No. 95-208

MV *Washington* and MV *Han Tao He*

Port of Tauranga

14 September 1995

Abstract

On Thursday, 14 September 1995 at about 2252 hours a collision occurred between two motor vessels off the Port of Tauranga. A harbour pilot and one trainee pilot had just disembarked the outbound MV *Washington* and were proceeding out to board the inbound MV *Han Tao He* when the two vessels collided. Damage to the *Han Tao He* was substantial. Causal factors included non-compliance with the International Collision Regulations and the standard of bridge resource management.

Transport Accident Investigation Commission

Marine Accident Report No. 95-208

Vessel Particulars:

Name:	*Washington*	*Han Tao He*
Registered:	Port Vila, Vanuatu	Shanghai, China
Official number:	530	
Call sign:	YJYE8	BOBL
Type:	Reefer cargo carrier	Container
Class:	Nippon Kaiji Kyokai	PRC ☐ ZCA (container ship) Ice Class B, AUT-1
Built:	Imabari, Japan, 1988	Kyo Kuyo, Japan, 1985
Main propulsion unit:	One 5779 KW direct reversing diesel engine driving a right hand turning fixed pitch propeller	One 4996 KW direct reversing diesel engine driving a right hand turning fixed pitch propeller
Length over-all:	129.19 m	117.4 m
Breadth, moulded:	18.00 m	21.4 m
Depth, moulded:	10.50 m	10.2 m
Gross tonnage:	6154 tonnes	8282 tonnes
Nett tonnage:	3565 tonnes	3586 tonnes
Vessel owners:	Stevens Line Co. Ltd	China Ocean Shipping Company
Vessel Operators:	Kyo Kuyo Shipping Ltd	Owner
Location:	Approaches to Port of Tauranga	
Date and time:	Thursday, 14 September 1995	2252 hours *
Persons on board:	Crew: 20 Passengers: Nil Others: Nil	Crew: 28 Passengers: Nil Others: Nil
Injuries:	Nil	Nil
Nature of damage:	Moderate damage to bow region	Substantial structural damage to midship region in way of ballast tanks
Information sources:	Transport Accident Investigation Commission field investigation	
Investigator in Charge:	T M Burfoot	

* All times in NZST (UTC + 12 hours)

1. Factual Information

1.1 History of the event

1.1.1 At 1310 hours on Tuesday, 12 September 1995 the refrigerated cargo carrier MV *Washington* sailed from Auckland, New Zealand bound for Tauranga and anchored off the Port of Tauranga at 2200 hours that same day. At 0500 hours on Wednesday, 13 September the *Washington* berthed at Tauranga to load a refrigerated cargo of Kiwifruit.

1.1.2 Cargo loading was completed at 1730 hours on Thursday, 14 September and the vessel made ready to sail from Tauranga at 2215 hours that night on the high tide slack water.

1.1.3 At 1300 hours on Thursday, 14 September the container vessel MV *Han Tao He* sailed from Auckland bound for Tauranga with the intention of entering the Port of Tauranga at 2300 hours on the same high tide slack water. Three other vessels were scheduled to enter the port on the same tide.

1.1.4 Arrival and departure of large vessels is restricted to times near slack water (when current in the channel is negligible). Five shipping movements were scheduled around the "high-water-slack" time of 2317 hours that evening of the 14 September. Three qualified and two trainee pilots were on duty for that shift. The movements were scheduled in the following order:

Washington	outbound	Pilot one plus trainee
Achtergracht	inbound	Pilot two plus trainee
Silver Wing	inbound	Pilot three
Han Tao He	inbound	Pilot one plus trainee transfer from *Washington*
Union Rotorua	inbound	Pilot two and trainee to transfer from *Achtergracht*

1.1.5 Pilot one and his trainee pilot boarded the *Washington* at 2205 hours on 14 September. The trainee took the "conduct" of the vessel under the guidance of the qualified pilot. No pilot information card was given to the pilot, nor was one requested. The qualified pilot was familiar with the Washington's handling characteristics having piloted vessels of her class before.

1.1.6 The Master did not have a passage plan for the unberthing and passage out from the port under pilotage. No information was requested of the pilots by the Master or the duty officer. It is usual for information on vessel movements to be relayed to the Master of outbound vessels through the pilot. The pilots were aware of all the vessel movements expected on that tide but as they did not exchange information with the Master when they boarded, the Master was deprived of this information at the time of leaving the berth.

1.1.7 The manoeuvre to unberth the *Washington* was relatively straight forward. Two tugs were made fast and at 2220 hours they were used to lift the *Washington* off the berth. When the *Washington* gained the middle of the channel, the tugs were let go, and speed was gradually increased to about 12 knots as the *Washington* proceeded outwards through Cutter Channel. On the bridge were the pilot and trainee who had the conduct, the Master in command, the Third Officer who was operating the telegraph and the helmsman who was steering the vessel.

