ACCIDENT REPORT

Report on the investigation of the grounding

of the cruise ship

Hamburg

in the Sound of Mull, Scotland

11 May 2015

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SERIOUS MARINE CASUALTY REPORT NO 12/2016 JUNE 2016

Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2012 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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CONTENTS

FIGURES

ANNEXES

TABLE

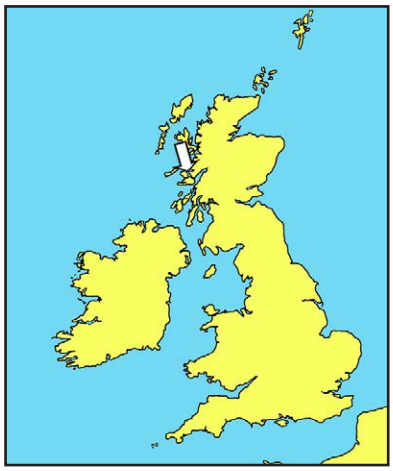
GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AB	-	Able seaman
AIS	-	Automatic Identification System
ARPA	-	Automatic Radar Plotting Aid
BNWAS	-	Bridge Navigational Watch Alarm System
BRM	-	Bridge resource management
BTM	-	Bridge team management
CERS	-	Consolidated European Reporting System
CoC	-	Certificate of competency
COG	-	Course over the ground
COLREGS	-	International Regulations for Preventing Collisions At Sea 1972 (As amended)
CPA	-	Closest point of approach
CRM	-	Crew resource management
DNV GL	-	Det Norske Veritas Germanischer Lloyd
DPA	-	Designated person ashore
ECDIS	-	Electronic Chart Display and Information System
ECP	-	Emergency contingency plan
ERM	-	Engine resource management
ETA	-	Estimated time of arrival
ETO	-	Electro-technical officer
GPS	-	Global Positioning System
gt	-	gross tonnage
HCSA	-	Hamburg Cruise SA
HELM	-	Human Element, Leadership and Management
ISPS	-	International Ship and Port Facility Security Code
kts	-	knots

m	-	metre
MRCC	-	Maritime Rescue Co-ordination Centre
NI	-	Nautical Institute
NLB	-	Northern Lighthouse Board
nm	-	Nautical mile (1nm = 1852 metres)
PA	-	Public announcement
Plantours	-	Plantours & partner GmbH
PMSC	-	Port Marine Safety Code
PSSC	-	Passenger Ship safety certificate
OOW	-	Officer of the watch
RIB	-	Rigid inflatable boat
RINA	-	Registro Italiano Navale
SMS	-	Safety Management System
SOG	-	Speed over the ground
SOLAS	-	International Convention for the Safety of Life at Sea 1974, as amended
STCW	-	International Convention on the Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended
THA	-	Tobermory Harbour Association
UTC	-	Universal co-ordinated time
VDR	-	Voyage data recorder
V.Group	-	V.Ships Group
VHF	-	Very high frequency
V.Ships	-	V.Ships Leisure SAM

TIMES: All times used in this report are UTC+1 unless otherwise stated

SYNOPSIS



At 1328:21 on 11 May 2015, the Bahamas registered passenger vessel *Hamburg* grounded on charted rocks near the New Rocks buoy in the Sound of Mull, Scotland. The accident caused considerable raking damage to the hull and rendered the port propeller, shaft and rudder unserviceable. There were no injuries and the vessel continued on its passage to Tobermory.

The investigation found that, having been unable to enter Tobermory Bay on arrival, the passage plan was not re-evaluated or amended. Combined with poor bridge team management and navigational practices, this resulted in the vessel running into danger and grounding. Despite the loud noise and vibration resulting from the grounding, the bridge team did not initiate the post-grounding checklist, no musters were held and neither the vessel's managers nor any shore authorities were notified of the accident.

Upon arrival at Tobermory Bay, the master made an ill-considered and poorly executed attempt at anchoring just within the bay's entrance instead of the planned position in the south of the bay. This had to be aborted to avoid a second grounding when *Hamburg* dragged its anchor. The passenger vessel was then taken back out to the open sea with unknown damage to its structure, before diverting to Belfast where a dive survey revealed the extent of the damage. The vessel was withdrawn from service for 3 months for repairs.

Following actions taken by V.Ships Group, Tobermory Harbour Association, the Northern Lighthouse Board, the UK Hydrographic Office and the Maritime and Coastguard Agency, no recommendations have been made in this report.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *HAMBURG* AND ACCIDENT

SHIP PARTICULARS	
Vessel's name	*Hamburg*
Flag	Bahamas
Classification society	DNV GL
IMO number	9138329
Type	Passenger vessel
Registered owner	Conti 1 Kreuzfahrt GmbH & Company KG MS Columbus
Bareboat charterers	Hamburg Cruises SA
Technical Manager	V.Ships Leisure SAM, Monaco
Construction	Steel
Year of build	1997
Length overall	144.13m
Registered length	129.21m
Gross tonnage	15067
Draughts	4.7m forward, 5.4m aft
Minimum safe manning	27
Authorised cargo	423 passengers
VOYAGE PARTICULARS	
Port of departure	Dublin, Ireland
Port of arrival	Tobermory, Scotland
Type of voyage	Commercial
Number of passengers	297
Number of crew	164
MARINE CASUALTY INFORMATION	
Date and time	11 May 2015 1328
Type of marine casualty or incident	Serious Marine Casualty
Location of incident	Sound of Mull, Scotland
Place on board	Hull
Injuries/fatalities	None
Damage/environmental impact	Port propeller cropped, port propeller shaft distorted, port rudder stock displaced, hull plating on port side from aft to approximately midships heavily indented and internal bottom structure damaged/no environmental impact
Ship operation	On passage
Voyage segment	Mid-water
External & internal environment	South-west winds occasionally gale force with moderate seas. It was light and visibility was moderate.
Persons on board	461
Maximum number of persons on board	596

Hamburg

1.2 BACKGROUND

On 4 May 2015 at 1942, the Bahamas registered passenger ship *Hamburg* left Bremerhaven, Germany bound for London, England. The cruise ship was scheduled to complete a cruise around England, Ireland and Scotland **(Figure 1)**.

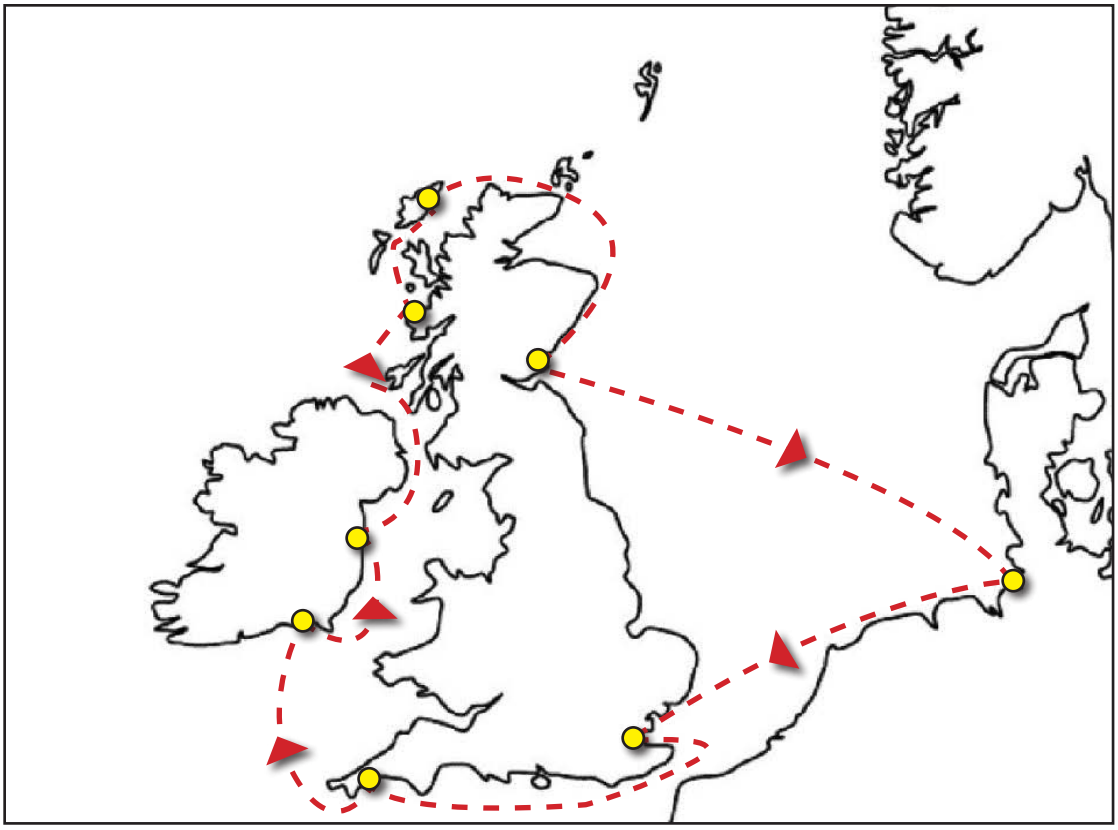


Figure 1: Planned cruise route

At 1328 on 6 May, *Hamburg* was approaching the Sunk pilot station in the Thames estuary, when a fishing net became entangled around its starboard propeller. As a result, the scheduled London port call was cancelled and the cruise ship diverted to Southampton, where divers removed the net. *Hamburg* then continued on its original schedule.

1.3 NARRATIVE

1.3.1 Dublin towards Tobermory

On 10 May at 1600 *Hamburg* departed Dublin, Ireland bound for Tobermory, Scotland. The vessel was scheduled to make its maiden call into Tobermory the following day at 1330.

Hamburg's master was aware that the United Kingdom's Meteorological Office had issued a gale warning for the Irish Sea area. The inclement weather was expected to run from the south-west and worsen after 1200 the following day. The master decided to proceed to Tobermory at the best possible speed so as to be at anchor in the shelter of Tobermory Bay before the weather deteriorated.

At 1734 the master sent an email to the Tobermory Harbour Association (THA) informing them of his decision and *Hamburg*'s amended estimated time of arrival (ETA) of 1200. The email also confirmed that the master would contact the THA 2 hours before arrival so that he could verify the conditions in the anchorage.

The following day, 11 May, the master arrived on the bridge at 0700 and took up his usual position by the port radar **(Figure 2)**. The safety officer, who was the officer of the watch (OOW), was stationed at the starboard radar where he could also see the ECDIS. He was assisted by the cadet and the duty able seaman (AB), who was the lookout. With its stabiliser fins deployed, *Hamburg* had maintained a steady passage in the south-westerly swell and the master was fully rested after a good night's sleep.

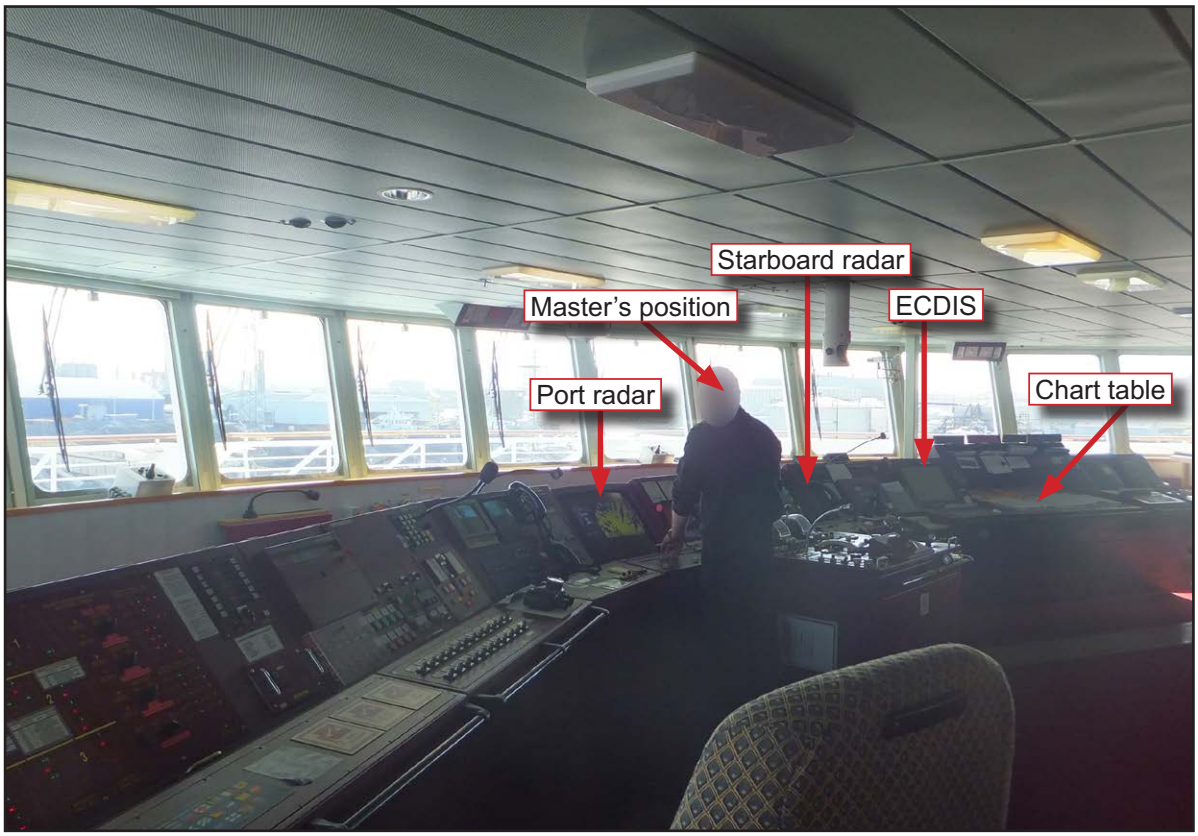


Figure 2: Photograph of *Hamburg*'s bridge

At 0800, the safety officer handed the navigational watch over to the second officer appointed to the 8-12 watch. The safety officer advised him that the vessel's ETA was 1200 and that the master had the conn; he then left the bridge. At 0820, the master gave 2 hours' notice of arrival to the duty engineer in the engine room and the second officer recorded this in the bridge bell book[1].

The master had not received a response from the THA to his email, and shortly after 0840 he began to try to make contact by telephone. At 0858 the THA marine manager answered the telephone and advised the master that there were two smaller cruise ships, *Hebridean Princess* and *Sea Explorer 1*, already anchored in Tobermory Bay and that *Hamburg* would have to wait for these vessels to leave

[1] A bell book is used to record significant information such as pilot boarding, passing of navigational marks and the change of conn. The information is later transcribed into the deck logbook.

before entering. At 0933 the THA deputy marine manager sent an email advising *Hamburg*'s master that *Hebridean Princess* was expected to leave the bay at about 1215.

At 1036 *Hamburg* approached Ardmore Point **(Figure 3)**. The master decided that *Hamburg* would continue towards Tobermory and then drift in the northern part of the Sound of Mull. He advised the OOW of his intentions but did not amend the passage plan.

