Marine Safety Investigation Unit

Transport Malta

MARINE SAFETY INVESTIGATION REPORT

Safety investigation into the grounding

of the bulk carrier

OLIVA

On Nightingale Island, Tristan Da Cunha

on 16 March 2011

MARINE SAFETY INVESTIGATION REPORT NO. 14/2012

FINAL

Investigations into marine casualties are conducted under the provisions of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 and therefore in accordance with Regulation XI-I/6 of the International Convention for the Safety of Life at Sea (SOLAS), and Directive 2009/18/EC of the European Parliament and of the Council of 23 April 2009, establishing the fundamental principles governing the investigation of accidents in the maritime transport sector and amending Council Directive 1999/35/EC and Directive 2002/59/EC of the European Parliament and of the Council.

This report is not written, in terms of content and style, with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The objective of this safety investigation report is precautionary and seeks to avoid a repeat occurrence through an understanding of the events of 16 March 2011. Its sole purpose is confined to the promulgation of safety lessons and therefore may be misleading if used for other purposes.

The findings of the safety investigation are not binding on any party and the conclusions reached and recommendations made shall in no case create a presumption of liability (criminal and/or civil) or blame. It should be therefore noted that the content of this safety investigation report does not constitute legal advice in any way and should not be construed as such.

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GLOSSARY OF TERMS AND ABBREVIATIONS

AB	Able Bodied Seaman
AIS	Automatic Identification System
AWT	Applied Weather Technology
BA	British Admiralty
BTM	Bridge team management
cSt	Centistokes
DGPS	Differential global positioning system
GMDSS	Global Maritime Distress and Safety System
GPS	Global positioning system
GT	Gross tonnage
IMO	International Maritime Organization
ISM	The International Management Code for the Safe Operation of Ships and for Pollution Prevention
ITOPF	The International Tanker Owners Pollution Federation Limited
Km	Kilometres
kW	Kilowatt
m	metre(s)
mm	millimetres
nm	Nautical mile
Non-conformity	an observed situation where objective evidence indicates the non-fulfilment of a specified requirement.
Observation	a statement of fact made during a safety management audit and substantiated by objective evidence.
OOWs	Officers of the watch
P&I	Protection and Indemnity
SANCCOB	South African Foundation for the Conservation of Coastal Birds
SMS	Safety Management System
STCW	The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 as amended
UNESCO	United Nations Educational, Scientific and Cultural Organization
USB	Universal Serial Bus
UTC	Universal Co-ordinated Time
VDR	Voyage Data Recorder
VHF	Very High Frequency

SUMMARY

At about 0510 (UTC) on 16 March 2011, *Oliva*, a Maltese registered bulk carrier ran aground on the north-west coast of Nightingale Island in the Tristan Da Cunha Group. *Oliva* was on a loaded passage from Santos, Brazil to China. The vessel sustained severe bottom damage to almost all of her water ballast tanks that resulted in the vessel developing a 12º list to port.

Initially, 12 crew members were transferred across to the fishing vessel *Edinburgh*, that was standing by to render assistance. On 17 March, the weather deteriorated and the remaining 10 crew abandoned the vessel. On 18 March, the vessel broke up in two sections; the forward section drifted away and the aft section capsized and sank. All this resulted in wide spread pollution around the islands of Nightingale and Inaccessible because of the diesel and fuel oil that escaped from the vessel's fuel tanks.

The investigation found that the vessel was following a great circle route that took the vessel directly over Nightingale Island. One of the navigational officers of the watch had made an error in plotting one of the way points the vessel had to follow. This resulted in a course line, which indicated that the vessel would clear the group of islands by about 10 nautical miles. The navigational officers of the watch (OOWs) was not using an appropriate large scale chart for that area and the plotting sheets in use did not show the islands ahead.

TMS Bulkers Ltd. has conducted an internal investigation that has resulted in a review of its navigational procedures. They also intend to increase the frequency of internal audits to identify any potential problems of a similar nature within its fleet.

The Marine Safety Investigation Unit has recommended TMS Bulkers Ltd. to hold unscheduled navigational audits at sea and amend the emergency checklists to include the need to save the VDR data.

1 FACTUAL INFORMATION

1.1 Vessel, Voyage and Marine Casualty Particulars

Name	*Oliva*
Flag	Malta
Classification Society	American Bureau of Shipping
IMO Number	9413705
Type	Bulk Carrier
Registered Owner	Monteagle Shipping SA
Manager(s)	TMS Bulkers Ltd.
Construction	Steel
Length overall	225.0 m
Registered Length	217.0 m
Gross Tonnage	40170
Minimum Safe Manning	16
Authorised Cargo	Bulk
Port of Departure	Santos, Brazil
Port of Arrival	Bound for China
Type of Voyage	International
Cargo Information	Soya Beans in Bulk
Manning	22
Date and Time	0510 UTC on 16 March 2011
Type of Marine Casualty or Incident	Very Serious Marine Casualty
Location of Incident	Nightingale Island, Tristan Da Cunha
Place on Board	Ballast tanks, bunker tanks and overside
Injuries/Fatalities	None
Damage/Environmental Impact	Total loss, resulting in severe pollution to the environment
Ship Operation	On passage
Voyage Segment	Mid-water
External & Internal Environment	Wind: WNW moderate breeze Visibility: Moderate
Persons on Board	22

1.2 Description of Vessel

1.2.1 Vessel overview

MV *Oliva* was built in 2009 at Hundong Zhonghua Shipping (Group) Co. Limited in Shanghai, China. She was a conventional design Panamax sized bulk carrier with seven cargo holds and a deadweight of about 75,000 tonnes. *Oliva* was classed by the American Bureau of Shipping, and was managed by TMS Bulkers Ltd, in Greece. The vessel was trading on a world-wide basis.

1.2.2 Bridge equipment

Oliva was fitted with standard navigational equipment in compliance with the statutory requirements of her Safety Equipment Certificate.

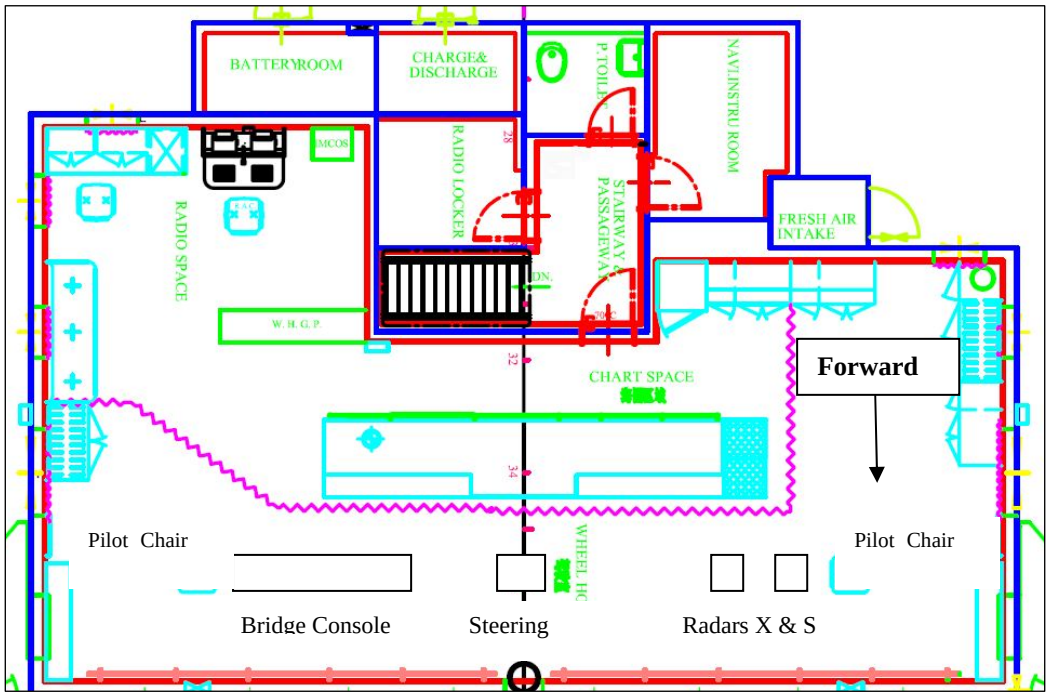

Figure 1: MV *Oliva* bridge layout

This included two Furuno radars, two DGPS receivers, Automatic Identification System (AIS), gyro and magnetic compasses, steering column incorporating manual and automatic steering and a course recorder (Figure 1).

The two radars were sited on the port side of the bridge, next to each other, with the X-band radar located on the inboard side. At sea and in open waters, one radar was

always in use while the other was on standby. The third mate was allocated the task of switching radars during his morning watch.

The bridge was also equipped with a fully functional GMDSS radio station required for vessel trading on a world-wide basis.

The vessel did not have an electronic chart display and information system (ECDIS); paper charts were used for navigation. *Oliva* was also fitted with a Rutter 100G3 voyage data recorder (VDR) that recorded a 12-hour loop of data.

A General Arrangement Plan of the vessel is reproduced in Figure 2.

