



**The Bahamas
Maritime Authority**

THE COMMONWEALTH OF THE BAHAMAS

M.v STAR PRIDE

IMO NUMBER: 8707343

OFFICIAL NUMBER: 8000353



**Report of the marine safety investigation into a grounding
at Isla de Coiba on 22nd December 2015**

M.v Star Pride – Marine Safety Investigation Report

The Bahamas conducts marine safety or other investigations on ships flying the flag of the Commonwealth of the Bahamas in accordance with the obligations set forth in International Conventions to which The Bahamas is a Party. In accordance with the IMO Casualty Investigation Code, mandated by the International Convention for the Safety of Life at Sea (SOLAS) Regulation XI-1/6, investigations have the objective of preventing marine casualties and marine incidents in the future and do not seek to apportion blame or determine liability.

It should be noted that the Bahamas Merchant Shipping Act, Para 170 (2) requires officers of a ship involved in an accident to answer an Inspector's questions fully and truly. If the contents of a report were subsequently submitted as evidence in court proceedings relating to an accident this could offend the principle that individuals cannot be required to give evidence against themselves. The Bahamas Maritime Authority makes this report available to any interested individuals, organizations, agencies or States on the strict understanding that it will not be used as evidence in any legal proceedings anywhere in the world.

This investigation has been conducted with the cooperation and assistance of the United States Coast Guard (USCG).

Date of Issue: 17th August 2017

Bahamas Maritime Authority
120 Old Broad Street
LONDON
EC2N 1AR
United Kingdom

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1 GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AE	-	Auxiliary Engine
AER	-	Auxiliary engine room
ANI	-	Approved nautical inspector
ASI	-	Annual safety inspection
BMA	-	Bahamas Maritime Authority
BV	-	Bureau Veritas
°	-	Degree
CC	-	Condition of class
C/O	-	Chief Officer
Conn	-	The act of giving wheel, hydroplane or engine orders
DNV – GL	-	Det Norske Veritas – Germanischer Lloyd
DPA	-	Designated person ashore
ECR	-	Engine control room
ENC	-	Electronic Navigational Chart
GMT	-	Greenwich mean time
IMO	-	International Maritime Organization
Knots	-	Nautical miles per hour
m	-	Metre
mm	-	Millimetre
LT	-	Local time
MLC	-	Maritime Labour Convention

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NM	-	Nautical mile
OOW	-	Officer of the watch
PA	-	Public address system
PSSC	-	Passenger ship safety certificate
SEMS	-	Safety and Environment Management System
SOLAS	-	International Convention for the Safety of Life at Sea
STCW	-	Standards of training, certification and watchkeeping
UTC	-	Universal co-ordinated time
USA	-	United States of America
USS	-	United States Ship
VDR	-	Voyage Data Recording
WTD	-	Watertight door

2

SUMMARY

- 2.1 The Star Pride is a motor passenger yacht operated by Windstar Cruises of Seattle, Washington State and registered in Nassau, Bahamas.
- 2.2 The afternoon of the 16th December 2015, the vessel was engaged on a voyage from Costa Rica to Panama. The vessel sailed from Isla de Coiba eastbound for Panama where upon it was reported to the managers by the Master that he heard three bumps in quick succession whilst transiting the Canal de Rancheria. An assumption was made by the Master that the bumps may have originated as a result of the vessel passing over an underwater object.
- 2.3 Arriving at the Port of Balboa, Panama on 17th December a diving company, engaged by the Operator's, inspected the hull. The diving company reported to the Master that they did not find any significant damage to any part of the hull.
- 2.4 The vessel then transited the reverse course back to Costa Rica via Isla de Coiba with a complement of 140 crew and 156 passengers. There were no discussions regarding changing voyage number 164 passage plan following the unknown source of bumps experienced on the 16th December and an identical course line was selected in reverse by the Navigating Officer.
- 2.5 At 0615 LT on 22nd December 2015 the vessel grounded on rocks in the Canal de Rancheria in position 07° 37.88N, 081° 42.41W. The vessel's momentum carried the vessel over the rocks and into deeper water. The impact resulted in multiple hull breaches.
- 2.6 The vessel proceeded to anchor in position 07° 37.903N, 081° 42.61W at 0631 on 22nd December.
- 2.7 The vessel's Operators were notified of the situation and the procedure for grounding was followed, shortly before the vessel started to take on water in the engine spaces.
- 2.8 Disembarkation of passengers commenced at 0830 on 22nd December by tender to a local beach where a scheduled barbeque would be held. By 1100 all passengers were disembarked from the vessel and relocated ashore.
- 2.9 Water levels were seen rising in the ballast tanks, the grey water tank, fuel tank 6 starboard, fuel overflow tank, main engine room, air conditioning room, pump room and separator room resulting in a 4° list.
- 2.10 A dive team arrived on scene and made temporary epoxy repairs to six (6) cracks in the hull.
- 2.11 The passengers were advised that they would not be able to return to the vessel and that their belongings would be packed by the ship's crew and delivered to them ashore.

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- 2.12 Alternate vessels were engaged to collect the passengers and crew members from Isla de Coiba.
- 2.13 No injuries were reported to have been sustained by passengers or crew or any discharge of oil from the vessel as a result of the grounding.
- 2.14 The Star Pride was handed to Resolve Salvage Company for recovery and repair.

3 DETAILS OF INVOLVED VESSEL(S) AND OTHER MATTERS

3.1 The m.v. Star Pride is a purpose built passenger vessel owned by Windstar Pride Ltd. and managed by Windstar Cruises of Seattle, USA and registered in the port of Nassau, Bahamas. The principle details as at 22nd December 2015 are as follows:

i	Owner	Windstar Pride Limited
ii	Operator	Windstar Cruises
iii	Built	Schichau Seebeckwerft Germany
iv	Year of build	1988
v	Registry	Nassau, Bahamas
vi	Official Number	8000353
vii	Type	Passenger vessel
viii	IMO	8707343
ix	Class	Bureau Veritas (BV)
x	Class notations	I+Hull +Mach
xi	Gross Tonnage	9,975 tonnes
xii	Nett Tonnage	3,023 tonnes
xiii	Overall length	133.4 metres
xiv	Breadth	20.5 metres
xv	Operating draft	5.50 metres

3.2 The vessel has 9 decks: Deck 9 Monkey Island; Deck 8 Wheelhouse; Decks 4 through 7 are Passenger areas; Deck 3 Restaurants, Galleys, Crew cabins and freezer spaces; Deck 2 Crew cabins, AC systems and Engine spaces; Deck 1 Engine spaces.

3.3 At the time of the incident the vessel was classed with Bureau Veritas (BV) and all statutory certificates remained valid.

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- 3.4 All crew carried appropriate documentation as required by the Standards of Training, Certification and Watchkeeping (STCW). All document holders had the necessary endorsements provided by the Commonwealth of the Bahamas and complied with the vessel's safe manning document.
- 3.5 All watchkeepers on duty during the 0400 to 0800 watch were in compliance with the statutory hours of rest requirements¹.

¹ Required by the International Convention of Standards of Training, Certification and Watchkeeping for Seafarers, 1978 as amended (STCW) and the Maritime Labour Convention, 2006 (MLC 2006)

**M/S STAR PRIDE
GENERAL ARRANGEMENT**

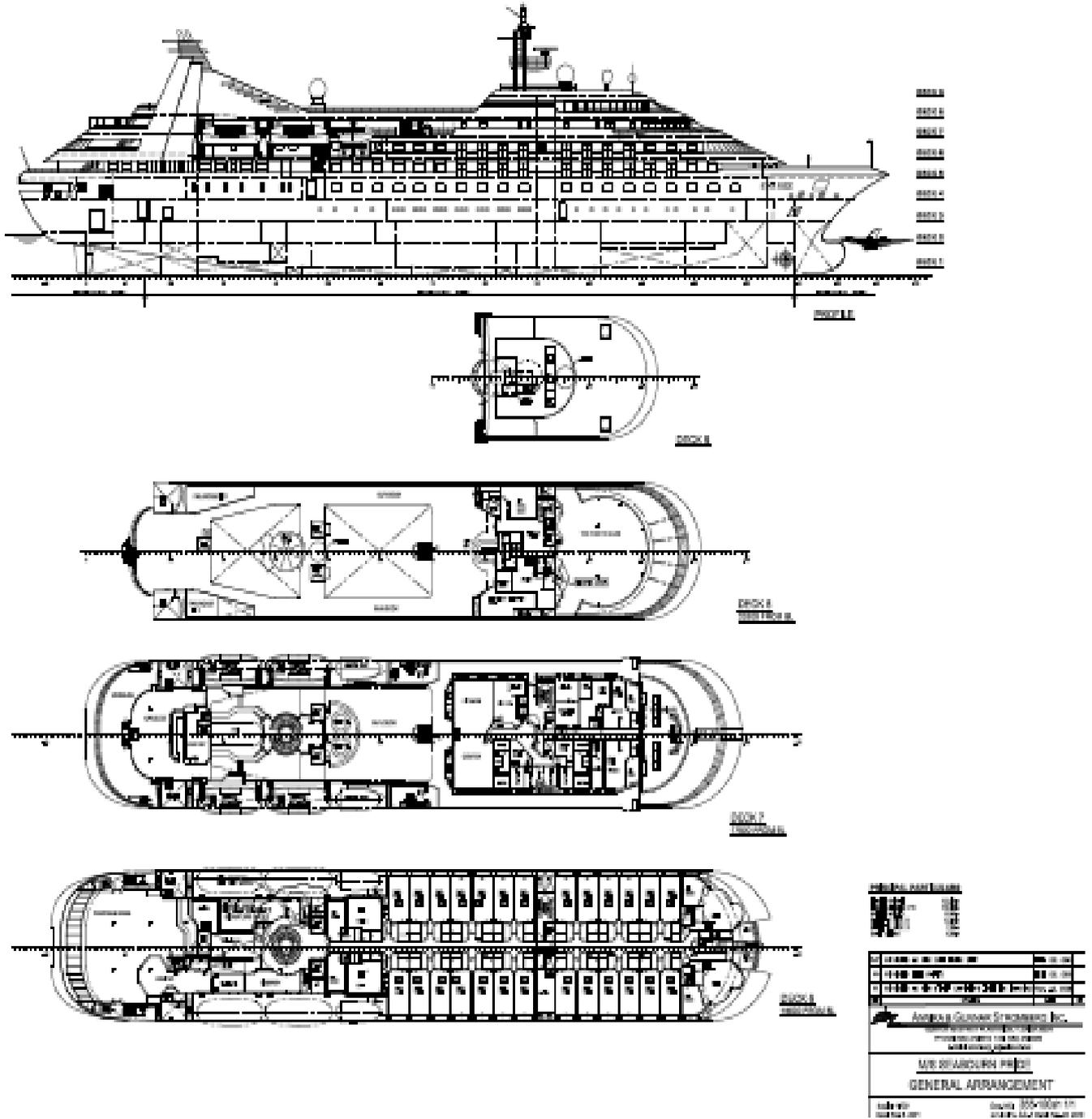


Figure 1: General arrangement plan of decks 6 through 9

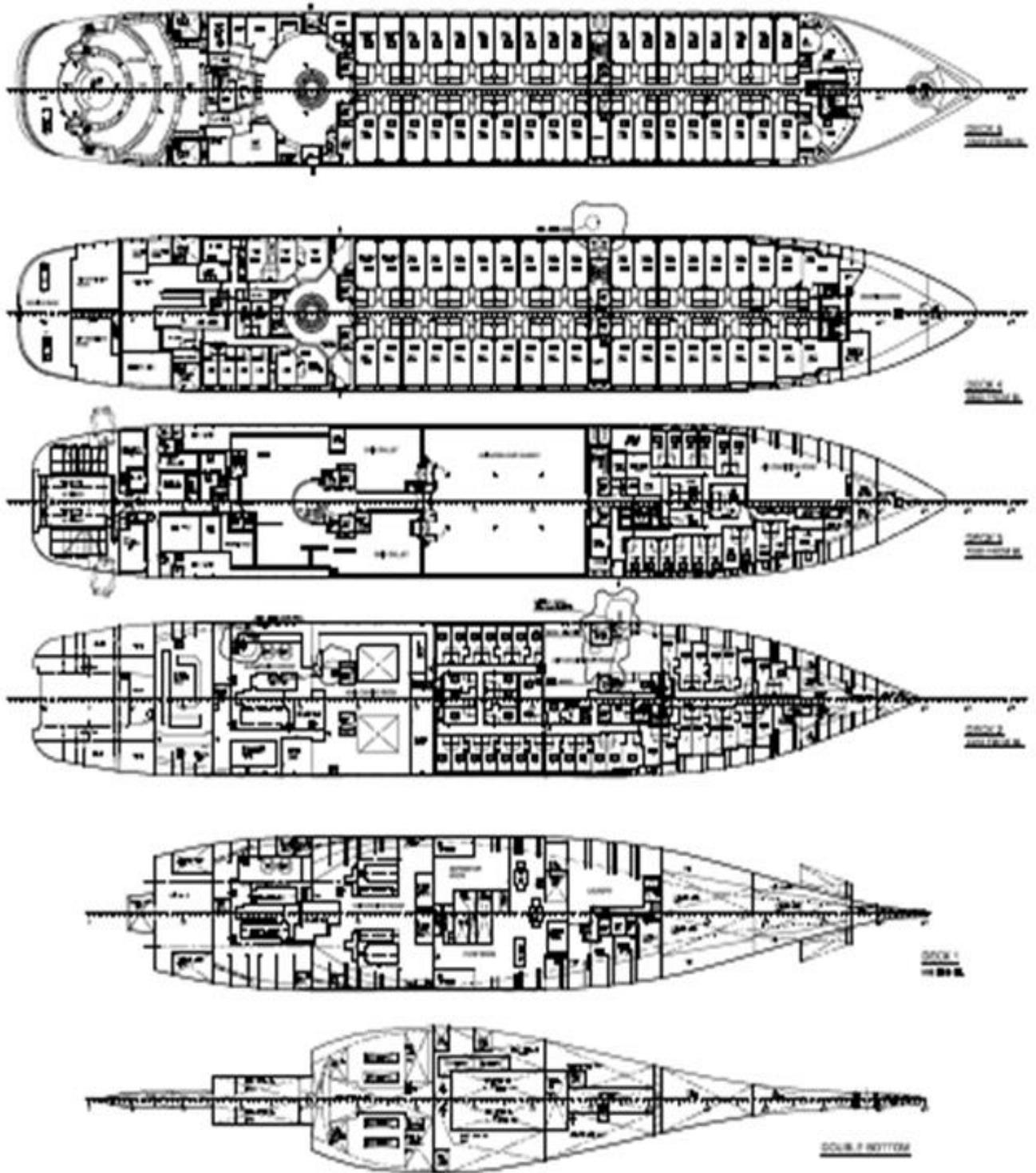


Figure 2: General arrangement plan of decks 1 through 6

4 NARRATIVE OF EVENTS

- 4.1 All times noted in this report are given in the style of the standard 24-hour clock without additional annotations. The vessel time used on board at the time of the incident was Universal Coordinated Time (UTC) -5.
- 4.2 The Star Pride was engaged on short, 7 day, cruises between ports in Costa Rica and Panama at the time of this incident.
- 4.3 Voyage 164 commenced at Colon, Panama on 19th December 2015. The itinerary planned was as follows:

