



Report 00-205

passenger ferries *Quickcat* and *Quickcat II*

collision

Auckland Harbour

31 May 2000

Abstract

At about 0914 on Wednesday, 31 May 2000, the passenger ferries *Quickcat* and *Quickcat II* were operating on the ferry service between Waiheke Island and Auckland when they collided about 0.5 miles east of the northern leading light in Auckland Harbour. The visibility in the area at the time of the collision was about 50 m due to fog. There was a total of 127 passengers and 7 crew aboard the 2 vessels, none of whom were injured.

Safety issues identified included:

- the speed of the 2 vessels in restricted visibility
- the inefficient use of radar for collision avoidance
- non-compliance with the collision regulations
- the adequacy of the documented passage plan
- the absence of high-speed navigation techniques
- the number of scheduled ferry services within Auckland enclosed limits and the need for a system to manage vessel traffic.

Safety recommendations were made to the operator and the Auckland Regional Council harbourmaster to address the safety issues.

The Transport Accident Investigation Commission is an independent Crown entity established to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future. Accordingly it is inappropriate that reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

The Commission may make recommendations to improve transport safety. The cost of implementing any recommendation must always be balanced against its benefits. Such analysis is a matter for the regulator and the industry.

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Quickcat



Quickcat II

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List of Abbreviations

ARPA	automatic radar plotting aid
GPS	global positioning system
km	kilometre(s)
kW	kilowatt(s)
m	metre(s)
mm	millimetre(s)
MSA	Maritime Safety Authority
NZDT	New Zealand Daylight Time (UTC + 13 hours)
t	tonne(s)
VHF	very high frequency

Glossary

abeam	direction at right angles to the length of a ship
amidships	middle section of a vessel, mid length
beam	width of a vessel
chart datum	zero height referred to on a marine chart
green to green	when 2 vessels agree to pass on the other's starboard side
gross tonnage	a measure of the internal capacity of a ship; enclosed spaces are measured in cubic metres and the tonnage derived by formula
knot	one nautical mile per hour
leading light(s)	light(s) that identify the safest track in a channel
port	left-hand side when facing forward
red to red	when 2 vessels agree to pass on the other's port side
restricted limits	operating limits as defined in Maritime Rule Part 20
starboard	right-hand side when facing forward

Data Summary

Vessel particulars:		
Name:	<i>Quickcat</i>	<i>Quickcat II</i>
Class:	Restricted Limit passenger vessel	Restricted Limit passenger vessel
Length (overall):	33.38 m	22.9 m
Breadth:	13.26 m	8.5 m
Gross tonnage:	445 t	232 t
Construction:	Aluminium	Aluminium
Built:	SBF Engineering, Australia in 1986	Sabre Catamaran International, Australia in 1993
Propulsion plant:	Twin MWM V12 diesel engines, each driving a 4 blade fixed pitch propeller	Twin MTU V12 diesel engines, each driving a 4 blade fixed pitch propeller
Engine output:	2320 kW	610 kW
Service speed:	23 knots	20 knots
Owner/ Operator:	Fullers Group Limited	Fullers Group Limited
Maximum passenger capacity:	647	274
Persons on board:	passengers: 109 crew: 5	passengers: 18 crew: 2
Injuries:	nil	nil
Location:	Auckland Harbour in latitude 36° 49.4'S longitude 174° 51.1'E	
Date and time:	31 May 2000 at about 0913 ¹	
Damage:	Moderate to both vessels	
Investigator-in-charge:	Captain W A Lyons	

¹ All times in this report refer to New Zealand Standard Time (UTC + 12 hours) and are expressed in the 24-hour mode.

1. Factual Information

1.1 History of voyage (*Quickcat*)

- 1.1.1 At about 0500 on Wednesday, 31 May 2000, the skipper of the *Quickcat* arrived at the vessel, which was berthed at the Queens Wharf ferry terminal in Auckland. He conducted the daily safety checks of the engine room and deck and found everything in order. Other crew members soon arrived and prepared the vessel for the scheduled commuter service between Auckland and Waiheke Island.
- 1.1.2 The skipper obtained the weather forecast from the recorded message service operated by the Auckland Volunteer Coastguard and entered the details in the daily log.
- 1.1.3 The *Quickcat* departed from Auckland at about 0630 and completed a return trip to Matiatia Wharf on Waiheke Island (see Figure 1), arriving back in Auckland at about 0800. During the trip the engineer had acted as lookout when necessary. The navigation lights were switched on and the manual fog signal was being sounded, but not at regular intervals.
- 1.1.4 During the first round trip the skipper recalled the weather conditions as being light variable winds and a calm sea with thick fog clearing to fog patches east of North Head. He stated that the visibility was about 5 km in the clearer areas and reduced to as little as about 50 m in the fog.
- 1.1.5 After exchanging cargo and passengers, the *Quickcat* departed from the Queens Wharf terminal at about 0815 for the second scheduled return trip to Waiheke Island. The weather conditions were reported to be similar to those experienced on the previous trip.
- 1.1.6 The *Quickcat* arrived at Matiatia Wharf at about 0850 and departed on schedule at 0900 bound for Auckland with 109 passengers and 5 crew on board. Shortly after departure the skipper called the Matiatia Wharf office on the in-house radio and reported the number of passengers on board.
- 1.1.7 The engineer had been acting as lookout but was required in the engine room so the service supervisor took his place in the wheelhouse. Two employees of Fullers Group Limited (the company) who commuted from Waiheke Island were also in the wheelhouse.
- 1.1.8 On departure the visibility was about 5 km. The skipper navigated the *Quickcat* through Motuihe Channel and adjusted the course to about 251 degrees true².
- 1.1.9 As the *Quickcat* approached the area between Bean Rock and the northern leading light the skipper could see a bank of fog stretching from Okahu Bay to the vicinity of the northern leading light. The skipper was hand steering using a joystick control and navigating by observing the radar, which was set on the 3 mile range. As the vessel approached the fog bank he changed the radar to the 1½mile range scale and then down to the ¾mile range scale just before entering the fog. He recalled the speed of the vessel being about 21 knots on the global positioning system (GPS) before entering the fog.
- 1.1.10 The skipper later recalled that at about 0912 the *Quickcat* was still on a course of about 251 degrees. The vessel was just entering the fog bank when he observed on the radar the echo of an approaching vessel fine on the port bow. At about the same time he received a call on the in-house radio from the *Quickcat II* asking if he was happy to pass “green to green”. The skipper of *Quickcat* declined the request and said “no, red to red”. At the same time he reduced the power on both engines, reducing the speed to about 15 knots, and put the helm hard to starboard. No further exchange took place over the radio.

² The courses of the vessels in the report have been converted from magnetic to true.

