



Report 98-210

Restricted-limit passenger and freight ferry *Stella*

loss of steering in heavy weather

Hauraki Gulf

18 August 1998

Abstract

On Tuesday, 18 August 1998 at about 1845 the passenger cargo vessel *Stella* had an apparent loss of steering in heavy weather when attempting to turn around and head out of Omaha Bay. The vessel was on passage from Tryphena to Auckland with three persons on board. Due to a navigational error the *Stella* approached Omaha Bay although intending to approach the Auckland main channel. The *Stella* was held approximately in position under tow by the vessel *Great Barrier Express*. *Stella* was towed to the shelter of Bon Accord Harbour by HMNZS *Kahu*.

Safety issues identified included poor navigational practices and insufficient knowledge of vessel equipment.

This incident was investigated by the Commission because *Stella* was approved to carry up to 24 passengers and the possibility of that number of people put at risk was seen to be significant for transport safety.



Figure 1
Stella at Marsden Wharf

Transport Accident Investigation Commission

Marine Incident Report 98-210

Vessel Particulars:

Type:	Passenger and cargo ferry
Class:	4, 5 and 6
Port of Registry:	Auckland
Limits:	Enclosed Water Limit (Inside straight lines joining Cape Reinga to a position 270 degrees and 30 miles from North East Island to a position 000 degrees and 30 miles from North East Island to position 34° South, 174° 10' East to a position 045 degrees and 30 miles from East Island and then to East Cape. Inshore Limit (Areas Auckland, Barrier, Bay of Plenty and Northland)
Allowable passengers:	24 when operating in enclosed water limits 18 when operating in inshore limits
Length (Overall):	20.21 m
Breadth (Registered):	5.22 m
Tonnage (Gross):	90 t
Tonnage (Net):	68 t
Construction:	Steel
Built:	New Zealand in 1973
Propulsion:	One General Motors diesel engine of 253 kW driving through a Twin Disc gearbox to a single fixed three-bladed propeller
Normal operating speed:	10 knots
Location:	Hauraki Gulf
Date:	Tuesday, 18 August 1998
Persons on board:	Crew: 2 Passengers: 1
Injuries:	None
Nature of damage:	None
Investigator-in-Charge:	Captain John Mockett

