesi. During a drill held by the crew one day before

the inspection, the hook plate of the lifeboat did not function and could not be released from the lifeboat because of thick rust formed by cement cargo dust that had not been cleaned off. National studies have shown that optimal lifeboat maintenance and regular lowering drills improve the handling of abandon-ship emergencies (Kuncowati, 2018; Rudiana et al., 2020; Pratama et al., 2022) and that compliance with SOLAS maintenance standards still varies between ships (Rachmi & Kendek, 2023; Takainginan et al., 2024). However, the effect of cargo dust on the release gear has received little attention. This study therefore analyses the implementation of lifeboat maintenance on the MV Sakti, evaluates its conformity with SOLAS, and identifies the causes of the release hook failure and the corrective measures needed.

1.1. Maintenance

Maintenance is a series of activities intended to keep facilities and equipment ready for use so that operations can be carried out effectively and efficiently according to schedule and to the required standards of function and quality. A maintenance system involves the equipment, spare parts, costs, planning methods, and the personnel who carry out the work. From a reliability perspective, maintenance aims to prevent failures, shorten repair times, and maximise the availability of equipment when it is needed (O'Connor & Kleyner, 2012). In ship machinery and equipment, preventive, predictive, and reliability-centred maintenance strategies are used to extend service life and to reduce unexpected failures (Jimenez et al., 2020; Eriksen et al., 2021; Song et al., 2022; Karatuğ et al., 2023). For life-saving appliances, maintenance ensures that the equipment can be used immediately in an emergency.

1.2. SOLAS Requirements for Lifeboat Maintenance

SOLAS Chapter III requires all life-saving appliances to be in working order and ready for immediate use before the ship leaves port and at all times during the voyage. Regulation 19 sets out requirements for abandon-ship drills, Regulation 20 sets out requirements for operational readiness, maintenance, and inspections, and Regulation 36 requires instructions for on-board maintenance that are easily understood and illustrated, including a checklist for inspections, maintenance and repair instructions, a schedule of periodic maintenance, a lubrication diagram with recommended lubricants, a list of replaceable parts and sources of spare parts, and

a log of inspections and maintenance (IMO, 2014). Under Regulation 20, the lifeboat engines must be run for not less than three minutes during the weekly inspection, and the lifeboats must be turned out from their stowed positions without persons on board every month, if weather and sea conditions allow (IMO, 2014).

Release gear, including free-fall release systems, must be maintained in accordance with the on-board maintenance instructions, subjected to a thorough examination and operational test during the annual survey by properly trained and certified personnel, and operationally tested under a load of 1.1 times the total mass of the fully loaded lifeboat whenever it is overhauled, with such overhaul carried out at least once every five years (IMO, 2016). Items to be examined include the lifeboat structure and its fixed and loose equipment, the engine and propulsion system, the sprinkler and air supply systems where fitted, the steering system, and the release gear, namely the release activation device, the hydrostatic interlock, the control and release cables, and the hooks. Adjustment of the release gear must not be carried out while the hooks are under load (IMO, 2016).

The International Life-Saving Appliance (LSA) Code further requires lifeboat engines to be capable of being started at any time, to carry sufficient fuel for at least 24 hours of continuous operation at 6 knots, to be capable of running astern, and to be protected against the weather, and requires a fully loaded lifeboat to reach a speed of at least 6 knots in calm water (IMO, 2017). Lifeboats must also be capable of being launched safely under unfavourable conditions of trim and list (IMO, 2017). Proper adjustment and maintenance of the release gear are therefore essential for the safe operation of the lifeboat and the safety of the persons on board.

2. METHOD

This study was conducted on board the MV Sakti, a ship of the fleet of PT Indobaruna Bulk Transport, from 10 December 2020 to 10 September 2021, during the authors' sea practice. Data were collected through (a) direct observation of the lifeboat and its equipment, its physical condition, the maintenance process, and the operating procedures; (b) interviews with officers and ratings directly involved in lifeboat maintenance, focusing on maintenance practice, lifeboat drills, and the problems encountered; and (c) a review of literature, company documents, technical drawings, and international regulations, particularly SOLAS 1974. The informants are identified only by number and age.