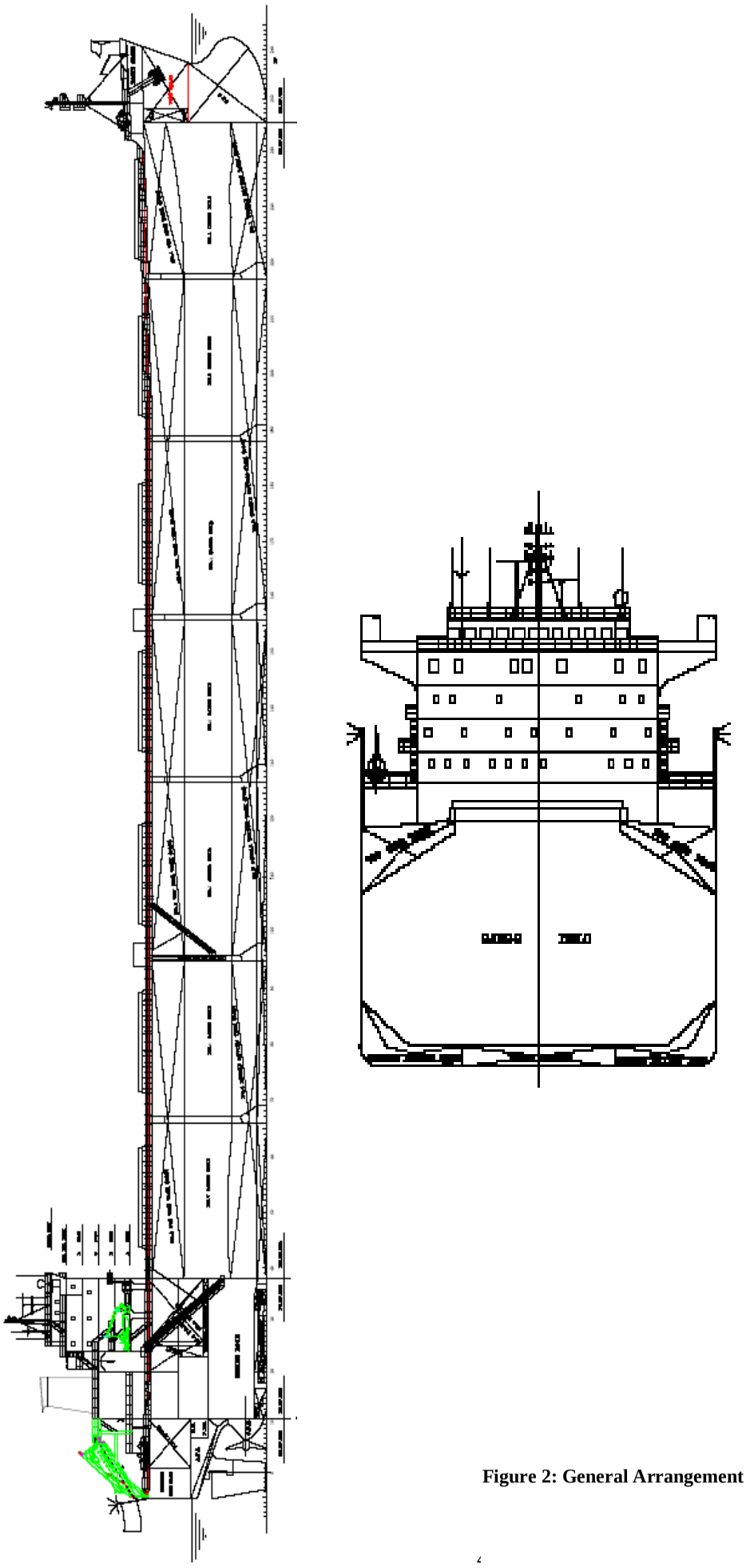

Figure 2: General Arrangement Plan

1.2.3 Safety management system

Oliva complied with the International Management Code for the Safe Operation of Ships and Pollution (ISM Code) and held a valid Safety Management Certificate that expired on 26 January 2015.

The last annual internal audit was held on 14 November 2010 by the marine superintendent. The audit resulted in one non-conformity and eleven observations. One observation was attributed to passage planning where information regarding abort positions and emergency anchorages had not been marked on the chart. The observations related to the navigation watchkeeping are listed below:

> *Observation 6: The compass error shall be calculated at least once per watch. If cannot be obtained the OOW shall record the reason in the Compass Error Book. Copy of Compass Error book shall be sent to Office. (sic)*
>
> *Observation 7: An improvement is required during Passage Plan. Abort point position & contingency Anchorages shall be marked on the chart and declared within the passage plan*
>
> *Observation 8: Alcohol tests have not been carried out since April 2010. Master shall ensure compliance with Companys. (sic)*
>
> *Observation 9: Blind sectors drawing shall be displayed at a visible place on the both radars. (sic)*
>
> *Observation 10: Celestial observation shall be prepared in order to record the compass error calculations and celestial position calculation by the sextant for officers practice.*

As per requirements of the vessel's safety management system (SMS), the master conducted a navigational audit on 30 December 2010. He did not identify any short-comings and neither did he raise any observations for improving navigation on board.

1.3 Manning

Oliva was issued with a Minimum Safe Manning Certificate that required the vessel to be manned by at least 16 persons. At the time of the accident, the vessel was manned

by 22 persons. The crew consisted of one Greek, two Romanians, and 19 Filipino nationals. English was the working language on board.

The following personnel are relevant to the events which resulted in the grounding of *Oliva*.

1.3.1 Master

The Master was a Greek national, who had joined the company in 2004. He had a valid unlimited master's Certificate of Competency in accordance with the requirements of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and had served in the rank of master since 1996. He had joined *Oliva* on 11 November 2010 in the port of Plomin, Croatia. The master had attended a bridge team management course.

1.3.2 Chief mate

The chief mate was a Filipino national. He had an unlimited Filipino master mariner's certificate (STCW II/2), which he had obtained in October 2009. He was promoted to the rank of chief mate in 2003 and has since worked on bulk carriers. He had joined *Oliva* on 3 February 2011 in the port of Kaohsiung, China. This was his first contract with the company.

On 15 March, a day before the accident, he was not feeling well as a result of a common cold. Soon after he had completed his watch at 2000, he took some 'cold medicine' which he had brought with him from home. He fell asleep around 2300.

1.3.3 Second mate

The second mate was a Filipino national and had obtained his officer of the watch license (STCW II/I) in 2004. He found employment as a third mate in July 2007 and was promoted to second mate in 2008.

On 22 October 2010, at the request of his company, he attended a refresher course in 'Voyage Planning' in a marine college in Manila. He joined *Oliva* on 11 November in the port of Plomin, Croatia. This was his second contract with the company and *Oliva* was the third vessel he had served on, in this rank. He had also attended a bridge teamwork course.

1.3.4 Look-out

The look-out was also a Filipino national and since 2002, he was qualified to serve as a rating forming part of a navigational watch (STCW II/4). He had been on board the vessel since 11 November 2010. This was his third contract with the company as an able bodied seaman (AB).

1.4 Navigational Procedures

The company's navigational procedures were contained in its 'Navigating Procedures Manual'. The purpose of the navigational procedures was to provide the masters and officers with information, instructions and best practices in respect to safe navigation. Some of the procedures relevant to this accident are detailed below.

1.4.1 Bridge team management

The company recognised the significance of bridge team management (BTM) as an important procedure to address performance variability on the bridge. Although not currently an international requirement, it had adopted this concept and incorporated it into its in-house training programme. Any officer joining a vessel was required to have undergone BTM training except in exceptional circumstances.

The company defined BTM as:

> *the use of all physical and personnel assets in an environment that maximises their effectiveness. It relies on the effectiveness of interaction between all members of the bridge team including the pilot, where appropriate, and the ability to adapt to any change during the safe conduct of a passage from berth to berth. (sic)*

1.4.2 Standing orders

The navigation procedures required the navigating officers to be familiar with the 'Company Bridge Standing Orders'. In addition, the master was required to issue his own specific 'Standing Orders' which would incorporate the company's orders and give details of his own requirements and special instructions. A copy of the master's standing orders is attached as Annex A.

The master was also required to maintain a bridge order book, usually known as a night order book. This was used for the purpose of passing on additional information to the duty officers. A copy of the master's night order for 15 March 2011 is attached as Annex B.

1.4.3 Handing and taking over the watch

The company's procedures reflected STCW requirements of handing and taking over a navigational watch. The company provided checklists to assist the officers. Navigating Checklist No. 1 was to be used at every change of watch. A blank copy of this checklist can be found as Annex C[1].

1.5 Passage Planning

1.5.1 Procedures

Relevant to passage planning are the following extracts from the Navigating Procedures Manual.

> **Section 18.1.2, Planning**: The procedure requires 11 items to be marked on the chart. One of them is "No Go" areas. No Go areas are defined as those areas into which a vessel shall not be allowed to enter.
> *'Once the passage plan has been drawn up the Navigating Officer and the Master shall review the plan to ensure that it is a safe route and that the* ***largest scale charts*** *are used and that all hazards and limitations have been correctly identified' (sic)*
>
> **Section 19.3.2, Deep Sea and open ocean courses**:
>
> *'The courses for the deep sea and open water sectors of the voyage shall be* ***drawn on the largest scale navigational charts*** *and the Navigating Officer shall confirm that they conform to the requirements for safe water, clearing distances and no go areas.' (sic)*
>
> **Section 20.1.3 Clearing distances**:
>
> *The company recommend that a vessel does not pass closer than:*

[1] A complete checklist was not made available.

10 miles from a danger, hazard to navigation or other "No Go" area when in deep sea or open water sectors.

1.5.2 Weather routeing advice

On 08 March 2011, the master received weather routeing advice from Applied Weather Technology (AWT), a weather routing advisory company. In view of the existing weather conditions during the vessel's expected passage across South Atlantic, AWT recommended that subject to safe navigation, the vessel should follow a great circle track from Santos to a position 40º south and 015º east. Thereafter, *Oliva* was to follow a rhumb line course to longitude 035º east, and then another great circle track across the Indian Ocean to Sundra Strait.

1.5.3 Passage plan

The second mate was responsible for planning the passage. Prior to departure, the second mate prepared BA charts 19 and 3980 for the first leg of the outward passage. To assist him with the passage planning, the company provided procedures, which he had to follow. These procedures reflected the International Maritime Organization's (IMO) Guidelines for Voyage Planning- Resolution A.893(21). A copy of this Resolution can be found as Annex D.

The master instructed the second mate on 08 March to prepare the passage plan for the forthcoming passage. He advised him to calculate and plot waypoints for every 10 degrees of longitude when following the great circle track. The second mate completed his calculations and stored them as waypoints into the Global Positioning System (GPS) receiver before the vessel's departure from Santos. A copy of the passage plan extract, which illustrates the pilot to pilot waypoints, is at Annex E.

During his morning watch on 10 March, he completed plotting the waypoints and drew the courses on BA chart 4022, covering South America to Africa on a scale of 1:10,000,000. This chart was placed on the chart table next to the plotting sheet for ready reference. He also noted that the route would pass about 10 nautical miles south of the Tristian Da Cunha Islands.

1.6 Environmental Conditions Before the Accident

On 16 March, during the 0000 to 0400 watch, the weather conditions experienced were Beaufort force 6 winds from the north-west. The sea was moderate to rough from the same direction and the vessel was shipping some spray over her port deck. It was recorded that at 0400, the wind decreased to Beaufort force 5 and the swell also reduced. The visibility was generally good although there were some light rain showers and drizzle around.

Nautical twilight and sunrise were estimated to be 0551 and 0648 UTC respectively.