1.1.8 The outward passage was made without incident. The two inbound vessels (*Achtergracht* and *Silver Wing*) had pilots on board and were making their approach slowly using the side leads of Number One Reach to leave the main leading line clear for the loaded outbound *Washington*. (See figure 1)

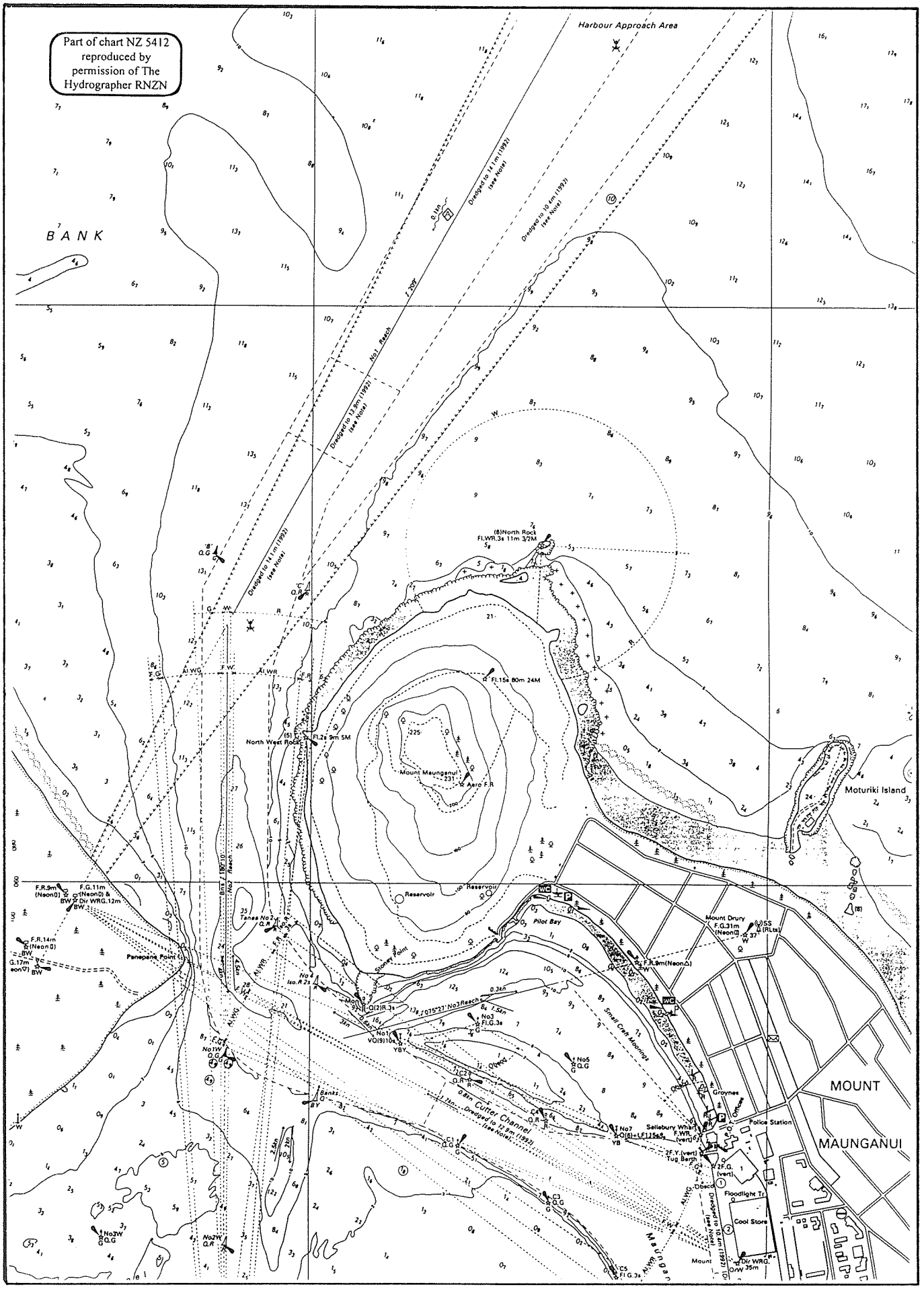

Figure 1
Approach Channel

1.1.9 As the *Washington* sailed out of Number Two Reach the two inbound vessels became visible. It was established among the pilots on the three vessels that the two inbound vessels would pass the *Washington* in Number One Reach starboard-to-starboard (keeping left). The Master of the *Washington* asked his pilots if the other two vessels had pilots on board and was said to have relaxed when they replied "Yes".

1.1.10 The *Washington's* Third Officer did not plot the vessel's position on the harbour chart and there was no written record of times in the bridge log of the ship passing prominent points or navigation marks.

1.1.11 The *Union Rotorua* and the *Han Tao He* became visible to the Master of the *Washington* as she turned on to the main leading line of Number One Reach. The first of the two inbound vessels (*Achtergracht*) passed starboard-to-starboard and at 2243 hours the *Washington* passed the inbound *Silver Wing* near "A" Beacon. After this the *Washington's* engine was reduced to "half ahead" to reduce speed for disembarking the pilots. Her gyro course was 030 degrees. At this time the *Union Rotorua* was stopped in the water approximately 2.7 nautical miles and 30 degrees on the *Washington's* starboard bow showing an aspect 5 degrees red (port). The *Han Tao He* was approximately 3.4 nautical miles and 14 degrees on the *Washington's* port bow showing an aspect 22 degrees green (starboard).

1.1.12 According to the pilots on the *Washington* the bearing of the *Han Tao He* was closing as they were preparing to leave the bridge. This indicated to them that the she would pass ahead of the *Washington* on her present course and speed. The *Washington's* speed was still reducing slowly, the engine having been reduced from full to half ahead. The Master felt at that time that the vessel's speed was too high for disembarking the pilots and for navigating in an area where other vessels were manoeuvring in close proximity.

1.1.13 At the time this assessment was made the *Han Tao He* was still steaming at near full sea speed (about 13 knots) on a gyro course of 174 degrees.

