Report 02-201

bulk log carrier

Jody F Millennium

grounding

Gisborne

6 February 2002

Abstract

On Wednesday 6 February 2002, at about 2152, the log carrier *Jody F Millennium* with a master and 18 crew on board, grounded in the Gisborne approach channel when it encountered large swells as it left the relative shelter of the breakwater while departing from the port. The ship was subsequently driven by the swell on to the shelving shoal area to the north of the channel, where it remained for 18 days before being re-floated. At the time of the grounding the ship was still within the pilotage area, but the pilot had disembarked a few minutes earlier.

Safety issues identified included:

- adequacy of interpretation and dissemination of weather forecasts and actual weather at remote locations
- adequacy of mooring system for expected conditions
- adequacy of communication between master and pilot
- adherence to minimum criteria for safe departure with regards to under keel clearance calculated from tide times and heights
- appropriateness of early pilot disembarkation
- difficulty of a pilot working alone, without the benefit of peer discussion or challenge, leading to a one-man decision without full exploration of possible alternatives
- appropriateness of limiting dimensions of ships able to use Port of Gisborne
- adequacy of the management and employment system practised by Port of Gisborne.

Safety recommendations were made to the General Manager of Eastland Port Limited, the Chief Executive of Gisborne District Council, the General Manager of Adsteam Port Services Limited and the Gisborne Adsteam Port Services Limited pilot.

The *Jody F Millennium* aground off Waikanae Beach - Gisborne

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Abbreviations

GM	metacentric height (measure of a vessel's statical stability)
GPS	global positioning system
hp	horsepower
hPa	hectoPascal(s)
kt(s)	knot(s)
km(s)	kilometre(s)
kW	kilowatt
m	metre(s)
m^3	cubic metres
mm	millimetre(s)
NIWA	National Institute of Water and Atmospheric Research Limited
nm	nautical mile(s)
PFD	personal floatation device
PIANC	The Permanent International Association of Navigation Congresses
rpm	revolutions per minute
t	tonne(s)
UKC	under keel clearance
UTC	Coordinated Universal Time
VHF	very high frequency

Glossary

abeam	direction at right angles to the length of a ship
aft	rear of the vessel
ballast	weight, usually sea water, put into a ship to improve stability
beam	width of a vessel
bollard pull	measure of the static pull a vessel can exert
cable	0.1 of a nautical mile
chart datum	zero height referred to on a marine chart
class	category in classification register
conduct (con)	in control of the vessel
dead reckoning	calculation of position considering courses steered, distance logged, set and leeway
double bottom	tank at the bottom of a ship formed by the inner and outer bottom plating of hull
draught	depth in water at which a ship floats
fetch	the distance travelled by wind or waves across open water
forecastle	raised structure on the bow of a ship
gross tonnage	a measure of the internal capacity of a ship; enclosed spaces are measured in cubic metres and the tonnage derived by formula
heel	angle of tilt caused by external forces
knot	one nautical mile per hour
leading light(s)	light(s) that identify the safest track in a channel
longitudinal	pertaining to length. Applied to any fore and aft member of a ship structure
port	left-hand side when facing forward
range of tide	difference in height between successive high and low waters
ranging	fore and aft movement of a ship alongside its berth
sounding	measure of the depth of a liquid
squat	increase in draught, trim or both due to the movement of a ship through the water
starboard	right-hand side when facing forward
stability	property of a ship by which it maintains a position of equilibrium, or returns to that position when a force that has displaced it ceases to act
surge	water movement created by long waves travelling large distances from distant storms, and sometimes exacerbated by local swell waves
surging	movement of a ship at its berth caused by surge in a harbour. Surging includes ranging along the berth, vertical lift at the berth and movement away from the berth
track	the path intended or actually travelled by a ship

Data Summary

Vessel Particulars:

Name:	*Jody F Millennium*
Type:	bulk log carrier
Class:	Nippon Kaiji Kyokai
Length (overall):	159.94 m
Breadth (extreme):	26.00 m
Gross tonnage:	15 071 t
Built:	2000
Propulsion:	a single 6156 kW Mitsui B&W 6S42MC (Mark VI) diesel engine, driving a single fixed-pitch propeller
Service speed:	14.5 kts
Owner:	Twin Bright Shipping Company Limited of Panama, Panama
Manager:	Soki Kisen Company Limited, Japan
Operator/Sub time charterer:	Hyundai Merchant Marine Company Limited Seoul, Korea
Voyage charterer:	Rayonier, New Zealand Limited
Time charterer:	News Maritime Company Limited Tokyo, Japan
Crew:	19
Date and time:	6 February 2002 at 2152[1]
Location:	Gisborne
Persons on board:	crew: 19 passengers: nil
Injuries:	crew: nil passengers: nil
Damage:	substantial to ship
Investigator-in-charge:	Captain John Mockett

[1] All times in this report are New Zealand Daylight Time (UTC + 13 hours) and are expressed in the 24-hour mode

1. Factual Information

1.1 History of event

1.1.1 On 6 February 2002, the bulk log carrier *Jody F Millennium* departed from Gisborne because a severe surge in the harbour created by a deep depression to the south and an increasing swell outside the harbour, was causing the ship to move violently alongside the wharf and break some of its shore mooring lines. As it passed the breakwater, the ship was struck by the swell and touched bottom in the approach channel, slowing and effectively disabling the ship, which was then driven by the sea and swell further on to the shoal area to the north of the channel where it remained hard aground for 18 days (see Figure 1).

1.1.2 The *Jody F Millennium* had arrived at Gisborne on 3 February 2002. The pilot boarded in the nominated pilot boarding area. He stated that on his arrival on the bridge, he indicated to the master the intended courses into the port, using the ship's chart, and gave the master a photocopy of part of the chart depicting the swinging basin and the way the ship was to be berthed, together with a drawing of how the ship would be secured alongside.

1.1.3 The master of the *Jody F Millennium* stated that he was not given any information on the port or a passage plan for entering the port. Neither was he given a set of port guidelines. The documentation referred to by the pilot could not be found aboard the ship.

1.1.4 The *Jody F Millennium* berthed at 2320 on 3 February 2002, port side alongside number 8 wharf, after being swung through 180° in the swinging basin. It was made fast using a combination of ship's mooring lines and shore mooring lines. The ship was initially scheduled to depart from Gisborne at about 1400 on 5 February.

1.1.5 Cargo loading operations began using the ship's cranes at 0700 on 4 February and, because of some delays, continued throughout until the afternoon of 6 February.

1.1.6 At 0955 on the 5 February, another ship, the *Asian Briar*, berthed at number 7 wharf behind the *Jody F Millennium*, to load squash. Because it was scheduled to remain alongside for just 24 hours the *Asian Briar* was secured using ship's mooring lines only.

1.1.7 On the afternoon of 6 February, with a deep depression to the south and a southerly swell building outside the harbour, conditions inside the harbour began to deteriorate with a moderate surge developing. The surge caused both ships and other smaller vessels in the port to move at their berths, ranging up and down the wharves, rolling and surging off the wharves. The agent for the *Asian Briar* requested the supervisor of the shore mooring gang to run shore mooring lines to the ship. At about 1400, the supervisor of the shore mooring gang contacted the pilot and told him about the surge in the harbour. The pilot came to the port at that time. Two shore mooring lines were secured to each end of the *Asian Briar*.

1.1.8 At about 1420, shortly after the shore mooring lines had been secured on the *Asian Briar*, one of the after shore mooring lines on the *Jody F Millennium* parted. The shore mooring gang replaced it and while doing that, one of the forward lines parted, which they also replaced. At about 1430 the pilot informed the general manager of Port Gisborne Limited of the situation and, through the general manager and the ships' agents, instructed the masters of both ships to ready their engines and be on immediate readiness for sea. The *Jody F Millennium* continued to move at the wharf and at about 1500 the pilot called out the harbour tug, *Turihaua*, to push on the ship in an attempt to dampen the movement. The tug arrived at the ship at about 1510. The crew of *Jody F Millennium* raised the gangway to prevent damage to it.

1.1.9 During the remainder of the afternoon, both ships continued to move violently at times and the second harbour tug, the *Titirangi*, was called out. It was initially to push on the *Asian Briar* at number 7 wharf but went straight to the *Jody F Millennium* because that ship was moving more and causing greater concern.

1.1.10 Owing to the movement of the *Jody F Millennium*, the stevedores had suspended cargo operations at about 1500, whereas they were able to continue on the *Asian Briar*. The stevedores ordered labour for the next shift at 1900 and continued to monitor the situation, noting that the movement eased slightly as the tide fell. However, at 1900 they decided that further cargo operations were unsafe so, while still able to do so, they removed the shore loading equipment from the ship, and cargo operations were postponed indefinitely.

1.1.11 By 1730 the conditions eased slightly and the tugs were stood down although the ships continued to move at the wharf. The *Asian Briar* completed loading cargo and departed at 1910 with the tug *Turihaua* assisting the un-berthing. On completion of this movement, the supervisor of the shore mooring gang requested the pilot to arrange for the tugs to push onto the *Jody F Millennium* again in order that he might safely replace more shore mooring lines that had broken. The *Turihaua* went directly to the ship while the pilot organised a crew for the second tug. The *Titirangi* arrived at the ship at about 1950. At about this time the pilot advised the ship, through the agent and the chief officer, that he intended to try to hold the ship alongside with tugs, but it might be necessary to put it to anchor in Poverty Bay at midnight, when there should be sufficient water in the approach channel to do so.

1.1.12 The ship continued to surge violently, causing it to roll and pitch as well as ranging up and down the wharf and off the wharf. Even with the tugs pushing on, the shore lines continued to break; a total of 8 of them parted during the afternoon and evening. The shore mooring gang replaced each of the lines as it parted but eventually it became too dangerous for them to operate with any safety in the vicinity of the mooring lines. The gang stood by but no more lines parted before the ship departed.

1.1.13 At about 2000, with conditions deteriorating, the pilot informed the general manager of Port Gisborne that sailing time could be brought forward to midnight if conditions allowed, but that he would try to keep the ship alongside as long as possible. The pilot also told the ship's agent and chief officer the same thing. The pilot asked the chief officer if the draught could be reduced by transferring ballast or fuel. The chief officer told him that it could not.

1.1.14 At about 2030, with conditions deteriorating, the pilot decided that the moorings were unable to safely hold the ship and that he should take the ship to sea as soon as possible in order to prevent damage to the ship and wharf and possible injury to personnel on the ship and ashore. His intention was that the ship would go to anchor until conditions in the port had eased. He informed the general manager of Port Gisborne Limited of this decision, and that 2200 would be the earliest time that the ship could depart owing to the depth of the channel, the state of the tide and the draught of the ship. The ship's agent was informed and he relayed the information to the master.

1.1.15 On board the ship, the crew were attempting to lash the deck cargo as best they could and also stated later that they were readying extra ship's mooring lines should they be required.

1.1.16 According to the ship's bridge movement book, the pilot boarded at 2115, the shore lines were clear at 2120 and the ship's lines were clear at 2138. However, the pilot recalled that he boarded at about 2130 and all lines were let go at about 2150. The times used in the remainder of this report are those taken from the bridge movement book.

1.1.17 The pilot and master had a brief information exchange before letting the ship go. The master reiterated that it was not possible to reduce the draught or the trim. The pilot decided, and advised the master, that the ship should proceed at slow speed to minimise the effect of squat.

