Final report MO-2016-204: Bulk carrier, *Molly Manx*, grounding,
Otago Harbour, 19 August 2016

Final Report

Marine inquiry MO-2016-204
Bulk carrier, *Molly Manx*, grounding, Otago Harbour, 19 August 2016

Approved for publication: October 2017

Transport Accident Investigation Commission

About the Transport Accident Investigation Commission

The Transport Accident Investigation Commission (Commission) is a standing commission of inquiry and an independent Crown entity responsible for inquiring into maritime, aviation and rail accidents and incidents for New Zealand, and co-ordinating and co-operating with other accident investigation organisations overseas. The principal purpose of its inquiries is to determine the circumstances and causes of occurrences with a view to avoiding similar occurrences in the future. Its purpose is not to ascribe blame to any person or agency or to pursue (or to assist an agency to pursue) criminal, civil or regulatory action against a person or agency. The Commission carries out its purpose by informing members of the transport sector and the public, both domestically and internationally, of the lessons that can be learnt from transport accidents and incidents.

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Important notes

Nature of the final report

This final report has not been prepared for the purpose of supporting any criminal, civil or regulatory action against any person or agency. The Transport Accident Investigation Commission Act 1990 makes this final report inadmissible as evidence in any proceedings with the exception of a Coroner's inquest.

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Citations and referencing

Information derived from interviews during the Commission's inquiry into the occurrence is not cited in this final report. Documents that would normally be accessible to industry participants only and not discoverable under the Official Information Act 1982 have been referenced as footnotes only. Other documents referred to during the Commission's inquiry that are publicly available are cited.

Photographs, diagrams, pictures

Unless otherwise specified, photographs, diagrams and pictures included in this final report are provided by, and owned by, the Commission.

Verbal probability expressions

The expressions listed in the following table are used in this report to describe the degree of probability (or likelihood) that an event happened or a condition existed in support of a hypothesis.

Terminology (Adopted from the Intergovernmental Panel on Climate Change)	Likelihood of the occurrence/outcome	Equivalent terms
Virtually certain	> 99% probability of occurrence	Almost certain
Very likely	> 90% probability	Highly likely, very probable
Likely	> 66% probability	Probable
About as likely as not	33% to 66% probability	More or less likely
Unlikely	< 33% probability	Improbable
Very unlikely	< 10% probability	Highly unlikely
Exceptionally unlikely	< 1% probability	

Photograph courtesy of Tony Des Landes

Molly Manx in Napier Port

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Abbreviations

BRM	bridge resource management
ECDIS	electronic chart display and information system
IMO	International Maritime Organization
m	metres
OOW	officer of the watch
PPU	portable pilotage unit
SOLAS	International Convention for the Safety of Life at Sea

Glossary

amidships	an order to a helmsman to move the wheel so that the rudder is in the vessel's fore and aft line, and has no turning effect
draught	the depth of a vessel's keel below the waterline
ebb tide	the period between high tide and low tide when the water flows away from the shore
flood tide	the period between low tide and high tide when the water flows towards the shore
half ahead/astern	a manoeuvring speed indication on an engine telegraph that results in a set amount of engine revolutions, which in turn will give rise to a certain speed for the vessel
knot(s)	nautical mile(s) per hour
leading line beacons	fixed markers that are laterally displaced to allow a mariner to navigate a fixed course along the preferred route. When lit, they are also usable at night. Usually the rear mark is higher than the front mark (see Figure 1). The mariner will know the geometry of the marks/lights from the navigational chart and can understand that when 'open' (not one above the other) the vessel needs to be navigated to 'close' the marks (so one is above the other) and be in the preferred line of the channel
maritime document	
port	the left-hand side of vessel when facing forward
portable pilotage unit	a compact, portable electronic display system that gives easy access to relevant navigational information, including charted data, and may include access to local real-time data.
starboard	the right-hand side of vessel when facing forward
squat	when a vessel moves through shallow water, some of the displaced water rushes under the vessel to rise again at the stern. This decreases the upward pressure on the hull, making the vessel sink deeper in the water than normal and slowing the vessel. Squat increases with the speed of the vessel
tidal window	a period of time in which a vessel is able to conduct a manoeuvre safely, such as entering a channel or turning in a channel. During a channel transit, tidal windows indicate the opening and closing times for carrying out manoeuvres safely at different locations in a safe depth of water
under-keel clearance	the distance between the deepest point on a vessel and the seabed in still water

Data summary

Vehicle particulars

Name:	*Molly Manx*
Type:	geared bulk carrier
Class:	NS*MNS*(Bulk Carrier type A, BC-XII, Grab 20)(ESP)(IWS)
Limits:	unlimited (SOLAS)
Classification:	Nippon Kaiji Kyokai
Length:	189.99 metres (m)
Breadth:	32.26 m
Gross tonnage:	32,296
Built:	Tsuneishi Shipbuilding Company, Cebu, Philippines, 2010
Propulsion:	one Mitsui M.A.N. – B&W DE 6550MC-C (Mark 7) direct reversing diesel engine producing 8,400 kilowatts, driving a single fixed-pitch propeller
Service speed:	14.0 knots
Owner/operator:	owner: Molly Marine Limited manager: Anglo-Eastern Ship Management Limited
Port of registry:	Douglas, Isle of Man
Crew:	20
Date and time	19 August 2016 at about 0735[1]
Location	Otago Harbour
Persons involved	vessel's crew and pilot
Injuries	nil
Damage	light impact damage in the region of the starboard bow where the protective coating system was scraped back to bare steel

[1] Times in this report are in New Zealand Standard Time (co-ordinated universal time + 12 hours) and are expressed in the 24-hour format.

1. Executive summary

1.1. At about 0600 on 19 August 2016, the bulk carrier *Molly Manx* arrived off Port Otago after an overnight passage from Lyttelton. A harbour pilot boarded the vessel at about 0630 and, after exchanging information with the master, the vessel entered the narrow channel taking it to its berth.

1.2. The *Molly Manx* was the maximum permitted length for vessels navigating the upper portion of the channel.

1.3. The vessel had just passed Port Chalmers and was approaching a narrow passage between two islands known as the Halfway Islands with the pilot conducting the navigation of the vessel. Two tugs were in attendance: one connected to the stern of the vessel and one ranging ahead of the vessel, waiting to assist.

1.4. As the vessel neared the Halfway Islands it deviated from the intended track and grounded on a sand bank. With the aid of the vessel's engine and the tug connected to the stern, the vessel was able to reverse off the sand bank, after which it was manoeuvred stern-first back to Port Chalmers for assessment.

1.5. There was no breach of the hull, and damage was limited to the bottom paintwork. Nobody was injured.

1.6. The Transport Accident Investigation Commission (Commission) found that the vessel grounded because the bridge team lost situational awareness. Because the bridge team was not adequately monitoring its progress using all available means, they did not realise that the vessel had deviated so far starboard from the intended track.

1.7. The Commission also found that: there was no formal shared understanding between the pilot and the vessel's crew on what passage plan would be used; the vessel's navigation equipment was not correctly configured for navigating in a narrow channel; and the standard of bridge resource management on the bridge leading up to the grounding did not meet good industry practice.

1.8. The Commission identified four safety issues relating to the standard of passage planning and the performance of the bridge team.

1.9. The Commission made three recommendations to the Director of Maritime New Zealand to address those safety issues identified

1.10. Key lessons arising from this inquiry include:

- there must be an absolute agreement and shared understanding between the vessel's bridge team and the pilot as to the passage plan and monitoring against that plan
- vessels' bridge teams must actively promote and use the concept of bridge resource management, including the incorporation of pilots into the bridge teams, to manage voyages properly
- a vessel's electronic chart display and information system (ECDIS) is an important system for monitoring the progress of the vessel and warning the bridge team when things could go wrong. It is essential that it be configured correctly for the phase of navigation and the proximity to navigation hazards.

2. Conduct of the inquiry

2.1. The Transport Accident Investigation Commission (Commission) was advised of the occurrence by email from Maritime New Zealand on 19 August 2016, the day of the occurrence. The Commission opened an inquiry under section 13(1)b of the Transport Accident Investigation Commission Act 1990 and appointed an investigator in charge.

2.2. On 19 August contact was established with the Isle of Man flag administration and agreement was reached that New Zealand would lead the investigation and conduct the investigation on behalf of the Isle of Man.

2.3. On 19 August two investigators travelled to Dunedin, where the *Molly Manx* was berthed. On 20 August the investigators conducted interviews with the crew of the vessel and collected evidence that included a download of the vessel's voyage data recorder.

2.4. On 21 August the investigators interviewed staff from Port Otago and the acting harbourmaster. They also gathered further documents relating to the port operations.

2.5. On 22 August contact was established with the vessel's operator, and documents relating to the company operation were obtained. Additional information was obtained from Maritime New Zealand and from the vessel.

2.6. On 17 January 2017 investigators conducted further interviews with staff from Port Otago in order to clarify information.

2.7. On 24 August 2017 the Commission approved the draft report to be circulated to interested persons for comment.

2.8. The draft report was distributed to 12 interested parties on 4 September 2017, with the closing date for receiving submissions as 25 September 2017. Six submissions were received that included comments.

2.9. The Commission has considered in detail all submissions made, and any changes as a result of those submissions have been included in the final report.

2.10. On 25 October 2017 the Commission approved the report for publication.

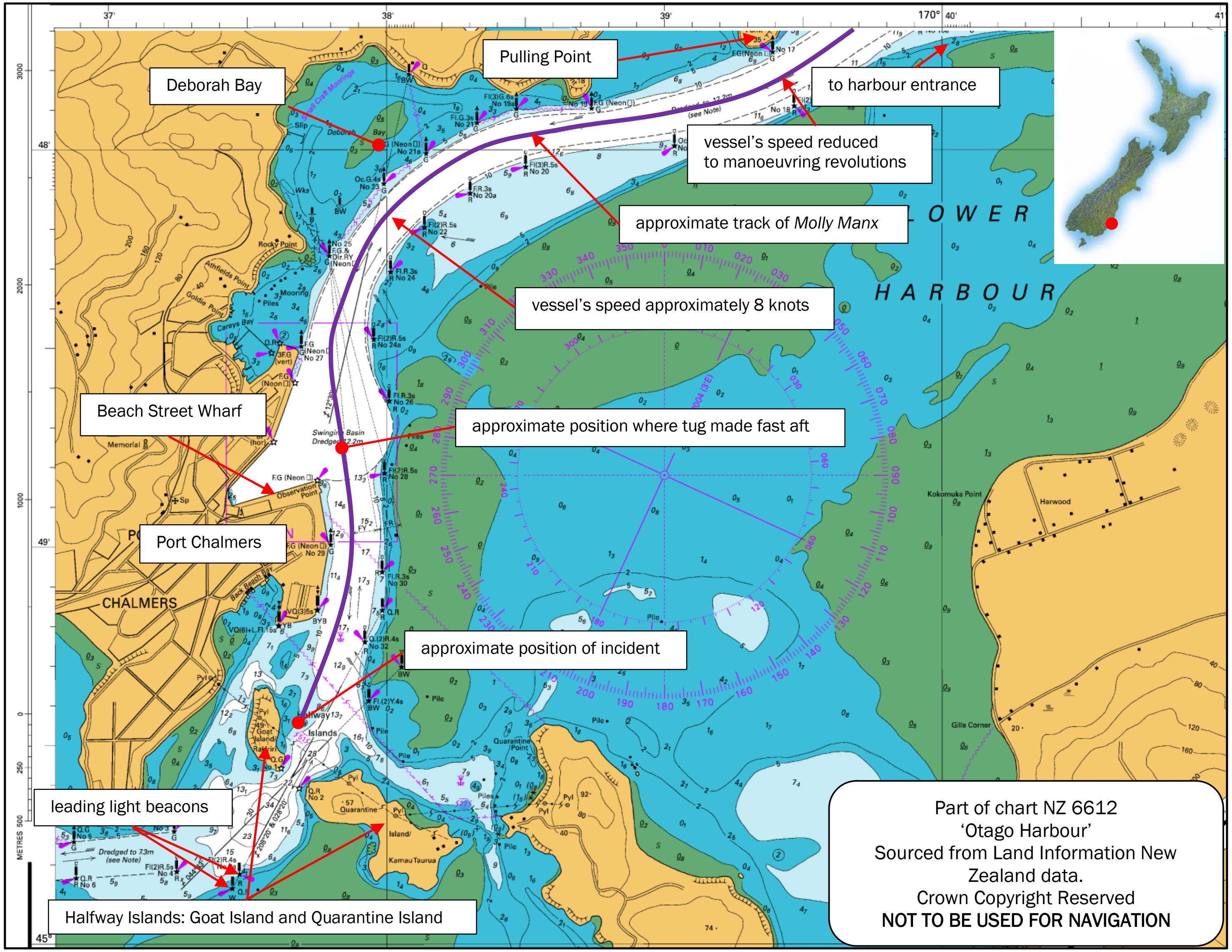

Figure 1
General area of the incident

3. Factual information

3.1. Narrative

3.1.1. At about 0600 on 19 August 2016, the bulk carrier *Molly Manx* arrived off Port Otago after an overnight passage from Lyttelton. The vessel was bound, with a cargo of phosphate rock, for the Ravensbourne fertiliser terminal, which was in the upper reaches of the harbour between Port Chalmers and Dunedin. The bridge team tested all the navigation and communication equipment and tested the main engine ahead and astern.