1.7 Narrative

1.7.1 Events leading up to the grounding

At 1808, on 09 March 2011, *Oliva* departed the port of Santos (Brazil) with a cargo of about 65,264 metric tonnes of soya beans in bulk. Her draughts were 13.14 m forward and 13.19 m aft. She had about 1748 tonnes of fuel on board. The vessel was bound for Singapore via the Sunda Strait for bunkering before proceeding to China to discharge her cargo.

At 2030, the master rang 'full away' on the telegraph and thereafter the chief mate ballasted the aft peak tank to improve the vessel's trim. During the outbound passage British Admiralty (BA) charts 19 and 3980 were in use.

On 10 March, soon after midnight, the master left the bridge. The vessel was on auto pilot and heading towards waypoint no. 2 of the voyage plan, on a course of 122º. *Oliva* was following a great circle route to 40º south and 015º east. This was recommended by AWT, as part of her first leg of the planned passage. The Mercator courses between the waypoints of the great circle track had been calculated at intervals of 10º longitude.

Thereafter, the second mate transferred the vessel's position from BA chart 3980 onto the plotting sheet on which he had laid down the first course line to follow. The voyage waypoints had been fed into the GPS receiver and were capable of being displayed on the radar screen in the form of a red solid line. The GPS receiver was

also set up to show the range and bearing to the next way point, as well as the cross track error.

On 11 March, AWT sent a weather forecast to the vessel and reconfirmed that the recommended route that the vessel was following, was still valid. On arrival at waypoint no. 2, the vessel's course was altered to 118º towards the next waypoint. The vessel's position was plotted and logged on an hourly basis in accordance with the master's instructions.

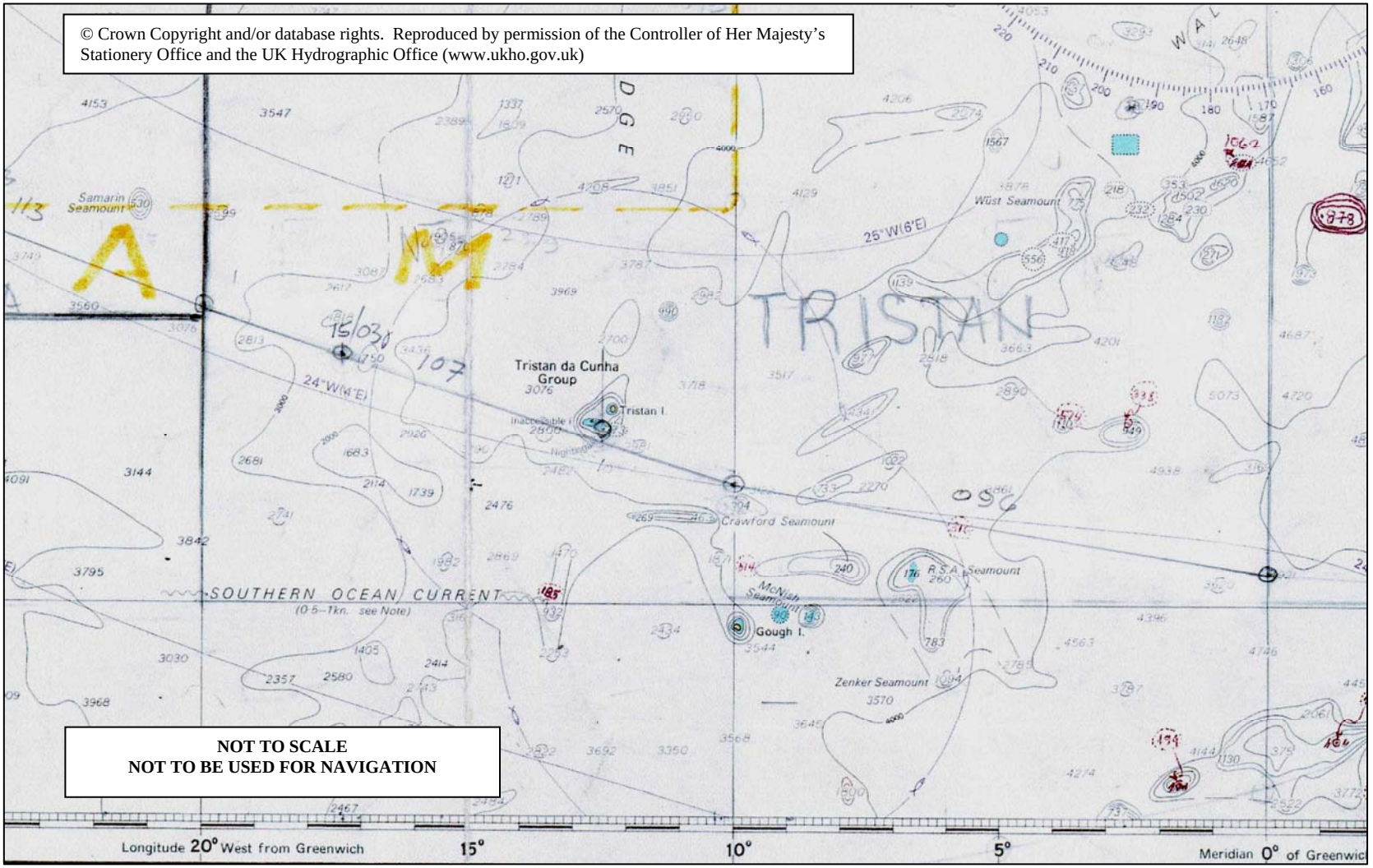

Figure 3: Extract of BA Chart 4022

At 0215 on 15 March, the second mate altered the vessel's course to 107º towards waypoint no. 5. He also transferred the vessel's position onto the plotting sheet covering 36º to 39º of latitude. The vessel's noon position was noted on BA chart 4022 (Figure 3).

At 2345 on 15 March, the second mate arrived on the bridge. The port radar (S-band) was in use and had been set up in relative motion, north-up mode. The heading marker was off centre resulting in an increase of range of 17 nautical miles ahead. The second mate read and signed the master's night orders and thereafter took over the watch from the third mate. The master was also present on the bridge but left after 5 minutes of the second mate taking over.

On 16 March, at 0340, the second mate called the chief mate for his watch. The 0400-0800 lookout arrived at about 0355 and took over his lookout duties from the 0000-0400 AB. Just after 0400, the second mate noticed a large defined echo on the radar screen, about five nautical miles and passing clear down on the vessel's port bow. The second mate assumed that it was either rain clouds or an iceberg; he thought that the vessel was within the limits of icebergs according to the routing chart he has seen. At 0410, the second mate made another call to the chief mate as he had not arrived on the bridge. The chief mate arrived on the bridge at 0420.

The second mate handed over the watch as the chief mate stood in front of the bridge window next to the location of the VHF radio. He advised him of the course set on the autopilot, which was 107º. Thereafter, the second mate left the bridge at about 0425. He did not tell the chief mate of the radar echoes he had noticed earlier, as they had passed clear of the vessel and he did not tell him that the vessel would be passing close to land during his watch.

The chief mate then sat down on the pilot chair located next to the radar in use. He recollected observing some fuzzy echoes which he thought were scattered rain showers. The starboard bridge door was open and the bridge window wipers were switched on because of rain. There was no indication that either the second mate and later the chief mate switched to the X band radar when they were approaching land or when they were expected to make landfall.

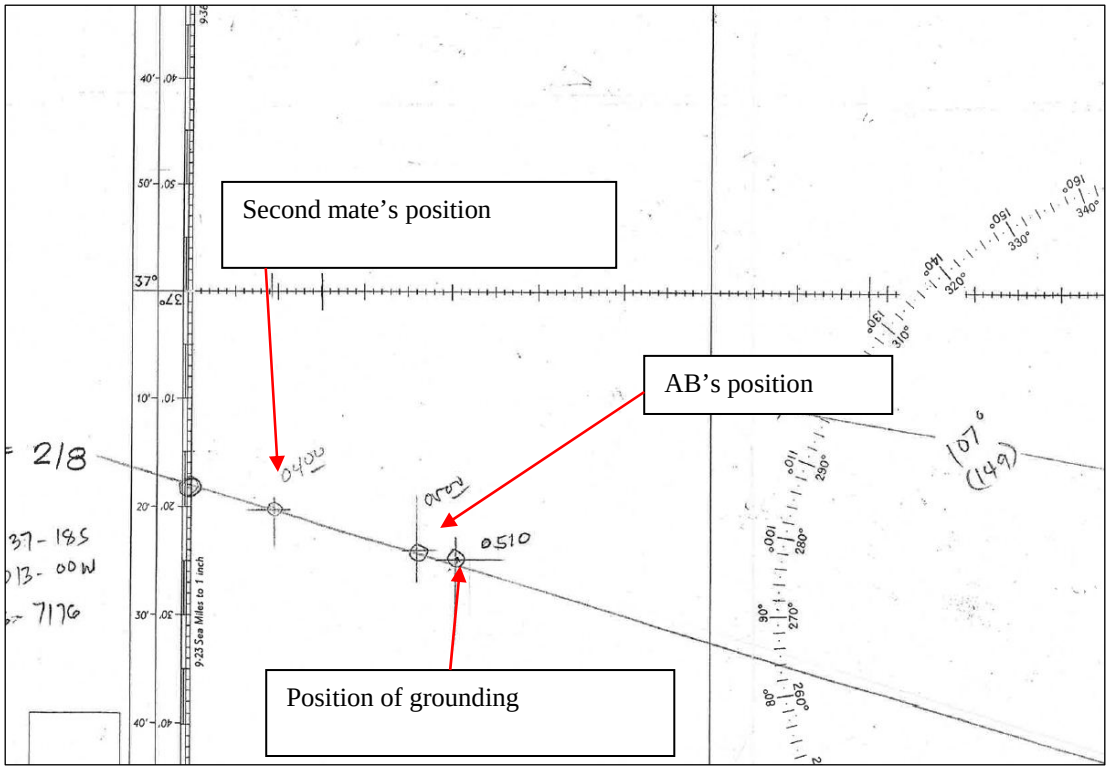

Figure 4: Extract of plotting sheet in use

At about 0430, the AB reported sighting a white light forward of the vessel's port beam, which he assumed was a fishing vessel. The chief mate responded that he could see it but did not get up from the chair to investigate it. At 0500, the AB entered the chartroom and plotted the vessel's position (Figure 4). He noted that the position was on the course line and that the heading marker on the radar display was on the red course line indicating that the vessel was on track. Just after 0500, the chief mate went to the chartroom and noted that the AB had plotted a position on the chart. He returned to sit on the pilot chair and noticed a large echo on the radar screen, very close ahead. He assumed it was a heavy storm cloud and thereafter, he felt the vessel's impact of running aground.

