Report 96-203

High Speed Passenger Ferry *Strait Runner*

Mana Channel

4 April 1996

Abstract

On Thursday, 4 April 1996, at approximately 2015 hours, when the high speed passenger ferry *Strait Runner* was outbound from Mana, she was hit by strong winds associated with a heavy rain squall, causing the vessel to ground on a gravel bank outside the main channel. The vessel sustained damage to her three propellers. Factors contributing to the grounding included a loss of situational awareness by the Master. A safety issue identified was the inadequacy of the harbour navigation aids for *Strait Runner* to depart at night. It was recommended to the Director of Maritime Safety that certain high speed craft be made to comply with Chapter 18 of the High Speed Code.

Transport Accident Investigation Commission

Marine Accident Report 96-203

Vessel particulars:

Name:	MV *Strait Runner*
Registered:	Wellington
Official number:	876129
Type:	High speed passenger ferry
Class:	New Zealand Restricted Limits Passenger Ship MSA Classes IV, V and VI
Built:	SBF Shipbuilders West Australia, 1995
Propulsion:	Three 610 kW MTU V12 diesel engines, each driving a fixed pitch propeller through a twin disc reversing gearbox
Speed:	30 knots (loaded)
Rudders:	Twin, one behind each outer propeller
Length, over-all:	31.1 m
Length, registered:	28.96 m
Breadth, registered:	6.51 m
Tonnage, gross:	127 t
Tonnage, nett:	56 t
Draft:	1.7 m
Owner:	SBF Shipbuilders
Charterer/Operator:	North by South Ferries Ltd
Location:	Approaches to Paremata, Mana Channel
Date and time:	4 April 1996, 2015 hours[1]
Persons on board:	Crew 5 Passengers 148 Other 1 (Supernumerary)
Injuries:	Nil
Nature of damage:	Moderate to three propellers
Investigator in Charge:	T M Burfoot

[1] All times in NZST (UTC + 12 hours)

1. Factual Information

1.1 History of the voyage

1.1.1 The high speed passenger ferry *Strait Runner* was scheduled to depart Mana at 1800 hours on Friday, 4 April 1996 with a full complement of passengers, bound for Picton. However, due to an incident on the previous trip when two of her life rafts were lost overboard, the vessel was late arriving at Mana, and further delays were experienced while management tried to find replacement life rafts to allow the vessel to sail with her full complement of passengers.

1.1.2 Due to the unavailability of sufficient replacement rafts the *Strait Runner* left the wharf at 2010 hours with a reduced number of passengers (148), five crew and one Supernumerary Master on board. On the bridge were the Master, Engineer, Supernumerary and one of the crew. The Master was steering the vessel and operating the engines from his conning position located near the centre of the bridge, with the Engineer monitoring all machinery from his console next to the Master. The Supernumerary was making the journey with the intention of relieving the Master in Picton and making the return trip to Mana that night.

1.1.3 On departure the weather was overcast with light rain, moderate visibility and the wind at 15 knots from the north-west. Frequent gusty rain squalls were passing over Mana. The weather forecast for the Cook Strait was for north-west winds at 40 knots. As the vessel left the wharf the Supernumerary noticed the radar was on stand-by so he switched it on and tuned the set for the Master as he manoeuvred the vessel off the berth and into the main channel. The Engineer assisted the Master by using a searchlight mounted on top of the bridge to illuminate several small craft that were moored near the wharf.

1.1.4 When the vessel was clear of the berth the Master requested the Engineer to illuminate the inner starboard channel beacon (port beacon outward bound) and the Master used this and the south channel leading lights to make his turn to the north and gain his intended track through the channel. Due to the design of the vessel the Master was afforded minimal visibility aft, and as he turned the vessel on to its northerly heading he lost sight of the leading lights behind the vessel.

1.1.5 The Master intended to pass the inner starboard beacon close down the vessel's port side as that part of the channel afforded the deepest water. As the *Strait Runner* approached the first beacon the wind increased to approximately 40 knots and the rain intensified. The wind funnelled down the channel in a north-north-west direction, slightly on the port bow of the *Strait Runner*. The vessel's speed was approximately seven knots into one knot of flood tide (six knots ground speed).