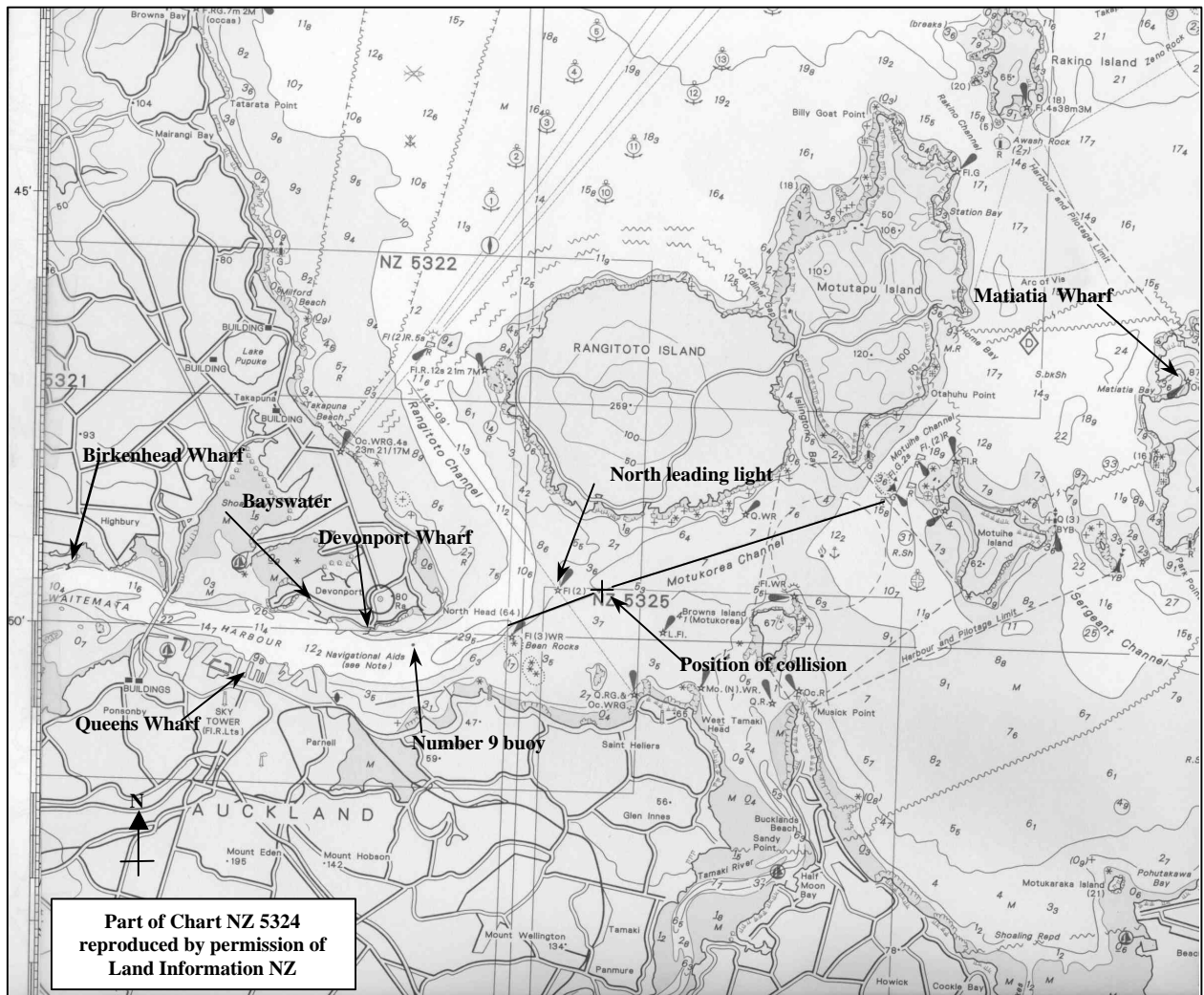


Figure 1
Part of Chart NZ 5324 showing Auckland Harbour

- 1.1.11 The *Quickcat II* appeared out of the fog, about 100 m away, on the port bow. The skipper of the *Quickcat* put both engines to full astern, but they both stalled. The *Quickcat* continued moving ahead and swinging to starboard.
- 1.1.12 The engineer had arrived back in the wheelhouse just as the *Quickcat II* appeared out of the fog. He opened the access door to the fore deck, which formed part of the front of the wheelhouse, and observed the *Quickcat II*. He later stated, "It did not seem to alter course. It just kept coming."
- 1.1.13 At about 0914 the 2 vessels collided in position $36^{\circ} 49.4' S$ $174^{\circ} 51.1' E$ with the starboard bow of the *Quickcat II* striking the port side of the *Quickcat* about amidships. The skipper of the *Quickcat* estimated that his vessel was travelling at less than 10 knots when the collision occurred and that the heading had reached about 300 degrees. After the collision the vessels drifted apart.
- 1.1.14 The skipper of the *Quickcat* immediately requested the crew to check the passengers for injuries. He then contacted the *Quickcat II* on the in-house radio and ascertained that they were not in immediate danger. The skipper and engineer then checked the damage to the vessel and the watertight integrity of the hulls.

- 1.1.15 When the skipper was satisfied that the vessel was not in immediate danger and none of the passengers had been injured, he restarted the engines and called the company office on the in-house radio to report the collision and then proceeded to Auckland.
- 1.1.16 When the *Quickcat* arrived at Auckland the damage was further inspected and the decision was made to withdraw the vessel from service for repair.