The chief mate moved to the steering position and noticed that the vessel was turning to port. He switched over to manual steering and attempted to use the wheel. The ship started to develop a port list (Figure 5) and the chief mate and AB could hear the sound of escaping air, presumably coming from the ballast tank vents. The vibration of the vessel running aground and the change in the main engine noise woke up most of the crew, including the master.

The master noted the time as 0510. The vessel ran aground close in to a rocky shore beneath low cliffs.

1.7.2 Post grounding events

The first person to arrive on the bridge was the master followed by the third mate and then the second mate. The third mate put the engine telegraph to stop. The master found the chief mate and AB on the bridge but neither could offer any explanation as to what had happened.

Figure 5: *Oliva* aground on Nightingale Island with a port list

The vessel developed a port list of 12º and assumed a heading of 091º. The master ordered the second mate and chief mate to take soundings of the ballast tanks. The third mate plotted the position of the ship (Figure 6) which placed the vessel on Nightingale Island, one of the three large islands that forms the Tristan Da Cunha Group.

The chief mate soon reported to the master that all the double bottom tanks (nos. 1 to 4) on the port side were full as well as double bottom no. 1 starboard. Sometime later,

he also advised the master that the forepeak tank had a sounding of 10.4 metres. The chief engineer reported that all fuel oil tanks were intact.

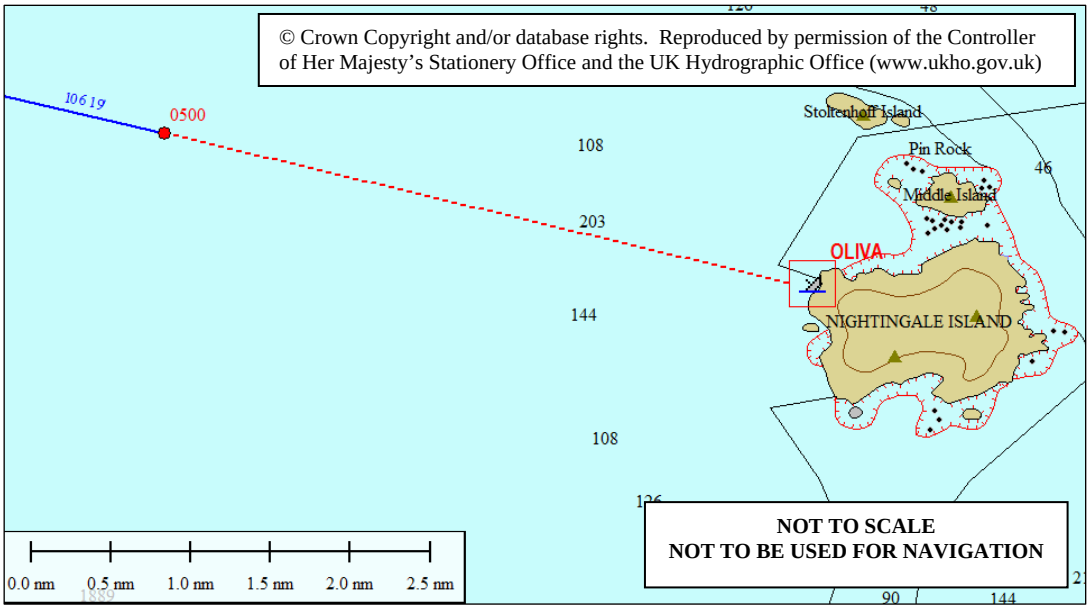

Figure 6: Position of *Oliva* aground

At 0530, the master informed the company by e-mail giving them the time and position of grounding. This was followed by a satellite telephone call to the operations manager. At 0720, the master received a VHF radio call from the Tristan Da Cunha Administrator requesting details of the incident.

As it became light, the master instructed the crew to don lifejackets, prepare the rescue boat and lower the vessel's free fall lifeboat into the water using the davit. This was done and the lifeboat manoeuvred and secured alongside starboard side of cargo hold no 7.

The master was advised by the company that it had arranged for a salvage tug from Cape Town but it would take about five days for her to reach *Oliva*'s position. In the afternoon, 12 crew members were transferred across to the fishing vessel *Edinburgh* (Figure 7), which had witnessed the grounding and now stood by the vessel to render assistance. The fishing vessel used her own lifeboat to facilitate the transfer.

Figure 7: Fishing vessel *Edinburgh* standing by to render assistance

During the evening of 16 March, the master received another weather update from AWT, which gave information of a cold front that was expected to pass over the area. The wind and seas were expected to increase as the front advanced. During the night, the weather deteriorated and the master ordered the crew to lower the starboard liferaft.

On 17 March, at about 0100, the vessel slid on the bottom and settled in a direction of 043º and the port list reduced to 5º. The vessel now started moving heavily over the rocks under the influence of the deteriorating sea and wind conditions, and the master decided to evacuate the rest of the crew to *Edinburgh*. However, the skipper of *Edinburgh* advised the master that no evacuation was possible due to the weather and poor light conditions.

At about 0200, the lifeboat painters parted and the boat drifted away. At about 0300, *Oliva* struck a large rock in way of hold no. 7 (Figure 8). By 0405, the chief engineer reported ingress of water into the engine room which soon reached the level of the bottom platform. In daylight conditions, the crew noticed an oil slick on the vessel's starboard side.

Figure 8: *Oliva*'s close proximity to the rocks

Soon after midday, the weather improved such that the remaining crew could then be transferred to *Edinburgh*. This time, the crew were ferried across in inflatable ribs (Zodiac) which were provided by the passenger ship *Prince Albert II* that had arrived in the area. The transfer was completed by 1530 and thereafter *Edinburgh* proceeded to Tristan Da Cunha where 15 of the crew members were landed ashore.

The seven remaining crew members including the master remained on board *Edinburgh* to return to Nightingale Island, to monitor the vessel condition.

1.7.3 Hull failure and pollution

Within hours from the master's notification, the managers had mobilised their Shore Emergency Response Team. On the same day, the vessel's P&I Club representatives and an ITOPF Senior Technical Advisor, were mobilised to travel to Tristan Da Cunha via Cape Town with a view to liaise with all the stake holders affected by the casualty. This enabled the managers to make an early assessment of the situation and the potential impact of a pollution.

The salvors hypothesised that in the event of a spill of bunker oil and / or soya bean cargo, the spilled material would drift eastwards along the northern shore of the island

and quickly come ashore. Moreover, it was very likely that any spilled material that would not become stranded, would most probably continue to move eastwards and into the open sea. The managers were made aware that the exposed nature and topography of the shore meant that it was likely that bunker oil / soya beans would possibly become concentrated in the small embayment and more sheltered stretches of the shore.

The managers were also concerned that the impacts of a significant spill of bunker oil were difficult to predict. The heavy fuel oil 380 cSt was unlikely to disperse and would most likely float in the form of tar balls or pats until it broke up in the open sea or was stranded on shore.

On the other hand, based on previous industry experience of spills, managers were informed that soya beans were considered to pose little in terms of an environmental threat. It was estimated that if released, it would be most likely that the beans will sink in seawater though a small percentage may float. Over time, the beans would absorb water and approach neutral buoyancy. Wave energy and currents at the exposed wreck site would most likely be sufficient to suspend, transport and deposit a large portion of the soggy beans onto the shore.

Eventually, at about 0230 on 18 March, *Oliva* broke up into two sections in the wake of the deteriorating weather and heavy swells (Figure 9). The forward section of the vessel from hold no. 7 onwards, separated from the aft section of the hull and drifted away. The aft section subsequently capsized and sank. This resulted in the spill of soya beans cargo and a wide spread pollution around the area because of the diesel and fuel oil that escaped from the vessel's bunker tanks.

The cleaning process was continuous and laborious. In total, there was a team of 28 people working alongside an 80-strong island volunteer force. With the onset of the southern winter, the adverse weather brought with it gale force winds and heavy seas. The weather hampered the clean-up response, however, it also broke up the majority of the released oil, although signs of pollution around Nightingale remained visible.

In addition to the assistance provided by *Edinburgh*, the managers initiated a (complex) process to ensure that adequate facilities and equipment are shipped to the accident site as soon as practicably possible. Despite the prevailing circumstances,

the company made arrangements for the provisions of booms, diving gear, power packs, portable lights and electrical generators, first aid treatment equipment and other equipment was made available to the on site team, who had reached the island within days of the accident. Other specialised equipment, including high pressure washing machines and a helicopter to monitor the oil spill were also made available.

By 20 April 2011, the pollution was confined to the area between Nightingale Island and Middle Island. The clean-up team had completed the oil-abatement and clean-up operation in the east Gully. Washing of penguins was also carried out with the help of volunteers from the island, although a significant number was reported lost by the rehabilitation facility that was purposely set up in the area.

Studies in the area are in progress. A dive survey of the Island in February 2012, identified mussels on the aft section of the wreck. Further investigations are being planned in order to assess the potential impact of invasive species.

Figure 9: *Oliva*'s aft section following the hull failure

The locals also took immediate steps to mitigate any potential rodent infestation on Nightingale Island[2].

[2] These measures are still in progress and to date no rodents have been found.

Several months after the accident, Tristan da Cunha authorities submitted that fishery scientists are now of the view that on the basis of their studies in the area, which were carried out after the accident, the soya beans spill might have caused considerable mortality to the lobsters in the area. Moreover, seventeen months after the accident, the lobster fishery at Nightingale Island remains closed and the quota at Inaccessible Island has been reduced by approximately one half.

1.8 Location of the Grounding

1.8.1 The Islands

Nightingale Island is part of Tristan Da Cunha Group, British Overseas Territory, which are the most remote islands in the Atlantic Ocean, lying 2805 km west of Cape Town, the nearest mainland (Figure 10).