1.1.14 At 2244 hours after the *Washington* had passed "A" Beacon the pilot handed over the conduct of the vessel to the Master. He informed the Master that the engine was on "half ahead" and the course was 030 degrees gyro. He pointed out the *Union Rotorua* and told the Master that she was stopped in the water awaiting a pilot. He pointed out the *Han Tao He* and said that she was a Chinese vessel proceeding to the pilot station. The Master accepted the conduct and indicated to the pilot that he would continue on his present course and speed until clear of the *Union Rotorua* and then alter course to starboard to commence his sea passage on initial course of 063 degrees true. No instructions were given for avoiding the *Han Tao He* and none were asked for. The Master had the conduct of his vessel which was now outside the harbour limits where the "Shipping (Distress Signals and Prevention of Collision) Regulations" (referred to as The Collision Regulations) apply. (See figure 2)

1.1.15 At 2245 hours the pilots left the bridge escorted by the Second Officer who had arrived there having secured his aft mooring station for sea. The deck flood lights positioned under each bridge wing had been switched on to illuminate the deck below for the crew rigging the pilot ladder and for the pilots making their way to the ladder.

1.1.16 At 2246 hours the pilots disembarked from the starboard side of the *Washington* on to the pilot launch which headed out towards the approaching *Han Tao He*.

1.1.17 The Master of the *Union Rotorua*, which was stopped in the water awaiting her pilot, recognised that a close quarters situation had developed between the *Han Tao He* and the *Washington*. At 2247 hours, realising that the Masters of the two vessels may think that the *Union Rotorua* was making way towards them he made the following general broadcast on the VHF radio: "*all ships - this is the Union Rotorua - we are lying stopped - we are stopped where*

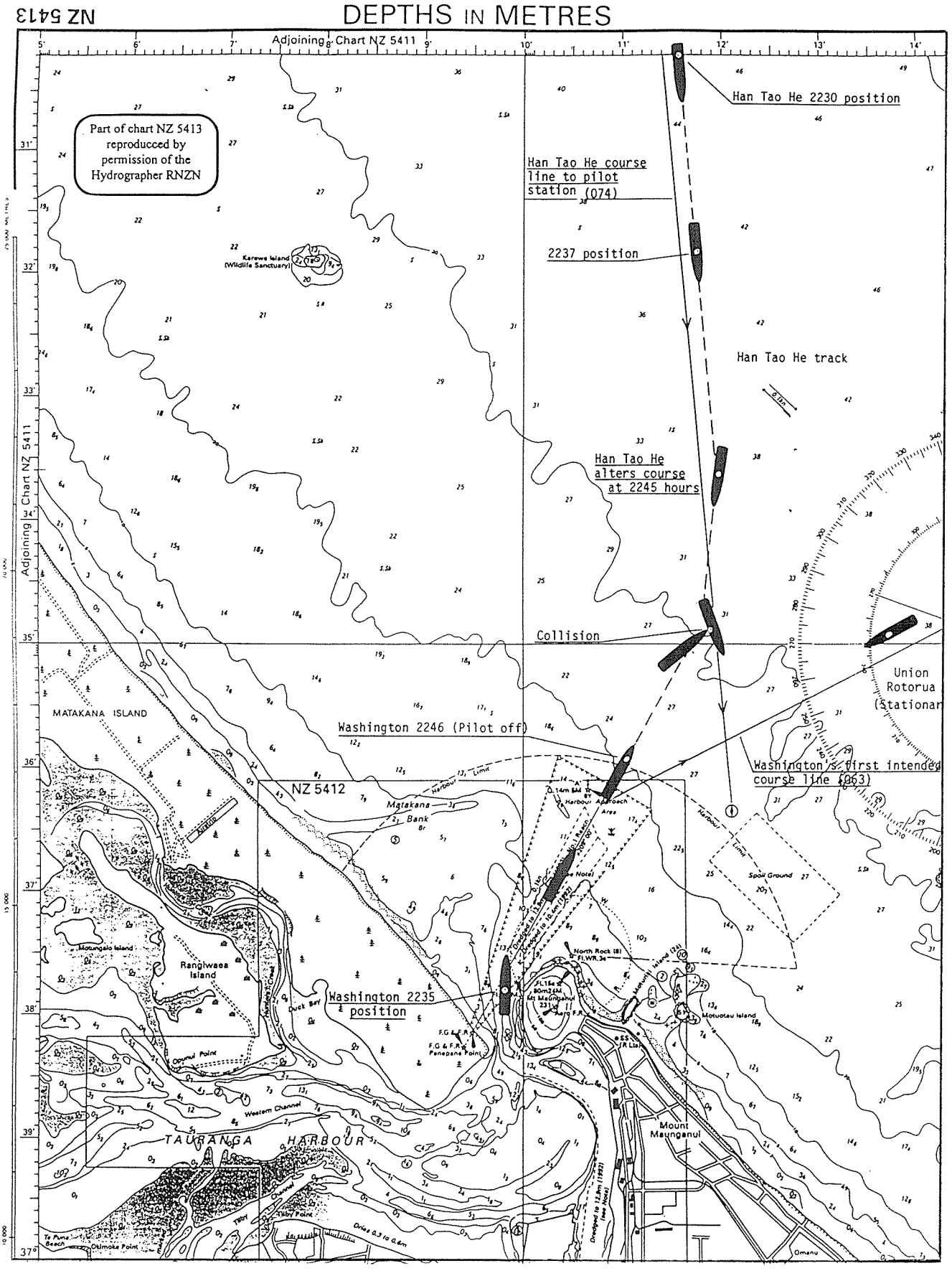
NZ 5413
DEPTHS IN METRES
Adjoining Chart NZ 5411
Part of chart NZ 5413 reproduced by permission of the Hydrographer RNZN
Han Tao He 2230 position
Han Tao He course line to pilot station (074)
2237 position
Han Tao He track
Han Tao He alters course at 2245 hours
Collision
Washington 2246 (Pilot off)
Washington's first intended course line (063)
Washington 2235 position
NZ 5412
MATAKANA ISLAND
Matakana Bank
Rangiwaea Island
Motungaio Island
Duck Bay
Western Channel
TAURANGA HARBOUR
Mount Maunganui
Motuotau Island
Spoil Ground
Union Rotorua (Stationar
Adjoining Chart NZ 5411