1.1.6 As visibility decreased due to the rain, the Supernumerary used the vessel's Aldis lamp[2] to illuminate the right-hand bank to provide the Master with another visual reference for keeping the vessel on track; however, shortly before reaching the inner beacon, the bulb in the lamp failed.

1.1.7 The local topography westward of the channel influenced the wind causing it to flow down a valley across the outer part of the channel. As the *Strait Runner* neared the inner beacon she entered into the effect of the cross-channel wind and began to move down on to the east bank. The Master compensated by using a combination of port helm and an increase in power to the starboard engine.

[2] Portable signal lamp used for communicating by visual Morse code.

Figure 1
Strait Runner

1.1.8 As the first beacon passed from view the Engineer commented to the Master that the vessel appeared to be off the leads to starboard (red sector outward bound). He repeated this twice and was backed up by a similar remark from the Supernumerary. The Master acknowledged this and applied more power to the starboard engine and increased port helm. He could not determine the amount of port helm he had, as no light had ever been installed to illuminate the helm indicator. Two cars were parked near the right bank, with their headlights shining into the *Strait Runner's* bridge.

1.1.9 The Engineer located the outer starboard-hand beacon with the searchlight but was unable to hold it in the beam due to the changing heading of the vessel. During this glimpse of the beacon the Master noted the bow was still falling off the wind in spite of the corrective measures taken. He was in the process of applying more helm when the vessel grounded on a shingle bank on the east side of the channel. The starboard engine stalled as a result of the grounding.

1.1.10 While the Engineer was re-starting the starboard engine the Master used the centre and port engines to manoeuvre the vessel off the bank. The crew member shone a flashlight on the helm indicator to assist the Master. After a period of manoeuvring, during which time the vessel touched bottom twice more, the *Strait Runner* gained the centre of the channel and proceeded out in much improved conditions, the squall having passed. When powering up the centre engine, vibration became apparent which necessitated the *Strait Runner's* return to Mana for an assessment of the damage.

1.2 Vessel Information

1.2.1 The *Strait Runner* was a high speed monohull passenger ferry constructed mainly from aluminium. Passengers were carried on two levels, the bridge being located at the forward part of the upper level.

1.2.2 The Master and Engineer operated the vessel from two consoles side by side located near the centre of the bridge. From their consoles, aft visibility was limited to that available through a window in the door leading onto the upper passenger deck.

1.2.3 Navigational aids available to the Master included, radar, GPS, depth sounder, Aldis lamp and a magnetic compass. The searchlight mounted on top of the bridge could be operated from the Engineer's console.

1.2.4 A maximum of 194 passengers and five crew could be carried at speeds reaching 30 knots. The vessel's "Hull and Superstructure Strength Only" was built to Det Norske Veritas (DNV) Rules for Classification of High Speed Light Craft 1993 to a class notation "1A1 HSLC R2 Passenger". The machinery, electrical installations, loadline, fire protection and life saving appliances were not surveyed by DNV and were therefore not covered under this class notation, but instead were assessed by New Zealand surveyors Marine and Industrial Ltd, upon the *Strait Runner's* entry into the New Zealand Register.

1.2.5 The reference "R2" in the class notation meant that the scantlings of *Strait Runner's* hull and superstructure were approved subject to the vessel operating within 83 nautical miles of the nearest harbour or safe anchorage, and at speeds appropriate to the significant wave height, but in any event, not in seas 2.5 m or above, except to seek shelter at low speed.

1.2.6 With the two outer engines engaged ahead at idle speed the *Strait Runner's* speed was approximately six knots. Rudder effect at this speed was negligible and directional control was often improved by clutching in and out the appropriate outer engine. This was done to avoid excessive speed when manoeuvring in confined areas.

1.3 Survey Information

1.3.1 In June 1994 the International Maritime Organisation (IMO) adopted an International Code of Safety for High Speed Craft (HSC) code. The 1974 Safety Of Life At Sea (SOLAS) convention was amended to bring the HSC code into force on 1 January 1996. The code set requirements for the design and construction of high speed craft built after this date, engaged on international voyages, the equipment which should be provided and the conditions for their operation and maintenance.

