ACCIDENT REPORT

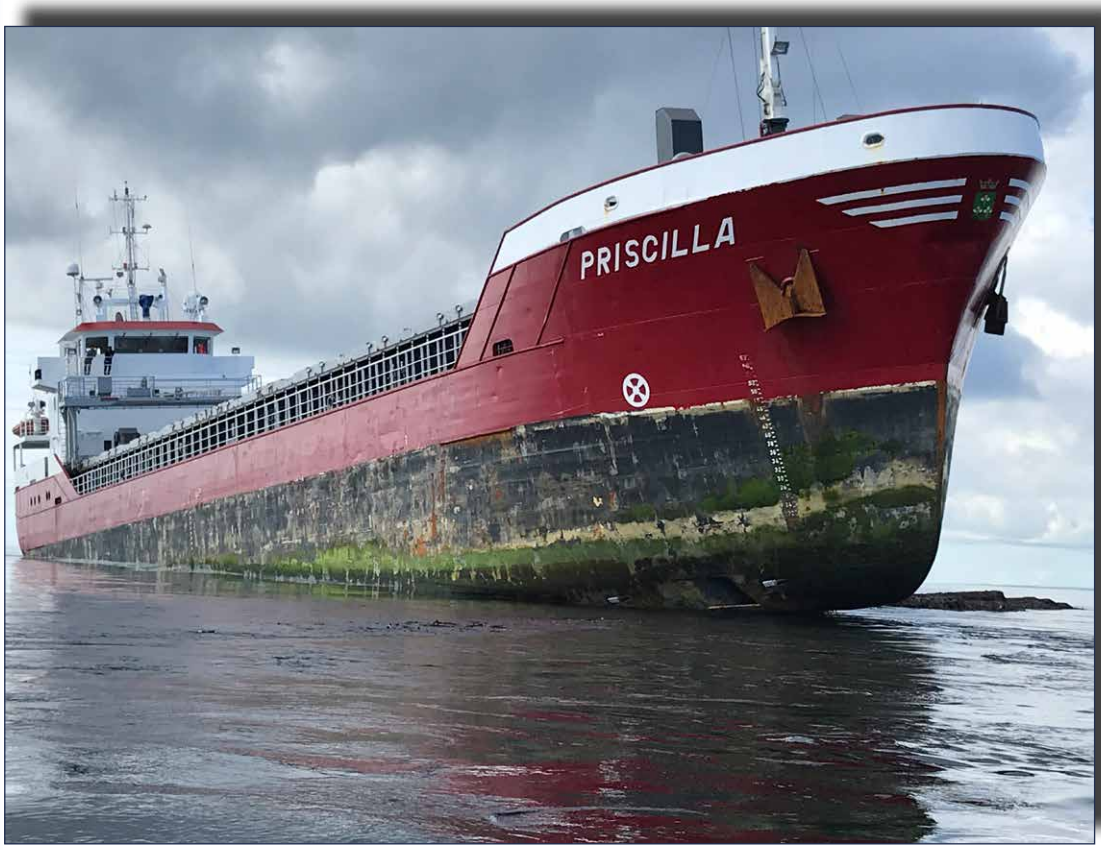
Report on the investigation of the

grounding of the general cargo vessel

Priscilla

on Pentland Skerries, Pentland Firth, Scotland

on 18 July 2018



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SERIOUS MARINE CASUALTY REPORT NO 12/2019 OCTOBER 2019

Extract from

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(Accident Reporting and Investigation)

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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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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AB	-	Able bodied seaman
AIS	-	Automatic Identification System
ALRS	-	Admiralty List of Radio Signals
BNWAS	-	Bridge Navigational Watch Alarm System
BV	-	Bureau Veritas
CGOC	-	Coastguard Operations Centre
COLREGS	-	International Regulations for Preventing Collisions at Sea, 1972, as amended
ECDIS	-	Electronic Chart Display and Information System
gt	-	gross tonnage
HMCG	-	Her Majesty's Coastguard
IMO	-	International Maritime Organization
ISM Code	-	International Safety Management Code
kts	-	knots
LOA	-	Length overall
m	-	metre
MAREP	-	Maritime Report
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MLC	-	International Labour Organization, Maritime Labour Convention (2006)
NMOC	-	National Maritime Operations Centre
OMS	-	Operational Management System
OOW	-	Officer of the watch
RNLI	-	Royal National Lifeboat Institution
RO	-	Recognised Organisation
SMS	-	Safety Management System

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
VHF	-	Very High Frequency
VTM	-	Vessel traffic monitoring
VTS	-	Vessel traffic services
VTSO	-	Vessel traffic services officer

TIMES: all times used in this report are UTC+2 unless otherwise stated

Image courtesy of J Biekes

Priscilla

SYNOPSIS

At 0443 on 18 July 2018, the Netherlands registered general cargo vessel *Priscilla* ran aground on Pentland Skerries in the eastern entrance of Pentland Firth, Scotland. Seven days later and after a partial removal of cargo, *Priscilla* was refloated. The grounding caused significant hull damage but there was no pollution or injury.

When approaching Pentland Firth, *Priscilla* was set to the south of its planned track but this was not observed because the officer of the watch did not monitor the vessel's progress for about 2 hours; instead, he sat in the bridge chair and watched videos. It is also possible that the officer of the watch fell asleep periodically.

When the officer of the watch realised that *Priscilla* was off track, there was ample time to regain the planned route. Instead, the officer of the watch chose an alternative route that placed the vessel in imminent danger; this happened because he relied solely on radar data and did not refer to navigational information when making this critical decision. There were no navigational alarms to warn of danger and, although the accident happened at night, no additional lookout had been posted. The bridge navigational watch alarm system was also switched off.

Priscilla's officer of the watch responded to two verbal warnings from shore authorities of the danger ahead. However, the action taken in response to the warnings was not effective and indicated that the officer of the watch did not have sufficient awareness to understand the situation and turn away from danger.

Since the grounding, the Maritime and Coastguard Agency has taken steps to improve the standards of vessel traffic monitoring in Pentland Firth. Additionally, *Priscilla*'s owner has updated onboard procedures; nevertheless, a safety recommendation has been made to the owner to take further steps intended to improve standards of watchkeeping.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *PRISCILLA* AND ACCIDENT

SHIP PARTICULARS	
Vessel's name	*Priscilla*
Flag	Netherlands
Classification society	Bureau Veritas
IMO number/fishing numbers	9411745
Type	General cargo ship
Registered owner	C.V Scheepvaartonderneming Priscilla
Manager	Owner managed
Construction	Steel
Year of build	2009
Length overall	88.97m
Registered length	84.99m
Gross tonnage	2281
Minimum safe manning	5
Authorised cargo	General cargo
VOYAGE PARTICULARS	
Port of departure	Klaipeda, Lithuania
Port of arrival	Silloth, England
Type of voyage	International
Cargo information	3300t of fertiliser in bulk
Manning	6
MARINE CASUALTY INFORMATION	
Date and time	18 July 2018, 0439 (UTC+2)
Type of marine casualty or incident	Serious Marine Casualty
Location of incident	Pentland Skerries, Scotland
Place on board	Hull
Injuries/fatalities	None
Damage/environmental impact	Significant hull damage, no pollution
Ship operation	Normal operation
Voyage segment	Mid-water
External & internal environment	Light airs; calm sea; good visibility; twilight. Air temperature 16°C
Persons on board	6

1.2 NARRATIVE

1.2.1 Events prior to the grounding

Priscilla departed from Klaipeda, Lithuania on 14 July 2018 with a cargo of 3300 tonnes (t) of fertiliser, bound for Silloth, England. Once outside the Skagerrak, *Priscilla* commenced a direct passage across the North Sea towards Pentland Firth **(Figure 1)**.

During the afternoon of 17 July 2018, a meeting was held on the bridge to plan the Pentland Firth transit; the master, chief officer and maritime officer were all present. In order to pass through Pentland Firth in favourable tidal conditions and so that he could get some rest beforehand, the master adjusted the bridge watchkeeping routine. The cadet was directed to keep a bridge watch from 2300 to 0200 that night and the maritime officer would commence his watch at 0200 with the Pentland Firth transit due to commence at about 0500.

Between about 1730 and 1900, the maritime officer was in the mess room with other members of the crew present; he ate a meal and drank two cans of beer to celebrate his birthday. The maritime officer went to his cabin at about 1900 and slept from about 2130 until 0145.

The master was on the bridge as officer of the watch (OOW) from 2000 to 2300 when he handed over to the cadet. The cadet was left alone on the bridge and instructed to call the master every 30 minutes with an update. The maritime officer relieved the cadet at 0200 on 18 July 2018; during their handover, it was confirmed that the maritime officer would call the master and chief officer prior to the Pentland Firth transit.

When the maritime officer took over as OOW, *Priscilla* was on a heading of 280° at a speed of 7.8 knots (kts); it was dark and the sea was calm. *Priscilla* was in track mode steering with the vessel automatically following the track selected in the electronic chart display and information system (ECDIS). The maritime officer then deselected track mode steering and switched on *Priscilla*'s standalone autopilot with the heading set at 279°. He then sat in the chair that was on the port side of the bridge **(Figure 2)** and started watching music videos that were being streamed to his mobile phone via the vessel's wi-fi internet connection.

1.2.2 The grounding

At about 0400, the maritime officer looked at the radar display on the port side of the bridge and realised that *Priscilla* was to port of the planned track **(Figure 3)**. At the same time, he observed two small islands ahead of the vessel painting on the radar display and decided to proceed between them with a plan to alter course to starboard thereafter to regain the planned track.

At 0427 the Orkney vessel traffic services officer (Orkney VTSO) at Kirkwall, Orkney Islands, observed *Priscilla*'s automatic information system (AIS) data and radar contact on his display. The Orkney VTSO was concerned that *Priscilla* was heading into danger towards Pentland Skerries. The Orkney VTSO then made telephone contact with the watch officer at Shetland Coastguard Operations Centre (Shetland