1.2 History of voyage (*Quickcat II*)

- 1.2.1 At 0600 the skipper of the *Quickcat II* arrived at the vessel, which was berthed at Bayswater. He conducted the daily checks and obtained the weather forecast from the recorded message service and entered it in the daily log. The *Quickcat II* departed for Birkenhead at 0625 to commence the commuter service between Birkenhead and Auckland. On board were the skipper and a deckhand.
- 1.2.2 The skipper later stated that for most of the time on the Birkenhead to Auckland service the weather conditions were light variable winds, calm sea and thick fog patches with visibility reduced to between 50 and 80 m at times. The navigation lights were switched on and the manual fog signal was being sounded, but not at regular intervals.
- 1.2.3 The vessel arrived at Auckland at 0840 after completing 4 trips and transferred to the Auckland to Waiheke Island via Devonport service. The vessel departed from Devonport at about 0900 with 18 passengers and 2 crew on board. Shortly after departure the skipper called the Devonport Wharf office on the in-house radio and reported the number of passengers on board.
- 1.2.4 When the vessel departed Devonport the weather conditions were similar to those experienced earlier. As the vessel approached number 9 buoy, the visibility began to increase so the skipper asked the deckhand to check the engine room. The engine room was supposed to be checked every hour but as the deckhand had been required in the wheelhouse as lookout, it had not been checked that morning.
- 1.2.5 The skipper was hand steering using the joystick. He was navigating by radar, which was set on the $\frac{3}{4}$ mile range. As the *Quickcat II* approached Bean Rock light the visibility began to deteriorate so the skipper reduced the speed from about 20 knots to about 15 knots. When abeam of Bean Rock light he adjusted the course to about 065 degrees.
- 1.2.6 The skipper observed an echo on the radar fine on the starboard bow, which he presumed was the *Quickcat*. He called the *Quickcat* on the in-house radio and suggested that they pass “green to green,” which was immediately declined by the skipper of the *Quickcat*, who said “no, red to red”.
- 1.2.7 The skipper of the *Quickcat II* immediately put both engines into neutral. At about that time he saw the *Quickcat* visually about 60 m away on the starboard bow and crossing ahead of his vessel. He did not attempt to alter course but put both engines to full astern. The speed of the *Quickcat II* was decreasing but the starboard bow collided with the port side of the *Quickcat*. The skipper of the *Quickcat II* estimated that his vessel was making about 4 knots when the collision occurred.
- 1.2.8 The deckhand immediately came up from the engine room and the skipper asked him to check the passengers and damage to the vessel. Meanwhile, the skipper manoeuvred the *Quickcat II* in order to keep the *Quickcat* in sight, and he also talked to the skipper of the *Quickcat* on the in-house radio. The deckhand reported back that no passengers were injured and that the vessel had suffered minor damage above the waterline.
- 1.2.9 The skipper then continued to Waiheke Island where he made further checks on the damage before returning to Auckland. On arrival in Auckland temporary repairs were made to the starboard hull and the vessel continued operating.

1.3 Personnel information (*Quickcat*)

- 1.3.1 The skipper of the *Quickcat* held a Mate of a Deep Sea Fishing Vessel Certificate, which he obtained in 1992. Part of the requirement for this certificate was for the candidate to complete a Restricted Radar Observer Course. He also held a First Class Diesel Trawler Engineer Certificate which he obtained in 1995.
- 1.3.2 The skipper had been a commercial fisherman for about 22 years, which included 10 years as skipper. He had been employed by the company as skipper for the previous 2½ years. During that time he had been skipper of a number of company vessels, but had mainly operated the *Quickcat* in the year prior to the collision.
- 1.3.3 The engineer on the *Quickcat* held a Commercial Launchmaster Certificate and a Marine Engineer Class III Certificate. He had been employed by the company for about 20 years and had been engineer on the *Quickcat* for the delivery voyage from Australia in 1993 and sailed on it many times since.
- 1.3.4 The 3 cabin staff had been employed by the company for varying periods and held no maritime qualifications.

1.4 Personnel information (*Quickcat II*)

- 1.4.1 The skipper of the *Quickcat II* had held a Commercial Launchmaster Certificate since 1992 and an Engineer Local Ship Certificate since 1998. He had also completed a Restricted Radar Observer Course in 1999. Since gaining his qualifications he had operated charter vessels for a number of years and had been employed by another Auckland ferry company for 5 years, including 4 years as skipper. He had been employed by the company for 3 weeks and had been trained on the *Quickcat II* for about a week before taking over as skipper.
- 1.4.2 The deckhand on *Quickcat II* held no maritime qualification and had been employed by the company for about 14 months.
- 1.4.3 The skippers of both vessels thought they were adequately rested and not fatigued at the time of the collision, which was supported by their work/rest history.

1.5 Vessel information (*Quickcat*)

- 1.5.1 The *Quickcat* was a catamaran constructed mainly of aluminium. It was built in Australia in 1986 and had been operated by the company since new.
- 1.5.2 The *Quickcat* had an overall length of 33.38 m, a beam of 13.26 m, and a gross tonnage of 445 t. The service speed was 23 knots. It had a maximum passenger carrying capacity of 647.
- 1.5.3 The wheelhouse was situated on the upper of the 2 enclosed passenger decks. No autopilot was fitted, so the skipper hand-steered the vessel using a joystick which was situated between the 2 conning chairs. The engine controls, navigational equipment, radios and engine monitoring indicators were located on the console in front of the main conning chair.
- 1.5.4 When seated the skipper could see the compass and reach the steering joystick, engine controls and radio. To adjust the radar settings he had to let go the steering joystick and stand up, as the radar was situated on the opposite side of the chair (see Figure 2).

1.5.5 Navigation aids included:

- one magnetic compass (last adjusted on 30 January 1998)
- one Codan 48 mile radar
- one Japan Radio Company JLU 122 GPS receiver
- one echo-sounder
- one Belcom very high frequency (VHF) radio.

The magnetic compass was a liquid card type graduated into one-degree intervals. The radar was not compass stabilised and was not fitted with an automatic plotting aid (ARPA).

1.5.6 The GPS on the *Quickcat* was operating at the time of the collision, but the tracking facility was switched off.

1.5.7 The *Quickcat* had a safe ship management certificate issued by the company on 1 September 1998 and valid until 1 July 2001.

1.6 Vessel information (*Quickcat II*)

1.6.1 The *Quickcat II* was a catamaran constructed mainly of aluminium. It was built in Perth Australia in 1993 and had been operated by the company since new.

1.6.2 The *Quickcat II* had an overall length of 22.9 m, a beam of 8.5 m, and a gross tonnage of 232 t. The service speed was 20 knots. It had a maximum passenger carrying capacity of 274.

1.6.3 The position of the wheelhouse and its layout was similar to the *Quickcat*. The steering joystick and radar were situated on the starboard side of the seat so the skipper could reach all the navigation and control equipment from a standing position. In order to adjust the radar settings the skipper had to let go the joystick (see Figure 3).

1.6.4 The navigation equipment included:

- one magnetic compass (last adjusted on 3 April 1998)
- one Japan Radio Company 24 mile radar
- one Japan Radio Company JLU 128 GPS receiver
- one Uniden MC 615 VHF radio.

The compass was a spherical type graduated in 5-degree intervals. The radar was not compass-stabilised and was not fitted with an ARPA.

1.6.5 The GPS on the *Quickcat II* was operational at the time, and the tracking facility was switched on. The track of the vessel prior to the collision was later downloaded. It showed that the *Quickcat II* had made good a course of about 068 degrees just prior to the collision.

1.6.6 The *Quickcat II* had a safe ship management certificate issued by the company on 7 April 1998 and valid until 7 April 2002.

1.6.7 At the request of the Commission the company conducted a stopping distance test on the *Quickcat II* and found that stopping the engine at a speed of 21 knots with the helm hard to starboard the vessel stopped in about 100 m and turned through 45 degrees.