Date	Port	Arrival	Departure	Distance
19 Dec	Colon		18:00	
20 Dec	Portobelo	08:00	11:00	70
21 Dec	Balboa	07:00	13:00	47
22 Dec	Isla Coiba	07:00	17:00	228
23 Dec	Golfito	05:30	07:00	123
23 Dec	Pto Jimenez	08:30	18:00	9
24 Dec	Bahia Drake	07:00	22:00	74
25 Dec	Quepos	07:00	18:00	56
26 Dec	Puerto Caldera	06:00	18:00	60

Figure 3: Voyage itinerary from 19th to 26th December 2015

- 4.4 At 2400 on 19th December the Duty Officer on the bridge recorded the vessel as making 6.4 knots, rolling and pitching gently in a rough sea with a strong North-easterly breeze.
- 4.5 At 0657 on 20th December the vessel dropped anchor off Portobelo, Panama. The anchor was weighed at 1120 the same day and the vessel commenced her sea passage to Cristobal at 1130, which marks the entrance to the Panama Canal.
- 4.6 The vessel anchored briefly at Cristobal between 1417 and 1616 on 20th December, immediately after a canal pilot boarded and the vessel commenced her canal transit.

By 0226 on the 21st the vessel had transited the Panama Canal and anchored at Flamenco Marina, Panama City.

- 4.7 Preparations for the sea passage to Isla de Coiba commenced at 1245 on 21st December; all crew and passengers were verified onboard; all watertight doors were closed; the aft marina access was confirmed closed; the anchor was weighed and stabiliser fins were deployed. The vessel resumed her sea passage at 1342.
- 4.8 A map of Panama showing locations of Colon, Portobelo, Panama City and Isla de Coiba is shown below.

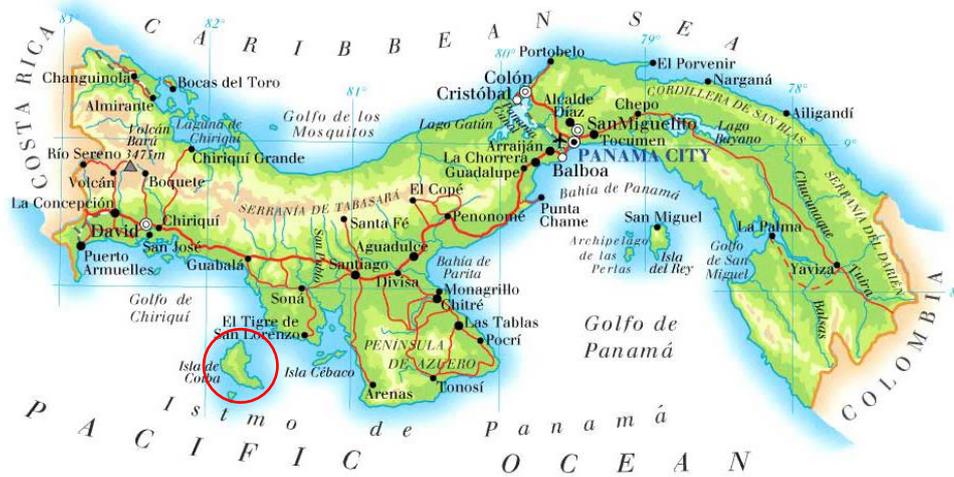


Figure 4: Map of Panama showing locations of Cristobal, Portobelo, Panama City and Isla de Coiba (circled)

- 4.9 At 2400 on 21st Monday December 2015 the bridge watch-keeping Officer (Officer of the Watch) reported the vessel underway at 12.7 knots pitching slightly in a low South-westerly swell in good visibility.
- 4.10 The following morning at 0400 the 2nd Mate on watch recorded the vessel as underway at 12.8 knots, engines 1, 3 & 4 were online, stabiliser fins deployed and the vessel rolling gently.
- 4.11 On 22nd December in preparation for arriving at Isla de Coiba the following events were recorded in the deck log book:

- i 0545 Stabiliser fins retracted

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- ii 0605 The Captain took the Conn²
- iii 0607 Hand steering was engaged
- iv 0610 The engines were placed on stand by
- v 0615 Bottom contact in position 07° 37.88N 081° 42.42W
- vi 0631 Starboard anchor let go
- vii 0636 Finished with engine.

4.12 The vessel approached Isla de Coiba as recorded on British Admiralty chart 2496 in use for navigation on the bridge on the 22nd December, an extract is reproduced below.



Figure 5: Extract of BA2496 in use at the time of the grounding

4.13 Course lines marked on this chart verify that the vessel's intended track from Isla de Coiba to Panama and the return track are identical. The passage plan for the track on 22nd December indicates that low tide would occur at 0645 with a 0.4 metre height of tide. The following high tide would be at 1302 with a height of 3.1 metres above chart datum.

² In this instance, the Captain retained responsibility for the conduct and execution of the navigation plan by giving wheel and engine orders to manoeuvre the vessel.

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- 4.14 Both the British Admiralty chart 2496 at a scale of 1:300,000 and the US Defense Mapping Agency chart 21583 with a scale of 1:80,049 were in use at the time of the grounding.
- 4.15 The vessel's ECDIS unit was type approved and although used for navigation it was not the primary source of navigation as the vessel does not have an exemption from paper charts.

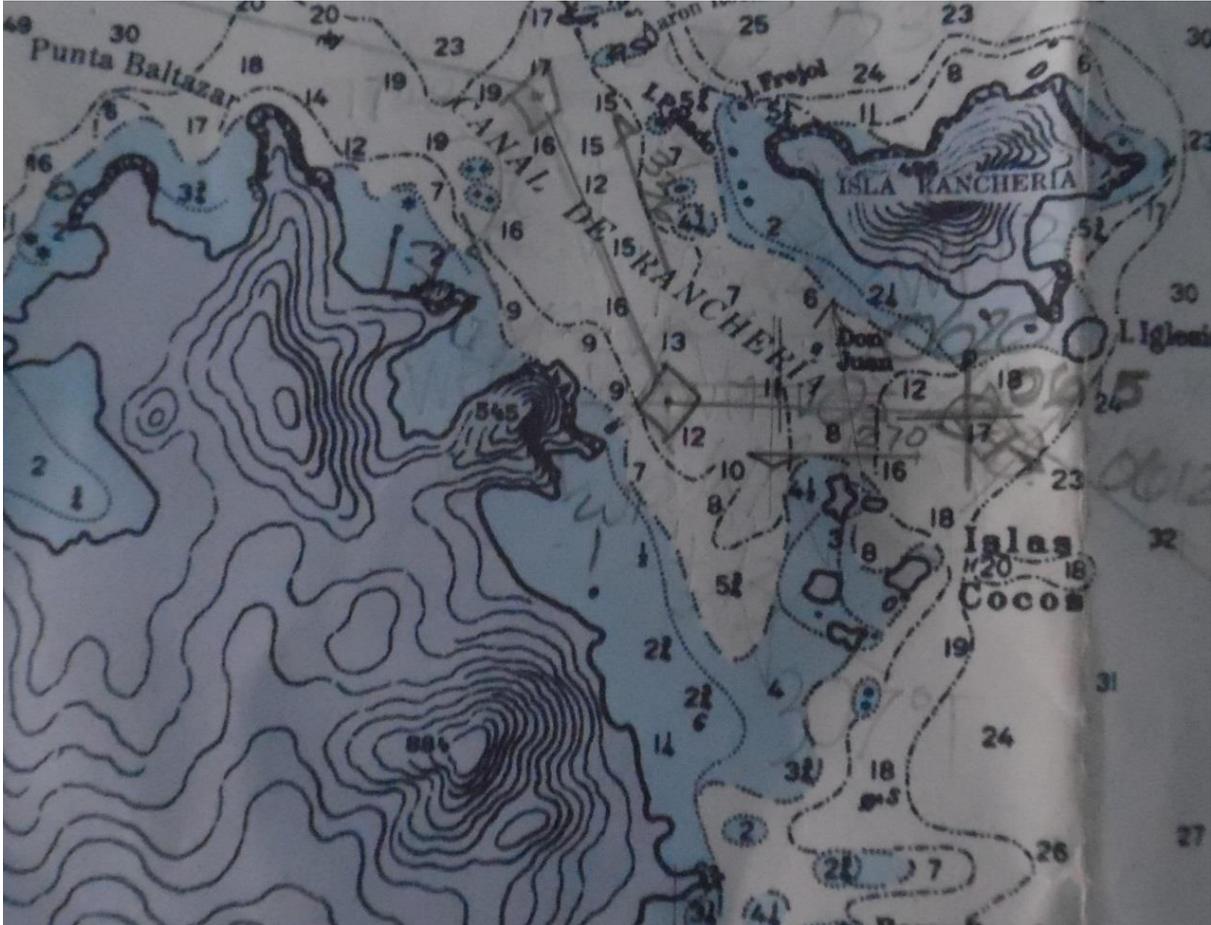


Figure 6: Extract of US chart 21583 'Isla de Coiba' indicates the vessel's route of the Canal de Rancheria on a larger scale and the position the vessel grounded at 0615 (note that the depths shown are in fathoms and are based on surveys conducted in 1934 and 1935 by USS Hannibal and corrected to World Geodetic System (WGS).

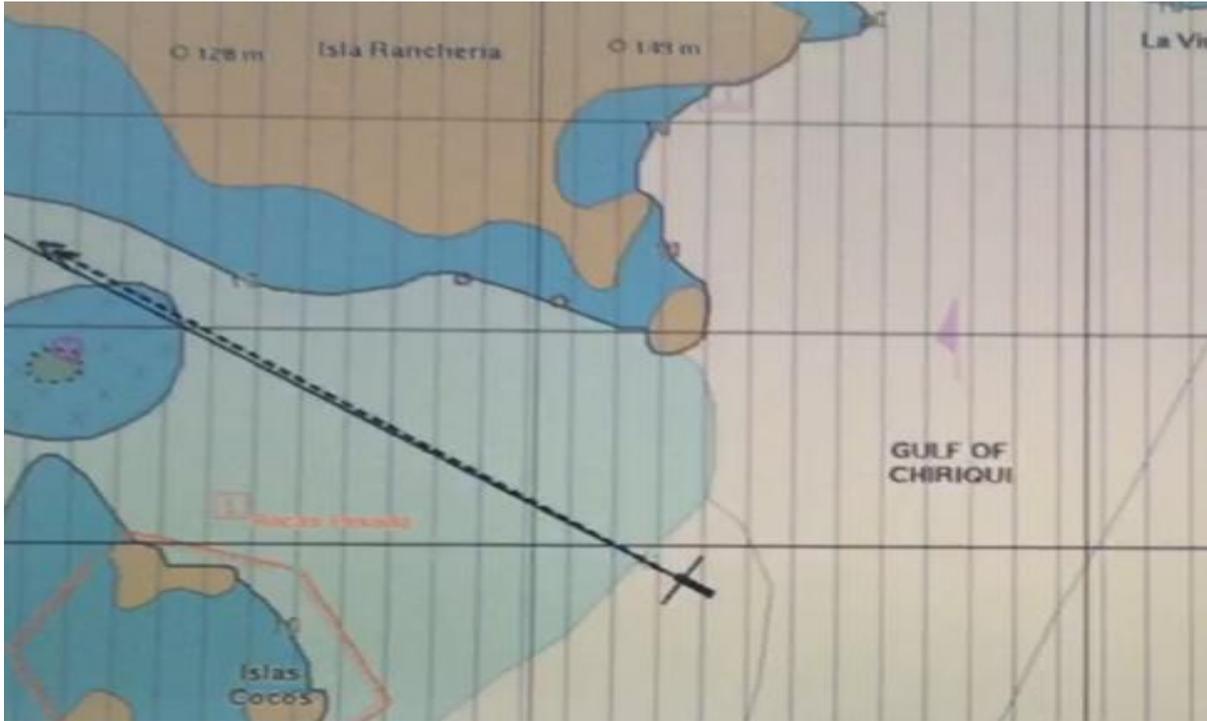


Figure 7: Ecdis screenshot showing vessel's approach to Canal (channel) de Rancheria (ENC No. 1401). Vertical lines indicate incorrect scale in use.

- 4.16 This extract is timed at 0611:22 on 22nd December, the Master had been at the Conn for approximately six (6) minutes, the engines had been on stand-by for one (1) minute and the vessel was heading 305° at a speed of 13.9 knots over the ground.