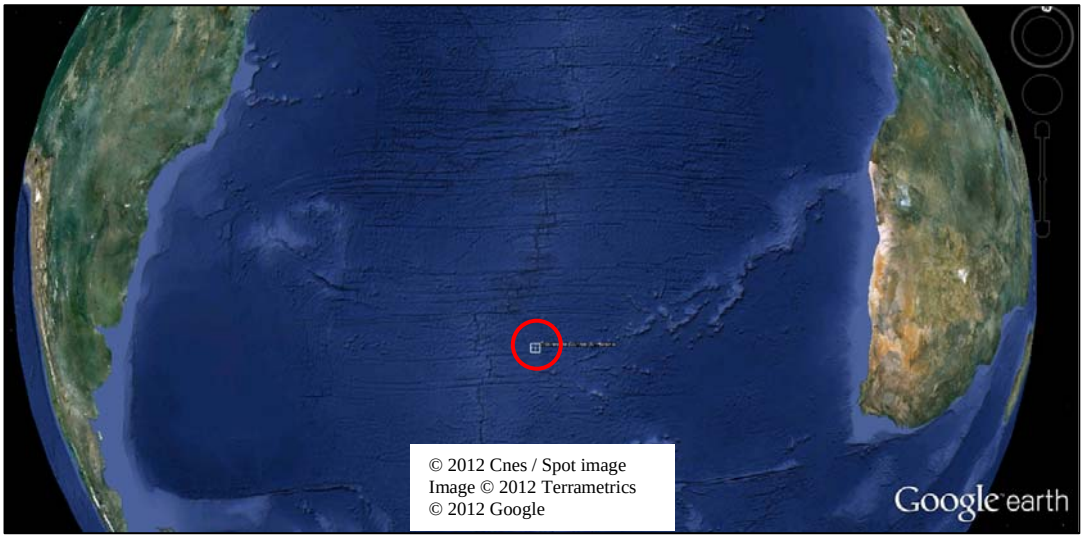

Figure 10: Tristan Da Cunha Group lying 2805 km west of the nearest mainland

Tristan Da Cunha Group includes Tristan Da Cunha (the only inhabited island), Nightingale Island (located 20 nautical miles south-west of Tristan Da Cunha), Inaccessible Island, and Gough Island (Figure 11). The latter two are both part of the UNESCO World Heritage Marine Programme.

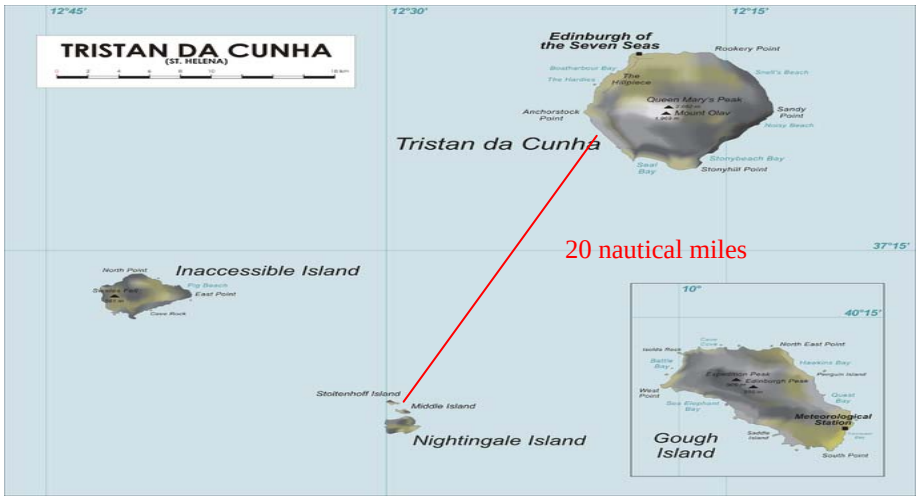

Figure 11: Tristan Da Cunha Group

Nightingale Island is only 2.5 km by 1.5 km (3.75 km^2) and is part of the Islands, which include islets Middle Island and Stoltenhoff Island. All three are uninhabited, but are regularly visited for various scientific and research purposes.

1.8.2 Wildlife and economic resource

Nightingale Island is known as a breeding ground for various types of seabirds and over two million birds are estimated to breed on the island from October to May. The Island hosts three species of endemic Tristan Da Cunha albatross species (such as the Atlantic Yellow-nosed Albatross) as well as the Great Shearwaters, near endemic to the Tristan Islands, and the Atlantic Petrel (*Pterodroma incerta*), endemic to the South Atlantic Ocean, and upgraded to 'Endangered' status in 2008. Together with Inaccessible Island, Nightingale Island has a breeding colony of Northern Rockhopper Penguins. The main economic resource of the islands is from commercial fishing for crayfishes and lobsters.

1.8.3 Local weather

For Tristan Da Cunha Islands, the temperatures in March are typically between 15ºC and 21ºC. The mean precipitation is fairly high with an expected 300 mm of rain and around 20 days of rainfall per month. It is worth noting that it was Autumn at the time of the accident and a deterioration of the weather (including gale force winds and heavy precipitation) were commonly anticipated.

2 ANALYSIS

2.1 Aim

The purpose of a marine safety investigation is to determine the circumstances and contributory causes of the accident as a basis for making recommendations, to prevent further marine casualties or incidents from occurring in the future.

2.2 The Grounding

The primary cause of *Oliva* running aground was the planned course, which the officer of the watch was following on the plotting sheet. The course took the vessel directly over Nightingale Island. The investigation identified a number of other contributory factors that are discussed in the subsequent sections of this safety investigation report.

When the second mate had initially drawn the course line on BA chart 4022, he made an error in plotting 'waypoint no. 5' (Figure 11). This resulted in a course line indicating that the vessel would clear the group of islands by about 10 nm. As indicated in Figure 11, if the correct waypoint (shown in red) had been plotted, the resulting course line would have indicated that it passed directly over one of the islands.

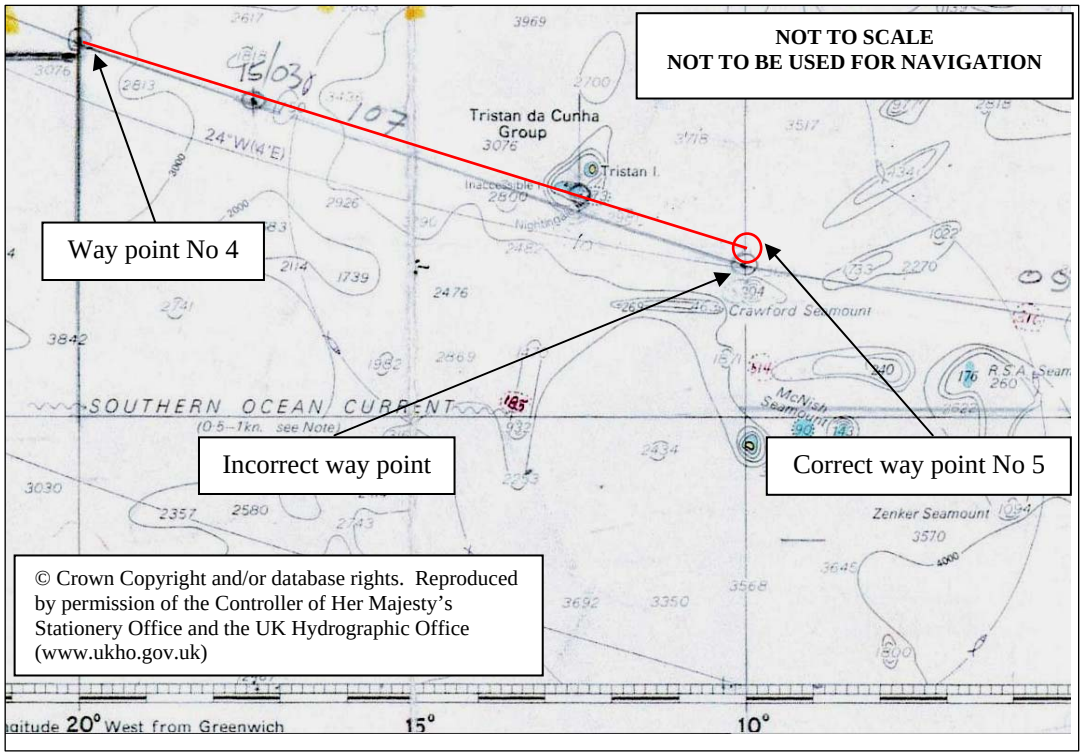

Figure 11: Extract of BA Chart 4022 showing correct way point

2.3 Passage Plan

As indicated in Figure 11, 'No Go' areas were not marked on the chart. It appeared that the vessel did not have BA Chart 1769, which was the appropriate large scale chart covering the Tristan Islands. Determining such a small passing distance on BA Chart 4022 was unsatisfactory and did not conform with the company's instructions of clearing distances when a vessel was in open waters.

Although the bridge team were aware that they would be passing close to some islands, they were not aware as to when that event would have taken place. The marking of critical areas on the charts would have assisted the bridge team in maintaining a good situational awareness of the hazards ahead.

As part of the passage planning, the company required the second mate to plot 'No Go' areas on the charts, draw the planned courses on the large scale navigational charts, and ensure that the passage did not pass closer than 10 nm from a danger or 'No Go' areas. This work was not carried out and neither did the master ensure that the company's requirements had been complied with.

Moreover, there was no evidence to show that a suitable mark was placed across the ship's track to indicate the need to change to a hydrographic chart.

2.4 Position Monitoring

Both the second mate and chief mate were not aware that *Oliva* was heading towards Nightingale Island. This was because there was no indication on the plotting chart to alert them of the dangers ahead. It appeared that the bridge team was focused on following the GPS track (red course line) superimposed on the radar screen instead of monitoring the vessel's position in relation to surrounding hazards.

The last position marked on BA chart 4022 was that of the 15th Noon (Figure 11). Thereafter, this chart appears not to have been consulted. Although this chart was of an unsatisfactory scale, it could have prompted the two navigational OOWs to adopt a precautionary approach when large echoes were sighted on the radar.

Soon after 0400, the second mate noticed a large defined echo on the radar screen which he failed to identify or investigate as a possible land mass. The plot in Figure

12 indicates that the vessel passed Inaccessible Island on her port side within 3.25 nm. This important information was not passed to the chief mate and neither did the chief mate notice it on the radar screen.

At about 0430, soon after the chief mate took over the watch, the Island would have been on the vessel's port beam and Nightingale Island right ahead at about 9.9 nm. Although he noticed some echoes on the radar screen, he did not investigate them as he dismissed them as rain clouds because it had been raining. Both officers did not grasp the significance of large echoes in open waters.