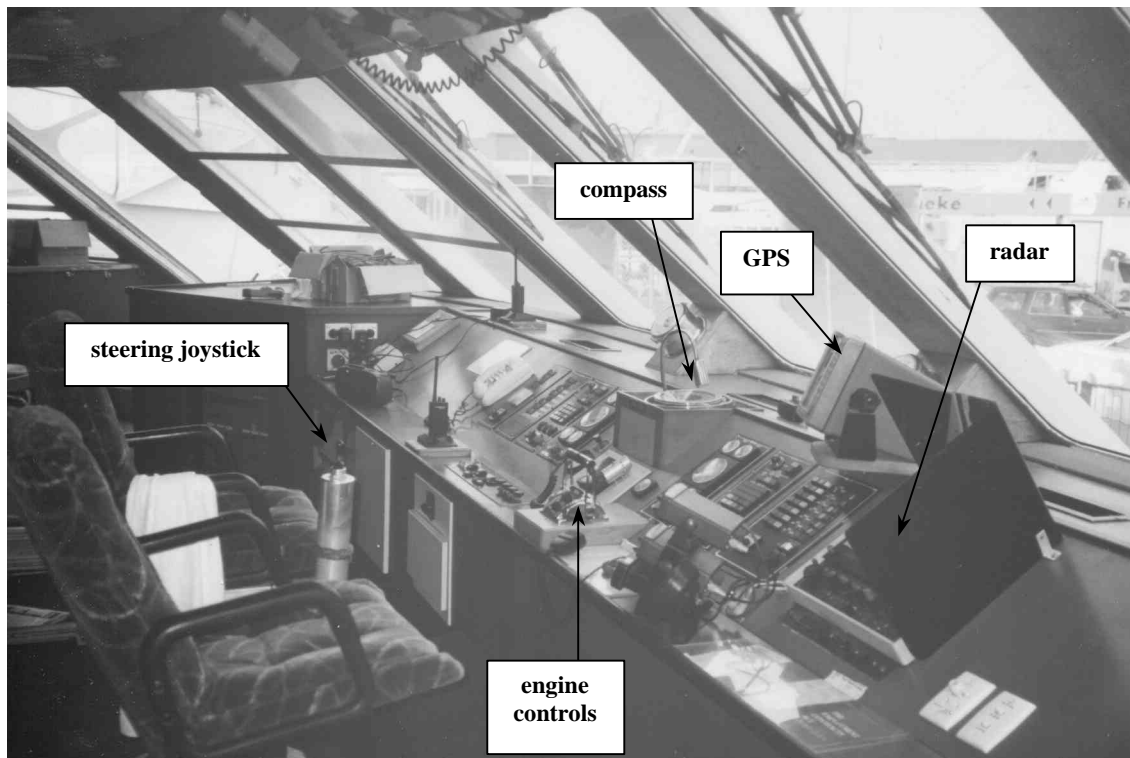


Figure 2
Quickcat wheelhouse

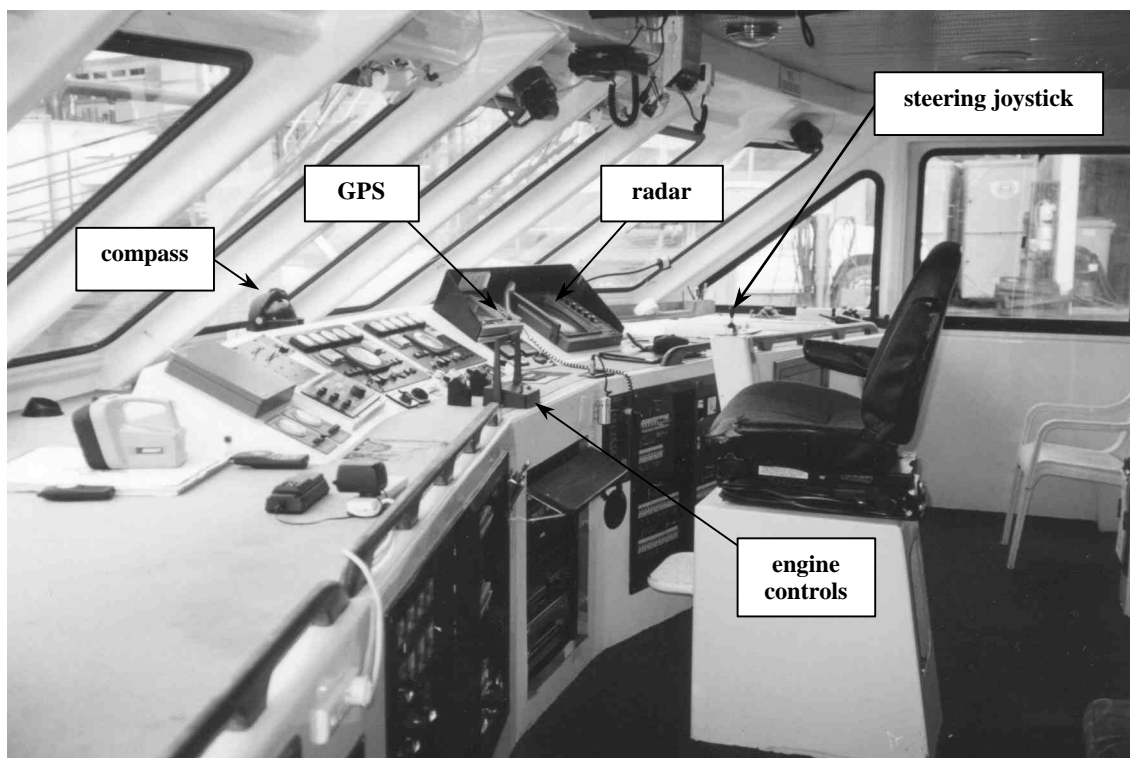


Figure 3
Quickcat II wheelhouse

- 1.6.8 From the conning position on both vessels there was a clear view directly forward, but the mullions between each window across the front of the wheelhouse on both vessels created a series of blind sectors to either side.

1.7 Damage to vessels

- 1.7.1 The damage reports for the *Quickcat* and *Quickcat II* were made by the company maintenance manager and stated:

Quickcat

Damage to the vessel was confined to a area immediately fwd [forward] of the engine room air intake screens above the belting in the superstructure. The superstructure plating was damaged in three places. The fwd two holes caused damage to the plating only. These holes were approx 600 mm by 600 mm. The larger hole aft 1500 mm by 500 mm also caused damage to two frames and one stringer. The fire hydrant in this area was bent and the morse release cable to the engine room intake flap was damaged. The window above was broken. A area of lining inboard approx 1 mt x 1 mt [metre] was also damaged The belting was dented approx 400 mm long by 60 mm deep.

Quickcat II

Damage to the vessel was confined to the Stb [starboard] bow area.

1. Fwd end of stb belting split approx 100 mm x 30 mm on under side of belting
2. The plating below the belting on the stb stem was punctured on each side of the stem bar making a hole of approx 350 mm x 400 mm. The stem bar was also damaged.
3. Hand rails on the stb bow were bent & sheared off at deck level.
4. The anchor stock was bent approx 45°.