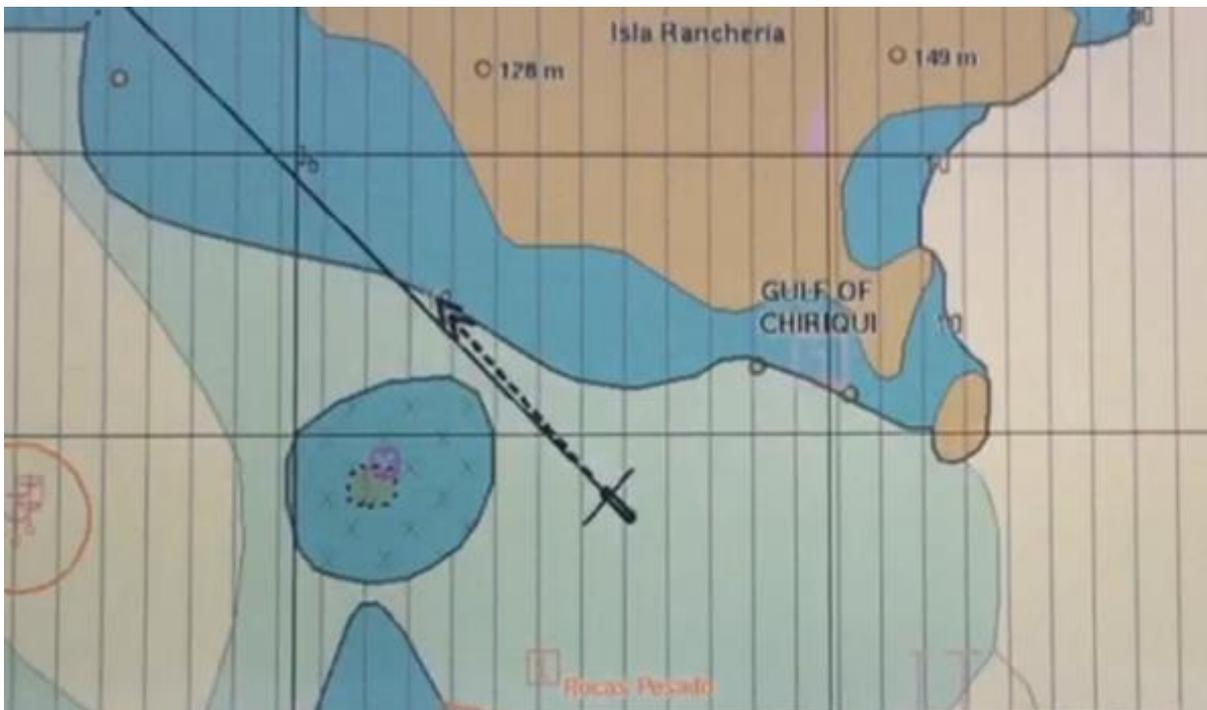


Figure 8: Ecdis screenshot showing vessel's grounding position at 1615:21. Vertical lines indicate incorrect scale in use.

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- 4.17 The vessel grounded at 0615:21 on 22nd December (as seen in figure 8) at which point the speed over the ground reduced to 4.0 knots almost immediately.
- 4.18 The Operator's Safety and Environment Management System (SEMS) Incident checklist (DEM 10.0) for grounding and the Grounding Communications checklist were completed and signed for by the Master on the 22nd December.
- 4.19 The Duty Officer on the bridge recorded the following events in the ship's log by 0800, approximately 2 hours after the grounding:
- i Vessel at starboard anchor, 4 shackles on deck*
 - ii Zodiac boats 1, 2 & 3 and sports Zodiac in water*
 - iii Port and Starboard pontoons open*
 - iv Marine platform open*
 - v Engine room checks ongoing*
- 4.20 The opening of marine platforms and pontoons is prohibited in a damaged and or flooded condition according to the damage control plan. In order to facilitate the operation of dive boats and access for local contracted divers to assess the damage and undertake repair operations, the Master assessed the risk and deemed it to be as low as reasonably practicable.
- 4.21 By 0834 the Engine Control Room reported to the bridge that water in the Purifier room was rising slowly.
- 4.22 At 1010 the vessel was noted as listing 1° to port.
- 4.23 At 1018 a transfer of grey water was made from the fore peak to tank 27 starboard to reduce the list, 8 minutes later the vessel was listing 1.5° to port. By 1600 at watch changeover on the bridge the list was recorded as 4.5° to port and steady.
- 4.24 Between 1030 & 1040 the Master made an announcement to inform all guests to proceed to shore as follows:
- “Dear guests, this morning on transit to our current port of call the yacht touched a sandbank which was not on our navigational charts*
- We are currently evaluating the incident and have called for local divers and technical support to start the required testing of ships operations. During this period we will shut down and restart a number of systems including A/C and electricity.*

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During the test period the yacht may become hot and humid with periods of electricity outage, to avoid inconvenience to our guests we would recommend that guests go ashore and enjoy the wonderful shore side experience.

I will keep you up dated of the situation as we progress. I apologize for any inconvenience.

Thank you, Captain”

- 4.25 At 1100 the contracted dive company arrived alongside and commenced diving on the hull until 1240. Simultaneously, internal transfer of water from the engine spaces to available water tanks began in order to stem the flooding.
- 4.26 Prior to the fuel pumps becoming submerged in the pump room, at 1215 the Chief Engineer shut down the main generators located in the pump room resulting in shipboard power being supplied by the emergency generator.
- 4.27 The Panamanian authorities boarded at 1430 and by 1450 the engine room was abandoned and no longer attainable due to no lighting throughout the space.
- 4.28 At the 2000 watch change on the bridge the vessel was reported as listing 4.3° to port, pumping water overboard at this point was the only remaining option given all internal tanks had reached capacity.
- 4.29 Between 2130 and 2230 forty-seven passengers and two crew members were transferred to the m.v. Terre Moana³.
- 4.30 At 2320 the m.v Star Breeze⁴ took delivery of 2 life rafts and 110 lifejackets from the Star Pride to increase the lifesaving capacity prior to taking onboard additional passengers.
- 4.31 The Master’s night orders entered in the Deck Log Book required:
“Keep monitoring ships listing & draft & state of condition in Laundry Room, Separator Room and any other area including all engine spaces”
- 4.32 On 23rd December at 0015 the transfer of passengers from shore to the Star Breeze was completed followed by the transfer of passengers luggage which was complete by 0245.
- 4.33 At the 0400 change of watch the vessel’s condition was recorded as listing 4.2°.
- 4.34 The list was noted in the log as having reduced at 0800 hours to 4.1° and at Noon to 3.8° and by 1600, the vessel’s list was recorded as stable at 4.1° to port and the pumping of water overboard had been suspended.

³ In August 2015, Paul Gauguin Cruises sold the *Tere Moana* to Grand Circle Cruises. The ship was renamed *Clio* and began sailing for Grand Circle Cruises, under the flag of Malta in July 2016.

⁴ Windstar Owned and Operated vessel

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- 4.35 At 1700 the list suddenly increased by half a degree, an hour later the list was reported stable at 4.2°.
- 4.36 At 1730 preparations for towing and securing the vessel for heavy weather commenced.
- 4.37 At 2000 the vessel was reported listing 4.3° to port, this increased to 4.5° at 2300 and to 4.8° by 2359.
- 4.38 At midnight, the Star Breeze was reported to be approaching Coiba to evacuate the crew members. There are no further deck log entries after this point.



Figure 9: Vessel pictured on the 22nd December at 1712 at 4.1° list, viewed from ashore

- 4.39 Seven crew members remained with the vessel until the arrival of teams from Resolve Salvage on the 25th December.
- 4.40 The vessel's engine spaces were flooded in two principle areas. These were the forward machinery room which includes the pump room and purifier room and the laundry space.

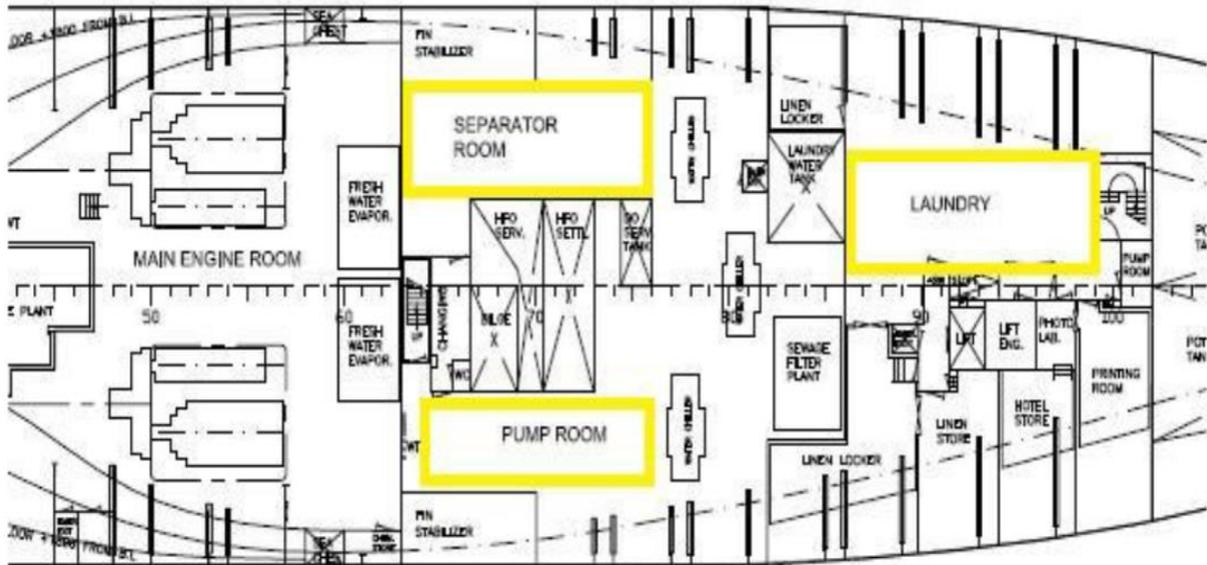


Figure 10: Flooded spaces as of the 27th December highlighted above and as follows: Separator Room, Pump Room and Laundry

- 4.41 The vessel was stable at a heel of 3.5° to port, at a deepest draft of 6.3 metres (port side amidship) and anchored in 8 metres water depth at the point the salvors commenced recovery of the vessel.

4.42 The damage sustained by the vessel is as follows (figures 11 – 17):

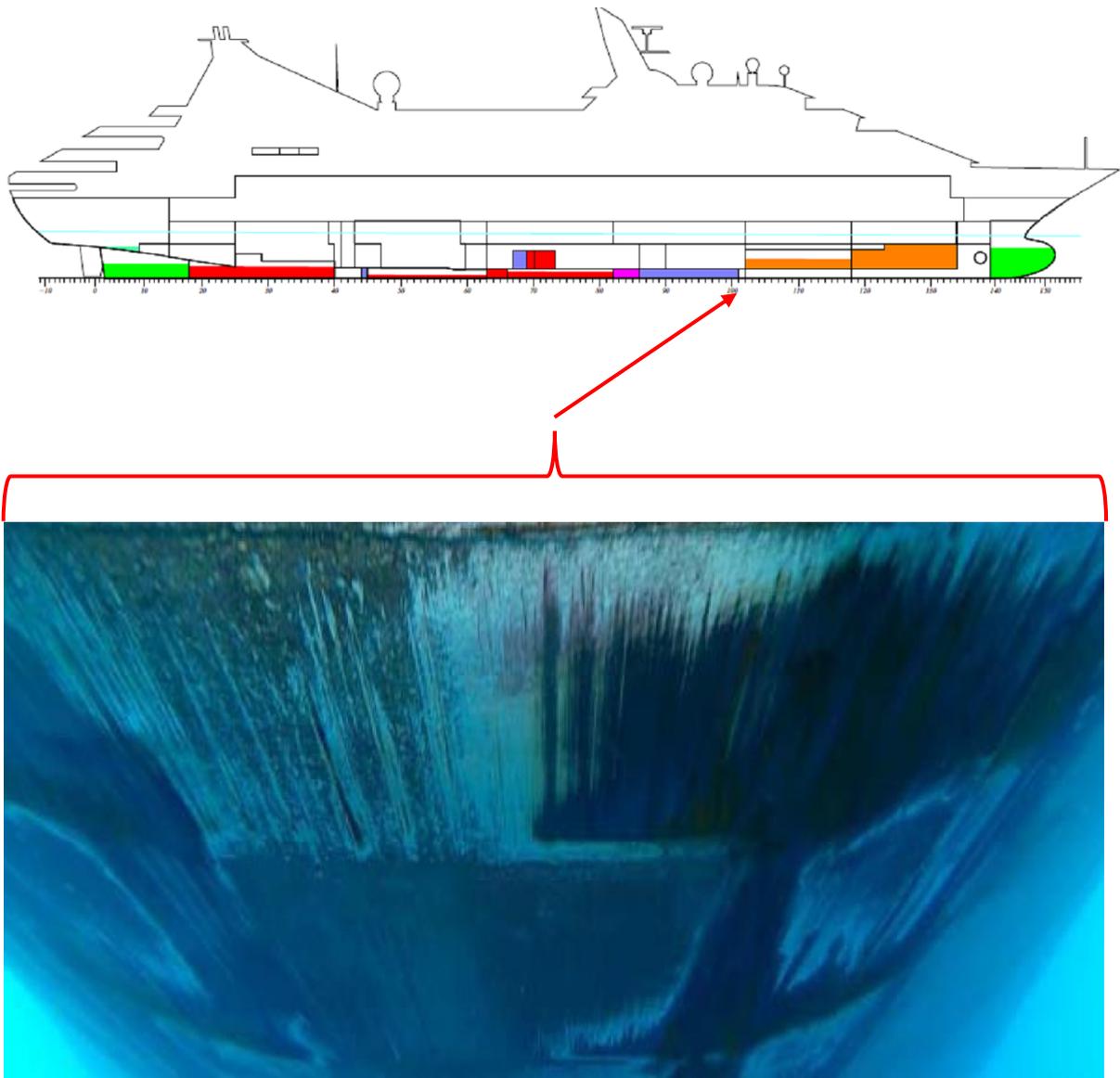


Figure 11: Frame 101 – 102 bottom impact and scrape, no cracks or penetrations

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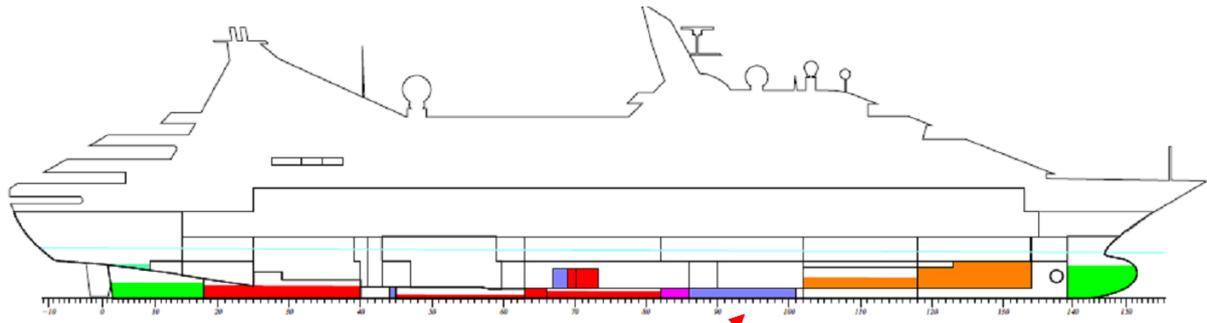


