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FINAL REPORT

VERY SERIOUS MARINE CASUALTY

Grounding and Total Loss of the Livestock Carrier *Deala*

Southeastern Coast of Istria, Cape Kremen, April 16, 2024



Safety investigations are not intended to assign blame or, in relation to this, to determine administrative, civil, or criminal liability.

This document cannot be used as evidence in a court procedure aimed at determining civil, administrative, or criminal liability.

This report is published in Croatian and English. In case of discrepancies in the interpretation of these two versions, the Croatian text shall prevail.



FOREWORD

The Agency for the Investigation of Accidents in Air, Maritime and Rail Transport, in accordance with the provisions of the Act on the Establishment of the Agency for the Investigation of Accidents in Air, Maritime and Rail Transport (Official Gazette 54/13, 96/18), the Maritime Code, Part III - I.b – Investigations of Maritime Accidents (Official Gazette 181/04, 76/07, 146/08, 61/11, 56/13, 26/15, 17/19), and the Regulation on the Manner and Conditions for Conducting Safety Investigations of Maritime Accidents and Incidents (Official Gazette 122/15), based on public authority and as an activity of interest to the Republic of Croatia, conducts safety investigations of maritime accidents in order to determine the circumstances and causes that led to the accident, propose corrective measures to prevent their occurrence and recurrence, and systematically improve navigational safety.

The Agency for the Investigation of Accidents in Air, Maritime and Rail Transport operates independently and autonomously in its work, with respect to all public authorities responsible for maritime transport and navigational safety, other state and judicial bodies, and all legal and natural persons. Safety investigations are conducted independently of any other investigations into the maritime accident carried out by other state bodies.

The conduct of safety investigations of maritime accidents by an independent and autonomous body arises from international conventions to which the Republic of Croatia is a party (including the United Nations Convention on the Law of the Sea, the International Convention for the Safety of Life at Sea, the International Convention on Load Lines, and the International Convention for the Prevention of Pollution from Ships), as well as the Directive 2009/18/EC of the European Parliament and of the Council establishing the fundamental principles governing the investigation of accidents in the maritime transport sector. This directive has been transposed into the Croatian legal system through the Act on the Establishment of the Agency, the Maritime Code, and the Regulation on the Manner and Conditions for Conducting Safety Investigations of Maritime Accidents and Incidents.

This report, following the completion of a safety investigation, was prepared and published by the Agency for the Investigation of Accidents in Air, Maritime and Rail Transport in accordance with the provisions of the Regulation on the Manner and Conditions for Conducting Safety Investigations of Maritime Accidents and Incidents (Official Gazette 122/15), Regulation (EU) No 1286/2011 establishing a common methodology for investigating maritime accidents and incidents, IMO Resolution MSC.255(84) – Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident, and other applicable IMO resolutions and guidelines.



CONTENT

1. SUMMARY	5
2. OBJECTIVE DATA	6
2.1. INFORMATION ON SHIP <i>DEALA</i>	6
2.2. FACTUAL INFORMATION	7
3. DESCRIPTION OF EVENTS	9
4. CASUALTY ANALYSIS	11
4.1. CARGO SHIP <i>DEALA</i>	11
4.1.1. Anchor Windlass and Chain System	11
4.1.2. Breakage of the Right Anchor Chain	14
4.1.3. Navigation Bridge	15
4.1.4. Main Engine	17
4.2. CREW	19
4.2.1. Master	19
4.2.2. Deck Department	20
4.2.3. Engine Department	20
4.3. COMPANY PROCEDURES	21
4.3.1. Deck Equipment Maintenance	21
4.3.2. Arrival to port	21
4.3.3. Depth to Length Ratio of Deployed Anchor Chain	22
4.3.4. Anchor Swinging Circle	24
4.3.5. Watchkeeping at anchor	26
4.4. ANCHORAGE	26
4.5. VTS SERVICE	27
4.6. SEQUENCE OF EVENTS LEADING TO THE GROUNDING OF THE VESSEL	28
4.7. WEATHER CONDITIONS	34
4.8. HUMAN ELEMENT	36
4.9. TECHNICAL STANDARDS, SURVEYS, AND INSPECTIONS	38
5. WRECK REMOVAL	39
6. CONCLUSION	40
7. SAFETY LESSONS	41
8. ANNEXES	43



1. SUMMARY

On April 12, 2024, the Tanzanian flag livestock carrier *Deala*, built in 1976, lowered 5 shackles of starboard anchor chain near the entrance to Raša Bay along the southeastern coast of the Istrian Peninsula, awaiting for the planned loading of cargo at the Croatian port of Bršica.

Four days later, deteriorating weather was forecast for the afternoon. The vessel traffic control service (VTS) informed the crew about the forecast and advised them to move away from the anchorage. The crew accepted the received instructions; however, as time passed, they repeatedly delayed leaving the anchorage, while still announcing their intent to follow the instructions. The wind gradually increased, putting additional strain on the anchoring system and its components, which ultimately led to a sudden break in the starboard anchor chain, resulting in the ship began to drift towards nearby shallows.

The master ordered the main engine to be prepared for manoeuvring, and half an hour after the anchor chain snapped, unsuccessfully attempted to move the ship out of her precarious situation.

At 6:59 pm, the ship grounded on its port side on a shallow near Cape Kremen. The sea flooded the engine room, causing the complete shutdown of all generators, which led the master to decide to abandon the ship together with his crew. All crew members were transferred by tugboats, uninjured, and safely taken to shore. The grounded hull of the ship was heavily damaged, and in the days following the accident, fuel was pumped out in controlled manner. The shipowner soon after the accident renounced ownership, so the responsibility for removal was assigned to the Maritime Safety Administration of the relevant ministry and the ship's insurance company. At the time of concluding this investigation, the ship had not yet been removed from the casualty site, and the removal process remains in the planning stage.

The investigation concluded that the accident occurred due to repeated delays in leaving the anchorage, which brought the ship into a situation where the interaction of various contributing factors led to the accident. No risk assessment was made regarding the ship's stay at anchor. The anchor system and its equipment were in poor condition, as a consequence of irregular maintenance of the deck equipment. Other factors include the inadequate ratio of depth and chain length due to the absence of company instructions, lack of due diligence in watchkeeping and vessel position monitoring, unpreparedness of the port anchor for emergency use, delayed readiness of the main engine combined with the reluctance to use it more decisively, and inaccurate communication with the VTS service from the responsible personnel on the bridge.

Three safety lessons are issued regarding watchkeeping while anchored, communication between the ship and VTS, and maintenance of the ship's anchoring system. In the context of the ship owner's renunciation of ownership of the vessel, and the complete absence of communication with the flag state and classification society, issuing any safety recommendations to these parties was deemed unnecessary and ineffective, and therefore, was omitted.



2. OBJECTIVE DATA

2.1. INFORMATION ON SHIP *DEALA*

Ship Name:	Deala
Identification Mark	500249
Flag:	Tanzania
Port of Registry:	Zanzibar
Call Sign:	5IM388
IMO Number:	7405091
MMSI:	677028800
Navigation Category:	International
Ship Type:	Livestock Carrier
Place and Year of Construction:	Martin Jansen GMBH & Company KG, Germany, 1976.
Shipowner:	Deala Shipping Company Ltd.
Hull Construction Material:	Steel
Maximum Allowed Number of Persons:	26
Minimum Number of Crew Members:	7
Overall Length:	79,48 m
Length Between Perpendiculars:	72,00 m
Beam (Width):	13,50 m
Side Height:	6,65 m
Draught at Summer Load Line:	5100 mm
Freeboard at Summer Load Line:	1550 mm
Net Tonnage:	1498 mt
Gross Tonnage:	2613 mt
Propulsion Type:	Internal combustion engine
Manufacturer and Type of Propulsion Engine:	MAK 8 MU452AK
Place and Year of Propulsion Engine Construction:	Peoria, 1992
Total Propulsion Engine Power:	1790 kW
Number and Type of Propellers:	1 (fixed blades)



2.2. FACTUAL INFORMATION

Type of casualty: Very serious marine casualty – grounding and constructional total loss of the ship.

Position and time¹ of the casualty:

Eastern coast of Istria, near Cape Krmen at the entrance to Raša Bay,
on April 16, 2024, at 6:59.pm LAT = 44°58.8276' N / LONG = 14°04.6017' E

Weather/ Conditions:

The meteorological report from the Croatian Meteorological and Hydrological Service, Maritime Meteorological Center Split, issued on April 16, 2024, at 06:00, is attached as Annex I to this report. The weather forecast included the following warning: "In the afternoon, in the northern Adriatic, and in the evening in parts of the central Adriatic, occasional gusts of NE wind 35-60 knots, and up to 75 knots under Velebit. In the afternoon, the sea locally at level 5. From midday onwards, occasional thunderstorms."

Meteorological data from the nearby ODAS buoy *Kvarner* are included in Annex II. More details on meteorological conditions can be found in Chapter 4.7.

Consequences of the Marine Casualty:

Due to a shift in wind direction and increased wind strength, the ship's anchor dragged, leading to the breakage of the starboard anchor chain. The wind then pushed the ship onto a shallow area near Cape Kremen, where it ran aground at a depth of approximately 5 meters. As a result of underwater damage, seawater began entering the engine room, prompting the master to order the abandonment of the ship. The crew rescue operation was coordinated by MRCC Rijeka. There were no fatalities, injuries, or marine pollution as a result of the incident.

On April 18, 2024, the Port Authority of Pula issued a decision ordering the owner of the vessel to remove the wreck of the ship *Deala*. However, on April 25, 2024, the shipowner submitted a "Notice of Abandonment," thereby transferring responsibility for further wreck removal actions to the vessel's P&I insurers.

Following the maritime accident, emergency response measures to prevent potential pollution were undertaken under the instruction of the Ministry of the Sea, Transport and Infrastructure. By the end of 2024, the insurer provided a more detailed plan regarding the further removal and disposal of the wreck. In March 2025, the insurer signed a contract with a contractor for the removal of the wreck using the method of lifting it onto a floating dock, which also includes towing the wreck to a suitable recycling facility.

¹ All times stated in the report are in Central European Time (CET), which is UTC +2 hours.



Emergency Response

After the master requested urgent assistance, the tugboat Mak was dispatched to the accident area. The master also reported to VTS that sea water was entering the engine room. At 7:24 pm, VTS Rijeka transferred the case to the competent authority, the National Maritime Rescue Coordination Centre (MRCC Rijeka). The tugboat arrived at the scene and at 8:16 pm informed MRCC Rijeka that the vessel Deala was experiencing flooding in the engine room and a loss of electrical power, and that due to weather conditions, no immediate action could be taken.

Shortly afterward, at 8:44 pm, the master requested crew evacuation due to the perceived risk of the vessel capsizing due to flooding. However, it was agreed that the crew would remain on board for safety reasons (strong winds, waves up to 3 meters).

The following day, April 17, 2024, another tugboat, Sveti Vid, was dispatched to assist, as well as divers.

The weather gradually improved, and the vessel remained stable.

The following factual conditions were established shortly after the maritime accident:

- Fuel tank status: 45 metric tons of diesel fuel, 1,800 liters of lubricating oil (L.O.)
- Displacement: 3,000 metric tons; Deadweight: 2,101 metric tons
- Dimensions of hull breach: 70 x 40 cm
- A part of an underwater rock was found inside the ship's hull
- The vessel had grounded along its entire port side, with the hull breach located approximately midship
- The rudder and propeller remained undamaged.

In the afternoon, all crew members were transferred by tugboats to shore, uninjured and properly accommodated.



3. DESCRIPTION OF EVENTS

On April 12, 2024, at 8:30 am, the cargo ship *Deala* anchored east of the entrance to Raša Bay at position 44°57.2' N, 14°05.8' E, approximately one nautical mile east-northeast of Cape Kremen. The crew lowered the starboard anchor with 5 shackles of anchor chain to a depth of 46 meters. The ship had arrived from the Israeli port of Haifa with fifteen Egyptian crew members, carrying no passengers or cargo. The vessel remained at anchor for several days, awaiting cargo readiness for loading, without confirmation of the final loading date. With no cargo onboard, the crew performed routine duties without any extraordinary repairs or major maintenance work on the ship's equipment.

Until April 16, 2024, the weather conditions at the anchorage were favourable. However, an increase in northeast wind intensity and the possibility of local thunderstorms were forecast for the afternoon of that day. Due to the expected deterioration of weather conditions at the anchorage, at 03:15 pm on April 16, 2024, VTS Rijeka called the ship via VHF Channel 14. Communication was established between a VTS Rijeka officer and the duty officer onboard. The VTS operator warned of worsening weather and advised the crew to prepare the engine, lift the anchor, and move to a safe zone, farther from the coastline. About an hour later, the VTS operator contacted *Deala* again, and the duty officer confirmed that the ship was ready to heave up the anchor and depart. Regular communication continued every 15 minutes, with the duty officer repeatedly stating that everything was going according to plan and that the ship would soon set sail.

Meanwhile, the wind intensified, causing increasing tension on the anchor chain. At 05:50 pm, the first signs appeared that the anchor was dragging. The duty officer (chief officer) was on the bridge, and around 6:00 pm, the master joined him. About five minutes later, a loud and sharp noise was heard throughout the superstructure. The master sent a team forward to investigate, who reported that the ship had lost her starboard anchor. At that moment, *Deala* was 0.9 nautical miles from the 5-meter contour line near Cape Kremen. After the anchor chain broke, the ship began drifting west-southwest.

VTS was not informed about the anchor chain failure, and the master continued to assert that everything was under control, not requesting assistance.

About half an hour after the anchor chain failure, the master attempted to regain control by manoeuvring with main engine, but the ship continued drifting towards the shore, driven by the strong bora wind at a drift speed of up to 2 knots. At this point, the master expressed doubts to VTS about whether the ship could avoid grounding and, for the first time, requested tug assistance. Assessing that regaining control of the vessel's movement was no longer possible, the master stopped giving ahead engine orders and, at 6:41 pm, initiated astern manoeuvres.

At 6:59 pm, *Deala* grounded on its port side on a shoal near Cape Kremen. Seawater flooded the engine room, causing a complete power outage (blackout). Shortly afterward, the master decided to abandon the ship with the crew. The evacuation was carried out the following day, as weather conditions prevented tugs from safely approaching the grounded vessel earlier. In the afternoon, all crew members were transferred onto tugs, unharmed, and safely brought ashore.



Figure 1. Cargo Ship Deala, after the accident
(source: AIN)



Figure 2. Cargo Ship Deala, after the accident, lost starboard anchor
(source: AIN)



4. CASUALTY ANALYSIS

4.1. CARGO SHIP *DEALA*

The subject vessel possessed all the necessary certificates issued by the flag state and the classification society in charge, Guardian Bureau of Shipping. It was certified for the transportation of livestock within a restricted navigation area, covering the following seas: the Mediterranean, Red, Black, Marmara, Azov, Aegean Seas, and the Persian Gulf². The company managing the vessel does not operate any other ships in its fleet. The vessel herself has undergone multiple name changes, with available investigation documents recording her previous names as “Barhom III,” “Water Clubs,” and “Le Havre.” The ship has also frequently changed her class; she was previously classed under the International Register of Shipping (IRS), Bulgarian Register of Shipping, and Vega Register (VGRS). Additionally, her nationality changed multiple times, having been registered under the Comoros, Guyana, and Equatorial Guinea flags.

The vessel regularly called at the port of Raša, making 39 visits starting from year 2021 and the date of the accident. Cargo loaded at the Istrian port was primarily transported to the Israeli port of Haifa.

4.1.1. Anchor Windlass and Chain System

In the absence of other sources of information regarding the anchoring system, the details found in the ship's publication “Emergency Towing Booklet” were analysed, which includes the following data:

- Type of anchor: Stockless High Holding Power (HHP)
- Weight: 1100 kg
- Number of anchors: 2
- Anchor chain: “Grade 2”
- Anchor chain length: 440 m
- Chain diameter: 38 mm
- S.W.L³ of chain: 620 kN
- Anchor windlass: 25 t × 30 m/min
- Chain stopper: “Screw type,” S.W.L. 1100 kN
- HHP anchors are designed to provide at least twice the holding power of a conventional anchor of the same weight.