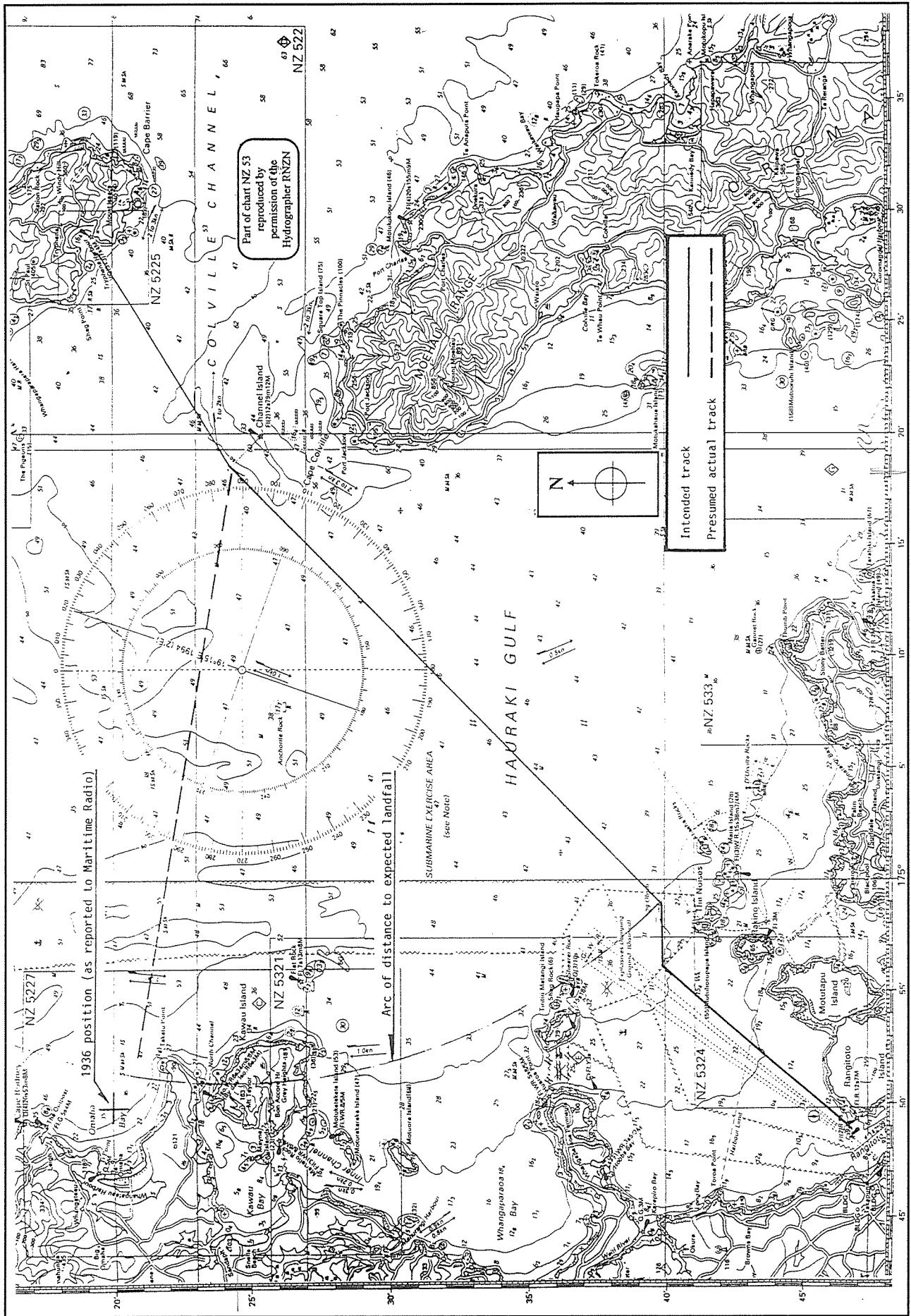


Figure 2
 Extract of Chart NZ 53 showing intended and presumed actual tracks

1. Factual Information

1.1 History of the trip

- 1.1.1 The passenger cargo ferry, *Stella* left Marsden Wharf in Auckland on Tuesday, 18 August 1998 at about 0840¹ for a scheduled trip to Tryphena on Great Barrier Island. On board were the master, one crew member and two passengers. The weather was easterly wind at 15 to 20 knots with a south-easterly swell of two to three metres and occasional rain.
- 1.1.2 *Stella* berthed in Tryphena at about 1400 that afternoon. The two passengers were disembarked and the cargo discharged. Cargo for Auckland was loaded and one passenger embarked. The vessel then departed Tryphena at about 1530 for the return trip to Auckland.
- 1.1.3 The master had obtained a weather forecast prior to departure from Tryphena. As forecast, the sea was rough with winds from the east-north-east at about 25 knots and a south-easterly swell of about three metres. The master planned the route back to Auckland to pass to the north-west of Channel Island and then make for the main Auckland channel rather than the usual passage through the Motuihe Channel. He considered that this route would afford greater shelter from both the wind and swell.
- 1.1.4 The master conned the vessel out of Tryphena and set course for the north-western side of Channel Island. Visibility was reduced by sea spray, mist and occasional rain. Once clear of the port area, the master engaged the automatic pilot.
- 1.1.5 The global positioning system (GPS) was operating but the master did not consult it and was not using it to navigate by. The chart of the area was in the wheelhouse but the master did not consult it and no positions were charted. The master was familiar with the area to the extent that he felt confident to navigate by dead reckoning and knew when he could expect to sight various landfalls either visually or by radar.
- 1.1.6 About one hour later, Channel Island was sighted on the radar abeam to port at a distance of about one and a half miles. The master set the automatic pilot to what he thought was 220 degrees magnetic for the passage across the Hauraki Gulf.
- 1.1.7 Having passed Channel Island at about 1645 and set the new course into the autopilot, he expected that the next landfall would be the Noises Islands on the port side of the vessel in about two hours time. The radar was operating on the two mile range as the master considered that his next alter course position would be at one and a half miles distance from the Noises.
- 1.1.8 As the passage progressed, the weather worsened with the wind veering to the south-east and strengthening to about 30 to 35 knots. The south-easterly swell was running at a height of about four metres. Visibility was reduced in rain. The motion of the vessel was moderate to heavy with seas breaking over the side and particularly onto the afterdeck.
- 1.1.9 The deckhand joined the master on the bridge for the latter half of the Hauraki Gulf crossing. Shortly after his arrival on the bridge the radar showed land on the port bow of the vessel. In the rainy conditions the radar picture was not clear but the master presumed that it was the Noises and Rakino Island. The master and deckhand had seen the configuration of these islands on radar many times previously and both were initially in agreement as to the position of the vessel.

¹ All times in this report are in NZST (UTC +12 hours) and expressed in the 24 hour mode

Part of chart NZ 522
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permission of the
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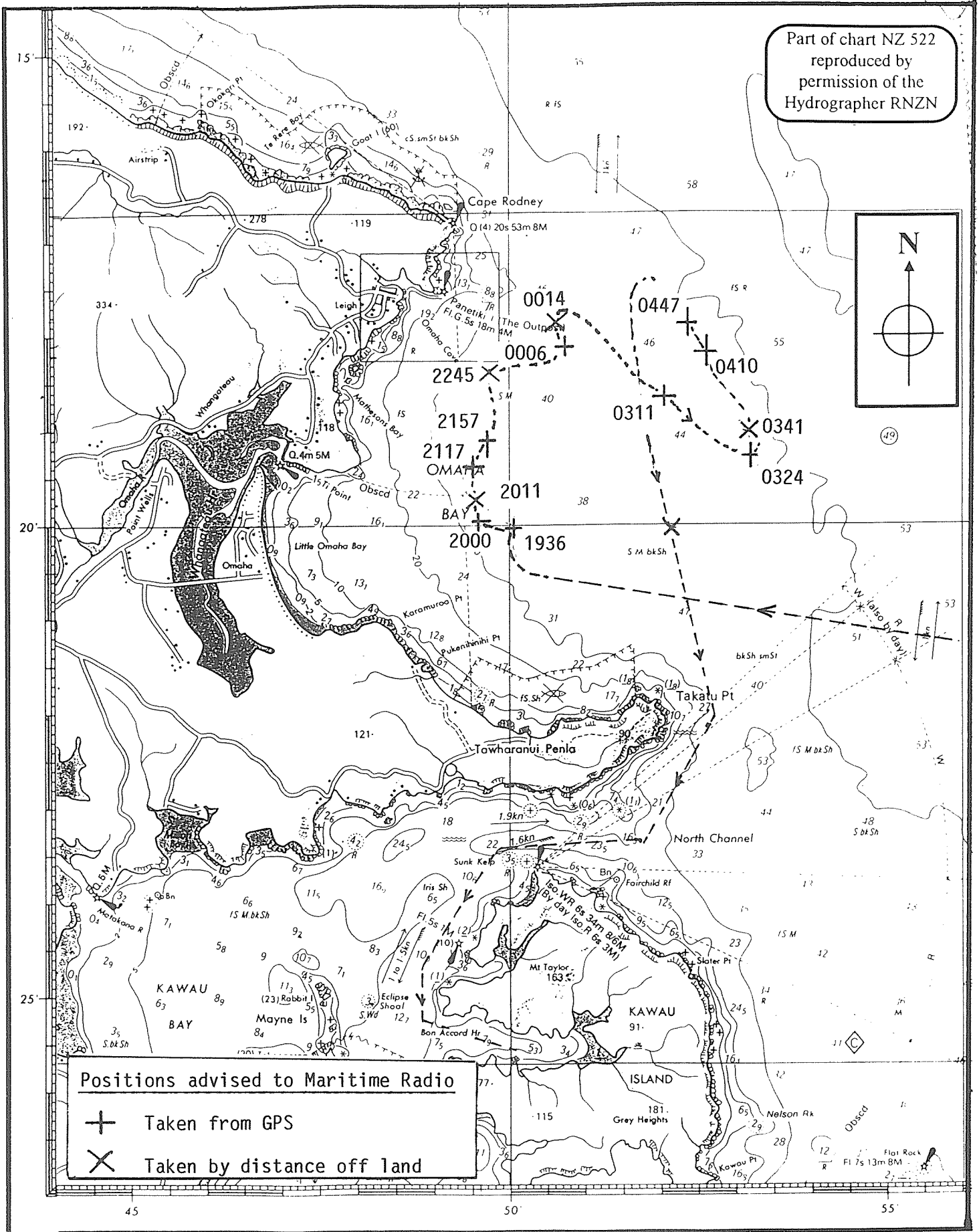