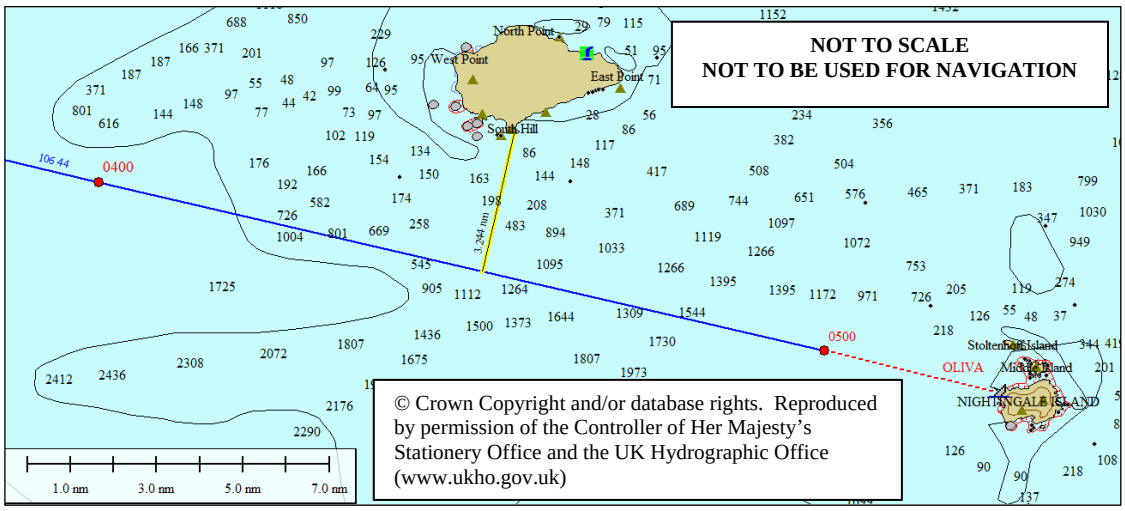

Figure 12 - Extract of BA chart 1769 showing vessel's positions

At 0500, the AB plotted a position on the chart and reconfirmed that the vessel was following the required track by looking at the radar screen. However, whilst the chief mate relied upon the position plotted by the AB, he did not investigate the large echo displayed on the radar screen ahead, and consequently, he did not have enough time to avert the grounding.

The company had adopted the concept of bridge team management to address performance variability. However, it appears that there was not an effective interaction between the members of the bridge team to the extent that they failed to identify and eliminate the factors that eventually contributed to the grounding.

In addition to the above, it may be stated that it was not the norm on board to have a daily posting of the ship's noon position on a simple chart of the world (posted in a

common area). Such approach could have triggered the interest of several crew members to see the Islands and enquire when they may become visible.

2.5 BTM and Single-Person Errors

As defined in the company's SMS Manual, BTM is the effective management and utilisation of all resources, human and technical, available to the bridge team. The scope is to ensure the planning and execution of a safe passage. One of the most important aspects of BTM is its potential against single-person errors; an important safety issue already identified by the Australian Transport Safety Bureau, although under different circumstances[3].

BTM is not limited or confined to the execution of the passage plan but is intended to be applied throughout the entire process, including the planning of the passage. Taking into consideration the extent of work on board, it would be unrealistic to expect that the master checks the course and every single waypoint, albeit this is an important defence. However, the close proximity of the ship and the Islands did not instigate the bridge team to review the voyage plan and ensure that the course was planned well clear of any navigational hazard. This approach essentially led to a single-person error that could have been detected and corrected through effective BTM at an early stage, possibly before the ship would have left her last port of call.

2.6 Master's Night Orders

In addition to the company's and master's standing orders, the master was required to advise his bridge team of any changing circumstances by using the night order book. This was particularly important for events that were expected to occur during the hours of his absence from the bridge, especially when the vessel was expected to make landfall or areas of shallow water.

The master's orders for the night of 15 March did not contain any such information, indicating that the master's unawareness that the vessel would be passing the Tristan Da Cunha Group of Islands during the night.

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[3] ATSB (2010). *Marine Occurrence Investigation MO-2009-001 No. 262 Final Report - Independent investigation into the grounding of the Hong Kong registered products tanker Atlantic Blue at Kirkcaldie Reef, Torres Strait on 07 February 2009.* Canberra: Author.

The night orders were signed by all three bridge watchkeepers, which indicated that they had been read. Therefore, the master's instructions to the watchkeepers to be aware of the landfall, could have alerted them to the significance of radar echoes.

2.7 Taking Over the Watch

The company provided a checklist to its navigating officers to assist them in handing and/or taking over the navigational watch. The procedure requires Checklist No. 1 (Annex C) to be completed and signed by the officers.

Checklists assist a person to focus attention on the required task, help establish priorities, and serve as an aid against performance variability, especially during periods of high stress.

The checklist required the chief mate to establish the proximity of any hazards to the vessel. However, this appears not to have happened, and he relied on the brief hand-over he received from the second mate. Neither the second mate nor the chief mate had any doubts over the safe navigation of the vessel and therefore did not call the master as required by the checklist.

2.8 Fatigue and Fitness

The chief mate was not feeling well on the evening of 15 March. After his evening watch, he had taken some medicine that he had brought from home. He had trouble falling asleep because of his cold and he finally fell asleep at 2300. He required two wake-up calls before he arrived on bridge to take over his watch. It is not known what the contents of the medicine were, but most common cold remedies can cause drowsiness and therefore usually are labelled with a warning not to drive or operate heavy machinery.

The fact that the chief mate sat in the pilot's chair up until he got up to check the vessel's position, the lack of reaction to sighting a fishing vessel and echoes on the radar display, indicated that his alertness may have been altered. The combination of the cold, medication, lack of sleep, the time of the day and reaction to the vessel's grounding suggested that the chief mate was probably not fit to stand a navigational watch and can be considered as one of the contributory factors to this accident.

Oliva sailed from Santos on 09 March, which meant that the bridge team had been at sea for six days. This would have allowed them to settle down to the traditional routine of 4 hours on, 8 hours off, where the minimum hours of rest would have been achieved. Thus, in the absence of evidence, which indicates otherwise (such as quality of sleep) the actions of the remaining bridge team cannot be attributed to fatigue.

2.9 Internal Audits

Although the company had provided comprehensive guidance and procedures in its SMS to prevent this accident, these were not followed on board. The master was responsible for the safe navigation of his vessel and should have ensured that the company's procedures and his very own standing orders were followed.

The marine superintendent carried out an internal audit on 14 November 2010, which identified 11 observations. The superintendent had found that the specified requirements of the company's SMS were being fulfilled although could have been improved upon.

Following the superintendent's observations, immediate corrective actions were reported to have been taken. In December 2010, the master had advised the company by email that the superintendent's observations had been closed following corrective actions taken on board. The master also advised that passage plans were being prepared in accordance with the company's Navigation Procedures Manual and that abort positions and emergency/contingency anchorage were being marked on the charts and noted in the passage plans. As a verification, he had also attached a copy of the latest passage plan for the ballast voyage from Plomin, Croatia to Algeciras, Spain to the email, together with other documentary evidence supporting the corrective action taken on board.

The reported corrective actions taken by the master were reviewed internally by the company. On 12 January 2011, a message was sent to the vessel, notifying the master that all observations were considered properly closed and that they had been recorded as such in the company's audit database. Therefore, at the time of the accident, the vessel had no outstanding observations and non-conformities.

Notwithstanding the reported corrective actions, a few months later it would appear that the bridge team had adopted a casual attitude to watchkeeping procedures when the vessel was in open waters.

2.10 Collision Regulations

The navigational OOWS approach was also analysed in the light of the requirements of the Collision regulations, in particular rules 2, 5 and 19. Whilst the dangers of navigation and special circumstances were not given due regards, for reasons explained above, a proper look-out was not being kept with regards to making a full appraisal of the situation given the circumstances of the case. Moreover, restricted visibility in large areas of rain was not considered as a threat.

2.11 Deployment of Lifesaving Appliances

The master ordered the crew to lower the free fall lifeboat soon after daylight. While this was a good precautionary measure, the deteriorating weather on 17 March caused the two painters to part and resulted in the boat drifting away.

The lifeboat was lowered well before a decision to abandon the ship was considered. Without the fishing vessel in the near vicinity, given the remoteness of the area, the crew of *Oliva* would have found themselves in a difficult position without a lifeboat.

2.12 Emergency Response

Following the grounding, the master utilised the emergency checklists for 'Stranding' provided in the SMS. Although the emergency checklist he was using made no mention to the requirement of saving the VDR data, he had saved this important information on the equipment's USB memory stick located in the data management module. The master did not immediately take the data into his custody as he was understandably dealing with other urgent matters. When the time came to abandon the vessel, he could not locate the keys to the cabinet (which contained the USB memory stick and the hard drive) and lost valuable time trying to break the lock. However, despite his best efforts, he could not retrieve the data and as conditions deteriorated, he had to abandon the vessel.

2.13 Post Abandonment Events - Pollution

During the early stages of the accident, the managers appreciated that the remote location of the accident and the limited oil pollution combat equipment available on the Islands had rendered a challenging task should the equipment be required. Eventually, the failure of the hull led to a substantially larger area of pollution in the area.

Considering the circumstances, not least the location of the accident, it was considered that the managers had understood the precarious situation of the casualty and responded to the threat immediately in order to limit the extent of damage to the environment even if the options available to mitigate a potential pollution incident were extremely limited.

The actions of the managers were based on the following factors:

- containment of floating oil / cargo around the vessel using booms and recovery of oil by skimmers would have most likely proved ineffective due to the rough sea conditions that are commonly found at the grounding site;
- much of the shoreline appeared to be very steep/cliffs and access for response personnel might have been both difficult and potentially hazardous;
- rough sea conditions would have the potential to cause rapid natural cleaning of oil and may wash any soya beans stranded ashore back out to sea where they would most likely drift eastwards away from the island;
- Tristan Du Cunha had no trained oil spill response personnel;
- Nightingale Island did not have an oil combating infrastructure. Such a task would have necessitated bringing all the required equipment to the accident site by boat from South Africa;
- establishing a cleaning and rehabilitation facility for oiled birds and wildlife was considered to be a necessity should an oil spill happen,

and included amongst others:

- the contracting of salvors under the terms of a Lloyd's Standard Form of Salvage Agreement;

- the hiring of the first salvage vessel from Cape Town on the same day of the accident, thereby ensuring immediate availability of the services and expertise of a salvage master, salvage workers, a naval architect and environmentalists;
- the chartering of the fishing vessel *Edinburgh* from the island as a stand-by vessel;
- establishing immediate contact with Tristan Du Cunha Administrator and SANCCOB thereby securing immediate resources and material for the oiled birds.