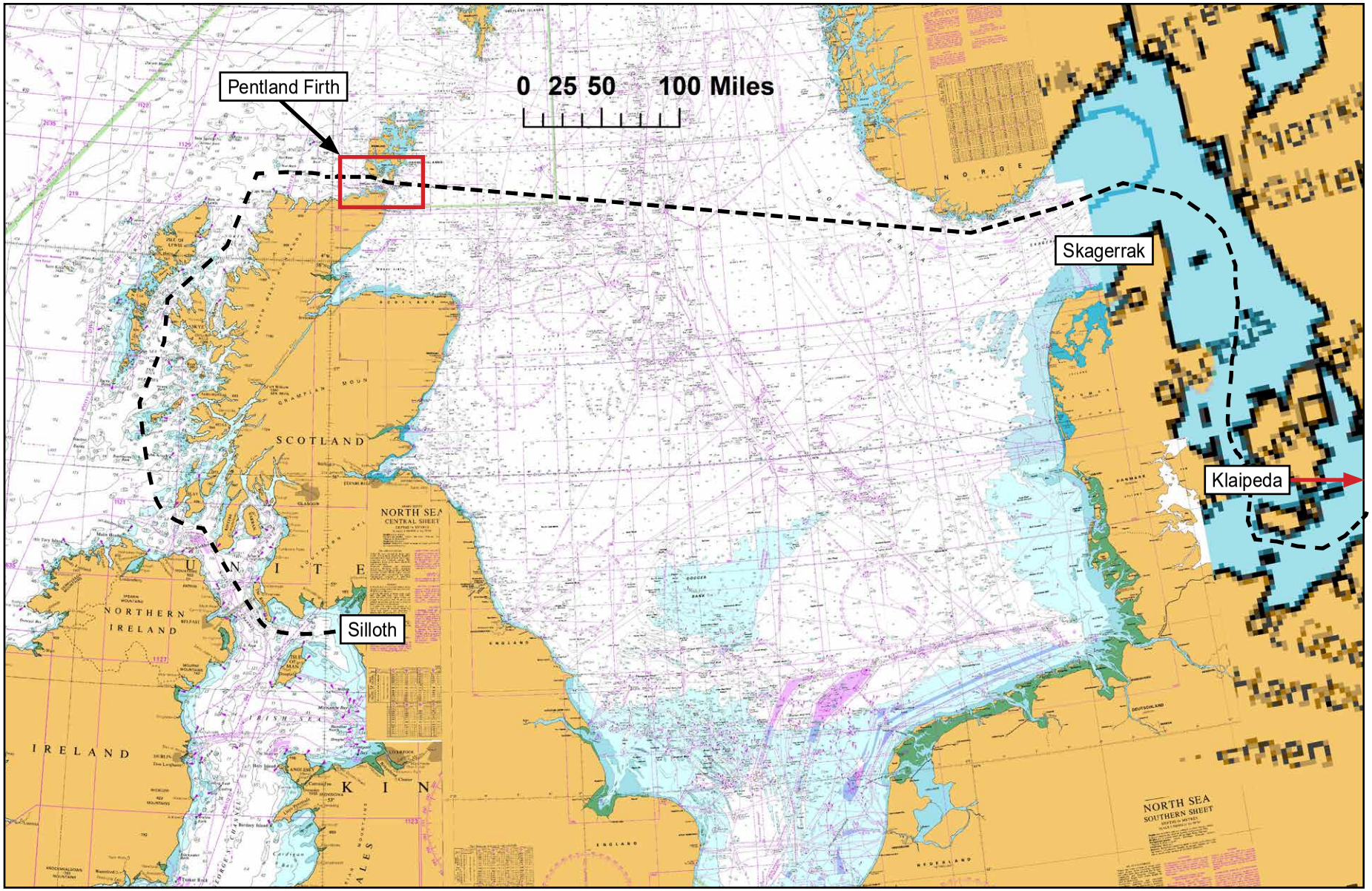

Figure 1: Overview of *Priscilla*'s intended passage from Klaipeda, Lithuania to Silloth, England via Pentland Firth

Figure 2: *Priscilla*'s bridge showing the radar displays, ECDIS, VHF radio, autopilots and bridge chair

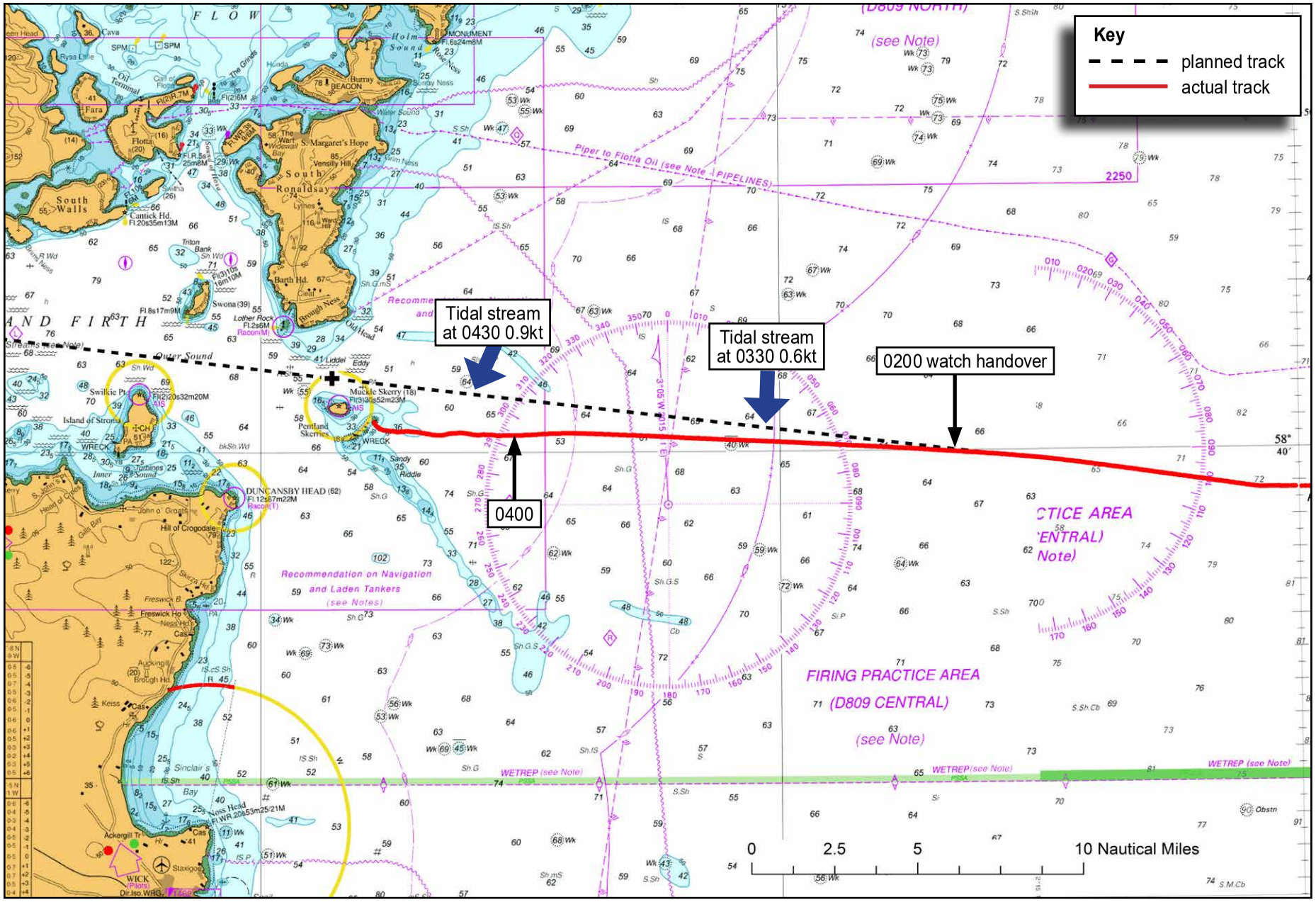

Figure 3: Chart showing *Priscilla*'s planned and actual tracks prior to grounding

CGOC) and raised his concern for *Priscilla.* The watch officer at Shetland CGOC identified *Priscilla* from its AIS data and agreed with the concerns of the Orkney VTSO.

The Shetland CGOC watch officer then hailed *Priscilla* using very high frequency (VHF) radio and *Priscilla*'s OOW responded to the first call. A transcript of the conversation is at **Table 1**.

Time	Station	VHF transmission
0430:58	Shetland CGOC	*"Priscilla, Shetland Coastguard, 67 over"*
0431:00	*Priscilla*'s OOW	*"This is Priscilla on 67 go ahead"*
0431:24	Shetland CGOC	*"Priscilla this is Shetland Coastguard, good morning sir. I can see you on AIS, are you aware you are 2 miles ahead from the Pentland Skerries, they are 2 miles on your bow. We are concerned you are on a collision course over"*
0432:05	*Priscilla*'s OOW	*"Ah, yes sir we are seeing what you are seeing. Indeed, we are 2 miles from the change course, indeed you are right with what you see. I am sorry for that, for the inconvenience we will alter"*
0432:25	Shetland CGOC	*"Priscilla, Shetland Coastguard, roger, yes sir, confirm you will alter course to avoid the rocks, Pentland Skerries over"*
0432:30	*Priscilla*'s OOW	*"Yes sir, thank you for the heads up. We will see later"*
0432:33	Shetland CGOC	*"Roger, Thank you Priscilla"*

Table 1: Transcript of the VHF conversation between Shetland CGOC and *Priscilla*'s OOW

The Orkney VTSO continued to monitor *Priscilla*'s movement and did not observe any alteration of course, so assessed that the vessel was still heading into danger. The Orkney VTSO then called *Priscilla* by VHF radio; a transcript of this conversation is at **Table 2**.

Time	Station	VHF transmission
0439:26	Orkney VTSO	*"Priscilla, Priscilla, Priscilla this is Orkney VTS, Orkney VTS, Orkney VTS calling on channel 16 over"*
0439:29	*Priscilla*'s OOW	*"This is Priscilla replying"*
0439:31	Orkney VTSO	*"Priscilla this is Orkney VTS. Warning* (with operator emphasis) *you are running on to rocks, there is clear water to the south. I say again, there are rocks ahead of you there is clear water to your south, over"*

Time	Station	VHF transmission
0439:55	*Priscilla*'s OOW	*"We are approaching a danger, I will change course"*
0440:05	Orkney VTSO	*"Yes sir, there is clear water to the south at this time. Thank you"*
0440:15	*Priscilla*'s OOW	*"I need to go to starboard right"* (stated as a question)
0440:32	Orkney VTSO	*"Priscilla this is Orkney VTS, for information there are rocks 5 cables*[1] *ahead of you, there are rocks 5 cables ahead of you. There is clear water to the south, over"*
0440:48	*Priscilla*'s OOW	*"Ah, I need to change course to the south"* (stated as a question)
0441:00	Orkney VTSO	*"Priscilla this is VTS there is rocks 5 cables ahead of you, 5 cables ahead of you. There is clear water to the south, over"*

Table 2: Transcript of the VHF conversation between Orkney VTSO and *Priscilla*'s OOW

During the VHF conversation with Orkney VTSO, *Priscilla*'s OOW reduced the range scale on the port radar and added a chart overlay to the display. He then realised that his plan to pass between the two islands ahead was unsafe as there was a shallow reef between the islands. The OOW then selected hand-steering and put the rudder full to starboard in an attempt to steer away from the reef. At 0443, *Priscilla* grounded on Pentland Skerries at a speed of 7kts **(Figure 4)**. Seconds prior to grounding, the ECDIS depth alarm sounded as *Priscilla* crossed over the 10 metre (m) depth contour.

Figure 4: *Priscilla* aground with Pentland Skerries lighthouse visible in the background

[1] One cable = 0.1 nautical mile or 200 yards; 5 cables = 0.5 nautical mile or 1000 yards

1.2.3 Post-grounding actions

When *Priscilla* grounded, the master was already awake and getting dressed in preparation for the Pentland Firth transit; the force of the grounding threw him on to his bunk. He immediately went to the bridge and realised the vessel was aground. The master made one attempt to free *Priscilla* by putting the engine full astern, but this was unsuccessful. The master sounded the general alarm and the crew was mustered and accounted for.

At 0446, Shetland CGOC called *Priscilla* on VHF radio. *Priscilla*'s master responded by confirming that the crew was safe, searches for damage were underway and tug assistance was required. Shetland CGOC then requested a Royal National Lifeboat Institution (RNLI) lifeboat to stand-by *Priscilla* and a "mayday relay" was broadcast on *Priscilla*'s behalf.