3.1.2. An Otago Harbour pilot boarded the vessel at about 0630. The master and pilot conducted an exchange of information. The pilot explained the Otago Harbour Passage Plan and the Otago Harbour Passage Planning Guide. The passage planning guide was the document produced by the harbour authority that contained relevant navigational information to assist the vessel's bridge team in constructing the preferred Port Otago passage plan into Port Otago. The master in turn explained the information contained on the vessel's pilot card[2] (see Appendix 1). The pilot noted that the vessel's arrival draught was deeper than that which the master had previously reported. The deepest draught was 7.1 metres (m), which was still within the maximum allowable draught of 7.4 m for berthing.

3.1.3. The pilot then took the con[3] from the master and the vessel headed towards the harbour entrance channel. The main engine was increased to full sea speed to achieve the optimum speed of 12 knots[4] for the first section of the pilotage.

3.1.4. At 0719 when the *Molly Manx* was passing Pulling Point (see Figure 1), the pilot requested a reduction in speed from full sea speed to manoeuvring speed, and by the time the vessel reached Deborah Bay (see Figure 1) it was making about 8 knots over the ground.

3.1.5. At about 0730, as the vessel passed Port Chalmers, the pilot reduced the engine revolutions to half ahead[5]. Shortly afterwards the line of the tug *Taiaroa* was secured to the stern of the vessel. The *Taiaroa* then followed behind the *Molly Manx* with no weight on the line. The tug *Otago* proceeded ahead of the vessel, ready to assist with berthing.

3.1.6. As the *Molly Manx* passed Port Chalmers, the pilot pointed out to the master the leading line beacons[6] he intended to use to guide the vessel through the narrow gap between Quarantine and Goat Islands (referred to as Halfway Islands on the chart – see Figure 1). At that time the leading marks showed that the vessel was to starboard of the intended track, which the pilot was aware of and where he planned the vessel to be once he had commenced the turn to starboard.

3.1.7. As the vessel approached the Halfway Islands the pilot was standing at the front of the bridge on or just to starboard of the centreline of the vessel, using the line of the deck cranes to judge the heading of the vessel. He occasionally left this position to check the vessel's speed on the electronic chart display and information system (ECDIS) located in the aft-facing console behind him. The pilot said that he could see that the channel between the islands was clear and that he was "about on the leads [leading line beacons]".

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[2] An information card, form or checklist used to ensure that essential master-pilot exchange items are covered.
[3] Control of the speed and direction of the vessel.
[4] Nautical mile(s) per hour.
[5] A manoeuvring speed indication on the engine telegraph that results in a set amount of engine revolutions, which in turn will give rise to a certain speed for the vessel.
[6] Fixed markers that are laterally displaced to allow a mariner to navigate a fixed course along the preferred route. When lit, they are also usable at night. Usually the rear mark is higher than the front mark. The mariner will know the geometry of the marks/lights from the navigational chart and can understand that when 'open' (not one above the other) the vessel needs to be navigated to 'close' the marks (so one is above the other) and be in the preferred line of the channel.

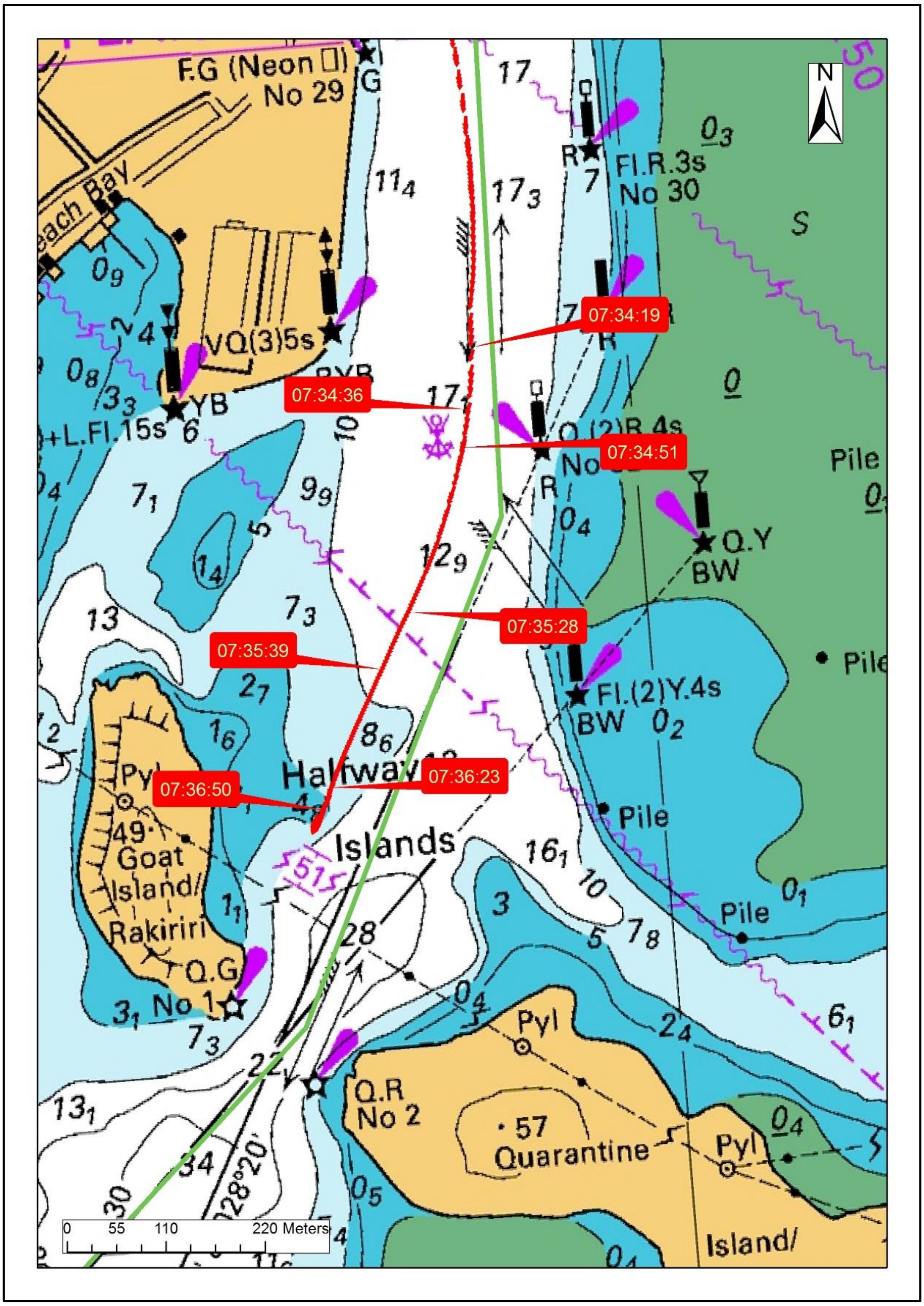

Figure 2
Diagram showing the track, with times, of the *Molly Manx* as extracted from the voyage data recorder

3.1.8. The members of the bridge team, including the pilot, then felt a bump that they initially thought was the aft tug bumping the stern of the vessel.

3.1.9. The pilot saw that the speed was reducing and he noted that the vessel's head was swinging to starboard despite the 10 degrees of port helm being applied. Both the master and the pilot realised the vessel had grounded, and ordered stop engines, half astern and full astern in quick succession.

3.1.10. The *Molly Manx* stopped in the water, aground on sand. The pilot called the tug *Otago* ahead of the vessel and ordered it to return and secure a line to the bow. The pilot ordered the aft tug *Taiaroa* to "lift off at 40 tonnes"[7]. The vessel started to move astern, at which time the pilot ordered the starboard anchor to be let go to one shackle[8] (27.5 m) of cable in an attempt to steady the bow.

3.1.11. As the *Molly Manx* moved astern into deeper water, the starboard anchor was raised. The pilot then manoeuvred the vessel stern-first back to Port Chalmers where it was made fast alongside Beach Street wharf. Soundings of all the tanks and spaces on the vessel were taken to ensure that the watertight integrity had not been compromised.

3.1.12. At about 1300 two pilots boarded the *Molly Manx* at Beach Street wharf and piloted it through the Upper Harbour to the fertiliser terminal at Ravensbourne. The operator of the vessel engaged a diving and salvage company to carry out an underwater inspection of the vessel to determine if any damage had occurred.

3.2. Environmental conditions

3.2.1. The climatic conditions were described as a light northerly breeze creating a significant northerly wave chop in the harbour of wind against the tide. The visibility was good with clear skies. At the time of the grounding the sun was just rising.

3.2.2. The tides for Dunedin on 19 August 2016 were as tabled in the New Zealand Nautical Almanac shown below:

High and low water times and heights for Dunedin 19 August 2016							
High water		Low water		High water		Low water	
Time	Height (m)	Time	Height (m)	Time	Height (m)	Time	Height (m)
0400	2.1	1052	0.1	1626	2.2	2318	0.1

Table 1
High and low water for Dunedin

3.2.3. The vessel could berth on either the flood tide[9] or the ebb tide[10] provided that there was a sufficient depth of water for the vessel to turn. Turning and berthing the vessel could only be achieved between certain times before and after high water; this is known as the tidal window[11] (see Figure 3).

3.2.4. The length of the *Molly Manx* was the maximum permitted for vessels transiting the Upper Harbour. It had a draught of 7.1 m, which gave it a tidal window that allowed the vessel to be swung around in the Upper Harbour to berth at the Ravensbourne fertiliser berth.

3.2.5. On joining the vessel, the pilot had used the Port Otago pilot information sheet to confirm that the vessel could arrive off the berth within the tidal window, which he had then explained to the master (see Appendix 1).

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[7] To pull away from the ship with a 40-tonne bollard pull (force).
[8] A vessel's anchor chain is usually divided into several sections of equal length (usually 27.5 metres or thereabouts) joined by a special joining shackle. When the anchor and connecting chain are 'let go' from the windlass, the person in charge on the forecastle head pays out the cable by a specified amount by counting the joining shackles. Thus one shackle on deck would have the first joining shackle secured on the forecastle deck with the first 27.5 metres of cable and anchor leading through the hawse pipe and into the water.
[9] The period between low tide and high tide when the water flows towards the shore.
[10] The period between high tide and low tide when the water flows away from the shore.
[11] A period of time in which a vessel is able to conduct a manoeuvre safely, such as entering a channel or turning in the channel. During a channel transit, tidal windows indicate the opening and closing times for carrying out manoeuvres safely at different locations in a safe depth of water.