On the basis of the above, it is concluded that the assessment and subsequent actions taken by the company were timely and adequate to address the situation amidst the challenges imposed by the remoteness and limitations in available resources.

THE FOLLOWING CONCLUSIONS, SAFETY ACTIONS AND RECOMMENDATIONS SHALL IN NO CASE CREATE A PRESUMPTION OF BLAME OR LIABILITY. NEITHER ARE THEY BINDING OR LISTED IN ANY ORDER OF PRIORITY.

3 CONCLUSIONS

Findings and safety factors are not listed in any order of priority.

3.1 Immediate Safety Factor

3.1.1 *Oliva* ran aground because the planned course the vessel was following on the plotting sheet was found to have taken the vessel directly over Nightingale Island.

3.1.2 Although the bridge team was aware that the vessel would be passing close to some islands, it was not aware as to when that event would take place.

3.1.3 Although the vessel did not have BA chart 1769, other appropriate available charts covering the area had not been used.

3.1.4 Both the second mate and chief mate were not aware that the vessel was heading towards Nightingale Island. This was because there was no indication on the plotting chart to alert them of the dangers ahead.

3.1.5 Both the second mate and chief mate saw some echoes on the radar screen, but did not investigate them and dismissed them as rain clouds.

3.1.6 There was no suitable mark placed across the ship's track to indicate the need to change to a hydrographic chart.

3.1.7 Neither officer had consulted BA chart 4022. Although this chart was of an unsatisfactory scale, it could have prompted them to adopt a precautionary approach when radar echoes were sighted on the radar.

3.1.8 The combination of the cold, the medication, lack of sleep, the time of the day and reaction to the vessel's grounding suggests that the chief mate was probably not fit to stand a navigational watch.

3.1.9 Although the company had provided comprehensive guidance and procedures in its SMS to prevent this accident, these were not followed on board.

3.2 Latent Conditions and other Safety Factors

3.2.1 The passage plan did not comply with the company's instructions of clearing distances when a vessel was in open waters.

3.2.2 The master made no reference to the passing of Islands in his night orders. Reference to the Islands, could have alerted the second mate and chief mate to the significance of radar echoes.

3.2.3 The handing over checklist required the chief mate to establish the proximity of any hazards to the vessel. This appears not to have happened and he relied on the brief hand-over he received from the second mate.

3.2.4 The chief officer did not check the position which the AB plotted on the chart.

3.3 Other Findings

3.3.1 The company had adopted the concept of bridge team management to address performance variability. However, in this case it appears that the crewmembers' interaction was not effective and they did not identify and eliminate the factors that resulted in the grounding.

3.3.2 The lifeboat was lowered soon after daylight as a precautionary measure, but was lost when the painters parted. Had the fishing vessel not been in the near vicinity, given the remoteness of the area, the crew of *Oliva* would have found themselves in a difficult position without a lifeboat.

3.3.3 Although the master had saved the VDR data, he was unable to retrieve it as he abandoned the vessel.

4 SAFETY ACTIONS TAKEN

4.1 Safety actions taken during the course of the safety investigation

TMS Bulkers Ltd has carried out its own internal investigation, which has resulted in a review of its procedures. These include:

- instructions on the use of plotting sheets during ocean navigation;
- requiring all officers on board to complete computer based training in voyage planning and bridge team management.

TMS Bulkers Ltd. also intend to increase the frequency of internal navigational audits so as to identify any potential problems of a similar nature within its fleet.

5 RECOMMENDATIONS

In view of the conclusions and taking into consideration the safety actions taken during the course of the safety investigation,

TMS Bulkers Ltd. are recommended to:

14/2012_R1 Consider holding unscheduled navigational audits at sea, so as to verify compliance of its operational procedures while the vessel is underway;

14/2012_R2 Ensure that emergency checklists are amended in order to include the need to save the VDR data.

ANNEXES

Annex A Master's standing orders

CARDIFF MARINE INC.

MASTER'S STANDING ORDERS

(IN ADDITION TO COMPANY BRIDGE STANDING ORDERS)

In addition to the navigation entries all log-books shall contain all important events effecting the vessel or the crew.

Prior departure from any port or anchorage the vessel's clocks, telegraph, steam, whistles, alarms, steering gear, navigation lights, navigational electric devices, telephones and public-address-system should be checked.

All Officers to relieve the watch in time and not to take over the watch until having a complete and thorough understanding of the existing situation.

The Officer being relieved not to leave the bridge being satisfied that his relief has full control of the situation.

All Officers to take part in the navigation of the ship and to determine the vessel's position whenever possible.

Radar and GPS are aids to the navigation only and must be checked against visual or celestial bearings.

Comparison of the magnetic and gyro compass must be made more frequently.

When the automatic pilot is in use the helmsman will remain on the bridge as lookout.

The user of the automatic pilot will cease if the weather becomes thick or in heavy traffic. The International Regulation for Preventing Collision at Sea always to be carried out.

Do not hesitate to call the Master at any time.

Do not wait for the Master to get to the bridge if you feel that some action must be taken for safety of the ship and lives on board.

As Officer of the Watch you are in charge until the Master relieves you.

CARDIFF MARINE INC.

CALLING THE MASTER

The Officer of the Watch should notify the Master immediately under any of the following circumstances:

1. When in any doubt as to the position or safety of the ship.
2. If visibility deteriorates to the level laid down in the Master's Standing Orders or Night Orders.
3. If the movements of other vessels in the vicinity create cause for concern.
4. If difficulty is experienced in maintaining the intended track due to traffic, weather or sea conditions.
5. On failure to sight land or navigational mark or to obtain sounding by the expected time.
6. On the breakdown of the engines, steering gear or power supply to any navigation equipment.
7. If in doubt about the weather conditions.
8. If damage to the ship is suspected due to heavy weather or any other cause.
9. If it is suspected that the ship has made contact with any object at sea.
10. If a distress signal is sighted or heard.
11. On the receipt of any distress or urgency message.
12. If not satisfied about the ability of a relieving Officer to carry out his duties.
13. If in doubt about the condition of the ship's structure or cargo.
14. If pollution is suspected to be originating from the ship.
15. If any major pollution is sighted.
16. At any other time when in doubt about the safety of the ship or any member of the crew.
17. At any other time as stipulated by the Master in his Standing Orders or Night Orders.

Annex B Master's night orders

CARDIFF MARINE INC.

MASTER's NIGHT ORDERS

ERS ARE TO SIGN WHEN MASTER'S ORDERS ARE READ AND UNDERSTOOD

15/03/11 VOYAGE FROM SANTOS TO SINGAPORE

ULOW - BRIDGE AND MASTER'S STANDING ORDERS"

ULOW - CALLING THE MASTER"

RE PATROLS AS PER SCHEDULE.

[redacted]

[redacted]

[redacted]

gned by Watch Officer

Signed by Watch Officer

MASTER'S SIGNATURE

MASTER's NIGHT ORDERS

ERS ARE TO SIGN WHEN MASTER'S ORDERS ARE READ AND UNDERSTOOD

_____ VOYAGE FROM _____ TO _____

gned by Watch Officer

Signed by Watch Officer

Signed by Watch Officer

MASTER'S SIGNATURE

TMS DRY LTD

Navigating Checklist No.1

Navigating Officer - Daily Checks

Work Form WF/MRS/535
Issue Date: 01.01.12
Revision No: 001
Authorised by: GM(D)

Vessel: _____ **Voyage:** _____ **Date:** _____

	Task	Requirement	00-04	04-08	08-12	12-16	16-20	20-24
1	Night Orders	Have you read and understood them?						
2	Helmsman/Lookout	In position and fit for duty?						
3	Position	What intervals of fixes in use? Primary & Secontary Position Fixing Method ?						
4	Charts and Publications	Are they available?						
5	Course	Is the vessel on track?						
6	Compass	Are gyro and magnetic errors known?						
7	Hazards	Proximity of hazards to vessel?						
8	Available Navigation Marks	Are Navigation Marks positively identified?						
9	Traffic in vicinity	Are any close quarters situations present?						
10	Speed	Current Speed						
11	Main Engine	Is engine on stand by?						
12	Steering Gear	Is the second motor available? Is it running?						
13	Navigation Equipment	Is all required equipment operational?						
14	Draft and Depth of Water	Do you need the echo sounder on? Squat?						
15	Tides and currents	Any additional precautions?						
16	Wind and Weather	Any additional precautions?						
17	Sea State	Any additional precautions?						
18	Navigation Warnings	Are warnings available? Plotted on charts?						
19	Defects	Are there any defects outstanding?						
20	Navigation Lights/Signals	Are the correct lights / signals displayed?						
21	Maintenance	Any special checks/watch required?						
22	Approaching Port	Is Pre-Arrival Checklist being completed?						
23		Are any special instructions in force?						
The Officer of the Watch is to sign when the checklist has been completed when								

The Officer of the Watch is to complete / initial each applicable box when checking the requirements. N/A shall indicate that this aspect is not required at the time. Upon completion an entry shall be made in the Deck Log Book – "Navigating Checklist No 1 completed"

If the Officer of the Watch is in any doubt about any of the above checks he shall immediately call the Master.

Verified by Master: _____

Retain in file for records

Annex D IMO Resolution A.893(21)

INTERNATIONAL MARITIME ORGANIZATION

IMO

E

ASSEMBLY
21st session
Agenda item 9

A 2/Res.893
4 February 2000
Original: ENGLISH

RESOLUTION A.893(21)
adopted on 25 November 1999

GUIDELINES FOR VOYAGE PLANNING

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

RECALLING ALSO section A-VIII/2, Part 2 (Voyage planning) of the Seafarers' Training, Certification and Watchkeeping Code,

RECALLING FURTHER the essential requirements contained in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers and the International Convention for the Safety of Life at Sea concerning voyage planning, including those relating to officers and crew, shipborne equipment, and safety management systems,

RECOGNIZING the essential importance for safety of life at sea, safety of navigation and protection of the marine environment of a well planned voyage, and therefore the need to update the 1978 Guidance on voyage planning issued as SN/Circ.92,

NOTING the request of the Assembly in resolution A.790(19) that the Maritime Safety Committee consider the issue of voyage planning in conjunction with its review of the Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on Board Ships (INF Code), and the Committee's decision that consideration of the issue of voyage planning should not be restricted to vessels carrying materials subject to the INF Code but should apply to all ships engaged on international voyages,

HAVING CONSIDERED the recommendation made by the Sub-Committee on Safety of Navigation at its forty-fifth session:

1. ADOPTS the Guidelines for voyage planning set out in the Annex to the present resolution;

2. INVITES Governments to bring the annexed Guidelines to the attention of masters of vessels flying their countries' flag, shipowners, ship operators, shipping companies, maritime pilots, training institutions and all other parties concerned, for information and action as appropriate;

3. REQUESTS the Maritime Safety Committee to keep the said Guidelines under review and to amend them as appropriate.

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ANNEX

DRAFT GUIDELINES FOR VOYAGE PLANNING

1 Objectives

1.1 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.