Figure 3
Extract of Chart NZ 522 showing positions of the Stella in Omaha Bay

- 1.1.10 As *Stella* approached further, lights of the shoreline were seen ahead. The lights were not in the expected configuration for the presumed position on the approach to Auckland and both the master and deckhand realised at this point that something was wrong.
- 1.1.11 The master decided to turn *Stella* around and head back out into the Hauraki Gulf and appraise the situation. He disengaged the autopilot and turned the wheel to starboard but found that the hand steering was sluggish. He described the feeling of the wheel action as being “soft”. He reduced engine speed to minimum. With many turns of the steering wheel he was able to achieve hard over rudder but when he increased engine speed the rudder angle “would begin to fall away”.
- 1.1.12 The master brought the vessel head to the sea using a combination of helm hard over and various engine speeds. He decided to anchor the vessel and further appraise his situation. At this stage he checked the GPS and found that the vessel was actually in Omaha Bay. The land that had been on the port bow was not The Noises but Takatu Point instead.
- 1.1.13 The anchor was dropped but would not hold the vessel in the four-metre swell that was running from the south-east. By this time the wind, also from the south-east, was steady at about 35 knots, gusting to 45 knots. More anchor chain was paid out but the vessel was still dragging the anchor.
- 1.1.14 The anchor was weighed and the vessel steamed ahead a short distance and the anchor dropped again. On this occasion the full 150 metres of chain was paid out. *Stella* was still dragging the anchor and the master had to keep the engine running in an effort to maintain position.
- 1.1.15 The master engaged the auto pilot again but the steering would not function correctly in that mode either. Realising that he now needed assistance the master called Maritime Radio on very high frequency (VHF) radio channel 16. The call to Auckland Maritime Radio was timed at 1936.
- 1.1.16 In the initial call the master stated that he thought the vessel had struck an underwater object causing the loss of steering. He gave the vessels position, taken from the GPS, as 36°20.04' South 174°50.07' East .

1.2 The rescue

- 1.2.1 Another ferry, *Great Barrier Express*, which was in position approximately 6 miles east-north-east of Tiritiri Matangi Island offered assistance. After querying the position given by the master of *Stella*, the master of *Great Barrier Express* proceeded to the scene estimating that it would take about two and a half hours to reach the *Stella*.
- 1.2.2 At 1952 Auckland Maritime radio transmitted a call to “all ships” to advise of the situation and ascertain if any other vessel in the area could assist with the tow.
- 1.2.3 At 2004 the master of *Great Barrier Express* confirmed that he was proceeding to the *Stella* and gave an updated estimated time of arrival (ETA) of about 2200.
- 1.2.4 At 2011 the master of *Stella* advised Auckland Maritime Radio that he would weigh anchor because the vessel was unable to hold position. His intention was to head out to sea to the north-east. By this time the wind had increased to 40 knots with gusts to 45 knots from the south-east.
- 1.2.5 At 2025 the crew of the tug *Kaitoa* offered assistance but as it would take the vessel over two hours to reach *Stella*, the rescue was left to *Great Barrier Express*. *Kaitoa* was berthed in Bon Accord Harbour and the crew continued to monitor the VHF in case their services might be required later.