3.2.6. The height of tide at the time of the grounding at the Halfway Islands was approximately 0.7 m based on the port data for Port Chalmers, the nearby standard port. The range of the tide was that of a spring tide.

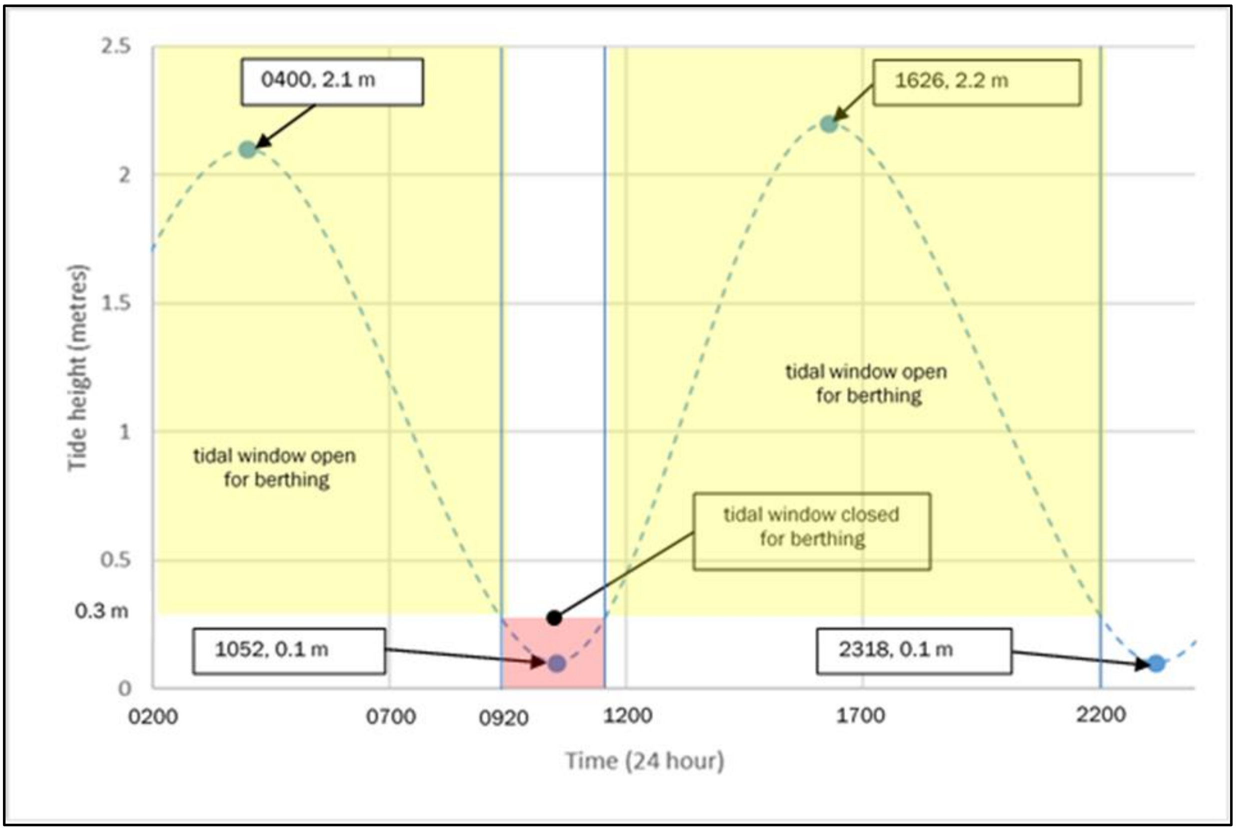

Figure 3
Tidal window for the berthing of the *Molly Manx* at Ravensbourne, assuming channel depth of 7.5 m and a static under-keel[12] clearance of 0.7 metre

3.3. Vessel details

3.3.1. The *Molly Manx* was a bulk carrier and had its own shipboard cranes. It had been built in Cebu, Philippines in 2010. It was owned by Molly Marine Limited in the Isle of Man and was registered in the Isle of Man. It was operated by Anglo-Eastern Ship Management Limited of Hong Kong, and at the time of the accident it was chartered to LT Ugland Limited of the Isle of Man.

3.3.2. The *Molly Manx* had a length overall of 189.99 m, a breadth of 32.26 m and a maximum draught of 12.826 m. It was powered by a Mitsui M.A.N. – B&W DE 6550MC-C (Mark 7) direct reversing diesel engine producing 8,400 kilowatts at maximum continuous rating driving a single fixed-pitch, right-hand-turning, five-bladed propeller.

3.3.3. The *Molly Manx* was equipped with the range of navigational equipment standard for this type of vessel, including an ECDIS and backup system that was compliant with international and Flag State rules and regulations. This configuration meant that the vessel could use the ECDIS as its primary method of navigation and was not required to carry paper charts.

3.4. Electronic chart display and information system

3.4.1. The International Maritime Organization (IMO) described an ECDIS in the ECDIS Performance Standards (IMO Resolution A.817(19)) as:

[12] The distance between the deepest point on the vessel and the seabed in still water.

> … a navigation information system which, with adequate back up arrangements, can be accepted as complying with the up-to-date chart required by regulation V/19 & V/27 of the 1974 SOLAS Convention[13], by displaying selected information from navigation sensors to assist the mariner in route planning and route monitoring, and by displaying additional navigation-related information if required.

3.4.2. The master and all navigational officers on board the *Molly Manx* were correctly certified and had undertaken both generic and type-specific ECDIS training.

3.4.3. User-defined safety settings are an important safety function when using an ECDIS. A failure to enter the correct safety settings can allow a vessel to enter unsafe waters without alerting the operator. To achieve a safe passage plan, users of ECDISs must understand how to determine accurately the correct value for a safety setting, as detailed in Table 2.

3.4.4. IMO specifications required an ECDIS to trigger certain alarms for the following conditions (see Table 2 on page 17):

- if the vessel is predicted to cross the safety contour within a user-specified time
- if the vessel is predicted to cross the boundary of a prohibited area or an area for which special conditions exist within a specified time
- if the vessel deviates off course by a specified amount from the planned route; cross-track distance
- if the vessel continues on its present course over a user-defined time or distance and is predicted to pass closer to an object that is shallower than the safety contour or an aid to navigation.

[13] The International Convention for the Safety of Life at Sea.

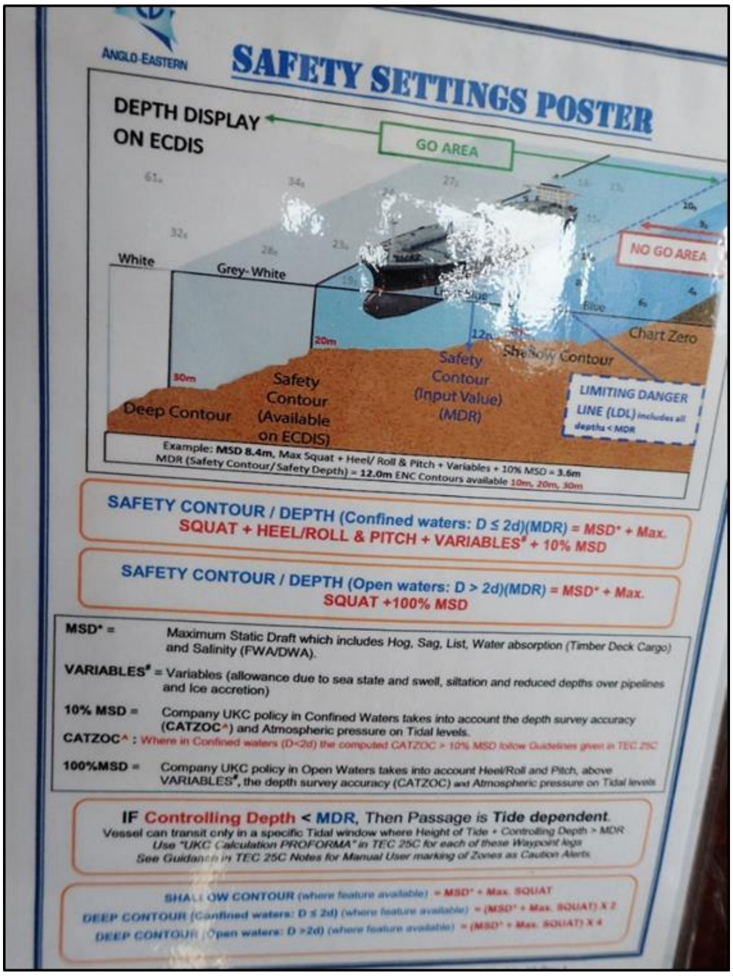

Figure 4
ECDIS safety settings as supplied in poster format on board the *Molly Manx*

3.5. Passage planning

3.5.1. The IMO's Resolution A.893(21), Guidelines for Voyage Planning, adopted on 25 November 1999 (see Appendix 3), describe voyage (passage) planning as:

> 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.

A more detailed explanation of the requirements can be found in Appendix 3.

3.6. Bridge resource management

3.6.1. Bridge resource management (BRM) was adopted in the early 1990s by the maritime industry as a safety and error management tool. It has since become an integral part of crew training and is included in the International Convention on Standards of Certification and Training and Watchkeeping developed by the IMO (see Appendix 2).

3.6.2. BRM is described as the effective management and utilisation of all resources, human and technical, available to a bridge team, to help ensure the safe completion of the vessel's voyage.

3.6.3. Some essential aspects of BRM are good closed-loop communications[14], participants sharing the same understanding of a planned passage, and maintaining situational awareness.

[14] A technique used to avoid misunderstandings. When the sender gives a message, the receiver repeats this back. The sender then confirms the message, usually by using the word 'yes'. When the receiver incorrectly repeats the message back, the sender will say "negative", or something similar, and then repeat the correct message.

4. Analysis

4.1. General

4.1.1. A vessel grounding, for however short a time, is a serious occurrence that can cause damage to the vessel and the environment.

4.1.2. Many large vessels successfully complete the transit of the Upper Harbour under pilotage every year. The following analysis discusses why on this occasion the vessel grounded. It also discusses four safety issues:

- the vessel's bridge team and the pilot did not have a shared understanding of a common passage plan before the pilotage began. Consequently the pilot and the vessel's bridge team had different understandings of the planned track to be followed and their respective roles in monitoring against the plan
- the IMO has set standards for passage planning that vessels must adhere to, but there is no corresponding requirement for the passage plans that pilots create and use to meet those same standards
- the crew were not using the ECDIS in the correct configuration required by the IMO and company standards when the grounding occurred
- the standard of BRM on board the *Molly Manx* during the Otago pilotage did not meet good industry practice.

4.1.3. The length of the *Molly Manx* was the maximum permitted for a vessel transiting the Upper Harbour, and with a draught of 7.1 m there was little margin for error. This meant it was important for the transit to be carefully managed and monitored by the bridge team.

4.1.4. The vessel was correctly certified and was manned with crew in excess of the safe manning certificate. The pilot who joined the vessel off the harbour entrance held a pilot's licence that was current for piloting a vessel of the type and size of the *Molly Manx* in that port.

4.2. What happened

4.2.1. The pilot had successfully piloted the vessel from beyond the entrance to Otago Harbour and was maintaining a speed that would allow him to berth the *Molly Manx* within the available tidal window. As the vessel approached Port Chalmers, the pilot reduced the speed of the vessel as the two tugs arrived to assist. One tug proceeded ahead of the vessel while the other was secured to the stern. Having the tug secured to the stern would have allowed the pilot to use it as a means of reducing speed or to assist with steering. The speed of the vessel and the configuration of the assisting tugs were appropriate for the passage between the Halfway Islands.