In the following days and at high water, two unsuccessful attempts were made to haul *Priscilla* off the rocks using tugs. On 20 July 2018, a salvage team arrived on board *Priscilla* and 3 days later, after a partial cargo discharge **(Figure 5)**, the vessel was refloated and towed clear of Pentland Skerries. Following a diver inspection at Scapa Flow, *Priscilla* proceeded under its own power to Silloth to complete the cargo discharge. Thereafter, *Priscilla* proceeded to dry dock in Swansea, Wales where a full inspection revealed extensive structural damage throughout the forward section of the hull, including gouging and distortion to the shell plating **(Figure 6)**.

Image courtesy of H Shaw

Figure 5: Partial cargo offload from *Priscilla* when aground

1.3 ENVIRONMENT

In the accident location, the sea was calm, it was light airs and visibility was good in darkness; the outside air temperature was 16°C. The predicted tidal stream for 0330 was in a southerly direction at 0.6kt, and by 0430 had increased to 0.9kt in a south-westerly direction **(Figure 3)**. *Priscilla* grounded on a falling tide 1 hour after high water. It was twilight as the accident happened after morning civil twilight had occurred at 0421 but before sunrise at 0529.

Figure 6: *Priscilla* - detail of hull damage

1.4 *PRISCILLA*

1.4.1 Overview

Registered in Rotterdam and built in 2009, *Priscilla* was 2,281gt and had a length overall of 88.97m. *Priscilla*'s main propulsion was provided by a Wartsila 1440 kilowatt engine giving a service speed of 10kts.

Priscilla's owner was a Dutch national who also worked on board the vessel as master, although he was not on board at the time of the accident. Chartering and crewing of the vessel was managed by Royal Wagenborg in The Netherlands and it traded throughout north-west Europe.

1.4.2 Bridge layout and equipment

Priscilla's integrated bridge **(Figure 2)** incorporated a SAM Electronics ECDIS. The system was certified for use as the primary means of navigation on board, and provided a host of navigational safety features including warning sectors, safety corridors, safety contour and safety depth settings.

The ECDIS was loaded with an outfit of suitable and updated electronic charts and there was an appropriate library of nautical publications on board. The master, chief officer and maritime officer had all attended generic ECDIS training and completed onboard familiarisation for their SAM Electronics system. The onboard ECDIS familiarisation checklist included training on the use of safety corridors and warning sectors.

There were two radar displays **(Figure 2)**; both were capable of showing the planned route, and the port side display could show chart data to the operator. As *Priscilla* was approaching danger, the port radar display was on the 12-mile range scale without chart data on display and the starboard radar display was on the 24-mile range scale.

Priscilla was fitted with two autopilot systems. The Trackpilot autohelm was part of the SAM Electronics integrated bridge and could be operated in heading, course or track modes. In track mode, the vessel would automatically follow the selected route from ECDIS. There was also an Anschutz Pilotstar autopilot **(Figure 2)** that was independent of the integrated bridge system and steered the vessel on a compass heading selected by the OOW. There was no onboard policy for the use of autopilots; instead, the system selected was at the discretion of the OOW.

Priscilla's echo sounder incorporated an audible depth alarm. At the time of the grounding the echo sounder was on; the status of the alarm setting has not been determined.

Priscilla's bridge navigational watch alarm system (BNWAS) was located on the starboard side of the main console **(Figure 2)**. When activated, the BNWAS would alarm if the OOW did not manually reset it every 12 minutes. BNWAS audible alarms were also fitted in other compartments on board to alert crew in the event of the OOW becoming incapacitated. *Priscilla*'s safety management system (SMS) stated that '*during one-man watch, the bridge watch alarm should be switched on'*. On board *Priscilla*, the master's policy was that use of the BNWAS was at the discretion of the OOW and it was rarely used. At the time of the grounding and during the cadet's watch, the BNWAS was switched off.

Priscilla's ship-to-shore communications included satellite and mobile data systems that provided internet access for the crew; there was also a wi-fi system on board allowing mobile devices to connect to the internet wirelessly.

The bridge chair was on the port side and its position could be adjusted but it was not routinely moved. When seated in the chair in the position in use on the day of the accident, it was not possible for the OOW to operate the ECDIS, BNWAS, autopilot or either of the radars **(Figure 2)**.

1.4.3 Safety management

Priscilla's safety was managed by its owner and internal audits were outsourced to Amsys Ship Management Limited (Amsys). *Priscilla* was operated under a generic SMS supplied by Amsys, and the vessel's operations were certified as compliant with the requirements of the International Maritime Organization's (IMO) International Safety Management Code (ISM Code); the Safety Management Certificate was valid until 16 September 2019. A document of compliance had been issued to the owner certifying the company's ISM compliance valid until 16 September 2019.

The owner was the designated person for *Priscilla* and the SMS included contact details for staff from Amsys who could be contacted in an emergency.

The SMS was held in a file on the bridge and contained instructions and checklists for shipboard operations. The SMS was separated into ten chapters and incorporated 31 operational forms/checklists, one of which was titled 'voyage

planning' **(Annex A)**. Once completed this checklist formed the passage plan. The SMS did not provide any detailed guidance on passage planning or the use of ECDIS. The SMS also contained risk assessments, including one titled 'Route Planning' **(Annex B)**.

The SMS contained no guidance on the use of mobile phones on the bridge. *Priscilla*'s crew used their mobile phones for personal and business use on the bridge without restriction.

The SMS stated that alcohol was not to be consumed in the 4 hours prior to a duty period. There was no alcohol testing equipment on board and none of the crew were tested for alcohol consumption after the accident.

1.4.4 Audits

On 31 October 2016, an auditor from Bureau Veritas (BV) carried out an intermediate audit to verify that *Priscilla* continued to comply with the ISM Code. BV was acting as the recognised organisation (RO) for the Flag State. The report of the audit did not identify any non-conformities or observations.

The report of Amsys's most recent annual internal audit, dated 23 October 2017, highlighted six non-conformities and two observations, none of which were related to the conduct of watchkeeping or navigation.

Priscilla was subject to a port state control inspection under the Paris Memorandum of Understanding in Lithuania on 1 November 2017. The port state control officer's report noted two defects, both in the engine room, that were rectified before departure.

A periodic audit of the company was carried out by BV on 13 November 2017 in order to endorse the document of compliance. Four observations were raised, none of which related to the conduct of navigation.

1.5 CREW

1.5.1 Overview

Priscilla's crew comprised four Dutch and two Filipino nationals; crew members held the requisite STCW[2] qualification in compliance with the Netherlands Flag State's minimum safe manning requirement. The safe manning arrangement permitted *Priscilla* to be operated with an unmanned machinery space and did not require the presence of a chief engineer when operating in European coastal waters with a port of refuge within 200 nautical miles (nm). Instead, a dual-qualified 'maritime officer' with engineering and deck qualifications was acceptable.

1.5.2 Crew members

The master was a 28-year-old Dutch national who had been employed for 6 years on board *Priscilla* as the maritime officer then chief officer. He joined *Priscilla* 2 weeks prior to the accident on his first contract as master.

[2] International Convention on the Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended

The chief officer was also a 28-year-old Dutch national; he had been working on board *Priscilla* for 2 years as the maritime officer before being promoted to chief officer. This was his second contract as chief officer. The chief officer was also *Priscilla*'s navigating officer and safety officer.

The maritime officer was a 23-year-old Dutch national who held a combined deck and engineering qualification with certification issued in February 2018. The maritime officer typically spent 2 hours a day in the engine room in addition to bridge watchkeeping, and expressed a preference for engineering duties. He had also been experiencing some feelings of anxiety and restlessness caused by the illness of a family member.

The other crew members were two Filipino able bodied seamen (AB), one of whom was the cook, and a Dutch officer cadet.

1.6 NAVIGATIONAL WATCHKEEPING

1.6.1 Watchkeeping standards

STCW Section A-VIII/2, Part 3 required the master of every vessel to ensure that '*watchkeeping arrangements are adequate for maintaining a safe navigational watch*.' Under the master's direction, watchkeeping officers '*are responsible for navigating the ship safely during their periods of duty, when they will be particularly concerned with avoiding collision and stranding*.' It also stated that the lookout '*must be able to give full attention to the keeping of a proper lookout and no other duties shall be undertaken or assigned which could interfere with that task*.'

The STCW Code A-V111/2, Part 3-1 also explained the roles and responsibilities of a vessel's OOW, including that '*during the watch the course steered, position and speed shall be checked at sufficiently frequent intervals, using any available navigational aids necessary, to ensure that the ship follows the planned course*.'

Navigational instructions in *Priscilla*'s SMS stated that the '*officer in charge of the navigational watch is the master's representative and is primarily responsible at all times for the safe navigation of the ship*'. It also required the OOW to '*follow the planned track, except when deviation is required to avoid a dangerous situation'* and that '*any changes of the planned track should be approved by the master*'.

The International Labour Organization's Maritime Labour Convention (MLC), 2006, as amended, sets out the requirements for seafarers' working and living conditions. The MLC stated that seafarers' periods of rest must be at least 10 hours in any 24-hours and a minimum of 77 hours in any 7-day period. If there are two or more periods of rest in any 24 hours, one must be at least 6 hours in duration.

1.6.2 Routines on board *Priscilla*

The master, chief officer and maritime officer kept the following bridge watches at sea:

- 0000-0400 and 1200-1600: maritime officer
- 0400-0800 and 1600-2000: chief officer
- 0800-1200 and 2000-0000: master

Irrespective of the watchkeeping routine, the master was always on the bridge when *Priscilla* was in pilotage waters, including Pentland Firth.

1.6.3 Lookout

The STCW Code A-V111/2, Part 3-1 (15) stated that the OOW may be the sole lookout in daylight provided '*the situation has been carefully assessed and it has been established without doubt that it is safe to do so, full account has been taken of all relevant factors and assistance is immediately available to be summoned to the bridge when any change in the situation so requires*'. The factors to be considered in assessing the suitability of reducing to a sole bridge watchkeeper included: weather conditions, visibility, traffic density and proximity of navigational hazards. This guidance was repeated on the watchkeeping notice posted on *Priscilla*'s bridge.

The Maritime and Coastguard Agency's (MCA) Marine Guidance Note (MGN) 137(M+F) *Lookout During Periods of Darkness and Restricted Visibility* applied to all vessels operating in UK territorial waters. This MGN *strongly advised* masters not to operate with the OOW as the sole lookout during periods of darkness. It also provided a reminder of the formal obligation[3] on all vessels to maintain a proper and effective lookout at all times.

Priscilla's bridge watchkeeping routine allocated additional lookout duties to crew members between 2200 and 0600 **(Annex C)**. However, additional lookouts were not utilised except during restricted visibility as *Priscilla*'s officers placed little value on their presence. Nevertheless, onboard hours of work and rest records **(Annex C)** incorrectly indicated that the ABs had been conducting night watches as lookout.

1.7 PASSAGE PLANNING

1.7.1 Regulatory requirement and onboard guidance

SOLAS[4] Chapter V Regulation 34 required that, prior to proceeding to sea, the master was to ensure that the intended voyage had been planned taking into account the guidance in IMO Resolution A.893(21) *Guidelines for Voyage Planning*. This guidance stated that '*the development of a plan for voyage or passage, as well as the close and continuous monitoring of the vessel's progress and position during the execution of such a plan, are of essential importance for safety of life at sea, safety and efficiency of navigation and protection of the marine environment*.'