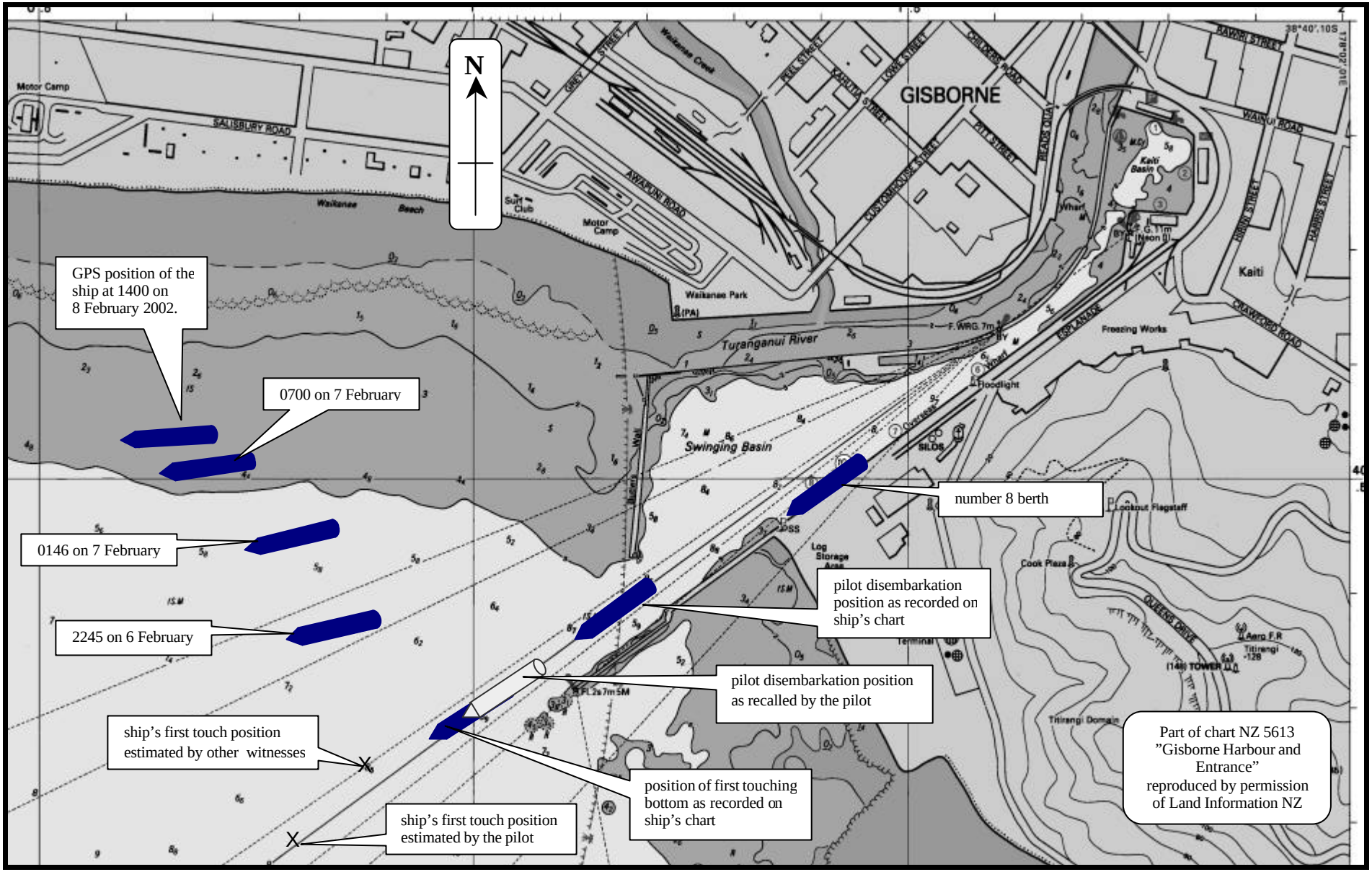

Figure 1
***Jody F Millennium* estimated grounding positions**

1.1.18 When all the lines were clear, the pilot ordered the tugs to stop pushing, and the ship left the berth bodily under the influence of the wind and moved rapidly to the north with the bow moving faster than the stern. This resulted in the ship being pushed north of the channel and pointing towards Butlers Wall (see Figure 2, position 2). Using the ship's engine and both tugs pushing, the pilot overcame the effect of the wind and returned the ship to the line of the channel. The forward tug, *Titirangi*, had to use full power to move the bow to port, while the aft tug, *Turihaua*, required less power to control the stern. At 2144, when the ship was aligned with the channel (see Figure 2, position 3), the pilot ordered dead slow ahead, with slow ahead soon after. The tugs moved clear of the ship and remained on standby in the swinging basin.

1.1.19 At 2146, the ship's engine speed was again reduced to dead slow ahead to enable the pilot to disembark. The time of the pilot disembarking was recorded in the bridge movement book as 2150, and a position noted on the chart alongside the end of Butlers Wall (see Figure 2, position 4). The pilot stated that he disembarked at the end of the southern breakwater. The pilot remained in the pilot launch, stationed on the leading line to watch the ship transit the approach channel, and ready to advise the master if required.

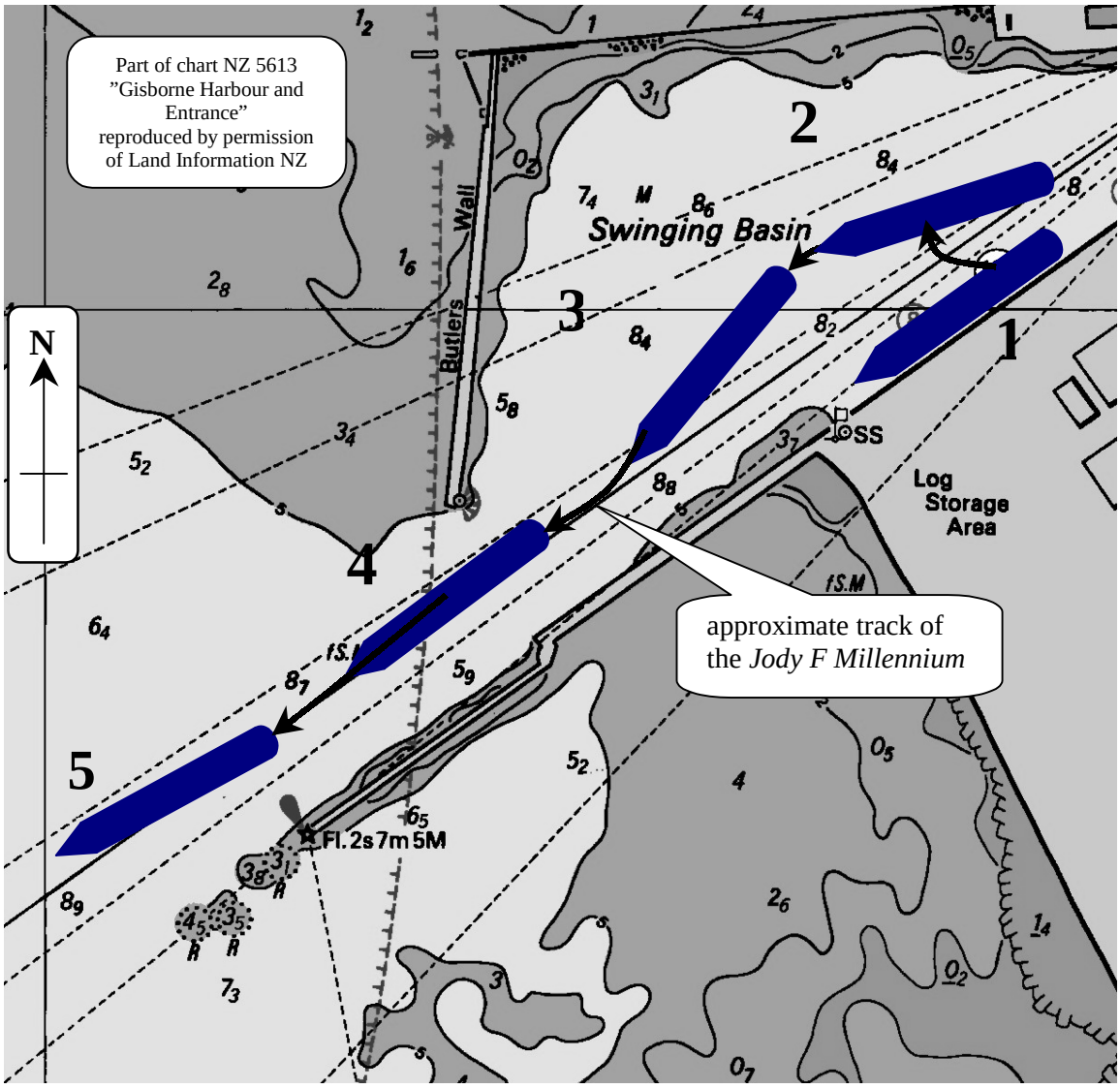

Figure 2
Swinging basin and breakwater configuration showing approximate track of the *Jody F Millennium*

1.1.20 At 2152, as the ship, on a course of 235° (T), emerged from behind the southern breakwater, a large swell struck the port shoulder of the ship pushing the bow to starboard and causing the ship to roll, first to starboard and then to port (see Figure 2, position 5). The master said he felt that the ship touched bottom forward, initially on the port side and then on the starboard, whereas the chief officer on the forecastle thought it had touched aft. The master increased speed and ordered the helm hard to port in an attempt to maintain position in the channel but the ship had lost forward momentum and was pushed by the wind and sea towards the starboard side of the channel.

1.1.21 Without sufficient forward momentum, the master was unable to steer the ship and it was driven further on to shoal ground outside the channel, despite attempts to free it using the main engine. The master informed the pilot, on the VHF radio, that the ship had grounded. The pilot suggested that the master put the engine astern, but when this was done, there was excessive vibration and so it was again stopped. The pilot instructed both tugs and the pilot launch to go out to the ship but owing to the weather conditions, which were observed by the pilot and service vessel crews to be 6-metre swells, they were unable to get alongside the ship and were unable to provide any effective assistance. The pilot suggested that the master drop the anchors. The master ordered the mate on the forecastle to let go the port anchor; this was soon followed by the order to drop the starboard anchor. Shortly after letting go the anchors, the forward crew had to abandon the forecastle because of waves crashing over the bow.

1.1.22 At some time during the night, both anchor cables parted and the ship was driven further to the north and towards Waikanae Beach, where it remained for 18 days before it was re-floated and towed off.

1.1.23 Temporary repairs were carried out in Tauranga before the ship was towed to Japan to undergo full repairs in dry-dock.

1.2 Approach channel to the port of Gisborne

1.2.1 The approach channel extended for about 0.9 nm from a starboard-hand arrival buoy to the harbour entrance between the southern breakwater and Butlers Wall (see Figure 1). The gap between the breakwater and the wall was about 100 m, with the leading line bisecting the gap. The leading line in the channel was 57 m from the southern breakwater, which was steep too.

1.2.2 The channel bottom was of hard mudstone, locally known as “papa”, which had an overlay of sedimentary sand and silt. Between 1997 and 2000, dredging was carried out to deepen the channel. Initially, the suction dredge *Pelican* was used to remove the sedimentary sand and silt in the area and then a barge with a backhoe was used to dig out the hard, rock-like mudstone. The swinging basin inside the harbour was not dredged as part of this project. A hydrographic company monitored the dredging by taking bottom surveys during the operation. On completion, a final survey was carried out between 15 and 20 March 2000 and a chart was produced showing the new channel depths; the least depth being 10.5 m. A follow-up hydrographic survey was undertaken in August 2001, which showed a least depth of 9.7 m.