4.2.2. The *Molly Manx* passed Port Chalmers and a log storage area and storage sheds. The ebb tide as shown on the chart (see Figure 3) would normally have pushed (set[15]) the vessel from left to right (port to starboard) as the vessel approached the narrows. However, the Otago Harbour pilots were aware that during an ebb tide the vessel would be first affected by the tidal stream emanating from behind Goat Island that would set the vessel from right to left (starboard to port). It was for this reason that the pilot was comfortable with being to starboard of the planned track as the vessel was passing the storage sheds, in anticipation of the vessel being set back onto the planned track before navigating between the islands.

4.2.3. When the vessel passed the storage sheds, the pilot ordered starboard helm to start the turn into the channel to pass between Quarantine and Goat Islands and to counteract his prediction that there would be a strong set from right to left from the ebb tide flowing between Goat Island and the Port Chalmers peninsula (see Figure 3).

4.2.4. The pilot was standing at the front of the navigating bridge either on the centreline of the vessel or one or two paces to starboard. From his position he could see clearly down the

[15] Be pushed towards – set towards.

channel between the islands and the leading line beacons beyond. From his position he was not able to see either the radar or the ECDIS screen. He was navigating the vessel by eye with an occasional check on the vessel's speed log readout on the panel above the forward bridge windows.

4.2.5. Using data downloaded from the vessel's voyage data recorder it was possible to calculate the vessel's heading and match that to the true course and speed over the ground at the time (see Figure 2. The data showed that from 0734:20 the tidal stream between Goat Island and Port Chalmers did set the vessel from right to left as predicted by the pilot. However, the pilot adjusted the heading of the vessel to counter this set and the vessel remained to starboard of the planned track.

4.2.6. The vessel then entered the area where it began to be set in the opposite direction, from left to right, then moved further to starboard of the planned track.

4.2.7. The pilot made a succession of helm orders for 5, 10 and then 15 degrees of port helm and then ordered the helm to "amidships" in anticipation of the change in direction of the tidal set. The pilot then noticed that the vessel was to starboard of the line of the leading beacons. He ordered 5 then 10 degrees of port helm and then ordered the helm to amidships.

4.2.8. However, although the bow of the vessel was pointing towards the gap between the islands, the vessel was still too far to starboard of the planned track, and the bow of the vessel entered the area of shallow water inside of Goat Island and grounded. The momentum of the vessel carried it over the shallow water, causing it to swing to starboard (see Figure 5).

4.2.9. Until the pilot felt the vessel grounding, he had not appreciated how far to starboard of the planned track the vessel was. He had lost awareness of exactly where the vessel was in the channel and the influence that the tide was having on its progress. The risk of this happening is high when navigating large vessels in narrow channels using only visual references to monitor the vessels' progress. It is why all available means by all available persons should be used to monitor the progress of a vessel along its planned track. These points are discussed in more detail in the following sections.

4.2.10. The pilot realised that something was wrong when he, along with the rest of the bridge team, felt a bump. He noticed that the speed of the vessel was slowing and the vessel's bow was swinging to starboard despite his having just applied port helm. He realised from these indicators that the vessel was grounding and immediately ordered the engine to stop and then astern and for the tug secured aft to pull right aft. In doing so the pilot was able to manoeuvre the vessel off the bank and back into deeper water.

Findings

1. The grounding occurred because the bridge team, including the pilot, lost situational awareness and did not realise that the vessel had deviated so far starboard of the intended track.
2. The bridge team, including the pilot, did not realise how far the vessel had deviated from the intended track because they were not monitoring the vessel's progress effectively and by all available means.

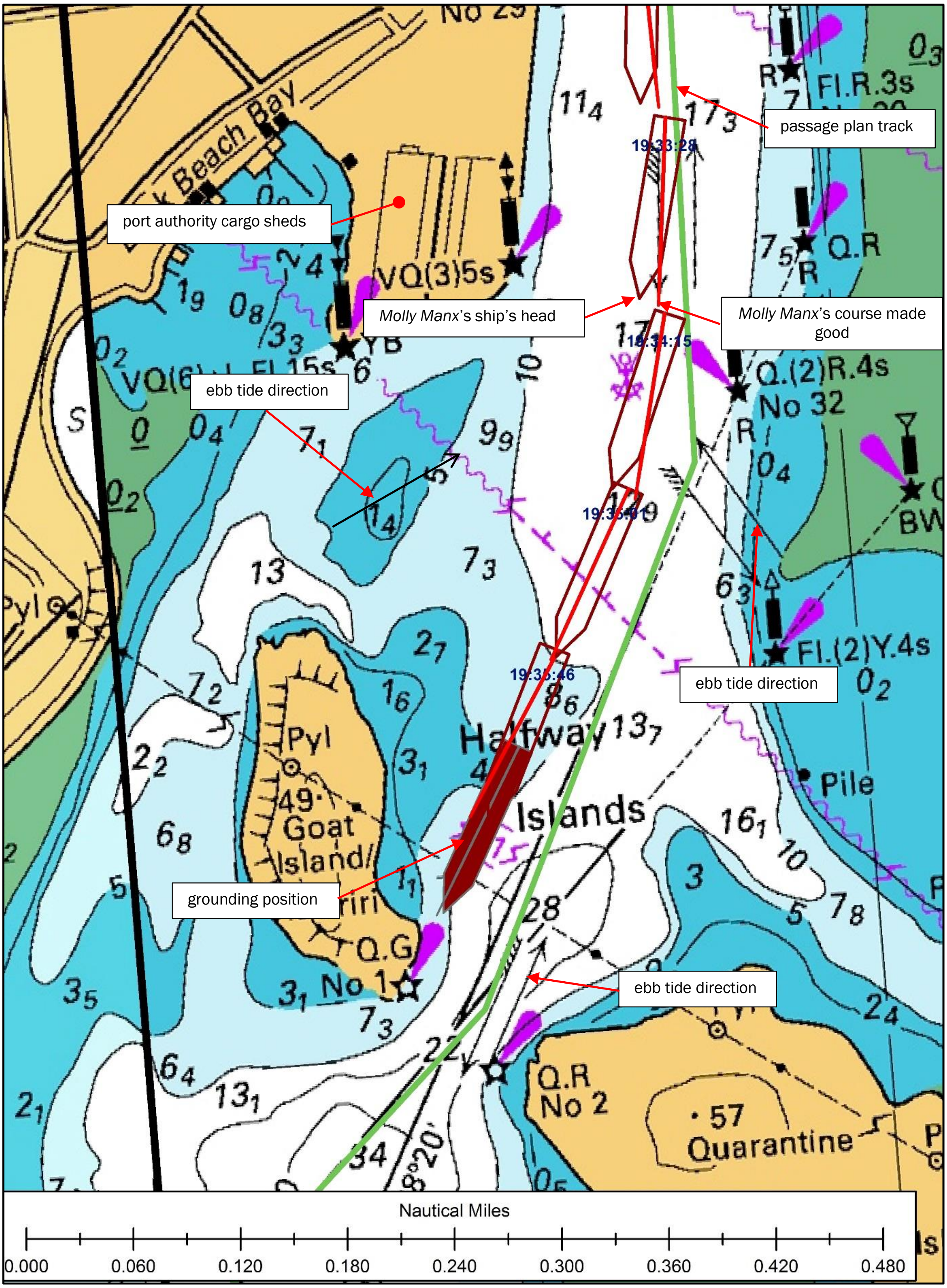

Figure 5
Passage plan track of the *Molly Manx* (green) and actual track (red)

4.3. Passage planning

Safety issue: The vessel's bridge team and the pilot did not have a shared understanding of a common passage plan before the pilotage began. Consequently, the pilot and the vessel's bridge team had different understandings of the planned track to be followed and their respective roles in monitoring against the plan.

Safety issue: The IMO has set standards for passage planning that vessels must adhere to, but there is no corresponding requirement for the passage plans that port authorities create and use to meet those same standards.

4.3.1. When a pilot joins a vessel prior to the pilotage it is the first opportunity for the master and bridge team to: talk to the pilot; clarify any issues that may have been identified during the preparation of the passage plan; and ensure they are satisfied with the planned transit. At this stage the pilot needs to be fully integrated into the bridge organisation so that the whole team works as a cohesive body and has a shared understanding of the passage plan.

4.3.2. Before any pilotage act begins, it is essential that the pilot and the master (including other members of the team) have a shared understanding of the passage plan. That did not happen in this case. As often happens, the pilot intended to navigate to the standard port company passage plan, and the vessel had its own passage plan, which differed from that of the port company.

4.3.3. An essential part of integrating the pilot into the bridge team is the pilot and master exchange of information, a briefing that should include all members of the bridge team. The briefing is a bilateral exchange of important information where everyone is made aware of: any changes to the proposed plan; the handling characteristics of the vessel; and any notable 'dynamic' information such as weather and tides for the transit.

4.3.4. The port passage plan was available over the internet from the Port Otago website. The channel is narrow and there is little scope for deviating from the plan without leaving the navigational channel. The preferred courses were presented as smooth, curved lines without any marked waypoints, turn radii or off-track limits. Without that information the vessel's crew would not have been able to replicate it in their own navigation systems, such as the ECDIS. The vessel was required to plan the passage in accordance with the IMO convention standards and guidelines[16] (see Appendix 3), but there was no international or New Zealand requirement for the port companies and their pilots to follow the same standards when developing their own generic passage plans. The Port Otago passage plan as presented on its website would not meet the IMO standards or other reputable guidelines available to mariners on voyage planning[17].

4.3.5. When the pilot joined the *Molly Manx* he and the master discussed the vessel's characteristics and went through the Otago Harbour passage plan.

4.3.6. However, the vessel had its own passage plan loaded into the ECDIS, which differed from that of Port Otago. Because the vessel's plan was the plan loaded into the ECDIS, that is what the bridge team, excluding the pilot, was using to monitor the vessel's progress. Meanwhile, the pilot was navigating the vessel to the Port Otago passage plan, using visual references as he had been trained to do. The bridge team, which now included the pilot, was not aligned in its thinking and did not share the same understanding of the plan. This dynamic was going to make effective BRM difficult to achieve, which is discussed in the following section.

4.3.7. The New Zealand Port and Harbour Marine Safety Code is a voluntary national standard. The Code recommends that, "Up-to-date passage plans and guidance should be published, and be available to harbour users and the masters of visiting vessels" (see Appendix 6).

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[16] Chapter V, Safety of Navigation, of the Annex to the International Convention for the Safety of Life at Sea and Resolution A.893(21) Guidelines for Voyage Planning.

[17] Other best-practice guidelines also contain valuable advice on bridge watchkeeping in general and voyage planning in particular. They include: the United Kingdom's Maritime and Coastguard Agency's guidance on Chapter V, Safety of Navigation, of the Annex to the International Convention for the Safety of Life at Sea; the Nautical Institute's Bridge Team Management – A practical guide; and the International Chamber of Shipping's Bridge Procedures Guide.

4.3.8. One method of ensuring that an approved passage plan is available on board would be for port companies or harbour authorities to make available to vessels properly constructed and validated passage plans that meet the port-specific standards and guidelines included in Chapter V, Safety of Navigation, of the Annex to the International Convention for the Safety of Life at Sea (SOLAS), and Resolution A.893(21) Guidelines for Voyage Planning. Such a system would assist in on-board passage planning and allow a vessel to be better prepared when the pilot boards. This action would greatly assist the smooth transition of the pilot into the bridge team at a time of typically high workload and little time before the pilotage begins.

4.3.9. More vessels are using ECDISs as the primary means of navigation, and this will increase in the future. As it was on board the *Molly Manx*, the passage plan to the berth is usually loaded into the vessel's ECDIS. Ideally, passage plans generated by port companies should be to the same IMO standards that vessels are required to meet, and should be compatible for use in an ECDIS.

4.3.10. Many vessels transit more than one New Zealand port. It would greatly enhance safety if the passage plans were, as far as practicable, in a standard format and could be found at one site. Vessels routed to several New Zealand ports would be able to access from one place standardised passage plans for several ports, even before they departed from their previous overseas ports.