Figure 2

we are". The Master of the *Han Tao He* said he heard the broadcast but did not understand it. The Master of the *Washington* could not recall the broadcast.

1.1.18 At the time the *Washington* was departing her berth the *Han Tao He* was approaching the pilot boarding ground from the north. At 2025 hours the First Officer tried to make contact with the signal station by VHF radio but the distance was too great and the radio signal was distorted. A radio contact was scheduled for one hour later when the vessel would have been closer. At 2135 hours the Third Officer on the *Han Tao He* contacted the signal station and gave an ETA (estimated time of arrival) of 2300 hours. The signal station acknowledged the ETA and told the Third Officer that one ship would depart and two ships would enter before their vessel. The Third Officer, who knew little English, did not understand the message. The signal station simplified the message and said "your vessel will be the third vessel to enter". This message was acknowledged by the Third Officer.

1.1.19 At 2200 hours the Master of the *Han Tao He* took over the conduct of the vessel from the Third Officer and placed the engine room on stand-by. The Third Officer informed the Master that they would be the third ship to enter. The Third Officer continued to plot the vessel's progress on the chart using, according to him, radar ranges and checking each position against the GPS. There were no range marks drawn on the chart. Each position was denoted by a triangle with a point in its centre marking the position. Later when the pilots boarded they noted that the light in the starboard gyro repeater was not working.

1.1.20 At 2230 hours the Master of *Han Tao He* called the signal station and told them that he was 30 minutes away from the pilot station and asked what time the pilot would be boarding his vessel. The signal station replied that the pilot was on his way to board him now. The Master acknowledged this fact. At this time the vessel was still travelling near full sea speed (about 14 knots) and the *Han Tao He* was about 6.3 nautical miles from the pilot boarding ground. The Master was unaware that there would be an out bound ship and that the pilot would be transferring from that vessel to his vessel. (See figure 2)

1.1.21 With the knowledge that the pilot was on his way to his vessel and that he had 6.3 miles to run to the pilot boarding ground the Master of *Han Tao He* did not reduce engine speed.

1.1.22 At approximately 2235 hours the Master of the *Han Tao He* noted the pilot launch moving between two inbound vessels (*Achtergracht* and *Silver Wing*) in the proximity of the pilot boarding ground. He also noted the position of the *Union Rotorua* on his port bow which was slowly approaching the pilot boarding ground.

1.1.23 At 2237 hours he saw the *Washington* in the vicinity of "B" and "C" buoys, approximately 20 degrees on his starboard bow. The *Washington* was exhibiting navigation lights but the sidelights and aft masthead light were partially lost in the glare of two bridgewing floodlights that were shining forward illuminating the deck. This made it difficult for the Master of the *Han Tao He* to determine the aspect of the *Washington*. At this time the lookout assumed the helmsman duty and the engine was left on full ahead. The Third Officer continued to plot the vessel's progress on the chart using the radar and GPS. He had seen the *Washington* outbound in the channel but neither he nor the Master made any attempt to plot the vessel or use any other means to determine if a risk of collision existed in spite of their obligation to give way to vessels crossing from their starboard side.

1.1.24 At 2244 hours the *Han Tao He's* engine was reduced to "harbour full ahead". At 2245 hours the Third Officer plotted the *Han Tao He's* position on the chart which showed the vessel was slightly east of the 174 degree course line to the pilot boarding ground.

1.1.25 At 2246 hours the Master of *Han Tao He* saw the pilot launch emerge from behind the *Washington*, which was then approximately 2.6 miles on his starboard bow, and heading in his direction. He altered course 11 degrees to starboard towards the pilot launch (and the *Washington*) and reduced the engine to "slow ahead". The Master then ordered the Third Officer down to stand by the pilot ladder and escort the pilot on board leaving himself and the helmsman on the bridge.

1.1.26 At 2247 hours, as the pilot launch approached the *Han Tao He* the Master further reduced engine speed to "dead slow" ahead. The Master was concentrating on embarking the pilot and, although aware of the *Washington's* presence, he still did not take measures to determine if risk of collision existed. At this time the combined closing speed of the two vessels was approximately 17 knots.

1.1.27 At 2250 hours the Master, becoming alarmed at how close the *Washington* was to his vessel, stopped his engine and sounded about seven short blasts on the ship's whistle. With his focus then completely on the *Washington* the Master realised that collision was imminent and at 2252 hours put his engine on half ahead to try and pass ahead of the *Washington*. Almost immediately it became apparent to him that collision was unavoidable and he ordered the wheel hard over to port and placed the engine telegraph on full astern. The head of the vessel had begun to swing to port and the engine was still in its sequence of starting astern when the *Washington* struck the *Han Tao He* amidships at an angle of attack of some 90°.