The document “Anchor – Chain Links Measurements”, dated 12 January 2022 (Annex III), which provides evidence of anchor chain measurements, contains the most relevant information available to the investigation regarding the anchor chain. The document states that the chain diameter is 42 mm (confirmed by measurements taken during the onsite inspection), with the port anchor chain measuring

² According to the Minimum Safe Manning Document, issued on October 6, 2023, issued by Zanzibar Maritime Authority

³ SWL – Safe Working Load

7 shackles (192.5 m) and the starboard anchor chain 8 shackles (220 m). The same document shows that the measured values exceed the permissible reduction in chain link thickness. Both chains showed such deviations, with the port chain exceeding limits to a lesser extent than the starboard one.

No records were found indicating that any measures were taken by the company in response to these findings. The lack of accompanying documentation, the general condition of the chain, and random measurements of individual links taken during the inspection suggest that no corrective actions were undertaken to address the deviations identified in the measurements. The onsite inspection also confirmed that the starboard and port anchor chains were not identical; the crossbars of the starboard chain links measure approximately 75 mm, while those on the port anchor chain are larger, approximately 130 mm.

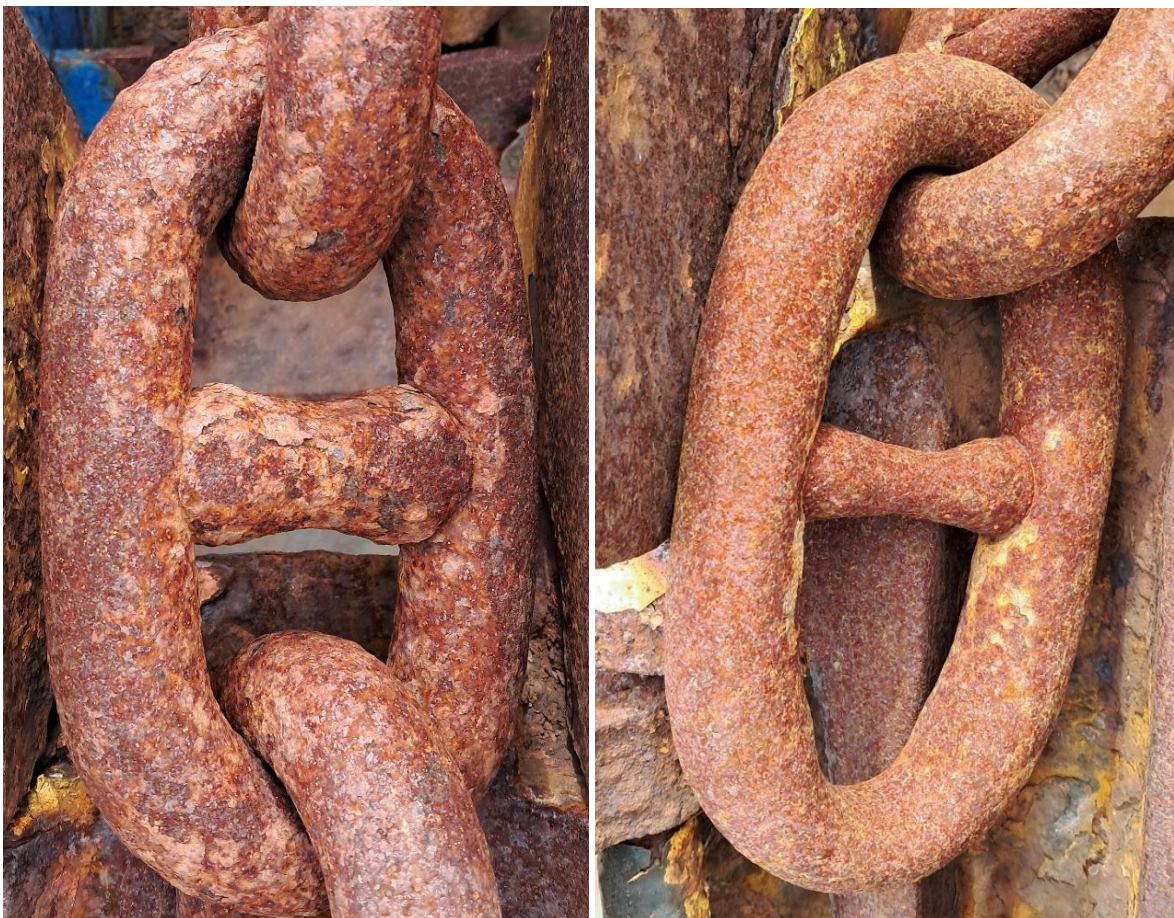


Figure 3: Comparison of shackles of port and starboard anchor chain (source: AIN)

The entire anchor system – windlass, brake components, chain stopper, brake pads, and both anchor chains – are in poor condition, significantly affected by corrosion. There are no signs of lubrication on the moving parts. Some links are missing crossbars, just like the appropriate markings for individual shackles. No records were found regarding the maintenance of these systems or a maintenance plan for the anchor system. Such state of the anchor system, as well as the deck equipment in general, is consistent with the testimonies of certain crew members who held responsible positions on this ship

over an extended period of time. The following photographs demonstrate the overall condition of the parts of the anchor system:

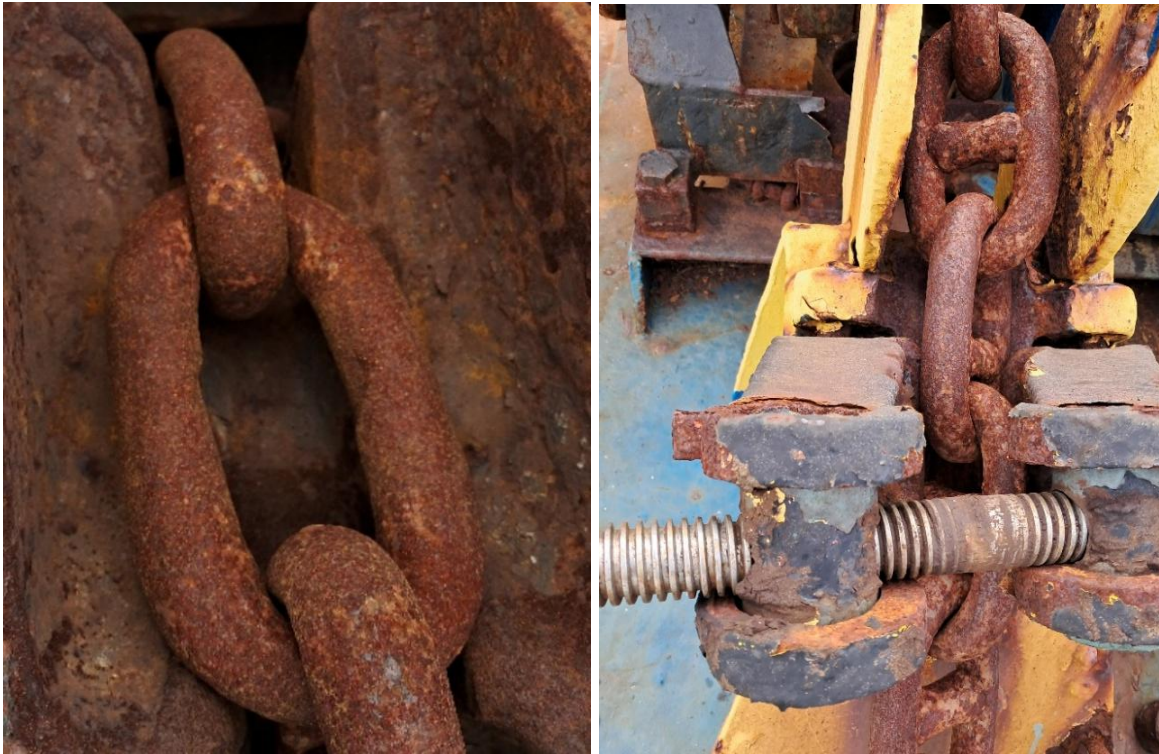


Figure 4: Shackle with no crossbar and anchor stopper of the port anchor system (source: AIN)



*Figure 5: Cargo ship *Deala* after the accident – the brake on the starboard windlass (source: AIN)*

4.1.2. Breakage of the Right Anchor Chain

The right anchor chain broke exactly at the position where it was held by the chain stopper.

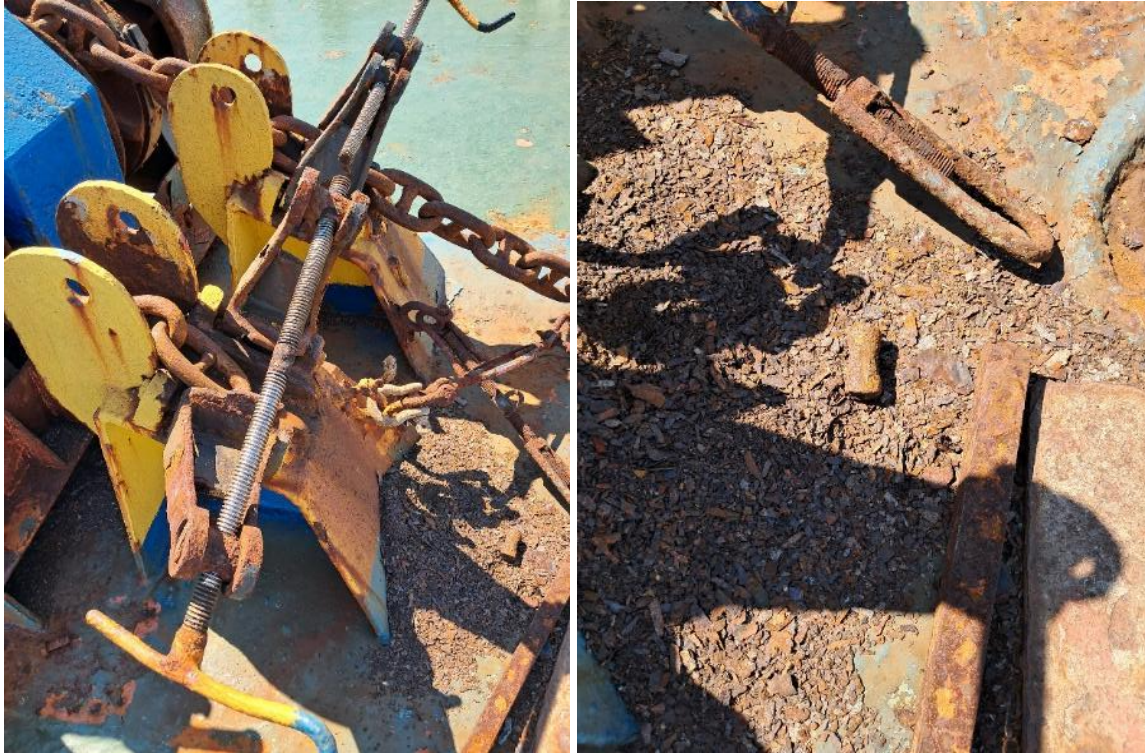


Figure 6: Breakage of the right anchor chain (source: AIN)

There were no direct witnesses of the breakage, but crew members who were at different locations within the superstructure reported hearing a sudden and loud noise resembling an explosion. Following this, a team led by the chief officer proceeded to the ship's forecastle. The chain breakage is also evidenced by the remains of a broken anchor chain link scattered beneath the right chain stopper (Figure 6). The stopper itself was also damaged, indicating that it was engaged at the time of the breakage. The anchor windlass brake was engaged (tightened) when the chain broke, although it is unclear how accurately it could be tightened, given that there are no markings on the windlass to indicate the correct braking force application.

The exact point of chain breakage clearly suggests that there was significant stress on the anchor chain link resting against the chain stopper. This overload was caused by external factors such as wind, waves, and currents, but possibly also by some slippage of the brake, which further transferred the load onto the chain stopper and the link it was pressing against. Considering the poor condition of the anchor chain system and its associated components, which are designed to withstand tensile forces, it can be concluded that this deterioration contributed to the incident under conditions of increased material stress due to the aforementioned external factors.

4.1.3. Navigation Bridge

The navigation bridge is typically located at the top of the superstructure, with the view toward the foredeck significantly obstructed by cargo hold structures. As a result, there is no visual contact between the area around the anchor windlass and the bridge (Figure 7), nor are there any cameras that would allow the duty officer to monitor that part of the ship.



Figure 7: View from the port wing of the navigation bridge (source: AIN)

Paper navigational charts were used on board. The British Admiralty (BA) Chart 1426 "Luka Mali Lošinj and Ports and Harbours on the Coast of Istria" was in use while at anchor from April 12, 2024, until the ship was abandoned (Figure 8). Publications were also in paper form, without an electronic equivalent.

However, it should be noted that unofficial electronic charts were widely used, displaying the on-screen notice "not used navigation."

The following equipment is present on the navigation bridge:

- Magnetic compass
- Gyro compass
- Gyro compass repeater
- Compass bearing device
- BNWAS (Bridge Navigation Watch Alarm System)
- GPS device
- Radar
- AIS
- LRIT
- Echo sounder
- Day signal lamp

The ARPA device is not integrated into the radar system. No issues were reported with any device or navigation system. Although BNWAS was installed, it was not in use, as confirmed by the PSC inspection from March 25, 2024.

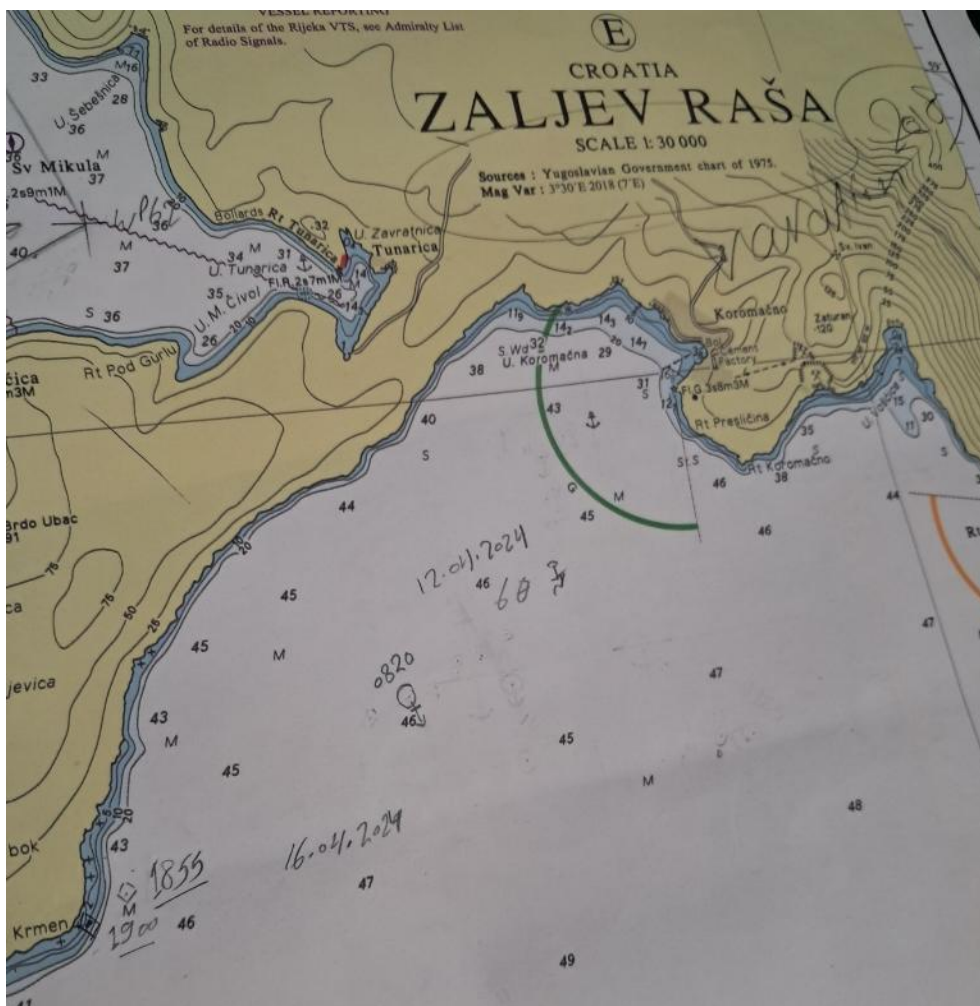


Figure 8: Nautical chart BA1426, part „Zaljev Raša“, located on the bridge (source: AIN)



All communication (GMDSS) devices on the bridge are listed in the ship's radio station certificate in Annex IV. For internal communication, the crew uses a portable transceiver as well as the internal telephone system.