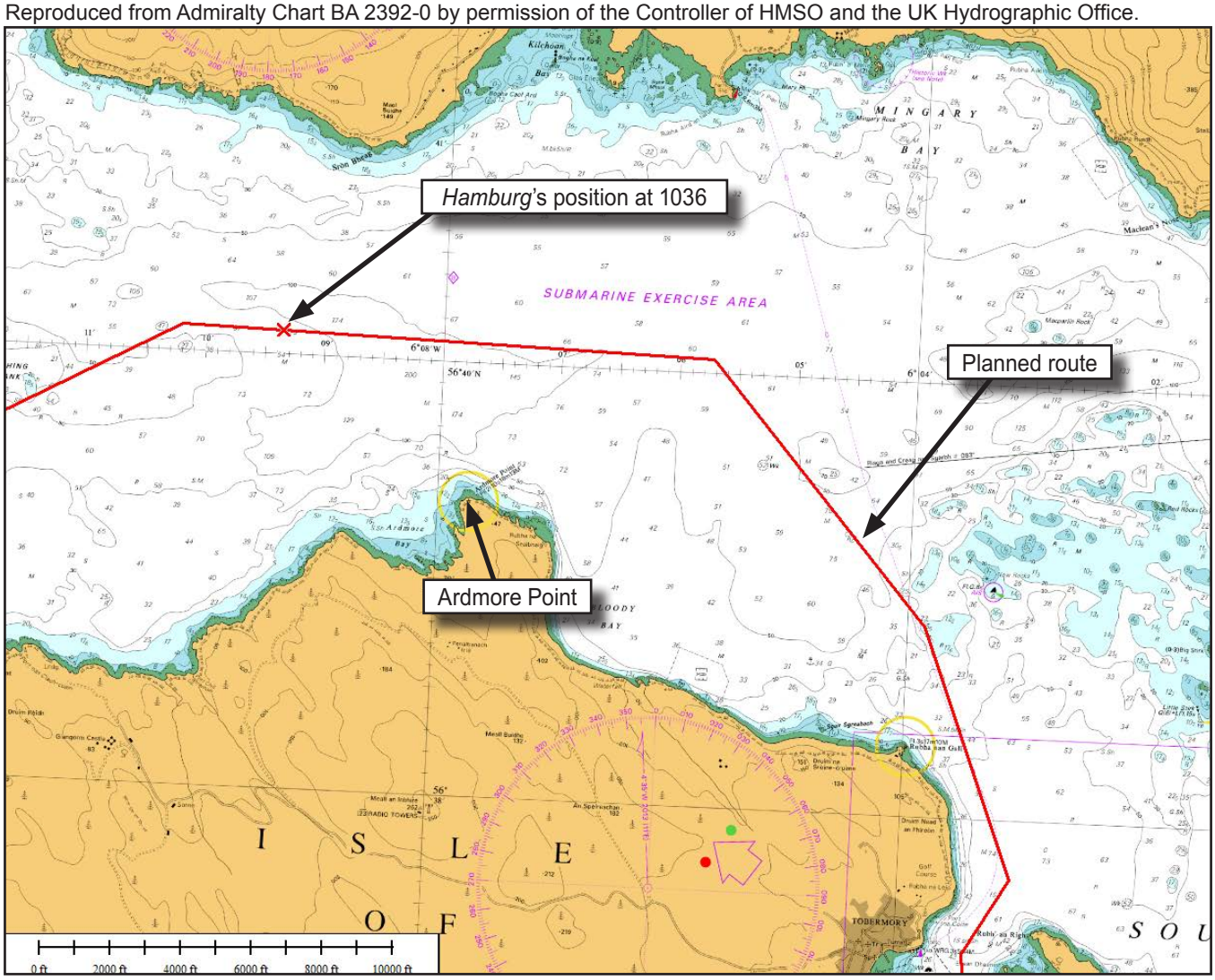


Figure 3: Extract of chart BA 2392 showing *Hamburg*'s position at 1036

As *Hamburg* proceeded into the Sound of Mull, the port and starboard anchors were cleared of their lashings and made ready for use. At 1045 the bridge team put into effect 'condition red'[2] and the engine control room and reception desk were advised accordingly. By 1100 the cruise ship was drifting in an area to the south-west of Mingary Bay, awaiting further information from the THA marine manager. The stabiliser fins were stowed, the engines were on standby[3] and the steering was in manual control.

[2] Condition red indicates that the bridge team and engine control room team must not be disturbed. During this time, telephone calls to the bridge and engine room control are limited to those required for the safe navigation of the ship. Furthermore, manning of these areas is restricted to operational staff, unless specifically authorised by the master.

[3] The condition of standby indicates that the engines are ready for manoeuvring.

1.3.2 Events leading up to the grounding

Shortly after 1200, *Hebridean Princess* departed from Tobermory Bay. The second cruise ship, *Sea Explorer 1*, remained at anchor in the bay.

At the same time, *Hamburg* was on a south-easterly heading and still drifting in the north of the Sound of Mull. There was a moderate swell and the wind was south-westerly force 6 to 7 gusting up to 40kts[4] at times. *Hamburg*'s engine controls were periodically adjusted to maintain the vessel's position, but generally they were set to stop.

Although the second officer appointed to the 12-4 watch had taken over as the OOW and the duty AB had also changed, the master and cadet remained on the bridge. In the course of their non-navigational duties, the staff captain and safety officer had visited the bridge for various reasons throughout the morning. Neither had been appointed navigational duties for the arrival at Tobermory. At 1220 the second officer appointed to the 8-12 watch, in his role as the vessel's navigating officer, also returned to the bridge to prepare the passage plan for *Hamburg*'s next scheduled voyage from Tobermory to Stornoway.

The OOW had set the starboard radar display to the 3nm range scale with relative motion and 12-minute true vectors. He had also set the radar display off-centre to extend the forward range to approximately 5nm. Both the OOW and the cadet were irregularly and infrequently plotting the vessel's position on the paper chart.

At 1245, *Sea Explorer I*'s OOW called *Hamburg* via very high frequency (VHF) radio channel 16. The officer informed *Hamburg*'s master that *Sea Explorer I* would depart Tobermory Bay no sooner than 1300. *Hamburg*'s master asked *Sea Explorer I*'s OOW if there was a swell in Tobermory Bay, and received the reply that there was not.

The master then instructed the OOW to monitor *Sea Explorer I* on the radar so that *Hamburg* could proceed as soon as the smaller cruise ship cleared Tobermory Bay. Accordingly, at 1248:57 the OOW informed the master that *Sea Explorer I* was raising its anchor. *Hamburg*'s heading was 165° with a course over the ground (COG) of 105° and a speed over the ground (SOG) of 1.11kts.

Hamburg's master ordered the AB to take the wheel and set the rudder to hard-to-starboard. The cruise ship began a slow swing to starboard. At 1310, the anchor party was called to station in readiness for anchoring in the Bay. The master then began to adjust the engine controls, and at 1312 *Hamburg* was heading 200.5° with a SOG of 1.29kts. At the same time, *Sea Explorer I* was underway in the bay.

By 1318 *Sea Explorer I* had cleared Tobermory Bay and was on a northerly heading through the Sound of Mull. *Hamburg* was on a heading of 200.6° with a COG of 182.4° and a SOG of 3.41kts **(Figure 4)**. *Hamburg*'s master then ordered the AB to steer 195°. By 1320 the master had set the engine control to 'half ahead' and *Hamburg* was steady on 195° with a COG of 181° and a SOG of 3.72kts.

[4] kts – knots, a measure of speed = nautical miles per hour

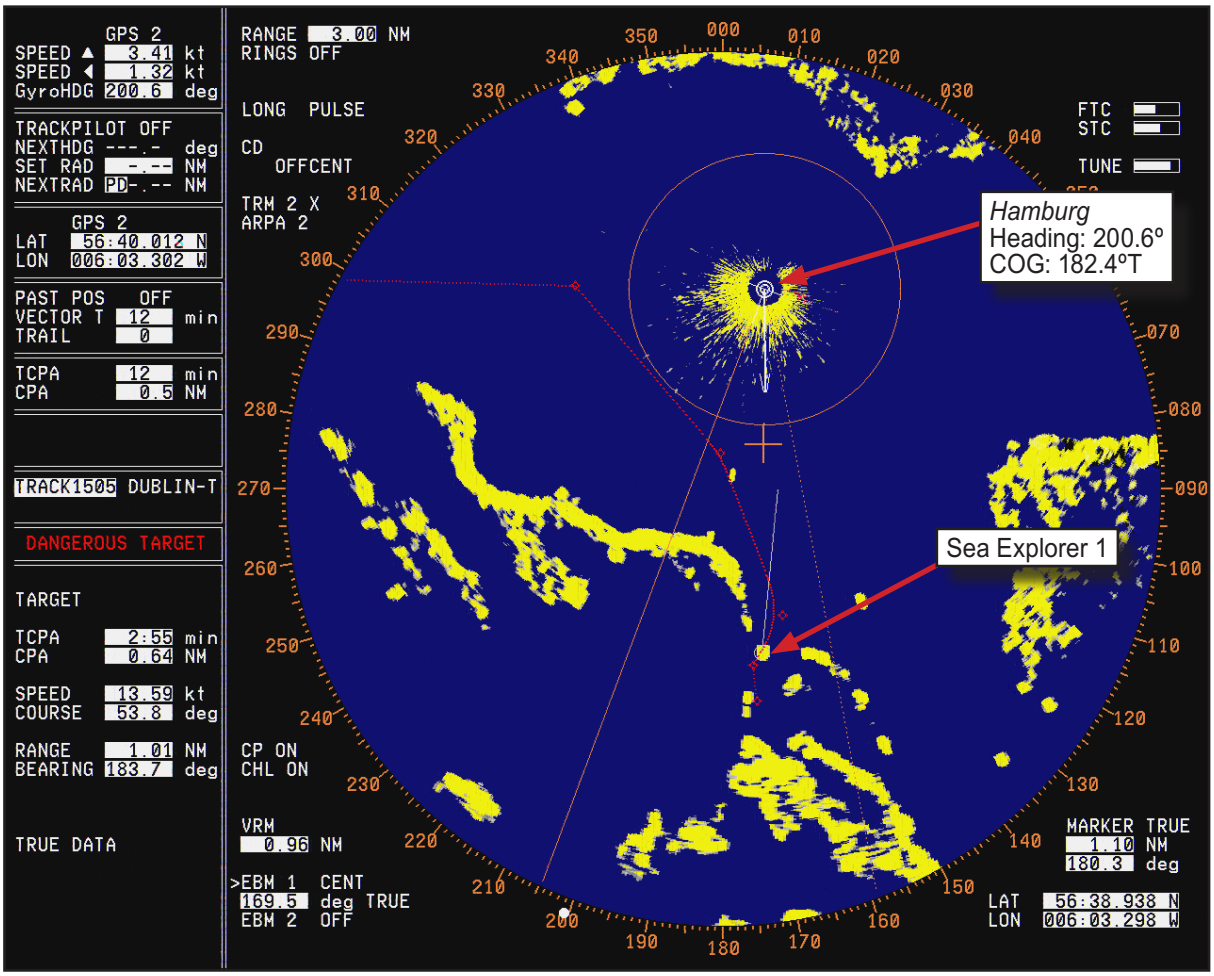


Figure 4: Radar display showing the positions of *Hamburg* and *Sea Explorer 1* at 1318

At 1321 both the OOW and the cadet plotted *Hamburg*'s position on the chart **(Figure 5)**. The cadet saw that his plotted position was some distance away from the OOW's position but closer to the New Rocks shoal. Without consulting the OOW, the cadet assumed his own position was incorrect and removed it from the chart using an eraser. At 1322:55 the OOW reduced the starboard radar display to the 1.5nm setting **(Figure 6)**.

At 1323:30 the News Rocks buoy was on *Hamburg*'s port bow. The cruise ship was on a heading of 193° and had a closest point of approach (CPA) with *Sea Explorer I* of 0.03nm with a time to CPA of approximately 7 minutes. *Sea Explorer I*'s OOW again called *Hamburg* on the VHF radio and agreed with the OOW that the vessels would pass green-to-green[5].

[5] Green-to-green refers to the side on which two ships pass. In this case, each vessel passes along the starboard side of the other. A red-to-red agreement would lead to the vessels passing along the port side of each other.

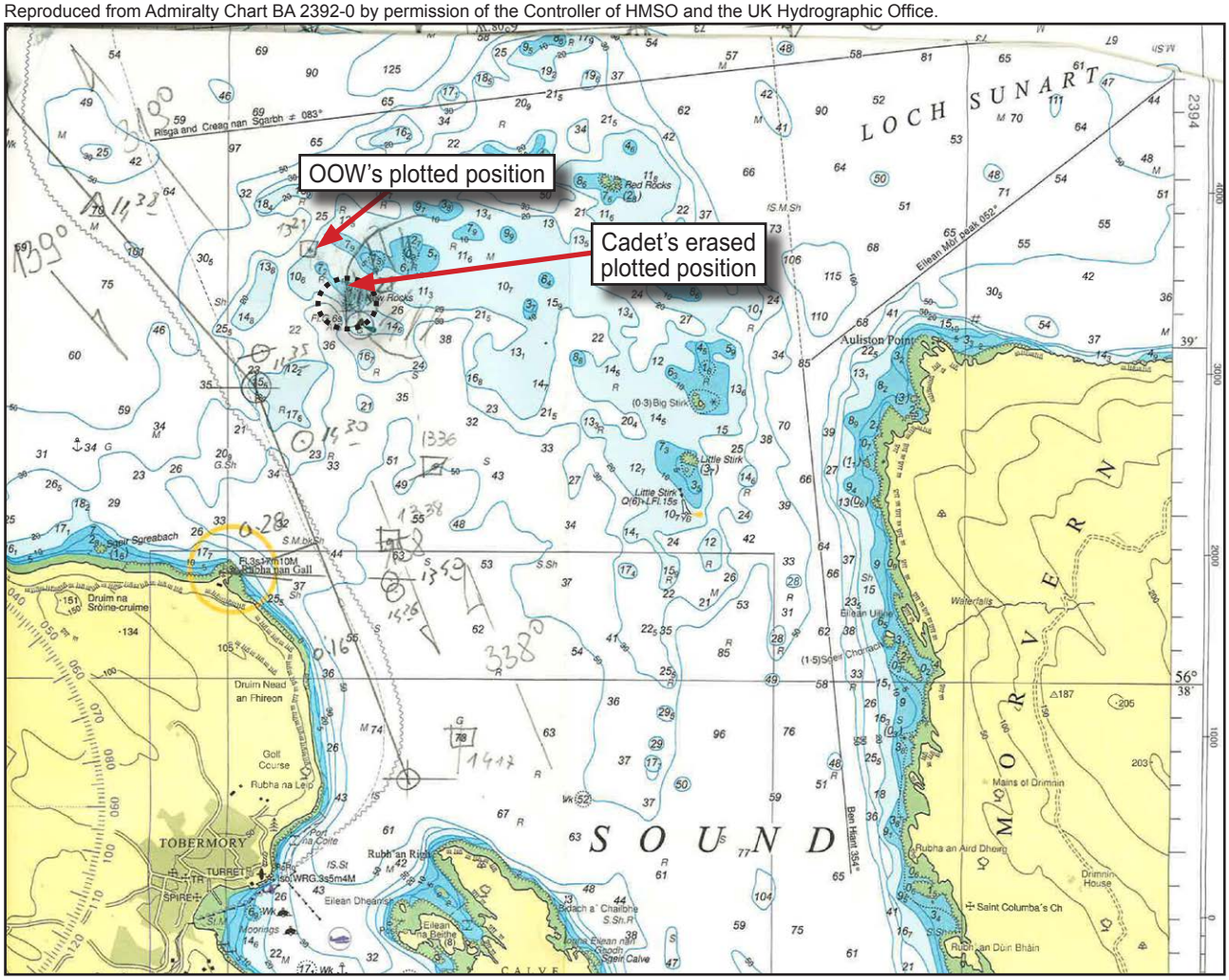


Figure 5: Extract of chart BA 2392 showing plotted position at 1321

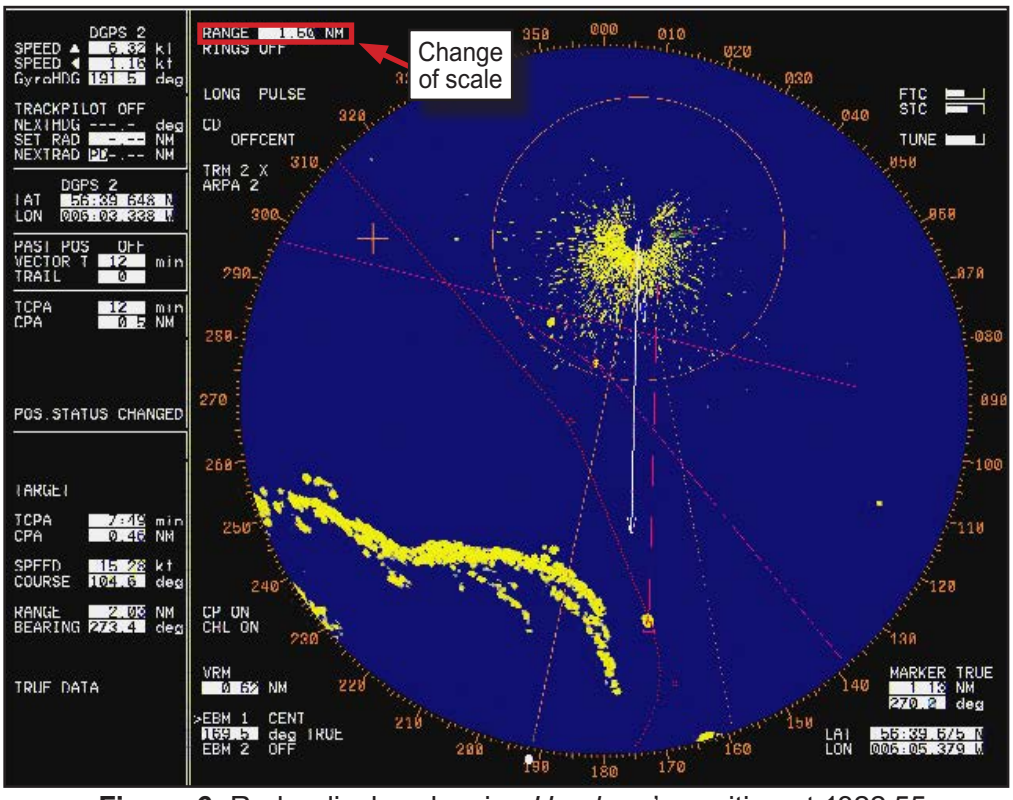


Figure 6: Radar display showing *Hamburg*'s position at 1322:55

Shortly afterwards, at 1324, motor yacht *Nahlin* was on a north-westerly course and approaching the New Rocks buoy from the south-east. At the same time the bulk carrier *Yeoman Bridge* was approaching the New Rocks buoy from the north-west **(Figure 7)**. Simultaneously, officers on board both *Nahlin* and *Yeoman Bridge* called *Hamburg* on VHF radio channel 16 and *Hamburg*'s OOW replied. A transcript of the resulting VHF conversation is at **Table 1** below.