1.1.28 On board the *Washington*, having disembarked the pilots, the Master maintained his course of 030 degrees and engine setting "half ahead", as planned. At 2246 hours he observed the *Han Tao He* altering course to starboard towards his vessel. Although he did not plot the *Han Tao He* the Master did take a series of bearings which remained steady. He occasionally noted the radar distance of the *Han Tao He* from his vessel.

1.1.29 Under the Collision Regulations the *Han Tao He* was the "give-way" vessel and the *Washington* was the "stand-on" vessel. The Master of the *Washington* was reluctant to alter his course to starboard due to the position of the *Union Rotorua* lying stationary in the water off his starboard bow, so he elected to stand-on (maintain his course and speed) assuming that the *Han Tao He* would give way. The Master of the *Washington* did not make any sound or light signals. He did not see or hear any signals made by the *Han Tao He*. The floodlights under the bridge wings were still shining forward to assist the crew while they were de-rigging the pilot ladder.

1.1.30 At 2250 hours it became apparent to the Master of the *Washington* that the *Han Tao He* was not going to give way so he stopped his engine. This was at approximately the same time as the Master of the *Han Tao He* stopped his engine. Realising that collision was imminent the Master of the *Washington* ordered the wheel over hard to starboard and engine "half astern" followed immediately by "full astern". The action was too late and the vessel's head had just started to swing to starboard and the engine was still in its sequence of starting astern when the *Washington's* bow struck the *Han Tao He*.

1.1.31 As the pilot launch pulled ahead of the *Washington* on its way to the *Han Tao He*, the pilots had noticed that it was difficult to see the port side light of the *Washington* due to the glare from the floodlights shining forward on deck. Neither of the pilots heard or saw any signals between the two vessels, nor was there any radio communication between the two vessels until after the collision. The pilot vessel was about to round the stern of the *Han Tao He* heading for her pilot ladder on the port side when the pilots suspected that the *Washington* and the *Han Tao He* were going to collide. The pilot vessel stopped near the stern of the *Han Tao He* where its occupants observed the collision.

1.1.32 The bow of the *Washington* remained imbedded in the side of the *Han Tao He* for about 30 seconds until the previously ordered full astern action of both Masters pulled the two vessels apart. Both vessels subsequently dropped anchor to assess the damage. Initial inspection revealed substantial damage to each vessel and both entered port on the next tide to undergo full assessment and repairs.

1.2 Weather information

1.2.1 The weather was fine with a clear sky and good visibility. The wind was from the south-south-west at 10 knots.

1.2.2 High tide slack water was predicted for 2317 hours.

1.3 Vessel information (*Han Tao He*)

1.3.1 The *Han Tao He* is a container vessel that was providing a regular service between the Far East and New Zealand. The accommodation is aft and two cranes are mounted forward on the centreline of the vessel. The cranes, when stowed, protrude up above the level of the bridge creating a blind sector forward of approximately four degrees when viewed from the centre conning position.

1.3.2 The normal service speed of the *Han Tao He* was 14.5 knots and manoeuvring "full ahead" about 12 knots. The vessel was operated using bridge control of its main engine.

1.3.3 The ballast tanks are arranged as a series of double bottom tanks under the cargo holds, and wing tanks that extend up the sides of the cargo hold to the deck line. The containers were stacked on deck three high in front of the bridge and two high forward. The arrangement of the containers on deck did not unduly restrict the forward visibility from the bridge.

1.3.4 Bridge equipment fitted on board the *Han Tao He* included the following:

One 3 cm radar
One 10 cm radar
Automatic engine logger (recording the engine selections)
A course recorder (recording the vessel's heading and rudder movements against time).
GPS navigator
Transit satellite navigator
Gyro compass with automatic pilot
Doppler speed log
Depth indicator and recorder
Bridge control of the main engine

1.3.5 The engine logger was in operation but the course recorder had not been turned on at the time of the collision. Neither radar was fitted with an ARPA (automatic radar plotting aid) nor were they required to be under the SOLAS (Safety Of Life At Sea) Regulations Chapter 5, Regulation 12(j). The gyro was within ± one degree of true and the bridge clock was accurate to within 10 seconds of New Zealand standard time (NZST).

1.4 Vessel information (*Washington*)

1.4.1 The *Washington* is a refrigerated cargo carrier that was engaged in world wide trading. The accommodation is aft and the hatches are serviced by four sets of derricks attached to two sets of Samson posts which protrude above the level of the bridge but do not create any significant blind sectors. She was carrying no deck cargo at the time of the collision.