The guidance subdivided passage planning into four key stages: appraisal, planning, execution and monitoring. The initial voyage planning appraisal stage involved the gathering of all information relevant to the intended voyage. The next stage required the detailed planning of the whole voyage from berth to berth. The third and fourth stages were the effective execution of the plan and monitoring the vessel's progress during the implementation phase.

Priscilla's SMS required the chief officer, in his role as the navigating officer, to prepare a passage plan for the master's approval in accordance with the voyage planning checklist **(Annex A)**. On completion, the voyage planning checklist formed the passage plan. The chief officer was also required to input the proposed route

[3] International Regulations for Preventing Collisions at Sea, 1972, as amended (COLREGS)

[4] International Convention on the Safety of Life at Sea, 1974, as amended

into the ECDIS. The SMS did not contain any detailed guidance for the use of ECDIS or other methods for fixing the vessel's position including visual, radar or echo sounder.

The SMS contained a 'logbook insert' dated 01 January 2014 **(Annex D)** with instructions for the conduct of watchkeeping, including the requirement for a watch order book. This booklet was required to be used to '*record instructions for the next watch(es). The master…may issue additional watchkeeping instructions, a copy should be kept in this book*.' There was no watch order book in use on board *Priscilla*.

The logbook insert also listed the conditions under which the OOW was required to call the master. These included:

- '*Failure to sight land, or a navigation mark or obtain soundings at the expected time*;
- *if difficulty experienced in maintaining course*;
- *if the ship meets any hazard to navigation,* or;
- *if in any other emergency or if in any doubt*'.

1.7.2 Conduct of navigation on board *Priscilla*

The chief officer had planned *Priscilla*'s voyage while the vessel was alongside in Klaipeda. Segments of the route used on previous voyages were merged with new routes to create the overall voyage plan. The ECDIS safety depth was set at 10m, but no safety corridors or warning sector were selected.

After completing the voyage planning checklist **(Annex A)**, the chief officer discussed it with the master, who then signed the paper copy. Once underway, *Priscilla*'s bridge watchkeeping officers monitored progress by visually checking the vessel's position in relation to the ECDIS track.

The convention on board *Priscilla* was for the OOW to complete hourly log readings in the bridge log, including the vessel's position. There were no positional log entries made after 0000 local time on 18 July 2018.

1.8 PENTLAND FIRTH

1.8.1 Overview

Pentland Firth is the sea passage between the Scottish mainland and the Orkney Islands **(Figure 7)**. It is used by shipping traffic passing in both directions between the Atlantic Ocean and North Sea, as well as by vessels proceeding in and out of Scapa Flow. The area is notorious for extreme tidal and sea conditions that must be considered when passage planning.

Pentland Skerries **(Figure 7)** is a group of uninhabited islands lying to the east of the entrance to Pentland Firth. Muckle Skerry is the largest island in the group and home to the Pentland Skerries lighthouse, which has an elevation above sea

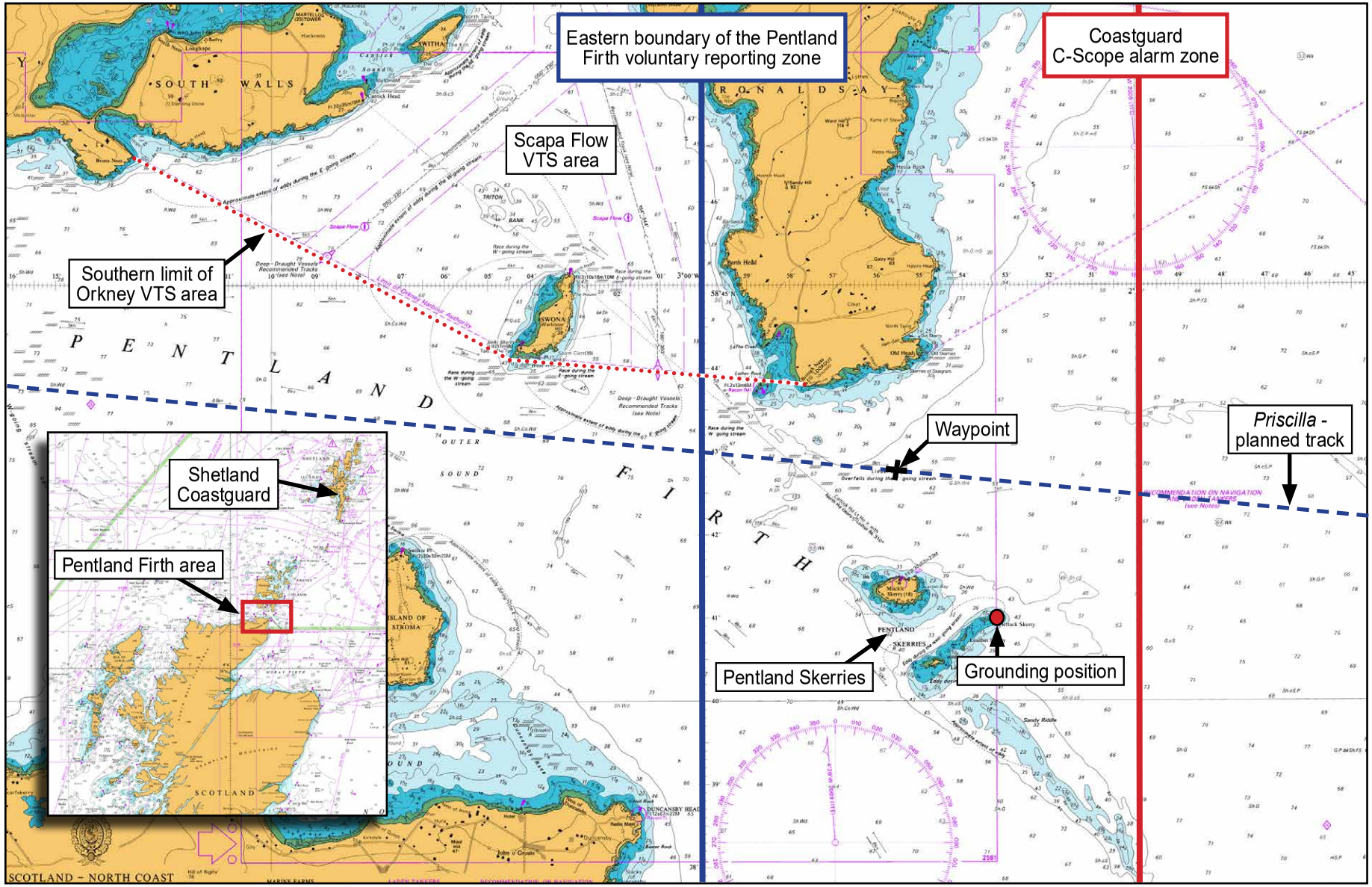

Figure 7: Chart showing Pentland Firth, *Priscilla*'s planned track, Orkney VTS limit, the boundary of the Pentland Firth voluntary reporting scheme and the coastguard's C-Scope alarm boundary

level of 52m and a nominal range of 23nm. The other, smaller islands in the group are Clettack Skerry[5], Louther Skerry and Little Skerry that form a single, shallow, treacherous, rocky reef lying to the south-east of Muckle Skerry.

1.8.2 Ship reporting schemes

Ship reporting schemes enhance safety of life at sea, safe navigation and environmental protection by monitoring shipping traffic in designated areas of potential risk. Mandatory schemes are approved by the IMO and vessels are obligated to comply with the reporting requirement as set out in SOLAS Chapter V, Regulation 11. Coastal states may also promulgate voluntary reporting schemes that have similar objectives, and vessels are strongly urged to participate.

Pentland Firth has a voluntary ship reporting scheme. Details of the system were promulgated in the Admiralty List of Radio Signals Volume 6[6] including the area covered **(Figure 7)**, and the procedure for vessels to make a maritime report (MAREP) 1 hour before entering, and again on departure. *Priscilla* did not make this report, which would have been due at about 0400, 1 hour prior to entering the zone.

1.8.3 Coastguard operations

UK coastguard operations were managed by the National Maritime Operations Centre (NMOC) in Fareham, England and a network of ten regional coastguard operations centres (CGOC). Each of the CGOCs had responsibility for a zone of coastline and adjoining sea area. Zone flexing was a procedure that allowed responsibility for zones to be passed between CGOCs to ensure even workloads across the network.

Vessel traffic monitoring (VTM) was a core responsibility for the coastguard, and its policy document stated that its aim was '*to enhance the safety and efficiency of maritime traffic. This includes; improving the response to incidents, accidents or potentially dangerous situations at sea (including search and rescue and maritime security) and contributing to better prevention and detection of pollution by ships*.'

C-Scope was the coastguard's primary VTM system. C-Scope used AIS data to display shipping contacts overlaid on chart information; alert zones could be set around hazards with visual and audible alarms being triggered when vessels crossed the alert zone boundaries. Coastguard procedures stated that '*Vessel Traffic Monitoring will be carried out at each station by having at least one terminal logged into C-Scope at the correct VTM area*.'

The coastguard's operational management system (OMS) provided guidance to watch officers on procedures to follow in response to potential emergencies. When a vessel was observed heading into danger, the OMS advised use of the following terminology when issuing an alert using voice communications:

> *'Warning, according to my coastguard equipment, on your present course you appear to be running into danger. What are your intentions? Over'*

[5] *Priscilla* grounded on rocks just to the west of Clettack Skerry

[6] NP 286(1)

All coastguard officers were trained in VTM procedures and all CGOCs had the necessary manpower and equipment to fulfil the VTM responsibility, with zone flexing available to sustain manageable workloads across the network.

1.8.4 Shetland Coastguard Operations Centre

The Pentland Firth voluntary reporting scheme was managed by Shetland CGOC, which was responsible for monitoring traffic and logging MAREPs. On the night of *Priscilla*'s grounding there were two coastguard officers on duty at Shetland CGOC when the suggested level was three members of staff. At the same time, the national coastguard network was manned by 33 officers, exceeding the 31 required. As a result, zone flexing was used between 2300 and 0000 local time on the night of the accident to transfer control of Shetland's zone to Dover CGOC to allow the two coastguard officers at Shetland to have a meal break. When this zone flexing was utilised, Dover CGOC took full responsibility for Shetland CGOC's zone, including the monitoring of the Pentland Firth voluntary reporting scheme.

In Shetland CGOC **(Figure 8)** the C-Scope system was installed on three of the six operator terminals. Each of these terminals had been configured to provide an audible and visual alarm to the duty officers when a vessel entered the C-Scope alert zone around the Pentland Firth **(Figure 9)**.

On the night of *Priscilla*'s grounding, the C-Scope system in Shetland CGOC was not being monitored as neither coastguard officer had logged into a terminal with operational C-Scope. Additionally, *Priscilla* did not transmit a MAREP, which meant that the officers on duty at Shetland CGOC were unaware of the unfolding situation until the phone call from the Orkney VTS [Section 1.2.2].

1.8.5 Orkney vessel traffic services

Orkney Islands Council's Marine Services Department operated an information level vessel traffic service (VTS) from its operations room at Scapa Flow. This service was provided to vessels in or approaching the Scapa Flow VTS area **(Figure 7)**. An information level service provides essential and timely information that may include traffic updates, weather forecasts, notices to mariners and the status of aids to navigation, but does not involve the direction of shipping movements. The Orkney VTS operations room was continuously manned, and situational awareness was achieved using radar and AIS surveillance as well as VHF radio. Shipping traffic transiting Pentland Firth did not cross into the Orkney VTS area of responsibility; nevertheless, these vessels were usually detected and displayed on the VTS operator's display.