Figure 12: Frame 92 – 95 port centre, longitudinal crack 1800mm x 80-120mm in way of #3 port grey water tank

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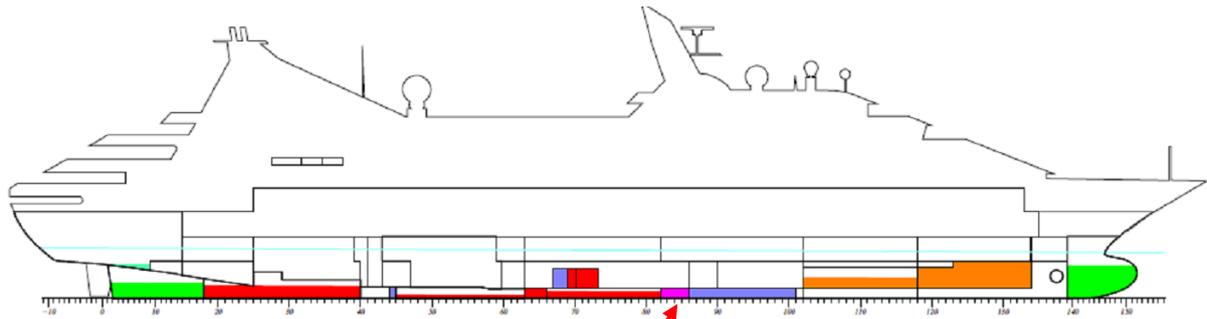


Figure 13: Frame 82 – 86 starboard side, longitudinal crack 400 x 60-80mm in way of #3 starboard grey water tank and #5 centre MGO tank. 2nd crack 105mm x 30-40mm in way of #3 starboard grey water tank and #5 centre fuel oil tank

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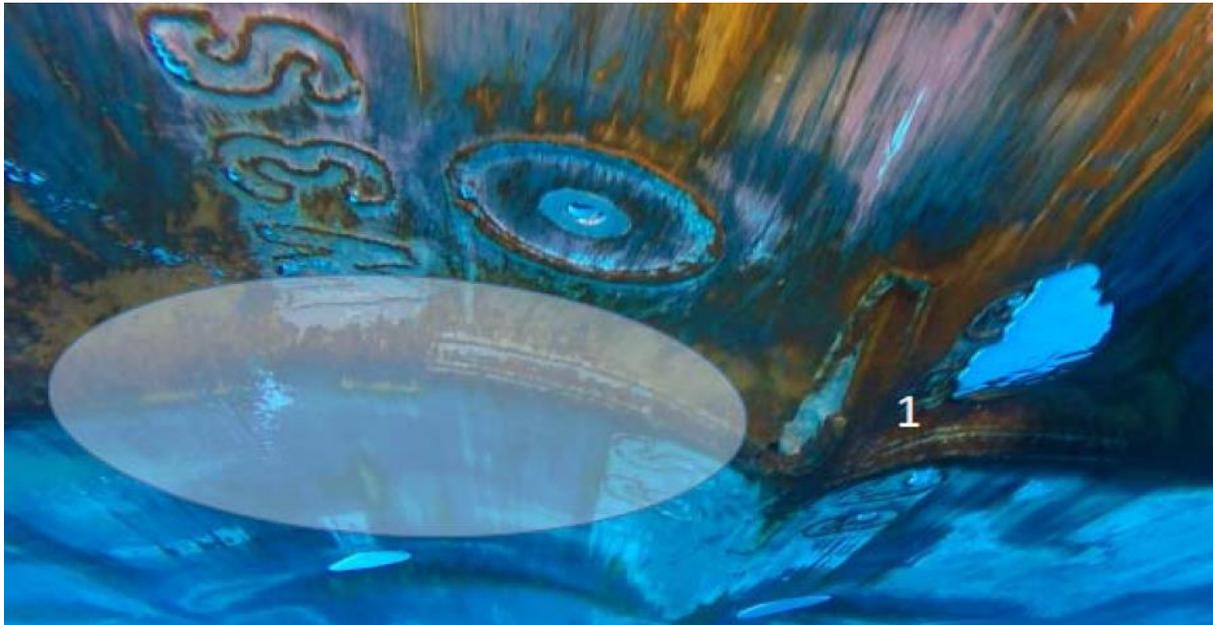
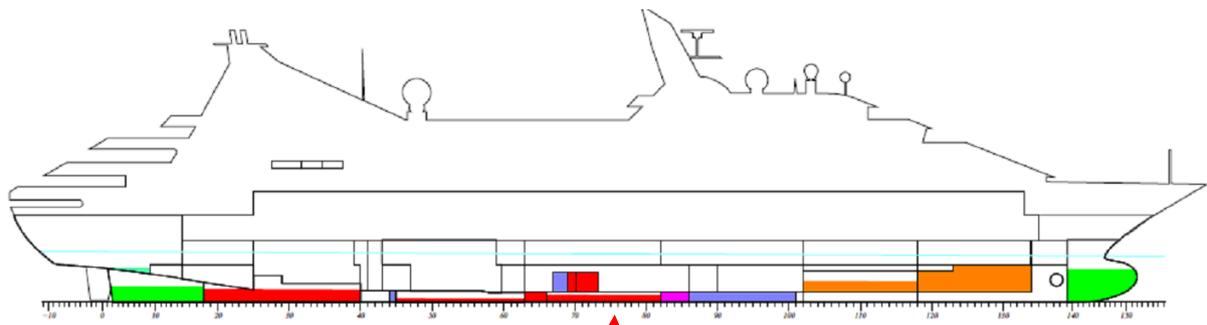


Figure 14: Frame 75 port side, 50-100mm plate indentation/deflection under tank 6 port and 7 port HFO/sludge storage tanks. No cracks. Frame 84 (image not shown) minor indents.

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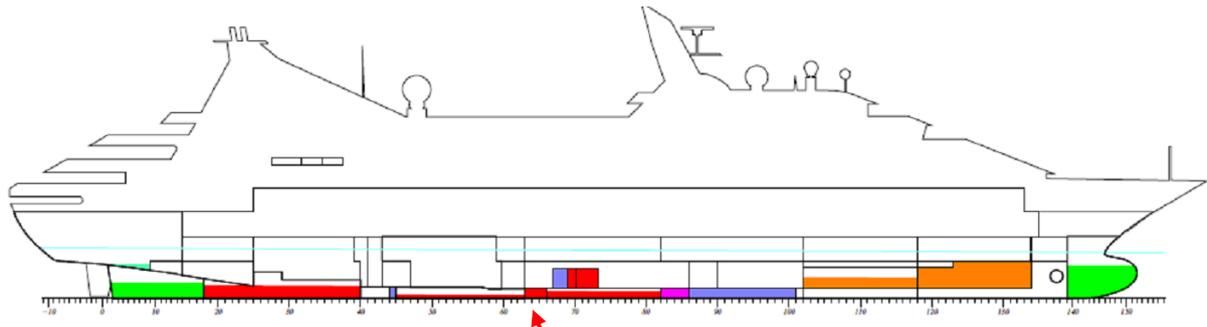


Figure 15: Frame 63-66 starboard, 100-150mm indentations below starboard stabilizer. Crack 1500mm x 60-80mm into #6 HFO tank. Crack 100mm x 10mm into #15 starboard FO overflow tank.

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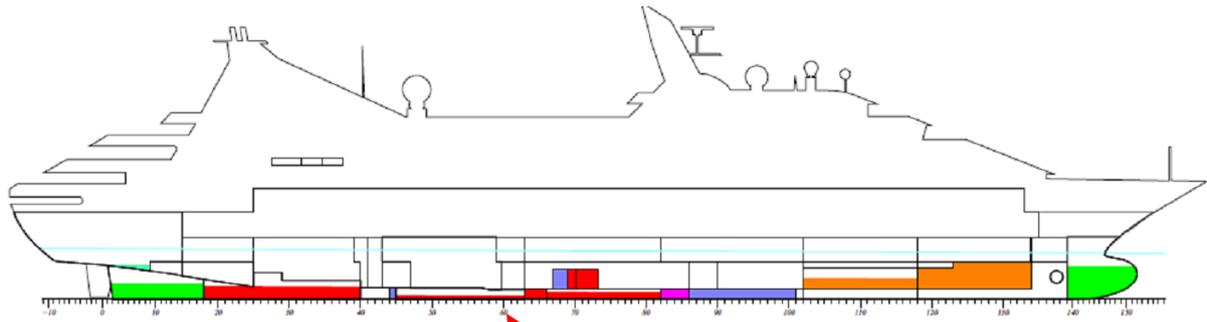


Figure 16: Frame 61-63 port side, minor indentations. Crack 100mm x 20-40mm in way of #17 port grey water tank and cooling water drain tank #2.

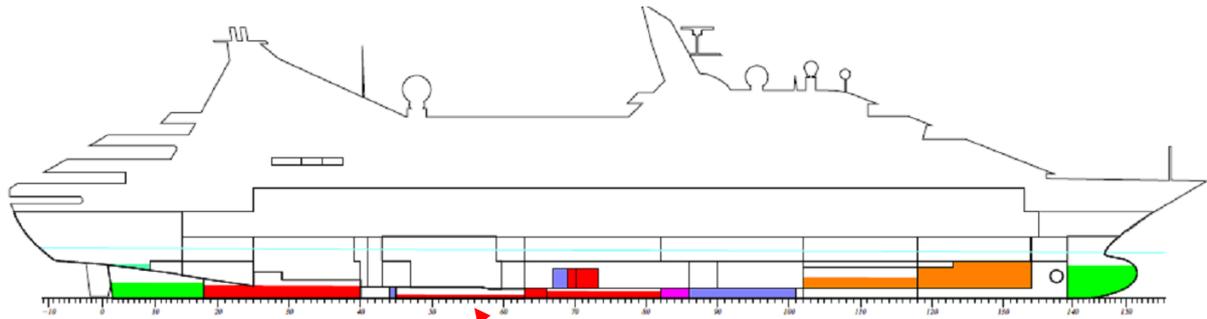


Figure 17: Bilge keep port side partially detached from vessel

Salvage Plan

- 4.43 The Salvors developed a plan to pump off the flooded spaces to a barge to be brought alongside. Internal transfer was not possible due to the number of already flooded tanks.
- 4.44 Prudent safety and anti-pollution measures were implemented to minimise the risk of marine pollution, including the use of anti-pollution booms.

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- 4.45 Det Norske Veritas – Germanischer Lloyd (DNV-GL)⁵ emergency response service was used to analyse the vessel's stability while flooded spaces were dewatered.
- 4.46 The vessel would be prepared for towing to Balboa anchorage, the anchor would be raised using power supplied by an external generator with cutting gear kept on stand-by.
- 4.47 Emergency pumping equipment and a riding crew would remain aboard during the tow.

⁵ Service provided by DNV-GL; in the event of an emergency DNV Emergency Response Service provides technical expertise to assist the vessel with a particular emergency.

5

ANALYSIS AND DISCUSSION

5.1 Passage Plan and Conduct of Navigation

- 5.1.1 The Master had previously transited this area specifically following the same route on two prior occasions on the 02nd December and again on the 16th December. The first transit was without incident. The second transit on the 16th December resulted in divers being required to inspect the hull as a safety precaution after the Master and bridge team heard an unusual noise consisting of three bumps while underway in 10 meters of water.
- 5.1.2 An adequate passage plan for voyage 164 (22nd December) was not undertaken nor was consideration given in vicinity of the source of the bumps experienced within close proximity to the intended route to the anchorage off Isla de Coiba. The vessel planned a route to Isla de Coiba anchorage intent on passing over the same ground where upon it was never determined the source of the bumping experienced on voyage 163 five and half days earlier. The report received from the hull inspection conducted by the divers determined that no significant damage to any part of the hull could be found, however in the same report it also states that the hull was extremely dirty and therefore the divers were unable to assess the vessel’s paint condition. This should have warranted further precaution to be exercised until the source of the bumping, which was presumed by the Master to be the vessel encountering an uncharted underwater object, was fully determined.
- 5.1.3 The primary means of navigation onboard was on paper charts. The ECDIS is type approved and the bridge Officers have received generic training in its use. The British Admiralty (BA) and United States (US) paper charts were both present and had the intended passage drawn on each chart. The ECDIS was used for planning purposes and the passage was planned on ECDIS and transferred to paper prior to sailing. It was determined that although paper charts remain primary means of navigation, ECDIS was used to monitor the vessel’s position in relation to the planned track. This could potentially cause confusion given the data presented was in two different formats. Further, monitoring BA, US and ECDIS chart formats simultaneously cannot be achieved without compromise and the likelihood of missing charted objects in relation to the vessel’s location remains high given the vessel’s position cannot be accurately plotted on all three charts at the same time.
- 5.1.4 The Operator’s Safety and Environment Management System manual under section 4.3 ‘Bridge and Navigation Operation Procedures’ outlines the requirements for an effective passage plan described as follows:

‘4.3 Bridge and Navigational Operating Procedures

The safety of the lives onboard and of the yacht is always to be the consideration taking precedence over all others. No consideration of cruise programs, previous

instructions or convenience justifies taking any risk to the safety of the yacht and all those onboard.'