1.8 Weather and tidal information

- 1.8.1 The Auckland Volunteer Coastguard recorded weather forecast was issued at 0450 on the morning of the collision and stated:

Wind warning A33 in force for the Hauraki Gulf and from Bream Head to Cape Colville.

Situation:

A strengthening unstable northerly flow covers the North Island.

Forecast issued at 0429 Wednesday 31 May 2000

Valid to midnight Wednesday:

For the Manukau and Waitemata Harbours

Northerly 10 knots rising to 20 knots in the evening.

Sea becoming moderate.

Fog clearing this morning. Becoming cloudy in the afternoon with isolated showers becoming more persistent in the evening.

Outlook for all areas until midday Thursday:

Northwest 25 knots gusting 35 knots. Showers some heavy.

- 1.8.2 High tide for Auckland Harbour was predicted at 0501 at a height of 2.9 m above chart datum, and low tide was predicted at 1105 at a height of 0.6 m above chart datum. At the time and place of the collision the tide was predicted to be setting in a westerly direction at about 0.5 knots.

1.9 Company procedures

- 1.9.1 The company was approved by the Maritime Safety Authority (MSA) to operate its own safe ship management system. The system was periodically audited by the MSA and the vessels subjected to random flag state inspections to ensure that the system was maintained to the required standards.
- 1.9.2 The sea staff employed by the company were trained in the operation of the safe ship management system. All vessels operated by the company were allotted time each week for crew training in the practical requirements of the system. The company felt that this assisted the crews to become more familiar with their vessels and further appreciate the requirements of the safe ship management system.
- 1.9.3 The company also encouraged and provided the opportunity for crew members to obtain maritime qualifications and attend fire fighting, first aid and radar courses. The company monitored the performance of the crews and they were also subject to annual peer reviews. The operations manager also made random trips on the vessels to observe the crews operating procedures.
- 1.9.4 The company had an in-house radio system known as the “trunk radio”. This system enabled all vessels to communicate with each other and with the offices situated at Queens Wharf, Devonport and Matiatia Wharf. The Quality Procedures Manual stipulated that each voyage passenger numbers were to be passed on to a shore station as soon as practicable after departure.
- 1.9.5 The Quality Procedures Manual had a section entitled Fog and Poor Visibility, which consisted of a visibility scale and a procedure in the form of a flow chart. The flow chart referred to the International Regulations for Preventing Collisions at Sea (1972) (Collision Regulations) with regard to sound signals and posting a lookout but made no reference to the determination of a safe speed or the action that should be taken when encountering other traffic. The flow chart is contained in Appendix 1.
- 1.9.6 The Quality Procedures Manual also had a section titled Recommended Courses which stated the following:

Auckland to Waiheke: Down the main wharf side of the Harbour to the Fergusson container wharf, then to Bean Rock light, proceed from there on a line to a position with the Motuihe passage buoy giving as much distance as possible for other company vessels heading from Waiheke to Auckland from Motuihe buoy to Matiatia Harbour

Waiheke to Auckland: From Matiatia to a position with the Motuihe channel buoy, proceed from there to a position with Iliomama Rock light. Proceed from there to a position with the North leading light and a course from there to the Fergusson container terminal.

1.10 Regulations

- 1.10.1 The Collision Regulations detail all requirements for vessels with regard to collision avoidance. The relevant sections are listed in Appendix 2.
- 1.10.2 The Auckland Regional Council had no additional local regulations or by-laws governing the operation of the ferries on Auckland Harbour.

- 1.10.3 The International Maritime Organisation adopted an International Code of Safety for High Speed Craft in May 1994. The purpose of the code was to provide an appropriate level of safety for the increasing number of high speed craft operating internationally as distinct from the regulations covering conventional vessels. The factors distinguishing a high speed craft under the code were essentially their size in relation to their maximum speed. Neither the *Quickcat* nor *Quickcat II* was required to comply with the Code of Safety for High Speed Craft.

2. Analysis

- 2.1 The collision was essentially caused by both vessels travelling too fast for the prevailing conditions and circumstances. When the skippers first observed each other on radar they both had their radars set on the $\frac{3}{4}$ mile range. The *Quickcat* was travelling at about 21 knots and the *Quickcat II* was travelling at about 15 knots. This gave the vessels a closing speed of about 36 knots. At this speed it would have taken 75 seconds from the time they first detected each other on the radar screen until they met. Given the limitations of the radar equipment, this was insufficient time to assess and fully appreciate the situation and take appropriate action.
- 2.2 The track downloaded from the GPS of the *Quickcat II* was its true course made good prior to the collision. The skipper of the *Quickcat* had the tracking facility switched off on his GPS so the reconstruction of events is based on his account of the action that he took. The actual distance of closest approach if they had maintained their courses is unknown (see Figure 4).