1.3.2 The preamble to the HSC code suggested that administrations, in considering the suitability of a high speed craft under the code, should apply all sections of the code to prevent an imbalance, which may be created by non-compliance with any part of the code, adversely affecting the safety of the craft, passengers and crew.

1.3.3 The HSC code was endorsed in New Zealand by way of the "Ship Construction and Safety Equipment (Code of Practice for New High Speed Craft) Notice 1994" for the purpose of applying provisions contained in the code relating to the construction of, and equipment to be carried on, new high speed craft. The notice made such provisions applicable to every new high speed craft, which was a passenger ship of 24 m or more in length operating within river or extended river limits. *Strait Runner* fell into this category.

1.3.4 In September 1995, the Commission expressed concern to the Maritime Safety Authority (MSA) over apparent short comings in the application of some aspects of Chapter 18 of the HSC Code, in relation to an accident involving *Condor 10,* a vessel previously operated under the Dynamically Supported Craft (DSC) code and Chapter 18 of the HSC Code. MSA responded favourably to the Commission's concerns and confirmed that they would require all future operators of similar high speed craft, in all operational matters, to comply with Chapter 18 of the HSC Code. MSA did not envisage this to include class VI vessels such as *Strait Runner.*

1.3.5 North by South Ferries submitted an application to operate *Strait Runner* approximately three weeks before commencing operation. The MSA allocated *Strait Runner* to Class VI, subject to additional requirements as a high speed craft under the Ship Construction and Safety Equipment (Code of Practice for High Speed Craft) Notice 1994. Operationally, additional requirements were set by MSA relating to crew levels, training and route operations. In December 1995 the vessel began providing a passenger-only service between Mana and Picton.

1.3.6 A "Route Operational Manual" which would have been required under Chapter 18 of the HSC code, would have included information on ".....specific route conditions or requirements relating to position fixing, operations by night and in restricted visibility, including the use of radar or other electronic aids to navigation".

1.3.7 The operational limits prescribed under "R2" of the DNV class notation with regard to significant wave height, formed part of *Strait Runner's* Certificate of Survey. For initial training and route familiarisation each Master and Engineer had to complete a minimum of three return voyages, one of which was to include a night arrival into Mana.

1.4 Crew information

1.4.1 The Master had a total of 22 years sea-going experience, the first three years of which was served in the Royal New Zealand Navy. In the following 19 years he was involved with the fishing and charter boat industries until January 1996 when, having obtained his New Zealand Coastal Master Certificate, he was employed as Master on *Strait Runner.*

1.4.2 The Master had completed approximately 125 return voyages from Mana, many of which involved returning to Mana at night. None of the few occasions on which he had departed from Mana at night, prior to the accident, was in restricted visibility.

1.4.3 The Engineer held an Engineer of Local Motor Ship (ELMS) Certificate and a Commercial Launchmaster Certificate (CLM). He had 10 years experience with tourist craft and tug-and-barge operations, the last eight years of which was as Skipper.

1.5 Port information

1.5.1 Porirua Harbour is a bar harbour situated on Wellington's west coast. The harbour is entered from the west across the bar, which had a reported controlling depth of 1.37 m, and then southward through the Mana Channel. Mana is situated on the eastern side of the channel. The harbour is predominantly used by pleasure craft with the exception of a small number of local fishing vessels. North by South Ferries had constructed a purpose built wharf at the southern end of Mana, near the rail bridge where the channel divided into the two main arms of Porirua Harbour. (See figure 2)

1.5.2 In daylight, the deepest route across the bar was depicted by two leading beacons[3] located on Goat Point, the front one of which was fitted with a single, directional, red/white/green, light occulting[4] every 2.5 seconds, for night navigation. A second set of leading beacons with a light of the same characteristics was located at the southern end of the Mana Channel to guide vessels in making the turn into the channel, and maintaining the deep water track during their transit.