- 5.1.5 The vessel returned on the reciprocal course of voyage 163 on the 22nd December as that on the 16th December although the known height of tide on the 22nd December was lower. On the 16th December, the vessel sailed from Isla Coiba, south-eastwards along the Rancheria Channel with the Chief Officer at the Conn. Transiting between Isla Iglesia and Isla Cocos the Master reported he was not on the bridge but upon hearing the vessel “bumping” he returned to the bridge. The Chief Officer testified to the fact that it was 1810 (sunset was at 1801) and recounted hearing a single “bang”, the echo sounder confirmed a charted depth of 10m was observed. Divers were engaged at Balboa and the Master was advised that the hull was dirty with all types of growth but the hull had sustained no significant damage.
- 5.1.6 The passage plan for this transit had been made by the vessel’s Navigating Officer who had been relieved of this position on the 13th December and had become the vessel’s Safety and Training Officer. A replacement Navigating Officer joined the vessel on the 13th December, the voyage plan for voyage 163 was already in place and approved by the Master and therefore not considered for requiring another review.
- 5.1.7 The newly joined Navigating Officer was aware of the incident on December 16th although he was not on duty at the time. He prepared the passage plan for voyage 164 which included a new destination Portobelo, Panama on the Atlantic Coast. From Balboa westwards, the waypoints from the previous voyage on the 16th December were adopted without change and passing over the same ground.
- 5.1.8 There was no discussion between the Navigator and the Master regarding modifying the route to avoid the area where the vessel experienced bumping on the 16th December. During a bridge resource meeting with all Deck Officers in attendance the Master did not include Isla de Coiba despite the Navigating Officer being unfamiliar with the approaches.
- 5.1.9 It remains unknown why Isla de Coiba anchorage was not discussed during the bridge resource meeting. The vessel’s itinerary for the day was published and informed all guests that the intention was to spend the day off Isla de Coiba between the hours of 0700 and 1700. The navigation plan did not provide a location to anchor and instead detailed the intended route between Isla de Coiba and Isla Rancheria in preparation for the next leg of the voyage to Golfito the following day. Recommended safe navigational⁶ practice dictates that when time allows, a primary anchorage position should be identified on the chart in order for the Master to properly evaluate its suitability prior to committing to the anchorage leg.

⁶ In accordance with the voyage & passage plan checklist; course to steer with heading, leading lines, parallel index distance, distances between waypoints and important navigational marks are to be shown on the chart were appropriate.

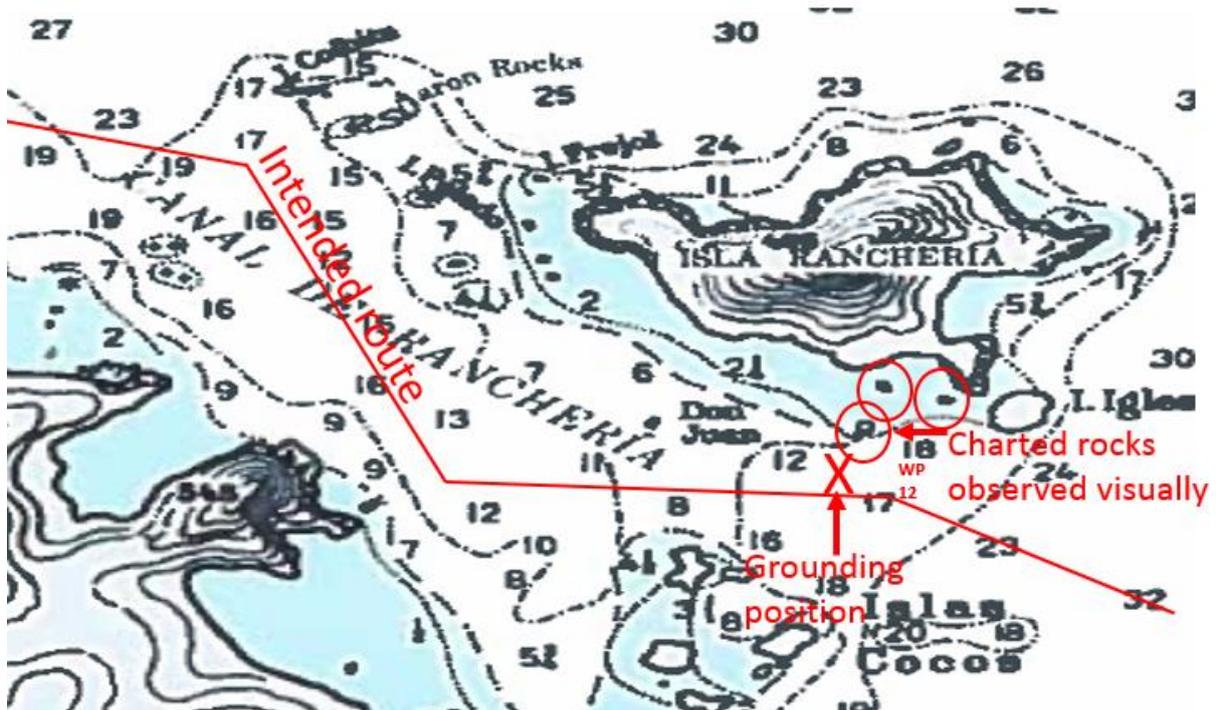


Figure 18: Intended route for passage 164 between Isla Rancheria and Isla de Coiba overlaid onto US Defence Mapping chart 21583 (depth in fathoms)

- 5.1.10 The Master who at the time of the grounding had the Conn, manoeuvred the vessel to port in order to provide more safe water between the vessel and the chartered rocks seen both visually and by radar (circled within figure 18). In doing so the Master deviated from the intended route by altering course to port, before regaining once he deemed sufficient safe water had been achieved between the rocks and the vessel. Moments after regaining the intended route, in proximity of way point 12, the vessel ran aground in an area with a charted depth of approximately 12 fathoms (21.9m) of water.
- 5.1.11 The 16th December position coincided with Waypoint #12 (WP 12) (although exact position cannot be guaranteed) of the intended track. The 22nd December position was taken from GPS, saved by the Deck Cadet at the time of impact. The distance between these two positions is 248 metres (slightly less than 2 ship lengths). The high tide on the evening of 16th December was at 1924, with a recorded height of 4.8 metres, a height difference of 4.4 metres above the height of tide at the time of impact on 22nd December.
- 5.1.12 The Chief Officer marked a paper copy of the vessel's ECDIS screen with the location of the bumping experienced on the 16th December, reproduced in figure 19 below (as indicated by the 'x'). As an approximate comparison, the grounding position on the 22nd is marked on the ECDIS identified by the vessel's location within figure 20 below.

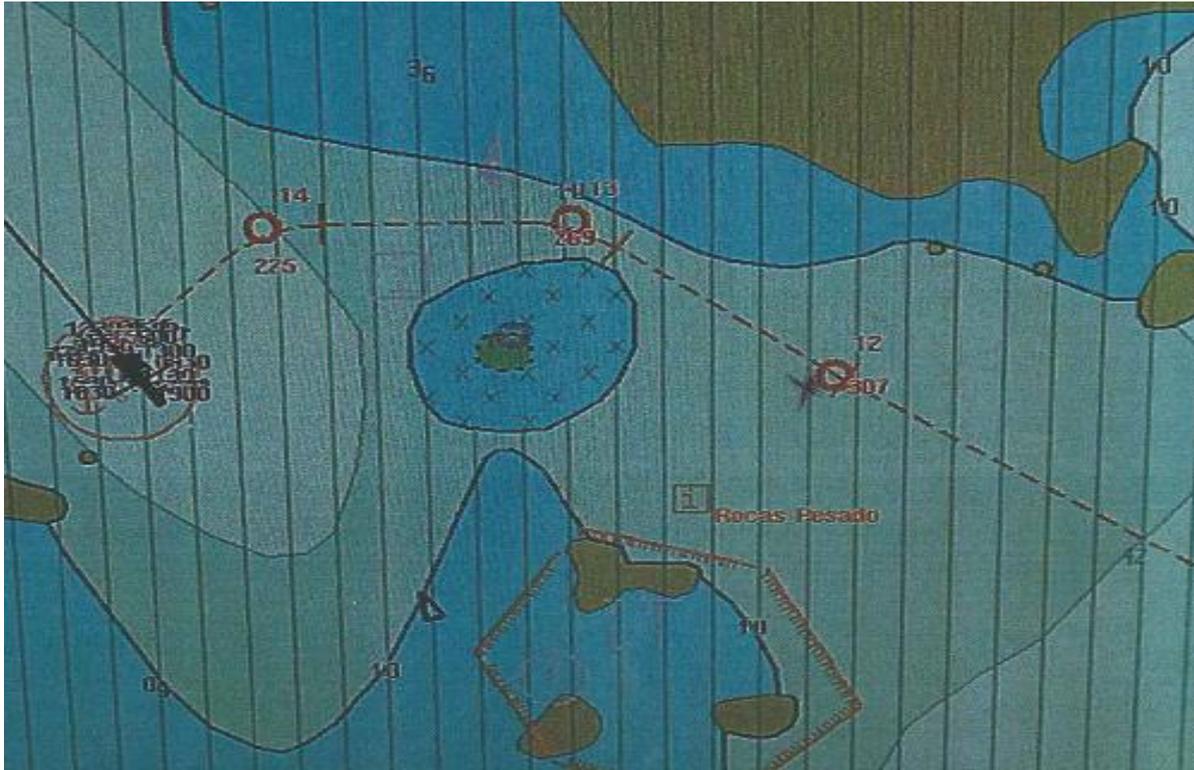


Figure 19: Reproduced ECDIS screenshot with 'x' marking the position of the unknown source of the bumping experienced on the 16th December

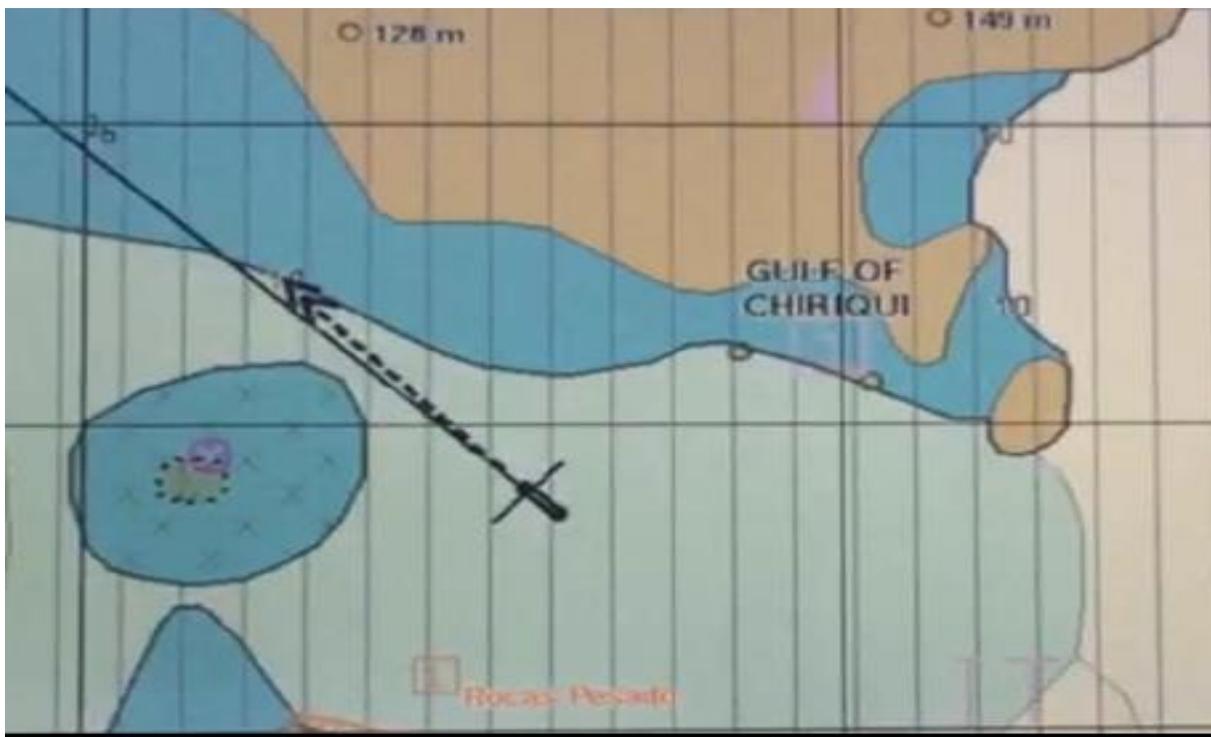


Figure 20: ECDIS display on the 22nd December indicating position of grounding

5.1.13 An alternative route existed to the North of Isla Rancheria via the Canal de Afuera which was considered a safer passage by remaining outside the 10-meter contour.

However, the Master decided not to incorporate the northern passage within the navigational plan as other vessels within the fleet had previously transited the Canal de Rancheria without incident.

5.2 Results of Survey and Dive Inspection of Grounding Area

- 5.2.1 The last known official charted survey of the area was conducted in 1934 and 1935 by USS Hannibal. After the grounding, the Owners contracted a local survey company, Sea & Land Surveys, to investigate the area north of Isla de Coiba in the designated position of the grounding. The findings of the investigation conducted where provided on the 07th February and a summary is provided within this section of the report.
- 5.2.2 The GPS plots observed by Sea & Land Surveys coincided closely with the published map and chart of the area, therefore it can be determined with a high degree of confidence that the chart used accurately depicted the land mass and location of charted objects thus confirming that the shallow water in which the vessel grounded was not charted.



Figure 21: Google Earth image with a white box around lighter blue water at the grounding location, indicating visually an area of shallow water

5.2.3 Bathymetry of the area was performed and the result shown within the contour chart below (figure 22 below). The GPS position to the left of the image shows the location of the grounding according to the position provided by the Owners. The two red circles to the right of the GPS position were confirmed later by divers as the exact location of the grounding. These two positions correlate with the GPS plots and google earth imagery confirming that the location of grounding was not charted. Additionally, the bathymetry was able to determine the depth of water in the surrounding area. The two locations identified within the survey of the two grounding positions determined that the actual depth of water experienced was between 0.5 – 4.99m rather than the charted depth of approximately 21 meters.