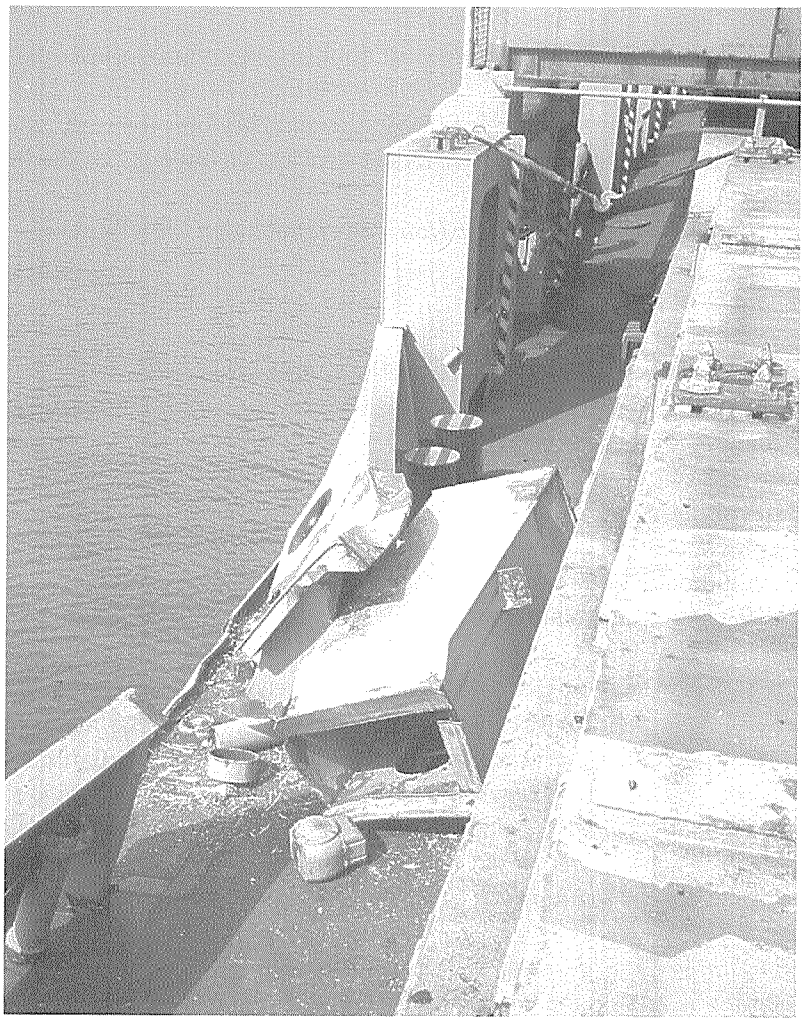

Figure 3
Han Tao He

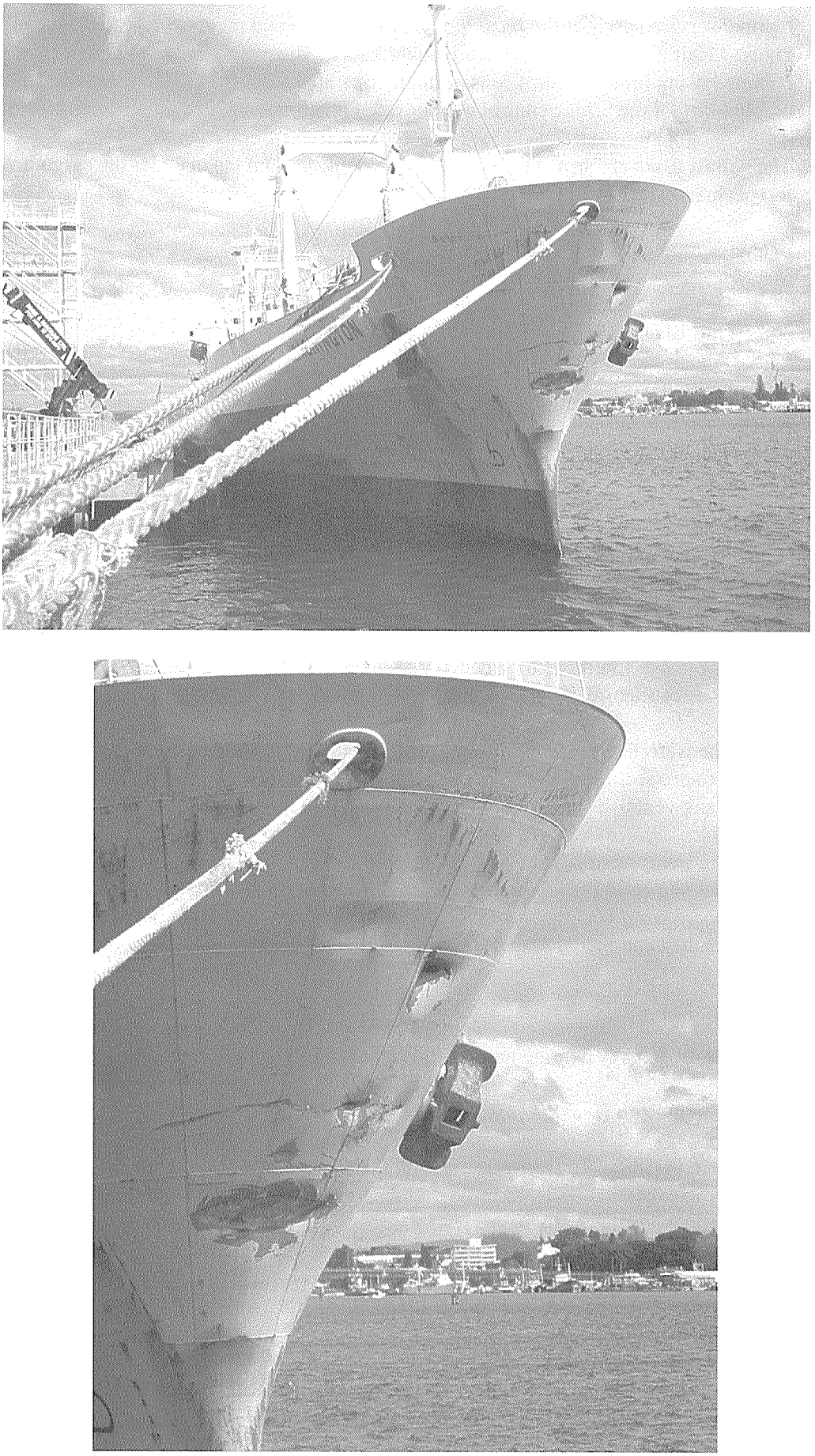

Figure 4
Washington

1.4.2 Normal service speed of the *Washington* is 17.5 knots and manoeuvring "full ahead" is 12 knots. "Half ahead" is approximately eight knots. The main engine, although capable of being operated using bridge control, was normally operated from the engine room due to the unreliability of the bridge control system when manoeuvring.