The investigation determined that the ship did not receive NAVTEX messages throughout the entire month of April, including the period spent at anchor. The last received message dates back to March 29, 2024 (Irakleio Radio). As a result, no messages were found on board on the day of the accident that were broadcast on the 518 kHz frequency (Plovput, Split Radio - Q), which contained warnings about the impending worsening weather conditions.

The first such warning was broadcast on April 16, 2024, at 00:44 am (Annex V). Four more broadcasts followed before the accident, but none were received on the ship's NAVTEX device. No issues were reported with any radio communication equipment, including the NAVTEX. The investigation concluded that the NAVTEX device was either turned off or its receiver settings on the day of the accident were such that it did not receive messages while at anchor.

However, the master and navigation officers regularly checked weather conditions using their personal phones, utilizing available weather forecasting applications and tools (Windy).

Additionally, they received broadcasted voice messages over VHF channels, as well as a direct message from VTS in the afternoon of the day of the accident.

For these reasons, they were aware of the impending worsening weather conditions, and the investigation assesses that a lack of weather information was not a contributing factor to the accident.

4.1.4. Main Engine

The ship's main engine, type MAK 8 MU452AK (Atlas Mak Maschinenbaunen), is an eight-cylinder engine that achieves a maximum speed of 11 knots in ballast or 10.5 knots when fully loaded. The pilot information card states that the minimum RPM is 200, at which the ship can reach a speed of four knots. It also notes that the engine's astern power is 50% of its ahead power.

The investigation did not reveal any issues with the main engine that could have potentially limited the captain's ability to maneuver and control the ship. According to statements from the engine department crew, preparing the ship for departure from the anchorage takes no more than about ten minutes for the bridge to safely issue commands via the telegraph.

The engine room requires continuous crew presence, and at the time of the anchor chain breakage, the chief engineer was in the engine control room. After the chain breakage, another engine officer joined him in preparing the propulsion system.



The engine is controlled from the bridge by setting the telegraph lever to the desired position. The following telegraph movements were recorded in the engine (telegraph) log on the day of the accident (Annex XIII):

1. 6:38 PM – Dead Slow Ahead
2. 6:41 PM – Stop Engine
3. 6:43 PM – Dead Slow Astern
4. 6:47 PM – Stop Engine
5. 6:52 PM – Dead Slow Astern
6. 6:56 PM – Slow Astern
7. 6:57 PM – Half Astern
8. 6:58 PM – Full Astern
9. 7:07 PM – Stop Engine

Since there is no automatic recording of commands given via the telegraph, the provided data cannot be considered entirely accurate, especially given the circumstances preceding the accident, from the breaking of the starboard anchor chain to the grounding.

However, an analysis of the SEG vessel tracking program (chapter 4.6) shows that there were no strong engine manoeuvres.

Additionally, the recorded engine commands largely align with the statements of the engine department crew members.



4.2. CREW

All 15 crew members are of Egyptian nationality and use the Arabic language in their daily communication and work. The deck and engine officers also use English, with proficiency ranging from basic to intermediate.

They serve contracts lasting six months or more. The navigational watch (including anchor watch) is carried out by the master, the chief officer, and the second officer, rotating in the usual four-hour intervals. Other crew members perform their duties within the standard eight-hour work schedule, which extends up to twelve hours a day when cargo is onboard.

Overall, the relationships among the crew members were harmonious, as demonstrated in the days following the accident when they supported and helped each other in difficult circumstances.

Records of working and rest hours do not indicate crew fatigue in the days leading up to the incident, which is expected given that the vessel was at anchor, without cargo, awaiting entry into port and the start of loading. Work and rest hours records of the master can be found in annex VI.

4.2.1. Master

He began his seagoing career about ten years ago, with the last three years spent on this vessel. He first boarded *Deala* as a second officer at the end of 2021. At the turn of 2022 to 2023, he was promoted to chief officer. He first boarded *Deala* as master a month and a half before the incident, making this his first contract in that role.

Throughout this period, the vessel regularly loaded cargo in the port of *Raša*, typically once or twice a month, meaning that the captain, having previously sailed in other capacities, was well acquainted with the navigation area and the specific anchorage. However, this was his first time facing such strong winds at this anchorage in his present capacity. The master kept watch from 08:00 to 12:00 and 20:00 to 24:00 and was also required to be present during all vessel manoeuvres, as it is regular practice in maritime industry.

He was aware of the approaching bad weather and maintained constant communication with the VTS service in Rijeka. He confirmed to the VTS operator his intention to depart before the weather deteriorated further. This communication continued even as the wind intensified, but no concrete actions were taken, suggesting that he considered the situation sufficiently safe.

The order to prepare the engine was given to the chief engineer shortly after 6:00 pm. However, the exact timing of the engine preparation request varies across different statements collected during the investigation. Some accounts state that the request was made around 6:00 pm when it was suspected that the anchor was dragging, while others indicate that it occurred after it was confirmed that the vessel had lost its anchor. Since the first engine movement was recorded at 6:38 pm, the investigation concludes that the instruction was given after the right anchor chain broke.



After the grounding and seawater ingress into the engine room, the master decided to abandon the vessel and maintained close contact with the National Maritime Search and Rescue Coordination Center (MRCC).

4.2.2. Deck Department

The chief officer oversees this department, which consists of one more officer, the boatswain, and five helmsmen. This was the chief officer's first assignment on this vessel, having come from another company. He first visited the port of *Raša* on December 23, 2023, making this his seventh visit at this port but only his second anchoring there. He kept watch on the bridge during the 04:00-08:00 am/pm.

Following the master's order, he proceeded to the forward forecastle after everyone heard a loud explosion-like sound, aiming to assess the situation. He was the one who reported to the master that they had lost the starboard anchor.

The second officer was in the seventh month of his nine-month contract, and this was also his first contract with this company and on this vessel. He kept watch during the 00:00-04:00 am/pm shifts, so he was in contact with the VTS officer when information about the impending worsening weather conditions was initially relayed to the vessel. He passed this information on to the chief officer and the master. After completing his watch, he went to his cabin and did not participate in any navigational or operational tasks until the vessel was abandoned.

The boatswain had been sailing on *Deala* for the past three years. The loud noise from the anchor chain breaking caught him while he was having dinner in the mess room. He then proceeded to the bow together with the chief officer and one helmsman, where they saw that the vessel had lost anchor.

Among others, one helmsman joined the master on the bridge after the anchor chain broke and remained there until the vessel ran aground.

4.2.3. Engine Department

This department, led by the chief engineer, consists of one engine officer and three oilers. The chief engineer had been sailing on the vessel since 2021, making him well acquainted with the ship's equipment and the route. Following the master's order, he prepared the engine for manoeuvring after the starboard anchor chain broke.

After water ingress occurred, he shut off the fuel supply valves and ventilation before abandoning the vessel along with the rest of the crew.



4.3. COMPANY PROCEDURES

The seventh chapter of the Safety Management System (SMS) outlines the procedures for performing tasks and operations on board. Chapter 07-1 specifies bridge procedures, including voyage planning, watchkeeping, equipment testing, and more.

The investigation particularly focuses on procedures related to deck maintenance, vessel arrival in port, anchoring, and anchor watch duties.

4.3.1. Deck Equipment Maintenance

Deck and deck equipment maintenance is prescribed in section 7.3.5 *Deck Maintenance*. Subsection 7.3.5.3, *Regular Maintenance*, lists deck equipment that requires regular inspection, lubrication, cleaning, and general upkeep to ensure proper operation. Among this equipment are winches, the anchor brake, and the chain stopper. Notes on planned and completed work are recorded in the *DE-11 Deck Plan Maintenance Report*, but no such record was found during the investigation.

A visual inspection of the deck equipment revealed that it was in very poor condition due to neglect and lack of maintenance. In the context of this accident, this particularly concerns the maintenance of all critical anchoring system components, as described in section 4.1.

Given the absence of records or documentation that could establish a chronological maintenance and inspection history of the anchoring system, along with the factually confirmed poor condition of the anchor chain and other anchoring system components, it can be concluded that the vessel's maintenance was not carried out with due diligence. This negligence ultimately led to the deterioration of the anchor system and windlass components.

4.3.2. Arrival to port

The anchoring procedures are outlined in section 7.3.2.2, *Anchoring*. Among other requirements, it mandates that after anchoring, all brakes and other available securing methods must be engaged. The SMS also includes risk assessment and hazard analysis procedures (Risk Assessment – R.A. and Job Hazard Analysis – J.H.A.), with risk assessment no. 1, *Anchoring*, being particularly relevant. During the investigation, this document was not found, nor was there any entry in the ship's log on the day of anchoring indicating that a risk assessment had been conducted. This suggests that the risk assessment for the vessel's stay at anchor was not done.

The DE06 *Bridge – Pre-arrival Checklist* was displayed on the bridge and electronically completed, but without references to the date and time of completion. According to this checklist, all listed items were verified and deemed in order. At the end of the checklist, there is a note stating that once all checklist items have been verified, an entry must be made in the ship's log. However, such an entry

was not made on the anchoring day, April 12, 2024. The DE06 checklist confirms the availability of updated weather reports, the proper functioning of all navigational and communication equipment, and the readiness of both anchors, among other things. Item 3 of this checklist confirms that both anchors are ready for use by removing all securing elements beyond the windlass brake (Appendix VII). However, it was determined that the port anchor was not ready for use (Figure 9). The readiness of both anchors was also confirmed in the completed DE07 *Anchoring and Anchor Watch* checklist (Appendix IX).

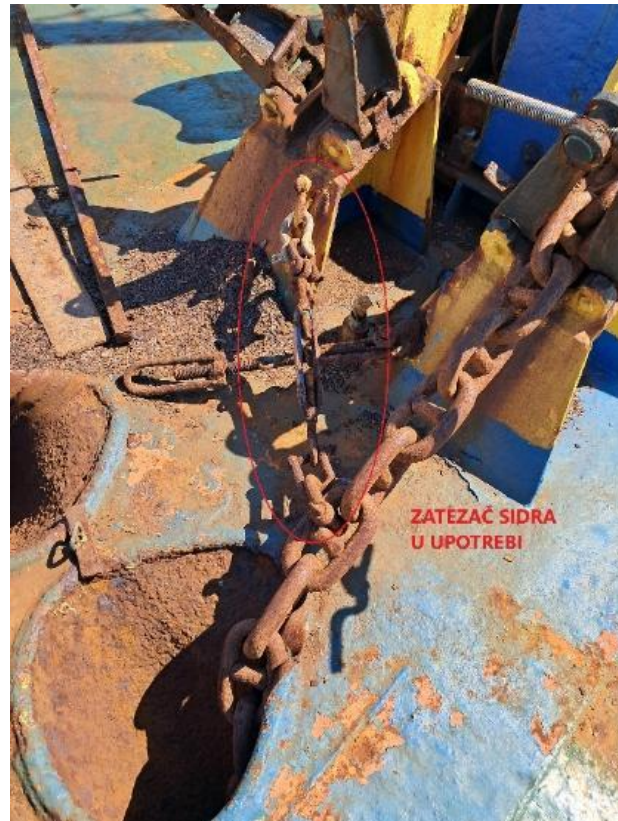


Figure 9: Port chain lashing (source:AIN)

Regarding the checklists used during port arrival, the SMS of the vessel *Deala* also includes the DE33 *Checklist before every entry mooring operation*. The last completed DE33 checklist was electronically filled out on April 17, 2024, at 06:00 (Appendix VIII). Among other items, this checklist confirms the functionality of the windlass brake. Given that the vessel was abandoned the day before, it is concluded that this checklist was completed before the declared date.

4.3.3. Depth to Length Ratio of Deployed Anchor Chain

The vessel's Safety Management System (SMS) does not contain specific company instructions regarding this ratio, while crew members provided varying accounts of the usual depth-to-chain deployment ratio, ranging from 1:2 to 1:3.

Although various literature contains different figures for the optimal depth-to-chain ratio, a widely accepted reference in the maritime industry is *The American Practical Navigator* by Nathaniel



Bowditch. It states that "*when anchoring a vessel, enough anchor chain should be deployed so that the length released is five to seven times the water depth. This applies in favourable weather conditions, while in deteriorating conditions, the ratio should be even greater.*"⁴ Naturally, factors such as vessel type, anchor and chain characteristics, and associated equipment must also be considered. Additionally, operational factors such as anchorage sea room, exposure to meteorological and hydrological conditions, vessel safety, and clearance from shallows and other maritime structures influence the total number of chain links deployed into the sea.

Since the bridge team did not record depth sounder readings at the time of anchoring, the estimated depth at which the vessel dropped anchor is based on nautical charts, indicating a depth of 46 meters. Any deviation from this estimated depth does not significantly affect the calculation of the depth-to-chain ratio.

There are two differing pieces of information regarding the length of the anchor chain deployed into the sea – the VTS recorded that the ship's crew reported five shackles (137.15 m), while statements given after the incident refer to six shackles (164.58 m) of chain in the water. If the ship had five shackles in the water, the scope ratio would have been 1:3 (46:137.15), while with six shackles the ratio would be 1:3.6 (46:164.58).

According to the statements given by responsible personnel on board, the total length of the starboard anchor chain is seven shackles, which means the maximum possible scope ratio at that depth would be 1:4.17 (46:192.01). According to the document from Annex III, the starboard anchor chain is eight shackles long (219.44 m), which would increase the maximum possible scope ratio to 1:4.77.

The length of the starboard anchor chain remaining on board is estimated at approximately up to three shackles, although it should be noted that this figure cannot be verified due to the absence of shackle markings and the condition in which the chain was found stored (Figure 10).

Given the conclusion that the document in Annex III is a reliable source regarding the the anchor chain features, and considering that it aligns with both the reported length of the deployed chain and the estimated length of the segment from the point of breakage to the end of the anchor chain remaining stored in the chain locker, the figure of five shackles in the water can, with high probability, be considered accurate.

Furthermore, the responsible personnel on board were not aware that the starboard anchor chain was 27.5 meters longer than the port chain, and that its total length amounted to eight shackles.

⁴ Nathaniel Bowditch, LL.D., *American Practical Navigator: An Epitome of Navigation, Volume 1*, (National Geospatial-Intelligence Agency, 2024), p.212



Figure 10: Anchor Chain (source: AIN)

It can be concluded that, according to generally accepted standards in the maritime industry, the ratio of depth to anchor chain length in the conditions of the approaching storm was insufficient and, consequently, did not provide an adequate level of ship safety under the prevailing anchorage conditions. This is a result of the absence of company guidelines, as well as the decision not to release more of the starboard anchor chain. At the same time, it cannot be ruled out that the total length of the anchor chain itself would still have been insufficient for the conditions on the day of the accident. The investigation did not have access to the rules of the relevant classification society, making it impossible to analyze and compare them with the actual condition of the ship.

4.3.4. Anchor Swinging Circle

Plotting the ship's swing circle and regularly monitoring the vessel's position in relation to that circle is an important method for timely detection of any deviation from the anchoring position, which may indicate that the anchor is not effectively holding the vessel within expected limits—considering the chain length, anchoring depth, and the ship's overall length.

Section 7.1.4.8 "At Anchor" of the Safety Management System requires frequent checks on the ship's position, particularly when the vessel is swinging around the anchor. However, it does not provide specific details regarding the methods to be used for such monitoring, and the plotting of the anchor swing circle is not mentioned in this context.

There are several formulas for calculating a ship's turning circle around a deployed anchor. A simple calculation would be to consider only the length of the deployed anchor chain (5 shackles) and the overall length of the vessel:

$$\text{Turning circle radius (nm)} = [\text{anchor chain length (m)} + \text{overall length (m)}] / 1852 \text{ m}$$

$$\text{Turning circle radius (nm)} = [137.15 \text{ m} + 79.5 \text{ m}] / 1852 \text{ m}$$

$$\text{Turning circle radius (nm)} = 216.65 \text{ m} / 1852 \text{ m}$$

$$\text{Turning circle radius (nm)} = 0.117 \text{ nm}$$

More complex calculations take into account additional parameters that are omitted here, as illustrated in the image below.