1.2.3 The pilot received a copy of the sounding chart for the survey completed on 20 March 2000 but maintained that he had asked Port Gisborne Limited for another survey to be carried out. He said that he was not aware of the August 2001 survey nor was he given a copy of the chart for that survey. Port Gisborne Limited maintained that the pilot was given a copy of both charts.

1.2.4 The depth of the channel was continuously reduced as sedimentary sand and silt was deposited in it by tidal flows. Port Gisborne Limited attempted to maintain the channel depth by regular use of the dumb suction dredge *Pukanui*, which was towed by one of the harbour tugs. The port company estimated that the *Pukanui* removed between 100 000 and 130 000 m^3 of sand per year, predominately from the approach channel. At the time of the accident the *Pukanui* was on the slipway undergoing survey work. The last maintenance dredging of the channel had been undertaken between some time in September and 4 December 2001, some 2 months before the grounding.

1.2.5 The maintenance dredging completed in December 2001 was unlikely to have increased the depth of water in the channel to the original 10.5 m but no soundings were available to verify what depth was actually achieved. In the 2 months between the dredging and the grounding of the *Jody F Millennium*, the channel would have partially in-filled with sand and silt. As no accurate figure could be determined for the depth in the channel on the night of 6 February 2002, the Commission estimated the maximum depth of water at 10 m.

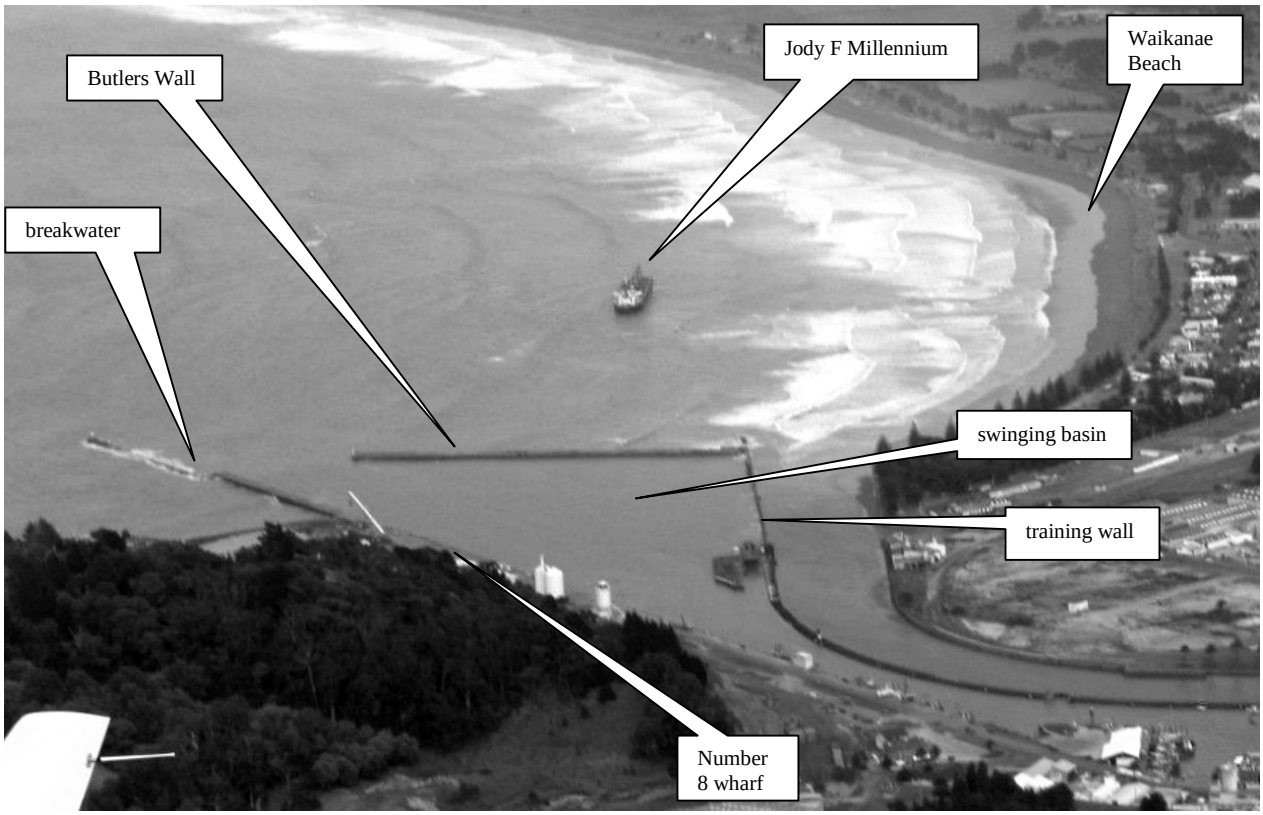

Figure 3
Aerial photo of the port of Gisborne with *Jody F Millennium* aground off Waikanae Beach

1.2.6 Before the approach channel was deepened, a new deep-water berth, number 8 wharf, was built and the existing deep-water berth, number 7 wharf, refurbished.

1.2.7 Prior to the channel being deepened and the new wharf being built as part of a long-term major redevelopment of the port, a field and modelling study was carried out in 1996/97. This was to determine the wave performance inside and outside the port to provide a reference for calibrating the performance of the model of the harbour in its existing configuration with a view to simulating wave behaviour in the hypothetical harbour designs. The study report concluded that for the existing port, wave heights along the deep-water berths were higher than those in the turning basin. The report did not come to any conclusions regarding changes to the wave behaviour for the projected changes in port configuration.

1.2.8 The New Zealand Pilot (Admiralty Sailing Directions NP51) reported that the port of Gisborne approach channel was dredged to a depth of 10.5 m over a width of about .05 nm (half a cable or 93 m) about the leading line. The New Zealand Pilot also advised that depths in the dredged areas might not be regularly maintained and that the latest depths should be obtained from the Port Authority. Other than the depth soundings, no reference to the maximum depth of the channel was made on navigational chart NZ 5613.

1.2.9 The swinging basin was stated to have a maximum width of 250 m and the bottom shelved rapidly towards Butlers Wall and the Training Wall between the harbour and the Turanganui River. For a ship of length similar to the *Jody F Millennium* (160 m), the pilot at the time of the accident used a maximum forward draught of 7.5 m on a 2.0 m high tide when swinging a vessel.

1.2.10 In between hydrographic surveys, the port relied upon echo sounder readings obtained from the harbour tug used to position the dumb dredge, and the pilot launch. Neither of these vessels was fitted with a heave compensator to allow for the rise and fall of the vessel due to the sea conditions and therefore gave only an approximate reading of the depth.

1.2.11 Based on the results of the March 2000 survey, the pilot gave the general manager of Port Gisborne Limited a chart of the draught criteria he used when deciding on whether a ship was able to transit the approach channel (see Figure 4). He used a maximum draught of 10.2 m and allowed an under keel clearance of 2.0 m subject to swell and wind conditions. He noted that the maximum wind allowable for berthing would be 15 knots and the maximum swell would be 2.0 m.

Table of drafts for various tide times

	Tidal Height		Max Draft	
	Neap Tide	Spring Tide	Neap Tide	Spring Tide
Time from HW				
LW	0.7	0.3	8.7	8.3
5hrs before	0.8	0.5	8.8	8.5
4hrs before	0.9	0.7	8.9	8.7
3hrs before	1.2	1.2	9.2	9.2
2hrs before	1.4	1.9	9.4	9.9
1 hr before	1.6	2.1	9.5	10.1
HW	1.7	2.2	9.7	10.2
1hr after	1.6	2.1	9.6	10.1
2hrs after	1.4	1.9	9.4	9.9
3hrs after	1.2	1.2	9.2	9.2
4hrs after	0.9	0.7	8.9	8.7
5hrs after	0.8	0.5	8.8	8.5
LW	0.7	0.3	8.7	8.3

These calculations are based on a dredged depth of 10.0 mts and allowing a keel clearance of 2.0 metres. They are to be taken only as an indication of the limitations of draft as both swell and weather conditions have also to be taken into account. Also steaming time to and from the berth

Figure 4
Draught criteria as used by pilot and supplied by him to Port Gisborne Limited

1.2.12 After the accident, the Maritime Safety Authority of New Zealand commissioned a hydrographic survey that showed there was considerably less water than that detailed in the surveys of March 2000 and August 2001. A least depth of 9.5 m (+/- 0.2 m) was found on the leading line over an area between 160 and 400 m south-west from the south breakwater head.

1.2.13 In July 1999, the general manager of Port Gisborne Limited received a letter from the Gisborne District Council voicing concern over the safety systems with respect to the shore moorings because of the expected alteration in surge in the harbour from dredging. The surge effect was never quantified or measured for the dredging alone, although a study had been carried out for the full-scale re-development of the port, which was not completed.. In May 2000 the pilot, who was the local manager of Adsteam Port Services Limited, wrote to his New Zealand general manager in Auckland commenting on the increased surge in the harbour caused by the deeper channel. He mentioned that a bulk log ship, the *New Baroness*, 167 m in length, had broken several shore mooring lines while alongside.

1.3 The Permanent International Association of Navigation Congresses (PIANC)

1.3.1 PIANC was founded in 1885 and was an international non-profit making and non-political technical and scientific organisation. The objective of PIANC was:

> to promote the maintenance and operation of both inland and maritime navigation by fostering progress in the planning, design, construction, improvement, maintenance and operation of inland and maritime waterways and ports and of coastal areas for general use in industrialised as well as in industrialising countries.
>
> Its intention is to provide practising engineers with guidelines and data which will allow them to design a channel for a given ship or mix of ships types or, alternatively enable assessment of the suitability of an existing channel for the proposed change in ship type or operation.

1.3.2 Since 1973 PIANC had been studying and making recommendations on the optimum design and dimensions of shipping channels, taking into account the advances in knowledge, analytical methods and technology over the years.

1.3.3 In 1997, PIANC published a document called “Approach Channels: A Guide for Design.” PIANC recognised that in order to design the approach channel to a port to an acceptable level of navigability and safety, a number of factors must be taken into account, including:

- vessel size
- manoeuvrability
- ship handling characteristics
- human factors in ship handling
- effects of the physical environment
- maritime engineering
- cost.

1.3.4 From the guide it was possible to calculate the optimum dimensions for straight and curved channels as well as swinging basins and other design aspects of a port. The method utilised vessel dimensions and fractions or multiples of them. In determining the optimum size of a waterway, the guide used the dimensions of the largest vessel expected to use the channel.

1.3.5 For straight sections of a channel, such as in Gisborne, the manoeuvrability of the vessel dictated the basic width of the channel. Depending whether the channel was exposed or an inner harbour channel, the following criteria multiplied by factors of the beam were added to the basic width:

- vessel speed and manoeuvrability
- prevailing cross wind
- prevailing cross and longitudinal current
- significant wave height and length
- availability of aids to navigation
- bottom surface
- depth of waterway
- cargo hazard level
- bank clearance
- under keel clearance.

1.3.6 When the optimum width of channel was calculated from the recommended values of these criteria, and using the characteristics and dimensions of the *Jody F Millennium* and the approach channel to the port of Gisborne, a manoeuvring lane width of 164 m was obtained.