1.5.3 The eastern limit of Mana Channel was bordered by unmarked sand and gravel banks. The western side was marked by two unlit starboard-hand beacons, each marking a rocky outcrop which reduced the width of the channel to approximately 80 m at these points.

1.5.4 The navigation aids for Porirua Harbour were not designed to be "all-weather" aids for commercial operations such as the *Strait Runner*. Prior to commencement of the *Strait Runner* service the Mana Channel south leading light's intensity was increased to make it more easily identifiable within the background city lights. An unlit orange buoy, fitted with reflective tape, was laid near the turning point at the intersection of the two leading lights. The purpose of the buoy was to provide additional guidance for the *Strait Runner's* Master to turn into Mana Channel after crossing the bar, as the south leads could be obscured in poor visibility.

1.5.5 The Wellington Regional Council indicated their intention to fit a low powered green flashing light to each of the starboard-hand beacons in Mana Channel at some time in the near future. The Operator had responded that such lights were a necessity, and that in addition, leading lights for vessels out-bound in Mana Channel, and replacement of the orange buoy with a permanent, lighted beacon, would be desirable. The Operator's proposal was under consideration by the Regional Council at the time of the grounding.

1.5.6 A five knot speed restriction was current for the Mana Channel; however, it was recognised and agreed between the Harbourmaster and the Operator that, due to her high windage factor in relation to her draft, the *Strait Runner* would need to exceed this restriction in certain weather conditions to maintain steerage.

[3] Beacons which are kept in line to ensure the vessel is on track
[4] The total duration of light exceeds that of dark