4.3.11. Currently there can be issues with uploading standardised passage plans into an ECDIS, because ECDIS manufacturers have proprietary systems that require specific formats. However, that will shortly change. The International Hydrographic Organization and the International Electrotechnical Commission standard for ECDISs (IEC 61774 Edition 4, September 2015) from August 2017 includes a route exchange format that will make it easier for data transfers. In the future it will be possible to send passage plans to all vessels in the correct format to be uploaded directly into the ECDIS system, thereby reducing the possibility of navigating officers making errors when loading them into ECDISs. However, this facility was not available at the time of the accident and therefore was not able to be used by the bridge team on this occasion.

4.3.12. The Commission has made recommendations to Maritime New Zealand to promote the use of standard passage plans by all New Zealand harbour authorities.

4.4. *Molly Manx* electronic chart display and information system

Safety issue: The crew were not using the ECDIS in the correct configuration required by the IMO and company standards when the grounding occurred.

4.4.1. The *Molly Manx* was approved to use an ECDIS as a primary means of navigation and as such did not have to carry or use paper charts for navigation.

4.4.2. User-defined safety settings are an important safety function when using an ECDIS. A failure to enter the correct safety settings can allow a vessel to enter unsafe waters without alerting the operator. To achieve a safe passage plan, users of ECDISs must understand how to determine accurately the correct value for a safety setting as detailed in Table 2 on page 16. The *Molly Manx*'s passage plan included settings for the deep contour, safety contour and safety depth, shallow contour, cross-track limit and watch vector settings (look ahead).

4.4.3. Some of the values of user-defined ECDIS safety settings in use on board the *Molly Manx* differed from the values stated in the vessel's passage plan and from the usual default settings.

4.4.4. The cross-track distance to either side of the vessel was set at 0.25 nautical miles or 463 m as per the passage plan. However, the narrowest width of the Port Otago channel was approximately 100 m. The vessel would therefore have been 413 m outside the channel before the cross-track distance alarm would activate. At the position of the grounding the vessel was approximately 75 m off track. The settings in the ECDIS were not appropriate for the intended passage into Port Otago.

ECDIS safety settings			
Name	Description	Usual and default settings	*Molly Manx*'s passage plan
Safety depth not coloured, used as an alarm trigger	Intended as an aid when appropriate safety contour is available in the system electronic navigational chart[18]	Usually user defined as vessel's: draught+squat[19]+under-keel clearance	8.83 m
Safety contour usually coloured grey-white between the deep contour and safety contour and light blue between shallow and safety contour	Marks the division between safe and unsafe water	Usually user defined as: draught+squat+under-keel clearance+height of tide Defaults to 30 m	8.83 m Safety contour and safety depth cannot be individually set on equipment
Deep contour usually coloured grey-white between the deep contour and safety contour white in deeper water	Indicates the depth at which a vessel experiences squat	Usually user defined as: twice the vessel's draught	15.48 m
Shallow contour usually coloured light blue between shallow and safety contour, deep blue inside shallow contour	Highlights the gradient of the seabed adjacent to the safety contour	Usually user defined as: draught+squat or next contour shallower than the safety depth	7.74 m
Cross-track distance usually shown by some form of limit line on either side of the planned track	The distance a vessel can deviate from the planned route before an alarm activates	Usually user defined	0.25 nautical miles
Watch-vector/predictor usually shown as a vector arrow or ship shape ahead of the vessel	Used as an alarm setting and indication to the user where the vessel will be	Usually user defined as a set distance or as a distance that will be covered in the set time	2 minutes

Table 2
ECDIS safety settings

18 A digital vector chart specifically designed for use in electronic navigational systems on board vessels.
19 When a vessel moves through shallow water, some of the displaced water rushes under the vessel to rise again at the stern. This decreases the upward pressure on the hull, making the vessel sink deeper in the water than normal and slowing the vessel. Squat increases with the speed of the vessel.

4.4.5. The watch vector or predictor was required to be set for two minutes according to the passage plan. At the time of the grounding the ECDIS display showed that the vector was set at 10 minutes rather than two minutes as specified in the vessel's passage plan. In a winding channel such as Otago Harbour, setting the watch vector to 10 minutes would very likely cause the head of the vector to be constantly outside the safe navigable water within the channel, which means it would be in a constant state of alarm. Apart from creating alarm management issues for the officer of the watch (OOW), it was unable to alert the bridge team to any safety hazards ahead.

4.4.6. Accurate user-defined settings are essential if an ECDIS is to provide the level of navigational safety expected of it. This accident shows how ineffective it can become if the settings that have been entered are incorrect.

4.5. Bridge resource management

Safety issue: The standard of BRM on board the Molly Manx *during the Otago pilotage did not meet good industry practice.*

Implementation of BRM on board

4.5.1. Achieving a high standard of BRM during the pilotage to Port Otago was going to be difficult because the fundamental requirement of all working to the same passage plan had not been met. Nevertheless, effective BRM could still have prevented the grounding, but it was essentially absent amongst the bridge team.

4.5.2. The OOW and the helmsman were part of the bridge team, but they were not included in the briefing between the master and the pilot. The absence of the OOW, the relieving OOW and the helmsman from the briefing was a missed opportunity to ensure that everyone was sharing the same understanding, and reinforced the need to engage in challenge and response and ensure that the pilot was incorporated into the bridge team.

4.5.3. The navigable channel through Otago Harbour to Dunedin is narrow. For a vessel the size of the *Molly Manx* there are very few possible variations to the preferred courses. Even if the OOW had been monitoring the progress of the vessel against the vessel's passage plan with agreed off-track limits, the vessel's deviation to starboard of the track could and should have been noticed and raised with the master and pilot. However, the ECDIS had not been correctly configured for the transit of the narrow channel, and the OOW had not been invited to challenge the master or pilot if the vessel deviated from the intended route.

4.5.4. As the vessel entered the Otago Harbour pilotage the OOW was relieved. The relieving OOW was not briefed by the master on what was expected of him or made aware of significant information from the master-pilot exchange of information. He was therefore not fully incorporated into the bridge team.

4.5.5. Despite the pilot advising the master at the master/pilot exchange that he welcomed being challenged by the bridge team, and explaining the contents of the Port Otago Master/Pilot Information Exchange sheet (see Appendix 1), which includes the notation:

> Despite the duties and obligations of a Pilot, the Pilot's presence on board does not relieve the Master or Officer in charge of the navigation watch from their duties and obligations for the safety of the vessel. The Bridge Team have a duty to support the Pilot and to ensure that his/her actions are monitored at all times.

the pilot said that after the OOWs had changed he soon realised that he was working very much on his own. It was a situation that the pilot said he was familiar with. As difficult as it will be to encourage a bridge team to engage fully in the conduct of a vessel when it is not their normal culture to do so, a pilot should nevertheless challenge the navigation team to do so, as should a navigation team do in a reciprocal situation where a pilot lapses into a one-person operation. A breakdown in BRM can never be attributable to only one of the participants.

4.5.6. The relieving OOW assumed responsibility for: operating the engine telegraph; monitoring the helmsman and ensuring the correct helm was applied; checking the under-keel clearance; and checking the vessel's position on the ECDIS. These were important tasks. Both the master and the OOW noticed the vessel deviating to starboard, but neither spoke up and alerted the pilot to the vessel's position. There was silence on the bridge as the vessel ran aground.

4.5.7. The company's safety management system had comprehensive sections on BRM and the requirement for passage planning from berth to berth (see Appendix 5) (as contained in Chapter V, Safety of Navigation, of the Annex to SOLAS, Regulation 34 Safe Navigation and Resolution A.893(21) Guidelines for Voyage Planning) (see Appendix 3 for relevant parts).

4.5.8. However, including a requirement to practise good BRM and planning the passage in a safety management system does not fulfil a company's and master's obligations in that regard. Putting the concepts into practice is the key. Unless managers and masters believe in, promote, practise and drive good BRM skills, they are unlikely to succeed.

4.5.9. The Commission would normally make a recommendation to the Flag State administration for the vessel to address through Flag State control any deficiencies in bridge practices. However, the vessel is now under different operation and has been re-registered with a different Flag State.

Findings

3. The pilot and the vessel's bridge team did not have a shared understanding of one common passage plan to the berth before the pilotage began, which meant they were not all sharing the same understanding of the plan.
4. The vessel's ECDIS was not correctly configured for navigation in a narrow channel, which meant the crew were not adequately monitoring the progress of the vessel in support of the pilot, who was navigating mainly by visual references.
5. Neither the master nor the officer of the watch speaking up when they both noticed that the vessel was to starboard of the track according to their passage plan was a lost opportunity to avert the grounding.
6. The standard of bridge resource management on the *Molly Manx* bridge leading up to the grounding did not meet industry good practice.

5. Findings

5.1. The grounding occurred because the bridge team, including the pilot, lost situational awareness and did not realise that the vessel had deviated so far starboard of the intended track.

5.2. The bridge team, including the pilot, did not realise how far the vessel had deviated from the intended track because they were not monitoring the vessel's progress effectively and by all available means.

5.3. The pilot and the vessel's bridge team did not have a shared understanding of one common passage plan to the berth before the pilotage began, which meant they were not all sharing the same understanding of the plan.

5.4. The vessel's ECDIS was not correctly configured for navigation in a narrow channel, which meant the crew were not adequately monitoring the progress of the vessel in support of the pilot, who was mainly navigating by visual references.

5.5. Neither the master nor the officer of the watch speaking up when they both noticed that the vessel was to starboard of the track according to their passage plan was a lost opportunity to avert the grounding.

5.6. The standard of bridge resource management on the *Molly Manx* bridge leading up to the grounding did not meet industry good practice.

6. Safety issues

6.1. The vessel's bridge team and the pilot did not have a shared understanding of a common passage plan before the pilotage began. Consequently the pilot and the vessel's bridge team had different understandings of the planned track to be followed and their respective roles in monitoring against the plan.

6.2. The IMO has set standards for passage planning that vessels must adhere to, but there is no corresponding requirement for the passage plans that pilots create and use to meet those same standards.

6.3. The crew were not using the ECDIS in the correct configuration required by the IMO and company standards when the grounding occurred.

6.4. The standard of bridge resource management on board the *Molly Manx* during the Otago pilotage did not meet good industry practice.

7. Safety actions

General

7.1. The Commission classifies safety actions by two types:

(a) safety actions taken by the regulator or an operator to address safety issues identified by the Commission during an inquiry that would otherwise result in the Commission issuing a recommendation

(b) safety actions taken by the regulator or an operator to address other safety issues that would not normally result in the Commission issuing a recommendation.

Safety actions addressing safety issues identified during an inquiry

7.2. Since the accident Anglo-Eastern Ship Management has:

- briefed the master about the incident citing the importance of taking overriding action well in time when in doubt as to a pilot's advice
- promulgated the findings of this incident to all company-managed ships and to company training centres by a 'One of our ships' report so as to create better awareness.

7.3. Since the accident Port Otago has taken the following actions:

- all pilots have been or are being issued with their own individual PPU [portable pilotage units]– Currently six of the eight pilots (including the pilot that had the accident) have been issued with a Navicom Channel Pilot Mk 3 PPU
- a virtual starboard-hand beacon is to be put in over the shoal where the *Molly Manx* ran aground. This is done through the AIS system
- the maximum size of bulk vessel to be allowed to navigate in the Upper Harbour is to be reduced from 190 metres LOA [length overall] to 180 metres (there will be a couple of exceptions later this year as some vessels were already under charter to the Ravensdown fertiliser company but we will have specific controls in place with respect to the use of tugs, wind and tide limits).

Safety actions addressing other safety issues

None identified.

8. Recommendations

General

8.1. The Commission may issue, or give notice of, recommendations to any person or organisation that it considers the most appropriate to address the identified safety issues, depending on whether these safety issues are applicable to a single operator only or to the wider transport sector. In this case, recommendations have been issued to Maritime New Zealand.