1.4.3 The ballast tanks are arranged as a series of double bottom tanks under the cargo holds, a forepeak and aft peak tank.

1.4.4 Bridge equipment fitted included the following:

One 3 cm radar
One 10 cm radar
Transit satellite navigator
Loran navigator
Electro-magnetic speed log
Depth indicator and recorder

1.4.5 Neither radar was fitted with an ARPA nor were they required to be under the SOLAS Regulations. The gyro was within ± one degree of true and the wheelhouse clock was found to be one minute slow of NZST.

1.5 Damage to the vessels

1.5.1 The *Washington's* bulbous bow penetrated the *Han Tao He* amidships below the waterline and the soft nose structure of her bow rode up over the *Han Tao He's* deck line.

1.5.2 Above the waterline the *Han Tao He* sustained slight buckling of the top of the sheerstrake and an eight metre section of the bulwarks was stove inwards shearing off a container pedestal and several tank vents.

1.5.3 Below the water line the *Han Tao He* suffered substantial damage. The *Washington's* bulbous bow struck the solid bulkhead and tanktop separating No. 2 starboard wing water ballast tank, the starboard wing heeling tank and No. 2 starboard double bottom ballast tank. All three tanks were breached and the bulkhead and tanktop suffered crushing and buckling. (See figures 3 and 4)

1.5.4 Damage to the *Washington* consisted of buckling and penetration of the soft nose in way of the forecastle, and heavy denting and two holes in the bulbous bow breaching the forepeak tank.

1.6 Crew information (*Washington*)

1.6.1 All of the crew on board were Korean with the exception of the Master and the Chief Engineer who were Japanese. The Third Officer on board the *Washington* did not understand or speak the English or Japanese languages well and the Master often had problems communicating with him. The International Maritime Organisation (IMO) International Safety Management (ISM) Code requires that ship managers ensure that there is a "command" language used on board their vessels. This will not be required until 1 June 2002 for cargo vessels such as the *Washington*.

1.6.2 The Japanese Master had 28 years' experience at sea, the last 12 years of which was as Master. He had been Master of the *Washington* for eight months prior to the collision. His ability to understand and speak English was relatively good.

1.7 Crew information (*Han Tao He*)

1.7.1 The entire crew were Chinese including the Master. The Master had 19 years' sea going experience. He had been appointed as Master in June 1994 and completed several training voyages as Supernumerary Master on other vessels before being appointed to the *Han Tao He* in January 1995. He completed one months' familiarisation on board before officially taking over as Master in February 1995.

1.7.2 The Third Officer had graduated from the Chinese nautical university in July 1994 and was appointed to the ship as first time Third Officer in June 1995. His ability to speak and understand the English language was limited to basic nautical terminology. Under the revised IMO International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) 1995, officers of the navigational watch will require adequate knowledge of written and spoken English to be able to effectively communicate with other ships and coast radio stations. The revised convention will enter into force in February 1997.

1.8 Port information

1.8.1 The Port of Tauranga is a tidal port situated at the south-east end of Tauranga Harbour. Entry to the port is through a channel dredged across Matakana Bank that passes between the south-eastern tip of Matakana Island and Mount Maunganui. Tidal rates of up to four knots make manoeuvring of large vessels in the channel difficult. Vessels can berth day or night but those over 100 m in length are only handled at or near slack water (when the current in the channel is negligible).

1.8.2 The approach to the port is made in three stages, firstly through No. 1 Reach into No. 2 Reach and then into the Cutter Channel. The current reaches its maximum rate at the turn between No. 2 Reach and the Cutter Channel (See figure 1).

1.8.3 Due to the high number of vessels handled by the Port of Tauranga and the restricted times for arrivals and departures there are often several shipping movements in and out on any one tide as was the case on the night of 14 September.

1.8.4 Actual slack water in the channel lasts for approximately 20 minutes before the tide reverses its direction of flow. Vessel arrival and departures are sequenced to make maximum use of the favourable conditions at slack water. Vessels are prioritised according to size, draft, pilot availability, vessel readiness (ETA or ETD (estimated time of departure)) and commercial needs. If one or more of these factors change it is sometimes necessary to change the order of priority to suit.

1.8.5 A signal station is situated on top of Mount Drury which has a view over the approaches to the harbour and the pilot boarding ground. The station is manned continuously and is equipped with VHF radio and a radar. The function of the signal station is to control and regulate shipping and to keep a radio log of events. It is not the function of the signal station to provide a navigation service for shipping.

1.8.6 Vessels contact the signal station to pass on ETA messages or request information. The signal station provides information on berthing schedule, traffic movement, and when requested, weather and tidal information. Vessels are told not to approach closer than one mile from "A" Beacon unless directed by the pilot.

1.8.7 To facilitate the flow of traffic and maintain the schedule inbound vessels will often pass outbound vessels in No. 1 Reach. The deeper water is on the main leading line of No. 1 Reach which is to the west of the dredged channel. A second set of leading lights (side leads) depict

informed at 2230 hours by the signal station that the pilot was on his way to his vessel "now" the Master had 30 minutes less time to carry out actions required to embark a pilot.