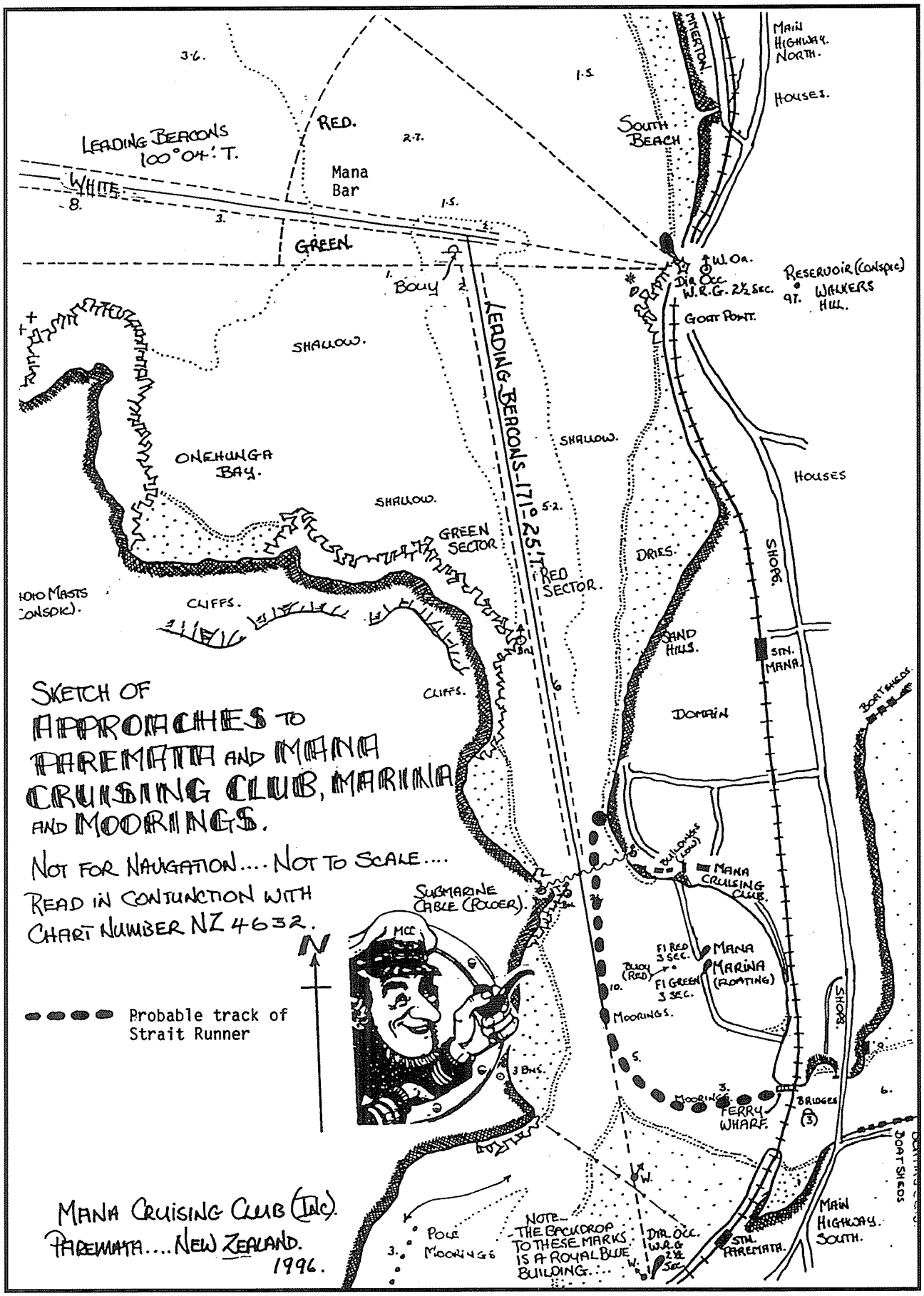

Figure 2
Local guide for approaching Paremata and Mana (reproduced with the consent of the Commodore of the Mana Cruising Club)

2. Analysis

2.1 Monitoring of a vessel's progress, and the factors influencing that progress along her intended track, are crucial to maintaining situational awareness. To enable a bridge team to maintain situational awareness they must first, have adequate means at their disposal, and second, use those means to monitor the vessel's position at all times.

2.2 When manoeuvring in close proximity to navigational hazards, such as in the confines of the Mana Channel, the margin for error is significantly reduced, thus requiring more precise methods for monitoring, greater vigilance and adequate contingency plans.

2.3 When considering the *Strait Runner's* design, size in relation to the space available to manoeuvre in the channel, and the weather conditions that prevailed immediately prior to the accident, the harbour navigation aids were not adequate for the Master to maintain situational awareness.

2.4 The vessel departed the wharf more than two hours behind schedule. The Master did not switch on the radar before departing, as he would normally, but opted to rely on the visual sightings of the inner beacon and the south leading light as his first points of reference. At this time he was aware of the vessel's position in the channel.

2.5 As the vessel turned on to its northerly heading, the Master's view of the south leading light was obscured by the superstructure of the top passenger deck, leaving him with only one visual reference by which to navigate. At about this time the visibility decreased further and the wind in the rain squall intensified causing the vessel to drift sideways in the channel.

2.6 The Master's perception of the vessel's drift in the channel was affected by the limitations of the single point of reference (the inner beacon). It was not until the *Strait Runner* was almost abeam of the inner beacon that the Master judged the vessel had drifted across the channel. This was confirmed by the comments from the Engineer and the Supernumerary, each of whom had a limited view of the leading light aft through the window in the door leading to the passenger area.

2.7 The Master's corrective action was not sufficient to stop the vessel's sideways drift and loss of directional stability. The Master lost control of the situation as the inner beacon passed from his view leaving him no significant visual references by which to gauge the vessel's position and drift in the channel. The degrading effect of the car headlights on his night vision would have contributed to his loss of situational awareness.

2.8 As the vessel's rudder angle indicator was not illuminated the Master was unaware of how much rudder he had applied to counter the vessel's drift in the channel. Had he used the magnetic compass and the radar earlier, he may have been able to maintain better awareness of the situation.

2.9 The insistent comments made by the Engineer and the Supernumerary about being off the line of the leading light, and his glimpse of the outer beacon prompted the Master to take more radical corrective action, but too late to prevent the vessel grounding.

2.10 It took less than two minutes for the Master to change from a state of situational awareness to a feeling of "loss of control" which, in the confines of the narrow channel, was sufficient for the vessel to lose the intended track and run aground.