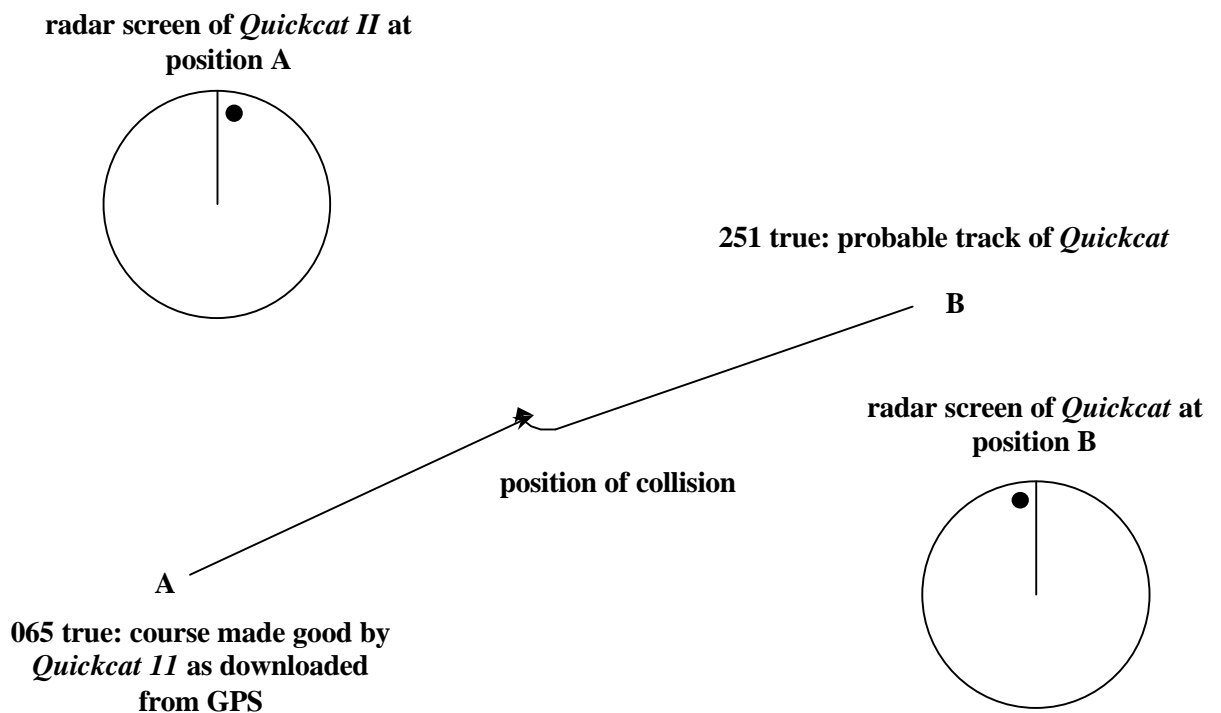


Figure 4
Diagram showing aspect of *Quickcat* and *Quickcat II*
(not to scale)

- 2.3 The skipper of the *Quickcat* saw the radar echo of the *Quickcat II* fine to port of his heading marker, so he instinctively wanted to alter course to starboard and pass “red to red”. The skipper of the *Quickcat II* saw the *Quickcat* fine to starboard of his heading marker and elected to offer to pass “green to green”, which appeared to the skipper of the *Quickcat* to involve him altering course to port. Neither skipper, however, fully appreciated the situation. Neither knew what the course, speed or aspect of the other vessel was. The only prudent course of action to allow time to properly assess the situation in this case would have been to reduce speed to the minimum steerage speed or stop.
- 2.4 Rule 19(d)(ii) of the Collision Regulations states that an alteration of course to port for a vessel forward of the beam which has been detected by radar alone should be avoided. The 2 skippers had established contact via the in-house radio. An alteration of course to port may have been acceptable if both skippers had established beyond doubt the position, course, speed and aspect of the other vessel, and both had agreed to the avoiding action, which had not been the case.
- 2.5 The Collision Regulations stipulated that certain measures must be taken when navigating in or near an area of restricted visibility, which included:
- posting a lookout
 - sounding a fog signal
 - displaying navigation lights
 - having the engines ready for immediate manoeuvring
 - determining a safe speed for the conditions
 - long-range radar scanning
 - determining if risk of collision exists with any targets on the radar
 - if risk of collision does exist, taking early and substantial action to avoid a close quarters situation
 - not making assumptions based on scanty radar information.

Both skippers complied with the first 4 measures but not the remaining 5.

- 2.6 Prior to the collision, the skipper of the *Quickcat* had the service supervisor in the wheelhouse acting as lookout. The *Quickcat II* only had the skipper in the wheelhouse; the deckhand had been acting as lookout but was checking the engine room at the time of the collision. Neither of the lookouts had any maritime qualifications and as such were acting solely as lookouts, leaving the skippers of both vessels with the following tasks:
- hand-steering
 - radar observing
 - collision avoidance
 - navigation
 - radio communications
 - sounding the fog signal.

- 2.7 The wheelhouse of each vessel was set up for a one-person operation. In clear weather skippers could navigate and control the vessel, by themselves, with little difficulty. In restricted visibility, however, the workload of the skipper increases dramatically. The skipper could better manage this increased workload by reducing speed to allow more time to perform the individual tasks. Alternatively, they could assign certain tasks to a second person, assuming that person was suitably qualified and experienced to conduct such tasks.
- 2.8 Rule 6 of the collision regulations requires all vessels to travel at a safe speed for the prevailing circumstances and stipulates factors that should be taken into account when determining what is a safe speed. In the context of Rule 6 both vessels were travelling too fast for the conditions that existed at the time of the collision, for the following reasons:
- the poor visibility
 - the stopping distances of the vessels in relation to the visibility
 - the characteristics, efficiency and limitations of the radar equipment
 - constraints imposed by the radar range scale in use.
- 2.9 A safe speed should allow sufficient time to:
- detect the presence of other vessels and determine if risk of collision exists
 - carry out a manoeuvre to avoid a close-quarters situation
 - ensure that the avoiding action is having the desired effect
 - stop if necessary
 - minimise the impact, if a collision is imminent.
- 2.10 When using a radar for collision avoidance, especially in restricted visibility, it is good practice to detect the existence of other vessels early. The range scale can then be reduced to more accurately monitor the movement of any vessel concerned. The skippers could have used longer range scanning than the $\frac{3}{4}$ mile range scale to give early warning of approaching vessels and allow time to better ascertain if risk of collision existed.
- 2.11 The stopping distance of each vessel at full service speed was estimated to be about 100 m. The skippers had estimated that the visibility was as little as about 50 m at the time of the collision. This gave each vessel as little as 25 m in which to stop or take avoiding action once they sighted each other visually.
- 2.12 The meeting of the 2 vessels constituted a head-on situation. The collision regulations state that, in this case, in clear weather each vessel was required to alter course to starboard to pass clear. In restricted visibility, once the situation had been ascertained by radar plotting it would be expected, in the observance of good seamanship, that each vessel would do the same.
- 2.13 Both vessels had been operating for about $2\frac{1}{4}$ hours before the accident. The Auckland to Birkenhead timetable allowed a turnaround time of about 5 minutes at each end and the Waiheke Island to Auckland timetable allowed a turnaround time of about 15 minutes each end. The skippers of both vessels reported that the fog had been patchy all morning with visibility reduced to 50 m at times. Despite the reduced visibility both vessels managed to keep to the timetable and therefore had both been operating at about their normal service speeds all morning. This indicates that a safe speed in restricted visibility may not have been adhered to routinely, rather than this collision being a one-off case.