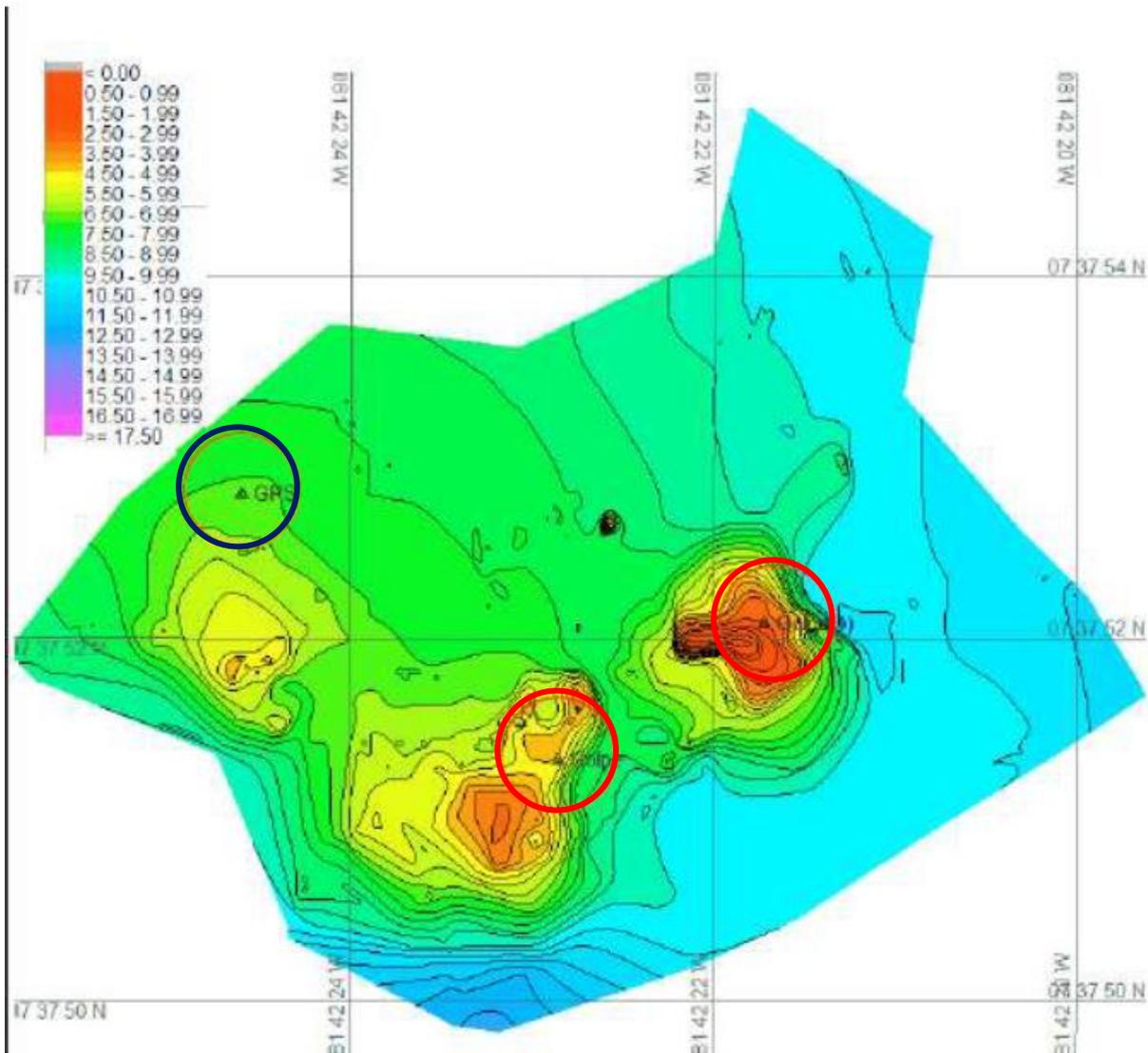


Figure 22: Bathymetry survey of area. Location of grounding circled in red and original GPS position of grounding in blue

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- 5.2.4 A dive survey was also conducted in the location of the grounding position. The pictures provided below confirm the vessel grounded by presence of red paint from the hull deposited on the flattened rock.



Figure 23: Picture of rock confirming vessel grounded



Figure 24: Picture of second rock confirming vessel grounded

5.3 Hours of Rest⁷

- 5.3.1 The Master testified that on the 21st December the vessel sailed from Flamenco Marina at 1330. After the vessel was on passage he went to his office to check emails. This was followed by a ‘welcome reception’ for the passengers at 1830.
- 5.3.2 Dinner was from 1930 to between 2200 & 2230, 6 guests were at the Captain’s table for dinner.
- 5.3.3 The Bar Attendant testified that the Captain left the dining room with the same 6 guests for the Star Bar. This group remained at the Star Bar when last orders were called at midnight until the bar closed at 0100. The last round of drinks was served at 0045 on the 22nd December.
- 5.3.4 The Master then woke at 0515 in preparation for the transit through the Isla de Coiba commencing at 0605, the point when the Master took the Conn.
- 5.3.5 The Master had been entertaining guest at his table for dinner until 2200, after which he was socialising with guests at the Star Bar until 0100, approximately 4 hours later he was on the bridge taking the Conn at 0605. The Maritime Labour Convention is quite clear in defining hours of rest and although he was within the maximum hours

⁷ Defined as *hours of rest* means time outside hours of work; this term does not include short breaks. Maritime Labour Convention, 2006, Regulation 2.3.2 (b)

of work⁸ and from 1000 to 0605 resting, it is considered that poor judgement was exercised by an experienced Master choosing to remain at the Star Bar until the early hours of the morning in the knowledge that he was required on the bridge later that morning.

- 5.3.6 There is insufficient evidence to make a determination of how many drinks had been served to the Captain over the course of dinner and at the Star Bar between 1900 on the 21st and 0100 on the 22nd and therefore it cannot be determined the effect, if any, that this may have had on his capacity as Master the following morning while on the bridge.

5.4 Bridge Resource Management

- 5.4.1 The bridge team did not recognise the impending danger the vessel was standing into when additional, uncharted exposed rocks were sighted ahead of the vessel. The vessel maintained speed sailing straight into an area where a week earlier the Master required divers to confirm the condition of the hull after 3 successive bumps were heard. An alteration of course to port was ordered by the Master so as to keep clear of the rocks to starboard whilst making a departure from the intended navigational plan. At no point, even when uncharted rocks appeared at low tide, were any discussions held regarding changing the route, reducing speed or taking precautions to maintain the vessel's safety. The Master did request that the Cadet record the position of the uncharted rocks in order to provide their location to a sister vessel.
- 5.4.2 The Master testified when he took over the Conn the Cadet was at the chart table to the rear of the bridge and that the Officer of the Watch (OOW) and the Chief Officer were on the bridge.
- 5.4.3 The Chief Officer testified overhearing the Master take the Conn and the exchange of information between the OOW and the Master.
- 5.4.4 Sunrise had occurred and therefore the rocks could be clearly seen both visually and identified on radar and reported by the Master, Chief Officer and OOW as the vessel proceeded on a North-westerly course.
- 5.4.5 Two rock formations were visible to starboard and another to port, the rocks to starboard were approximately 2 metres in height and one of the two did not appear on the chart.
- 5.4.6 At this point the vessel remained at full speed. The realisation should have been made by any one of the bridge team that the reliability of chart information could not be guaranteed to maintain navigational safety and therefore appropriate precaution should have been taken until navigational certainty was restored. Despite confidence being placed on the reliability of charted data alone, the bridge team, in the knowledge that the vessel had potentially come into contact with an uncharted, underwater object

⁸ Maximum hours of work shall not exceed 14 hours in any 24-hour period and 72 hours in any seven-day period. Maritime Labour Convention, 2006, Regulation 2.3.5 (a)

in this vicinity, should have alerted them to the fact that with a high degree of probability the vessel was standing into danger.

- 5.4.7 The Master manoeuvred the vessel to port and then to starboard in order to avoid the uncharted rocks prior to regaining the track but did not reduce speed. The vessel grounded resulting in breaching the hull in six (6) places. The height of tide at the time of the grounding was 4.4m lower than that experienced the previous time the vessel used this navigational plan, which on this particular day, resulted in the amount of safe water available between the uncharted rock and the hull to be a negative value.
- 5.4.8 The Chief Officer testified he observed the uncharted rock, he then looked at the tide schedule and realized the tide was at low water. He looked at the echo sounder and the water depth beneath the keel dropped from 10 metres to 2.1 metres as the vessel grounded.
- 5.4.9 The vessel's Safety and Environment Management System section 4.1 instructs the Master in organising an effective bridge team. It is reproduced below:

‘Bridge Resource Management

Weakness in bridge organization and management has been cited as a major cause for marine casualties worldwide. Accidents in operations are frequently caused by resource management errors.

Masters and Officers in charge of the navigational watch shall continuously reassess how bridge-watch resources are being allocated and used, based on Bridge Resource Management (BRM) principles.

BRM is the effective management and utilization of all resources, human and technical, available to the Bridge Team. BRM reduces the risk of a marine casualty and ensures the safe completion of the vessel's voyage by helping a yacht's bridge crew anticipate and correctly respond to their yacht's changing situation.'

The Company Standing Orders continues with the following guidelines:

'You should never hesitate to take any appropriate action in order to avoid a collision or a close-quarters situation developing or whenever there is doubt about the safety of the ship relative to the land or other navigational hazard.'

- 5.4.10 There should be little doubt that had effective management of all resources in conjunction with the Bridge team adhering to the guidelines within the Company Standing Orders, the outcome of the vessel's passage would have been quite different.

5.5 Drug and Alcohol Testing

- 5.5.1 Contrary to the Safety and Environment Management System (Chapter 11) the vessel's Doctor was instructed by the Master on 23rd December to conduct drug testing only and that alcohol testing would not be required.
- 5.5.2 The Operator's Safety and Environment Management System (Chapter 11) requires drug and alcohol testing to be conducted after a reportable incident, accident, or near miss or when deemed necessary and shall be conducted as soon as practicable. It cannot be determined why the testing of key personnel took place 36 hours after the event.

The Operator's Safety and Environment Management System Chapter 11 requires the following in event of an incident:

'The Master or senior Officer onboard must make the determination of who is to be tested. Tests should only be requested from those personnel whose actions or decisions could have contributed to the incident. In most case the Officer in charge of the operation which led to the incident, those directly involved in the incident, and those standing watch will have to be tested.'

'When it is determined that testing is necessary, the Master shall take all practicable steps to ensure that any person directly involved in the accident is escorted to qualified medical personnel for the purpose of testing as soon as possible.'

- 5.5.3 Neither the Master nor any senior Officer on board deemed that drug and alcohol testing should be conducted on those personnel involved and on watch at the time of the grounding or as soon as practicable thereafter. There is no evidence supporting the Master's decision in requiring a 36-hour delay in testing. It cannot be determined either as to why only drug testing was conducted and not alcohol testing. There is no doubt that the Master did not adhere to Company policy and procedures in this regard as detailed within the Safety and Environment Management System.
- 5.5.4 The results of the delayed drug testing taken from Bridge and Engine Room crew were all found negative when tested for Phencyclidine (PCP), Amphetamines, Opiates, Cocaine and Marijuana.

5.6 Training and Drills

- 5.6.1 The vessel's Second Officer, arrived on board on the 13th December 2015 and immediately assumed the duties and responsibilities of the Navigator.
- 5.6.2 Section 3.1.6.5 of the Operator's Safety and Environment Management System requires that new Deck Officers undergo familiarisation training and that upon completion the training is recorded in the Deck Log book.

The requirement is reproduced below:

‘Each licensed individual must become familiar with the relevant characteristics of the vessel on which engaged prior to assuming his or her duties.

In addition to completing Safety Familiarization Training, Deck and Engineering Officers should familiarize themselves as soon as possible with all essential systems and operations, as well as Company policies, procedures and instructions contained in the Safety and Environmental Management System.’

There is no entry in the Deck Log Book that this training was completed.

- 5.6.3 The Safety and Environment Management System, Volume 2, Appendix F lists overlap periods for Officers joining the Company vessels. For a Senior or Junior 2nd Officer the required overlap period is 7 days.
- 5.6.4 On the 13th December the Navigating Officer joined the vessel having relieved the former Navigating Officer who had assumed the role of the Safety Officer upon the departure of the previous Safety Officer. No overlap period was exercised and the Safety Officer joined the watch bill on the 4-8 watch. The purpose of the 7 day overlap period is to ensure the duties and responsibilities are conveyed and understood before the new incumbent assumes responsibility for the role.
- 5.6.5 The vessel’s Safety and Environment Management System requires Fire and Boat Drills to be carried out at weekly intervals. No drills were recorded in the Deck Log Book between the 6th December and the 22nd December.

Extracts from the SEMS (Section 7.4.1) are shown below:

‘The International Convention for safety of Life at Sea (SOLAS) requires the mandatory execution of drills. The following drills are made mandatory:

- a. Abandon Ship*
- b. Fire*
- c. Steering Gear*
- d. Line throwing device (if applicable)*
- e. Enclosed Space Entry*

An abandon-ship drill and a fire drill must be conducted weekly.’

5.7 Prescribed Medication

- 5.7.1 The vessel’s Chief Officer was prescribed by the ship’s Doctor 0.5mg Lorazepam tablets to be taken as necessary for a sleeping disorder. The drug test report indicates the medication was last taken on the 21st December.
- 5.7.2 Lorazepam belongs to a group of drugs known as benzodiazepines, these act on the brain and central nervous system to produce a calming effect. Use of this drug may

affect the ability of the Chief Officer to perform his duties as outlined in the SEMS as follows:

‘1.2.1.2 Chief Officer – Is 2nd in Command of the vessel and is the designated Ship’s Security and Safety Officer. The Chief Officer is the Head of the Deck Department and is responsible for its operation including navigation as per Company and regulatory requirements’.

- 5.7.3 The Chief Officer’s prescription by the ship’s Doctor of Lorazepam for insomnia is a violation of the STCW 2010 Amendments A-1/9, paragraph 2.5. The entire text of paragraph 2 is as follows:

‘2 The standards of physical and medical fitness established by the Party shall ensure that seafarers satisfy the following criteria:

2.1 have the physical capability, taking into account paragraph 5 below, to fulfil all the requirements of the basic training as required by section A-VI/1, paragraph 2;

2.2 demonstrate adequate hearing and speech to communicate effectively and detect any audible alarms;

2.3 have no medical condition, disorder or impairment that will prevent the effective and safe conduct of their routine and emergency duties on board during the validity period of the medical certificate;

2.4 are not suffering from any medical condition likely to be aggravated by service at sea or to render the seafarer unfit for such service or to endanger the health and safety of other persons on board; and

2.5 are not taking any medication that has side effects that will impair judgment, balance, or any other requirements for effective and safe performance of routine and emergency duties on board.’