There was no requirement for the Orkney VTS watchkeeper to monitor *Priscilla*, yet he was concerned that it was heading towards Pentland Skerries and made the decision to alert Shetland CGOC.

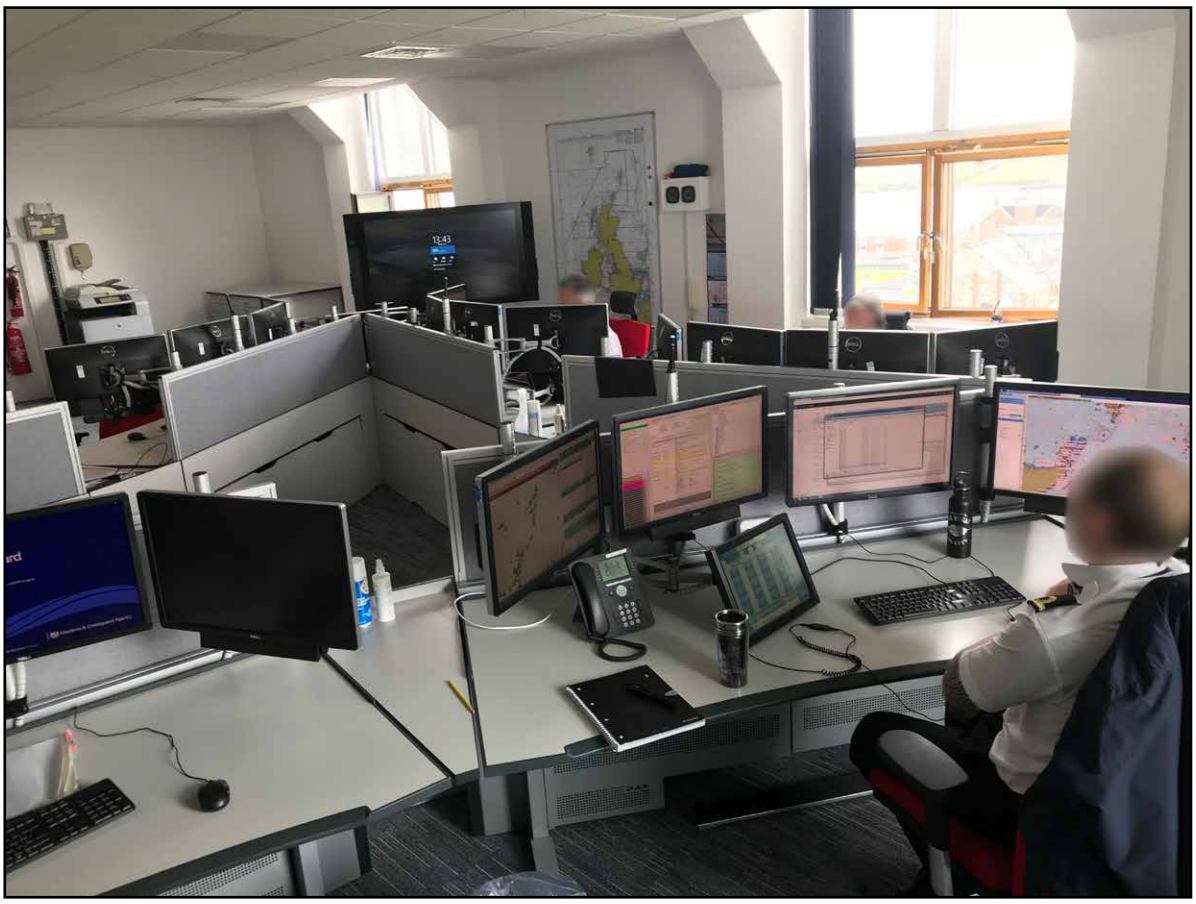

Figure 8: Shetland Coastguard operations room

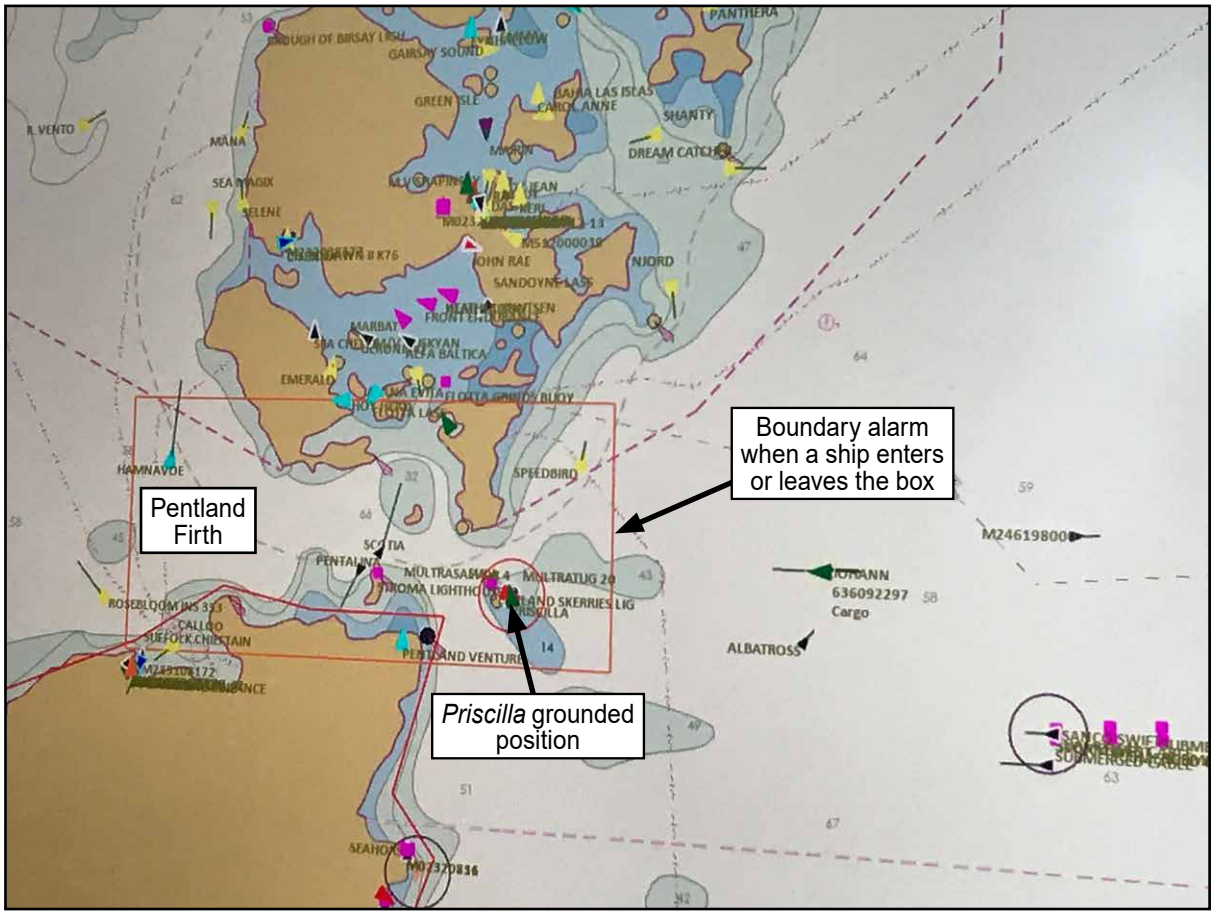

Figure 9: Shetland Coastguard's C-Scope display showing the alarm boundary

1.9 RECONSTRUCTION

1.9.1 Set-up and limitations

Priscilla's grounding was reconstructed in a bridge simulator[7]. The aim of the reconstruction was to gain an appreciation of the environment of the accident and potential factors influencing decision-making. *Priscilla*'s movement for the 1-hour period prior to grounding was reconstructed using AIS track data. Observations were made visually and using radar and ECDIS displays at various range scales and settings. The simulated vessel characteristics were those of a small cargo vessel, similar but not identical to *Priscilla*; manoeuvring actions just prior to grounding were not reconstructed. The radar and ECDIS equipment in the simulator differed from *Priscilla* and the exact settings from the time of the accident were unknown; however, these issues were not assessed to have made any significant impact on the aim of the reconstruction.

1.9.2 Observations

The key observations made during the reconstruction were:

- The Pentland Skerries lighthouse was visible throughout, observed on *Priscilla*'s starboard bow.
- All four islands in Pentland Skerries painted on radar on the 12-mile range scale with Muckle Skerry and Little Skerry observed as significantly larger targets than Louther Skerry or Clettack Skerry.
- Muckle Skerry's radar return was assessed as suitable for a radar parallel index.
- Throughout the simulation, the radar display ship's head marker was passing between Muckle Skerry and Little Skerry.
- Pentland Skerries were visible in the twilight conditions and the Orkney Islands and Scottish mainland were just visible in the distance.

1.10 PREVIOUS OR SIMILAR ACCIDENTS

1.10.1 Overview

The MAIB holds records of 194 groundings of cargo vessels between 500gt and 3000gt that occurred in UK waters between 2008 and 2017. Nine of these groundings, six of which occurred when the vessel was on passage, resulted in a full MAIB investigation and a published report. In five of the six groundings where the vessel was on passage, the BNWAS was switched off and there was no additional lookout on the bridge. Other recurring themes in these accidents include: ineffective use of ECDIS, poor standards of watchkeeping, insufficient passage planning and falsification of hours of work and rest records.

[7] The reconstruction of *Priscilla*'s grounding was undertaken with the assistance of South Shields Marine School

1.10.2 Capsize and foundering of *Cemfjord* – MAIB report 8/2016

On 2 January 2015 the Cyprus registered cement carrier *Cemfjord* capsized in violent sea conditions in Pentland Firth; all eight crew members perished. One outcome of the MAIB investigation was a safety recommendation to the MCA to review the arrangements for the safety of shipping in Pentland Firth. In response to this recommendation, the MCA commissioned a study by Marico Marine. One of the recommendations in Marico Marine's subsequent report was to ensure that '*thorough, documented procedures are introduced with vessel traffic monitoring to ensure that all coastguard officers are trained and practised in managing a reporting scheme, no matter where in the UK*.'

SECTION 2 - ANALYSIS

2.1 AIM

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

2.2 OVERVIEW

Priscilla ran aground on Pentland Skerries at night in calm sea conditions, fine weather and good visibility. The grounding occurred because *Priscilla* was set to the south of the planned track and the OOW did not take appropriate action to resolve this. Instead of returning to the planned track, the OOW chose an alternative route that took the vessel over a charted reef of rocks.

This section of the report will explore the reasons why *Priscilla* was allowed to drift off track, the subsequent decision-making and why interventions by Shetland CGOC and the Orkney VTSO did not prevent the grounding. It will also discuss the contributing factors including: passage planning, watchkeeping standards, the use of electronic navigation aids and traffic monitoring in Pentland Firth.