- 1.2.6 Meanwhile on board *Stella*, the master was maintaining his position by using ahead power on the engine and alternating between hard to port and hard to starboard on the rudder. He had considered the emergency steering system but this would have involved the crew member working on the afterdeck, which he considered to be unsafe in the prevailing conditions.
- 1.2.7 Although Auckland Maritime Radio was co-ordinating the overall situation, Auckland Volunteer Coastguard Radio became involved in a supporting role. The owner of the vessel had been alerted and was monitoring the rescue together with the coastguard. He was able to pass messages to the master of *Stella* by cellphone.
- 1.2.8 The *Great Barrier Express* arrived close to *Stella* at about 2230 and the two masters discussed the situation and the connection of the tow. The wind at this time was east to south-east with gusts to 40 knots with seas and swell up to 4 metres from the east.
- 1.2.9 The first line was established between the vessels at about 2250 but was soon lost and the vessels had to reposition to re-establish the tow. The second attempt was successful and *Great Barrier Express* confirmed to Auckland Maritime Radio that *Stella* was under tow at 2309. The intent at this stage was to initially tow *Stella* out of Omaha Bay and assess the situation.
- 1.2.10 At 2344 the towline between the vessels parted and the two vessels manoeuvred to re-establish another line. The master of *Great Barrier Express* expressed concern that his remaining line may not be suitable for towing but felt that it would probably suffice to hold *Stella* in position.
- 1.2.11 The tug *Kaitoa* was alerted by Auckland Maritime Radio and at 0005 on 19 August it departed Bon Accord Harbour to proceed to the scene. The tug cleared Bon Accord at 0036 and advised that they would take over an hour to reach *Stella*. Auckland Maritime Radio asked the master of *Stella* if his vessel was in immediate danger to which the master replied “not at this stage”.
- 1.2.12 At 0111 the master of *Kaitoa* contacted the *Great Barrier Express* and advised that the sea conditions off Takatu Point were too severe for the tug to continue. The master advised Auckland Maritime Radio at 0116 that *Kaitoa* could not continue in the conditions and that he was abandoning his effort to reach the site.
- 1.2.13 At 0119 the towline between *Great Barrier Express* and *Stella* was re-established but was lost again two minutes later. The *Great Barrier Express* manoeuvred around *Stella* and the tow was again established by 0220.
- 1.2.14 The company management meanwhile was trying to contact other possible towing vessels in the area. Two Royal New Zealand Navy vessels were anchored at Gardeners Gap, close to Rangitoto Island, and offered assistance. At 0240 company management advised the master of *Stella* by cellphone that HMNZS *Kahu* was to proceed to the aid of his vessel. This information was relayed to Auckland Maritime Radio by the master.
- 1.2.15 At 0312 HMNZS *Kahu* advised that they would take 2 hours and 20 minutes to reach the site. Meanwhile the *Great Barrier Express* was continuing to hold *Stella* in position. However, the *Great Barrier Express* was getting low on fuel.
- 1.2.16 At 0326 the towline parted again. Neither *Stella* nor *Great Barrier Express* had any more suitable lines to re-establish the tow. The masters contacted Auckland Maritime Radio for confirmation of the ETA of *Kahu*, which was advised as being 0540.

- 1.2.17 *Great Barrier Express* left the *Stella* and proceeded to Auckland due to low fuel reserves. The master advised Auckland Maritime Radio to that effect at 0338. *Stella* was by this time in a position 2.88 miles from Takatu Point and drifting in a direction of about 020 degrees. The wind was estimated to be easterly at 35 knots. The master confirmed again that his vessel was not in immediate danger and that he hoped to be able to hold his position despite his continuing steering problem.
- 1.2.18 By 0530 *Kahu* was within one mile of *Stella* and circled the vessel to assess the situation. Tow lines were passed between the vessels at 0545 and by 0600 the tow was established. At 0610 the commanding officer of *Kahu* confirmed that all was fine with the tow and speed over the ground was about three knots. The wind recorded on board *Kahu* was from 165 degrees true at 30 knots and gusting. The highest recorded gust was 57 knots. The swell was estimated at four metres.
- 1.2.19 Agreement was reached between the vessels that the tow would proceed through the North Channel and to Bon Accord Harbour where the *Stella* would anchor for damage assessment and repairs. An initial ETA was given as 1030. During the passage to Bon Accord, the towline parted once and was resecured. The towline also had to be reset twice due to chafing.
- 1.2.20 At about 1120 the tow arrived at the anchorage in Bon Accord. *Kahu* manoeuvred the *Stella* into position and the tow was released. Once *Stella* was anchored and the lines returned to *Kahu*, the commanding officer of *Kahu* verified that all was well on board *Stella*. With no further assistance being required, *Kahu* left Bon Accord at about 1135 bound for Auckland.
- 1.2.21 At 1142 Auckland Maritime Radio closed the log on the incident.

1.3 Post rescue information, steering gear

- 1.3.1 Once safely anchored in Bon Accord the master started to investigate for possible causes of the steering malfunction. He and the crew member checked for damage from the upper steering position on the monkey island down to the wheelhouse steering position and the hydraulic lines down through the engine room from where they passed into the steering flat. They noticed two areas where there was an oil dampness but no obvious signs of leaking.
- 1.3.2 The steering flat was checked and again there was no sign of any hydraulic oil loss and no obvious damage to any of the steering mechanism.
- 1.3.3 They checked the oil level in the header tank situated at the upper steering position and no oil registered on the dipstick. The master reported his findings to the owner by cellphone. As there was no replacement oil available on board he requested the owner to arrange delivery of the appropriate oil to the vessel.
- 1.3.4 A supply of oil was arranged through a local contractor and delivered to the *Stella* by launch. About two litres of oil were added to the header tank, which was sufficient to replenish the tank to normal working level.
- 1.3.5 Having topped up the header tank, the wheel was turned in both directions several times at both steering positions. The action of the wheel at this time felt normal to the master and the indicated rudder response to the movement of the wheel was also normal.
- 1.3.6 The master re-checked the oil level in the header tank and found that it had not dropped. He checked the lines to the steering flat again and found nothing untoward. As a final check he checked for air in the system by bleeding the lines at the steering ram with the rudder hard over each side. This resulted in a release of apparently clean and bubble-free oil.