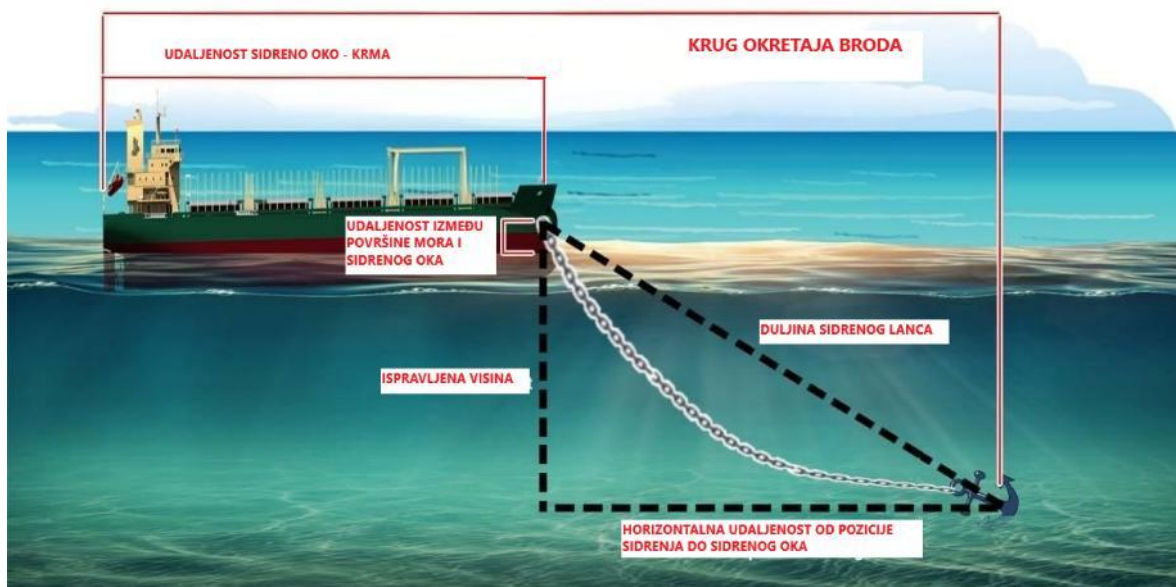


Figure 11: Visual representation of the calculation of the ship's turning circle radius (source: AIN)

$$\text{Corrected height (m)} = \text{depth (m)} + \text{distance from the hawsepipe to the water surface (m)}$$

$$\text{Corrected height (m)} = 46 \text{ m} + 4 \text{ m} = 50 \text{ m}$$

$$\text{Horizontal distance (anchor-hawsepipe) (m)} = \sqrt{\text{chain length}^2 - \text{corrected height}^2}$$

$$\text{Horizontal distance (anchor-hawsepipe) (m)} = \sqrt{137.15^2 - 50^2}$$

$$\text{Horizontal distance (anchor-hawsepipe) (m)} = 127.7 \text{ m}$$

$$\text{Turning circle radius (nm)} = (\text{horizontal distance anchor-hawsepipe (m)} + \text{hawsepipe-bridge distance (m)}) / 1852 \text{ m}; \text{ Turning circle radius (nm)} = 0.112 \text{ nm}$$

The ship's swing circle is an essential method for position monitoring and early detection of anchor dragging, and it is considered a fundamental skill of a navigation officer. Failure to plot the swing circle on the nautical chart and/or radar significantly reduces the effectiveness of bridge watchkeeping while the vessel is at anchor.

The investigation determined that the swing circle was neither calculated nor marked upon the vessel's arrival at the anchorage, nor at any later stage during the anchorage period.



4.3.5. Watchkeeping at anchor

Procedures related to anchor watch are prescribed in the SMS chapter 7.1.4.8 *At Anchor*. This chapter also includes a requirement for frequent position checks, especially when the vessel moves in a circular motion. The checklist DE07 *Anchoring and Anchor Watch* outlines all actions required during anchoring planning and anchor watch.

Among other things, this checklist requires that, whenever circumstances allow, the vessel's position must be frequently checked using visual azimuth observations relative to fixed coastal objects. This checklist was electronically completed on April 12, 2024, with corresponding entries in the ship's logbook, starting from the day the vessel anchored until grounding and abandonment. Each watch confirmed compliance with this checklist, with an entry recorded every four hours. However, neither in the checklist, the ship's logbook, the nautical chart, nor any other record, was there any indication of which specific fixed coastal object(s) were used as a reference for position verification. The ship's logbook exclusively recorded GPS positions every four hours. The investigation determined that, during the vessel's time at anchor prior to the accident, position checks were conducted exclusively using GPS every four hours. The habit of relying solely on GPS for position determination is further confirmed by examining the nautical charts used for coastal approach, where it is evident that the duty navigation officer, despite the proximity of *Unije Island* and *Galijola Rock*, marked only GPS positions (Appendix X). This practice remained unchanged even with the onset of the bad weather, when it would have been reasonable to suspect the possibility of anchor dragging.

4.4. ANCHORAGE

A bay extends shallowly into the mainland, extending from Koromačna Bay is regularly used as an anchorage for vessels waiting to load in the ports of *Plomin* and *Bršica* (Figure 12). Anchoring within *Raša Bay* is generally avoided due to its dense maritime traffic and other commercial activities. Additionally, the bay is deep and narrow, which limits safe anchoring options for vessels. The anchorage is not officially marked on nautical charts. *Koromačna Bay* is generally well protected from the bora wind and waves, but this protection gradually decreases as vessels anchor further southwest from the port of *Koromačno*. The wider bay area is bordered by the coastline of the Ubac Peninsula, with depths near the shore ranging from 40 to 46 meters, as indicated on nautical charts.

Due to the lack of alternatives, and despite the fact that this sea area is not designated as an official anchorage, the marked area in the image serves as an anchorage for vessels waiting to enter the ports of *Raša Bay*. Anchoring further south of the marked area is not optimal, as it is too exposed, leaving vessels vulnerable to waves from both western and eastern directions. As a result, a maximum of four vessels up to 100 meters in length typically anchor in this area simultaneously.

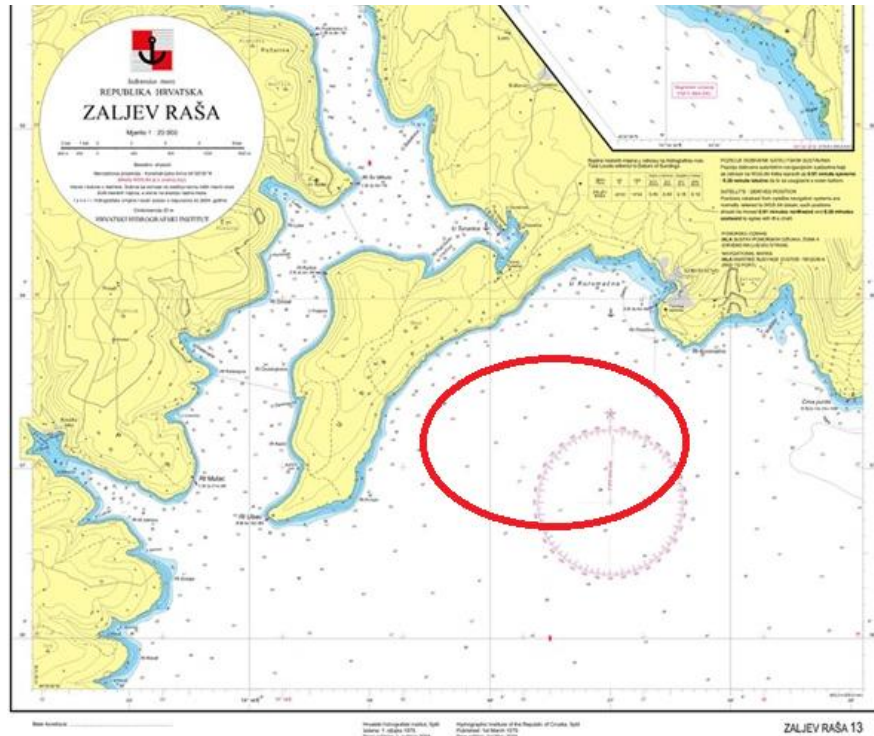


Figure 12: Nautical chart „Zaljev Raša - 13“, with marked anchorage (source: HHI)

4.5. VESSEL TRAFFIC SERVICE

The tasks of vessel traffic monitoring and management are performed by the Vessel Traffic Service (VTS) of the Ministry of the Sea, Transport and Infrastructure (hereinafter referred to as the VTS service) in accordance with the provisions of the *Maritime Code* and the regulation adopted based on the *Maritime Code*, which more precisely regulate the tasks of this service and interaction with vessels. At the time of the accident, the *Regulation on the Safety of Maritime Navigation in Internal Sea Waters and the Territorial Sea of the Republic of Croatia*, as well as the *Method and Conditions for Performing Maritime Traffic Monitoring and Management (Official Gazette Nos. 79/13, 140/14, 57/15)*, was in force.

The VTS service is authorized to provide vessels with services important for safe navigation, navigational advice and support, as well as carry out tasks related to the organization of navigation and vessel traffic management. Vessels within the area of supervision must comply with safe navigation rules, provide data to the VTS service, and act according to the instructions of the VTS service.

From the day the vessel arrived in the anchorage area until the day of the maritime accident, it was located within the Rijeka VTS sector, where VTS services are provided by the VTS service on VHF radio channel 14.

On April 12, 2024, at 7:30 AM, the VTS operator recorded in the log that the vessel *Deala* "anchored in Koromačno Bay with five shackles of anchor chain in the water." On the day of the accident, the log states that at 5:17 PM, *Deala*'s anchor dragged, and the captain was warned to start the engine and reposition. The master did not request assistance and stated that "everything is under control."

The following log entries were recorded:

- 5:35 PM – *Deala* " anchor up, and the master states they will relocate north of the anchoring position."
- 5:35 PM – 7:15 PM – "Repeated calls on channel 14, with the captain continuously responding that everything is under control, but the strong bura wind is making maneuvering difficult."
- 7:24 PM – *Deala* grounded, MRCC takes over.

On the day of the accident, the first contact between the VTS operator and the duty officer on the bridge occurred around 3:15 pm, when the VTS operator instructed the vessel to prepare the engine, heave up the anchor, and move her away from the coastline. The duty officer on *Deala* confirmed receipt of the instruction. An hour later, another contact was made, with the vessel confirming its intention to pick up the anchor and proceed according to instructions. From that moment onwards, contact continued approximately every fifteen minutes on VHF channel 14, with repeated assurances from the vessel that everything was fine and that they would depart soon.

About ten minutes before the grounding, the master for the first time requested the tug assistance. At no point did MRCC Rijeka receive information from the vessel regarding the developing situation, including the chain breaking. This information was also not relayed to the VTS operator, leading them to believe the vessel's anchor was still dragging. After the grounding, MRCC Rijeka took over communication and rescue coordination.

The investigation determined that the ship's officers repeatedly misinformed VTS about the vessel's safety status, continually assuring them that the situation was under control.

4.6. SEQUENCE OF EVENTS LEADING TO THE GROUNDING OF THE VESSEL

Due to the absence of automatic data recorders on the vessel and within the VTS, the only digital trace available for the investigation is the vessel's movement recorded by the *SafeSeaNet Ecosystem Graphical User Interface of European Marine Safety Agency* (EMSA SEG system)⁵.

Figure 13 illustrates the vessel's movement from the moment the wind intensified and changed direction until the ship's keel grounded on the seabed.

⁵ The EMSA SEG system is an integrated maritime traffic information system covering the coastal states of the EU, maintained by the European Maritime Safety Agency. In this specific case, the data were obtained from the AIS of the national coastal VTMS system of the Ministry of the Sea, Transport and Infrastructure.

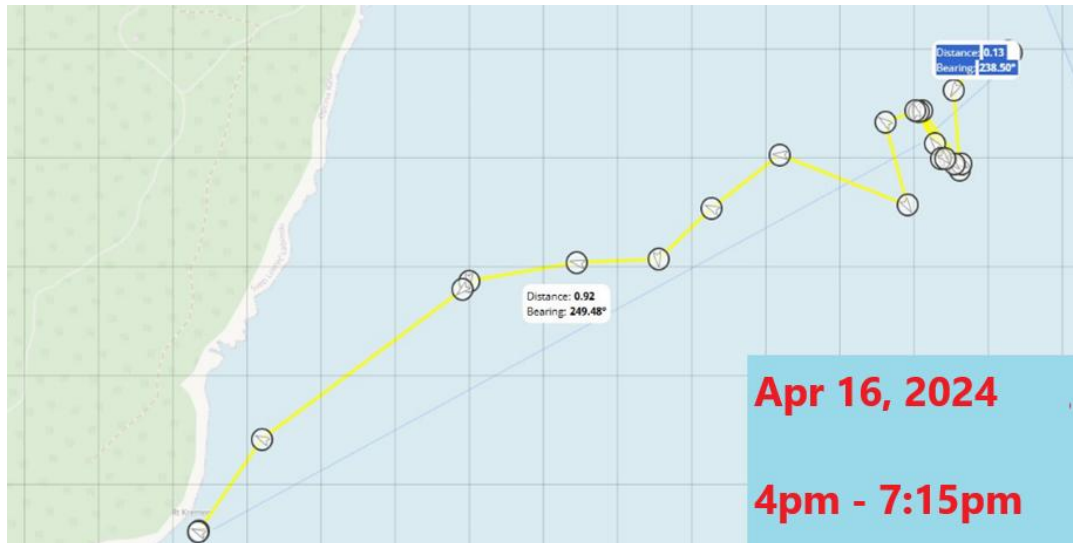


Figure 13: SEG extract (1) (source: EMSA SEG System)

In general, the sequence of events can be divided into four periods:

- First period (4:00 PM – 5:05 PM): The wind intensifies, causing the anchor chain to stretch, resulting in the vessel drifting 0.13 nm (240 m) southwest from its initial position over the course of an hour. Since the vessel anchored with five shackles, this movement remained within the possible swinging circle.
- Second period (5:05 PM – 5:50 PM): Characterized by constant changes in the vessel's heading, but without a significant change in distance from the original position.
- Third period (5:50 PM – 6:05 PM): The vessel starts drifting away from the original anchoring position, indicating that the anchor has begun to drag.
- Fourth period: Begins with the sudden breakage of the anchor chain and ends with the vessel's grounding.

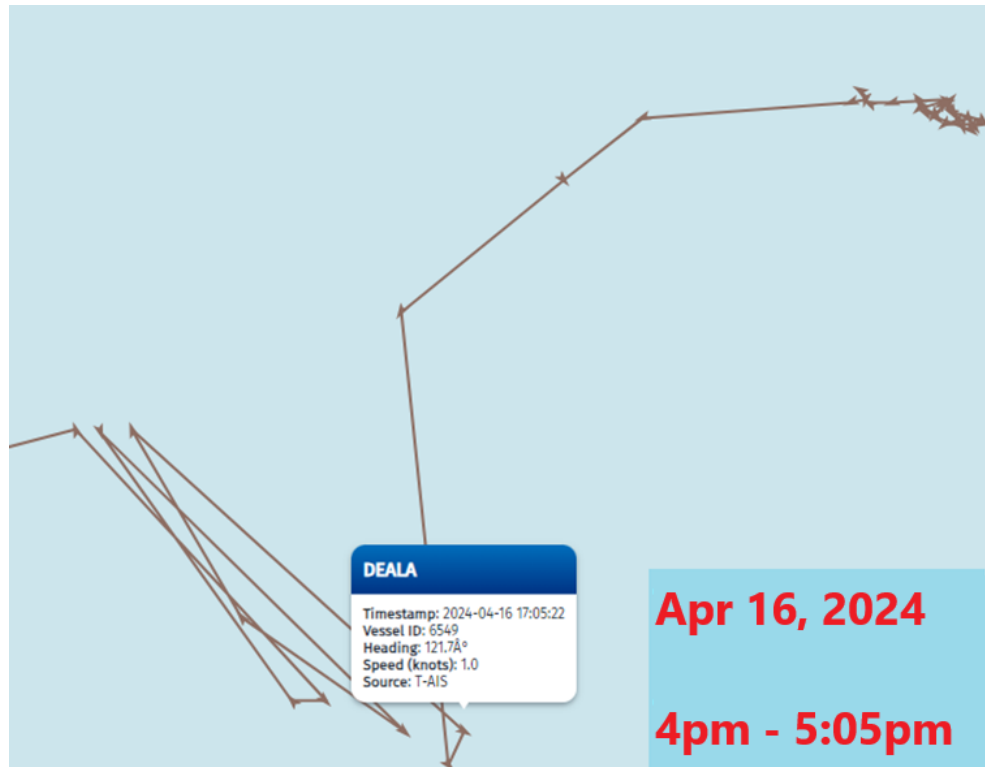


Figure 14: SEG extract (2) (source: EMSA SEG System)

At around 4:00 PM, the vessel's bow was facing west (4:05 PM – 252.6°; 4:11 PM – 298.3°). An hour later, under the influence of changing wind conditions, the vessel turned southeast (4:56 PM – 139.6°; 5:05 PM – 121.7°). This indicates that the recorded shift of 0.13 nm between 4:00 PM and 5:05 PM remained within expected values, confirming that the anchor had not yet dragged (Figure 14).