1.3.7 The PIANC guidelines recommended that areas used to turn vessels through 180 degrees should consist of a circular swinging area having a diameter of between 1.8 and 2 times the length of the ship.

1.4 Interaction

1.4.1 When a vessel is travelling in calm, open, deep water, the water pressure system around the hull reaches equilibrium. If the vessel moves into shallow or confined water, this equilibrium can become upset as the pressure system around the hull interacts with the seabed or sides of a channel.

1.4.2 Vessels operating in shallow water are affected by what is known as the Bernoulli effect. Water passing a ship in shallow water has to accelerate due to the restriction. The increase in velocity results in higher drag, which reduces the forward momentum of the ship. This effect is the basis of all interaction, including squat.

1.4.3 Squat is the term given to an increase in draught, trim or both experienced by a vessel due to its movement through the water. The water accelerates as it flows past the hull to fill the hole the vessel has left in its wake. This increase in velocity causes a decrease in water pressure under the vessel and a resultant loss of buoyancy. The effect is usually more pronounced in shallow water where the flow of water past the hull can be restricted by the seabed.

1.4.4 In much the same way as a ship squats towards the seabed, a ship travelling close to the side of a channel can experience bank effect. An increase in water pressure at the bow forms a cushion between the bow and the bank, deflecting the bow away from the bank. At the same time, aft of the pivot point, the flow of water accelerates between the bank and the side of the ship, drawing the stern of the ship towards the bank. If not counteracted with helm movements, the resultant forces may cause the ship to sheer across to the other side of the channel.

1.4.5 The influence that squat and bank effect have on a vessel varies exponentially with the speed of the vessel. Therefore, a small reduction in speed will dramatically reduce the effects of squat and bank effect.

1.4.6 Under keel clearance (UKC) is the separation between a ship's keel and the sea bottom. The minimum clearance depends on many factors and should allow for squat, the vertical motion of the ship in the water and the increase in draught through heel (see Figures 5 and 6). In a paper prepared for the United Kingdom Pilots Association (Marine) technical committee, Captain A McKinnon states:

> It is widely appreciated by mariners that ship manoeuvrability rapidly deteriorates when the UKC is reduced below 20 per cent of the draught, and a minimum UKC of 10 per cent is recommended as safe practice only when the speed required for steering can be kept under five knots with the charted depth reliable through frequent surveys. These restrictions assume that the wind will not greatly affect the steering at low speed and the ship is unaffected by sea or swell.

1.5 The decision to sail

1.5.1 During the afternoon of 6 February, the pilot requested, via the ships' agents, that both the *Jody F Millennium* and the *Asian Briar* ready their main engines for immediate use. The *Jody F Millennium*'s engine was not made ready until about 2030 when the agent told the master of the decision to sail the ship. It appeared that the initial request was received by a crew member at a time when the master was ashore, and the message was not given to the master on his return.

1.5.2 The stevedores decided that the movement of the ship made it unsafe to continue loading logs and ceased work at about 1500. They reassessed the situation at 1700 but decided that no further work was possible for the remainder of that shift. They returned at the start of the next shift at 1900 at which time they removed the loading equipment from the ship while still able to do so.

1.5.3 When loading was postponed, there were still about 2000 t of logs to be loaded. Because of the tonnage of logs already loaded, if the ship went out to anchor it would not have been able to return and turn around to berth because of the available depth of water in the swinging basin. In order to berth, the ship would have had to be manoeuvred into the port stern first, a very difficult manoeuvre requiring near perfect conditions.

1.5.4 During 6 February, the *Jody F Millennium* continued to move at the wharf. The intensity of the movement increased in the early evening and the shorelines started to break more frequently. The shore mooring gang and the ship's crew found it impossible to keep the vessel steady, even with the assistance of the 2 tugs. The supervisor of the shore mooring gang considered the situation to be extremely hazardous to his men because of the risk of injury from the parts of the shore mooring system as they parted under tension. One line did break as the lines gang were heaving on it. The supervisor later likened the situation to "a war zone". The safety of the ship's crew was also jeopardized by the risk of injury from the breaking lines and the fact that they had to walk over the slippery logs on deck to gain access to the forecastle. One of the mooring gang went aboard the ship to assist with the attachment of the shipboard end of the shore moorings that were replaced. With regard to the ship's moorings, there was a marked difference in the memories of those concerned. The master and ship's crew recall their offer to put out more lines being refused by the mooring gang, whereas the mooring gang recall their request for more mooring lines being refused by the ship's crew.

1.5.5 Of the total of 8 shorelines that parted, 5 parted at the wire and 3 parted at the lanyard. The hull of the ship was pounding against the wharf fenders with the potential for damage to both the ship and the wharf. In light of the foregoing, the pilot thought that the only possible solution to prevent damage to the ship or wharf, or possible injury to the personnel, was for the ship to sail into the bay, anchor and wait until the conditions improved. The ship's agent communicated this decision to the master, who thought that this decision was an order from the port authorities to leave the berth. However, the master later said that he could see no alternative to leaving the berth and was also concerned that he would be held responsible for any damage to the port facilities had he remained alongside in contravention of this perceived order.

1.5.6 Until the pilot boarded the ship for departure, there was no direct discussion between him and the master of the *Jody F Millennium*. Prior to that, all shore to ship communications, including the pilot's requests and requirements, were conducted by the ship's agent by mobile telephone and through the chief officer. Once on board, the exchange between the pilot and master was brief and only involved the pilot outlining the sailing plan. The master recalled that the pilot told him that the depth of water in the channel was 11.5 m, whereas the pilot recalled telling the master there was an under keel clearance of about 1.5 m, which was less than desired but should be enough. The pilot showed the master the courses on the chart. The pilot recalled telling the master where he would disembark and assuring that he would advise him from the pilot launch, if required. The master recalled that the pilot did not tell him he was disembarking until after letting go from the wharf and heading towards the entrance. From that briefing, the master's perception that he was being ordered from the port was reinforced. However, neither the pilot nor the master thought that there was any alternative action that could have been taken to prevent damage to the ship and wharf and possible injury to the personnel, so no discussion of possible alternatives took place. The master stated later that he thought it was impossible for the ship to remain alongside.

1.5.7 Thinking there was a depth of water of 11.5 m, the master of the *Jody F Millennium* made a simple arithmetical error when he calculated the under keel clearance of the ship. He quickly mentally subtracted 9.5, the deepest draught, from 11.5 by counting 9.5 equals 1, 10.5 equals 2 and 11.5 equals 3, concluding that he had an under keel clearance of 3 m.

1.5.8 On its departure, the under keel clearance of the ship, using the draught observed by the chief officer and the pilot, and making no allowance for squat or vertical movement of the ship in the seaway, was:

	estimated minimum channel depth	10.0 m
plus	height of tide	0.8 m
	total depth of water	10.8 m
minus	ship's maximum draught	9.5 m
	estimated under keel clearance	1.3 m

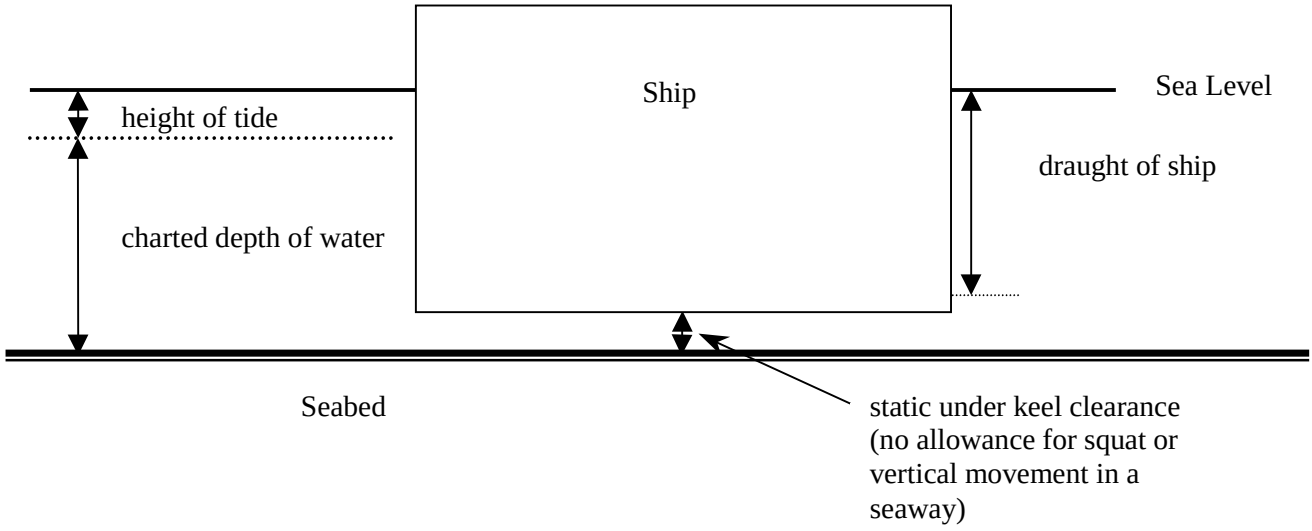

Figure 5
Illustration of determination of under keel clearance

1.5.9 In a seaway, a ship is partially supported along its length by a number of waves and does not rise and fall the entire height of the waves. The loss of draught through sea and swell is estimated to be one third of the significant wave height. Estimates of the sea and swell height

were between 2 to 3 m and 6 m on the evening of the accident, an average of 4.25 m. Therefore, the estimated increase in draught due to the sea and swell would be 1.4 m. When applied to the under keel clearance, a negative 0.1 m clearance results.

1.5.10 The pilot estimated that at the time of departure from the wharf, the swell was 2 to 3 m. Allowing a height of 2.5 m and a corresponding increase in draught of 0.83m, there would be an under keel clearance of only 0.47 m, less than 5 percent of the maximum draught.

1.5.11 Increases in the ship's draught could be expected due to squat and heel, further increasing the negative clearance. The increase due to squat is difficult to calculate and dependent on speed and vessel characteristics. Generally a master estimates the squat though experience with his vessel. At the speeds used, squat would be minimal. The increase in draught due to heel however is more easily calculated. An angle of heel of 5 degrees would increase the draught of the *Jody F Millennium* by almost a metre.