8.2. In the interests of transport safety, it is important that these recommendations are implemented without delay to help prevent similar accidents or incidents occurring in the future.

Recommendations to the Director of Maritime New Zealand

8.3. The IMO has set minimum standards and guidelines for passage planning that vessels should adhere to, but there is no corresponding New Zealand requirement for passage plans created by port authorities to meet those same standards. This raises an issue for masters of vessels when pilots prefer to conduct the navigation of their vessels in accordance with port-generated passage plans that might not meet the standards that a vessel should comply with.

One method of ensuring that an approved passage plan is available on board would be for port authorities to make available to vessels properly constructed and validated passage plans. The majority of the passage planning guidelines contained in Annex 24 to Chapter V of SOLAS can be encapsulated in a generic passage plan developed by a port authority, leaving only the vessel-specific considerations and 'dynamic' information such as tide and weather conditions to be discussed and agreed during the master/pilot exchange.

Such a system would assist in on-board passage planning and allow a vessel to be better prepared when the pilot boards. This would greatly assist the smooth transition of the pilot into the bridge team at a time of typically high workload and little time before the pilotage begins.

On 25 October 2017 the Commission recommended that the Director of Maritime New Zealand use the Port and Harbour Marine Safety Code and its associated governance arrangements, or any other appropriate mechanism, to ensure that port authorities produce and publish passage plans for their respective pilotage districts that meet the port-specific requirements and guidelines contained in Chapter V, Safety of Navigation, of the Annex to SOLAS and Resolution A.893(21) Guidelines for Voyage Planning. (029/17)

On 10 November 2017, Maritime New Zealand replied:

> As outlined in my response to the Commission's draft recommendations, neither the code nor the underlying statutory framework confer on the Director a mechanism to ensure that port operators or regional councils undertake specific activities as contemplated in this recommendation.
>
> However, I will, within six months of the Commission releasing its final report, convey this recommendation to both Port operators and Regional Councils who are parties to the code, for their consideration.
>
> Furthermore, Maritime New Zealand will advise the Commission of any response or comments received from Port operators and/or Regional Councils as to their intentions.

8.4. More vessels are using ECDISs as the primary means of navigation. This will increase in future. As it was with the *Molly Manx*, the pilotage plan to the berth is usually loaded into the vessels' ECDISs.

Currently there can be issues with uploading standardised passage plans into an ECDIS, because ECDIS manufacturers have proprietary systems that require specific formats. However, that will shortly change. The International Hydrographic Organization and the International Electrotechnical Commission standard for ECDISs (IEC 61774 Edition 4, September 2015) from August 2017 includes a route exchange format that will make it easier for data transfers. In the future it will be possible to send passage plans to all vessels in the correct format to be uploaded directly into the ECDIS system, thereby reducing the possibility of vessels' navigating officers making errors when loading into ECDISs the passage plans generated by the responsible harbour authorities.

Ideally, passage plans generated by responsible harbour authorities should be to the standard that is required by vessels, and should be compatible for use in an ECDIS.

On 25 October 2017 the Commission recommended that the Director of Maritime New Zealand encourage responsible harbour authorities to produce their passage plans in a format that will in future be capable of being directly uploaded into a vessel's ECDIS. (030/17)

On 10 November 2017, Maritime New Zealand replied:

> I will convey this TAIC recommendation to Port operators and Regional Councils through the mechanism of the Port and Harbour Marine Safety Code within six months of the Commission releasing its final report. Maritime New Zealand will advise the Commission of any response or comments received from Port operators and/or Regional Councils as to their intentions.

8.5. Many vessels transit more than one New Zealand port. It would greatly enhance safety if the passage plans were, as far as practicable, in a standardised format and could be found at one site. Vessels routed to several New Zealand ports would be able access from one place standardised passage plans for several ports, even before they departed from their previous overseas ports.

On 25 October 2017 the Commission recommended that the Director of Maritime New Zealand provide a common official website where responsible harbour authorities can make their passage plans available for download by shipping companies and vessel masters to access prior to planning their voyages. [031/17]

On 10 November 2017, Maritime New Zealand replied:

> As an additional service to any already provided by individual Port operators and Regional Councils, Maritime New Zealand will investigate through the mechanism of the Port and Harbour Marine Safety Code, providing a facility on its internet site for Port operators and Regional Councils who wish to make passage plans available for shipping companies and vessel masters to access prior to planning their voyages.
>
> The time frame to complete this recommendation will largely depend on whether or not Port operators and Regional Councils choose to accept the recommendations above.
>
> In my response to the Commission's draft recommendations, I referred to the statutory framework within which Maritime New Zealand operates, and limitations on the Director's powers to go beyond encouraging Port operators and Regional Councils to take specific actions. I re-state my view that it would be more appropriate for the Commission to address its concern directly with the parties that it wishes to see take action.

8.6. In order to fully contextualize, and to be read in conjunction with his specific responses to the Commission's recommendations 029/17, 030/17 and 031/17, the director referred to the following paragraphs in response to the Commission's draft recommendations:

> Part 3A of the Maritime Transport Act 1994 (MTA) provides for local regulation of maritime activity and sets out the functions and powers of regional councils and harbourmasters. Under section 33C, for the purpose of ensuring maritime safety in their regions, regional councils may regulate ports, harbours, waters and maritime-related activities in their regions. Section 33F sets out the powers of harbourmasters for the purposes of ensuring maritime safety, or enforcing navigation bylaws or regulations and rules made under the MTA.
>
> While these functions and powers are in the MTA, neither the Maritime NZ Authority nor the Director has the power to direct or require regional councils or harbourmasters to take the actions that TAIC has recommended. An alternative option would be for the Commission to make these recommendations directly to the local harbour authorities.

9. Key lessons

9.1. There must be an absolute agreement and shared understanding between the vessel's bridge team and the pilot as to the passage plan and monitoring against that plan.

9.2. Vessels' bridge teams must actively promote and use the concept of bridge resource management, including the incorporation of pilots into the bridge teams, to manage voyages properly.

9.3. A vessel's ECDIS is an important system for monitoring the progress of the vessel and warning the bridge team when things could go wrong. It is essential that it be configured correctly for the phase of navigation and the proximity to navigation hazards.

Appendix 1: Port Otago pilot information sheet and the vessel's 'pilot card'

PORT OTAGO LIMITED

Master/Pilot Information Exchange 16486

Point of Contact whilst in Port - **Port Otago Harbour Control – VHF Ch 14 or (03) 472 9882**

Date ......19 Aug 2016..................

Vessel ....Molly Manx...........

Move Arr Dep Shift

Berth ....4W.......................P S

Draughts For'd m Aft 7.05 m

Last/~~Next~~ Port ......Lyttelton...............

Mooring Plan ....4 + 2 FDA.........

First/Last line Time ....0812................

Weather

Present Dir .NNE..kts 20......
Forecast Dir .NE....kts 20.....
Visibility Min 0.75 M
Swell (Forecast) m

Predicted Tide

	Time	Height
Dunedin	0400	2.1
Port ~~Chalmers~~	1053	0.1

~~Flood~~/Ebb Spring/~~Neap~~

UKC Calculation

Dredged depth		7.8	m
HoT @ ..0800..	+	7.9	m
Total Depth	=	7.9	m
Draught	~	7.1	m
Static UKC	=	.8	m
Static UKC Req'd	=	.8	m

7.8
8.4
7.0
1.4
1.28

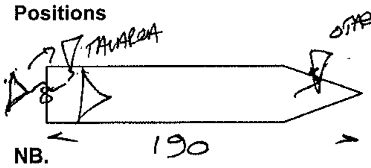
NB. No allowance for Squat/Swell

Vessel Elements	Y	N
Pilot Card; *presented*	✓	☐
Any defects or special characteristics	☐	✓
Engines; *tested astern, ahead*	✓	☐
Gyro Error;	.nil..	
Thrusters; *available & tested*	☐	✓
Anchors; *ready & manned*	✓	☐
Navigation Elements		
Navigation intentions; *berth, courses, speeds, W/O pos'n, etc*	✓	☐
Manoeuvre of V/l & Basin dimensions discussed	✓	☐
Other V/L *movements*	✓	☐
Critical areas of transit; *no go areas, interaction, squat, etc*	✓	☐
BRM Elements		
Challenge and Response; *process Established*	✓	☐
Responsibilities of Bridge Team defined; *OOW to monitor position, helm, telegraph,etc*	✓	☐
Contingency planning	✓	☐
Designate Radar for Pilot's use.	✓	☐
Portable Pilot Unit	☐	✓

Towage

Taiaroa (68T) Otago (58T) ~~Kapu (6T)~~

Positions



NB.
1. Tugs work on VHF Ch 12
2. Tugs lines used
3. Tug R/V point
4. Consider whether V/L's bitts match Tugs Bollard Pull
5. When letting go tug's line, lower line slowly under control

Despite the duties and obligations of a Pilot, the Pilot's presence on board does not relieve the Master or Officer in charge of the navigation watch from their duties and obligations for the safety of the vessel. The Bridge Team have a duty to support the Pilot and to ensure that his/her actions are monitored at all times

Master/Pilot Information exchange Complete and Conduct of V/L transferred to Pilot – Time..0636

MASTER (print)....... ....PILOT (print)..

MASTER (sign)....... .... PILOT (sign)..

Marine Services – Master/Pilot Information Exchange Rev: f Nov 2014.

ANGLO-EASTERN
QHSE MANAGEMENT
M.V. MOLLY MANX
PILOT CARD

No.:D/06	Date: 16 May 16	Revision: 0	Prep: Master	Appr: Suptd	Page 1 of 2

ACTION: FILE

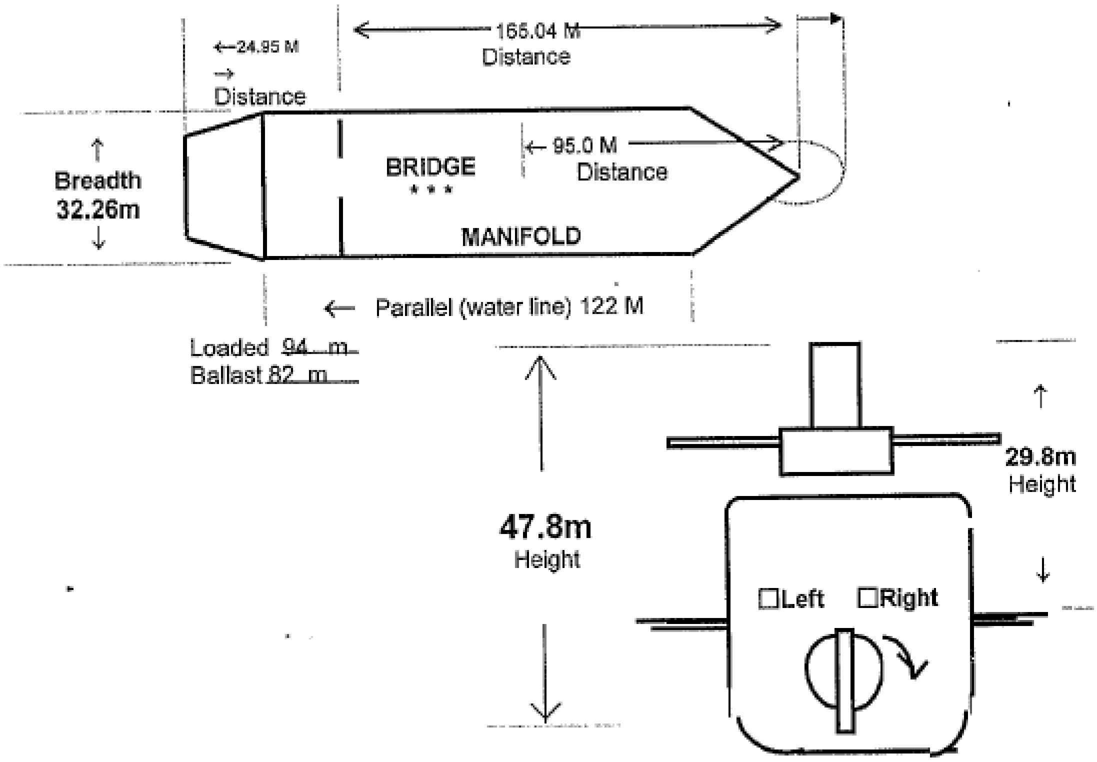
TO BE GIVEN TO PILOT

VESSEL DETAILS: **Port :** DUNEDIN ARR / DEP
Ship's Name : MOLLY MANX Flag : ISLE OF MAN Date: 19 AUG. 2016
Call Sign: 2 H N X 3 IMO No. : 9425863 Year Built : 2010
Deadweight : 23,575 Displacement : 33,395 GRT: 32,296
Draft Forward: 6.40 **m/** ft/in **Draft Aft :** 7.0 **m/** **ft/in**
Draft Amidships : 6.70 m/ ft/in **AIR DRAFT :** 40.85 **m/** **ft/in**
Cargo Type : 15,715 MT PHOSROCK Last / Next Port : LYTTELTON / NAPIER
SHIP'S AGENT : ISS- MCKAY LTD