- 5.7.4 The ILO Guidelines for the Medical Examination of Seafarers address the issuance of medical certificates; the purpose and scope of the guidelines include the following statement:

‘The MLC, 2006, and the STCW Convention, 1978, as amended, require a seafarer to hold a medical certificate, detail the information to be recorded and indicate certain specific aspects of fitness that need to be assessed.’

Appendix D specifically addresses the class of medicines that Lorazepam belongs to as follows:

‘Medications that can impair routine and emergency duties. Medication affecting the central nervous system functions (e.g. sleeping tablets, anti-psychotics, some analgesics, some anti-anxiety and anti-depression treatments and some antihistamines).’

5.8 Passenger Feedback

5.8.1 A passenger feedback form was provided to those passengers on board at the time of the grounding, a total of 13.5% of passengers returned completed questionnaires to Windstar. The feedback provided gave a 100% positive response to questions regarding the passenger safety drill and safety information provided by the cruise line.

The common features of these responses are summarised as follows:

- i. *The yacht grounded at 0615 and all passengers were aware of the incident but no immediate announcement was made.*
- ii. *The crew continued with routine operations, breakfast was served and preparations made for the day trip to Coiba for the beach visit.*
- iii. *A precautionary announcement prior to the beach trip would have allowed passengers to take extra clothing, most went ashore in bathing suits and cover ups. Valuables and medications were left onboard.*
- iv. *Throughout the Captain and Senior Officers were uncommunicative.*
- v. *Crew members in direct contact with passengers were helpful, professional and courteous but uninformed as to the state of the vessel.*
- vi. *Ashore there were infrequent updates and with no megaphone these were difficult to hear.*
- vii. *The severity of the situation was not explained, even when the yacht could be seen listing and a helicopter circling overhead.*

6

CONCLUSIONS

- 6.1 The vessel grounded on 22nd December 2015 causing serious hull damage as a direct result of the vessel's Bridge team not adhering to the Company Safety and Environment Management System and not take prudent steps to properly plan and execute a voyage.
- 6.2 The Master was likely suffering from a degree of fatigue at the time the vessel grounded having been in the company of guests until 0100. Although adequate hours of rest were recorded as defined by the Maritime Labour Convention, the Master retired to his cabin for approximately 4 hours prior to navigating a vessel through a narrow channel to anchor, on a small scale navigational chart, at low water with a Navigator who had not been properly familiarized with onboard procedures as required by Company policy.
- 6.3 The Navigating Officer had not been properly trained for his role onboard having undertaken his safety familiarisation training only. The Company mandated week-long overlap between positions had not been undertaken nor had he completed the required qualifications checklist within the required timeframe.
- 6.4 The Master did not conduct a proper voyage briefing taking into account the intended passage of voyage 164 that followed a reciprocal course to that on voyage 163 where the vessel may have come into contact with an uncharted underwater object.
- 6.5 The Bridge Team concept was not effectively adopted. The amount of available information to the bridge team was not properly utilized despite the significant warning signs that the vessel was standing into danger. A false sense of security was placed on the fact that other vessels in the fleet had navigated this channel previously without incident.
- 6.6 The Master's instruction to the Doctor not to conduct alcohol testing and to delay drug testing of bridge and engineering watchkeepers until 36 hours after the event is inexcusable and in direct violation of the Safety and Environment Management System.
- 6.7 Medical staff were unaware of the requirements of STCW in regard to medications prescribed to watchkeeping Officers. The Safety and Environment Management System did not provide sufficient guidance to the medical staff on what action to take when prescribing prescription drugs to watchkeeping personnel.
- 6.8 The severity of discomfort experienced by many passengers was unnecessary and could easily have been mitigated by frequent public announcements onboard and ashore provided by the Master or designated person informing passengers and crew of the current and developing situation.
- 6.9 In violation of Company procedures, no weekly drills had been conducted on board since the 6th December. Conducting regular drills improves crew familiarity of

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systems and emergency handling techniques ensuring personnel remain competent enough to execute the duty required of them in any given emergency.

7

RECOMMENDATIONS

Recommendations for the Operator:

- 7.1 Ensure all bridge watchkeepers have a thorough understanding of the Safety and Environment Management System. Consider implementing an internal audit and verification process to ensure comprehensive adherence to Company procedures.
- 7.2 Further navigational training should be considered for the bridge team to include but not limited to additional bridge resource management training to improve communication, spatial awareness, utilization of bridge equipment and operational planning techniques.
- 7.3 Consider reviewing the procedure for the execution of drills on board to ensure drills are conducted at regular intervals and in accordance with Company procedures.
- 7.4 In the event of incidents where drug and alcohol tests are required the Doctor should be given overriding authority to make these tests, taking into considerations the vessel's immediate safety. The overriding authority should be clearly defined and written into the Safety and Environment Management System and Company policy manuals.
- 7.5 The Doctor aboard any Company operated vessel should receive STCW training with regards to the rules for certifying a Seafarer medically fit for duty. The Company should develop a policy to allow the Doctor to prescribe medication to ship's crew and to maintain prescriptions listed on each crew member's medical fitness certificate.
- 7.6 A policy should be developed whereby the Master or delegated representative brief the passengers and crew as soon as practicable after any incident. This should be reinforced by updates on a regular and frequent schedule.

8

ACTIONS TAKEN

Provided by the Owner:

- 8.1 As of 22nd December 2015 all Windstar vessels have gone through at least one Safety and Environmental Management System internal audit while 50% of the fleet has gone through two internal audits. By the middle of 2017, the remaining vessels will have been through their second internal audit. The Star Pride has also conducted an external International Safety Management audit conducted by Bureau Veritas.
- 8.2 Windstar has put in place procedures for the bridge team to meet weekly and conduct a Bridge Resource Management meeting. Each meeting will cover a different aspect of BRM. Topics include communications, bridge equipment, review accident/incident/safety reports sent to the vessels from the Owners.
- 8.3 Shortly after the grounding the Company fleet alert was sent out to all vessels informing them of the finding that fire and boat drills were not being conducted as required on the Star Pride. It required the Master to discuss this issue at the next onboard Crew Monthly Safety Discussion and at the next Safety Committee meeting. Additionally, the Company is adding all required drills into its planned maintenance system as a reminder to the onboard team.
- 8.4 Windstar acknowledges the need to incorporate a clearly defined policy into the vessel's Safety and Environmental Management System and Company policy manuals regarding the authority of the Doctor to conduct drug and alcohol testing when deemed necessary.
- 8.5 Windstar's third party medical consultant has conducted training for all on board Doctors on the latest STCW requirements for certifying seafarers medically fit for duty. They are also implementing a program to keep the Doctors informed of any new requirements. Windstar already has procedures in place for prescribing and maintaining prescriptions listed on seafarer's medical fitness certificate.
- 8.6 Windstar does have a policy for briefing the passengers and crew as soon as practical. This is contained within the onboard emergency response procedures.

LIST OF APPENDICES

I. PHOTOGRAPHS

- 1. Flooding in the Laundry Space Dec 23rd at Coiba**
- 2. Flooding in Forward Engine Space Dec 23rd at Coiba**
- 3. General view of wheelhouse at Balboa January 2016**
- 4. General view of Star Bar at Balboa January 2016**
- 5. Forward engine space indicating depth of flooding**
- 6. Engine Control Room**

II. VDR extracts before and after grounding

III. DNV-GL Loading condition plot for tow Coiba to Balboa

APPENDIX I – Photographs



Picture 1: Flooding in the laundry Taken by Panama Authorities at Isla de Coiba



Picture 2: Flooding in Forward engine room space

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Picture 3: General view of wheelhouse at Balboa after tow from Isla de Coiba



Picture 4: The Star Bar on the vessel's upper deck after tow from Isla de Coiba

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Picture 5: The forward engine space at Balboa anchorage after tow (the dark stain indicates the maximum depth of flooding)