2.11 During the summer *Strait Runner's* daily scheduled departure time from Mana allowed some flexibility in case of delays; however, with the onset of winter and the change from daylight to standard time (NZST) any significant delay in sailing from Mana could result in the vessel departing at night.

2.12 Had the operator ensured that the Master received adequate route training for departing Mana at night, and had contingency plans been made to cater for navigation in the channel in reduced visibility, the potential for a grounding would have been significantly reduced.

2.13 Critical analysis of a "Route Operational Manual", which would have been required under Chapter 18 of the HSC Code, should have resulted in a restriction on *Strait Runner* sailing from Mana at night pending an upgrade of the port's navigation aids.

3. Findings

3.1 *Strait Runner* was certificated as required for a vessel of class VI, and crewed as required by the Shipping (Manning of Restricted Limit Ships) Regulations 1986.

3.2 The MSA's appraisal of the vessel as class VI was appropriate.

3.3 Had the *Strait Runner* been operated under Chapter 18 of the HSC code, additional route training and restrictions and/or provisions relating to position fixing at night would have prevailed, and may have prevented the grounding.

3.4 The grounding of the vessel was caused by a combination of drift and loss of directional stability during a rain squall.

3.5 The Master's loss of situational awareness was a contributing factor to the grounding.

3.6 The Master did not use all of the means available to monitor the vessel's position in the channel.

3.7 At the time of initial route approval, it was not envisaged by MSA or the Wellington Regional Council that *Strait Runner* would need to depart Mana at night. With the operator's decision to continue the service through the winter, a restriction on night sailing from Mana would have been prudent pending an upgrade of the harbour navigation aids.

3.8 The Master had not received adequate route training to enable him to navigate *Strait Runner* out of Mana at night safely.

3.9 Mana's navigation aids were not adequate for *Strait Runner* to depart safely at night.

4. Safety Recommendations

4.1 It was recommended to the Director of Maritime Safety that:

4.1.1 All new operators of high speed craft, and all operators of new high speed craft be made to comply with Chapter 18 of the HSC Code. (058/96)

4.2 The Director of Maritime Safety responded as follows:

4.2.1 I am pleased to advise you that the Authority is able to adopt Safety Recommendation 058/96 subject to the following:

The Authority may be prepared to waive the requirement under certain circumstances for operations within river (operating) limits i.e. protected inshore waters.

4.3 It was recommended to the Harbourmaster for the Wellington Regional Council that he:

4.3.1 Assess the suitability of the Paremata Harbour navigation aids for each new commercial operator and make the necessary upgrade, or place the necessary restrictions, to ensure safe operations within the harbour. (061/96)

4.4 The Harbourmaster for the Wellington Regional Council responded as follows:

4.4.1 I am in complete agreement with the above, and this was already realised and under consideration at the time of the incident. The company's changing plans (from originally intended summer-only service to proposed all-year round service, plus new schedule for a new service to Nelson) did not assist with the assessment of future requirements.

5. Additional information

5.1 The *Strait Runner* ceased operating soon after the grounding, negating the need for further safety recommendations.

23 October 1996

M F Dunphy
Chief Commissioner

Glossary of Marine Terms

AC	Alternating current
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
Bus	An arrangement of copper conductors (Bus bars) within a switchboard, from which the circuits are supplied
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"
DC	Direct current
Deckhead	Nautical term for roof
Dog	Cleat or device for securing water-tight openings
Draft	Depth of the vessel in the water
EPIRB	Emergency Position Indicating Radio Beacon
Even keel	Draft forward equals the draft aft
Freeboard	Distance from the waterline to the deck edge
Free surface	Effect where liquids are free to flow within its compartment
Freshet	Term used to describe an increase of water level in the river due to rain in the mountains
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
GS	General service
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
kW	Kilowatt
List	Angle of tilt caused by internal distribution of weights
m	Metres
MSA	Maritime Safety Authority
Point	Measure of direction (one point = 11¼ degrees of arc)
Press	Force a tank to overflow by using a pump

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
V	Volts
VHF	Very high frequency radio
Windlass	Winch used to raise a vessels anchor