- 1.3.7 While still at anchor the steering was tested several times and operated in a normal manner. The master was able to put the rudder to either side and to hold any angle between amidships and hard over.
- 1.3.8 The master decided to weigh anchor and steam up and down Bon Accord Harbour to test the steering while under way. This test proved to be satisfactory and he then berthed the vessel at the yacht club to test the steering while manoeuvring. Again this test proved to be satisfactory.
- 1.3.9 The checks and tests gave the master confidence to continue to Auckland rather than wait in Bon Accord. He departed at about 1400 and took the vessel south through Inner Channel into Whangaparaoa Bay. On the passage across the Bay the master engaged the autopilot and successfully tested the steering function in that mode. His track took the vessel between Whangaparaoa Peninsula and Tiritiri Matangi Island and south to Rangitoto Island. On arrival at Rangitoto, the master disengaged the autopilot and hand steered the vessel to Marsden Wharf without problem.
- 1.3.10 On his approach to the berth on Marsden Wharf the steering failed again with the same symptoms as previously. The master was able to berth the vessel without incident by using engines and hard over rudder movements as he had in Omaha bay.
- 1.3.11 The vessel had been slipped six weeks prior to the incident and during that slipping work was carried out on the rudder and rudder stock. On 21 August, in a pre-arranged slipping to check the previous work, the opportunity was taken to inspect the hull. Nothing untoward was found, either with the previous work or any new damage to the vessel.
- 1.3.12 Subsequent to the incident, company management engaged the services of a firm of hydraulic engineers to check, test and overhaul the steering system. The engineers report stated:

1) Despite fingers pointing at the top helm pump as being the item responsible for the steering system not to respond to the actions of the lower helm pump, this was not the case. The helm pump contained some evidence of emulsified oil which over the years of being in an exposed position to all weathers is acceptable. This contamination is contained in the sump case and is unable to be sucked into the pressure circuit as the velocity of the oil movement is not great. Otherwise the internal components of this pump are in good condition, showing normal wear indicators for a unit of this type.

2) I reassembled the pump after cleaning all components to ensure that the pump would not have any foreign bodies in the ports that would work their way into the pressure system, then refitted the pump back to the original position on the top station of the vessel, reconnected the pipework, refilled the pump with oil, which by the way contains 1.8 litres of oil. After purging the air out of the pump cavity the system was back to the same situation as prior to the incident.

3) The skipper² then contacted me with regards to attending a sea trial to assess the performance or non-performance of the system that consists of two manual helm pumps, an engine driven pump fitted to a closed-circuit system that is controlled by a twin-ported solenoid valve to operate the steering ram as directed by the autopilot in either automatic mode, or in the dodge mode or finally the tiller mode. For approximately 1 hour the vessel was steamed up and down the harbour in moderate seas with winds of approx 30 - 35 knots. The manual system performed without any signs of air compression, that results in a sponginess feel to the response of the ram. There was no sign of check valve chatter that indicates air in the system or a faulty valve. Under autopilot operation the system proved faultless in all aspects of the range of functions that the pilot offers. The dodge function performed 100%. The tiller function also performed well. It was during this point of the testing that a

² The 'skipper' referred to in the engineers report is the regular master of the vessel and not the master on the incident trip

discovery was made. This was that if the manual helm was operated whilst the electric tiller function was engaged, one was able to move the helm and induce a response of 15 to 18 degrees of rudder movement before the electric tiller brought the rudder back to where it was previously positioned rendering the course correction useless. As engine revolutions were increased from idle the reaction time is decreased to a point where the steering does not respond to the helm at all. To all observations the steering could have failed.

This scenario appears to fit the symptoms that were described by the crew at the time of the failure.

These were; a chattering of the helm pump, inability to maintain the desired course in the conditions present, and loss of control of the steering both at cruising speed and at manoeuvring speed. The exact conditions present at the time cannot be reproduced as such as other factors may have been present at the time that were not present and could never exist again.

The skipper has conveyed to me that the vessel has completed some considerable mileage since the sea trial with no further repercussions of reported problems.

1.4 Post incident information, navigation

- 1.4.1 Subsequent to the incident, the master has made a self-critical analysis of his actions on the day . He has come to the assumption that in setting the autopilot when passing Channel Island he had entered the wrong required course into the unit. His intended initial course from Channel Island had been 220 degrees magnetic. He believes that he probably set the required course as 270 degrees magnetic.

1.5 Vessel information

- 1.5.1 The vessel was a 20.21 m, passenger cargo vessel capable of carrying 24 passengers but restricted to 18 on the trade on which it was plying. The vessel had a small cargo hold aft and the forward compartment, previously crew accommodation, had been converted to a refrigerated cargo space.

- 1.5.2 The vessel was built in New Zealand in 1973 for the Marine Department which was then part of the Ministry of Transport. At that time the vessel was employed as a tender for the servicing of navigational aids around the New Zealand coast.

- 1.5.3 The bridge equipment included

- Kelvin Hughes radar type 140MMSAURA
- GPS
- Autopilot
- Single Sideband radio Type Coden 6801S Mk 2B
- VHF radio type Belcom MC 5000
- Echo sounder type AW 6025

- 1.5.4 The steering could be operated from either an upper position on the monkey island or a lower position in the wheelhouse. Steering was hydraulically operated and could be automatic, electric tiller or manual. Emergency steering could be operated from the afterdeck by removing a cover held down by bolts and fitting a tiller directly to the rudder stock. The hydraulic oil level in the header tank had been checked by the regular master “two to three weeks” prior to the incident.

- 1.5.5 When operating in autopilot the desired course was shown digitally on a small light emitting diode (LED) screen. To input a new desired course the numbers were changed by depressing an ‘up’ or a ‘down’ button the appropriate amount of times until the new course was displayed.