2.16 The work overload was compounded by the Master's decision not to reduce speed at that time to avoid delaying the pilot. Shortly after that he saw the *Washington* outward bound in the channel showing the strong spot lights which made it difficult to determine its aspect. With his mind focused on finding and embarking the pilot, the Master chose to ignore the presence of the *Washington*. Neither the Master nor the Third Officer used any means to determine if a risk of collision existed with the vessel that was on their starboard side.

2.17 The light not working in the starboard gyro repeater would have made it difficult to take bearings; however as no attempt was made by the Master or the Third Officer to monitor the *Washington's* progress, this was not considered to be a causal factor.

2.18 When the pilot boat appeared from behind the *Washington* and headed in their direction the Master took the instinctive action of turning towards it and slowing his vessel down. By sending the Third Officer down to pick up the pilot the Master placed himself in a position where he alone had to navigate, manoeuvre his vessel to embark the pilot, maintain a lookout and avoid a collision with a vessel when he was unsure of that vessel's movements.

2.19 The accumulation of tasks facing the Master may explain why he chose to focus on embarking the pilot, who would take the conduct of the vessel and ease his workload, and ignore the unknown quantity of the vessel on his starboard side.

2.20 The Master would have been unaware that his slight course alteration toward the pilot vessel and subsequent drop in speed had placed his vessel on collision course with the *Washington*.

2.21 Eventually the distance between the two vessels closed to a point where the Master could no longer ignore the *Washington's* presence. His stopping of the engine was an instinctive reaction to give him more time to assess a situation which he had not properly addressed. Unfortunately this coincided with the time at which the Master of the *Washington* stopped his engine and the combined effect of these two actions maintained the collision course between the two vessels.

2.22 From that point on collision was inevitable. The only option either Master had was to take action to lessen the impact. As no manoeuvring signal was made by either vessel it came down to a matter of chance which way each vessel turned. The last minute turn to port made by the *Han Tao He* was an instinctive reaction to turn away from the source of danger. This action presented the *Han Tao He's* beam to the bow of the *Washington* and worsened the effect of the impact and subsequent damage to his vessel.

2.23 Given the angle of approach of the *Washington* and the *Han Tao He* it would have been more prudent for the Master of *Han Tao He* to make a last minute turn to starboard. This would have at least made the impact a glancing blow and at best, when combined with the *Washington's* turn to starboard, may have avoided the collision.

2.24 If VHF radio communication had been established between the two vessels at an early stage before the pilots left the *Washington* the two Masters should have been able to discuss a plan for their two vessels to pass, but in this case the limited English spoken by the two Masters may have confused the situation and added to their already high workload. Notwithstanding this both Masters should have been informed by the signal station, or by the pilot, of the other vessel's name should they have chosen this means to avoid collision. The Masters could have requested this information.

3. Findings

3.1 Both the *Washington* and the *Han Tao He* were manned and equipped as required for vessels of their class.

3.2 Both vessels' international statutory certificates were in order.

3.3 There was no mechanical failure or malfunction of equipment that contributed to the collision.

3.4 Neither vessel had formed a passage plan to encompass the pilotage section of their respective voyages as recommended in the IMO Bridge Procedures Guide.

3.5 There was no exchange of information between the Master and pilots on board the *Washington* prior to departing the berth.

3.6 Both vessels were under the conduct of their respective Masters at the time of the collision.

3.7 The International Collision Regulations applied, as both vessels were outside harbour limits, at the time of the collision.

3.8 Neither vessel had a dedicated lookout on the bridge immediately before the time of the collision.

3.9 The two vessels were meeting in a crossing situation before and at the time of the collision.

3.10 The *Han Tao He* was the "give-way" vessel and the *Washington* was the "stand-on" vessel.

3.11 After sighting the *Washington* the Master of the *Han Tao He* did not meet the requirement of Rule 7 of the Collision Regulations in that he did not use any of the available means to determine if a risk of collision existed.

3.12 After the *Han Tao He* altered course to starboard the Master of the *Washington* determined that risk of collision existed.

3.13 The Master of the *Washington* was entitled to hold his course and speed as the close quarters situation and risk of collision developed.

3.14 It was incumbent on the *Han Tao He* to take early and substantial action to keep clear as required by Rule 16 of the Collision Regulations.

3.15 When it became apparent to the Master of the *Washington* that the *Han Tao He* was not taking appropriate action in compliance with the Collision Regulations, it would have been prudent for him to alter course to starboard as allowed under Rule 17(a)(ii) of the Collision Regulations.

3.16 The *Washington's* turn to starboard was appropriate when it became apparent to the Master that collision could not be avoided by the action of the *Han Tao He* alone.

3.17 The bridgewing floodlights shining forward on the *Washington*, were in contravention of Rule 20 (b) of the Collision Regulations and made it difficult for other vessels to observe the *Washington's* aspect visually.

3.18 Poor bridge resource management on both vessels leading to work overload among the bridge team was a contributing factor to the collision.

3.19 Poor communication resulting from language difficulties contributed to the cause of the accident.

3.20 Poor bridge resource management and poor communication resulted in a number of breaches in the Collision Regulations.

17 April 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 surplice 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	Securing device, cleat
Draft	Depth of the vessel in the water
EPIRB	Emergency Position Indicating Radio Beacon
Freeboard	Distance from the waterline to the deck edge
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)
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
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)
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
V	Volts
VHF	Very high frequency radio
Windlass	Winch used to raise a vessels anchor