2.3 THE GROUNDING

2.3.1 The drift off track

Before the maritime officer took over as OOW, *Priscilla* was in track mode steering, following the planned track in the ECDIS. When the maritime officer took over, he changed from track mode steering to the standalone autopilot; thereafter, *Priscilla* was following the selected heading of 279°. This decision by the OOW to use the standalone autopilot allowed the southerly tidal stream to set *Priscilla* off track to the south **(Figure 3)**. Other than a personal preference, it has not been possible to determine exactly why the maritime officer chose the standalone autopilot; however, there were no onboard procedures or direction from the master to guide the OOW when making his decision.

After switching over the autopilot mode, the OOW then sat in the bridge chair and started watching music videos on his mobile phone. Seated and alone on the bridge in the middle of the night was an environment that created a very high risk of the OOW falling asleep, and it is possible that he did so periodically between about 0230 and 0400.

When seated in the bridge chair, the OOW was unable to operate or interact with any of the navigational equipment or cancel the BNWAS **(Figure 2)**. This meant that, whether awake or asleep, and for about 2 hours, the OOW was unaware of *Priscilla*'s gradual deviation from the planned track.

2.3.2 Management of the deviation off course

When the OOW looked at the port radar display at about 0400, he realised that *Priscilla* was well to the south of the planned track. The opportunity to alter course to starboard at this point and return directly to the planned route was not taken. This investigation has not established a definitive reason why this did not happen.

However, it is likely that the OOW was anxious about his perceived mistake of allowing the vessel to drift off track and might not have wanted to alert the master, which could have been the case had an alteration of course been made. This analysis is underpinned by the fact that the OOW did not call the master, which he was obliged to do [Section 1.7.1] when he discovered that the vessel had not been kept on track.

Therefore, and instead of immediately regaining the planned track, the OOW decided to steer between two islands that were painting on radar ahead. **Figure 10** is an illustration of a reconstructed radar display showing the OOW's intended passage between the islands. However, the OOW made no reference to the ECDIS display when making this decision, and the chart overlay function on the radar was not selected. This means that the decision to pass between the islands was based solely on radar data and not navigational information. As a result, the OOW was unaware that the islands ahead formed part of a shallow, dangerous reef and his revised plan was unsafe as it took *Priscilla* directly into this danger.

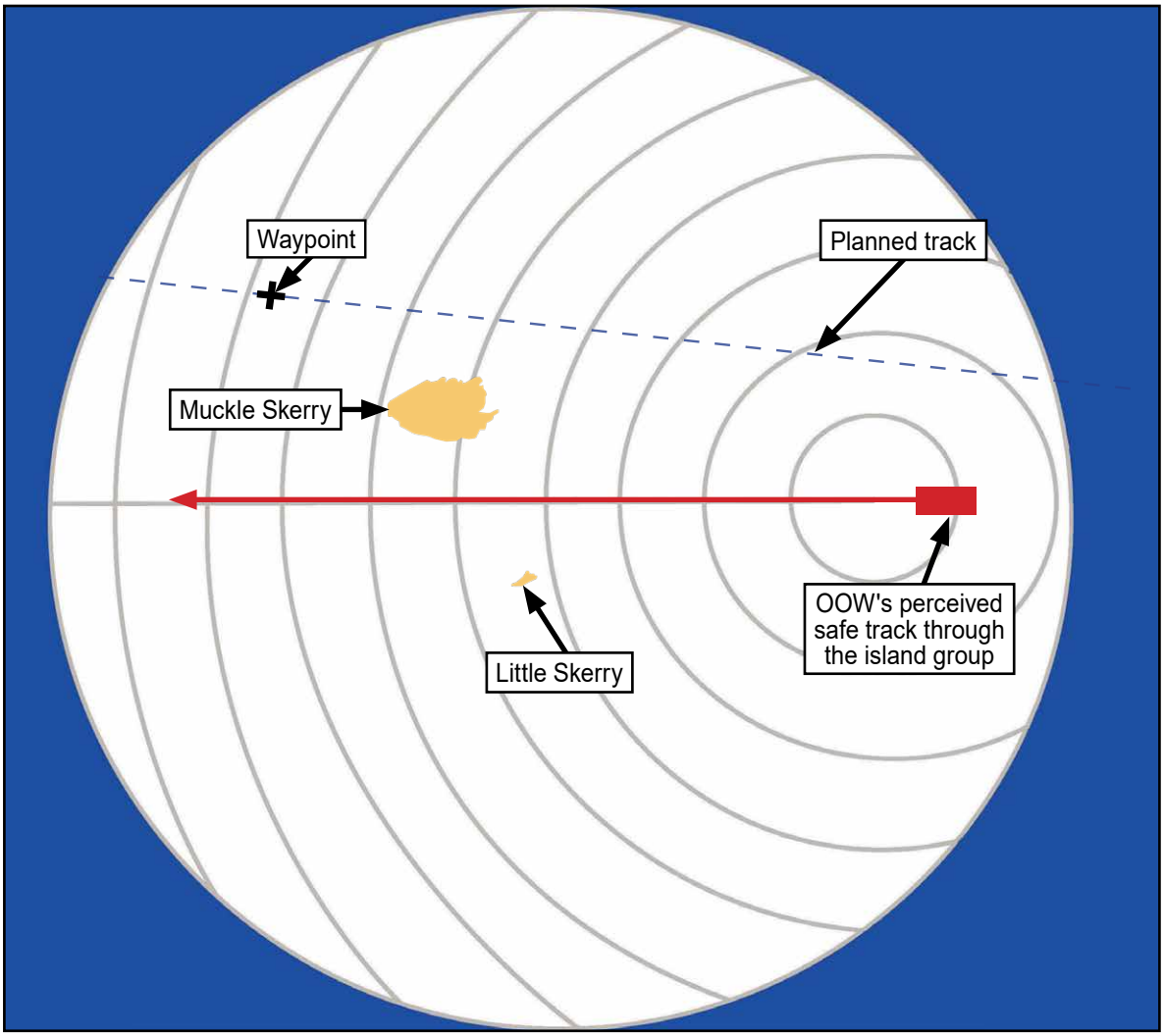

Figure 10: Reconstruction of the radar display to illustrate the OOW's perceived safe plan passing between the islands on radar

2.3.3 Shore interventions

At 0430 and with Pentland Skerries about 2nm ahead of the vessel **(Figure 11)**, Shetland CGOC contacted *Priscilla* by VHF radio. The OOW answered the call, acknowledged the situation and stated that an alteration of course would be made. When the coastguard officer sought confirmation that avoiding action would be taken, the OOW stated "*we will see later*" **(Table 1)**. This response was vague and did not offer a categoric statement that action to avoid danger would be taken. This action by the OOW indicates that he was confident of the plan to pass between the islands ahead.

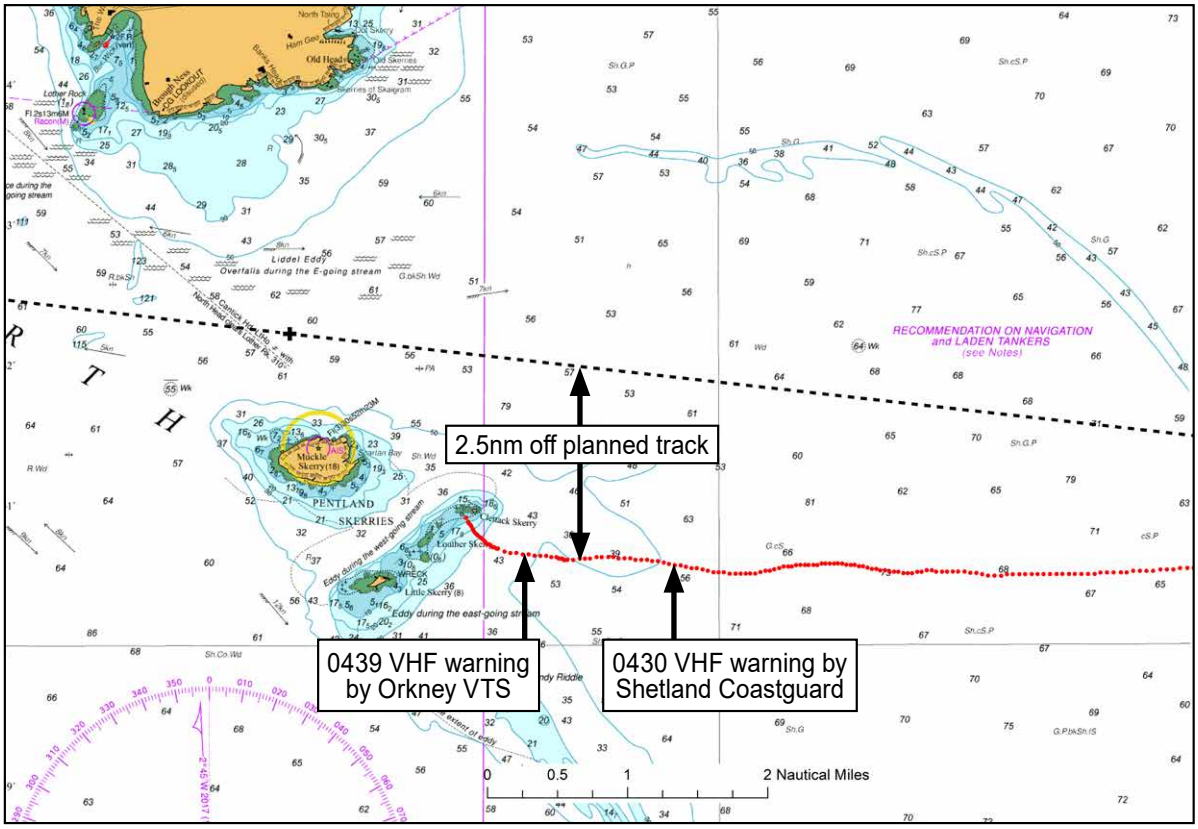

Figure 11: AIS track showing *Priscilla*'s position at the time of the VHF calls from Shetland Coastguard and Orkney VTS

Having made the radio call, the duty team at Shetland CGOC assumed that *Priscilla* would alter course away from danger, so no further action was taken by the CGOC watchkeepers. However, the Orkney VTSO continued to monitor the situation and accurately assessed that *Priscilla* was still heading into danger. Therefore, the Orkney VTSO intervened directly and initiated another VHF radio call to *Priscilla* and specifically used the word "*warning*" to caution *Priscilla*'s OOW. Only at this point, with the rocks about 0.5nm ahead, did the OOW select the chart information on the port radar display and appreciate the navigational danger.

When issuing the warning, the Orkney VTSO told *Priscilla* that there was "*clear water to the south*" five times. With time running out and sensing real danger, it was reasonable for the Orkney VTSO to assume that *Priscilla*'s OOW would have appreciated that a report of safe water to the south would necessitate a turn to port. However, it is apparent from the OOW's responses that he was not sharing the Orkney VTSO's mental model of the situation. In response to the Orkney VTSO's indication of safe water to the south, the OOW said: "*I need to go to starboard right*"

and "*I need to change course to the south*"; both stated as questions **(Table 2)**. It is likely that the suggestion of a turn to starboard was based on the fact that the vessel was to port of the planned track and that would be the natural correction. However, the OOW's agreement that there was a need to change course to the south was not followed by a southerly course alteration. This indicates that the OOW may not even have appreciated that *Priscilla* was heading in a westerly direction and that heading south would entail turning to port. The OOW was evidently disorientated and lacked the situational awareness necessary to avoid danger.