SHIP'S PARTICULARS :
Length Overall: 189.99 m, Breadth: 32.26 m, Bulbous Bow? No
Anchor Chain : Port 12 shackles Starboard 11 shackles
Stern N/A shackles (1 shackle = 27.4 m/ 15 fathoms)

STEERING CHARACTERISTICS :
Type of rudder : 5 BLADES SOLID PITCH Maximum Angle : 35^0 degrees
Advance 0.46 nm
Rudder angle for neutral effect : 0.5^0 degrees **Transfer 0.44 nm**
Hard over to hard over: 22.7 seconds **Tactical diameter nm**

KEY DISTANCES: (FILL UP DATA AS APPLICABLE)



AESM

ANGLO-EASTERN
QHSE MANAGEMENT
M.V. MOLLY MANX
PILOT CARD

No.:D/06	Date: 16 May 16	Revision: 0	Prep: Master	Appr: Suptd	Page 2 of 2

CHECK OPERATIONAL :

☑ Anchors Cleared Away ☑ Yes ☐ No	☑ Steering Gear No. of units operating : 2
☑ Whistle	☑ Compass System Gyro error : 0.2 H
☑ Radar 3CM ☑ 10CM	☑ RPM Indicator
☑ ARPA	☑ Engine Telegraphs
☑ Echo Sounder	☑ Rudder Indicator
☑ Doppler/EM Speed Log	☑ VHF
☑ AIS	☑ GPS
☑ Pilot Plug	☑ Other Electronic Positioning System
☑ ECDIS	☑ Mooring Winches and lines

MOORING ROPES/WIRES :
FWD: Number 6 Length 200 M Circumference ____ Material:
AFT: Number 6 Length 200 M Circumference ____ Material:

THE FOLLOWING HAS BEEN DISCUSSED WITH PILOT :
ANY NOTABLE CHARACTERISTICS, e.g. berthing restrictions, or maneuvering peculiarities, etc.:
- **The minimum U.K.C. while making approaches to port / during pilotage**
Minimum UKC Required – 1.55 Calculated Minimum UKC for the transit – 0.69
- **The minimum U.K.C. whilst at berth**
Minimum UKC Required – 0.69 Calculated Minimum UKC for the berth – ____
- When in ECA and operating on Ultra Low Sulphur Fuel, inform the pilot of the possible change in the propeller shaft RPM and generator loads for existing throttle settings (due to different energy content of given volume of ULS fuel and residual fuel).

TYPE OF ENGINE :
Maximum Power : 3X480 kW 7140 KW hp
Engine Critical rpm : 59-71 Maximum consecutive starts : 11
Propeller :
☐ **Controllable Pitch**
☒ **Fixed**

ENGINE ORDER	RPM/PITCH	SPEED (KNOTS)	SQUAT (MTR) Open/Confined	SPEED-BALLAST (KNOTS)
Full Ahead	82	10.9		11.7
Half Ahead	75	10.0		10.7
Slow Ahead	54	7.2		7.7
Dead Slow Ahead	40	5.3		5.7
Dead Slow Astern	40	Time limit astern NO LIMIT minutes		Minimum Speed 40 rpm 5.7 Kts
Slow Astern	54	Full ahead to Full Astern 15 seconds		Astern Power 72 % ahead
Half Astern	75			
Full Astern	82			
Bow Thruster? Power N/A kW / hp	☐ Yes ☒ No	STERN THRUSTER? Power N/A kW / hp		☐ Yes ☒ No
Effective ship speed range (knots)	NA	Effective ship speed range (knots)		

Note: Mobile phones to be used for port information and safety of navigation only.

DUTY OFFICER **MASTER** **PILOT (NAME AND SIGNATURE)**

AESM

Appendix 2: Standards of training, certification and watchkeeping Manila 2010, code Chapter II, table A-II/1

Table A-II/1

Specification of minimum standard of competence for officers in charge of a navigational watch on ships of 500 gross tonnage or more

Function: Navigation at the operational level

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Maintain a safe navigational watch	*Watchkeeping* Thorough knowledge of the content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended Thorough knowledge of the Principles to be observed in keeping a navigational watch The use of routeing in accordance with the General Provisions on Ships' Routeing The use of information from navigational equipment for maintaining a safe navigational watch Knowledge of blind pilotage techniques The use of reporting in accordance with the General Principles for Ship Reporting Systems and with VTS procedures	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience; .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training Assessment of evidence obtained from one or more of the	The conduct, handover and relief of the watch conforms with accepted principles and procedures A proper look-out is maintained at all times and in such a way as to conform to accepted principles and procedures Lights, shapes and sound signals conform with the requirements contained in the International Regulations for Preventing Collisions at Sea, 1972, as amended, and are correctly recognized The frequency and extent of monitoring of traffic, the ship and the environment conform with accepted principles and procedures A proper record is maintained of the movements and activities relating to the navigation of the ship

	Bridge resource management Knowledge of bridge resource management principles, including: .1 allocation, assignment, and prioritization of resources .2 effective communication .3 assertiveness and leadership .4 obtaining and maintaining situational awareness .5 consideration of team experience	following: .1 approved training .2 approved in-service experience .3 approved simulator training	Responsibility for the safety of navigation is clearly defined at all times, including periods when the master is on the bridge and while under pilotage Resources are allocated and assigned as needed in correct priority to perform necessary tasks Communication is clearly and unambiguously given and received Questionable decisions and/or actions result in appropriate challenge and response Effective leadership behaviours are identified Team member(s) share accurate understanding of current and predicted vessel state, navigation path, and external environment

Appendix 3: SOLAS Chapter V, Regulation 34 Safe Navigation and Resolution A 893(21) Annex

1 Prior to proceeding to sea, the master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned, taking into account the guidelines and recommendations developed by the Organization.*

2 The voyage plan shall identify a route which:

.1 takes into account any relevant ships' routeing systems;

.2 ensures sufficient sea room for the safe passage of the ship throughout the voyage;

.3 anticipates all known navigational hazards and adverse weather conditions; and

.4 takes into account the marine environmental protection measures that apply, and avoids, as far as possible, actions and activities which could cause damage to the environment.

Resolution A 893(21) Annex

DRAFT GUIDELINES FOR VOYAGE PLANNING

1. Objective

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. .1 the condition and state of the vessel, its stability, and its equipment; any operational limitations; its permissible draught at sea in fairways[20] and in ports; its manoeuvring data, including any restrictions;
2. .2 any special characteristics of the cargo (especially if hazardous), and its distribution, stowage and securing on board the vessel;
3. .3 the provision of a competent and well-rested crew to undertake the voyage or passage;

[20] Navigable water in a channel, harbour or river.

4. .4 requirements for up-to-date certificates and documents concerning the vessel, its equipment, crew, passengers or cargo;
5. .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. .6 accurate and up-to-date sailing directions, lists of lights and lists of radio aids to navigation; and
7. .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:

8. .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;
9. .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.

Appendix 4: Relevant parts of the *Molly Manx*'s passage plan – Otago Harbour

ANGLO - EASTERN

FILE REF. : BRIDGE

Distribution:

Ship

PASSAGE PLAN

FOR VESSELS WITH ECDIS AS APPROVED MEANS OF NAVIGATION (AS PER SEQ CERTIFICATE)

VESSEL : M.V. MOLLY MANX

Voyage No. 14L

From Port : LYTTELTON

To Port : DUNEDIN

Dep Draft F: 6.16 mtr | Draft A: 6.98 mtr

Arr Draft F: 6.16 mtr | Draft A: 6.98 mtr

Min. estimated UKC (corrected for squat) for the passage (Refer guidelines given in SBP 201A 3.3.1 and ECDIS Safety Settings Poster QA34): 0.69 Mtr

Ensure salinity of water is taken into account while calculating Max draft

W PT No.	WPT LAT	WPT LONG	T/CO	DIST	DTG	Leg Speed	Deep Contour	Safety Contour & Safety Depth (5)	Shallow Contour	Safety Height	XTL	Watch Vector Setting	Expected Current/ Tidal Stream Dir x rate	Posn fixing method (14)	Bridge Manning Level (15)	VHF watch on CH	Wx. fax Navtex stns to monitor	Reference Page No.'s (16)	Master's Remarks/ Additional Instructions or Deviation from Plan (See note 17)
9	45-43.61 S	170-43.74 E	2241	1.10	15.20	8	15.48	8.83	7.74	42.87	0.25	2 Mins	[illegible] printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	DUNEDIN P/S 8
Note:	Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
Note:	Alert 8.2	Strictly monitor movements of other vessels																	
Note:	Alert 8.3																		
10	45-47.42 S	170-43.18 E	186	3.60	11.40	8	15.48	8.83	7.74	42.67	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note:	Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
Note:	Alert 8.2	Strictly monitor movements of other vessels																	
Note:	Alert 8.3	Fwd standby for anchoring																	
11	45-47.64 S	043-08.85 E	223	0.30	11.10	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note:	Alert 8.1	Fix position every 5 mins Monitor UKC.																	
Note:	Alert 8.2	Strictly monitor movements of other vessels																	
Note:	Alert 8.3																		
12	45-47.74 S	170-42.58 E	244	0.20	10.90	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note:	Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
Note:	Alert 8.2	Strictly monitor movements of other vessels																	
Note:	Alert 8.3																		
13	45-47.73 S	170-41.81 E	271	0.50	10.40	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note:	Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
Note:	Alert 8.2	Strictly monitor movements of other vessels																	
Note:	Alert 8.3																		
14	45-47.52 S	170-40.53 E	283	0.90	9.50	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note:	Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
Note:	Alert 8.2	Strictly monitor movements of other vessels																	
Note:	Alert 8.3																		
15	45-47.55 S	170-40.12 E	266	0.30	9.20	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note:	Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
Note:	Alert 8.2	Strictly monitor movements of other vessels																	
Note:	Alert 8.3																		
16	45-47.67 S	170-39.72 E	245	0.30	8.90	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	