Primary data consisted of observation and interview results recorded during the sea practice, and secondary data consisted of company documents and other references related to the maintenance of safety equipment. The data were analysed descriptively by systematically describing lifeboat maintenance on the MV Sakti and comparing the practice on board with the requirements of SOLAS and the related IMO instruments (Sugiyono, 2008).

3. RESULTS AND DISCUSSION

3.1. Release Hook Failure during the Drill

The drill was carried out in February 2021 while the MV Sakti was at anchor at Biringkassi Port, Pangkep, South Sulawesi. Lowering the lifeboat proceeded normally, but the problem occurred when the release hook was operated: the hook jammed, so the lifeboat could not be released from the hooks connected to the davit falls. The Third Officer then inspected and maintained the release hook in stages to ensure that it would work during subsequent boat drills and during the inspection by the marine inspector. The analysis showed that the lifeboat could not be operated during the abandon-ship drill because maintenance of the safety equipment, particularly the release hook, had not been optimal. Thick rust on the hook plate caused it to jam, so that it could not be opened or released from the lifeboat. This finding also revealed a lack of crew awareness of the importance of maintaining all release gear components.

3.2. Lifeboat Maintenance Practice on the MV Sakti

Lifeboat maintenance on board is organised into weekly, monthly, and annual activities. Table 1 compares these activities with the corresponding requirements and summarises the findings on board.

Table 1. Lifeboat Maintenance Activities on the MV Sakti and Findings on Board

Interval	Activities	Basis	Findings on board
Weekly	Visual inspection of release hooks and launching appliances; greasing of grease points and davit wires; running the lifeboat engine, steering, and propeller systems for not less than 3 minutes and checking the gearbox; testing the general emergency alarm	SOLAS III/20 and III/36 (IMO, 2014)	Not fully implemented: greasing focused on davit wires and davits; the hook plate was not cleaned or greased
Monthly	Turning out the lifeboat without persons on board when conditions allow; checking oars, bilge pump, sea anchor, fishing tackle, and seat belts; checking the hull and grab lines; checking water, medicines, and food rations; checking the condition and expiry dates of hand flares, parachute signals, and smoke signals	SOLAS III/19 and III/20 (IMO, 2014)	Drills held infrequently, so the condition of the hook plate was not detected

Interval	Activities	Basis	Findings on board
Annual	Thorough inspection of all lifeboat components, survival equipment, and distress signals; replacement of unserviceable components, including the release gear, engine overhaul, and steering system	MSC.402(96) (IMO, 2016)	No specific findings reported

Maintenance must be carried out as thoroughly as possible so that obstacles to lowering and releasing the lifeboat are avoided and the lifeboat can be operated optimally. On the MV Sakti, weekly maintenance had not been carried out to its full extent, so several lifeboat components were not in optimal condition.

3.3. Interview Results

Interviews with two informants involved in lifeboat maintenance (Informant 1, 40 years old; Informant 2, 27 years old) supported the observation findings. On weekly maintenance, Informant 1 stated: “In weekly maintenance, the visual condition of the lifeboat must be ensured. The release equipment must be checked and maintained to support the lowering of the lifeboat, and the engine and steering must be tested so that the lifeboat is always ready for use.” Informant 2 added: “This maintenance is done by greasing the wires, davits, and other moving release equipment and by removing rust that can hinder the lowering of the lifeboat.”