Time	VHF Channel	Caller	Dialogue
13:23:40	16	*Sea Explorer 1*	*Cruise vessel Hamburg this is Sea Explorer.*
13:23:45	16	*Hamburg*	*Sea Explorer, Hamburg* zero six.
	16	*Sea Explorer 1*	*Zero six*
13:23:50	16	*Yeoman Bridge*	*Motor vessel Hamburg, Yeoman Bridge.*
	06	*Hamburg*	*Sea Explorer. This is Hamburg, go ahead*
13:23:55	06	*Sea Explorer 1*	*Green to green.*
	06	*Hamburg*	*Okay, green to green.*
	06	*Sea Explorer 1*	*Back to sixteen.*
13:24:05	16	*Nahlin*	*Cruise ship Hamburg, this is Nahlin sixteen.*
	16	*Yeoman Bridge*	*…Ah…Yeoman Bridge zero six.*
13:24:10	16	*Hamburg*	*Who calling passenger vessel Hamburg?*
	16	*Yeoman Bridge*	*.. bulk carrier ….* [Unintelligible].
	16	*Nahlin*	*.. sixteen. Can we go zero six?*
	16	*Yeoman Bridge*	*Yeoman Bridge on your starboard bow over*
13:24:20	16	*Hamburg*	*Who speak with passenger vessel Hamburg zero six please. Zero six.*
13:24:25	16	*Yeoman Bridge*	*Zero six.*
	16	*Nahlin*	*Zero six.*
13:24:30	06	*Hamburg*	*So bulk carrier passenger vessel Hamburg, go ahead.*
		Yeoman Bridge	[Unintelligible] *on your starboard side. I suggest that you slow down and let me through ahead of you.*
13:24:35	06	*Hamburg*	*Okay, okay. You go down in speed, is correct?*
13:24:40	06	*Yeoman Bridge*	*Reduce. Reduce your speed. I proceed full speed ahead of your ship* [Unintelligible] *starboard side.*
13:24:50	06	*Nahlin*	*.. I can't go behind you because of the shallow water.*
13:25:00	06	*Hamburg*	*Okay we reduce speed. Okay.*
13:25:05	06	*Nahlin*	*Okay I'm going to go in front of you and I will pick up speed.*

Table 1: Transcript of the VHF dialogue between the vessels

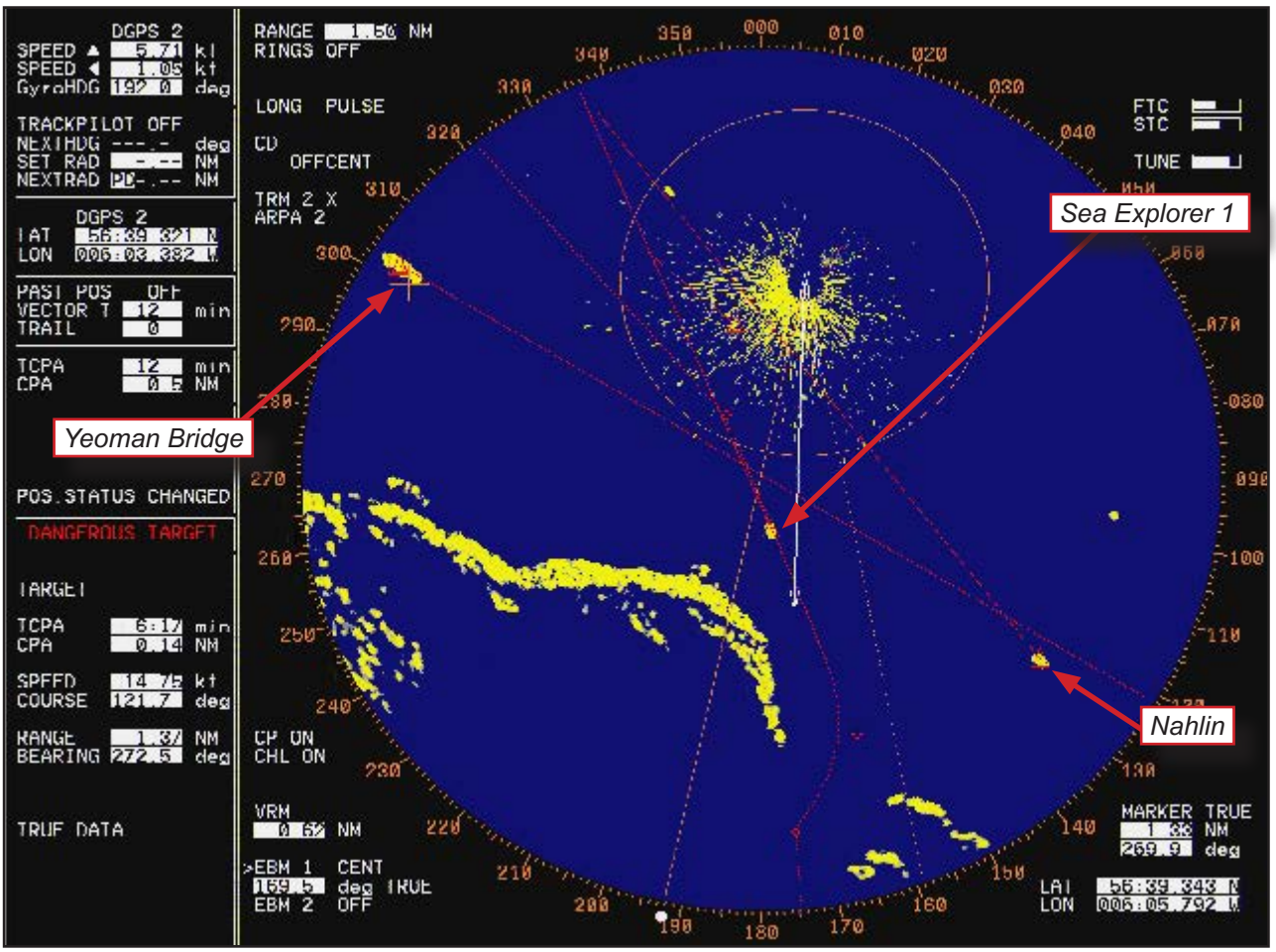


Figure 7: Radar display showing positions of *Hamburg*, *Sea Explorer 1*, *Nahlin* and Y*eoman Bridge*

1.3.3 The grounding

After the VHF conversation, *Hamburg* continued on a heading of 195º with the New Rocks shoal on its port bow. The master reduced the vessel's speed to allow the other three vessels to pass ahead. **Table 2** shows *Hamburg*'s COG, heading and SOG between 1325 and 1328 while the vessel's track and relative headings are shown in **Figure 8**.

Time	Latitude	Longitude	Heading	COG	Set	SOG	Wind Direction	Wind Speed
1325:00	56 39.44	006 03.37	195.1	186	9.1	6.86	241.6	31.5
1325:30	56 39.36	006 03.38	195.1	186.4	8.7	6.29	240.6	37.5
1326:00	56 39.31	006 03.38	191.6	178.6	13	5.71	247.9	33.2
1326:30	56 39.27	006 03.38	191.3	179.6	11.7	5.21	229.2	37.8
1327:00	56 39.22	006 03.37	189.1	174.9	14.2	4.68	237.9	37.2
1327:30	56 39.18	006 03.36	189.1	172.3	16.8	4.68	228	37.8
1328:00	56 39.13	006 03.36	189.1	179.7	9.4	5.69	246.8	30.2

Table 2: *Hamburg*'s COG, heading and SOG between 1325 and 1328

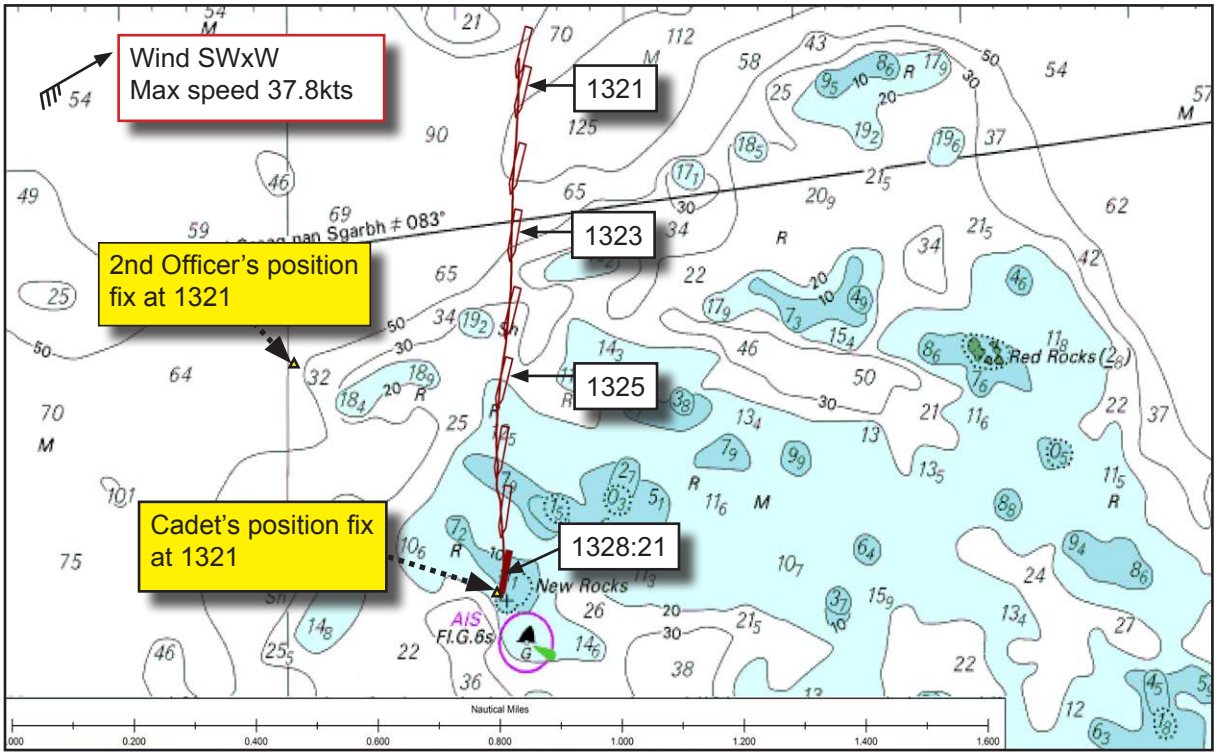


Figure 8: Extract of chart BA 2392 showing *Hamburg*'s track and relative headings between 1321 and 1328

The expected CPAs between the three vessels and *Hamburg* remained very close at less than 0.2nm. The master was preoccupied with the traffic situation but he was also aware that *Hamburg* was approaching the New Rocks buoy. At 1328, the safety officer arrived on the bridge again and the master asked him to visually check the vessel's position off the New Rocks buoy. The safety officer went onto the port bridge wing to take a bearing of the buoy's position and, at 1328:21, as he returned to the bridge, *Hamburg*'s port quarter grounded to the north-east of the New Rocks buoy with a SOG of 6.37kts.

1.3.4 Actions immediately after the grounding

Hamburg shook violently as it grounded, but it did not become fast on the rocky shoal. The master immediately ordered the helm hard to port to swing the vessel's stern clear of the shoal; he then ordered a southerly course again. *Hamburg*'s port and starboard main engines automatically declutched and the port main engine stopped. A switchboard preferential trip also activated, resulting in the temporary loss of electrical power to some navigational systems. The emergency generator started automatically, restoring electrical power to many systems, including the navigational equipment. Multiple alarms sounded both on the bridge and in the engine room control room as various equipment shut down, either automatically or as a result of power loss. The bridge team restarted the radars and the ECDIS as the master again ordered the helm hard-to-port in an attempt to regain safe water. The general alarm and crew alert were not sounded.

Following instructions from the master, the staff captain and safety officer conducted a visual inspection of the internal spaces including the steering gear, laundries, and bow thruster compartments to determine if there was any water ingress. Although the master issued instructions for spaces to be checked, the Grounding Incident and Communications checklists **(Annex A)** were not used.

The chief engineer, who was in the engine room, used the internal sound-powered telephone to inform the master that the port main engine had shut down. He also stated that there appeared to be a problem with the port propeller and that it should not be used. The master then confirmed that the vessel would proceed into Tobermory on one engine and instructed the chief engineer to monitor the bottom tank soundings. The checks on the tanks and spaces indicated that there was no water ingress.

At 1332, on the master's order, the cruise director made a public address (PA) announcement, in German, to the passengers informing them that all was well and that the cruise would continue.

1.3.5 Arrival in Tobermory

At 1345:37 *Hamburg* was at the entrance to Tobermory Bay **(Figure 9)** heading 209.5° with a SOG of 4.5kts. The wind continued from a south-westerly direction but its strength had decreased slightly in the sheltered bay. The master saw that there were many small boats on moorings in the bay and, unwilling to continue into the congested area, he decided to anchor in the bay entrance rather than in the planned position at the THA designated anchorage to the south-west. The master continued to reduce *Hamburg*'s speed in preparation for anchoring.

The THA deputy marine manager, who was in a RIB situated a short distance off *Hamburg*'s starboard bow, saw that the cruise ship had stopped. At 1347 she attempted to hail *Hamburg* on VHF channel 16, but received no response.

By 1351:29 *Hamburg's* master had ordered the starboard anchor to be let go to 5 shackles[6] on deck[7]. The cruise ship was on a heading of 223.9° and the charted depth of water was 61m. As the anchor was deployed, *Hamburg* was slowly moved astern using its engine and assisted by the wind. The cruise ship travelled in an easterly direction across the bay entrance and, at 1353:40, the OOW advised the master that there was a shallow patch of water on the vessel's port side **(Figure 9)**.

At 1354, the THA deputy marine manager again hailed *Hamburg* on the VHF radio. When the OOW replied, she asked if the cruise ship was going to proceed further into the bay. The OOW told her that *Hamburg* would not. The deputy marine manager then stated that there was more shelter further inside Tobermory Bay. *Hamburg*'s bridge team did not respond to this message and there was no further communication between the cruise ship and the THA.