- 2.14 The Fog and Poor Visibility Procedure flowchart mentioned the Collision Regulations with regard to keeping a lookout and sound signals but made no reference to Rule 6 other than to “maintain a navigational speed pertaining to conditions at all times”. Given that neither skipper had taken into account the main factors for determining a safe speed as listed in Rule 6, the operator may need to reconsider the effectiveness of the flowchart.
- 2.15 The company had documented recommended courses in its Quality Procedures Manual but they were not specific. To comply with the Quality Procedures Manual in the area of the collision the *Quickcat* should have been further to the north and the *Quickcat II* further south. If they had adhered to the intent of the instructions in the Quality Procedures Manual they should have passed each other with ample distance separating them. Adhering to the instructions would not have prevented all close-quarters situations with all vessels but would have lessened the likelihood of 2 company vessels on reciprocal courses meeting head on.
- 2.16 The workload of the skippers left little time for plotting the position of the vessel in any condition of visibility. Although the *Quickcat* and *Quickcat II* were not required to adhere to the High Speed Craft Code there were some sections that could be applied to their operation which could have enhanced the safety and efficiency of the operation. The *Quickcat* was capable of carrying a total of 647 passengers at relatively high speed in confined waters. The fast ferries operating in Cook Strait, which were required to adhere to the Code, carry about 750 passengers. Although these craft were bigger and faster, the operating requirements were similar.
- 2.17 Both vessels had a GPS receiver which was not being used to its full potential in conjunction with the radar. If the company had a passage plan for each route it operated and designated alter course positions to separate opposing traffic, the skippers would have been able to monitor the position of the vessel, relative to the plan, by utilising the waypoint facility on the GPS.
- 2.18 If the designated routes were adhered to in all conditions of visibility, skippers would become familiar with navigating the same route and utilising the navigational aids to their maximum potential. In times of restricted visibility the skippers would not have to alter their navigational techniques and as a result would lessen their workload and be better equipped to handle abnormal situations.
- 2.19 More than one ferry operator offered scheduled ferry services in and around the Auckland enclosed limits and the number of ferries operating had increased in recent years. Ferry operators and other harbour users would benefit from a coordinated approach to route planning, and marking of common ferry routes on the relevant marine charts. A safety recommendation was made to the Auckland Regional Council harbourmaster to this effect.

3. Findings

- 3.1 Both the *Quickcat* and *Quickcat II* were operating under a safe ship management system and had a current maritime document at the time of the collision.
- 3.2 The skippers and crew of the *Quickcat* and *Quickcat II* held appropriate qualifications and had sufficient experience for their positions.
- 3.3 Both the *Quickcat* and *Quickcat II* were travelling too fast for the reported 50 m visibility at the time of the collision.
- 3.4 The speed of the 2 vessels, combined with the limitations of the navigational equipment and the manner in which it was being operated, allowed the skippers little time to detect the presence of the other vessel, assess the situation and take appropriate action.

- 3.5 A number of non-compliances with the collision regulations by both vessels contributed to the collision. They included:
- determining a safe speed for the conditions
 - effective use of radar for collision avoidance
 - making assumptions on the basis of scanty radar information.
- 3.6 The skippers of both vessels were not adequately monitoring the position of their vessels.
- 3.7 The likelihood of 2 company vessels meeting on opposing courses would have been reduced if both vessels had been following the recommended tracks as documented in the Quality Procedures Manual.
- 3.8 The safe navigation of Fullers Group Limited vessels would benefit from adopting route operational planning and route following practices similar to that used by vessels under the Code of Safety for High Speed Craft.
- 3.9 Ferry operators and other harbour users would benefit from a coordinated approach to planning routes for scheduled ferry services and from marking such routes on the marine charts.
- 3.10 The actions of the skippers and crews following the collision were appropriate under the circumstances.

4. Safety Recommendations

- 4.1. On 3 November 2000 it was recommended to the general manager of Fullers Group Limited that he:
- 4.1.1 Develop a comprehensive passage plan for each of the company routes that utilises all available resources aboard company vessels, and make it company policy for all vessels to follow the plans as closely as practicable in all conditions of visibility. (096/00)
- 4.1.2 Revise the Fog and Poor Visibility section of the Quality Procedures Manual to clearly identify the responsibilities of the skippers under the collision regulations with particular regard to safe speed. (098/00)
- 4.1.3 Arrange for skippers employed by the company attend a high speed navigation course. (099/00)
- 4.1.4 Continue the training of deckhands employed by his company to a level where they can competently assist or relieve the master as necessary. (100/00)
- 4.2 On 7 December 2000 the general manager of Fullers Group Limited replied:
- 4.2.1 In response to safety recommendations formulated for us:
1. Comprehensive passage plans for the company routes are being worked on with the Auckland Regional Harbour Master and hopefully will be finalised before the end of December 2000.
 2. The fog and poor visibility section has been revised and a copy is enclosed.

3. In conjunction with the Maritime School, Captain Tim Wilson has formulated the course for the company and the Masters will be attending this through 2001.
4. Rule 31B will require all deckhands to have at least an Advanced Deckhand Certificate and I am confident that through this we will meet your requirements.

4.3 On 3 November 2000 it was recommended to the harbourmaster of the Auckland Regional Council that he:

- 4.3.1 Require all ferry operators offering scheduled ferry services within Auckland enclosed water limits to submit for approval to the council a detailed route operational plan for all scheduled ferry routes, then coordinate between operators to ensure that such passage plans as far as practical avoid ferries meeting on opposing tracks. The approved route operational plans should be required to form part of operators' safe ship management system. (106/00)
- 4.3.2 Establish the main ferry routes within Auckland enclosed water limits and arrange to have them marked on the appropriate charts with an appropriate warning for other harbour users that ferries regularly ply those routes. (107/00)

4.4 On 14 November 2000 the harbourmaster of the Auckland Regional Council replied:

- 4.4.1 Currently we have only four scheduled operators in the Auckland Harbour, Fullers, Pacific, Subritzky's and Stella Shipping. I have arranged a meeting with them this Friday to ensure that they will submit detailed route operational Plans and will include these in their Safe Ship management systems.