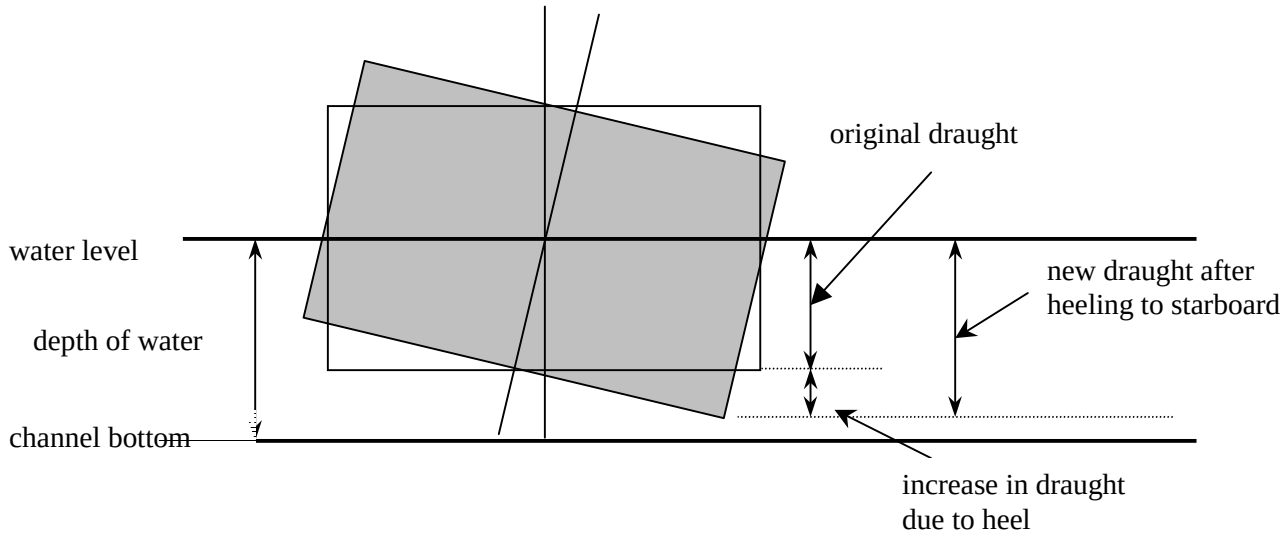

Figure 6
Illustration of increase in draught due to heel

1.5.12 The pilot made a miscalculation when calculating the time the ship could safely sail. He had determined that the earliest time that the ship could safely sail was 2200 but his stated criteria for a ship with the draught of the *Jody F Millennium*, were up to 2 hours either side of high water, with the possibility of sailing a ship up to 3 hours either side of high water in exceptional circumstances. The time of high water was 0226 on 7 February so, by his own criteria the earliest time the ship could safely sail was 0026 under normal circumstances or 2326 in exceptional circumstances. The ship sailed over 4 and a half hours before high water at a time when, from the pilot's draught criteria, the maximum draught for sailing was 8.6 m to give an under keel clearance of 2.0 m. Sailing at a draught of 9.5 m reduced the clearance to 1.1 m with no allowance for swell and weather conditions.

1.5.13 After the event, several persons suggested alternative action that might have been taken other than sailing the *Jody F Millennium*. These were:

- ballast the ship down to sit on the bottom alongside the berth. To accomplish this the ship's crew needed to fill all the available ballast tanks and possibly other tanks not designated for clean ballast

- move the ship further into the port, to number 7 wharf where the surge had been observed to be less severe
- stream an anchor to dampen the ship's movement
- use the tugs to hold the ship off the wharf, against the moorings, thereby tightening the moorings and keeping the vessel away from the fenders
- use the ship's engine at low power (dead slow ahead) to place weight on the after moorings and forward backsprings. Together with use of the tugs, this would have helped keep the vessel alongside against the surge.

1.5.13 A total of 8 shore mooring lines broke alongside the berth. Some of the lines that broke were those that had already been replaced. Although the mooring gang supervisor thought he remembered one ship's line breaking, the ship's crew said that all the ship's lines remained intact.

1.6 Pilot disembarkation

1.6.1 When the pilot boarded the ship for the departure, he requested that the pilot ladder be made ready on the starboard side of the ship. The pilot informed the master that he would have to disembark the ship while in the safety of sheltered water near the breakwater as it would be too rough for the pilot launch to operate safely outside the breakwater. Exactly when this was conveyed to the master was unclear. The master assumed this to be an order and, as this was the master's first time to Gisborne, he thought it was probably normal practice.

1.6.2 Once the pilot considered the ship to be safely on the leading line, he told the tug masters to stand by in the swinging basin. He then left the ship and boarded the waiting pilot launch after instructing the master that he would guide him out down the channel from the pilot launch using VHF radio, channel 12.

1.6.3 To enable the pilot to disembark, the master reduced the ship's engine speed to dead slow ahead, and to ensure that the pilot disembarked safely the master watched him from the starboard bridge wing until the pilot launch was clear of the ship. Before the master could increase the engine speed, the bow of the ship emerged from the relative shelter of the breakwater and the port bow of the ship was struck by a wave.

1.6.4 Earlier that evening, when the pilot sailed the smaller and less deeply laden *Asian Briar*, he had disembarked at or near the end of the breakwater. That ship's master successfully navigated the approach channel on his own. The pilot noted that the swell outside the breakwater at this time was about 2 to 3 m.

1.6.5 When the pilot worked in Napier, some 6 years before this accident, it was common practice in adverse weather for pilots to disembark a ship inside the breakwater.

1.7 Position of grounding

1.7.1 The position of first touching the bottom was recorded by the ship at 2152, and was 100 m bearing 259°(T) from the southern breakwater light (see Figure 1).

1.7.2 Once the second officer came to the bridge after letting go aft, he was monitoring the ship's progress using parallel indexing on the radar. The positions recorded by the ship from radar and global positioning system (GPS) were relative to the position of the scanners or aerials, which were mounted above the wheelhouse near the stern of the ship.

1.7.3 From vantage points on the port service vessels and ashore, several witnesses estimated the ship's grounding position. The average of those positions, excluding that estimated by the pilot, was centred on a point 300 m bearing 249°(T) from the southern breakwater light. These

estimates were made by eye without the aid of instruments, and after the VHF radio call came from the master that the ship had touched bottom and was in difficulty.

1.7.4 The pilot was under the impression that the time elapsed between him disembarking and the call from the master was considerably longer than that estimated by the other witnesses. Consequently, his estimation of the ship's position at the time of grounding was further down the channel in a position 510 m bearing 242°(T) from the southern breakwater light.

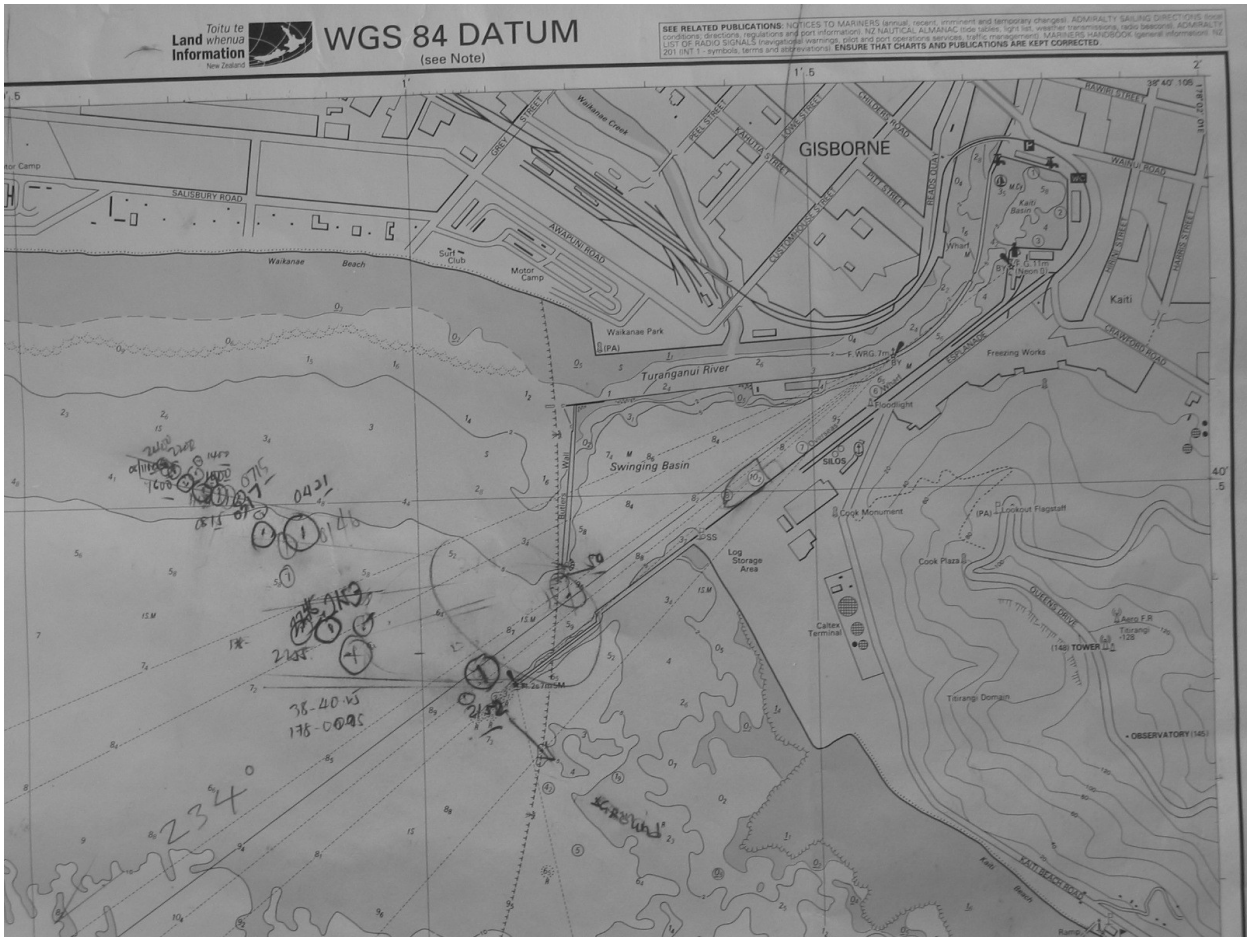

Figure 7
Photograph of part of the ship's navigational chart (NZ 5613) showing positions and times as recorded by ship's crew

1.7.5 The estimated position of the ship by both the pilot and the majority of the other witnesses was based on the time the master informed the pilot that the ship had grounded. The call was overheard by the crews of the pilot launch and the tugs, and by the lines gang supervisor. However, immediately after first touching bottom, the master spent several minutes taking corrective action attempting to regain control of the ship before he called the pilot.

1.7.6 Once the grounding had halted the ship's forward progress, the *Jody F Millennium* was set by the sea and swell on to the shoal ground to the northern side of the channel and continued to be driven further on to the shoal, despite dropping its anchors.

1.7.7 By the afternoon of the 7 February 2002, the ship had moved to a position approximately 320 m off Waikanae Beach. The ship continued to move in a generally northern direction over the next few days bringing it closer to Waikanae Beach (see Figure 1).

1.7.8 An extensive salvage and pollution control operation was mounted. Some heavy fuel oil escaped from ruptured double bottom tanks but it was successfully contained and cleaned up. The ship was re-floated on 24 February 2002.

Analysis 1

Approach channel

1 The study carried out prior to the channel being deepened and the new wharf built determined the wave characteristics of the port as it existed, but had not predicted the conditions for post redevelopment because the full redevelopment was not completed. Consequently there was no appreciation of the effect those changes that were made would have on the water flow and the movement of the ships in the port. It would have been beneficial for Port of Gisborne Limited to have more fully explored the consequences of deepening the channel and approaches to the berths.

2 The swinging basin had not been dredged at the time the channel depth was increased because Port Gisborne Limited anticipated that the majority of ships would enter the port lightly laden and then load to their limiting draught for departure. The *Jody F Millennium* was too deeply laden for it to re-enter the port and be turned around. Although this eventuality was mentioned between the agent and the pilot, it did not influence the pilot's decision to sail the ship.

3 The water depth in the approach channel effectively captured deeply-laden ships in the port during low water periods of the tidal range. The state of the weather had to be taken into consideration when determining whether it was safe to negotiate the channel. Seas and wind across the channel would make it difficult for a ship to remain within the deepest part of the channel, which extended only about 50 m either side of the leading line. The combination of channel depth and weather could prevent deeply-laden ships from leaving the port.