1.6 Safe Ship Management

- 1.6.1 When the Marine Department was separated from the Ministry of Transport, their survey department was sold into the private sector and became Marine and Industrial Safety Services Limited (M&I). The *Stella* remained under their ownership until May 1997, when it was purchased by L N Bates Shipping. At this time the vessel was operating under a safe ship management system provided by M&I.
- 1.6.2 The new owner of *Stella* was not of a marine background and this was his first involvement with a shipping enterprise. He chartered the vessel to the company, Great Barrier Shipping of Auckland, who operated the vessel on a passenger and freight trade between Auckland and Great Barrier Island.
- 1.6.3 At the time of the change of ownership, M&I contacted the new owner to enquire if he intended to keep the vessel under safe ship management with M&I. The owner indicated that he did but as he received no advice as to what action, if any, was required of him, he presumed that the safe ship management that was already in place would continue.
- 1.6.4 In November 1997 the Maritime Safety Authority (MSA) queried the status of the safe ship management certificate for *Stella* with M&I. Both MSA and M&I contacted the owner and pointed out that the previous safe ship management certificate was invalid because of the change of ownership and subsequently that the vessel was not legally allowed to operate.
- 1.6.5 M&I issued an Interim Fit for Purpose Certificate for *Stella* on 13 January 1998. This certificate was valid for three months during which time the vessels management system and accompanying documentation had to be audited prior to the issue of a safe ship management certificate.
- 1.6.6 MSA issued an Exemption Certificate (From having a New Zealand Safe Ship Management Certificate) for *Stella* on 23 January 1998. This exemption was valid until 30 April 1998. The certificate was in recognition that the owners were in the process of developing their safe ship management system and that the audit process had yet to be completed.
- 1.6.7 Despite the audit not having been done, M&I issued a Safe Ship Management Certificate for *Stella* on 26 January 1998. Realising their administrative error, M&I cancelled this certificate on 19 February 1998. The MSA Exemption Certificate remained valid.
- 1.6.8 In April 1998 L N Bates Shipping took the vessel back from the charterer. The owner of the vessel also owned Aotea Shipping Company Limited which he formed to take over the responsibility for the trading operations of the vessel. On 24 April 1998 the owner was informed by M&I that the safe ship management documentation was complete and the manual and logbook for the vessel were forwarded to him on 27 April 1998. The certificate would be issued on completion of a physical inspection of the vessel, which needed to be undertaken with the vessel out of the water.
- 1.6.9 The logbook was put into use and the manual kept on the vessel. A copy of the manual was also kept in the wharf office. The manual contained a section on maintenance with checklists for actions required at weekly, monthly and annual intervals. None of the checklists were put into use and no record of maintenance carried out was kept either in the manual or in any other form.
- 1.6.10 After several delays for varying reasons *Stella* was eventually slipped in late June 1998. An M&I surveyor carried out an initial audit inspection of the vessel on 2 July 1998 and issued a Corrective Action Repair (CAR) Notice to the owner listing six deficiencies, four of which had to be rectified within one month and two within one year. An Interim Fit For Purpose certificate was also issued on 2 July 1998 as a result of the inspection.

- 1.6.11 On 7 July 1998 the vessel was issued with a Safe Ship Management Certificate valid until 2 August 1998 but it was temporarily restricted to Auckland Extended River limits until the CARs had been rectified. At this time an amendment to the Safety Manual was issued which included additional annual maintenance checks.
- 1.6.12 Under the safe ship management system an owner or operator is responsible for the completion of a CAR and must notify the safe ship management provider as each CAR is complete and also when all CARs on the notice are completed. Unless stipulated in the CAR notice, the repairs were not normally checked by an M&I surveyor.
- 1.6.13 Two of the short term repairs had been completed on *Stella* but M&I was not informed. One of the outstanding repairs was to reinstate the fire pump which had been substituted by a temporary system utilising the fresh water carried on board. The CAR notice stipulated that:

the fire pump be in working condition and tested by a surveyor.

Despite the requirement for a surveyor to test the pump, no notification or reminder that the CAR was overdue was conveyed by M&I to the owner of *Stella*.

- 1.6.14 When the certificate expired on 2 August 1998 no notification or reminder of the expiry was conveyed by M&I to the owner of *Stella*.
- 1.6.15 During an MSA inspection following the incident, it was noted that some of the CARs were overdue and the Safe Ship Management Certificate had expired so the vessel was detained in Auckland on the grounds that it did not have a currently valid maritime document.

1.7 Company information

- 1.7.1 L N Bates Shipping owned only the *Stella*, which was operated by Aotea Shipping Company Limited. The permanent company staff consisted of the owner, an office manager, the master and the deckhand. When staff were on leave, temporary reliefs were employed, as was the case with the master at the time of the incident.
- 1.7.2 The operation was the first marine venture that the owner had undertaken. He relied on the master, M&I and MSA for advice on the operation of the company and the vessel.
- 1.7.3 The company office and *Stella* were based at Marsden Wharf in Auckland. The vessel sailed to Tryphena on Great Barrier Island and back to Auckland on each Tuesday. It sailed again on each Thursday to Great Barrier Island and called at the ports of Tryphena, Port Fitzroy and Whangaparapara in a rotation dictated by the cargo and passengers carried. The vessel remained in the final port overnight and returned to Auckland on Friday.
- 1.7.4 The vessel spent the remaining time tied up to Marsden Wharf unless any charter jobs were available. During this idle time ship maintenance was carried out. No records of completed maintenance were kept, either in the safe ship management manual or in a separate log.

1.8 Personnel information

- 1.8.1 The master of *Stella* on the night of the incident had had involvement with small private and commercial craft for a period of 35 years. He obtained his Local Launchmaster Licence (LLL) in 1989. He said that when he gained the requisite amount of hours on commercial vessels he submitted his logbooks to the MSA and was informed by it that his licence had been upgraded to a Commercial Launch Masters (CLM) licence. The correspondence to confirm this had been lost when his briefcase had been stolen from his car some weeks prior to the incident.