For the next 45 minutes, the vessel's distance from the anchoring position remained almost unchanged, but its bow direction continuously fluctuated within the range of 320° – 160° (from southeast to northwest and vice versa). This is also reflected in recorded lateral speeds over the ground, reaching up to 1.8 knots.

It can be concluded that during this period, the anchor chain was subjected to significant stress due to the continuous lateral movement of the bow. The crew did not conduct a visual inspection of the anchor chain's condition during this time.

Additionally, it can be assumed that under these conditions, the anchor chain was highly tensioned, stretched, and in a long stay, tight position.

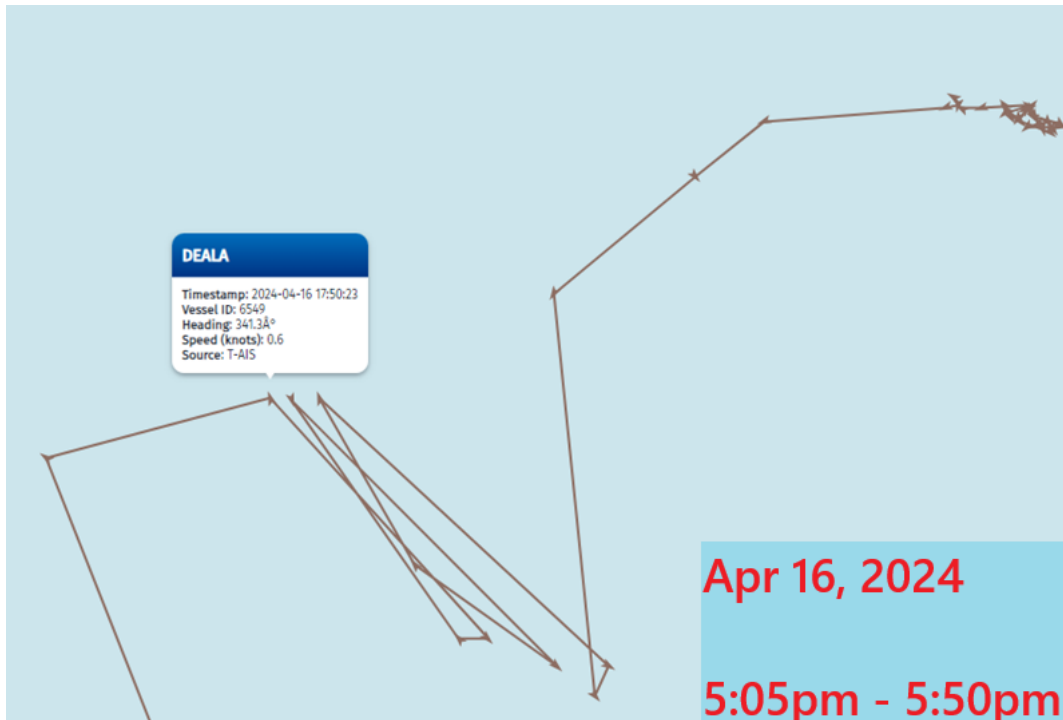


Figure 15: SEG extract (3) (source: EMSA SEG System)

Between 5:50 PM and 6:05 PM, in addition to lateral movement, the vessel also recorded a displacement of 0.07 nm (130 m) from its original anchoring position. This indicates that the anchor chain was fully stretched and judging by the changes in the vessel's bow direction and the recorded displacement, the anchor began dragging along the seabed.

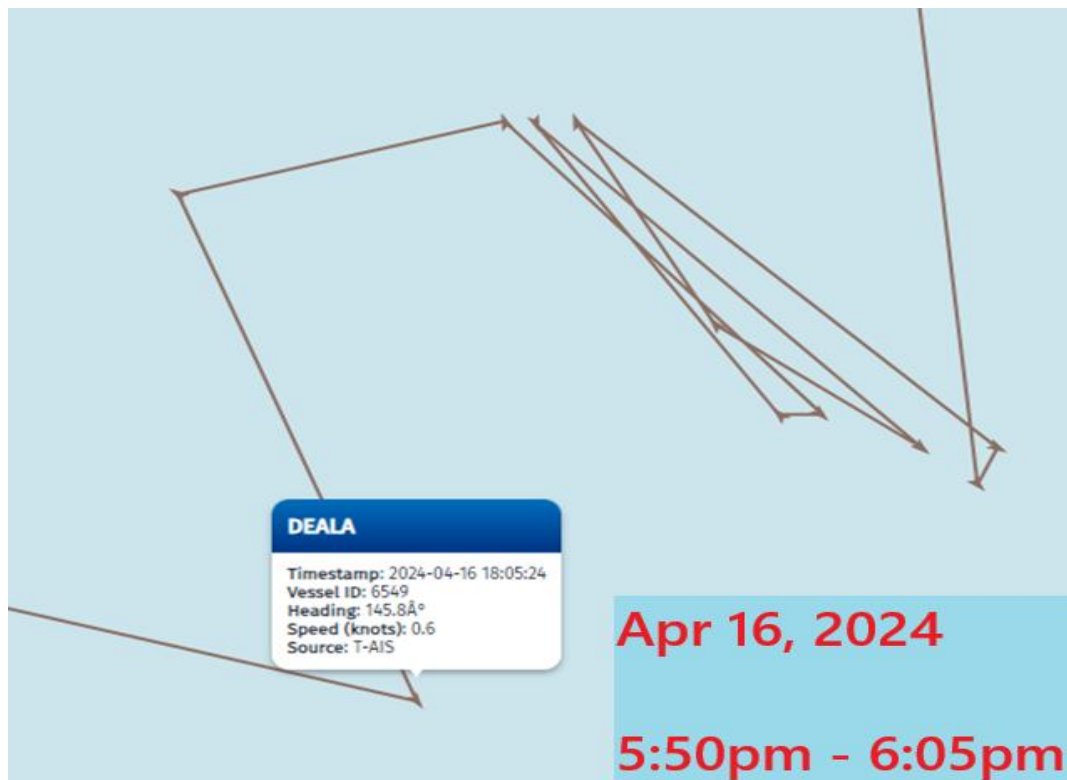


Figure 16: SEG extract (4) (source: EMSA SEG System)

Between 6:05 PM and 6:11 PM, the vessel's drifting speed increased, clearly indicating the breaking of the anchor chain. The sudden change in the vessel's drift is also clearly visible in Figure 17, where the transition of the marked track from yellow to blue indicates the acceleration of the drift, thereby identifying the moment the anchor chain broke.

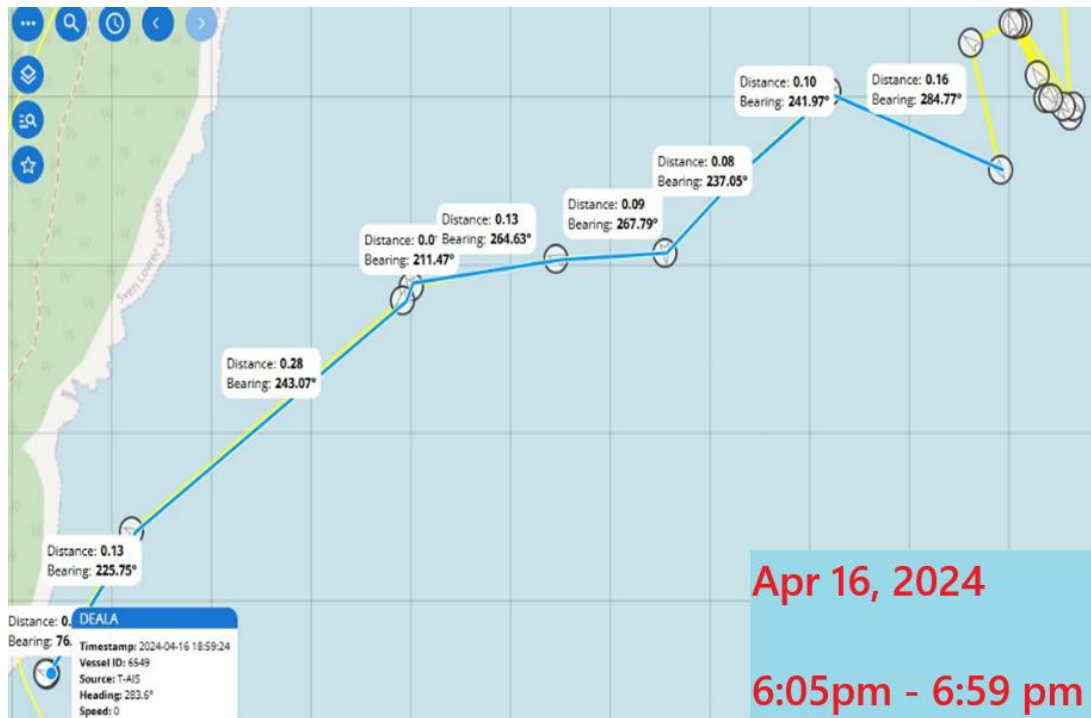


Figure 17: SEG extract (5) (source: EMSA SEG System)

After the chain broke, the lateral component of the vessel's speed significantly decreased, and the ship drifted away from the anchoring position. At the moment of the sudden chain failure, the vessel was 0.8 nautical miles east-northeast of hazardous shallow waters. As previously established, the vessel's position was not being monitored using a fixed coastal object, nor was a swinging circle plotted — both of which are key tools for determining position near the coast and for early detection of changes in dynamic conditions of the ship while at anchor.

After some time, the chief mate and his team informed the master about the situation with the starboard anchor chain, but the master did not notify the VTS. His next step was to instruct the chief engineer to prepare the engine for manoeuvring. No instructions were given to prepare or lower the port anchor, which was not ready for deployment. Approximately thirty minutes passed from the moment the chain broke until the first engine manoeuvres, which aligns with the recorded values shown in Table 1, where a brief reduction in drift speed corresponds to the documented engine use. Although the master initially engaged the engine ahead at low speed, he quickly abandoned the attempt to save the vessel from grounding and began going astern with the intention of "protecting the rudder in case of grounding."



Vrijeme	Pramčanica	Udaljenost	Brzina	Napomene
2024-04-16 16:38:21	248.2°	0,03		
2024-04-16 16:44:21	139.1°	0,02		
2024-04-16 16:50:22	209.9°	0,03	0,3	
2024-04-16 16:56:22	139.6°	0,09	0,9	chain stretching
2024-04-16 17:05:22	121.7°	0,01	0,1	predominantly lateral movement, minimum increase in the distance from the anchor position
2024-04-16 17:11:22	342°	0,07	0,7	
2024-04-16 17:20:22	321.4°	0,04	0,3	
2024-04-16 17:26:22	133°	0,03	0,3	
2024-04-16 17:32:22	161.5°	0,07	0,7	
2024-04-16 17:38:22	318.6°	0,06	0,6	
2024-04-16 17:44:23	135.8°	0	0	
2024-04-16 17:50:23	341.3°	0,06	0,6	
2024-04-16 17:59:23	304.7°	0,04	0,3	
2024-04-16 18:05:24	145.8°	0,09	0,9	anchor chain break
2024-04-16 18:11:24	272.9°	0,16	1,6	
2024-04-16 18:20:24	292.7°	0,1	0,6	
2024-04-16 18:26:24	172.6°	0,08	0,9	
2024-04-16 18:32:24	282.8°	0,09	0,9	
2024-04-16 18:38:24	176.3°	0,13	1,3	
2024-04-16 18:44:25	229.4°	0,01	0,1	use of engine (probably)
2024-04-16 18:53:24	295°	0,28	2,1	
2024-04-16 18:59:24	283.6°	0,13	1,3	aground
2024-04-16 19:05:25	293.6°		0	

Table 1: Calculation of Vessel Speed Based on SEG Data (source: EMSA SEG system, adapted by AIN)

Aside from the brief attempt to regain control through limited use of the main engine, the vessel's movement was practically uncontrolled and steady, entirely under influence of external factors. There was no attempt to apply stronger engine power ahead, which would likely have had a greater effect on the trajectory along which the vessel was drifting under the influence of external forces. While going astern, only 50% of the engine's power is available, and the rudder's response in such reverse motion is reduced due to decreased fluid flow.

The situation was further complicated by the fact that the Wheelhouse Poster, which displays the vessel's maneuvering characteristics, was not filled in and posted on the bridge (Annex XI – Wheelhouse Poster), raising a doubt about the level of understanding of the ship's manoeuvring capabilities by the responsible personnel on board. The absence of such critical information is particularly concerning in hazardous situations, as it prevents the navigating officers from quickly verifying data on the vessel's handling characteristics and making timely decisions.

At the moment the attempt to avoid grounding was abandoned, the master informed VTS for the first time that the vessel was in distress, requesting tug assistance.

4.7. WEATHER CONDITIONS

The weather forecast from the Maritime Meteorological Center Split for the day of the accident predicted worsening weather conditions, as indicated in the Meteorological Report for port authorities and info centres from April 16, 2024, at 06:00 (Annex I). For the northern Adriatic, northeast wind gusts of 35-60 knots were forecasted in the afternoon, along with occasional storms.

Meteorological data were collected from the Kvarner meteorological buoy, located at position 44°41.497' N, 14°09.115' E, 15.7 nm south-southeast of the accident site (Annex II). Although this buoy is positioned in open waters, which generally means slightly higher recorded wind strength and wave heights, its proximity to the accident location allows for a high probability that the recorded data accurately indicate the prevailing weather dynamics along the southeastern coast of Istria.

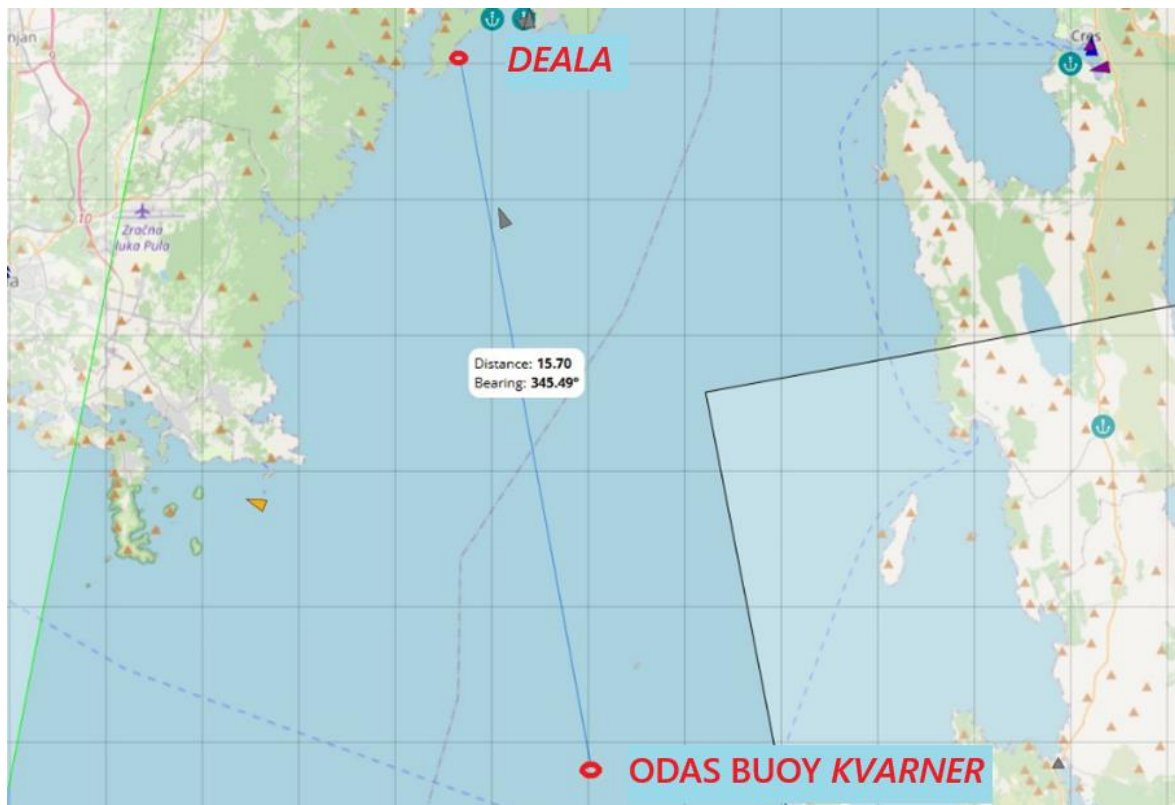


Figure 18: ODAS buoy „Kvarner“ (source: EMSA SEG system, adapted by AIN)

The *Kvarner* buoy recorded an increase in wind intensity at 4:20 PM, with maximum values reaching 14.5 m/s. Simultaneously, the wind shifted from a southeast to a northeast direction, gradually strengthening to an average wind speed of 21.7 m/s (with a maximum of 32.5 m/s) by 6:50 PM.