2.4 THE PASSAGE PLAN

2.4.1 Pre-departure

Passage planning is an obligation under SOLAS regulations [Section 1.7.1] and requires consideration of a broad range of documentary and electronic references to prepare a comprehensive and safe plan. *Priscilla*'s SMS required the chief officer to prepare the passage plan and for the master to approve it; the vessel was also well equipped navigationally.

When *Priscilla* was in Klaipeda, the chief officer completed the SMS voyage planning checklist, which then formed the passage plan. However, the SMS contained no guidance on the use of ECDIS for passage planning, and the chief officer did not consider the use of an ECDIS safety corridor or warning sector settings. Ideally, the safety corridor and warning sector values should be tailored to the navigational hazards that might be encountered in order to give sufficient warning. However, this did not happen, primarily due to the lack of onboard guidance. The absence of a safety corridor or a warning sector was evident from a screenshot of the ECDIS display taken after the accident **(Figure 12)**.

The passage plan did not contain any meaningful details of the navigational hazards likely to be encountered and the methods expected to be used to keep *Priscilla* safe. Given that the plan was to pass through Pentland Firth, it would be reasonable for the passage plan to contain details of the navigational marks, anticipated depths and adjustments of the safety corridor for this element of the passage. During each OOW handover, these expected hazards could have been reviewed to ensure awareness of danger ahead. For the maritime officer taking over at 0200, the anticipated sightings of lighthouses and land should have been apparent from the passage plan. Armed with such information, the OOW could have compared sightings of navigational marks and depth soundings with those expected in the passage plan. The absence of this level of planning detail on board *Priscilla* happened because the chief officer's planning was restricted to completing the voyage planning checklist and joining up historical tracks in ECDIS, as this was the accepted routine on board.

Supervision of the preparation of the passage plan and approving it before use helps provide assurance that the plan is fit for purpose. In this case, the master had offered no guidance on the preparation of the plan and had not scrutinised it thoroughly before sailing, although the plan itself had been signed. Given that the master was still in his first 2 weeks in command, this should have been a time for heightened awareness of safety, and thorough checks on the navigation plan.

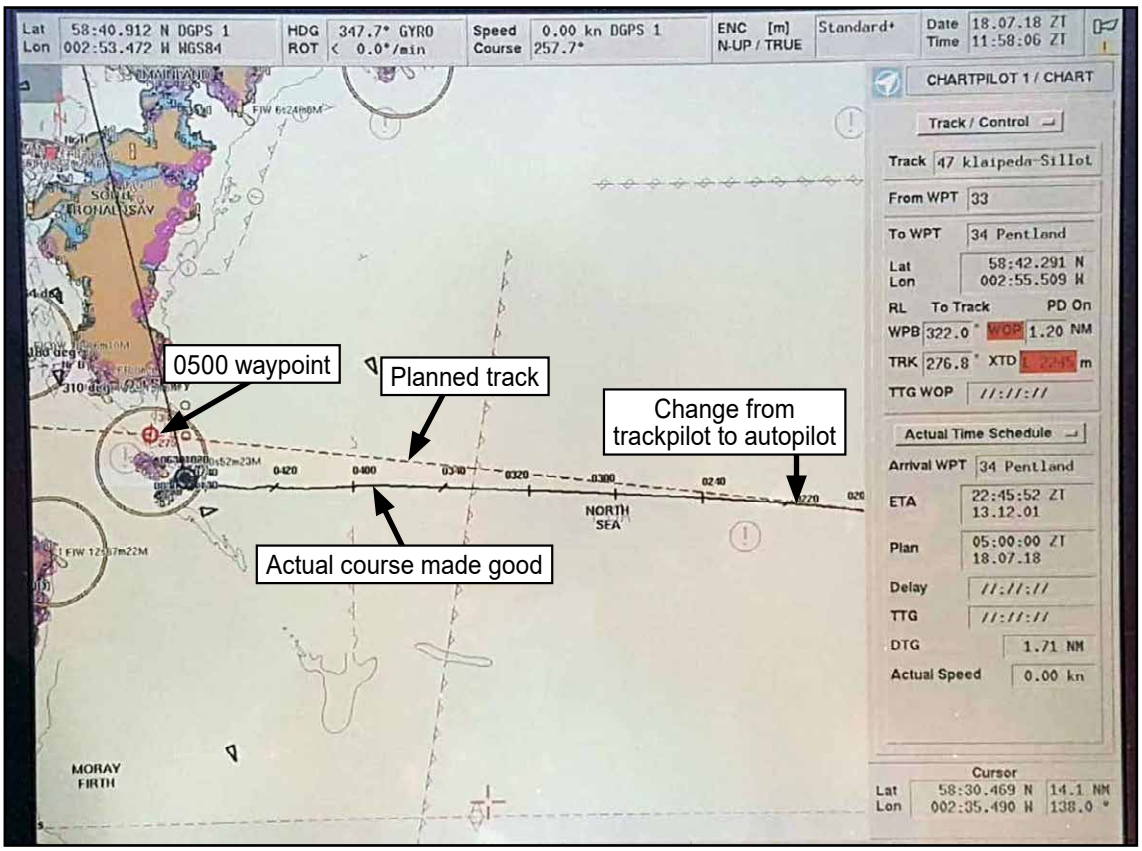

Figure 12: Screenshot of Priscilla's actual ECDIS showing the deviation from the planned track

2.4.2 Passage monitoring

Guidance in the IMO Resolution on passage planning [Section 1.7.1] indicated that a vessel's progress should be effectively monitored throughout the execution and implementation of a passage plan. This means fixing by all available means and consideration of environmental factors and vessel characteristics to remain on track or correct any deviations.

Priscilla's OOWs monitored progress by visually checking the electronically plotted position in relation to the track in the ECDIS or radar systems. The vessel's position was not verified by other means and the fixing interval was not determined as a function of the proximity to danger. The result of this situation was that, when the maritime officer took over the watch, there was little appreciation that there was danger ahead and that monitoring the vessel's position in the approach to Pentland Firth would become increasingly important over the next 2 hours. In particular, the maritime officer was unaware of the expected sightings of land, lighthouses or anticipated changing depths.

Priscilla's ECDIS could have provided an audible and visual alarm had an appropriate safety corridor value been set, alerting the OOW to the fact that the vessel was off track. The 10m safety contour setting was inappropriate as it did not provide sufficient warning to take action to avoid danger; the 20m contour would have been a more helpful alarm setting. *Priscilla*'s officers had all attended generic ECDIS training and completed onboard familiarisation, but it was evident that they were unable to safely and confidently operate the ECDIS as they were unaware of the importance of critical safety settings and associated alarms.

Given the good conditions of visibility, Pentland Skerries lighthouse would have been visual for at least 2 hours as *Priscilla* approached. With a plan to pass north of Pentland Skerries, this lighthouse should have been observed on the port bow with progressive left bearing movement. However, for about an hour before the grounding, Pentland Skerries lighthouse would have been visual on *Priscilla*'s starboard bow. Equally, a radar parallel index on Muckle Skerry or radar overlay in ECDIS would have been a very effective method of monitoring the passage. With an awareness of the navigational environment, radar, ECDIS and visual fixing methods would have provided compelling evidence to the OOW that there was something wrong with the execution of the plan. However, the OOW was not paying sufficient attention to make this observation as he was distracted by mobile phone videos and disinterested in the task. There were also no visible or audible alarms to warn of the danger, primarily due to the lack of onboard procedures and insufficient supervision.

Effective passage monitoring requires a systematic approach to the execution of the plan. The vessel's position should be monitored at a time interval consistent with the proximity to danger, and the OOW should be aware of navigational hazards and the planned methods to avoid them. The full functionality of the ECDIS was not used on board due to limited system knowledge and lack of guidance in the SMS.

2.5 STANDARDS OF WATCHKEEPING

2.5.1 Lookout

The STCW Code stated that, prior to reducing to a lone watchkeeper, the situation has to be properly assessed and all relevant factors considered, including the proximity of navigational hazards. UK guidance [Section 1.6.3] strongly advised masters not to operate with the OOW as the sole lookout during periods of darkness.

Although the term 'lookout' is synonymous with the COLREGS, the purpose of an additional lookout is not solely to report sightings of other vessels. A competent additional lookout can assist the OOW by reporting all sightings, including navigation marks, and can counter fatigue by acting as a stimulus for the OOW. *Priscilla*'s watchkeeping routine **(Annex C)** required an additional lookout to be posted between the hours of 2200 and 0600.

With a crew of just six and potentially significant maintenance demands, there are understandable pressures not to use additional lookouts at night. However, when risk assessing the arrangements for lookout, darkness and the approach to hazardous waters would both be conditions likely to make lone watchkeeping unacceptable. However, this was not the case on board *Priscilla*; the vessel was approaching land at night and the OOW was alone on the bridge. Indeed, the additional lookout was only required by *Priscilla*'s officers when in restricted visibility as they saw little value or benefit from the presence of an additional person on the bridge.

Hours of work and rest records, if used appropriately, can enable vessels' crews and inspecting authorities to identify where action may be necessary to ensure that working practices on board are safe and compliant with international guidance. *Priscilla*'s hours of work and rest records **(Annex C)** were falsified to suggest that additional lookouts were being used when this was not the case. This would mislead auditors into assessing that lone watchkeeping was not the norm.

2.5.2 Fatigue

Alertness and performance tend to be at their lowest during the early hours of the morning as the human circadian rhythm is synchronised with the normal pattern of daytime wakefulness and sleep at night. Guarding against the risk of fatigue requires vessel crews to identify the factors making this more likely and take steps to minimise those risks.

The maritime officer took over the watch at 0200 and the grounding occurred at 0443; a period of time with significant risk to the alertness of watchkeepers. Although the maritime officer had taken some rest before taking over as OOW, he had consumed alcohol and was suffering anxiety and restlessness. When on watch, the maritime officer was seated and alone in darkness on the bridge. All of these factors combined to create a very high risk of the OOW falling asleep.

2.5.3 Watchkeeping routine

With three qualified deck officers on board, *Priscilla*'s bridge team was able to operate a 4 hours on / 8 hours off watchkeeping routine. This complied with the MLC requirement [Section 1.6.1] and would also allow time for other duties such as the maritime officer's engineering responsibility.

The master's decision to adjust the bridge routine in the approaches to Pentland Firth [Section 1.2.1] provided him and the maritime officer some additional time off the bridge, but required the unqualified cadet to stand a watch on the bridge alone at night from 2300 until 0200.

It was the maritime officer's birthday the day before the accident, and he drank some alcohol with his evening meal. He would therefore have appreciated the additional rest time.

Although there was value in planning the Pentland Firth transit, there was no reason to adjust the bridge watchkeeping routine, and the decision to allow the cadet to be the OOW alone at night was not appropriate. With three qualified watchkeepers on board, there was no justification for this decision. The master's decision was also not challenged by any of the other officers on board.

2.5.4 Bridge navigational watch alarm system

Priscilla was fitted with a BNWAS capable of assisting the OOW to keep alert and, in the event of the OOW's incapacitation, alerting the crew. The SMS required that the BNWAS be switched on during periods of lone watchkeeping; however, this was not enforced on board *Priscilla*, where use of the BNWAS was left to the OOW's discretion.