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[6] 1 shackle = 27.43m

[7] The number of shackles of anchor cable deployed is either measured from the vessel's deck (*X shackles on deck*) or from the waterline (*X shackles in the water*).

By 1401, *Hamburg* had 5 shackles of anchor cable deployed. The OOW set the variable range marker on the starboard radar display to 0.15nm to monitor the vessel's position and, at 1405, he informed the master that *Hamburg* was moving astern towards Calve Island[8] at a SOG of approximately 0.5kt. The master decided to abort the anchoring operation and ordered the recovery of the anchor. The master, intending to move *Hamburg* backwards out of the bay before turning the vessel to the north, increased its astern power and turned the vessel to clear the island. The cruise ship moved astern out of Tobermory as its anchor was being recovered, passing less than 0.1nm off Calve Island **(Figure 10)**. The anchor was reported as home[9] at 1422.

1.3.6 Notification

At 1424, *Hamburg* was on a north-westerly heading to transit the Sound of Mull. Immediately upon departure from Tobermory Bay, the master attempted to contact V.Ships' Leisure SAM, Monaco (V.Ships) designated person ashore (DPA[10]), to notify him of the grounding. At 1428, having spoken to V.Ships' office, but having failed to reach either the DPA or the back-up contact (V.Ships' Fleet Manager), the master telephoned the bareboat charterer's technical consultant at Hamburg Cruise SA (HCSA). During this telephone call it was agreed that the vessel would proceed to Belfast, Northern Ireland for an underwater inspection. V.Ships was informed of the accident by HCSA's technical consultant at 1505. Neither the master, HCSA nor V.Ships reported the incident to the UK coastguard, the THA or the UK Marine Accident Investigation Branch (MAIB).

At 1820, the Dublin Maritime Rescue Co-ordination Centre (MRCC) was alerted to the accident when the concerned mother of a crew member telephoned them. She had been having a telephone conversation with the crew member about the accident when mobile phone contact was suddenly lost. Fearing the worst, she contacted the coastguard. Dublin MRCC, which was aware of *Hamburg*'s new destination port, warned Belfast MRCC that the passenger vessel might have been involved in a grounding. Belfast MRCC then contacted *Hamburg* and, in conversation with the master, established that the vessel had grounded earlier in the day. The master also confirmed that *Hamburg* was proceeding using one of its two propeller shafts since one had been rendered unserviceable by the grounding, but stated that he was content with the situation and was not in need of assistance.

In the worsening weather conditions overnight and with only one working propeller shaft, *Hamburg* struggled to make progress to Belfast and the master chose to heave-to[11] in the Irish Sea and wait for the gale force winds to abate before continuing on passage for Belfast.

---

[8] *Hamburg*'s astern movement was due to a combination of its engines going astern and the effect of the prevailing wind.

[9] Anchor home is the term used to indicate that the anchor has been recovered and stowed.

[10] Designated person ashore. The responsibility and authority of the designated person should include monitoring the safety and pollution-prevention aspects of the operation of each ship and ensuring that adequate resources and shore-based support are applied, as required.

[11] Heave-to – when a vessel is head into the wind and swell with its engines running but her position does not change.

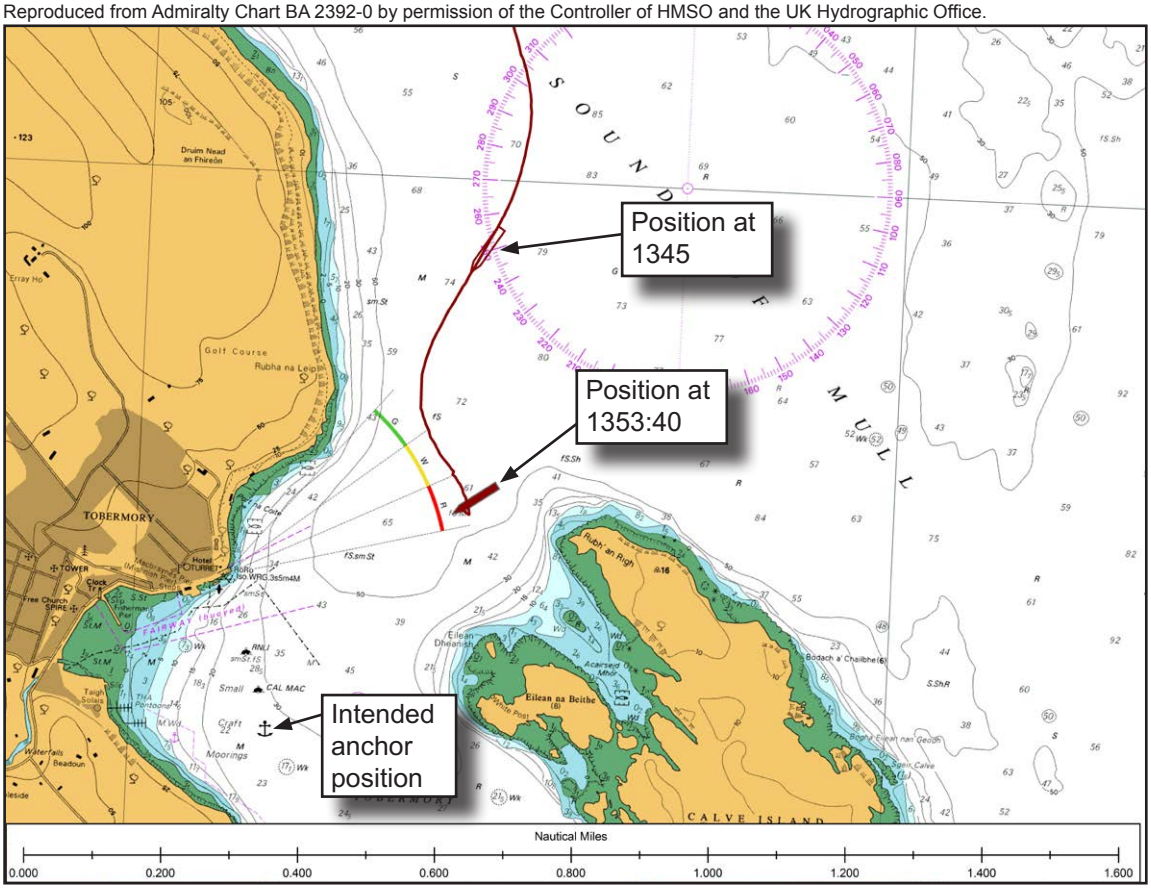

Figure 9: Extract of chart BA 2392 showing *Hamburg*'s position and track between 1345 and 1353:40

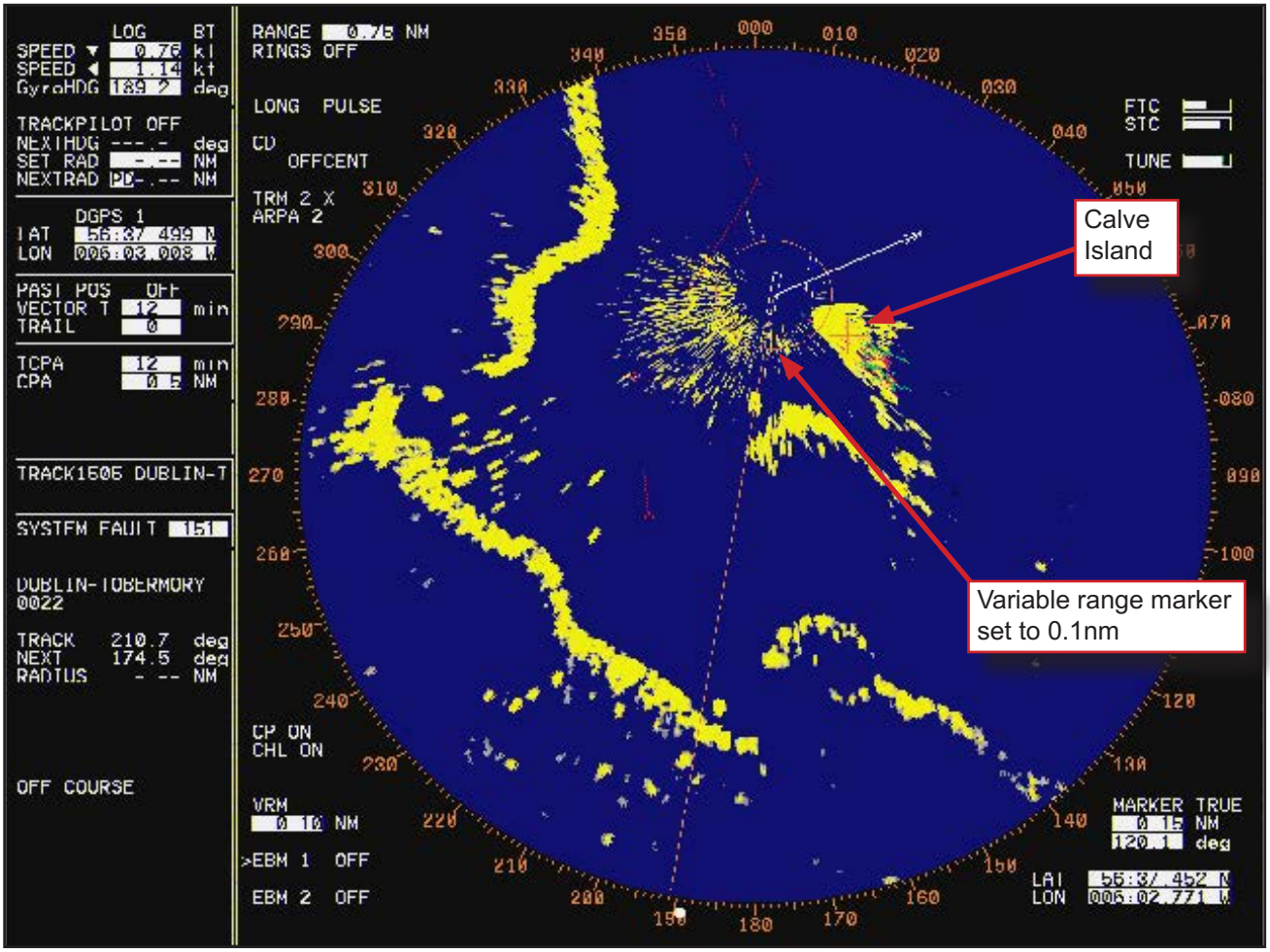

Figure 10: Radar display showing *Hamburg* passing within 1 cable of Calve Island

1.4 DAMAGE

At 1824 on 12 May *Hamburg* arrived at Belfast and an underwater inspection was completed. This indicated that the damage attributed to the grounding appeared to be substantial but, due to the poor water visibility, the exact extent of damage could not be ascertained. The surveyor from the vessel's classification society, Det Norske Veritas Germanischer Lloyd (DNV GL), and representatives from V.Ships and HCSA agreed that the cruise ship needed to be dry docked in Belfast. Later that day, the cruise ship entered the dry dock, where significant damage to the port propeller, port propeller shaft, port propulsion auxiliary equipment, port rudder/rudder stock and hull were identified **(Figure 11)**.

On 13 May, the DNV GL surveyor directed that *Hamburg* should remain in Belfast for temporary repairs. Consequently, the remainder of the cruise was cancelled and passengers were repatriated from the vessel that day. *Hamburg* remained in dry dock at Belfast until 30 May, when the cruise ship sailed under a single voyage safety certificate to Bremerhaven for permanent repairs. *Hamburg* returned to service on 10 August 2015.

1.5 ENVIRONMENTAL DATA

1.5.1 Weather

Wind: South-westerly, force 7-9

Sea state: Moderate

Visibility: Moderate (2-5nm)

Sunrise: 0426

Predicted high water at Tobermory: 1057 3.5m

Predicted low water at Tobermory: 1723 1.6m

1.5.2 Weather forecast

The weather forecast transmitted on Navtex[12] by the UK Meteorological Office on 11 May provided the following information:

Gale warnings: Irish Sea, Rockall, Malin, Hebrides, Bailey, Fair Isle, South East Iceland.

Irish Sea: South or south-west 5 to 7, occasional gale 8. Moderate or rough seas. Showers but good visibility.

Malin and the Hebrides: Southerly 6 to gale 8, veering south-west 7 to severe gale 9. Rough or very rough seas, becoming very rough or high. Squally showers. Good visibility but occasionally poor.

[12] Navtex (Navigational Telex) is an international automated medium frequency direct-printing service for delivery of navigational and meteorological warnings and forecasts, as well as urgent maritime safety information to ships.

Figure 11: Photographs of hull and propeller damage

1.6 VESSEL

1.6.1 Ownership and management

In 1997, the passenger vessel *C. Columbus* was built for Conti Holding GmbH & Company KG. The vessel traded under this name until 18 May 2012 when Hamburg Cruises SA undertook a bareboat charter of the vessel and its name was changed to *Hamburg*.

At this time, technical management for the vessel was passed to V.Ships and the day-to-day logistics and scheduling of the vessel to HCSA. Plantours & partner GmbH, Bremen (Plantours) were responsible for the marketing and itinerary planning.

V.Ships was part of the V.Ships Group (V.Group), which managed over 600 ships worldwide. The V.Ships leisure fleet comprised 25 passenger, high speed and ro-ro vessels.

1.6.2 General

Hamburg was registered with the Bahamas Maritime Authority. The vessel's Safety Management Certificate, confirming that its safety management system complied with the ISM Code, was issued by Registro Italiano Navale (RINA) on 10 December 2012 and was valid until 8 November 2017. *Hamburg*'s Passenger Ship Safety Certificate (PSSC), which confirmed the vessel's compliance with SOLAS, was issued by DNV GL on 12 June 2014 and was valid until 30 June 2015. A renewal survey was completed by DNV GL on 17 April 2015 and the PSSC was extended until 29 November 2015.

1.6.3 Navigation equipment

*Hamburg'*s primary means of navigation was paper charts. The vessel was fitted with the following navigational equipment:

- Two Atlas 9800 ARPA radars, the port display was configured to the S-band (10cm) radar and the starboard display was configured to the X-band (3cm). The radars were interfaced with the AIS and capable of displaying AIS or ARPA data.
- An Atlas 9502/9205T echo-sounder. This was operating at the time of the accident with safety depth alarms set to 2m and 3m under the keel. The buzzer was suppressed.
- A SAM Electronics Chartpilot ECDIS.
- A Trimble NT 200 DGPS[13].
- A SAAB R4 GPS.
- A DEBEG 2900 Navtex receiver.
- A DEBEG 3400 UAIS AIS receiver.
- An integrated bridge navigational watch alarm system (BNWAS), which was switched off at the time of the accident.

[13] Differential Global Positioning System

1.6.4 ECDIS on board *Hamburg*

The Chartpilot ECDIS was intended for use only as an aid to navigation, and had not therefore received full ECDIS approval from the Bahamas Maritime Authority. There were two displays for the ECDIS: one sited on the forward starboard side of the bridge, adjacent to the forward chart table **(Figure 2)**, and the second located at the aft chart table. The second display was used for passage planning.

The ECDIS was also the approved display for the DEBEG 3400 UAIS data **(Figure 12)**.

Figure 12: *Hamburg*'s ECDIS display showing AIS information

The Chartpilot ECDIS could be set up to warn operators of the risk of grounding, using safety depth and safety contour functions. To set valid safety depth and safety contour limits, operators were required to select values appropriate to the local navigational conditions, taking into account the ship's draught, the effect of squat and, where necessary, height of tide. Additionally, operators could set the deep and shallow contour values. However, these only controlled the colour of the shading on the chart display. *Hamburg*'s bridge team used the same settings for these parameters on the Chartpilot ECDIS at all times. These were:

- Safety depth – 8m
- Safety contour – 8m
- Deep contour – 10m
- Shallow contour – 5m

The Chartpilot ECDIS was capable of providing both visual and audio warnings when pre-set limits such as safety depth or distance off track had been reached. *Hamburg*'s ECDIS alarm buzzer had been switched off in the system's settings. Other tools provided by the Chartpilot ECDIS were the 'look ahead' and 'predicted movement' features. Neither of these features were being used by the bridge team on *Hamburg* at the time of the accident.