4 There was little passage planning done by either the pilot or the ship's crew. Courses were shown to the master on the ship's chart by the pilot. The pilot said that on the ship's arrival, he had explained the turning manoeuvre, the positioning of the tugs and berthing arrangement to the master, whereas the master said he had been given no information. It could not be established to what extent a master/pilot exchange covered the intended movements into or out of the port. Under such exceptional circumstances of this departure, as much planning and agreement between all concerned should have been in place.

5 The beam of the *Jody F Millennium* was 26 m, a quarter of the gap between Butlers Wall and the breakwater. When passing through this gap, the ship had to push a plug of water through the gap and the resistance would have reduced the ship's forward momentum.

6 The width of channel recommended by the PIANC guidelines for a ship of the manoeuvrability and size of the *Jody F Millennium* was 164 m. The actual navigable width of channel was about 93 m. The channel was therefore only 57% of the width recommended by PIANC.

7 To comply with the PIANC guidelines, a swinging basin for a ship the length of *Jody F Millennium* needed to be circular and 288 m in diameter. The Gisborne swinging basin was a maximum of 250 m, was triangular and surrounded by solid structures. In addition, if a ship was alongside number 8 wharf, the width of the swinging basin was further reduced by the beam of that ship.

8 The PIANC guidelines are considered to be best practice and many ports in New Zealand are unable to meet all the recommendations.

9 The ship would have interacted with the breakwater close on its port side, potentially causing the bow to fall off to starboard. The speed of the *Jody F Millennium* was slow and consequently the effect of any interaction, which increases exponentially with the speed, would have been small, but in combination with the southerly swell was possibly sufficient, at dead slow ahead, to push the ship off course into the shallower water at the northern side of the channel.

10 Different people used diverse values for the least depth of the channel. The port company, in order to attract more ships, had promoted a limiting depth of 10.5 m. From his observations of the depth from the pilot launch's echo sounder, the anticipated silting of the channel, and the least depth shown on the March 2000 survey chart, the pilot had reduced his operating maximum draught to 10.2 m. The hydrographic survey undertaken between July and August 2001, showed least depths of 9.7m on or about the leading line. While the maintenance dredging carried out between September and December 2001 would have increased the available depth in the channel, the in-filling since the dredging probably meant a channel depth of about 10 m. The hydrographic survey undertaken after the accident, between 22 and 25 February 2002, showed least depths of 9.5 m (+/- 0.2 m). The storm conditions on 6 February and the following days would have produced significant in-filling. Before the storm there was probably a greater depth of water available in the channel on the evening of 6 February 2002, again probably about 10 m.

11 The pilot maintained that the hydrographic survey chart dated March 2000 was the latest information available to him. As sole pilot in the port he should have been aware that another survey had been carried out in August 2001, but had not sought nor been informed of the results from Port Gisborne Limited. Knowing that a survey had been completed, the pilot of a port with such a limited access, which had a port company that was promoting the use of the port by larger ships, would have been prudent to gain all information that might assist him to safely discharge his duty. Similarly, Port Gisborne Limited should have recognized, for the safety of the port, that it was essential the pilot be fully informed, although it maintained that the pilot was informed of the survey result.

12 The pilot realised from occasional soundings obtained by the pilot launch and tugs, his only up to date source of information on the depth of the channel, that the channel was being filled with sand and silt and he reduced the draught limitations to what he considered a safe margin. Had he had access to the August 2001 survey he might well have reduced his operating depth to 9.7 m and that might have made him realise that there was insufficient water for the *Jody F Millennium* to negotiate the channel in the prevailing conditions.

Decision to sail

13 The pilot based his decision to sail on the perceived inability to keep the ship moored safely alongside in the deteriorating conditions. The motion of the ship and the possible damage that might occur influenced his decision.

14 The master was not involved in the decision-making process of whether the ship should sail. All communications with the ship were by the agent via cellular telephone, or with the chief officer. It would have been prudent and beneficial for the pilot to discuss the situation directly with the master, even if that was by cellular telephone or VHF radio.

15 On the evening of 6 February, the pilot and the master were separately deeply concerned about the prevailing conditions and neither could think of an alternate solution to the problem. As the situation developed there were lulls in the movement

of the ship, and the pilot missed the opportunity to get on board and have meaningful discussions with the master before the haste of departure. The master also could have requested a meeting with the pilot but he too did not take the opportunity.

16 The pilot sailed the ship outside his usual criteria for a ship as deeply laden as the *Jody F Millennium*. Both the pilot and master misinterpreted critical data, almost certainly because they were placed under severe pressure by the prevailing conditions.

17 Once the decision to sail the ship was made, its continued violent motion further pressured the pilot into taking immediate action. In what he saw as an emergency situation, he thought that getting the ship away quickly would prevent damage to it and the wharf, ignoring the lack of water in the channel.

18 When taking the swell and its effect on the ship into account, the under keel clearance of the ship was probably negative. Simply put, the ship did not have sufficient water to transit the channel at that time.

19 Alternatives to sailing were proposed by various persons following the accident:

- To ballast the ship down on to the seabed at the berth would have taken many hours of flooding the double bottoms and pumping the side tanks. The bottom alongside the berths had been dredged using a backhoe that left ridges and pinnacles in the bedrock. Had the ship been sunk onto this, the hull may have been punctured. The amount of ballast necessary to hold the ship on the bottom would have overloaded the ship and possibly caused structural damage. Additionally, this action would have been contrary to the charter party under which the master was working.

- To move the ship to number 7 wharf would have required letting go all the shore and the majority of the ship lines before moving the ship along the wharf under the control of the main engine, tugs and the ship's lines. To do this would have exposed the shore mooring gang and the ship's crew to more danger than they were already facing from breaking lines. The ship and the shore installations would have been vulnerable during such an operation.

- To stream an anchor and for it have any effect, it would need to have been placed at some distance from the ship before the cable was hove tight. Mudstone does not provide good holding ground and so it would be doubtful whether the anchor would "bite" into the bottom. A tug would have had to carry the anchor away from the ship to provide a reasonable lead; such an operation would have been hazardous in the conditions prevailing at the time, and would also have taken one tug away from the attempt to hold the ship alongside.

- Use of the tugs to hold the ship off the wharf might have prevented damage to the ship, but had the lines parted the ship would have been adrift in the port.

- Similarly if the engines had been used to drive the ship ahead at low power against the sternlines and forward backsprings, there was the potential for the moorings to part and the ship to break adrift.

20 At the time the decision was made to put the ship to anchor, the aim was to prevent any damage to the ship or wharves. The biggest immediate threat was that the ship would break adrift and be driven into the shallow water inside the port, with the possibility of damage, pollution and the port becoming blocked. The possibility of the ship grounding in the channel with the resultant pollution and damage seems not to have been considered.

21 With the ship's lines still intact, the broken shore moorings replaced and the tugs pushing on, it is possible that the ship might have been able to stay alongside for longer than it did. Extra lines might have been secured during the slight lulls in the weather, although this operation was potentially as dangerous as replacing the shore mooring lines. As a minimum, the ship might have been able to remain alongside until the tide had risen sufficiently to increase the possibility that the ship might negotiate the channel successfully.

Pilot disembarkation

22 The pilot decided that the severity of the weather and the limitations of the pilot launch made it necessary for him to leave the ship in the lee afforded by the breakwater, instead of remaining with the ship until the designated pilot station. Had he stayed on board to the anchorage, he would have had to remain on board until the conditions eased. Once clear of the harbour, the owner or charterer might have decided to proceed overseas rather than try to re-enter Gisborne. In that case, the pilot might have been over carried to another New Zealand port where the ship would have been able to complete clearance formalities.

23 As the sole pilot for the port, he might have been concerned about either being confined to the ship at the anchorage or being over carried to another port. However, once the *Jody F Millennium* had left, the port would have been effectively closed and so he would not have been needed for pilotage duties.

24 To disembark the pilot safely, the ship was required to slow its already ponderous headway. After the pilot was clear, and before the master had been able to increase the engine speed, a large wave struck the ship on the port bow as it emerged from the relative shelter of the breakwater.

25 When the pilot disembarked, the master observed the operation from the starboard bridge wing to ensure the pilot's safe disembarkation. In so doing the master was distracted from the critical task of navigating the ship during the disembarkation process. This standard practice of ship's masters would not normally present a problem, but in this situation where precise navigation in difficult conditions was essential, such a distraction should not have been imposed on the master.

26 The pilot was conditioned to disembark ships early in adverse weather. It had been a routine operation in Napier while he was working there, a work practice he continued in Gisborne. Having earlier disembarked the *Asian Briar* in a similar position, the pilot did not consider disembarking the *Jody F Millennium* inappropriate.

27 Had the pilot remained on board, the engine speed would not have needed to be reduced, so the ship would have had more forward momentum when it emerged from the shelter of the breakwater. It would most probably have still touched bottom but might have had sufficient momentum to continue down the channel. With greater speed, the steering and directional stability of the ship would have been maintained. In addition, had the pilot continued with the control of the ship, continuity would have remained.

28 Using speeds of 4 knots and 6 knots, for dead slow ahead and slow ahead, assuming instantaneous changes in speed and allowing for the time taken to manoeuvre the ship clear of the berth, the distance travelled until pilot disembarkation was calculated as 432 m, a position inside of the southern breakwater. This position was commensurate with those given by the pilot launch and the ship's crew but not with that given by the pilot.

Grounding position

29 The time of the grounding recorded on the navigational chart corresponded to the time of grounding recorded in the bridge movement book. Using the same ship speed criteria as above, the dead reckoning position at 2152 was within a few metres of the initial position of touching bottom recorded by the ship's bridge team.

30 The ship would not have stopped immediately it touched bottom. The master increased the engine speed to half ahead and then full ahead in the minute following the initial grounding. It is therefore probable that the ship travelled a short distance further down the channel before it became fully aground.

31 Positions are difficult to determine at night without the use of navigation aids. The position estimated by the pilot and witnesses might have been affected by the darkness of the night, the brightness and dazzle of the lights on the ship's after deck and accommodation block, and those from the shore.

32 The small distances involved, the variations in timing and difficulty of assessing positions at night would have affected the accuracy of the positions indicated by the witnesses and would explain the discrepancy in estimated positions.

1.8 Port organisation and port services including pilot and pilotage examination

1.8.1 In 1988, the New Zealand Parliament passed legislation to dissolve harbour boards throughout the country. The boards were divided into 2 entities, one with a commercial function and the other a regulatory function. In Gisborne, the commercial arm was Port Gisborne Limited, a company wholly owned by the Gisborne District Council, and operated since 1997 through a holding company, Gisborne Holdings Limited. Port Gisborne Limited had 2 business units, a farming operation, which was insular within the company and was operated as a separate business unit and a port operation to service vessels operating into the port. The regulatory function was entrusted to the Gisborne District Council, which was responsible for the appointment of the harbourmaster. Until the Adsteam Port Services Limited pilot was appointed, the incumbent pilot of the time was also the harbourmaster.

1.8.2 In 1995, Port Gisborne Limited embarked on a long-term port development and expansion plan for which it obtained loans totalling $16.5 million. Land was bought to improve the log storage facility, an extra wharf was to be built, the existing deep-water berth to be refurbished and the approach channel dredged to enable larger ships to access the port. The 1997 Asian Crisis halted the expected increase in cargo throughput and the port struggled financially. Port Gisborne Limited sought leave from its shareholder to sell its farming assets. The sale was approved by the shareholder but was challenged through the courts by local Iwi, thus delaying the start of the sale process until 2001. In addition to the proposed sale of the farming operation, which was not completed, Port Gisborne Limited economised by restructuring its workforce, choosing to casualise the labour force by making the majority of the permanent staff redundant. Development work that was underway was finished but there was no further capital expenditure.