The worsening weather conditions are also reflected in the air pressure curve (Annex II), which clearly shows a depression forming in the afternoon hours. Data on wind strength and direction for the period between 4:00 PM and 7:30 PM are provided in Table 2.



TIME	Av. wind speed (m/s)	Direction of wind (average)	Max. wind speed (m/s)	Direction of wind (max)
16:00	4,1	101	4,7	101
16:10	4,5	90	5,8	73
16:20	7,3	73	14,5	56
16:30	8,8	73	18,5	28
16:40	7,4	73	17,8	62
16:50	9,2	34	18,1	79
17:00	9,6	73	19,9	56
17:10	14,4	56	22,7	73
17:20	13	68	22,3	56
17:30	12,4	73	25	56
17:40	17,7	73	29,6	56
17:50	13,9	56	26,3	62
18:00	14,9	73	26,2	68
18:10	17,3	68	29,1	68
18:20	17,5	56	29,1	84
18:30	19,6	73	30,6	68
18:40	18,7	56	30,7	68
18:50	21,7	73	32,5	45
19:00	17,5	73	26,2	73
19:10	17	73	29,5	73
19:20	14,8	73	26	79
19:30	16,5	56	28,4	68

Table 2: Wind data from ODAS buoy „Kvarner“ (source: DHMZ)

Since the crew on bridge did not record weather data while at anchor, it is not possible to compare the data recorded on the ship with those automatically recorded by the buoy. However, the investigation noted a close correlation between the timing of wind shifts in direction and strength recorded by the buoy and the events at the anchorage 15 nm further north. According to witness statements, the winds at the anchorage were somewhat weaker, reaching up to 7 Beaufort (13.9-17.1 m/s), which is expected for sea area close to the shore. According to the Beaufort scale, wind of this strength is considered “moderate gale, near gale”.

It is also important to emphasize that such short periods of gale wind are not uncommon in the northern Adriatic and therefore do not represent a meteorological phenomenon or an extreme event that could not have been reasonably anticipated, especially given that this development was forecasted with high accuracy. For this reason, it is considered that the element of surprise in the development of this situation at the anchorage near the entrance to Raša Bay did not influence the outcome of this incident, as the weather conditions were in line with forecasts and generally within the usual weather anomalies for this region during this time of year.



4.8. HUMAN ELEMENT

During the investigation, the exact reason why the master of the vessel, despite verbally expressing a clear intention to weigh anchor and leave the anchorage, did not do so remains undetermined. He repeatedly claimed that the vessel was preparing to depart. Between the verbal confirmation of the vessel's readiness to depart the anchorage (04:15 PM) and the first order to start the engine (6:38 PM), more than two hours had passed. Master only decided to depart after receiving information from his crew that the anchor had been lost. The vessel had already set adrift the moment the chain broke; the only thing left was to regain control over the vessel and navigate away from the anchorage. Several possible reasons could explain why the true intentions were not accurately conveyed to VTS.

One possibility is that technical difficulties affecting the vessel's manoeuvrability were being concealed. However, the investigation did not identify any such difficulties, and the crew did not carry out any special maintenance tasks on any equipment, which would be expected in the case of a malfunction. Therefore, this reason is considered less likely, though it cannot be entirely ruled out.

Underestimation of the risks associated with the incoming weather deterioration is a more probable reason for such behaviour. This was only the second time the chief officer had anchored in this area, while the second officer had only slightly more experience than his superior. The master was certainly familiar with the region's meteorological characteristics and the overall condition of the vessel. Nevertheless, he chose to remain at anchor, with the main engine not being on standby until the anchor chain broke. It is possible that this decision was based on his personal belief, formed through previous experience, that the anchor would hold without issue under such conditions.

Although not supported by evidence, another hypothesis worth mentioning is that senior personnel on board and/or the company's management sought to minimize fuel consumption. Had the vessel left the anchorage and ran underway, it would have consumed significantly more fuel during that period than if it remained at anchor. Since fuel costs, along with other oils and chemicals required for engine operation, constitute a major expense for shipowners, the financial incentive in such a situation is apparent. The vessel's general condition and the state of its equipment suggest an approach aimed at minimizing all non-essential operational costs. In this context, leaving the anchorage was not strictly necessary, especially as it was not operationally imperative, though this disregards the safety aspect of decision-making.

The insufficient length of anchor chain deployed in the water, and consequently, the low depth-to-chain-length ratio, is another factor linked to human element. However, this must be viewed in the context of the company's lack of procedures and detailed guidance on this matter. The investigation established that additional deployment of the starboard anchor chain was neither considered nor executed during worsening weather conditions. However, given the maximum depth-to-chain-length ratio for the starboard anchor, the lack of additional information about the characteristics of the anchor and its associated equipment, and the established poor condition of such equipment, deploying more chain would not have significantly improved safety margins under these circumstances.



On the other hand, earlier departure, in accordance with VTSO instructions, would have significantly increased the safety margin. A risk assessment was not conducted, meaning the decision-making process regarding whether to stay at anchor or leave lacked an analysis of potential hazards, including the overall condition of the anchoring system, the characteristics of the anchorage, the depth-to-chain ratio, the vessel's manoeuvrability, and other factors.

Regarding the master's and crew's actions following the sudden breaking of the anchor chain, an initial lack of understanding of the vessel's sudden difficult circumstances is noticeable. The vessel's position while at anchor was not monitored using fixed shore objects, which delayed attempts to regain control of the vessel's movement at that moment.

The port anchor was not ready for use, and the investigation determined that the option of deploying the remaining anchor was not considered by the master or deck officers. Additionally, the delayed readiness of the main engine and its use with the intent of manoeuvring the vessel away from shallow waters is noted.

The sequence of orders given by the master to the engine telegraph clearly indicates that the main engine was not operated in a manner that maximized its power and manoeuvring capabilities, likely due to panic and confusion in the new circumstances.

The issue of inadequate vessel maintenance in this case largely falls under systemic problems related to the company's and vessel's operational model, rather than deficiencies in the crew's maintenance planning and execution. These systemic issues are also reflected in recorded PSC inspections, analyzed in the following chapter. Therefore, the master's and crew's actions should be viewed in light of the overall condition of the vessel and company, which clearly indicates a diminished awareness of safety considerations in decision-making processes.



4.9. TECHNICAL STANDARDS, SURVEYS, AND INSPECTIONS

Since *Deala* regularly called at the port of *Raša*, it was subject to several Port State Control (PSC) inspections. The last three inspections, conducted in 2023 and 2024, revealed deficiencies related to the implementation of the ISM Code (failure to adhere to the three-month period for corrective actions addressing ISM system non-conformities—the deficiency was not rectified), vessel maintenance (corrosion in various parts of the ship), and during an inspection on March 29, 2023, an issue was recorded concerning the anchoring system, where a significant amount of water and sludge was found in the anchor chain locker, which certainly affects the condition and deterioration of the anchor chain.

During the latest PSC inspection in *Raša*, conducted on March 25, 2024, ten deficiencies were identified, including a repeated issue regarding the inadequacy of ISM system corrective actions. Additionally, the inspector found that the BNWAS (Bridge Navigational Watch Alarm System) on the bridge was not operational, and the crew was unaware of the location of the system's activation key. Both deficiencies were also confirmed during the PSC inspection following the accident.

Persistent deficiencies regarding the safety management system, maintenance, crew familiarization, and the general condition of the vessel were also evident in a PSC inspection conducted in Haifa on May 29, 2022, where 26 deficiencies were found, 8 of which were serious enough to result in the vessel's detention until they were rectified, which occurred four days later.

PSC inspection records indicate inadequate maintenance, including deficiencies in the anchor windlass system, chains, and other associated equipment, shortcomings in the implementation of the established safety management system, as well as a lack of knowledge and improper use of navigational equipment. Taken together, these findings point to systemic issues within this shipping company.

The reports from the relevant classification society and the flag state were not available for this investigation.

5. WRECK REMOVAL

Preparatory work for the removal of a wreck, the prevention of further decay of the wreck and the contamination of the accident site, selection of the most optimal removal method, and the actual removal itself generally constitute a complex undertaking. It requires professional and technical expertise and execution to ensure that the entire process is carried out safely and in an environmentally acceptable manner. It is important to emphasize that each wreck must be approached based on the specific circumstances of the case, taking into account the type of vessel, the condition of its structure and stability, the location of the accident, the presence of hazardous substances on board, applicable salvage and removal technologies, and a range of other factors.

Accordingly, in the present case, the competent authorities of the Republic of Croatia undertook appropriate and suitable measures and actions in accordance with the provisions of the Maritime Code. A brief overview of the chronology of the measures and activities undertaken is provided below, concluding with the information available to this investigation as of the publication date of this report.

On April 18, 2024, the Port Authority of Pula issued a decision ordering the owner of the vessel to remove the wreck of the ship *Deala*, with immediate effect and no later than April 30, 2024. The removal was to be carried out in accordance with the conditions for safe removal as outlined in the decision. This decision followed an assessment by the competent port authority that the vessel in question met the criteria to be classified as a wreck under the Maritime Code, that it posed an immediate risk of further material damage, and that its condition represented a threat to navigation safety, with a reasonable expectation of harmful consequences for the marine environment, coastline, and related interests such as public health, the well-being of the coastal area, maritime activities in the region, and other economic interests.

On April 25, 2024, the shipowner submitted a "Notice of Abandonment" to the competent authorities of the Republic of Croatia, thereby transferring responsibility for further wreck removal actions to the vessel's P&I insurers.

On May 29, 2024, acting on the instruction of the Ministry of the Sea, Transport and Infrastructure, removal of residual hydrocarbons, wastewaters, and other waste from the wreck was initiated. Approximately 97,500 liters of oily and waste waters, as well as solid waste found on the vessel, were removed during this operation.

In the final quarter of 2024, the insurer more precisely defined the subsequent steps regarding the removal and disposal of the wreck and began reimbursing the costs of the inspection, stabilization of the vessel, and removal of hydrocarbons and other waste from the wreck.

In March 2025, the insurer concluded a contract with a contractor for the wreck removal, using the method of lifting the vessel onto a floating dock, which includes towing the wreck to an appropriate dismantling facility.



6. CONCLUSION

The persistent delays of departure from the anchorage, which ultimately never occurred, placed the vessel in a situation where various contributory factors led to the accident. This decision resulted from the absence of a risk assessment for her stay at anchor, particularly during bad weather conditions.

The anchor system was in very poor condition due to a lack of maintenance, causing the anchor chain to fail under the strain of strong winds (a contributory factor). Additionally, inconsistencies were found regarding the company's handling of deviations in chain measurements, as well as the characteristics of the anchoring equipment and chain. The condition of the deck equipment was not considered when assessing the risk of remaining at anchor or deciding whether to depart from the anchorage.

The ratio of water depth to chain length did not provide an adequate level of safety in deteriorating weather conditions (contributing factor). This resulted from the absence of company guidelines and the overall chain length, which, even at maximum deployment, would not provide a desirable safety margin.

Another contributory factor was the inaccurate transmission of information to the VTS service by the responsible personnel on the bridge. This unnecessary delay may have affected the actions VTSO could have taken had he been timely and accurately informed about the master's plans and the events leading up to the grounding.

The lack of proper watchkeeping and precautionary measures, which are part of standard seamanship while at anchor, also contributed to this accident. The vessel position monitoring in relation to azimuth and/or distance from fixed shore objects was not practiced. Ship's swinging circle was not utilized. Such circumstances delayed an appropriate response to the critical situation caused by the anchor chain breaking.

The measures taken after the anchor chain broke were marked by two contributory factors: the port anchor remained secured and therefore unavailable for immediate use, eliminating one possible means of stopping or mitigating the vessel's drift. Additionally, the delayed readiness of the main engine, combined with its ineffective use, resulted in insufficient and untimely utilization of its power.

The above-mentioned factors clearly highlight issues related to a lack of awareness regarding the safety requirements, standards, and regulations for shipboard operations and ship management. This situation is closely linked to issues beyond the scope of this investigation, concerning certain flag states and classification societies that enable the continued operation of vessels with lower safety standards. That this vessel falls into such a category is evident not only by the findings related to the ship herself but also by frequent changes in its flag and classification, as well as the lack of cooperation from the current flag state and classification society during this investigation. Although beyond the scope of this investigation, in order to understand the deeper causal factors of this maritime accident, it is necessary to highlight the mentioned aspect of the management and oversight of vessels operating under lower safety standards.



7. SAFETY LESSONS

Based on the results of the safety investigation into the marine casualty of the cargo ship "Deala" and following the analysis and conclusions of this report, the Agency for the Investigation of Accidents in Air, Maritime, and Railway Transport issues the following safety lessons:

AIN05-SL-2/2025: Required actions while at anchor

During the planning phase of the ship's anchorage, the responsible personnel on board must conduct a risk assessment, considering all potential hazards that could endanger the vessel. These include meteorological and hydrological conditions, the distance from shallows and other objects, the poor condition of the anchor and chain system, navigational aids and shore-based markers, other vessels, as well as safety and environmental standards.

The ratio of depth to the length of the deployed anchor chain should comply with company guidelines and the technical specifications of the anchor and anchoring system, in accordance with generally accepted maritime industry standards.

Diligent monitoring and timely preventive measures to mitigate the risk of collision, impact, or grounding are fundamental principles of safe and responsible watchkeeping while at anchor. Continuous visual observation must be supplemented by all available technical means.

A precise calculation and plotting of the swinging circle around the anchor must be carried out at the very beginning of the anchorage, using all available tools. The ship's position should be regularly determined by all available methods, with particular emphasis on fixing the position using a fixed coastal object or another stationary object at sea. The anchor chain must be regularly inspected as part of routine safety checks, with increased frequency in extraordinary situations.

A second anchor must always be ready for deployment in case the primary anchor fails. Deploying the second anchor can quickly neutralize unwanted vessel drift and prevent an accident.

The main engine and the primary steering system must be ready for use within the shortest possible time. If the risk assessment deems it necessary, they should remain available at all times while at anchor, significantly speeding up the response of responsible personnel in the event of a sudden need. Any difficulties with critical ship equipment affecting the vessel's seaworthiness must be reported to the vessel traffic service.

Recipients: This safety lesson is intended for all participants in maritime industry.



AIN05-SL-3/2025: Communication between ship and VTS

The role of the Vessel Traffic Service (VTS) is to contribute to the safety of navigation within the VTS maritime area by preventing the development of hazardous situations for the vessel, crew, and environment. This is achieved by providing timely and relevant traffic, navigational, and other information, which can assist crews in their decision-making processes. The VTS is staffed and adequately equipped to interact with maritime traffic by providing specific services and the capability to respond quickly in dangerous circumstances. Therefore, open and timely communication with the competent VTS is of utmost importance for navigational safety, including while the vessel is at anchor.

The rules on providing VTS services, the obligations of vessels, and the manner of ship-VTS interaction are detailed in navigation safety regulations and are made available to end users (vessels) as part of the system for the publication, distribution, and updating of official maritime navigation charts and publications.