On the release hook, Informant 1 explained: “The release hook did not work because of rust on the hook plate, which made it jam and difficult to open; it could even break if opened by force.” Informant 2 stated: “Maintenance of the hook plate has not been done every week because maintenance focuses too much on the wires and davits, so small parts such as the hook plate are overlooked. Lifeboat drills are also rarely held, so the condition of the hook plate was not known.” On the cause of the rust, Informant 1 explained: “The rust on the hook plate is caused by dust from the cement cargo sticking to it, which creates rust and makes the hook plate jam. The main cause is that the release gear unit has not been maintained thoroughly according to the established weekly checklist.”

The interviews therefore confirm that maintenance of the release gear unit had not been carried out to its full extent. This is evidenced by the rust on the hook plate, which made it jam and unusable when it was needed.

3.4. Discussion

The release hook failure on the MV Sakti shows that a lifeboat can appear ready, with its davits, wires, and engine maintained, while a small but critical

component of the release gear has deteriorated. The cement dust carried by the cargo accelerated corrosion of the hook plate, and the incomplete weekly maintenance and infrequent drills allowed the problem to remain undetected until the drill before the inspection. This is consistent with national studies showing that lifeboat readiness depends on thorough maintenance of all components and on regular lowering drills (Kuncowati, 2018; Rudiana et al., 2020; Pratama et al., 2022) and that maintenance practice does not always meet SOLAS standards (Rachmi & Kendek, 2023; Takainginan et al., 2024). Internationally, the safety of release hooks has been addressed through design improvements and monitoring devices (Chang et al., 2014) and through the mandatory maintenance and testing regime of MSC.402(96) (IMO, 2016), while the dynamics of lifeboat launching in rough seas show why release gear must operate reliably (Qiu et al., 2020).

The findings also point to human and organisational factors. The crew's limited awareness of the importance of maintaining every release gear component reflects the role of human error in shipping operations (Weng et al., 2019; Sanchez-Beaskoetxea et al., 2021; Kasyk et al., 2023). Knowledge of lifeboat equipment can be strengthened through structured training and assessment of cadets and crew (Tomilin et al., 2023), and realistic emergency drills improve human reliability in emergency response (Ahn et al., 2022). Because life-saving appliances are a regular focus of port state control, systematic maintenance also reduces the risk of deficiencies and detentions (Yuan et al., 2020; Shen et al., 2021; Chen et al., 2022; Peričin et al., 2024).

From a reliability perspective, the effectiveness of lifeboat maintenance can be monitored using indicators such as the history and frequency of failures by component, the mean time to repair, the availability of the lifeboat in a ready condition, compliance with the preventive maintenance schedule, the availability of critical spare parts, and the results of inspections and certifications (O'Connor & Kleyner, 2012). Recording these indicators in the ship's planned maintenance system would allow problems such as the corroded hook plate to be detected before they compromise an emergency (Jimenez et al., 2020; Karatuğ et al., 2023).

Based on these findings, the following measures are recommended: (1) carry out weekly maintenance of all release gear components, including cleaning and greasing of the hook plate, according to the checklist required by SOLAS Regulation

36; (2) clean cement and other cargo dust from the lifeboat and its release gear after loading and discharging; (3) hold lifeboat drills at the intervals required by SOLAS so that defects are detected early; and (4) provide training to raise crew awareness of release gear maintenance. This study is limited to a single ship and a small number of informants, and quantitative maintenance records were not analysed.

4. CONCLUSION

Based on the results and discussion, the following conclusions can be drawn.

1. Lifeboat drills and maintenance on the MV Sakti had not been fully implemented in accordance with SOLAS 1974. Weekly maintenance focused on the davit wires and davits, while the hook plate of the release gear was neither cleaned nor greased, and drills were held infrequently.
2. The release hook jammed during the drill in February 2021 because thick rust had formed on the hook plate as a result of cement cargo dust that was not cleaned off and incomplete maintenance of the release gear unit, so the lifeboat could not be released from the falls.
3. Planned maintenance of all release gear components according to the weekly checklist, regular removal of cargo dust, drills at the intervals required by SOLAS, and crew training are recommended to ensure that the lifeboat is always ready for use in an emergency.

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