	Note: Alert 8.1	Fix position every 5 mins, Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
17	45-47.88 S	170-39.25 E	239	0.40	8.50	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
	Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
18	45-47.95 S	170-38.51 E	262	0.50	8.00	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Norwood Navtex - France/Croco	ALRS /ALL-Attached ASD - NP 5-(attached). Nav area V-In file	
	Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
19	45-48.05 S	170-38.19 E	245	0.30	7.70	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
	Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
20	45-48.18 S	170-37.98 E	229	0.20	7.50	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
	Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
21	45-48.24 S	170-37.94 E	205	0.10	7.40	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
	Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
22	45-48.65 S	170-37.82 E	192	0.40	7.00	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
	Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
23	45-48.86 S	170-37.90 E	166	0.20	6.80	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
	Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
24	45-49.28 S	170-37.88 E	182	0.40	6.40	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
	Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
25	45-49.57 S	170-37.68 E	206	0.30	6.10	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G,R,V, 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
	Note: Alert 8.1	Fix position every 5 mins, Monitor UKC.																	
	Note: Alert 8.2	Strictly monitor movements of other vessels																	
	Note: Alert 8.3																		
													As Per printout	G,R,V				ALRS /ALL-Attached	

													from DATT		4	14/12/16	Navtex -	Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
27	45-49.79 S	170-35.63 E	265	0.60	5.20	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
28	45-49.88 S	170-35.25 E	251	0.30	4.90	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
29	45-50.11 S	170-35.64 E	242	0.50	4.40	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
30	45-50.20 S	170-35.47 E	232	0.20	4.20	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
31	45-50.34 S	170-35.34 E	212	0.20	4.00	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
32	45-50.67 S	170-35.19 E	198	0.30	3.70	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
33	45-50.88 S	170-35.07 E	201	0.20	3.50	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
34	45-51.03 S	170-34.97 E	206	0.20	3.30	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
35	45-51.38 S	170-34.67 E	211	0.40	2.90	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			

36	45-51.68 S	170-34.39 E	213	0.40	2.50	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
37	45-51.86 S	170-34.11 E	228	0.30	2.20	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
38	45-52.03 S	170-33.69 E	240	0.30	1.90	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
39	45-52.16 S	170-33.19 E	249	0.40	1.50	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
40	45-52.32 S	170-32.42 E	254	0.60	0.90	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
41	45.52.41 S	170-32.07 E	250	0.30	0.60	8	15.48	8.83	7.74	42.87	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
42	45-52.49 S	170-31.67 E	265	0.30	0.30	6	14.8	8.49	7.4	42.77	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			
43	45-52.48 S	170-31.39 E	273	0.30	0.00	0	13.96	8.07	6.98	42.77	0.25	2 Mins	As Per printout attached from DATT	G.R.V. 5 MINS	4	14/12/16	Fax - Auckland Navtex -	ALRS /ALL-Attached ASD - ENP-51(attached). Nav area XIV-In file	BERTH
Note: Alert 8.1	Fix position every 5 mins. Monitor UKC.																		
Note: Alert 8.2	Strictly monitor movements of other vessels																		
Note: Alert 8.3																			

Appendix 5: Excerpts from Anglo-Eastern Ship Management's shipboard procedures manual

3.2 PASSAGE PLANNING AND VOYAGE EXECUTION

3.2.1 Passage Planning

3.2.1.1. The objective of planning is to make an appraisal of the hazards involved in advance and establish the most favourable route whilst maintaining appropriate margins of safety.

3.2.1.2. **Passage plan shall be made berth to berth, including areas under pilotage.** The **Master is responsible for ensuring that a comprehensive passage plan is made** and executed. He may delegate the Second Officer or other Navigating Officers to prepare the passage plan for the voyage.

3.2.1.3. Passage planning is a fundamental part of operating a vessel safely and hence prior to departure from a berth, as much of the plan must be completed as is possible. If the entire plan cannot be completed prior to sailing, the ship may depart provided that the first part of the passage plan has been completed. The remainder plan must be completed as soon as possible after sailing. …

3.2.13.8 Passage Planning on Electronic Charts: Marking/ highlighting of electronic charts can be carried out in a similar way to paper charts to identify radar conspicuous targets, no-go areas, parallel index lines (essential for the monitoring stage), transit marks, clearing bearings, etc.

It is prudent for a simulated passage to be run prior to the vessel's departure to ensure that the route does not enter any alarm preset danger areas that may have been overlooked. Estimated positions should be marked on both paper and electronic chart for each watch, in advance.

3.2.14.7 Execution and Monitoring on electronic charts: Navigating officers must not become over-reliant on ECDIS. Frequent checks should be made of the ECDIS position fixing system (normally GPS) by the use of other means. Such checks should include:

- Use of radar to check the accuracy of the charted position by comparing the location of the radar target against the charted symbol;
- Visual cross bearings;

The full functionality of ECDIS cannot be achieved when operating in the raster chart[21] display (RCDS) mode and thus the system should always be operated in ECDIS mode. Data input from the gyrocompass, speed log, echo sounder and other electronic equipment should be periodically monitored to ensure accuracy.

3.2.17.4 **The bridge team meeting is extremely important for preventing accidents. Master must motivate and promote a culture of avoiding human errors by going through the passage plan seriously and officers must** question **each other and question the master if there are any doubts about safety. The company strongly recommends a de-briefing be conducted upon completion of passage and any important information forwarded to the office.**

[21] An accurate digital image displayed on an electronic screen. It is essentially an electronic picture of a paper chart.

3.5.3 **Bridge Resource Management**

In spite of adequate training of individual officers, accidents sometimes occur due to the bridge team not functioning well together.

Bridge (Marine) Resource Management (BRM) is the effective use of the bridge team and the creation of an environment where “one-person error” is eliminated.

3.5.3.1 ASSIGNMENTS AND DUTIES

Each vessel should employ a bridge resource management system for vessel navigation, collision avoidance, and bridge administration.

The specific duties described below shall be applicable: Additional lookouts may be required depending upon the circumstances of the case, including but not limited to the seaman on watch being utilized for hand steering. (Cadets and trainees shall not form a part of the bridge watch structure other than for training purposes).

	Conn	Traffic	Comms	Navigation	Other Duties	Helm	Lookout
TASKS	Ln charge of Bridge Team Conn Ship Give Helm & Engine Orders Take Collision Avoidance Action	Track traffic on Radar & ARPA	Handle external VHF[22] Comms. Report to VTS and relevant authorities	Fix Ship's position (Verify position by alternative means)	Tend to Telegraph Monitor & report helm and engine response Keep Logs/ Check List Conduct equipment tests/ checks Internal Communications	Steer Ship	Keep Lookout
LEVEL 1	OOW (AB Available on Call).						
LEVEL 2	OOW					Qualified Helmsman and /or Lookout	
LEVEL 3	Master/ Ch Officer	OOW				qualified Helmsman and /or Lookout	
LEVEL 4	Master/ Ch Off/ Pilot	OOW				qualified Helmsman	Lookout
LEVEL 5	Master/ Pilot	OOW 1/Pilot		OOW2		qualified Helmsman	Lookout

3.5.3.2 PROCEDURES FOR NAVIGATING WITH A PILOT

The pilot is an important part of the Bridge team.

The officers and Master must make utmost efforts to function as one team with the pilot. Procedures stated under 'Navigation with the Pilot on Board' should be followed.

3.5.3.3 RESPONSIBILITIES AND COMMUNICATION GUIDELINES IN EMERGENCIES

In case of emergencies the Master must be called to the bridge immediately. The procedures given in the Emergency Manual must be followed.

3.5.3.4 GOALS, OBJECTIVES AND PRIORITIES

The primary goal of all watch officers is to function cohesively, and support each

[22] Very high frequency.

other so that errors of any one person do not create a hazardous situation and the same are brought to notice and rectified well in time.

The bridge team shall achieve this by:

- Discussion of passage plan
- Considering the maneuvering characteristics of vessel
- Bridge Team / Pilot Information exchange
- Creation of a Team environment
- Recognition and handling of stress or distractions

3.5.3.5 COMMUNICATIONS

The IMO Recommended Standard Marine Communication Phrases shall be used in all cases where simple English communication is not possible.

Verbal orders for steering/ engine movements etc. must be repeated (closed loop) to ensure that they have been correctly understood.

3.5.3.6 REASSIGNMENT OF TASKS

In case of the Master being incapacitated the chief officer shall take over command of the bridge. The bridge team should be familiar with, and capable of taking over, each other's tasks.

Appendix 6: Extracts from New Zealand Port and Harbour Marine Safety Code

Port passage planning and guidance

The purpose of port passage planning and guidance is to ensure that everyone involved in the movement of ships in the harbour:

- has a clear, shared understanding of potential hazards, margins of safety, and the ship's characteristics;
- has agreed on the intentions and required actions for the conduct of the port passage, including the use of tugs and their availability, and any significant deviation should it become necessary;
- knows relevant details of any particular port passage in advance.

The Harbourmaster will promote the use of port passage planning and ensure guidance is available. As a minimum, passage planning should apply to all ships that take a pilot or are under the conduct of a Pilot Exemption Certificate (PEC) holder. Where a ship takes a pilot, the passage plan will be used in conjunction with the master/pilot exchange.

The risk assessment for the port and harbour may indicate that passage plans are not needed for all ships, for example recreational craft. However, if it is necessary or practicable, passage planning can still be required for such craft.

Passage plan guidance is usually developed by the port operator in consultation with the Harbourmaster and pilotage provider. Guidance should focus on critical port movements and cover matters such as:

- entry to the port;
- entry to specific berths – for example the movement of deep draught ships to a particular berth;
- ship sizes and cargoes;
- prevailing conditions and tidal constraints;
- tug allocation;
- holding areas; and
- recommended tracks, as appropriate.

Up-to-date passage plans and guidance should be published, and be available to harbour users and the masters of visiting ships.

Plans adopted for particular passages are recorded. The pilot and the master of the ship keep records of their port passage plans in case they are needed for an accident investigation.

Port passage plans may change if a pilot needs to react to unforeseen circumstances. Any changes must first be discussed with the master of the ship and, if relevant, with the harbour radio service. The reasons for any change will be recorded.

Recent Marine Occurrence Reports published by
the Transport Accident Investigation Commission

MO-2016-205	Fatal fall from height on bulk carrier, *New Legend Pearl*, 3 November 2016
MO-2015-201	Passenger ferry Kea, collision with Victoria Wharf, Devonport, 17 February 2015
Interim Report MO-2017-203	Burst nitrogen cylinder causing fatality on board the passenger cruise ship *Emerald Princess*, 9 February 2017
MO-2012-203	Fire on board *Amaltal Columbia*, 12 September 2012
MO-2016-203	Bulk log carrier Mount Hikurangi, Crew fatality, during cargo securing operation, 27 February 2016
MO-2014-203	Fatal injury, Purse seine fishing vessel, *Captain M. J. Souza*, 24 August 2014
MO-2015-202	Containership *Madinah*, loss of person overboard, Lyttelton Harbour entrance, 2 July 2015
MO-2016-202	Urgent recommendation: Cruise ship *Azamara Quest*, contact with Wheki Rock, Tory Channel, 27 January 2016
MO-2011-202	Roll-on-roll-off passenger ferry *Monte Stello*, contact with rock, Tory Channel, Marlborough Sounds, 4 May 2011
MO-2014-201	*Dream Weaver*, flooding due to structural failure of the hull, Hauraki Gulf, 23 February 2014
MO-2010-206	Coastal container ship *Spirit of Resolution*, grounding on Manukau Bar, Auckland, 18 September 2010
MO-2014-202	Lifting sling failure on freefall lifeboat, general cargo ship *Da Dan Xia*, Wellington, 14 April 2014
11-204	Container ship MV *Rena* grounding, on Astrolabe Reef, 5 October 2011
13-201	Accommodation fire on board the log-carrier, *Taokas Wisdom*, Nelson, 11 July 2013
13-202	Bulk carrier, *IDAS Bulker*, pilotage incident Napier, Hawke's Bay, 8 August 2013
12-202	Fishing vessel *Torea*, collision with uncharted rock, Foveaux Strait, 24 August 2012
09-210	Bulk carrier, *Taharoa Express*, cargo shift, Port Taharoa, 16 December 2009
10-204	Inquiry 10-204: Bulk carrier *Hanjin Bombay*, grounding, Mount Maunganui, 21 June 2010
10-202	*M.V. Anatoki*, grounding, off Rangihaeata Head, Golden Bay, South Island, 6 May 2010
11-204	Interim Report Marine inquiry 11-204 Containership MV *Rena* grounding on Astrolabe Reef 5 October 2011

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