Recipients: This safety lesson is intended for all participants in maritime industry that are obliged to use VTS services.

AIN05-SL-4/2025: Anchoring System Maintenance

The anchor, along with the chain and other associated equipment, including the anchor windlass, should be classified as a critical ship system, since its failure could lead to uncontrolled vessel movement and consequently all possible negative outcomes of such situation. Therefore, regular, and thorough maintenance of all system components is a key prerequisite for its safe operation.

Any doubts regarding the condition of this system's components must be immediately reported to the deck officer responsible for the maintenance of deck equipment. This officer, in coordination with the master and relevant company personnel, must then develop an operational plan to promptly rectify any deficiencies.

The responsible personnel must be familiar with the technical characteristics of the anchoring system, designed to meet maritime industry safety standards.

External inspections and ship surveys should assess the condition of the anchoring system and act in accordance with professional standards.

Recipients: This safety lesson is intended for seafarers assigned to operate and supervise this part of the deck equipment, shipowners, ship operators, companies, maritime safety inspection authorities, and classification societies.

8. ANNEXES

Annex I: Weather report for the port authorities for April 16, 2024 (source: DHMZ)



UPOZORENJE: Mjestimice udari SE i SW, a navečer na otvorenom moru dijela srednjeg Jadrana i NW vjetra, 35-45 čvorova. Poslijepodne na sjevernom, a navečer i na dijelu srednjeg Jadrana, mjestimice udari NE vjetra 35-60, a podno Velebita do 75 čvorova. Poslijepodne more ponegdje 5. Od sredine dana mjestimice nevere.

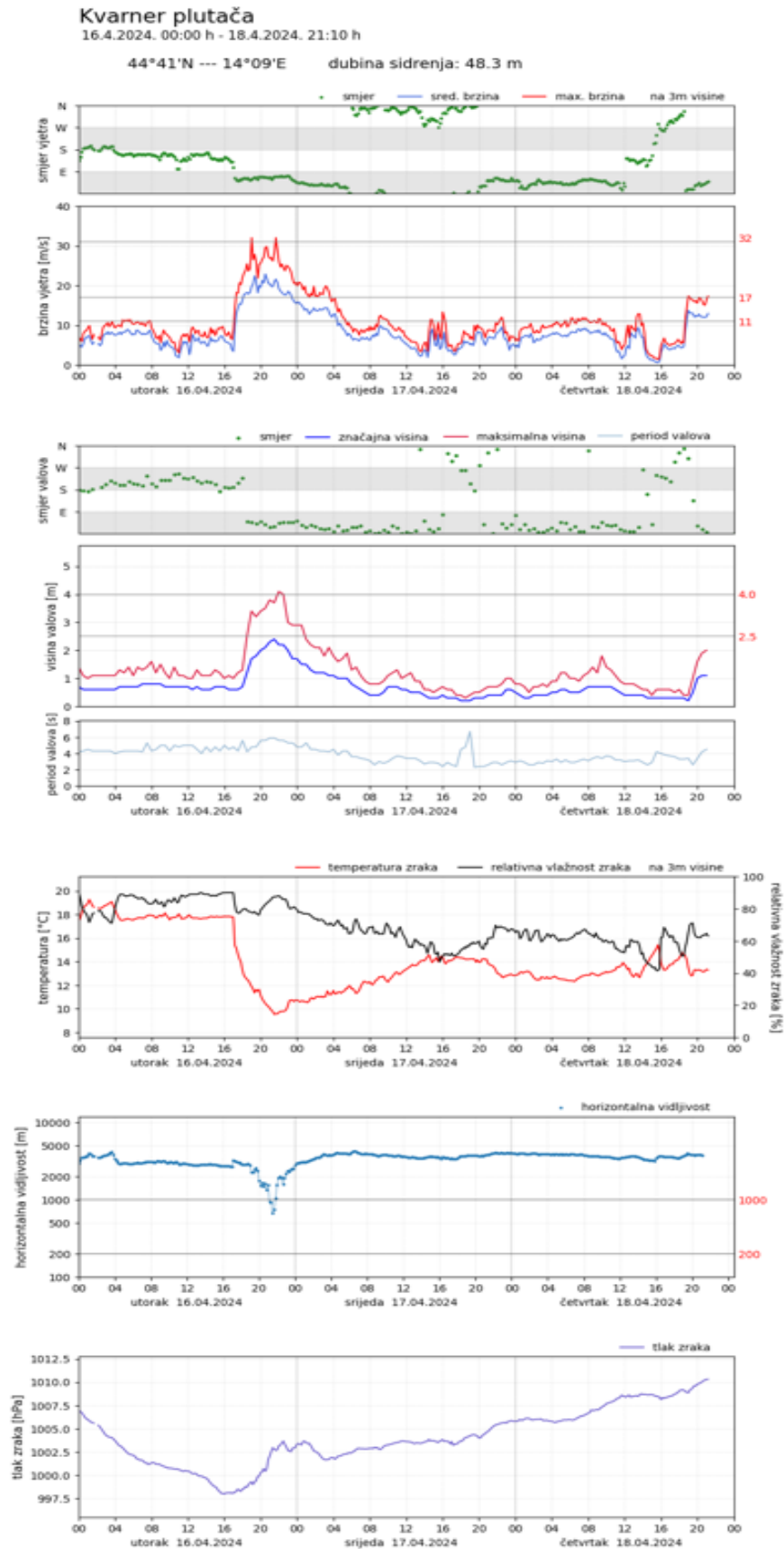
PROGNOZA VREMENA ZA JADRAN ZA 24 SATA (to + 24)
SE i SW vjetar 10-20, mjestimice do 24 čvora, poslijepodne na srednjem i južnom Jadranu u jačanju na 14-28, mjestimice do 32 čvora dok će na sjevernom, a navečer i na dijelu srednjeg Jadrana okretati na NE vjetar 16-34, podno Velebita do 40 čvorova. Navečer i u noći na otvorenom moru srednjeg Jadrana NW vjetar 14-28 čvorova. More 3-4, poslijepodne na južnom Jadranu, a navečer i drugdje 4-5. Vidljivost 10-20 km. Promjenljivo oblačno, od sredine dana kiša, te pljuskovi s grmljavinom.

PROGNOZA VREMENA ZA DALJNJIH 48 sati (to + 72):
Jak i vrlo jak NE, a na južnom Jadranu S i SW vjetar. Poslijepodne će vjetar okrenuti na umjeren do pojačan, na srednjem i južnom Jadranu mjestimice i jak NW. More 3-4. Promjenljivo oblačno, mjestimice uz kišu, te pljuskove s grmljavinom. 18.4. Slab do umjeren, na sjevernom Jadranu i pojačan NW i NE vjetar, prema kraju dana će na južnom i dijelu srednjeg Jadrana sasvim oslabjeti. More u smirivanju na 2-3. Promjenljivo oblačno, mjestimice uz kišu, te pljuskove s grmljavinom.

VRIJEME NA JADRANU U 5 SATI								
Mjesto	Vrijeme	Vjetar čv.	Stanje mora	Vidljivost km	Tlak zraka hPa	Temperatura °C		Gubine mm
						Zraka	Mora	
PULA aerod								
REJKA								
SENI								
ZADAR								
ŠIBENIK	vedro	E 6	/	20	1006	18		
SPLIT	1/2 obl.	SE 16	3	20	1007	19		
HVAR								
PALAGRUZA	1/2 obl.	E 10	2	20	1008	21		
PLOČE								
DEBROVNIK	1/2 obl.	SE 20	2	15	1009	19	18	

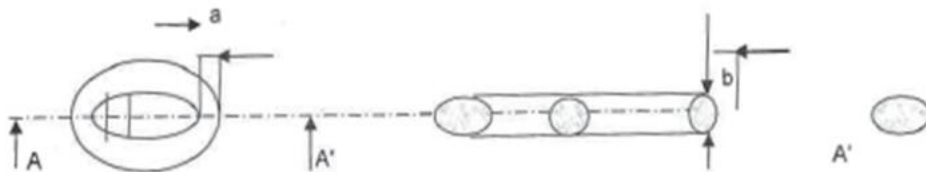


Annex II: Meteorological and hydrological data from the ODAS buoy *Kvarner* (source: DHMZ)



Annex III: „Measurement of Chain“ document (source: *Deala*)


E3S GROUP		ZİNCİR ÖLÇÜM FORMU				FORM NO	EOS.FR.89	
						REV DATE	19.08.2021	
ANCHOR - CHAIN LINKS MEASUREMENTS								
Shackle No	PORT SIDE				STBD SIDE			
	a	b	(a+b)/2	Diminution %	a	b	(a+b)/2	Diminution %
1	36,30	40,90	38,60	8,10%	37,10	41,10	39,10	6,90%
	36,40	41,70	39,05	7,02%	37,20	41,20	39,20	6,67%
	36,80	41,80	39,30	6,43%	37,10	41,10	39,10	6,90%
2	35,80	42,30	39,05	7,02%	38,10	41,10	39,60	5,71%
	35,70	42,10	38,90	7,38%	38,20	41,20	39,70	5,48%
	35,50	41,90	38,70	7,86%	38,10	41,10	39,60	5,71%
3	35,30	42,10	38,70	7,86%	33,50	38,60	36,05	14,17%
	35,40	42,20	38,80	7,62%	33,40	38,70	36,05	14,17%
	35,50	42,10	38,80	7,62%	33,50	38,50	36,00	14,29%
4	35,60	40,20	37,90	9,76%	34,40	37,30	35,85	14,64%
	35,70	40,20	37,95	9,64%	34,50	37,40	35,95	14,40%
	35,50	40,40	37,95	9,64%	34,30	37,50	35,90	14,52%
5	33,30	40,50	36,90	12,14%	32,40	37,50	34,95	16,79%
	33,80	40,40	37,10	11,67%	32,50	37,60	35,05	16,55%
	33,50	40,30	36,90	12,14%	32,30	37,70	35,00	16,67%
6	33,20	40,40	36,80	12,38%	31,20	38,30	34,75	17,26%
	33,30	40,40	36,85	12,26%	31,30	38,40	34,85	17,02%
	33,40	40,30	36,85	12,26%	31,10	38,20	34,65	17,50%
7	33,60	41,30	37,45	10,83%	34,20	36,10	35,15	16,31%
	33,70	41,10	37,40	10,95%	34,40	36,20	35,30	15,95%
	33,80	41,00	37,40	10,95%	34,30	36,10	35,20	16,19%
8					33,40	38,50	35,95	14,40%
					33,50	38,60	36,05	14,17%
					33,30	38,70	36,00	14,29%
9								




VESSEL'S NAME	DEALA	
Nominal Diameter (mm)	42	
Tolerance of Diminution	12%	
Date	12.01.2022	Signature
Measured By		



Annex IV: Ship Radio Station Licence (source: *Deala*)



THE UNITED REPUBLIC OF TANZANIA
ZANZIBAR MARITIME AUTHORITY




SHIP RADIO STATION LICENCE


The Maritime Transport Act 2006
Under the authority of the Government of Zanzibar

Name of the ship	DEALA	
Distinctive number or letters	5IM 388	
Gross tonnage*	2613	
IMO number	7405091	
Licence number	ZMA-SSL-231954	
MMSI number	677028800	
Radio accounting authority	MURR MARINE (LE01)	
Type of Equipment	Number	Frequency
VHF	SAILOR + FURUNO, RT4822+FM8500	
VHF DSC	SAMSUNG STV-160, ICOM IC-GM1600E x 2	
MF/HF Radiotelephony	SAILOR 6365	
MF/HF DSC	JRC / JSB-196GM	
SART	OCEAN SIGNAL / SAFE SEA S100/2	
EPIRB	NSR NEB-2000C	
NAVTEX	FURUNO NX-500	
AIS	FURUNO FA-100	
Portable Two Way (VHF)	SAMSUNG / STV-160/3	
Inmarsat Mini C (SSAS)	FURUNO FELCOM 15	
EGC	FURUNO FELCOM 15	
LRIT	FURUNO / FELCOM 15	
Radar	JRC JMA-3300, JRC1 JMA-2300	
GPS/DGPS	FURUNO + JRC GP-150 + NWZ-4620	
Other		

Issued at Zanzibar on 06/10/2023. This certificate is valid until 19/10/2024.



Registrar of ships



Version 1-2018 ZMA-SSL-231954 Page 1 of 1



Annex V: NAVTEX Warning (source: *Plovput*)

QE89 / 15.4.2024. 22:44:44 / 518 kHz

152240 UTC APR 24
SPLIT RADIO

WEATHER BULLETIN FOR ADRIATIC ISSUED BY THE MARINE METEOROLOGICAL CENTER SPLIT ON 16/04/2024 AT 0000 UTC

1. WARNING:
LOC GUSTS OF SE/SW, IN THE EVENING OFFSHORE OF PART OF CENTRAL ADIATIC ALSO NW, 35-45 KT. IN THE AFTERNOON ON N-ERN, IN THE EVENING ALSO ON A PART OF CENTRAL ADRIATIC, LOC GUSTS NE 35-60, IN VELEBITSKI KANAL TO 75 KT. IN THE AFTERNOON SEA LOC 5. FM MIDDAY LOC UDDEN STORMS.

2. SYNOPSIS:
DURING DAY SHIFTING OF LOW WITH OVER ADRIATIC IS EXP.

3. FORECAST FOR THE NEXT 24 HOURS VALID UNTIL 17/04/2024 AT 0000 UTC

N-ERN ADRIATIC:
SE/SW 10-20, LOC TO 24 KT. IN THE AFTERNOON WIND TURNING TO NE AND INCR 16-34 IN VELEBITSKI KANAL TO 40 KT. SEA INCR ON 3-4, IN THE EVENING LOC 5. VIS 10-20 KM.
VRB CLOUDY, FM MIDDAY RAIN/T-SHWS.

CENTRAL ADRIATIC:
SE/SW 10-2, LOC TO 24 KT, IN THE AFTERNOON INCR 14-28, LO TO 32 KT. IN THE EVENING/OVERNIGHT ON N-ERN PART OF AREA WIND TURNING TO NE, OFFSHORE ALSO NW 14-28 KT. SEA INCR 3-4, IN THE EVENING LOC 5. VIS 10-20 KM.
VRB CLOUDY, FM MIDDAY RAIN/T-SHWS.

S-ERN ADRIATIC:
SE/SW 10-20, LOC TO 24 KT, IN THE AFTERNOON INCR 14-28, LOC TO 32 KT. SEA INCR 3-4, IN THE AFTERNOON LOC 5. VIS 10-20 KM. VRB CLOUDY, FM MIDDAY RAIN/T-SHWS.

Annex VI: Work and rest hours records for the measter for April 2024 (source: *Deala*)

DEALA SHIPPING AND TRADING COMPANY RECORD OF WORK AND REST PERIOD **MLC-07**

Name of ship: *DEALA* IMO number: 2405091 Flag: TANZANIA
Seafarer (full name): [REDACTED] Rank: MASTER Watchkeeper:

Month and year: 04/2024

Please mark periods of rest, with an X, or using a continuous line or arrow.

Hours	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Rest in 24 hrs period	COMMENTS	Not to be completed by seafarer
Date																											
1																											
2																											
3																											
4																											
5																											
6																											
7																											
8																											
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28																											
29																											
30																											
31																											

I agree that this record is an accurate reflection of the hours of work or rest of the seafarer concerned.

Seafarer signature: _____ Name of master or authorized person and signature: _____

A copy of this record is given to the seafarer. This form is subject to examination and endorsement under procedures established by the Office of the Deputy Commissioner of Maritime Affairs, Republic of Togo.

1) The terms used in this model table are to be appointing in the working language or languages of the crew and in English. 2) Check as appropriate.
3) For completion and use in accordance with the procedures established in SOLAS 2006-03/3.16
4) Additional calculations or verifications may be necessary to ensure compliance with the relevant requirements of Maritime Labor Convention, 2006 & International Convention on Standards of Training, Certification and Watchkeeping, 1978 as amended.

PAGE 1



Annex VII: DE06 Bridge Pre-arrival Checklist (source: *Deala*)

DE06

DEALA SHIPPING AND TRADING COMPANY.