- 1.8.2 The MSA records showed that the master was issued with an LLL on 14 February 1990 subsequent to examination on 29 November 1989. The records did not show any upgrade to CLM. The master has engaged in communication with the MSA in an attempt to trace his logbooks and accompanying correspondence and to verify the upgrade of his licence.
- 1.8.3 Apart from his time spent crewing private craft, the master had worked for various other operators in the Auckland area. He had sailed on other vessels as master and said that his CLM had been verified on various occasions during surveys of the vessels on which he was serving. Notwithstanding the masters licence, or lack of it, he was familiar with the Hauraki Gulf and the many ports in the area.
- 1.8.4 The relieving master was known to the regular master of *Stella* and had been asked to act as a relief master for a period of about two weeks. Having agreed to serve on the vessel, he made two familiarisation trips on the vessel while the regular master was on board. Prior to the incident trip he had made two trips to Great Barrier Island in command of the vessel.
- 1.8.5 The deckhand served in the Royal New Zealand Navy as seaman rating from 1964 to 1974. He had held various proficiency and service certificates. He held a variety of positions ashore after leaving the service. About two years prior to the incident trip, he began crewing on another vessel trading in the area and had been serving on the *Stella* for about a year. He did not hold any merchant shipping qualifications.
- 1.8.6 The regular master had been involved with the vessel for about 15 years. He had served on the vessel when it was owned by M&I and then worked for Aotea Shipping. He had held a Certificate of Competency as Master, Restricted Limit Launch since 1971 and had held a Certificate of Competency as New Zealand Coastal Master since 1992.

2. Analysis

2.1 Navigation

- 2.1.1 The master was experienced in navigating around the Hauraki Gulf area and normally navigated visually and by dead reckoning. While this might have been appropriate when visibility was good, it would have been prudent for him to have utilised the GPS and plotted positions on the chart in the conditions that prevailed on the night of the incident.
- 2.1.2 If the master had plotted the position of *Stella* on the chart, he would have detected that the vessel was not following his intended track.
- 2.1.3 Whenever the course of a vessel is altered, it is good seamanlike practice to verify that the vessel has indeed settled on the intended course and that the course is the correct one for the desired destination. Had the master taken a few moments to check the compass after altering course at Channel Island, any error that he might have made with the course input to the autopilot would have become apparent to him.
- 2.1.4 When the master altered the course at Channel Island he intended to enter 220 degrees. Having made two previous trips in command of the vessel and the trip to Tryphena that morning he should have been familiar with the autopilot.
- 2.1.5 The master believes that he erroneously entered 270 degrees instead of 220 degrees. This may have been so, but to do so he must have pushed the “up” button rather than the “down” button, which suggests either unfamiliarity with the equipment or complacency on his part.

2.1.6 The vessel passed Channel Island at a distance of about one and a half miles. The island was not sighted visually but was seen on the radar. In clear visibility from this position the lights of Auckland would be visible to give directional awareness. On this occasion the master was relying on radar. In poor visibility it is good seamanlike practice to change the range of the radar up and down to alter the picture presentation and give the navigator every chance of sighting other vessels and providing a navigational orientation. Had the master changed the radar range up he would have been alerted to his deviation from the intended track.

2.2 Steering

2.2.1 When using manual steering for undocking from Auckland, berthing and undocking at Tryphena, nothing unusual in the steering control was noted.

2.2.2 After departure from Tryphena the master was operating the vessel under autopilot. This was appropriate in the prevailing conditions as automatic steering systems are as or more capable than a wheelman of maintaining a course in heavy weather. The autopilot operation allows the watchkeeper to monitor his overall situation without having to devote total concentration to the steering. Nevertheless the course steered should always be monitored by the watchkeeper.

2.2.3 The checks and overhaul of the steering system carried out after the incident found nothing obvious that might have caused the apparent steering failure. However, it is possible that in overhauling the system a fault might have been rectified and was no longer present during the subsequent sea trials.

2.2.4 When the master realised that his vessel had deviated from the intended track and he found himself in Omaha Bay, his intended action of turning the vessel around to give himself some assessment time was appropriate.

2.2.5 Once he experienced problems with the steering gear it was also appropriate that he anchor his vessel in order to be able to assess the mechanical problem in addition to the navigational one.

2.2.6 The problem with the steering remains unexplained. The tests carried out later by the regular master and the hydraulic engineers duplicated in the most part, symptoms as described by the master. In order for those tested symptoms to have been present when the vessel was in Omaha Bay, the master must have put the steering into tiller mode rather than manual mode.

2.2.7 The master was distracted with his concerns over the close proximity of his vessel to land in poor weather conditions and with trying to analyse the error in navigation that had caused his vessel to be in Omaha Bay. His distraction probably led to an error in steering mode selection.

2.2.8 Two familiarisation trips on the vessel with the regular master and two previous trips in command of the vessel should have given the master sufficient training in the use of the bridge equipment to have become fully conversant with its operation under normal conditions. However, when confronted with a stressful situation, such as the adverse weather, the master appears to have made an error in course selection. The additional stress caused by the realisation of his navigational error appears to have led to a further error in steering mode selection.

2.3 Safe ship management

- 2.3.1 The safe ship management certificate for *Stella* became invalid at the time of change of ownership. M&I verified that the new owner wanted it to continue to provide a safe ship management system for the vessel but did not pursue the certificate renewal with him. Under the circumstances, it would have been appropriate for M&I to have notified him that the certificate for the vessel was no longer valid and to have advised him of the required actions for renewal.
- 2.3.2 When a certificate was issued, it was only for a short term period until corrective action repairs were due to be completed. In the absence of notification from the owner or master that the repairs were complete, and when the certificate expired, it would have been appropriate for M&I, under its responsibility to monitor the safe ship management system, to have advised that the repairs were overdue and that the certificate had expired.
- 2.3.3 Similarly, with the CAR that required the attendance of a surveyor, it would have been appropriate for M&I to have advised that the closure date was approaching and to have enquired when the repair was to be ready for inspection.
- 2.3.4 The safety manual for the vessel had been in place since April 1998 but no maintenance records were entered into it. Had the checklists been used the hydraulic oil level would have been checked on a weekly basis and the low oil level reported by the master on the incident trip would have been rectified.

3. Findings

The findings and safety recommendations are listed in order of development and not in order of priority.