1.7 SAFETY MANAGEMENT SYSTEM

The V.Ships Safety Management System (SMS) was divided into 14 Fleet Operational Manuals. Fleet Operations Manual volume 1 provided instructions and guidance for shipboard operations. The implementation of the SMS on board *Hamburg* was the responsibility of the master, under the management of V.Ships' DPA.

1.7.1 Crew training and drills

The SMS included a schedule of 12 specific drills, which included grounding/stranding, to be conducted at least once a year. At the time of the accident, the drills that had been conducted in 2015 were: pipe leakage, tank overflow, and hull breach. Damage control drills, where the ship's watertight doors were closed, were completed on a weekly basis.

1.7.2 Emergency procedures

The SMS included a ship-specific emergency contingency plan (ECP). *Hamburg*'s ECP contained guidance and an incident checklist that was to be used by the bridge and engine room teams in the event of grounding or stranding. The grounding incident checklist that was completed after *Hamburg* had departed Tobermory is at **Annex A**. Line 19, '*Notify Port State Authority'*, had been ticked and the comment '*Tobermory Harbour Master'* had been added. No such report was made or attempted.

The SMS also specified that:

> '*The Master must notify the Company (The DPA should be the first point of contact, if not available then the Fleet Manager as a Back-up DPA and if not available either – any of the rest of the Emergency Company Contacts as listed in the ECP/SOPEP) as soon as possible, by telephone, of any Hazardous Occurrence of a serious nature and/or when media interest is anticipated.'*

1.7.3 Passage planning

Section 33 of the SMS provided guidance on coastal navigation, specifically:

> '*33.2.6 The passage plan in coastal navigation must show:*
>
> *.1 All areas where the ship cannot go (indicated by highlighting or cross hatching, taking care not to obliterate information).*
>
> *.2 Courses to steer with headings, leading lines, parallel index distances, distances between waypoints and important navigational marks.*

.3 Wheel over positions, turn radio and/or centres

.4 Available cross track margins

.5 Bearing and radar range measurement check lines.

.6 Permanent and temporary hazards to navigation such as wrecks, power cables and shallow water depths which may cause interaction, and other obstructions

.7 Any area of concern with regards to environmental protection measures.' [sic]

Also contained in Section 33 was a requirement for radar to be used for parallel indexing.

1.8 CREW

1.8.1 General

Hamburg's 164 crew were made up of 22 different nationalities, predominantly Filipino, Indonesian and Ukrainian. The deck and engine crew were employed by the technical managers, V.Ships, through the V.Group manning agencies based in Monaco, the Philippines, Ukraine, India, Poland, Bulgaria and Romania. The remaining 'hotel services' crew were employed through HCSA.

All the deck and engine officers' International Convention on the Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended (STCW) certificates of competencies had been endorsed by the Bahamas Maritime Authority. The master and deck officers had completed generic ECDIS training and, with the exception of the cadet, type-specific ECDIS training for the SAM Chartpilot ECDIS system on board *Hamburg*.

The deck crew comprised:

- The master
- Staff captain
- Security officer
- Three deck officers
- Cadet
- Eleven ratings
- Carpenter
- Doctor
- Nurse

1.8.2 The master

The master was a 57 year old Portuguese national. This was his third contract as the master of *Hamburg* and he had been on board for just over 1 month. The master had been at sea for more than 35 years and had held a master's certificate of competency (CoC) for over 20 years. He held an unlimited master's STCW II/2 CoC issued in Portugal. He had previously served on board container and general cargo vessels, but had moved into the passenger ship sector in 1995. The master had attended a Bridge Resource Management (BRM) course in October 2010 in Portugal.

Hamburg's master had overall responsibility for the safety of the ship, passengers and crew. He worked primarily throughout the day but would also be present on the bridge whenever required.

1.8.3 The deck officers

The staff captain was a 47-year old Italian national. He had previously served on tankers and ro-ro vessels before moving into the passenger ship sector, where he had progressed to the rank of master. He had served as staff captain on board *Hamburg* since 2012 and had last joined the passenger vessel on 7 March 2015. The staff captain held an unlimited master's STCW II/2 CoC issued in Italy. When at sea, the staff captain held the 1600-2000 navigational watch.

The safety officer was a 31-year old Portuguese national. He had joined *Hamburg* in late February 2015 for his first contract. The safety officer held a Portuguese unlimited chief officers' STCW II/2 CoC and previously had sailed with the master for a different company. The safety officer held the 0400-0800 navigational watch.

The second officer appointed to the 8-12 navigational watch was Polish and 45 years old. He had joined *Hamburg* in late April 2015 for his second contract on board. He held an STCW II/1 CoC issued in Poland in 1995 and had attended a BRM course in January 2014. He was the vessel's navigator, responsible for passage planning.

The second officer appointed to the 12-4 navigational watch was the OOW at the time of the grounding. He was a 36 year old Italian and held an Italian STCW II/1 CoC. He had joined Hamburg in late January for his third contract on board. At the time of the accident he had not attended a BRM course.

The deck cadet had joined *Hamburg* in late February 2015. It was his first ship after passing his nautical college examinations. The cadet's contract was for 6 months, following which he needed to accumulate a further 6 months of sea-time before being awarded his STCW II/I CoC.

1.9 BRIDGE RESOURCE MANAGEMENT

1.9.1 General

BRM can be described as *"the effective management and utilisation of all resources, human and technical, available to the bridge team, to ensure the safe completion of the vessel's voyage.*[14]*"*

[14] The Navigator – Bridge Resource Management October 2014

The 2010 amendments to the STCW convention introduced BRM and engine resource management (ERM) requirements for deck and engine officers. These came into force on 1 January 2012 with a 5-year transitional period, until 1 January 2017, to allow for a phased implementation.

1.9.2 V.Ships' training policy

V.Ships required its deck and engine officers to attend an in-house 5-day crew resource management (CRM) course designed to meet the STCW 2010 requirements for BRM and ERM. The company policy stated that officers should attend the course as soon as practicable after joining V.Ships, and every 5 years thereafter. This training was being provided by approved external training providers but, in order to meet the high demand, the group was in the process of constructing its own training facilities at a number of its core seafarer recruitment locations.

None of the officers on board *Hamburg* at the time of the grounding had attended this CRM training, although the master and the second officer appointed to the 8-12 watch had attended BRM training prior to working for V.Ships.

1.10 NAVIGATION

1.10.1 Responsibility

In accordance with the SMS, the navigating officer was responsible for preparing passage plans using the V.Ships form '*SAF09 Voyage and Passage Plan*', **Annex B**. The master was required to check and approve the proposed passage plan before it was implemented.

1.10.2 Preparing the passage plan from Dublin to Tobermory

The passage plan for the voyage between Dublin and Tobermory was prepared by the navigating officer prior to the vessel's call at Waterford. He was not given any specific guidance by the master and used form '*SAF09 Voyage and Passage Plan*', **Annex B**, as a guide. He used the following parameters to plan the passage:

- Safe depth – draught was taken to be 5.5m
- Under keel clearance 2-3m
- Squat 1m
- Generally the route was 3-5 miles off the coast for coastal passages
- ETAs calculated based on a speed of 13.5kts.

The route was planned using the ECDIS planning station, which calculated the distances and courses. The navigating officer then transferred these onto the paper charts and verified that there were no dangers on the course lines. With the exception of the courses to steer, the navigating officer made no other notations or marks on the charts.

The navigating officer prepared form SAF09, which the master then signed to indicate that he had checked and approved the planned passage. The form was then signed by the other deck officers.

1.10.3 Liaison with Tobermory Harbour Association

On the evening of 9 May 2015 *Hamburg*'s master sent an email to the agents for the port call to Tobermory containing the following:

> '*Concerning our call in your good port, seeing the forecast for the 11th, as you know it will not be so favourable. Can you give your advise, as per harbour master opinion*?'[sic]

THA's deputy marine manager responded the following morning:

> '*Thank you for your enquiry. The forecast is for the wind to go round to SSW in the afternoon. Tobermory Bay is sheltered from this direction and it should be possible for you to anchor in the bay.*
>
> *Please contact us by the duty mobile [Number] when you are approaching the bay for more information if required*.'

The email was signed '*Relief Marine Manager, Tobermory Harbour Association*.'

1.10.4 Examination of the passage plan

Paper chart BA 2392 **(Figure 13)**, which was the chart in use at the time of the grounding was examined for navigational practices and adherence with sections 28 and 33 of the V.Ships SMS. The findings included:

- The chart was a new, previously unused chart that had been corrected to reflect the most recent Notices to Mariners.
- The chart had been marked with the courses required for the voyage to Tobermory through the Sound of Mull.
- There was one area of 'highlighting' in the vicinity of the New Rocks.
- There were many different position markings used, indicating a mixture of observed, and satellite derived positions.
- The plotted positions were at infrequent and irregular intervals.
- There was no evidence of dead recknoning (DR) or estimated positions (EP) being generated following the plotting of the vessel's position, nor of courses to steer to regain the planned track.

The charts used for the passage from Dublin to Tobermory were also examined. Navigational practices such as wheel-over positions, no-go areas, abort points, clearing lines and navigational warnings in place were not marked on the charts. It was also noted that positions were plotted infrequently at irregular times and denoted by a wide variety of symbols.

During an examination of the completed passage planning form SAF09, **Annex B**, the follow points were noted:

- None of the cross track margin, check lines and red and green condition boxes had been marked as checked.
- The minimum distance from land was stated to be *'As Per Captains Order'.* [sic]
- There were several notations directing the user to '*See Charts'.*

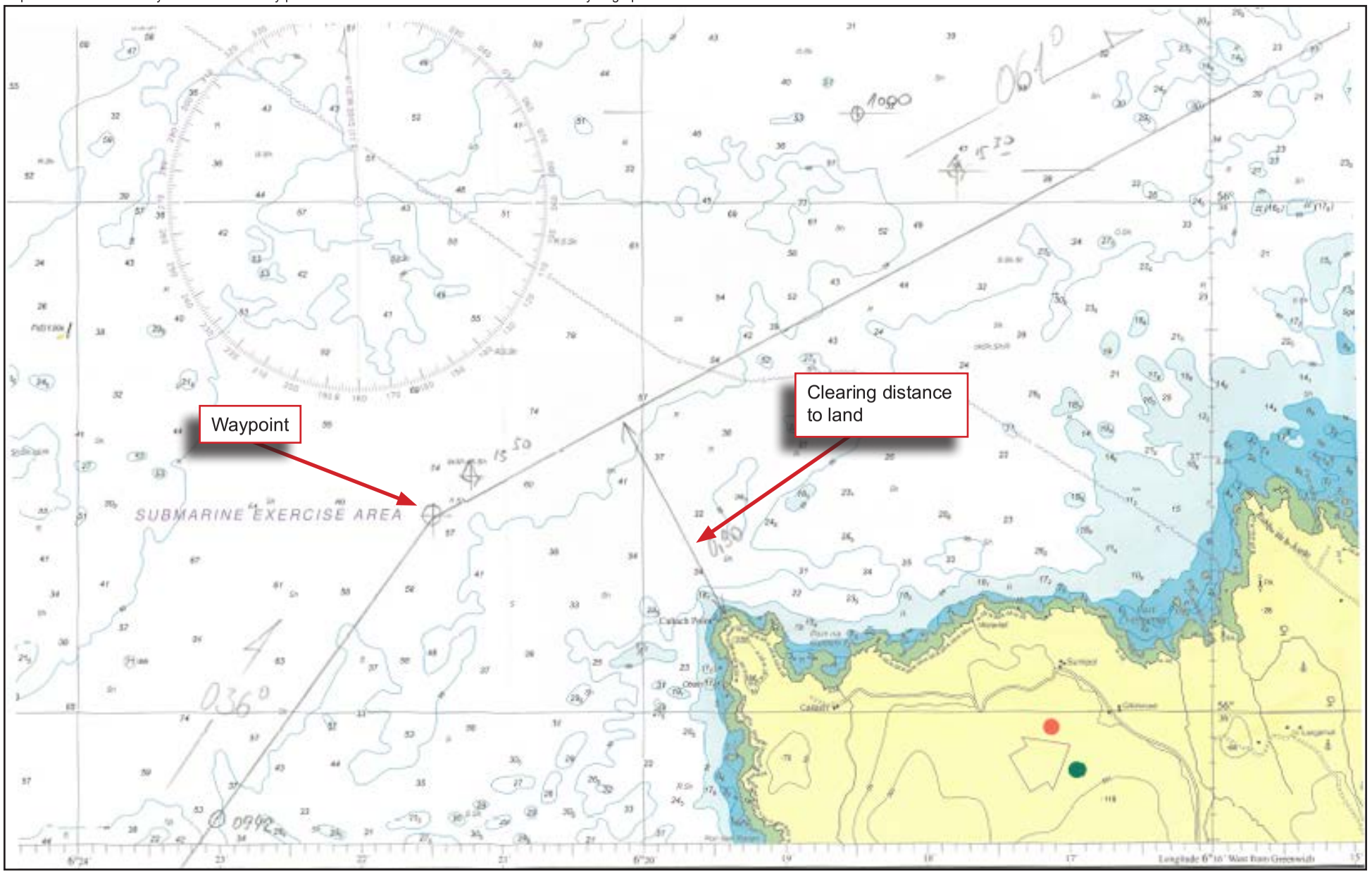

Figure 13: Extract of chart BA 2392 showing passage planning details

- Under keel clearance was stated as per the '*Exemptions marked on chart*' but there were no markings on the charts.
- Position fixing frequency was required to be '*1h in deep sea, 30 min in coastal approaches and 15 min in approaches*'.
- No primary or secondary position fixing method was identified for each stage of the passage as required by the SMS.

1.11 PORT ASSESSMENT

1.11.1 Planning

V.Ships' Fleet Operations Manual provided the process for the decision-making and assurances for *Hamburg*'s itinerary. In summary, this required Plantours to provide a list of nominated ports to the HCSA team. HCSA would then consult with the master on board *Hamburg* at that time to assess the ports' suitability. Once agreed with that master, HCSA would approve the ports and Plantours would be advised accordingly.

Generally, port approval for a planned itinerary was sought between 6 months and a year before the proposed date for the port call. Plantours had set the itinerary for the May 2015 round England, Ireland and Scotland cruise in early May 2014.

Once Plantours had identified the itinerary, it was sent to HCSA's operations manager who then forwarded the list to *Hamburg*'s master. Plantours would then take a number of factors into account to assess a port's suitability, these included the size of other vessels that had previously used the port and the number of passengers.

The master on board *Hamburg* at that time[15] was required to consider the proposed ports solely from a navigational safety point of view. In this assessment, the master utilised his own experience as well as information from navigational sources such as charts and sailing directions to assess the suitability of the ports for *Hamburg*. Once he had completed his assessment, he emailed his opinion to HCSA. The email was the only onboard record of the assessing master's opinion for the navigational safety assessment on board *Hamburg*. The 2015 port call to Tobermory was confirmed to HCSA on 21 May 2014 via email from its main agent.

1.12 AUDITS AND SURVEYS

The last annual internal ISM audit on board *Hamburg* had been carried out between 22 and 27 August 2014. V.Ships conducted an additional internal ISM audit between 4 and 7 March 2015. Navigational practices were not assessed during this audit. However, there was an audit finding that '*The em'cy drill should be conducted as more possible to the reality using, for example, the fire hoses with the wtr in pressure.*'[sic]

The last external ISM audit available on board the vessel was dated 30 March 2013 and had been completed by RINA. An observation was made that arrival and departure checklists were not being signed. An email reminder was sent by V.Ships to the deck officers and master.

A renewal survey[16] conducted by DNV GL on 17 April 2015 did not identify any problems with the vessel's navigation equipment.

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[15] The master who completed the assessment was not on board *Hamburg* at the time of the grounding.

[16] Renewal survey – A survey completed at 5 year intervals to ensure compliance with class requirements.

1.13 VOYAGE DATA RECORDER RECOVERY AND DATA

Hamburg grounded at 1328 on 11 May 2015, but the master did not instruct the vessel's electro-technical officer (ETO) to save and download the voyage data recorder's (VDR) data until 1848. This was the first time the ETO had attempted to save and download VDR data, and he was unsure whether he had followed the procedure correctly. The SMS did not require the routine download of VDR data for either training or audit purposes.