BRIDGE – PRE-ARRIVAL CHECKLIST

VESSEL:	DEALA	DATE:	
PORT:		TIME:	

NO.	ACTION 2 hours prior to arrival fairway buoy		√
01.	In preparing the passage plan for arrival in port, have the following factors been taken into consideration?		√
	• Availability of port information.		√
	• Advice/recommendations in sailing directions.		√
	• Latest weather reports.		√
	• Tides and currents for port.		√
02.	Is it necessary to re-arrange ballast?		√
03.	Have anchors been cleared prior to arrival?		√
04.	Have the latest navigational messages for the area been received?		√
05.	Has ETA been sent with all relevant information required by local regulations:-		√
	• Arrival draft.		√
	• Details of dangerous cargo on-board.		√
	• Length of vessel.		√
	• Defects on-board.		√
06.	Has all navigation equipment including steering gear been checked?		√
07.	Has the following equipment been checked:-		√
	• Course and engine movement recorder.		√
	• Synchronisation of clocks.		√
	• Internal communication equipment.		√
	• Deck lighting.		√
	• Pressure on fire main.		√
	• Mooring lines/wires/heaving lines.		√
08.	Has pilot card been completed?		√
09.	Has manual steering been engaged in sufficient time for the helmsman to become accustomed before manoeuvring commences?		√
10.	Has the crew been advised on the time for 'stand-by' for entering port?		√
11.	Have VHF channels for various port contact been noted and a radio check carried out?		√
12.	Is the following berthing information available:-		√
	• Whether anchoring or berthing.		√
	• Which side alongside.		√
	• Whether gangway/accommodation ladder/shore gangway to be used.		√
	• Size/No of shore connections.		√
	• Crane required.		√
	• Mooring boats available.		√
13.	Master/Pilot information exchange effective.		√
14.	Officers briefed on mooring plan.		√

CHECKED BY: [REDACTED]

MASTER: [REDACTED]

APPROVED BY DPA: [REDACTED]

ISSUE NO: 6 DE-06 Page 1 OF 1



Annex VIII: DE33 Checklist before every mooring operation (source: *Deala*)

A SHIPPING AND TRADING COMPANY DE 33

Checklist before every mooring operation					
L:	DEALA	DATE:	17.04.2024	TIME:	06:00
Master has made all officers aware of the procedures outlined below.					
ACTION					✓
Inspect ropes and wires:					✓
- Check for signs of wear, fraying, or damage on mooring lines.					✓
- Ensure proper splicing and secure end fittings.					✓
- Verify the condition of wire ropes, looking for broken strands or corrosion.					✓
Check Mooring winches:					✓
- Test the functionality of winches and capstans, ensuring they operate smoothly and without abnormal noise.					✓
- Verify the condition and tension of drive belts or chains.					✓
Inspect bollards and fairleads:					✓
- Check bollards and fairleads for any damage or misalignment.					✓
- Ensure that securing bolts are tight and free from corrosion.					✓
Review chocks and rollers:					✓
- Inspect chocks and rollers for wear, cracks, or any signs of damage.					✓
Verify markings and labeling:					✓
- Check that load limits and markings are visible and legible.					✓
Inspect mooring winch brakes:					✓
- Test the operation of mooring winch brakes to ensure they engage and hold securely.					✓
- Verify brake linings for wear and proper adjustment.					✓
Review documentation and certificates:					✓
7. - Check the validity and availability of certificates for mooring equipment.					✓
- Review maintenance records and ensure inspections are up to date.					✓
Lights in mooring areas:					✓
8. - Check the functionality of lights in mooring areas.					✓

APPROVED BY DPA ISSUE DATE: 01.01.2024



Annex IX: DE07 Anchoring and Anchor Checklist (source: *Deala*)

DEALA SHIPPING AND TRADING COMPANY. DE07

ANCHORING AND ANCHOR WATCH

VESSEL:	DEALA	DATE:	05.03.2024	TIME:	12:30
---------	-------	-------	------------	-------	-------

Master has made all officers aware of the procedures outlined below.

No.	ACTION	
01.	Prepare an anchoring plan and include the following:-	✓
	• Speed reduction in ample time.	✓
	• Direction/strength of current.	✓
	• Tidal stream when manoeuvring at slow speed.	✓
	• Need for adequate sea room particularly to seaward.	✓
	• Depth of water, type of seabed and the scope of anchor cable required.	✓
	• Have the engine room and anchor party been informed of the time of "stand-by" for anchoring?	✓
	• Are the anchors, lights/shapes and sound signalling ready for use?	✓
	• Has the anchor position of the ship been reported to the authorities?	✓
02.	While at anchor the OOW should:-	✓
	• Determine and plot the ship's position on the appropriate chart as soon as practicable.	✓
	• When circumstances permit, check at sufficiently frequent intervals whether the ship is remaining securely at anchor by taking bearings of fixed navigation marks or readily identifiable shore objects.	✓
	• Ensure that a proper lookout is maintained.	✓
	• Ensure that inspection rounds of the ship are made periodically.	✓
	• Observe meteorological and tidal conditions and the state of the sea.	✓
	• Notify the Master and undertake all necessary measures if the ship drags anchor.	✓
	• Ensure that the state of readiness of the main engines and other machinery is in accordance with the Master's instructions.	✓
	• If visibility deteriorates, notify the Master.	✓
	• Ensure that the ship exhibits the appropriate lights and shapes and that appropriate sound signals are made in accordance with all applicable regulations.	✓
	• Measures are taken to protect the environment from pollution by the ship and comply with applicable pollution regulations.	✓

Note: When checked Entry should be made in deck log book

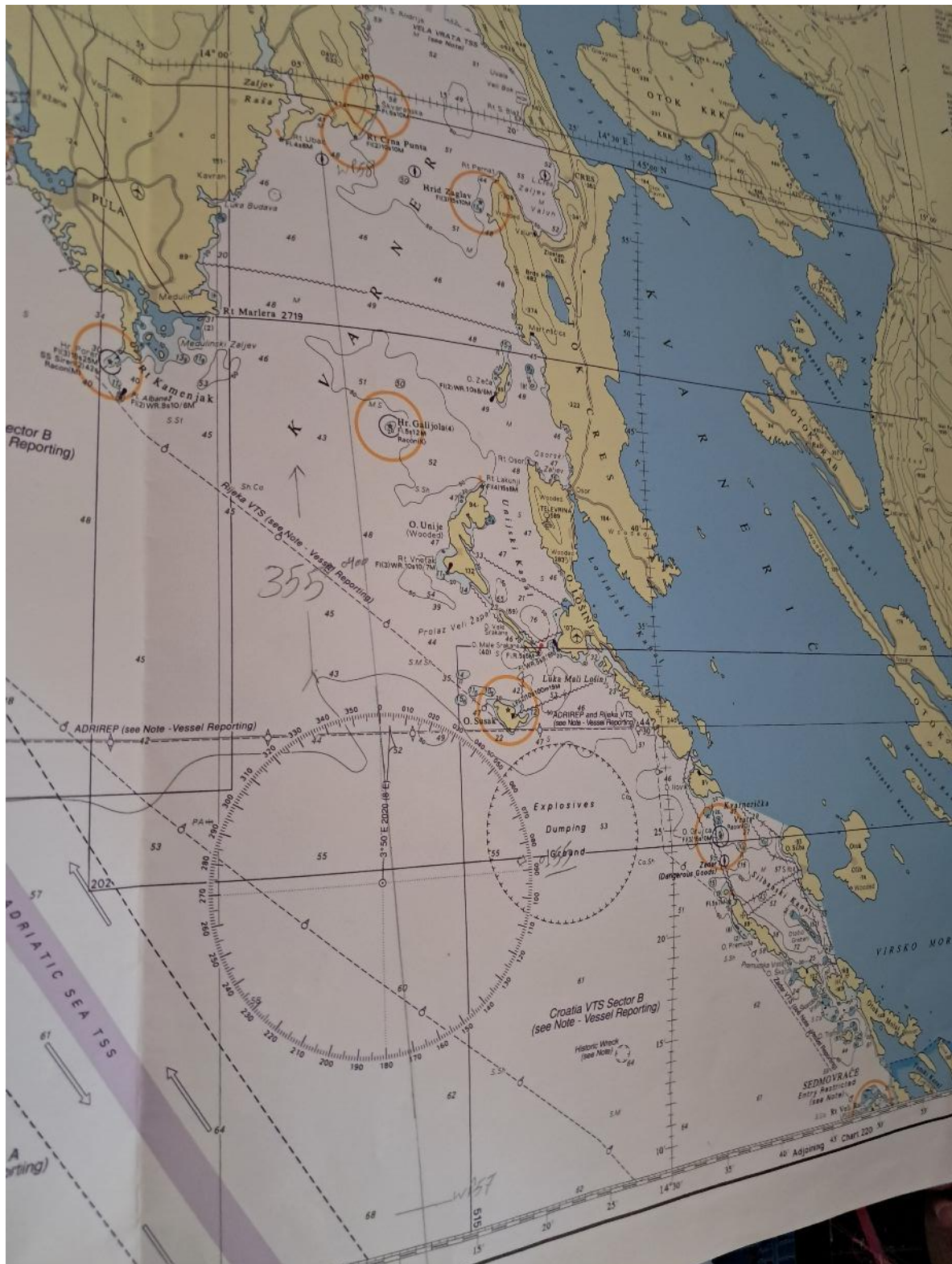
CHIEF MATE: [REDACTED]

2ND MATE: [REDACTED]

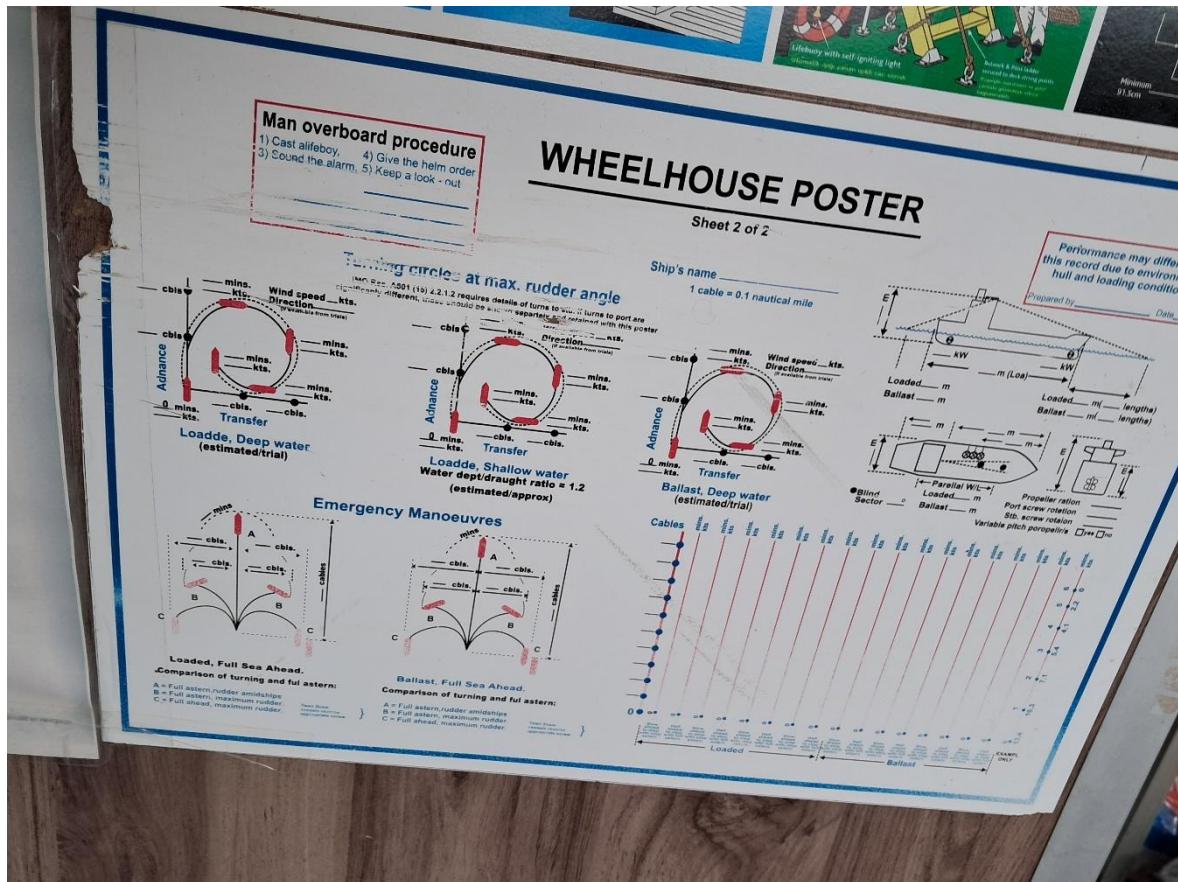
MASTER: [REDACTED]

APPROVED BY DPA ISSUE DATE: 01.01.2023 ISSUE NO.:

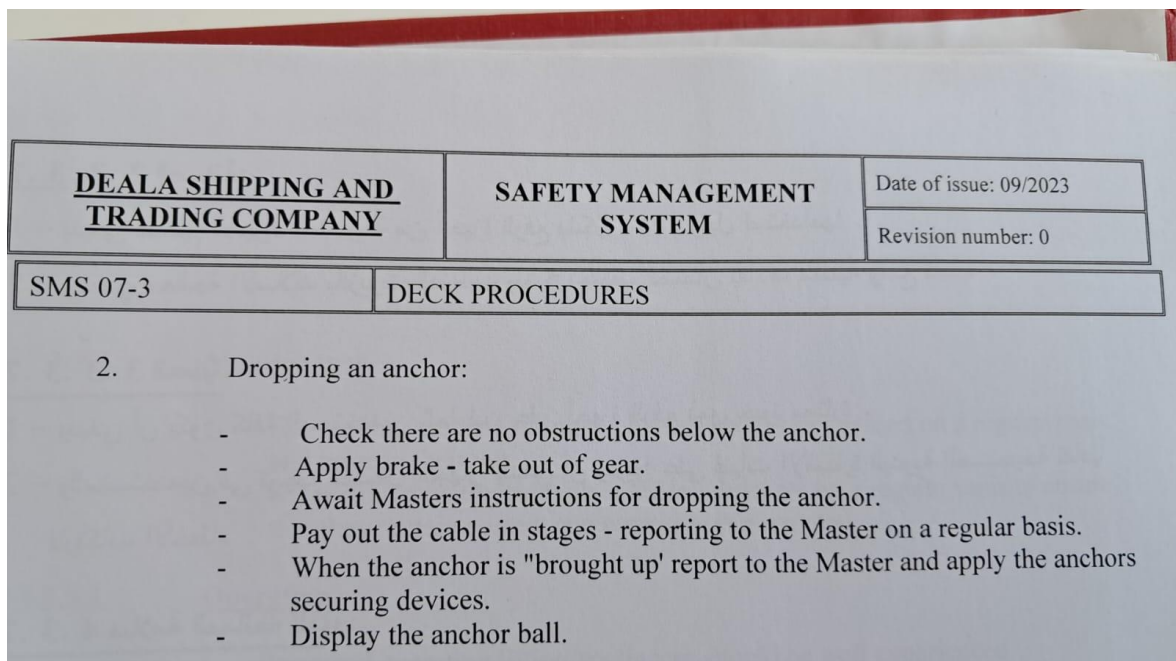
Annex X: Nautical chart used on Apr 11-12, 2024 while approaching Kvarner Bay (source: Deala)



Annex XI: Wheelhouse poster (source: mb „Deala“)



Prilog XII: Lowering anchor procedure from SMS (source: mb „Deala“)





Annex XIII: Extract from Bellbook, from 16-Apr-2024 (source: mb „Deala“)

DATE 16-04-2024 AT THE PORT OF PASA Ankers

ARRIVAL / DEPARTURE / SHIFTING AT SEA/

STAND BY _____ HRS	COUNTER AT ST.BY _____
FULLAWAY _____ HRS	COUNTER AT FULLAWAY _____
FINISH WITH PASSAGE _____ HRS	COUNTER AT END OF PASSAGE _____
FINISH WITH ENGINES _____ HRS	COUNTER AT F.W.E. _____
COMING FROM _____	DEPARTING TO _____

ASTERN				STOP	AHEAD			
FULL	HALF	SLOW	D.SLOW		D.SLOW	SLOW	HALF	FULL
					1838			
				1841				
			1843					
				1847				
			1852					
		1856						
	1857							
1858								
				1907				