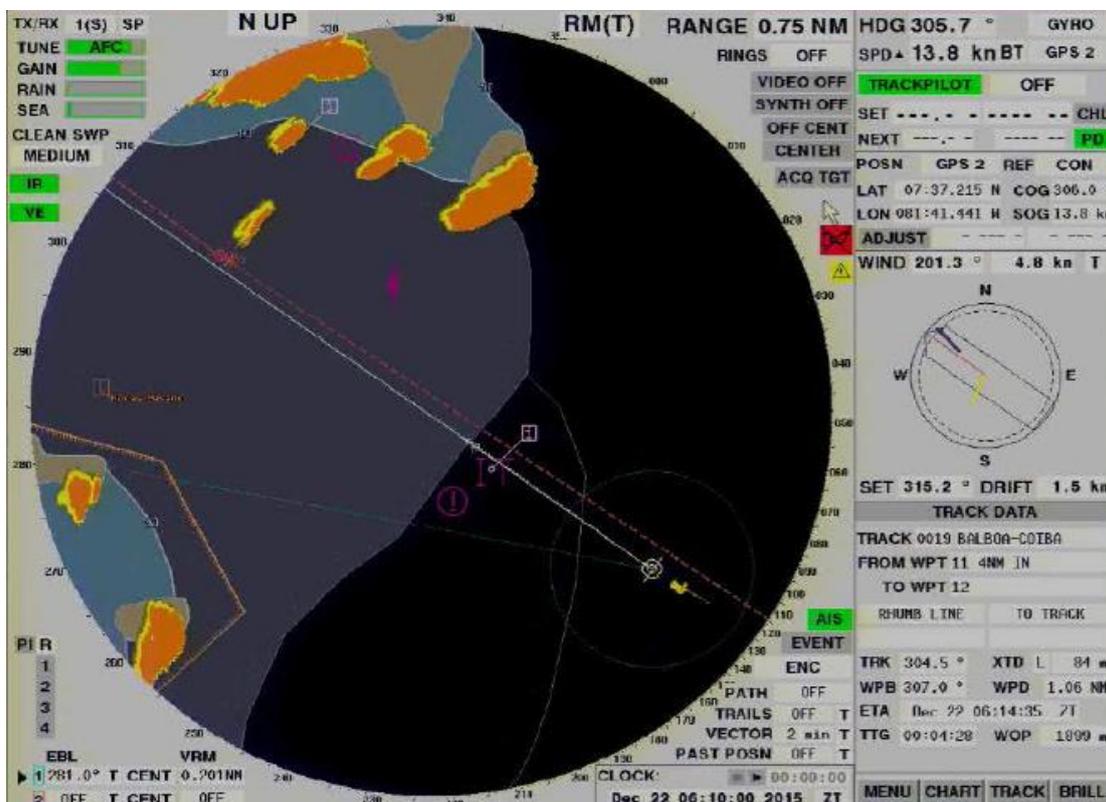


Picture 6: The Engine Control Room at Balboa anchorage after tow

APPENDIX II - VDR extracts before and after grounding

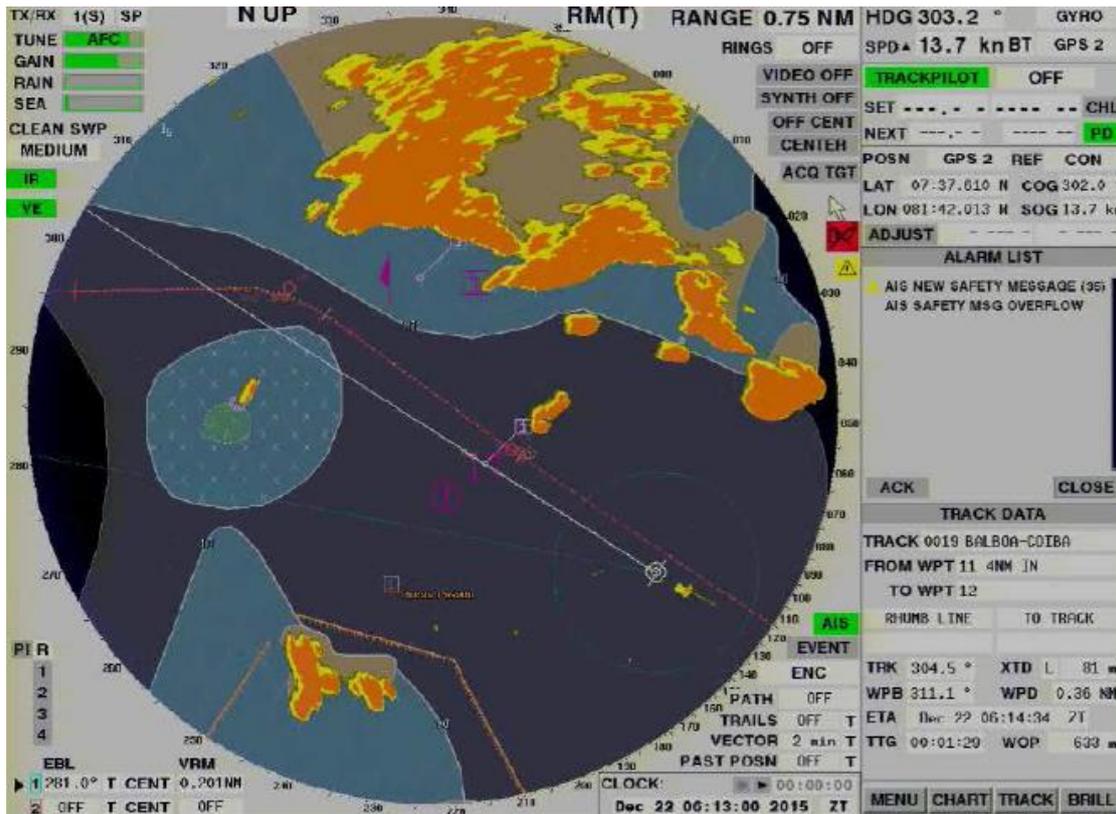


Vessel position at 0605LT – Master takes the Conn

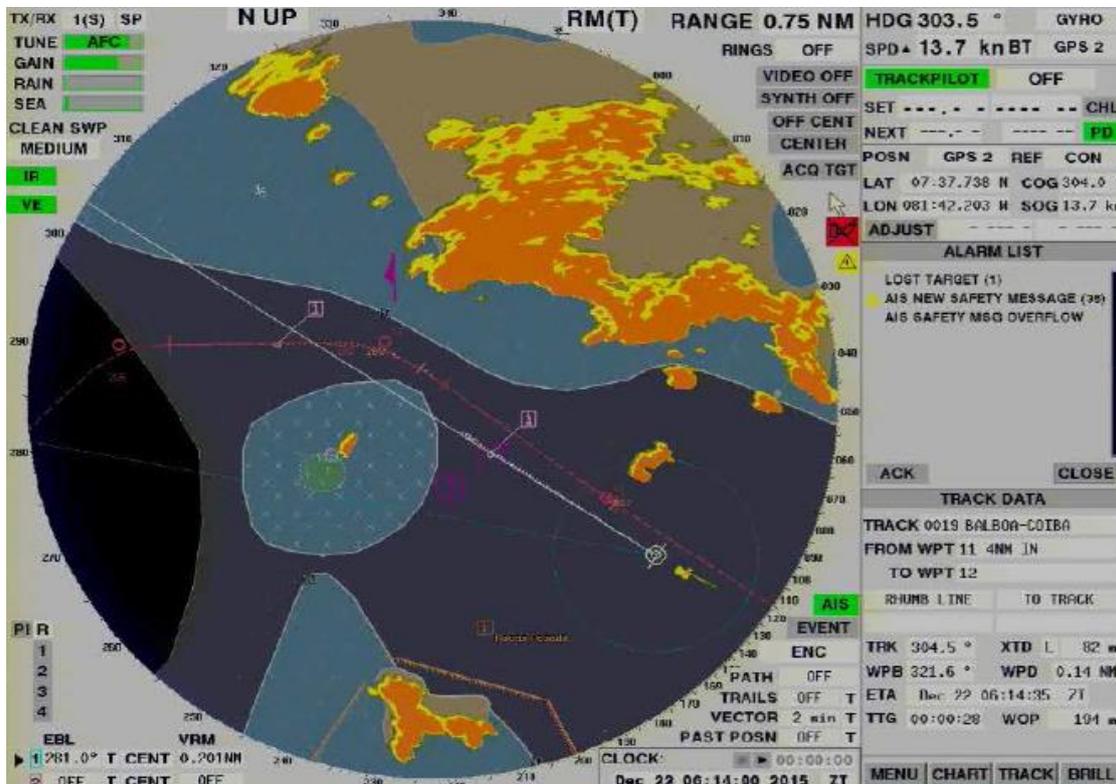


Vessel position at 0610LT – engines on stand by

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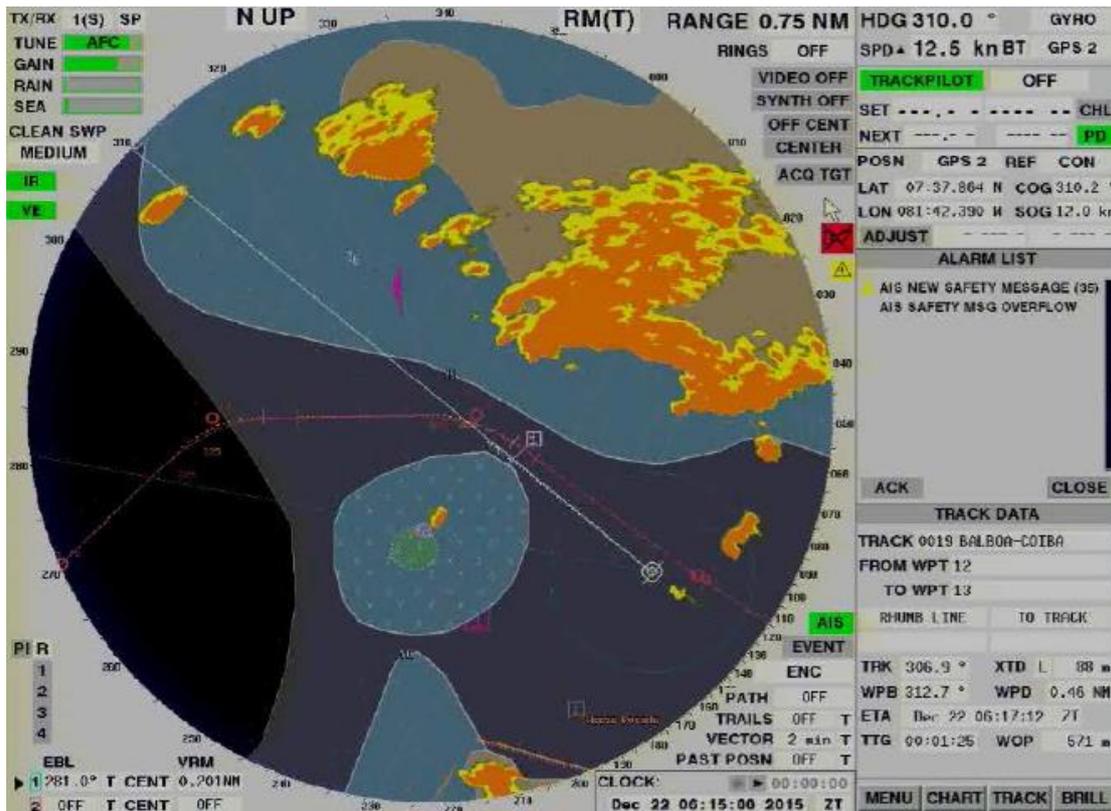


Vessel position at 0613 LT – minor course alteration to port

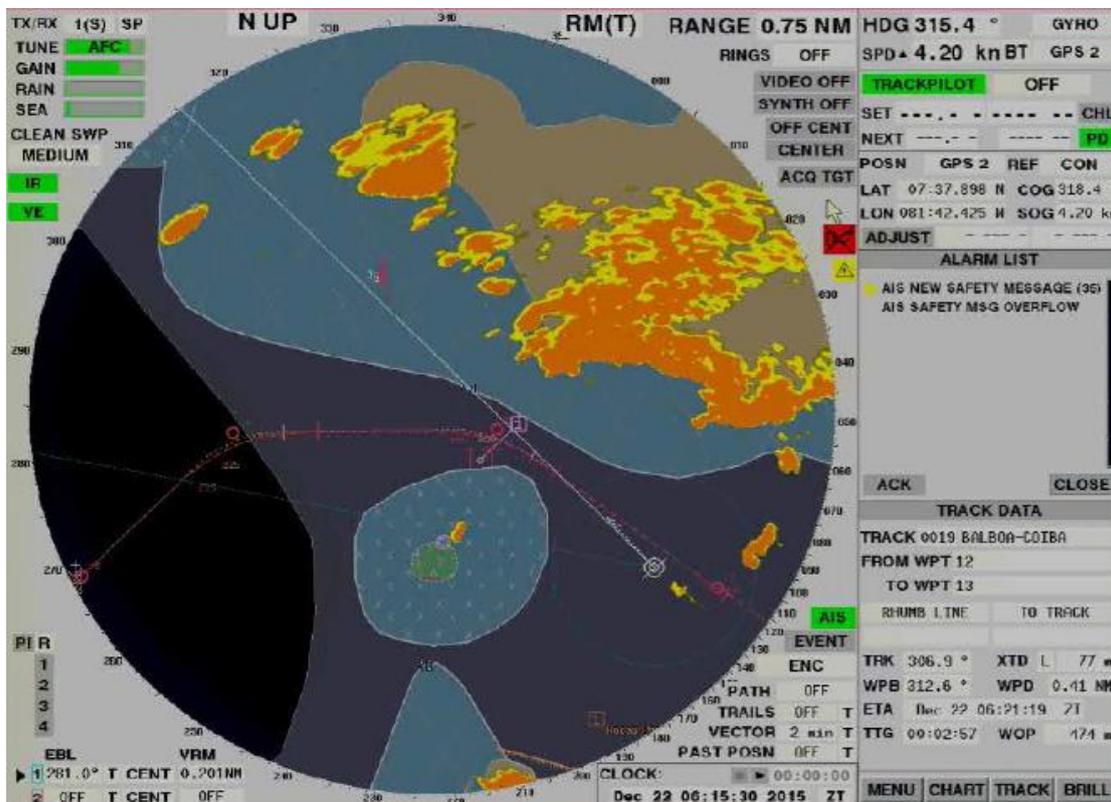


Vessel position at 0614 LMT – approaching the grounding position

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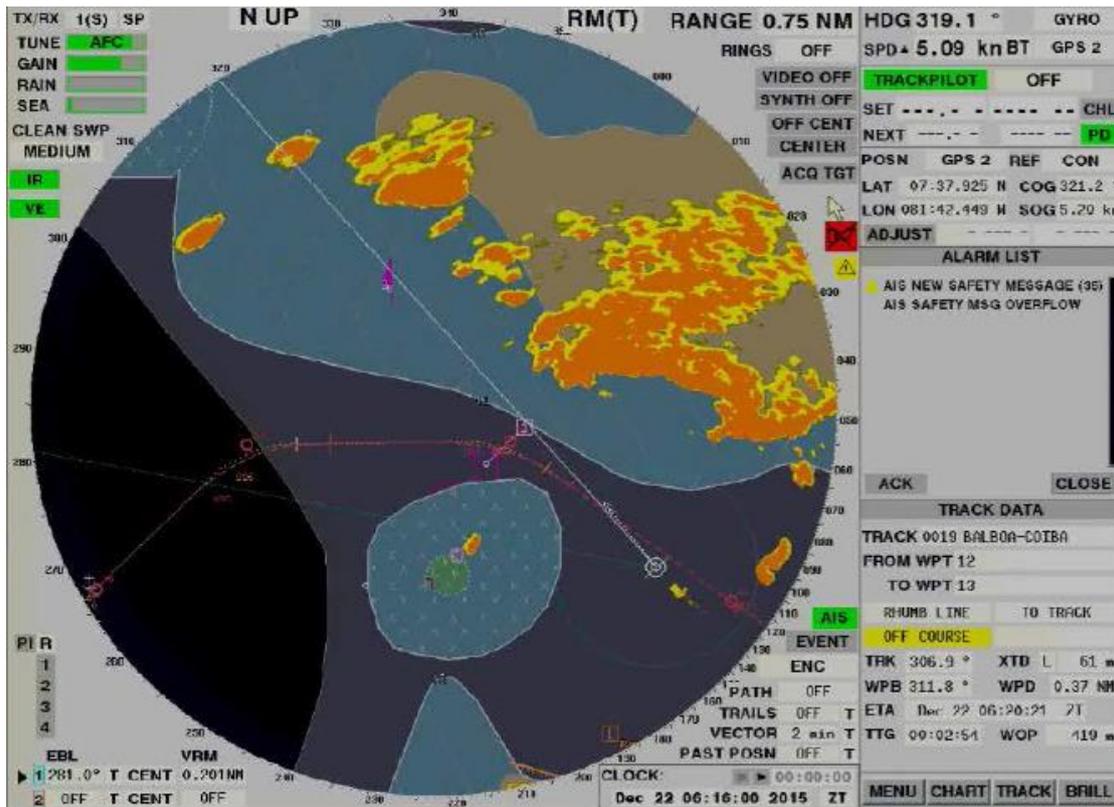


Vessel position at 0615 LT – course adjusted to starboard

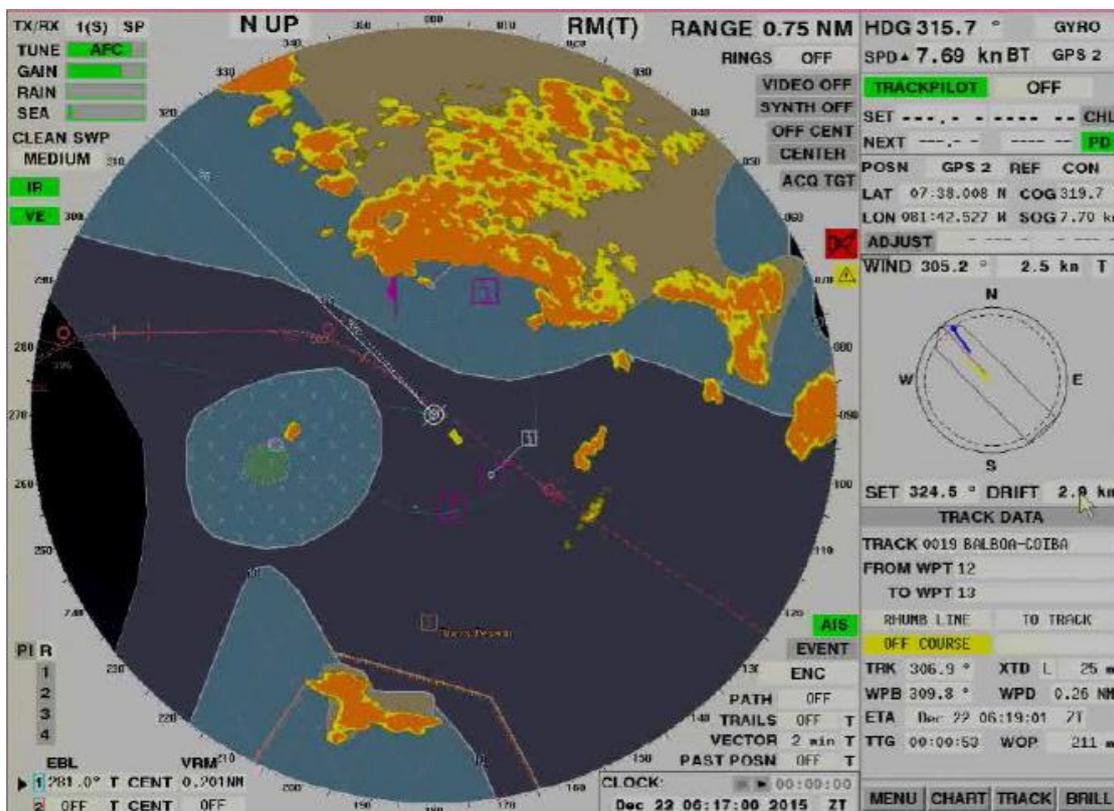


Vessel position at 0615:30 LT - Grounding

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Vessel position at 0616 LT – recovery after grounding



Vessel position at 0617 LT – resumed route to anchorage

APPENDIX III – Loading condition plot for tow Coiba to Balboa (DNV-GL)



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2 LOADING CONDITION PLOT