- 3.1 The *Stella* was manned with the appropriate number of crew.
- 3.2 It was unclear whether the master possessed the required qualification for *Stella*.
- 3.3 When employing the master, no verification of his qualification was undertaken by Aotea Shipping Company Limited.
- 3.4 The *Stella* was operating without a currently valid maritime document at the time of the incident.
- 3.5 The weather conditions encountered on the passage to Auckland were within the normal capabilities of *Stella*.
- 3.6 The master appears to have entered his required course from Channel Island incorrectly.
- 3.7 The progress of the vessel was not monitored from Channel Island until the expected time of the next landfall.
- 3.8 Had the master plotted GPS positions onto the chart, the navigational error would have become apparent to him and could have been readily corrected earlier.
- 3.9 As the master did not monitor a radar display of an appropriate range he was not forewarned of a deviation from the planned course.
- 3.10 Once the master ascertained the vessel was in Omaha Bay, his action of turning *Stella* around to head out into the Hauraki Gulf was appropriate.

- 3.11 When he disengaged the autopilot, the master probably engaged tiller mode rather than manual mode which caused the symptoms that were experienced and led him to believe the steering had malfunctioned.
- 3.12 The master conceived that he had a steering failure and coupled with his concerns over the navigational error and the poor weather conditions he continued with the concept.
- 3.13 The master's action in attempting to anchor the vessel was appropriate.
- 3.14 The master's call to Maritime Radio for assistance once he realised that the anchor was dragging was appropriate
- 3.15 Given that the master believed there was a steering gear failure, the actions taken by himself and the deckhand throughout the subsequent rescue were appropriate and carried out in a competent manner.
- 3.16 The efforts of the master and crew of the *Great Barrier Express* probably prevented the *Stella* grounding before more appropriate assistance arrived.

4. Safety Recommendations

- 4.1 On 7 December 1998 it was recommended to the owner of L N Bates Shipping and Aotea Shipping Company Limited that he:
 - 4.1.1 Formulate an employment policy for the vetting of applicants for permanent or temporary positions to ensure that the individual has documented proof of the qualifications appropriate to the position applied for. (108/98)
 - 4.1.2 Produce a procedures manual, in addition to the safe ship management manual, to make masters aware of the manner in which they are expected to operate the company vessel. (109/98)
 - 4.1.3 Include in the procedures manual a section on operating instructions for the various items of equipment carried on the company vessel. (110/98)
- 4.2 On 20 January 1999 the owner of L N Bates Shipping indicated that he agreed with the safety recommendations but he pointed out that, since the incident, the *Stella* and the business of Aotea Shipping Company Limited had been sold to Aotea Shipping NZ Limited.
- 4.3 On 20 January 1999 the owner of Aotea Shipping NZ limited indicated that he agreed with the safety recommendations and that:
 - 4.3.1 Safety recommendation 108/98 had been fully implemented and in addition the company retained copies of staff qualifications.
 - 4.3.2 Safety recommendations 109/98 and 110/98 were in the process of implementation.
- 4.4 On 7 December 1998 it was recommended to the Manager of Marine and Industrial Safe Ship Management Services that he:
 - 4.4.1 Introduce a system where owners or operators are advised of the impending closure date of Corrective Action Repairs. (114/98)

- 4.4.2 Introduce a system where owners or operators are advised of the impending expiry of a safe ship management certificate. (115/98)
- 4.5 On 18 December 1998, the Manager of Marine and Industrial Safe Ship Management Services responded as follows:
- 4.5.1 At the time of the accident a system of monitoring overdue Corrective Actions was being implemented and is now fully operational.
- 4.5.2 Regarding expiry dates on certificates it is the owners responsibility to arrange renewal as required. M&I naturally monitor expiry dates closely but with the enormous number of vessels entering Safe Ship Management over a comparatively brief period inevitably occasional slips will occur.

Approved for publication 3 February 1999

Hon. W P Jeffries
Chief Commissioner

Glossary of marine abbreviations and terms

aft	rear of the vessel
beam	width of a vessel
bilge	space for the collection of surplus liquid
bridge	structure from where a vessel is navigated and directed
bulkhead	nautical term for wall
cable	0.1 of a nautical mile
chart datum	zero height referred to on a marine chart
command	take over-all responsibility for the vessel
conduct	in control of the vessel
conning	another term for “has conduct” or “in control”
deckhead	nautical term for ceiling
dog	cleat or device for securing water-tight openings
draught	depth of the vessel in the water
EPIRB	emergency position indicating radio beacon
even keel	draught forward equals the draught aft
freeboard	distance from the waterline to the deck edge
free surface	effect where liquids are free to flow within its compartment
focsle	forecastle (raised structure on the bow of a vessel)
GM	metacentric height (measure of a vessel’s statical stability)
GoM	fluid metacentric height (taking account the effect of free surface)
GPS	global positioning system
heel	angle of tilt caused by external forces
hove-to	when a vessel is slowed or stopped and lying at an angle to the sea which affords the safest and most comfortable ride
Hz	hertz (cycles)
IMO	International Maritime Organisation
ISO	International Standards Organisation
kW	kilowatt
list	angle of tilt caused by internal distribution of weights
m	metres
MSA	Maritime Safety Authority
NRCC	National Rescue Co-ordination Centre
point	measure of direction (one point = 1 1/4 degrees of arc)
press	force a tank to overflow by using a pump

SAR	Search and rescue
SOLAS	Safety Of Life At Sea convention
sounding	measure of the depth of a liquid
SSB	single-side-band radio
statical stability	measure of a vessel's stability in still water
supernumerary	non-fare-paying passenger
telegraph	device used to relay engine commands from bridge to engine room
ullage	distance from the top of a tank to the surface of the liquid in the tank
VHF	very high frequency
windlass	winch used to raise a vessels anchor