Had the BNWAS been in use during the night of the accident, it would have been necessary for the OOW to leave the bridge chair to reset the alarm on the main bridge console at least every 12 minutes. Resetting the BNWAS would have had the potential to prompt the OOW to monitor the vessel's position as it was adjacent to the ECDIS. Equally, had the OOW fallen asleep, and it is possible that he did so, then the BNWAS alarm on the bridge could have woken him up.

2.5.5 Use of mobile phones

Mobile devices such as phones and tablets, particularly where there is internet access available, can provide a useful additional source of information. However, they can equally be a significant distraction to those assigned critical safety responsibilities such as keeping lookout.

On board *Priscilla*, there was no restriction on the use of mobile phones and the maritime officer was able to watch music videos when on duty as OOW. At a superficial level, this could be seen as a method of staying alert when alone at night on the bridge; however, the reality is that using a mobile device for recreational purposes is a significant distraction from the critical safety task of monitoring the vessel's position.

2.5.6 Watch order book

Priscilla's watch order book provided a formal method for the master to offer guidance and direction to watchkeepers. Instructions can be tailored to the local environment and ensure that settings of navigational equipment are appropriate and actions are taken, or reports made at the right time. An example would be for the watch order book to direct the OOW to report when entering the Pentland Firth voluntary reporting scheme. However, on board *Priscilla*, there was no watch order book in use and the OOW did not make a MAREP report when crossing into the Pentland Firth reporting zone.

2.5.7 Alcohol

Even small amounts of alcohol can have a detrimental effect on watchkeepers' performance, potentially exacerbated by fatigue and anxiety. Consumption of alcohol on board vessels should be controlled, ideally to remove the risk of these potentially detrimental effects. The only policy regarding alcohol on board *Priscilla* was that it should not be consumed in the 4 hours before starting a watch. *Priscilla*'s maritime officer drank some beer during the evening before going on watch. Although it is understood that he had stopped drinking more than 4 hours before the watch started, the risks associated with consuming alcohol should not be underestimated and, if exacerbated by the feelings of anxiety that he was suffering, could have a detrimental effect.

2.5.8 Summary

As *Priscilla* approached danger, none of the aids to safe navigation were in use, and the systems designed to help keep the OOW alert or warn others of his incapacitation had been disabled. With no additional lookout posted and the BNWAS switched off, the OOW was able to watch videos on his phone and lose interest in the safe navigation of the vessel. This situation was underpinned by the absence of detailed guidance in the SMS or specific guidance in the watch order book. Steering by the standalone autopilot and without a safety corridor in the ECDIS, *Priscilla* was susceptible to the tidal stream setting the vessel off course and this deviation did not trigger an alarm to warn the OOW.

It is of concern that this accident is characterised by common causal factors identified in previous investigations into groundings of small cargo vessels while on passage [Section 1.10.1]. The common factors include: the BNWAS being switched off; the absence of a dedicated lookout; and ineffective use of the ECDIS.

Companies and vessel masters must guard against these shortcomings by ensuring high standards of watchkeeping and purposeful supervision on board and from ashore.

2.6 SAFETY MANAGEMENT

The purpose of the SMS was to provide a framework for safe operations at sea and mitigate identified risks. To be effective, an SMS must be continually reviewed to ensure that shipboard operations are conducted safely and efficiently; this should be driven by a commitment from the owner and master to provide a safe working environment. The SMS should also contain policies and procedures for the safe conduct of the vessel, including watchkeeping and navigation.

While there was an SMS in use on board *Priscilla*, the crew placed insufficient value in its content. The SMS did not contain sufficiently detailed guidance or direction for the safe manning of the bridge or utilisation of the navigation equipment. Navigational risks could have been mitigated by SMS guidance on the posting of lookouts, use of BNWAS and ECDIS safety settings. Not using safety equipment such as the BNWAS had become normalised behaviour on board and were evidence of systemically poor safety management.

The purpose of audits is to identify where potential improvements can be made in the safety management of vessels and shipping managers. *Priscilla* held a valid safety management certificate and the owner held a document of compliance; both of these certificates verified compliance with the ISM Code. Nevertheless, taking the events described in this report, there was no evidence that shortcomings in *Priscilla*'s navigational safety had been detected by audits [Section 1.4.4].

Priscilla's officers placed little value on the SMS, the system lacked detail and it did not provide adequate guidance for the safe navigation of the vessel.

2.7 SHETLAND COASTGUARD

Traffic monitoring was a core responsibility of the coastguard, and Shetland CGOC was responsible for managing the Pentland Firth voluntary reporting scheme. The purpose of the scheme was to enhance safe navigation by monitoring shipping traffic in designated areas of potential risk. This undertaking was delivered by Shetland CGOC through the situational awareness provided by the C-Scope system, operated by qualified staff trained in the use of operational procedures [Section 1.8.3].

Priscilla grounded outside the Pentland Firth voluntary reporting scheme but inside the C-Scope alarm boundary **(Figure 7)**. However, *Priscilla* had not been identified or monitored by the watchkeepers at Shetland CGOC. Indeed, the Shetland CGOC officers only became aware of *Priscilla* heading towards the Firth following the phone call from the Orkney VTSO. This happened because the duty officers at Shetland CGOC had not logged on to terminals with operational C-Scope. It was also unhelpful that *Priscilla*'s OOW did not make the MAREP call using VHF radio 1 hour before entering the scheme as this would also have alerted the Shetland CGOC watchkeepers.

The VHF conversation between Shetland CGOC and *Priscilla*'s OOW did not follow the format that was defined within the coastguard's operational procedures; very specifically, the word 'warning' was not used to caution the OOW. The OOW's final remark in this conversation was vague and did not categorically state that action would be taken to avoid danger. Nevertheless, the coastguard watchkeeper did not challenge this response and assumed that *Priscilla*'s OOW would take action. It was not until the Orkney VTSO intervened directly that *Priscilla* changed course, albeit not in the direction advised.

Potential to improve the management of safety of shipping in Pentland Firth was identified in the MAIB's report of the loss of *Cemfjord* in 2015 underpinned by Marico Marine's findings in the subsequent study [Section 1.10.2]. Further efforts have been undertaken by the coastguard [Section 4] to build and sustain high standards of VTM in this potentially hazardous sea area.

SECTION 3 - CONCLUSIONS

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

1. *Priscilla* grounded because it drifted to the south of its planned track and the OOW did not correct this deviation when there was ample opportunity to do so. [2.3.1]

2. Instead of returning the vessel to the planned track, the OOW chose an alternative and unsafe route. This decision was based solely on radar information and had not utilised the navigational information available. [2.3.2]

3. Two verbal warnings of the danger ahead were made directly to *Priscilla* by VHF radio when there was sufficient sea room available to take avoiding action. The response by *Priscilla*'s OOW to the warning from Shetland CGOC was vague, but went unchallenged by the watchkeeper ashore. Despite repeated warnings from the Orkney VTSO, the actions of *Priscilla*'s OOW indicated that onboard situational awareness was insufficient to recognise which way to turn the vessel away from danger. [2.3.3]

4. The OOW's use of a mobile phone for watching music videos when assigned the duty of OOW was a significant distraction; however, there was no guidance or control on board regarding the use of mobile electronic devices. [2.5.5]

5. The decision to reduce to a sole lookout had not been effectively risk assessed taking into account the proximity of navigational hazards and operating at night. [2.5.1]

6. The environment of the bridge at the time of the grounding presented a very significant risk of the OOW falling asleep, and he might have done so periodically. [2.5.2]

7. As the primary means of navigation, *Priscilla*'s ECDIS was not utilised effectively; key safety features, including safety corridors and warning zones that could have provided warning, were not in use. [2.4.2]

8. *Priscilla*'s BNWAS was switched off despite the OOW being alone on the bridge at night. The safety protection that the BNWAS could provide was not fully appreciated on board and its use should not have been left to the OOW's discretion. [2.5.4]

9. *Priscilla*'s SMS did not provide sufficient guidance for the safe conduct of navigation. [2.6]

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

1. The duty officers at Shetland CGOC were unaware of the presence of *Priscilla* and the risk of grounding until prompted by the Orkney VTSO. This happened because the coastguard officers were not monitoring their C-Scope equipment and *Priscilla* had not transmitted a MAREP when approaching the reporting scheme. [2.7]

2. The VHF message issued by Shetland CGOC did not follow coastguard procedures, but specifically omitted the key word ‘warning’ used to alert vessels to danger. [2.7]

3. It was not appropriate for *Priscilla*’s master to direct that an unqualified cadet should be left alone on the bridge as OOW and this decision also went unchallenged by the other officers on board. [2.5.3]

4. Hours of work and rest records for the crew of *Priscilla* suggested that the ABs were keeping night watches as an additional lookout when this was not the case. [2.5.1]

5. Audits of *Priscilla* did not identify shortcomings in the SMS or weaknesses in the conduct of the navigation on board. [2.6]

3.3 OTHER SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT

1. Causal factors in this accident include the BNWAS being off, the absence of a dedicated lookout and ineffective use of the ECDIS; all of which have been identified in previous investigations as recurring safety issues in similar accidents. [1.10.1, 2.5.8]

SECTION 4 - ACTION TAKEN

The **owner of *Priscilla*** has:

- In co-operation with Amsys, conducted an investigation into the causes of the accident. The report of this investigation identified the following causal factors:
    - the inappropriate use of a mobile phone by the OOW;
    - the BNWAS not being in use; and
    - ECDIS safety features not being utilised, specifically the warning sector and safety corridor values.

- Amended *Priscilla*'s SMS to include instructions for:
    - the BNWAS to be on from pilot station to pilot station;
    - ECDIS limits for safety depth, safety contour and warning sector are to be included in the voyage plan;
    - the master's order book to be used, including checking the readiness of the relieving OOW;
    - OOWs are not to be permitted to use mobile phones, and;
    - the posting of dedicated lookouts.

The amended SMS also contained updated instructions on voyage planning, a revised voyage planning checklist and all officers were required to undertake further ECDIS familiarisation.

The **Maritime and Coastguard Agency** has:

- Continued with the analysis of the recommendations and findings from the Marico Marine review of the Pentland Firth vessel traffic reporting scheme.
- Carried out an internal tier 3[8] investigation into this accident, which identified the need for additional staff training.
- Closed Shetland CGOC for 3 days to facilitate a bespoke training package to be carried out with all officers.
- Re-issued VTM policy across the network for local awareness and local training initiatives.
- Conducted a VTM training needs analysis across the network.

[8] A tier 3 review is conducted by the coastguard in all cases where the consequences of the incident management, handling or outcome could have serious implications and could affect the reputational integrity of the MCA.

- Made modifications to the VTM training course for all staff.
- Initiated a procedure where, at 0900 and 2100 daily, all CGOCs call into a network briefing conference call hosted by a network controller at NMOC. During this call each CGOC must now provide a formalised positive statement that their individual zones are being monitored.

SECTION 5 - RECOMMENDATIONS

The **owner of *Priscilla*** is recommended to:

2019/118 Review and improve the safety management system and standards of watchkeeping on board the vessel, specifically ensuring that:

- All aspects of the passage plan are compliant with IMO guidance.
- An internal audit regime is in place to effectively monitor safety management.
- All methods of fixing the vessel's position are utilised effectively.
- Hours of rest are recorded accurately for all crew.
- Crew are prevented from undertaking duties for which they are not qualified.
- A thorough risk assessment is undertaken prior to making the decision to reduce to a lone watchkeeper.

Safety recommendations shall in no case create a presumption of blame or liability

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