1.8.3 To compound the financial pressure facing Port Gisborne Limited, the New Zealand oil tanker operating company placed operating demands on the port. In 1998, it carried out a risk assessment study of the operation of its ships in the port of Gisborne, and concluded that the principal risk occurred while they were being turned in the swinging basin due to the minimal clearing distances and the unforgiving rock and solid structures at those extremities. This risk was considered "unacceptably high". In order to reduce that risk, the report recommended that the maximum length of ship should be limited to 150 m. However all the company's ships were in excess of 170 m. As an interim measure, for a period of no longer than 2 years, the report recommended that the port needed to provide an additional tug of at least 30 t bollard pull. For the tanker company to continue using the port after 2 years, the report recommended that the

port be re-configured in such a way to provide a facility in which its ships could be manoeuvred with minimal risk. Port Gisborne Limited had plans in place to re-model the port but its financial status did not allow those plans to proceed. In May 2000, the tanker operating company carried out a follow up review of the risk assessment, which resulted in its announcing, in June 2000, that it was to cease trading to Gisborne.

1.8.4 In 1998, after the tanker company's risk assessment, Adsteam Port Services Limited approached Port Gisborne Limited offering to provide port services on a contractual arrangement. As part of their contract with Port Gisborne Limited, Adsteam Port Services Limited agreed to provide another tug, thus negating the need for Port Gisborne Limited to make a large capital outlay for a second tug. The parties entered into a 10-year agreement on 8 December 1998. The Port Gisborne Limited owned tug *Turihaua* and the pilot launch *Takitimu* were demise chartered to Adsteam Port Services Limited and in turn Adsteam Port Services Limited supplied an additional tug, the *Titirangi*.

1.8.5 Adsteam Port Services Limited also agreed to provide a licensed pilot and mooring gang. Adsteam Port Services Limited did not usually provide pilots; it therefore had to employ one specifically for the port of Gisborne. In January 1999, the pilot involved in this accident was appointed. He had gone to sea in 1959 and had gained his Foreign Going Master's Certificate in 1972. In 1975 he joined the Port of Napier, initially working as a tug master while he trained as a pilot. He gained his pilot's licence in 1981 and was employed as a full time pilot until 1996 when he left to return to sea.

1.8.6 On his appointment as pilot designate for Gisborne, he carried out a number of familiarisation trips, 4 with the incumbent pilot and 3 with a relief pilot. The incumbent pilot, who was justifiably concerned over his own continued employment, refused to allow the pilot designate to handle the vessels during those familiarisation trips and, eventually, refused to allow the pilot designate to accompany him at all. The pilot designate carried out the remaining familiarisation trips with the relief pilot, who was at that time based in Nelson. Following the familiarisation trips, the pilot designate sat and passed the examination for a pilot's licence. On 28 January 1999, the Gisborne District Council appointed and licensed him as pilot for the port of Gisborne; the licence being issued on 2 February 1999.

1.8.7 Around the time of the examination, concerns were raised by the then harbourmaster and the New Zealand Maritime Pilots Association, over the validity of the examination board and its compliance with the provisions of part IX of the General Harbour (Nautical and Miscellaneous) Regulations 1968, section 58. The concerns were that the examination had been carried out without approval and that one of the master mariners on the examination board was the Adsteam Port Services Limited manager responsible for the pilot. In addition, there was a question over the validity of the pilot designate's local knowledge and familiarisation.

1.8.8 In line with the regulations, the examination board was made up of 2 master mariners, one of whom had to have extensive local knowledge. However, approval of the board by the Director of Maritime Safety was not sought and the examination was carried out without his knowledge. The Maritime Safety Authority investigated each of these concerns and retrospectively approved the composition of the examination board, thus validating the examination and the licence.

1.8.9 The relief pilot for Gisborne indicated that when he was examined for his pilot's licence in 1991, the examination board was not convened under the provisions of part IX of the General Harbour (Nautical and Miscellaneous) Regulations 1968, section 58 but was retrospectively empowered by the Maritime Transport division of the Ministry of Transport, in a similar fashion to that of the pilot designate.

1.8.10 In 1998, because Port Gisborne Limited had contracts with its employees that still had 12 months to run, Adsteam Port Services Limited was required to use those personnel until the end of that contractual period. The shore mooring gang at that time comprised people from the

general stevedoring workforce. At the conclusion of the employees' contracts, Adsteam Port Services Limited sub-contracted the mooring services to a newly formed company called Eastland Moorings Limited commencing on 1 January 2001.

1.8.11 When Adsteam Port Services Limited started its operation, the incumbent pilot was superseded by the Adsteam Port Services Limited's own pilot. The incumbent pilot lodged a personal grievance claim against Port Gisborne Limited and set up a competing pilotage service in the port. There was insufficient shipping for 2 pilots and the incumbent pilot retired from pilotage duties in 1999. He eventually won the personal grievance case against Port Gisborne Limited and was awarded financial restitution. After retiring from pilotage duties, the incumbent pilot continued as harbourmaster until 2001.

1.8.12 In 1999, in preparation for the millennium festivities and the potential problems that were forecast to occur at the change of the year, Gisborne District Council approached Hawkes Bay Regional Council for the option to deputise the Napier harbourmaster to assist the Gisborne harbourmaster during this period. This was an informal arrangement put in place on 15 December 1999, which continued until a more formal agreement was finalised. In addition to the deputising the Napier harbourmaster, Gisborne District Council appointed 4 enforcement officers from the existing non-marine council staff to administer the harbour bylaws.

1.8.13 Part VIII of the General Harbour (Nautical and Miscellaneous) Regulations 1968 required that a full-time harbourmaster hold a certificate of competency as master of a foreign ship, but a part-time harbourmaster needed no such certificate.

1.8.14 When the Gisborne harbourmaster retired in February 2001, the non-marine enforcement officers continued their duties and the Napier harbourmaster continued as before under the informal arrangement. On 20 September 2001, the Napier harbourmaster conditionally accepted the role of part time harbourmaster for Gisborne in addition to his role in Napier. However, contract negotiations were not completed for some time with the agreement being signed by the Napier harbourmaster on 1 February 2002, 5 days before the accident and by the Gisborne District Council on 5 February, the day before the accident.

1.8.15 The powers of a harbourmaster are laid down in Part VIII of the General Harbour (Nautical and Miscellaneous) Regulations 1968. Among the duties and powers of the harbourmaster are the control of vessels within the harbour for the safety and preservation of vessels and the infrastructure of the port. Should he see fit, he may require a vessel to remove itself from a wharf and even from the port.

1.8.16 The contractual arrangement between Gisborne District Council and the Napier harbourmaster required that he work those hours required to perform the duties expected of the position and be available for 6 days per annum to administer the regulatory function of the harbourmaster plus 30 hours of other activities per year with authorised work in excess of that to be paid at a specified minimum daily rate, other than that he was not required to visit Gisborne. The harbourmaster was therefore not required to be resident in Gisborne.

1.8.17 The Gisborne pilot and the part-time harbourmaster had previously worked together in Napier. However, in the short time since the appointment of the harbourmaster, no working relationship had been established between him and the pilot or other employees of Port Gisborne Limited and Adsteam Port Services Limited. Consequently, when the problem arose on 6 February, it did not occur to the pilot, or others in the port, to discuss the situation with the harbourmaster.

1.8.18 For many years the previous pilot in Gisborne also fulfilled the role of harbourmaster and therefore acted as the marine authority within the port. While the pilot/harbourmaster did not always reside in Gisborne, by virtue of being present as pilot when ships entered the port, he was also able to fulfil the role of harbourmaster.

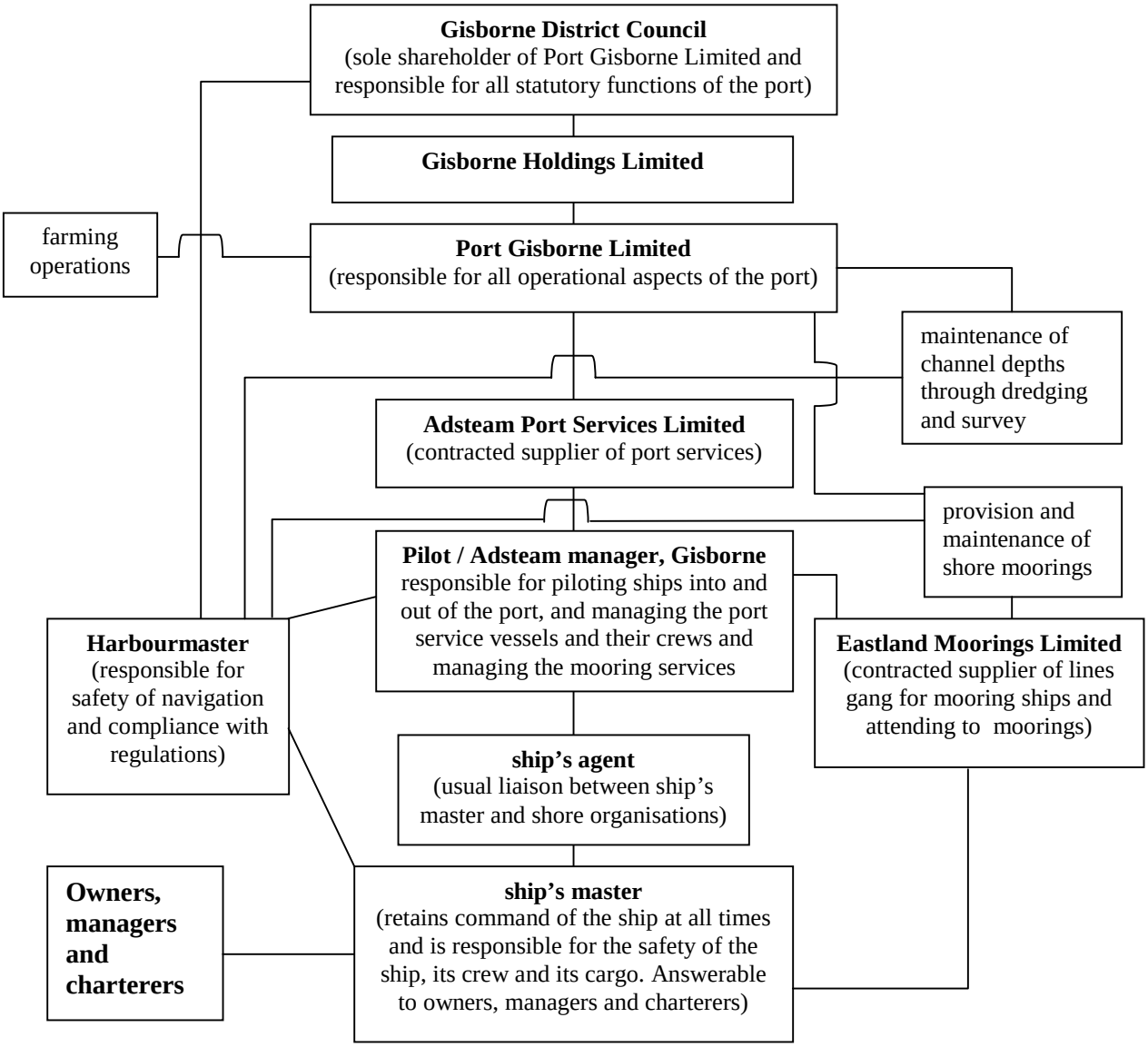

Figure 8
Simplified diagram of operational relationships

1.9 Mooring systems, mooring configuration and wharves

1.9.1 The number of lines used to secure a ship was determined principally by the pilot but with the approval of the master, and depended on the size of the ship, the weather and the duration of the ship's stay in port. The *Jody F Millennium* was a large ship that was expected to remain in port for a number of days so the ship's mooring lines were supplemented by shore mooring lines.