The MAIB received a copy of the VDR data download. Although English was the working language on board *Hamburg*, several conversations were in other languages. The quality of the audio recordings was very poor, with voice recordings being unintelligible in places and hampered by music being played on the bridge. V.Ships subsequently identified the source of the music as a small hi-fi system that has since been removed from the bridge.

1.14 ECDIS CARRIAGE REQUIREMENTS

SOLAS Chapter V, Regulation 19 states the carriage requirements for ECDIS as a means of navigation. As a passenger ship of over 500gt, *Hamburg* was required to meet Regulation 19 at the conclusion of its first survey after 1 July 2014, which had yet to take place.

1.15 ANCHOR SCOPE

When anchoring, the amount of anchor cable, or scope deployed will affect an anchor's efficiency. Optimum anchor efficiency is considered to be when the shank of the anchor lies horizontal to the seabed and guidance for the calculation of the correct amount of scope is contained in the Nautical Institute's (NI) publication *Mooring and Anchoring Ships*[17]*, Volume 1*.

The NI publication refers to the formulae provided by the British Admiralty in its own publication, *Admiralty Manual of Seamanship, Volume 2*. The formulae, **Figure 14**, assumes that the anchor cable used is forged steel[18], which is lighter than the mild steel used in most merchant ship anchor cable. The result is that in reality the scope that is paid out on board a merchant ship is usually a compromise between what will keep the anchor in place and the swinging space available. Further, the NI publication notes that the loads on the anchor will increase when the ratio of water depth to draft becomes less than 6:1.

1.16 THE SOUND OF MULL

1.16.1 General

The Sound of Mull is defined as the coastal waters lying between the Isle of Mull and Scotland. The sound is capped at its northern end by a collection of rocks, which include the New Rocks shoal. This shoal consists of a rock that covers and uncovers, of unknown drying height but may remain covered depending upon the height of the tide and weather conditions, along with a depth of 1.1m close north of the rock; on Admiralty chart 2392 these features are enclosed by a danger line.

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[17] Nautical institute, Mooring and Anchoring Ships, Volume 1, 2009. ISBN 978 1 870077 93 4

[18] Forged steel is used on board Royal Navy vessels.

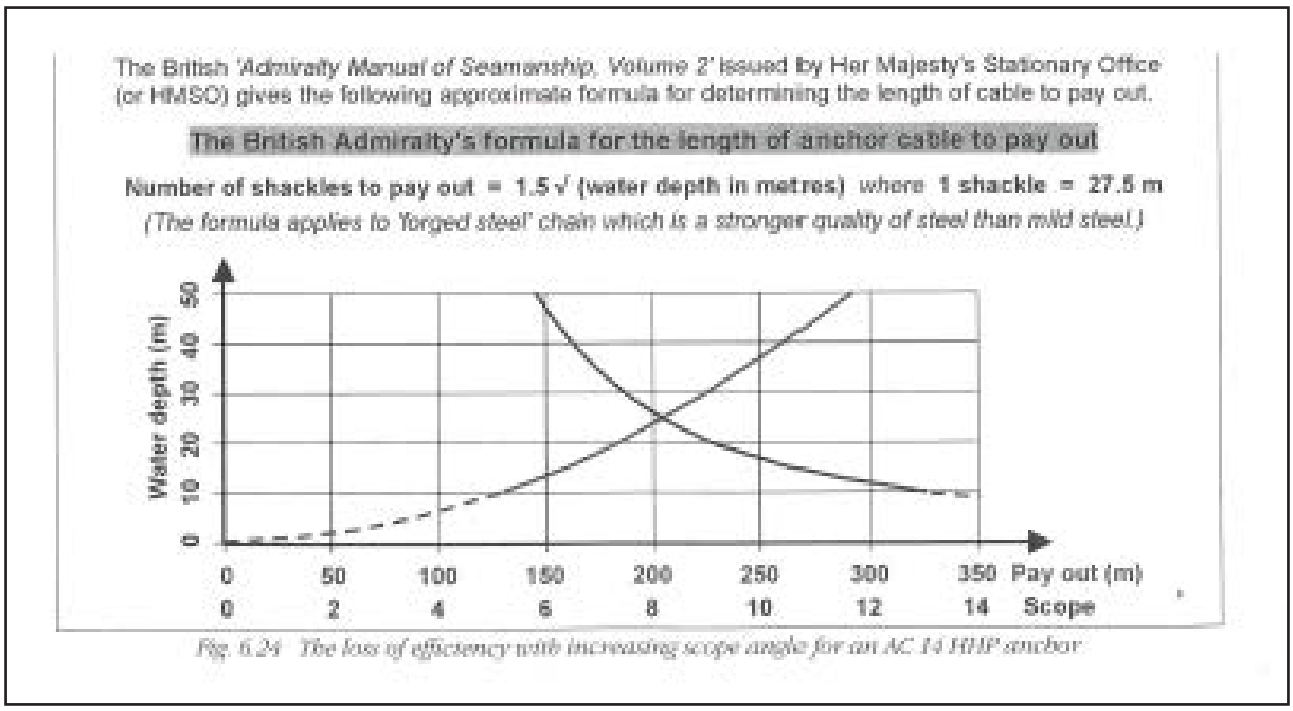


Figure 14: Extract from *Mooring and Anchoring Ships*

1.16.2 Buoyage

The New Rocks shoal has been marked by a green starboard hand lateral mark for approximately 100 years. The current buoy has a green light that illuminates once every 6 seconds and an AIS transmitter making it visible to ships equipped with AIS.

The Northern Lighthouse Board (NLB), as the General Lighthouse Authority for Scotland and the adjacent seas, is responsible for the navigational aids within the Sound of Mull. Following *Hamburg*'s grounding, the NLB checked the condition of the buoy but no damage was found.

1.17 TOBERMORY

1.17.1 General

Tobermory lies on the north-east coast of the Isle of Mull, Scotland, between the east side of the island and the west side of Calve Island. Tobermory is the principal town on the island with a population of about 1000. In addition to the regular ro-ro ferry service to the Scottish mainland, Tobermory has been increasingly visited by cruise ships, the largest of which, *Magellan*, carries up to 1800 passengers.

Admiralty Sailing Directions NP66A[19] (NP66A), which was carried on board *Hamburg,* describes Tobermory Bay as '*a natural, sheltered harbour, affording safe anchorage and berthing facilities*.' The controlling depth in the bay is a wreck with a depth of 17.1m. There is a mean spring tidal range of 3.6m. There is a designated anchorage in the south of the Bay **(Figure 15)**.

NP66A provided that the port authority is Caledonian Maritime Assets Ltd, which controls the MacBraynes Pier and that '*Tobermory Harbour Authority control the non commercial vessel moorings, pontoon and other facilities*.' [sic]

[19] Admiralty Sailing Directions NP66A – Edition November 2014

Reproduced from Admiralty Chart BA 2474-5 by permission of the Controller of HMSO and the UK Hydrographic Office.

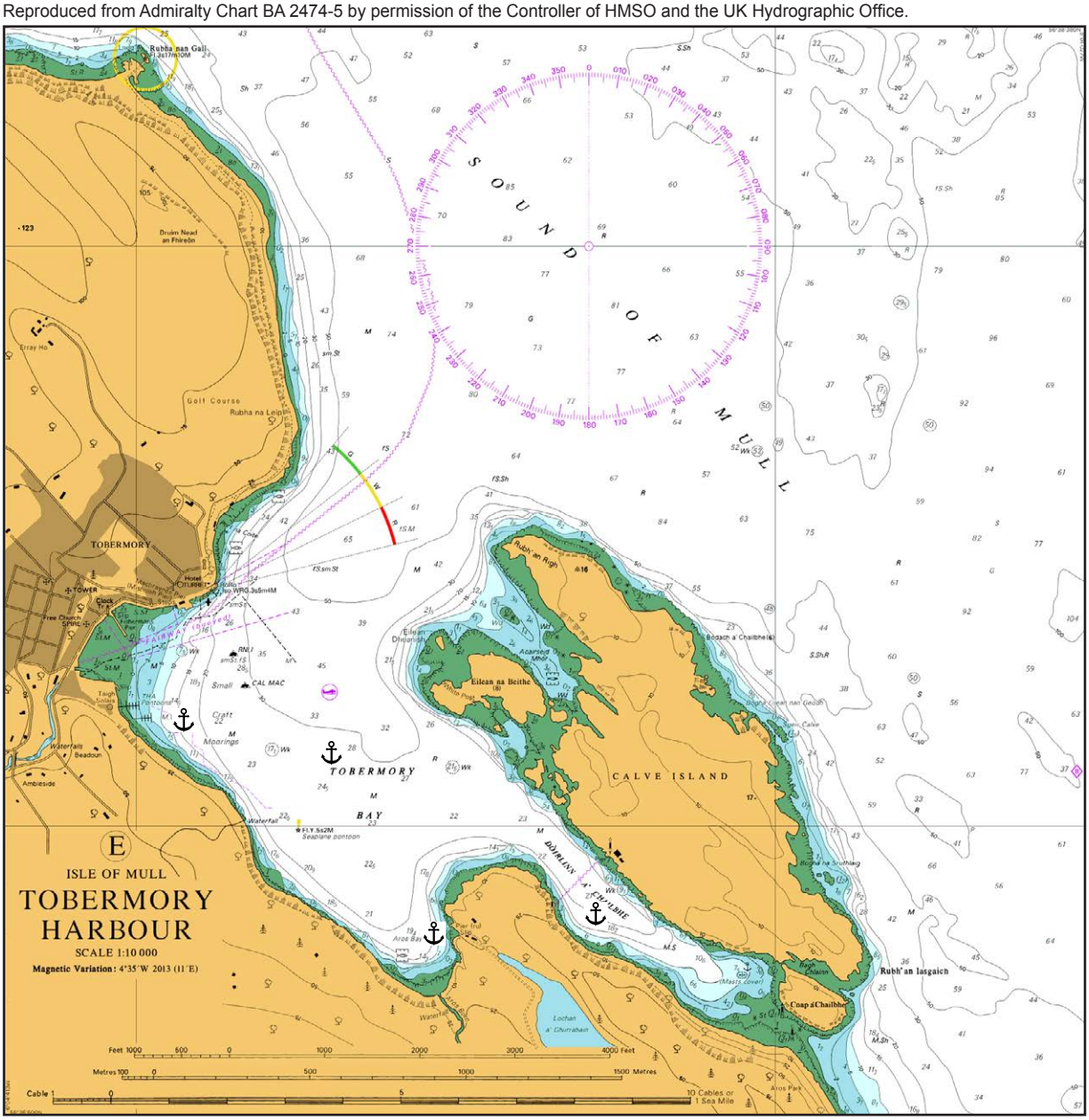


Figure 15: Tobermory Bay chart

1.17.2 Tobermory Harbour Association

The THA was formed in 1983 as the Tobermory Harbour Committee, a local action group formed to oppose the closure of the Caledonian MacBrayne (Calmac) pier in the harbour. After successfully winning that campaign, the committee took on a number of harbour related projects to improve and organise the area.

The THA provided advice to harbour users through its staff, website and a handbook. The website contained a section on Tobermory Bay, which included the following information:

> '***Approaches to Tobermory Bay from the west***
> *Boats approaching from the west will enter the Sound of Mull at Bloody Bay. The only hazard when approaching the entrance to Tobermory Bay is New Rocks, 1 mile east of Rubha nan Gall lighthouse. New Rocks are marked and buoyed. The main entrance to the Bay is between Rubha na Leip and Rubh' an Righ on the north of Calve Island.*'

1.17.3 Staff

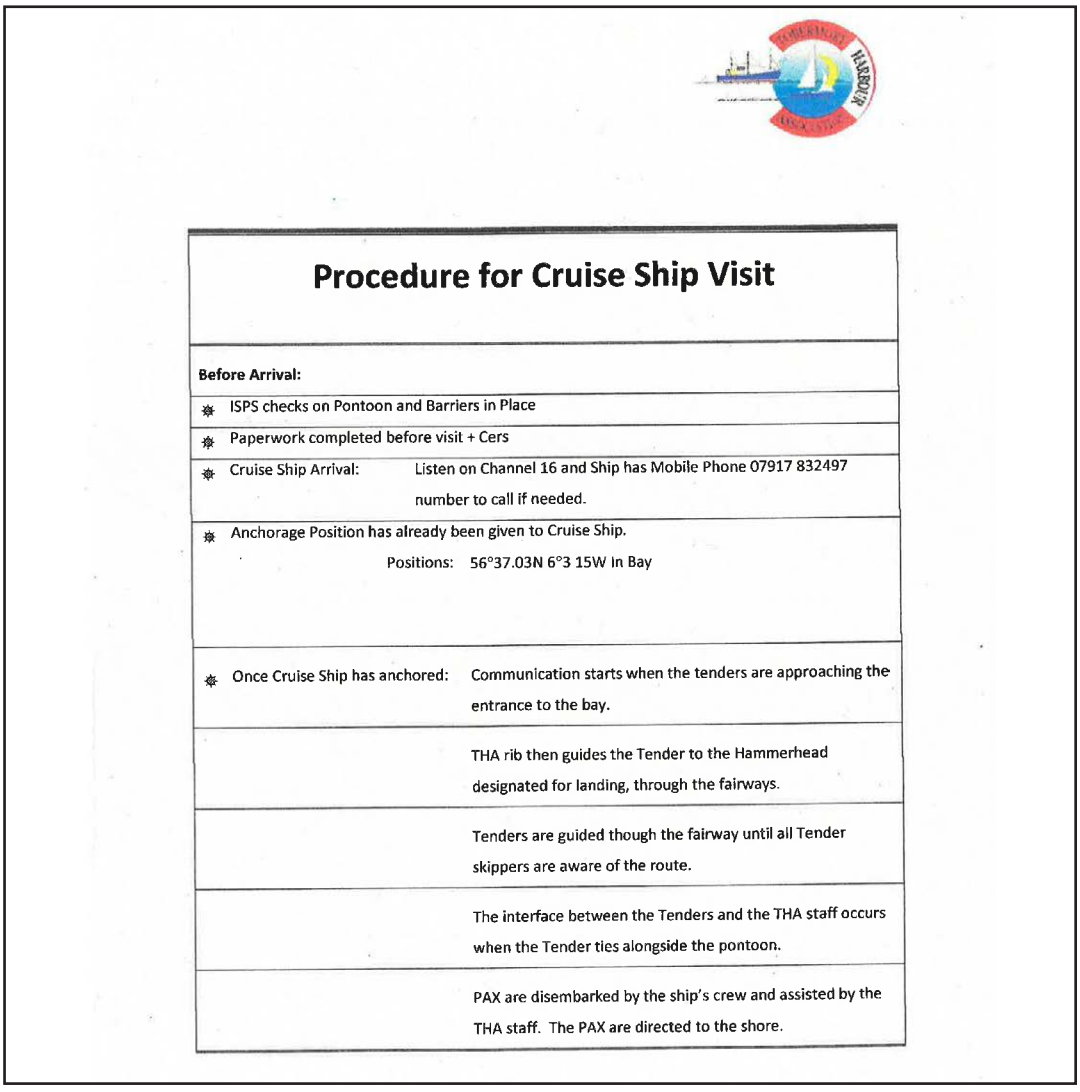
As a community organisation, THA's directors were unsalaried. There were 12 salaried staff who ran the organisation's concerns. These were separated into four departments: administration, marine, aquarium and maintenance. The marine department comprised the marine manager, deputy marine manager and marine assistant.

1.17.4 Provision for cruise ships

The first cruise ship called at Tobermory Bay in 2004. Since then, the number of cruise ship visits had steadily increased with more than 80 vessel calls in 2015. The cruise ship schedule was administered by THA's marine managers. The factors taken into consideration when assessing whether a cruise ship was suitable included:

- Size of the cruise ship
- Number of passengers versus safety on THA's pontoons
- Other vessels already scheduled.

The THA procedure for passenger ship calls can be found at **Figure 16**.