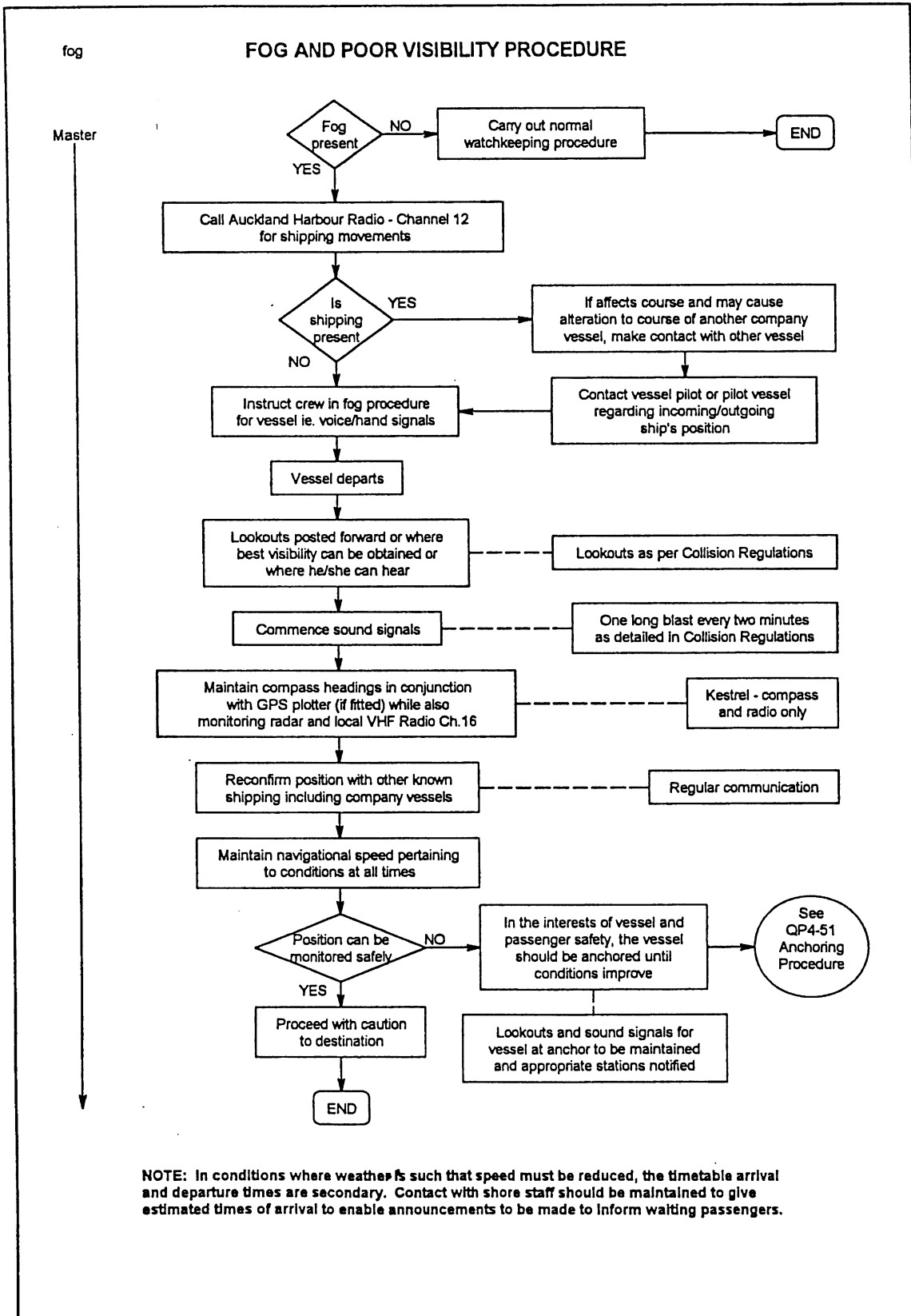
Following agreement on this, I will arrange the appropriate Notices to Mariners and amendments to the relevant charts. If it does not cut across any protocols, may I suggest that a press release be issued by Council on this with maybe a map showing the ferry routes for the information of the public.

I will advise the results of my meeting and the inclusion of the routes into charts.

Approved for publication 22 November 2000

Hon. W P Jeffries
Chief Commissioner

Appendix 1



Appendix 2

The relevant sections of the International Regulations for Preventing Collisions at Sea (1972) are as follows:

Rule 3 General definitions

For the purpose of these Rules, except where the context otherwise requires:

- (k) Vessels shall be deemed to be in sight of one another when one can be observed visually from the other.
- (l) The term “restricted visibility” means any condition in which visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes.

Section 1 Conduct of vessels in any condition of visibility

Rule 4 Application

Rules in this section apply in any condition of visibility.

Rule 5 – Look-out

Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

Rule 6 – Safe speed

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

In determining a safe speed the following factors shall be among those taken into account:

- (a) By all vessels:
 - (i) the state of visibility;
 - (ii) the traffic density including concentrations of fishing vessels or any other vessels;
 - (iii) the manoeuvrability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions;
 - (iv) at night the presence of background light such as from shore lights or from back scatter of her own lights;
 - (v) the state of wind, sea and current, and the proximity of navigational hazards;
 - (vi) the draught in relation to the available depth of water.
- (b) Additionally, by vessels with operational radar:
 - (i) the characteristics, efficiency and limitations of the radar equipment;
 - (ii) any constraints imposed by the radar range scale in use;
 - (iii) the effect on radar detection of the sea state, weather and other sources of interference;
 - (iv) the possibility that small vessels, ice and other floating objects may not be detected by radar at an adequate range;
 - (v) the number, location and movement of vessels detected by radar;

- (vi) the more exact assessment of the visibility that may be possible when radar is used to determine the range of vessels or other objects in the vicinity.

Rule 7 – Risk of collision

- (a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.
- (b) Proper use shall be made of radar equipment if fitted and operational including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.
- (c) Assumptions shall not be made on the basis of scanty information, especially scanty radar information.

Rule 8 – Action to avoid collision

- (a) Any action taken to avoid collision shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.
- (b) If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.

Section 2 Conduct of vessels in sight of one another

Rule 11 Application

Rules in this section apply to vessels in sight of one another.

Rule 14 – Head-on situation

- (a) When two power-driven vessels are meeting on reciprocal or nearly reciprocal courses so as to involve risk of collision each shall alter her course to starboard so that each shall pass on the port side of the other.
- (b) Such a situation shall be deemed to exist when a vessel sees the other ahead or nearly ahead and by night she could see the masthead lights of the other in a line or nearly in a line and/or both sidelights and by day she observes the corresponding aspect of the other vessel.
- (c) When a vessel is in any doubt as to whether such a situation exists she shall assume that it does exist and act accordingly.

Section 3 Conduct of vessels in restricted visibility

Rule 19 – Conduct of vessels in restricted visibility

- (a) This Rule applies to vessels not in sight of one another when navigating in or near an area of restricted visibility.
- (b) Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have her engines ready for immediate manoeuvre.

- (c) Every vessel shall have due regard to the prevailing circumstances and conditions of restricted visibility when complying with the Rules of Section 1 of this Part.
- (d) A vessel which detects by radar alone the presence of another vessel shall determine if a close-quarters situation is developing and/or risk of collision exists. If so, she shall take avoiding action in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:
 - (i) an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken;
 - (ii) an alteration of course towards a vessel abeam or abaft the beam.
- (e) Except where it has been determined that a risk of collision does not exist, every vessel which hears apparently forward of her beam the fog signal of another vessel, or which cannot avoid a close-quarters situation with another vessel forward of her beam, shall reduce her speed to the minimum at which she can be kept on her course. She shall if necessary take all her way off and in any event navigate with extreme caution until danger of collision is over.

Part D. Sound and Light Signals

Rule 34 – Manoeuvring and warning signals

- (a) When vessels are in sight of one another, a power-driven vessel underway, when manoeuvring as authorized or required by these Rules, shall indicate that manoeuvre by the following signals on her whistle:
 - one short blast to mean “I am altering my course to starboard”;
 - two short blasts to mean “I am altering my course to port”;
 - three short blasts to mean “I am operating astern propulsion”.

Rule 35 – Sound signals in restricted visibility

In or near an area of restricted visibility, whether by day or night, the signals prescribed in this rule shall be used as follows:

- (a) A power-driven vessel making way through the water shall sound at intervals of not more than 2 minutes one prolonged blast.