1.2 The need for voyage and passage planning applies to all vessels. There are several factors that may impede the safe navigation of all vessels and additional factors that may impede the navigation of large vessels or vessels carrying hazardous cargoes. These factors will need to be taken into account in the preparation of the plan and in the subsequent monitoring of the execution of the plan.

1.3 Voyage and passage planning includes appraisal, i.e. gathering all information relevant to the contemplated voyage or passage; detailed planning of the whole voyage or passage from berth to berth, including those areas necessitating the presence of a pilot; execution of the plan; and the monitoring of the progress of the vessel in the implementation of the plan. These components of voyage/passage planning are analysed below.

2 Appraisal

2.1 All information relevant to the contemplated voyage or passage should be considered. The following items should be taken into account in voyage and passage planning:

.1 the condition and state of the vessel, its stability, and its equipment; any operational limitations; its permissible draught at sea in fairways and in ports; its manoeuvring data, including any restrictions;

.2 any special characteristics of the cargo (especially if hazardous), and its distribution, stowage and securing on board the vessel;

.3 the provision of a competent and well-rested crew to undertake the voyage or passage;

.4 requirements for up-to-date certificates and documents concerning the vessel, its equipment, crew, passengers or cargo;

.5 appropriate scale, accurate and up-to-date charts to be used for the intended voyage or passage, as well as any relevant permanent or temporary notices to mariners and existing radio navigational warnings;

.6 accurate and up-to-date sailing directions, lists of lights and lists of radio aids to navigation; and

.7 any relevant up-to-date additional information, including:

.1 mariners' routeing guides and passage planning charts, published by competent authorities;

.2 current and tidal atlases and tide tables;

.3 climatological, hydrographical, and oceanographic data as well as other appropriate meteorological information;

.4 availability of services for weather routeing (such as that contained in Volume D of the World Meteorological Organization's Publication No. 9);

.5 existing ships' routeing and reporting systems, vessel traffic services, and marine environmental protection measures;

.6 volume of traffic likely to be encountered throughout the voyage or passage;

.7 if a pilot is to be used, information relating to pilotage and embarkation and disembarkation including the exchange of information between master and pilot;

.8 available port information, including information pertaining to the availability of shore-based emergency response arrangements and equipment; and

.9 any additional items pertinent to the type of the vessel or its cargo, the particular areas the vessel will traverse, and the type of voyage or passage to be undertaken.

2.2 On the basis of the above information, an overall appraisal of the intended voyage or passage should be made. This appraisal should provide a clear indication of all areas of danger; those areas where it will be possible to navigate safely, including any existing routeing or reporting systems and vessel traffic services; and any areas where marine environmental protection considerations apply.

3 Planning

3.1 On the basis of the fullest possible appraisal, a detailed voyage or passage plan should be prepared which should cover the entire voyage or passage from berth to berth, including those areas where the services of a pilot will be used.

3.2 The detailed voyage or passage plan should include the following factors:

.1 the plotting of the intended route or track of the voyage or passage on appropriate scale charts: the true direction of the planned route or track should be indicated, as well as all areas of danger, existing ships' routeing and reporting systems, vessel traffic services, and any areas where marine environmental protection considerations apply;

.2 the main elements to ensure safety of life at sea, safety and efficiency of navigation, and protection of the marine environment during the intended voyage or passage; such elements should include, but not be limited to:

.1 safe speed, having regard to the proximity of navigational hazards along the intended route or track, the manoeuvring characteristics of the vessel and its draught in relation to the available water depth;

.2 necessary speed alterations en route, e.g., where there may be limitations because of night passage, tidal restrictions, or allowance for the increase of draught due to squat and heel effect when turning;

.3 minimum clearance required under the keel in critical areas with restricted water depth;

.4 positions where a change in machinery status is required;

.5 course alteration points, taking into account the vessel's turning circle at the planned speed and any expected effect of tidal streams and currents;

.6 the method and frequency of position fixing, including primary and secondary options, and the indication of areas where accuracy of position fixing is critical and where maximum reliability must be obtained;

.7 use of ships' routeing and reporting systems and vessel traffic services;

.8 considerations relating to the protection of the marine environment; and

.9 contingency plans for alternative action to place the vessel in deep water or proceed to a port of refuge or safe anchorage in the event of any emergency necessitating abandonment of the plan, taking into account existing shore-based emergency response arrangements and equipment and the nature of the cargo and of the emergency itself.

3.3 The details of the voyage or passage plan should be clearly marked and recorded, as appropriate, on charts and in a voyage plan notebook or computer disk.

3.4 Each voyage or passage plan as well as the details of the plan, should be approved by the ships' master prior to the commencement of the voyage or passage.

4 Execution

4.1 Having finalized the voyage or passage plan, as soon as time of departure and estimated time of arrival can be determined with reasonable accuracy, the voyage or passage should be executed in accordance with the plan or any changes made thereto.

4.2 Factors which should be taken into account when executing the plan, or deciding on any departure therefrom include:

.1 the reliability and condition of the vessel's navigational equipment;

.2 estimated times of arrival at critical points for tide heights and flow;

.3 meteorological conditions, (particularly in areas known to be affected by frequent periods of low visibility) as well as weather routeing information;

.4 daytime versus night-time passing of danger points, and any effect this may have on position fixing accuracy; and

.5 traffic conditions, especially at navigational focal points.

4.3 It is important for the master to consider whether any particular circumstance, such as the forecast of restricted visibility in an area where position fixing by visual means at a critical point is an essential feature of the voyage or passage plan, introduces an unacceptable hazard to the safe conduct of the passage; and thus whether that section of the passage should be attempted under the conditions prevailing or likely to prevail. The master should also consider at which specific points of the voyage or passage there may be a need to utilize additional deck or engine room personnel.

5 Monitoring

5.1 The plan should be available at all times on the bridge to allow officers of the navigational watch immediate access and reference to the details of the plan.

5.2 The progress of the vessel in accordance with the voyage and passage plan should be closely and continuously monitored. Any changes made to the plan should be made consistent with these Guidelines and clearly marked and recorded.

Annex E Extract from the passage plan

CM/DT/SC

PASSAGE PLAN
Voyage Plan (1)

Work Form: WF/MRS/534
Revision No: 004
Issue Date: 01.01.09
Authorised By: AF

(a) Position fixing interval

PILOT STATION TO PILOT STATION											
WPT.	LATITUDE	LONGITUDE	TRUE COURSE	DIST.TO NEXT WP	DIST. TO GO	ETA TO WP	ACTUAL TIME PASSED	MIN DEPTH	REMARKS	(a) P.F.I.	BRIDGE WATCH CATEGORY
0	24° 00.60' S	046° 20.30' W			9,068.0'				SANTOS P/S	5 mins	CATEGORY 3
1	24° 03.00' S	046° 21.30' W	200.94	02.6'	9,065.4'				DW CHANNEL	5 mins	CATEGORY 3
2	27° 34.90' S	040° 00.00' W	121.56	404.9'	8,660.5'					30 mins	CATEGORY2
3	32° 09.70' S	030° 00.00' W	117.73	590.5'	8,069.9'					1h	CATEGORY 1
4	35° 36.50' S	020° 00.00' W	112.46	541.3'	7,528.6'					1h	CATEGORY 1
5	38° 00.90' S	010° 00.00' W	106.67	503.5'	7,025.1'					1h	CATEGORY 1
6	39° 28.30' S	000° 00.00' E	100.54	477.9'	6,547.1'					1h	CATEGORY 1
7	40° 02.40' S	010° 00.00' E	94.21	464.4'	6,082.8'					1h	CATEGORY 1
8	40° 00.00' S	015° 00.00' E	89.40	230.7'	5,852.1'					1h	CATEGORY 1
9	40° 00.00' S	035° 00.00' E	90.00	919.2'	4,932.8'				SOUTH DURBAN	1h	CATEGORY 1
10	39° 21.70' S	040° 00.00' E	80.62	235.0'	4,697.9'					1h	CATEGORY 1
11	37° 23.20' S	050° 00.00' E	75.91	486.9'	4,211.0'					1h	CATEGORY 1
12	34° 24.30' S	060° 00.00' E	69.87	519.9'	3,691.1'					1h	CATEGORY 1
13	30° 18.90' S	070° 00.00' E	64.26	565.1'	3,126.0'					1h	CATEGORY 1
14	25° 01.30' S	080° 00.00' E	59.25	621.2'	2,504.7'					1h	CATEGORY 1
15	18° 30.20' S	090° 00.00' E	55.07	683.1'	1,821.6'					1h	CATEGORY 1
16	10° 53.40' S	100° 00.00' E	51.95	741.1'	1,080.5'					1h	CATEGORY 1
17	06° 18.50' S	105° 33.30' E	50.34	430.8'	649.7'				SUNDA ASL 1 ENTRANCE	1h	CATEGORY 1
18	05° 15.00' S	106° 12.55' E	31.76	74.7'	575.0'				ASL	30 mins	CATEGORY 2
19	05° 17.00' S	106° 22.00' E	101.92	09.7'	565.3'				ASL	30 mins	CATEGORY 2
20	05° 17.00' S	106° 44.50' E	90.00	22.4'	542.9'				ASL	30 mins	CATEGORY 2
21	05° 10.50' S	106° 57.00' E	62.58	14.1'	528.8'				ASL	30 mins	CATEGORY 2
22	04° 05.00' S	107° 21.50' E	20.57	70.0'	458.9'				APPROACES SELAT GELASA	30 mins	CATEGORY 2
23	03° 30.00' S	107° 30.00' E	13.71	36.0'	422.8'				SELAT GELASA ENTRANCE	30 mins	CATEGORY 2
24	03° 10.00' S	107° 17.70' E	328.28	23.5'	399.3'				SELAT GELASA	30 mins	CATEGORY 2