Procedure for Cruise Ship Visit

Before Arrival:	
ISPS checks on Pontoon and Barriers in Place	
Paperwork completed before visit + Cers	
Cruise Ship Arrival:	Listen on Channel 16 and Ship has Mobile Phone 07917 832497 number to call if needed.
Anchorage Position has already been given to Cruise Ship.	Positions: 56°37.03N 6°3 15W In Bay
Once Cruise Ship has anchored:	Communication starts when the tenders are approaching the entrance to the bay.
	THA rib then guides the Tender to the Hammerhead designated for landing, through the fairways.
	Tenders are guided though the fairway until all Tender skippers are aware of the route.
	The interface between the Tenders and the THA staff occurs when the Tender ties alongside the pontoon.
	PAX are disembarked by the ship's crew and assisted by the THA staff. The PAX are directed to the shore.

Figure 16: THA procedure for cruise ship visit

1.17.5 Events after *Hamburg* sailed

When *Hamburg* departed from Tobermory Bay, THA's deputy marine manager did not know whether the cruise ship would be returning, and she returned to the harbour office. Attempts at telephoning the cruise ship failed. It was later that afternoon that *Hamburg*'s port agent, who was based in Glasgow, informed the marine manager that the cruise ship would not be calling at Tobermory after all. The THA was not informed of the reason for the cancelled call or that the vessel had grounded prior to anchoring in Tobermory Bay.

1.18 HARBOUR AUTHORITIES

A harbour authority is an organisation that has been granted statutory powers for the purpose of managing, improving, or maintaining a harbour as provided in the Harbours Act 1964. The organisation itself could be a registered company or local authority. Many harbour authorities in the United Kingdom are 'trust ports', which are ports, each of which is administered by an independent statutory body established by an Act of Parliament.

At the time of the accident, THA was not a harbour authority and held no statutory powers. As part of its plan to develop the harbour, THA intended to apply to Transport Scotland for a Harbour Empowerment Order in 2016.

1.18.1 International Ship and Port Facility Security Code

The International Ship and Port Facility Security Code (ISPS Code) was implemented through SOLAS Chapter XI-2 Special Measures, and enacted in the United Kingdom through The Ship and Port Facility (Security) Regulations 2004. Passenger vessels carrying more than 12 people and the port facilities that serve them, are required to comply with ISPS Code requirements.

The ISPS Code introduced a framework that enabled governments, ships and port facilities to co-operate in order to deter and detect acts that threatened maritime security. The ISPS Code was divided into mandatory provisions and guidance and recommendations. Compliance was enforced through a system of reporting and auditing.

THA achieved its ISPS accreditation in April 2013. The designated port facility security officer was the marine manager.

1.18.2 The Port Marine Safety Code

The Port Marine Safety Code [20](PMSC), issued by the UK's Department for Transport, was developed to improve marine safety in UK ports and enable harbour authorities to manage their marine operations to nationally agreed standards.

The PMSC was supplemented by the Guide to Good Practice on Port Marine Operations[21]. Both publications were intended to provide information and guidance to assist a harbour authority to develop a safety management system specific to its own marine operations.

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[20] Port Marine safety Code is published by the Department for Transport and is available in pdf format at https://www.gov.uk/government/publications/port-marine-safety-code

[21] The Guide to good Practice is available at https://www.gov.uk/government/publications/a-guide-to-good-practice-on-port-marine-operations

1.18.3 Consolidated European Reporting System

The Consolidated European Reporting System (CERS) was a marine traffic monitoring system aimed at improving the response of authorities to incidents, accidents or potentially dangerous situations at sea.

CERS was interlinked with the European SafeSeaNet system and was applicable to all merchant vessels over 300gt, fishing vessels and recreational craft with a length overall of 45m or more, or if carrying dangerous or polluting goods. UK ports were also required to notify the MCA of calling vessels that met the CERS requirement. The THA was compliant with CERS.

1.19 SIMILAR ACCIDENTS

Commodore Clipper

On 14 July 2014, the Bahamas registered ro-ro passenger ferry *Commodore Clipper* grounded in the approaches to St Peter Port, Guernsey. The subsequent MAIB investigation[22] found that the passage plan for the voyage was insufficient with the effects of the low tide and squat not properly considered. This resulted in the bridge team being unaware of the danger that the vessel was heading into.

Queen Elizabeth 2

On 11 November 2008, the passenger vessel *Queen Elizabeth 2* ran aground during her final arrival to her home port of Southampton. The preliminary enquiry by the MAIB found that the action taken by the bridge team was inadequate and could not arrest the vessel's swing in the strong headwind and tide. Consequently the vessel was unable to line up to the Thorn Channel and ran aground in Stanswood Bay.

Costa Concordia

On 13 January 2012, the Italian registered cruise ship *Costa Concordia* grounded on a rock during a pass off Isloa del Giglio, Italy due to poor BTM. The resulting hull damage caused flooding to the engine room, and after losing its engine power the vessel grounded a second time and foundered, coming to rest on its starboard side. The evacuation was poorly organised and the remote coastal location could offer only limited assistance to the stricken vessel, its passengers and crew. 32 people lost their lives as a result of the accident and the vessel was declared a constructive total loss and later scrapped.

[22] Report no 18/2015 - *Commodore Clipper* investigation

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 SUMMARY

Hamburg grounded on the charted New Rocks shoal because the bridge team did not recognise that their vessel was approaching the New Rocks buoy from an unsafe direction. Contributing to this lack of awareness were significant shortcomings in the conduct of navigation on board *Hamburg*, which were compounded by almost non-existent teamwork between the officers on the bridge. While the master was evidently under a degree of stress following the grounding, appropriate post-grounding actions were not taken. Consequently, an attempt was made to anchor the vessel in Tobermory Bay before a full assessment of the damage had been conducted and before any of the port, coastal state or company had been informed of the accident.

2.3 CONDUCT OF NAVIGATION

There is significant evidence that insufficient attention was being paid to the conduct of navigation on *Hamburg*. Specifically:

- The passage plan to Tobermory lacked detail, either in the ECDIS or on the paper chart. Clearance lines, no-go areas, abort points, wheel-over positions and an adequate anchorage safety swinging circle were not marked on the paper chart, and the safety settings on the ECDIS were not updated for the passage.
- When it was clear that *Hamburg*'s arrival at Tobermory would be delayed, no attempt was made to amend the passage plan to delineate a safe area within which the vessel would operate until it continued its approach to port, or to define a safe navigation track from the holding area to the harbour entrance.
- The cadet's chart work was unconventional and substandard in many respects, but his activities were not being monitored by the OOW with the consequence that useful information about the vessel's position, heading and proximity to dangers were not being assimilated by the bridge team.
- Once the decision not to anchor the vessel in the designated anchorage in Tobermory Bay had been made, no effort was made to plan an alternative anchorage before it was attempted, with the result that insufficient cable was deployed, the vessel dragged its anchor, and the visit was aborted.

Two main reasons for these shortcomings have been identified. In the first instance, the company's declaration that the primary method of navigation was by paper chart, when the vessel was equipped with a fully functional ECDIS, needed more consideration. The ECDIS was well placed for easy reference by the OOW, and it provided an instantaneous pictorial representation of the vessel's location. It was therefore foreseeable that the OOWs would refer to the ECDIS display instead of the paper chart. However, as the ECDIS was not approved and should not have been used for navigational purposes, the warnings and cautions intended to alert the OOW to deviations from the planned track or that the vessel was approaching

danger had not been activated. Further, although there were precise onboard instructions about the use of the safety features on the ECDIS, they were designated for approved systems only. Regardless of its approval status, it would have been appropriate to ensure that the system was set up to provide the OOWs with all the information required for safe navigation.

By relying on the ECDIS, the OOWs on board *Hamburg* inevitably paid little attention to the fixing and chart work conducted by the cadet. The cadet had only recently completed training, but his standard of chart work had already deteriorated significantly. Seven minutes before the grounding, both the OOW and the cadet plotted the vessel's position on the chart. Despite both plotted positions being incorrect, the cadet's fix did at least indicate that the vessel was running into danger. Unfortunately he did not feel empowered to challenge the OOW and chose to silently erase his own position, leaving the OOW's incorrect position on the chart **(Figure 5)**. As the OOW was not monitoring the cadet's chart work, the occurrence went unremarked. Proper attention to the cadet's activities would have helped motivate him to perform appropriately, and would have empowered him to contribute useful information derived from fixing to the bridge team.

Secondly, and most significantly, *Hamburg*'s master did not demand an appropriately high standard of navigation from his officers. With the exception of the cadet, all *Hamburg*'s bridge watchkeepers were suitably trained and experienced, and they would likely have delivered an appropriate standard of service had it been demanded of them. However, while the standard achieved permitted the vessel to fulfil its itinerary, insufficient consideration was given at the planning stage to the constraints of Tobermory Bay as an anchorage. Consequently, once the plan needed to be changed at short notice, the weaknesses in the bridge team's navigational practices set the conditions for the grounding to occur. By accepting and approving inadequate passage plans and by not checking that either the ECDIS was being used effectively or that the chart work was to an acceptable standard, the master was signalling to his officers that he was not concerned about the standards of navigation on board, and they took their lead from him.

2.4 BRIDGE TEAM MANAGEMENT

2.4.1 Application

Effective bridge team management is described in the following extract from the ICS[23] Bridge Procedures Guide:

> *"A bridge team which has a plan that is understood and is well briefed, with all members supporting each other, will have good situational awareness. Its members will then be able to anticipate dangerous situations arising and recognise the development of a chain of errors, thus enabling them to take action to break the sequence."*

There are six recognised tools that can be used to achieve effective bridge team management:

1. The development of a shared mental model or plan.

2. Communication.

[23] ICS – International Chamber of Shipping

3. Challenge and response.

4. Short-term strategy.

5. Situational awareness.

6. Error management.

The performance of *Hamburg*'s bridge team in the period leading up to and following the grounding is discussed under these headings.

2.4.2 Shared mental model

Despite this being *Hamburg*'s bridge team's first visit to Tobermory, a pre-arrival briefing was not held on board. Tobermory Bay was sheltered but confined, the weather was poor, the anchorages were already occupied and there were no tugs available. At 0933 the master received an email informing him that *Hebridean Princess* was expected to leave at 1215, so it was foreseeable that *Hamburg*'s arrival would be delayed.

Had a pre-arrival briefing been held, the opportunity would have been available for the relevant officers to discuss the passage plan, abort options, and the personnel required to ensure the bridge was appropriately manned while navigating in the restricted waters of the Sound of Mull.

No team can work cohesively unless they share a common understanding of the goal. Within BTM, this principle is often described as the development of a shared mental model. The model or plan need not be extensive but it should create a vision and purpose for what is required in order to achieve the goal. Briefings and toolbox talks are the most common means of establishing shared mental models and are fundamental to safe shipboard operations.

V.Ships' SMS required bridge team briefings to be held prior to entering any port the vessel had not previously visited. On this occasion, the required brief was not held.

The absence of a shared mental model resulted in the individuals on the bridge working in isolation, with no recognition of their individual responsibilities and therefore unable to provide the master with the assistance he required to maintain his situational awareness.

2.4.3 Communication

It was evident from the bridge audio recorded by *Hamburg*'s VDR that there was very little information flow or discussion within the bridge team. This is not surprising given the fact that they had no common understanding of the arrival plan and were working in isolation rather than cohesively. Of particular note were the VHF conversations between *Hamburg*'s OOW and adjacent vessels during which departures from the COLREGS were agreed. Specifically, the OOW's initial agreement to a green-to-green passing with *Sea Explorer I*, which prevented *Hamburg* from increasing speed to clear the New Rocks area, followed by his confusing conversations with the bridge staff of both *Nahlin* and *Yeoman Bridge*, in which he agreed to give way to *Nahlin*. Given the impact these conversations /

agreements had on the master's freedom to manoeuvre his vessel, it would have been appropriate for the OOW and master to have discussed their options before the OOW entered into dialogue with the other vessels.

Weakness in communication was also evident in the transfer of conn on board. The master did not take the conn during the 4-8 watch, but during the handover at the watch change the safety officer informed the second officer relieving him that the master had taken the conn. The handover of the conn was not recorded in either the deck log-book or the bell book, and the master did not correct the safety officer's statement. V.Ships' SMS contained instructions that the passing of the conn must be '*transferred clearly'* and that the OOW should not assume that the master's presence on the bridge equated to him having the conn.

Communication is critical to effective BTM. Positive reporting of actions completed, and verbal challenges to actions that might have been missed or decisions that are not understood are essential to safe operations. The bridge team relies on actions being verbalised and then confirmed in a closed loop to maintain the shared plan. The absence of such communication can lead to the breakdown of even the most experienced bridge team.

As a result of inherently poor communication, *Hamburg*'s bridge team were unable to respond effectively to the challenges resulting from the developing traffic situation in their approach to the New Rock shoal.

2.4.4 Challenge and response

During *Hamburg*'s approach to Tobermory there were many opportunities when a suitable challenge from one of the officers might have helped avert the grounding. These include:

- That the passage plan was incomplete and did not comply with the requirements of the company's SMS.
- The absence of a pre-arrival briefing, despite this being good practice and a requirement of the company's SMS.
- That the bridge team were not allocated specific roles for the arrival at Tobermory Bay.
- That the passage plan was not amended following the master's decision that *Hamburg* would drift while waiting for space in the bay.
- That the positions plotted by the second officer and the cadet immediately before the grounding differed significantly.

After the grounding, when it was clear that the vessel had sustained an unknown degree of damage, there were opportunities to question the master's decisions and actions. For example:

- The decision to proceed into the bay before the extent of damage was known.
- The proximity to shore and depth of water at the alternative anchorage location chosen by the master.
- The instruction to deploy insufficient anchor cable for the depth of water and the prevailing conditions.
- The decision to leave the sheltered waters of the Sound of Mull and to sail for Belfast with one functioning propeller and rudder and limited knowledge of the extent of the damage.

During the attempt to anchor *Hamburg* off Tobermory, the OOW did inform the master that the vessel was drifting closer to land, which in turn prompted the master to abort the visit to the port. However, none of the other actions or decisions taken on *Hamburg*'s bridge, before or following the grounding incident, were questioned by any member of the bridge team.

An effective bridge team will utilise challenge and response to minimise the risk of an error made by one member developing into a dangerous situation. For this to work, it is essential that all members of the bridge team are empowered to challenge the decisions of other - potentially more senior - members of the team.

The need to empower all members of the bridge team was specified in the V.Ships' SMS section on BTM, which stated that *"bridge team members will be asked and encouraged to raise any operational concerns without fear of retribution or retaliation*'. It is possible that the bridge team were concerned that challenges they raised with the master would not have been well received. However, there was no evidence to support this. More likely, the officers concerned were not sufficiently aware that one of their roles was, specifically, to monitor each other's performance and to challenge it when necessary. If this were the case, then more emphasis on the importance of this aspect of BTM was required.

2.4.5 Short-term strategy

Following *Hamburg*'s grounding on the New Rocks shoal, the master ordered the OOW to continue towards Tobermory before the damage assessment was complete.

A short-term strategy is a plan conceived and adopted by the bridge team to manage their response to an unexpected event. *Hamburg*'s grounding was an unexpected event that had an immediate impact on the vessel's propulsion, manoeuvrability and, potentially, its safety.

Having grounded the vessel on the New Rocks shoal, the first reaction of the bridge team should have been to refer to the grounding checklist **(Annex A)**. The purpose of this checklist is to provide a ready-made short-term strategy after a grounding, buying time for the team by providing them with a prepared list of the immediate actions they are required to take that have been specifically developed for that scenario.

Having addressed the actions on the grounding checklist, which included notifying crew and passengers on board as well as the relevant external authorities, the team should then have met to brief the master on the known damage sustained by the vessel and the potential implications of that damage. The likely outcome of this briefing would have been that the master would have developed a short-term strategy that kept *Hamburg* safe while he briefed the company on the situation, and engaged with them to develop a way ahead.

However, no such meeting was held and no plan was developed. Before the damage assessment was complete, the master instructed the OOW to continue towards the anchorage. It is possible that, following the cancelled visit to London, *Hamburg'*s master was keen not to miss a second port visit. It is also possible that he intended to anchor his vessel in a secure location and then take stock of the

damage. Whatever his motivation, his decision to proceed to anchor was premature given that he was not aware of the extent of the damage or its impact on the safety of the vessel.

2.4.5.1 - The decision to anchor just within the bay

As *Hamburg* approached Tobermory Bay, the master considered it to be too congested with small moorings for his vessel to safely anchor in the planned position. This would have been another opportunity to develop a considered short-term strategy to control an unexpected problem, especially in light of the unknown extent of the hull damage and the manoeuvring restrictions caused by the damage to the port propeller and rudder. However, no plan was discussed and the master made the decision to anchor in the entrance to the bay, despite the depth of water and in disregard of the THA deputy marine manager's advice that there was more shelter further in.

It is possible that the master was reluctant to proceed further into the bay because he was concerned by the vessel's reduced manoeuvrability, but his reasons for this were not passed to the other members of the bridge team. In any event, the subsequent attempt to anchor was ill-considered and unlikely to be successful.

The depth under *Hamburg*'s keel was 61m. Following the NI guidance and using the Admiralty formulae the minimum anchor cable that should have been deployed was either 6 x 61m = 366m or $1.5\sqrt{61}$= 321.75m. The master instructed the anchor party to deploy just 5 shackles, 137.15m. Since he was attempting to anchor in fine sand, close to a lee shore, in winds gusting up to 40kn, this was wholly insufficient, yet the width of navigable water meant that it was not safe to deploy the appropriate length of cable. A cursory examination of the chart would have established that the master's chosen anchorage location was not suitable, and one that might well have been challenged if the bridge team had been working effectively. Such a challenge might have prompted the master to review his plan, and thus have prevented the vessel being placed in further danger.

2.4.5.2 - The decision to sail for Belfast

The additional risks incurred by leaving Tobermory Bay were exacerbated by the decision to sail across the Irish Sea for Belfast.

This decision was made by the master, who informed V.Ships once the vessel had sailed out of Tobermory Bay. Belfast was a logical choice as the available facilities there meant that *Hamburg* could be surveyed and repaired. Nevertheless, *Hamburg* had grounded with sufficient force to trip two main engines and severely damage a propulsion system. Although the initial assessment found no evidence of water ingress, the residual strength of the vessel's internal structure had not been verified and the ship's seaworthiness was unknown. When the damage was later assessed in dry dock, the vessel required significant temporary repairs before being permitted to sail under a single voyage safety certificate, without passengers, to Bremerhaven for permanent repair.

In the circumstances, V.Ships and HCSA should have challenged the master's decision to sail for Belfast. Before another sea passage was considered, a strategy should have been developed between the vessel's senior officers, V.Ships as the technical managers and the relevant authorities ashore such as the coastguard, Class and/or flag state.

2.4.6 Situational awareness

In the period leading up to the grounding, *Hamburg*'s master and OOW were concentrating on avoiding close quarters situations with three other vessels transiting in the Sound of Mull. From his position on the port side of the bridge, the master could see neither the chart nor the ECDIS. Consequently, while he was aware of the proximity of the New Rocks lateral buoy, he was reliant on other members of the bridge team to provide him with timely accurate reports of the vessel's position in relation to navigational hazards, but these were not forthcoming.

Situational awareness is:

> *'…the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future.' Endsley, MR (1988).*

In order to manoeuvre *Hamburg* successfully in the developing situation, the master needed to:

- Know his own vessel's position, and what constraints there were on his freedom to manoeuvre.
- Know the positions of the approaching vessels and to project their movements to understand his and their obligations under the COLREGs.
- Understand the implications of the approaching vessels' CPAs for his own ship's movements.

And, if necessary, communicate with the approaching vessels to clarify his and their intentions.

In order to maintain an overview of all the information the master should not have embroiled himself closely in any of the above tasks. In the event, he and the OOW were concentrating on negotiating their way past the transiting vessels. The cadet was plotting positions on the paper chart, but was not projecting these forward to predict *Hamburg*'s future movements, and the ECDIS had not been set up to provide warning that the vessel was approaching a navigational hazard. Even had the ECDIS been appropriately enabled with a planned track and appropriate safety settings, there were insufficient personnel on the bridge for the tasks that needed to be accomplished, the specific roles of those individuals present were unclear, and they were not communicating effectively (see paragraph 2.4.3).

Given the number of certificated officers on board *Hamburg*, it would have been appropriate for at least one additional deck officer to join the bridge team once *Hamburg* entered the Sound of Mull, and for this officer to have been given specific responsibility, for example, for the conduct of navigation. In the event, there were insufficient personnel on the bridge, even had their tasks been clearly specified, for the master to maintain situational awareness.

2.4.7 Error management

Safety management is not restricted to the avoidance of accidents or emergencies. The ECP had been generated by V.Ships, as technical managers of the vessel responsible for safety management on board, to ensure the safest possible outcome for the vessel and those on board following any foreseeable emergency. It included comprehensive checklists of the actions required following a grounding **(Annex A)**. However, immediately after the grounding, *Hamburg*'s master and the rest of the bridge team chose not to follow this checklist, thereby creating additional workload and the potential for errors and omissions. Failure to notify the authorities ashore was one such omission and is dealt with in Section 2.4.5.2.

The checklist required the Command Team[24] on board to advise the DPA or another person from the vessel's back-up team[25] and notify the office staff. Although the accident occurred during normal office hours at V.Ships, the master did not attempt to call the company until nearly an hour after the grounding. Furthermore, when he was unable to reach the DPA or the fleet manager, instead of asking to speak to a member of the vessel's dedicated back-up team or explaining the situation to other office staff, he chose to call HCSA.

HCSA was responsible for the vessel's logistics and scheduling and so needed to be informed once a plan for managing the situation post-grounding had been developed. However, this plan should have been developed in consultation with V.Ships, the coastguard, and the vessel's classification society and P&I Insurers, and it should have been done before attempting to enter Tobermory Bay. It is quite possible that had V.Ships been informed in a timely manner, the vessel's back-up team would have met, informed all the necessary stakeholders, considered the available options for safely managing the situation and, together with the master, planned the next steps. Unfortunately, by the time V.Ships was informed by HCSA, the vessel had already made an aborted attempt to anchor in Tobermory Bay and had departed the sheltered waters of the Sound of Mull bound for Belfast.

The master also chose not to sound a crew alert or general muster as required by the checklist. This was a lost opportunity to gather the passengers in a controlled fashion while the ship was checked for damage and would have been the first step in preparation to abandon ship or disembark in a controlled manner if necessary.

There was also a lack of adequate announcements. The cruise director did make one announcement over the ship's public address system, in German. This resulted in the non-German speaking passengers and crew, including the master and bridge team, being unable to understand what was being said. Had the SMS been followed, the announcement would have first been made in English, the working language on board, followed by German.

2.5 NAVIGATION AUDIT AND INSPECTION

V.Ships last conducted an internal ISM audit on board *Hamburg* in March 2015 to verify that the working practices on board were in accordance with its SMS. This audit did not cover navigational processes. However, it did note a lack of realistic drills and this, together with the lax attitude to procedures and record keeping found

[24] Command Team – the shipboard team designated on the vessel's muster list as responsible for assessing the nature of the incident and co-ordinating the crew response teams on board.

[25] Back-Up team – the shore-based support team for the vessel during an incident.

during the MAIB investigation, suggests that it is probable that the training drills previously carried out had not been of a sufficient quality to prepare the crew to respond to the grounding effectively.

It is possible that had the company audit examined the navigational processes on *Hamburg* it would have identified many of the failings discussed in this report. The company could then have put in place suitable corrective measures to bring these up to the required standard. However, navigational processes are difficult to assess during audit as it is possible that the presence of an auditor will affect the standard of compliance with company procedures demonstrated by the crew.

Managers are increasingly recognising the value of examining VDR data when auditing bridge practices. Used appropriately, VDR data can provide a true reflection of the navigational practices on board and provide managers with a useful training tool for achieving compliance with the BTM and company procedures.

The VDR data retrieved from *Hamburg* was of poor quality and, in addition to very poor audio, contained some data such as the status of the watertight doors that could not be interpreted. Had V.Ships routinely downloaded and reviewed their vessels' VDR data for auditing purposes, the poor quality of the data being captured by the equipment would have been evident prior to this accident. Additionally, a requirement for masters and bridge staff to frequently save VDR data ensures they become familiar with the operation and so are able to carry it out effectively in the event of an incident or accident.

2.6 THE PORT OF TOBERMORY

2.6.1 Tobermory Harbour Association's role

As owners of the pontoons in Tobermory Bay, THA had the right to control their use. However, as THA was not a port authority it did not have the statutory powers to direct traffic within the bay and its approaches.

In the UK, the voluntary PMSC provides a framework for the assessment of risks in a port, and that activity forms an integral part of a port's SMS. Ports that comply with the Code are generally considered to be following best practice. The PMSC can be utilised by non-statutory harbour authorities, and assistance with implementing the Code can be obtained from the MCA or Transport Scotland. At the time of the accident, THA did not comply with the PMSC.

2.6.2 Assessment of Tobermory

HCSA was responsible for the completion of the port assessment for *Hamburg*'s itinerary. The assessment for Tobermory was completed in May 2014, ahead of the vessel's proposed call in 2015, and no issues with the port were raised.

Hamburg's master at the time of the accident was not on board when the port assessment was conducted, and he was not aware that the assessing master's opinion of the port was contained in an email stored in his computer. For his own pre-arrival assessment of Tobermory, the master initially relied on the information in NP66A. After *Hamburg* had departed Dublin, the master prepared for the visit through a number of email exchanges directly with THA and with the port agent. From *Hamburg*'s master's use of the title 'harbour master' in his email to the agent

on 9 May 2015, and other correspondence, it is clear that he considered advice received from the THA as coming from Tobermory's harbourmaster. However, this position did not exist at that time as the THA was not a harbour authority.

Furthermore, both of *Hamburg*'s masters and HCSA had incorrectly assumed that THA was the harbour authority for Tobermory. This assumption was based on NP66A, published in 2014, which incorrectly stated that THA was a harbour authority. In fact, THA was a community harbour association, a status made clear in the organisation's handbook and on its website.

It is evident that HCSA's port assessment of Tobermory did not establish whether THA had sufficient formal risk assessments in place. While many cruise ships visit locations that are not 'ports', such as so called BBQ beaches, the lack of port infrastructure and emergency resources at these locations is included in the company and ship's assessments, and contingencies are put in place.

THA had not assessed the risks or developed any plans to deal with an emergency involving a cruise ship. The requirement to control the visits of such vessels was realised as demonstrated by the employment of marine staff. However, if *Hamburg* had grounded on Calve Island during its aborted anchoring operation in Tobermory, or sunk within the bay, THA did not have the resources to assist or a back-up plan to render assistance. That such an event did not occur on this occasion was fortunate and, in other circumstances could easily have resulted in serious pollution, loss of the vessel and/or loss of life.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. *Hamburg* grounded on the charted New Rocks shoal because the bridge team did not recognise that their vessel was approaching the New Rocks buoy from an unsafe direction. [2.2]

2. There is significant evidence that insufficient attention was being paid to the conduct of navigation on *Hamburg*. Specifically:
    - The passage plan to Tobermory lacked detail.
    - The passage plan was not amended when the vessel was delayed.
    - The cadet's chartwork was substandard and was not being monitored by the OOW. [2.3]

3. It was foreseeable that the OOW would use the ECDIS instead of the paper chart for navigation, but no mechanisms were in place to ensure it was used effectively. [2.3]

4. *Hamburg*'s bridge team failed to apply BTM tools effectively, either before or after the grounding, despite the requirements of the SMS and the master and navigator having received BRM training. Specifically:
    - The individuals on the bridge were working in isolation, with no recognition of their individual responsibilities and therefore unable to provide the master with the assistance he required to maintain his situational awareness. [2.4.2]
    - No actions or decisions taken at any stage on *Hamburg*'s bridge, before or following the grounding, were questioned by any member of the bridge team. [2.4.4]
    - As a result of poor communication, the bridge team were unable to respond effectively to the challenges resulting from the developing traffic situation in their approach to the New Rocks shoal. [2.4.3]

5. Once *Hamburg* entered the Sound of Mull there were insufficient personnel on the bridge, even had their tasks been clearly specified, for the master to maintain situational awareness.

3.2 OTHER SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT

1. The master did not demand a high standard of navigational practices from his officers which resulted in a weak practices amongst the bridge team. [2.3]

2. The OOW placed *Hamburg* in an untenable traffic situation where the passenger vessel was giving way to all other vessels regardless of the requirements of the COLREGS. [2.4.3]

3.3 SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. The master's decision to proceed into Tobermory Bay was premature given the unknown extent of the damage or its impact on the safety of the vessel. [2.4.5]

2. The attempt to anchor in the entrance to Tobermory Bay was ill considered and unlikely to be successful yet it was not questioned by the bridge team. [2.4.5.1]

3. *Hamburg*'s master and the rest of the bridge team decided to proceed to Tobermory Bay before the damage had been assessed and without completing the post-grounding checklist. [2.4.5]

4. The decision to sail for Belfast without first developing a plan with the vessel's senior officers, V.Ships and the relevant authorities ashore was inappropriate and incurred additional unnecessary risks. [2.4.5.2]

5. Following the grounding neither the crew alert nor general muster were sounded. [2.4.7]

6. The only announcement following the grounding was made in German and not in the working language on board which was English. [2.4.7]

7. Sailing Direction NP66A incorrectly stated that THA was a harbour authority. [2.6.2]

3.4 OTHER SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT[26]

1. The VDR data retrieved from *Hamburg* was of poor quality and included data that could not be interpreted. [2.5]

2. Both HCSA and *Hamburg*'s masters had incorrectly assumed that THA was the harbour authority for Tobermory. [2.6.2]

3. Had *Hamburg* grounded or sunk within Tobermory Bay, THA did not have the resources to assist or a back-up plan to make such resources available. [2.6.2]

[26] These safety issues identify lessons to be learned. They do not merit a safety recommendation based on this investigation alone. However, they may be used for analysing trends in marine accidents or in support of a future safety recommendation.

SECTION 4 - ACTION TAKEN

The **Maritime and Coastguard Agency** has**:**

Prosecuted *Hamburg*'s master for the failure of passage plan under SOLAS and failure to report an accident contrary to the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012. The master pleaded guilty and was fined.

V.Ships Group has**:**

Conducted an investigation into the grounding, identified the causal factors, and implemented the following corrective actions:

- *Hamburg*'s masters and deck officers attended human element training.
- Bridge team management training was completed on board *Hamburg* prior to the vessel returning to service.
- Additional bridge team management training is to be carried out on board all V.Ships' managed vessels.
- Reviewed its navigational practices, implementing the lessons identified in its investigation report.
- Reviewed the emergency contingency plan grounding checklist.
- Reviewed the passage planning form SAF09.
- Replaced the VDR.
- A company superintendent supervised the new bridge team on board *Hamburg* when the vessel re-entered service.
- Commenced a programme to conduct audits using VDR downloads.
- Created a case study of the accident that was promulgated to the fleet.
- Undertaken a programme for deck officers to complete CRM/HELM training.
- Reviewed and updated the criteria specified in the SMS for bridge manning levels at critical periods.
- Reviewed the ECDIS procedures within the SMS, specifically the use of the 'look ahead' function.

Tobermory Harbour Association has**:**

Made a Harbour Empowerment Order application in order to establish statutory rights of direction within Tobermory Harbour. In addition, the association, in consultation with the Maritime and Coastguard Agency, is exploring how to meet the requirements of the Port Marine Safety Code.

The **Northern Lighthouse Board** has**:**

Carried out a review of shipping during the cruise ship season and consulted on buoyage changes resulting in the intended replacement of the New Rocks lateral mark with a west cardinal mark in 2016.

The **United Kingdom Hydrographic Office** has**:**

Issued an amendment for Sailing Direction NP66a in its Section IV Notice to Mariners in Week 1 of 2016, to change ‘Tobermory Harbour Authority’ to read ‘Tobermory Harbour Association’.

SECTION 5 - RECOMMENDATIONS

In view of the actions already taken, no recommendations have been made.

Marine Accident Report

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