1.9.2 The configuration of mooring lines that secured the *Jody F Millennium* was:
Ship lines: 3 headlines and 2 backsprings forward, and 3 sternlines and 2 backsprings aft.
Shore lines: 2 headlines and a backspring forward, and 2 sternlines and a backspring aft.

1.9.3 The ship's mooring lines were nylon multi-plait ropes. The lines gang supervisor thought that one of the ship's lines might have broken, but the ship's crew stated that none of these parted during the adverse weather.

1.9.4 Shore moorings were a combination of a 32 mm 9x16 steel core wire pennant, a spring of 80 mm polyester rope and 40 mm lanyards. Wire was used at the shipboard end because of its resistance to chafe, which occurred where the wire passed through the shipside fairleads. Wire is strong but has little elasticity; the polyester rope spring was attached to compensate for this lack of stretch. The polyester line was formed of a continuous loop that was seized around large thimbles at each end, and at one-metre intervals along its length. To reduce general wear and tear and to help minimise actinic degradation, a canvas sheath covered the polyester line. The thimbles were fitted at each end of the polyester rope loop to prevent chafe between the wire and the rope at one end and to allow the free passage of the multiple parts of the lanyard at the other. The lanyard was used to tighten the mooring system; it was rove around one of the shore bollards and through the thimble, and tensioned using a small tractor.

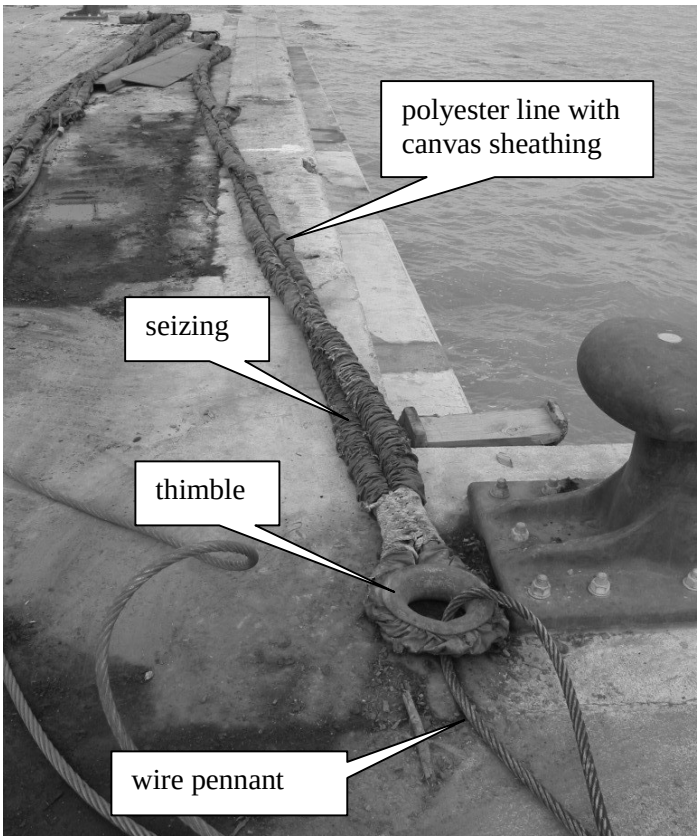

Figure 9
Shore mooring line

1.9.5 When a ship was being made fast, tractors tensioned the forward and aft shorelines, simultaneously heaving on the lanyards to ensure they had equal weight on them before the lanyards were secured to the wharf bollards. Tension on the mooring lines counteracted the effect of the swell, surge and wind and helped to minimise the ship's movement up and down the wharf. During the time a ship remains alongside a wharf it rises and falls with the tide and its waterline changes with cargo and ballast loaded and unloaded. The tension on the mooring lines changes as the height of the ship changes in relation to the wharf. On 5 February, the shore mooring gang supervisor called 2 of his men to tension the shore moorings on the *Jody F Millennium*.

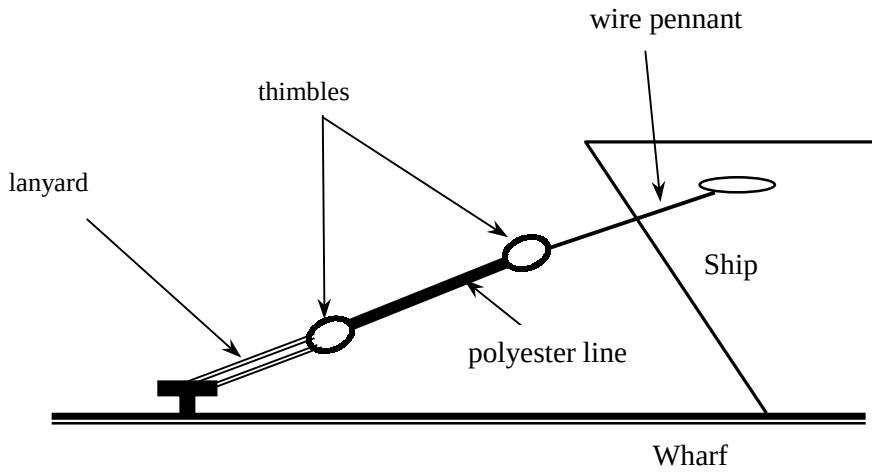

Figure 10
Shore mooring line configuration

1.9.6 Port Gisborne Limited owned the shore moorings and was responsible for their maintenance. Spare items of mooring equipment were kept in a storage shed. Eastland Moorings Limited, which was contracted to Adsteam Port Services Limited to supply the shore mooring gang, was responsible for the setting of the lines and had access to the store for parts to replace broken items. There was no inventory or planned inspection regime in place for the parts of the mooring system. The moorings remained on the wharf when not being used to secure a ship. After each use, the mooring gang inspected the moorings and arranged repair or replacement to Port Gisborne Limited account.

1.9.7 Since Port Gisborne Limited contracted out the mooring service, the labour for the lines gang was on call but not necessarily on the wharf during normal working hours. Consequently, there was no routine for the shore lines to be adjusted during a ship's stay in port. However, the pilot checked lines whenever he was on the wharf, and the supervisor of the shore mooring gang inspected the lines each morning and if they required adjustment he would mobilise his staff to carry this out. It was not usual for the shore mooring gang to attend ships at regular intervals to adjust the lines.

1.9.8 Number 8 wharf was of mixed construction; the outer or seaward half was of solid fill, similar to that of the adjoining breakwater. The remainder of number 8 wharf and all of number 7 wharf were of a concrete pile construction.

1.9.9 Large, sprung, flat-faced fenders protected number 7 and number 8 wharves. The outer face of the fender was constructed of a hard, rubber-like composition that, although providing protection for the wharf and ship, allowed the ship to slide across the face of the fender. Spring was provided by large rubber mountings which compressed to absorb the lateral energy of a ship when it bounced against the fender.

1.9.10 A breast line is the most effective means to hold a ship alongside. However, the spacing and position of bollards on the wharf did not always allow such a line to be set correctly. The mooring bollards were spaced at regular intervals along the outer edge of the wharf. The current and previous pilots and several ships' masters had voiced complaints that there were insufficient bollards, particularly where the bow and stern of ships were positioned, and they were not of the correct design. Once a bollard was used for a shore mooring it could not be used for another line.

Figure 11
Fendering at number 8 wharf

Analysis 2

Port Gisborne Limited, Gisborne District Council, the pilot and the harbourmaster

1 The port of Gisborne had gone through a period of development during the previous 5 years. It had been identified that there were large volumes of logs to be exported but the port infrastructure was unable to efficiently handle the size ships used to transport that type of cargo. The development of the port cost in excess of $16.5 million, which was financed through loans secured by the assets in the farming and port operations. The Asian crisis in 1997 prevented the increase in throughput that the port developers had planned for, resulting in the port being financial constrained and needing to reduce its expenditure. Cost cutting measures were taken by contracting out non-core services and restructuring the labour force. This resulted in casualisation and the dilution of maritime experience at the port. In order to reduce its debt, Port Gisborne Limited had sought to sell its farming operation, which had received shareholder agreement, but the legal challenges by Iwi had delayed the process. The port was consequently under financial and commercial pressure to improve its economic standing, which required a push for improved throughputs and maximising the size of vessels using the port.

2 The risk assessment carried out by the tanker operator required immediate improvements to be made by the port. At that time, Port Gisborne Limited was not in a financial position to purchase a second tug. The contract with Adsteam Port Services to provide port services, including a second tug, fulfilled this need.

3 Although involving a small percentage of the overall tonnage through the port, the withdrawal, in 2000, of the tanker service into Gisborne nevertheless represented an income loss, adding to the financial problems that Port Gisborne Limited was facing and made the proposed sale of the farm operation more urgent to ease the financial burden of the port company.

4	The casualisation of the majority of the labour force at the port of Gisborne resulted in many redundancies. Some of the personnel continued to work at the port on an "as required" basis, while others found full-time employment elsewhere. The dilution of the experience and skill base of the port employees inevitably followed. The part-time and irregular nature of the work at the port meant that workers had to have alternative forms of income, which resulted in people sometimes being unavailable for work at the port when required.
5	On his appointment, the pilot designate was put into a working environment, which was not conducive to his becoming familiar with local conditions. The incumbent pilot refused to train him or latterly allow him on ships that he was piloting. Consequently, the pilot designate was forced to complete his local knowledge training under the guidance of the relief pilot. The examination board and the Maritime Safety Authority were ultimately satisfied with the extent of his local knowledge at the time of his examination.
6	The pilot designate's local knowledge might have been rudimentary when he commenced piloting in Gisborne in 1999, but after 3 years and over 600 successful pilotage acts, his local knowledge at the time of this grounding would almost certainly have been better than that of any other person.
7	The composition of the examination board and the method of examination were not unique in New Zealand. The volume of shipping using the port of Gisborne was sufficient to provide employment for only one pilot at any one time. The pilot involved in this accident was appointed because of his previous pilotage experience at Napier, so he only needed to gain local knowledge rather than learning the art of piloting ships from first principles.
8	Being a sole pilot posed other logistical problems. The pilot had difficulty taking leave and should he be incapacitated the port was effectively closed until a relief pilot could be brought in. In addition, it was difficult to provide continuity of pilotage experience, with no junior pilot gaining experience and available as a relief or to be an eventual successor.
9	Within the port, there was no one of comparable seniority or experience with whom the pilot was able to discuss the situation he faced on 6 February. Had the part-time harbourmaster for Gisborne forged a working arrangement with the personnel at Gisborne, it might have occurred to the pilot that he was not as isolated as he thought. Any assistance that the harbourmaster would have been able to give would only have been as good as the communication skills of the person passing the local information and observations to him.
10	A remote harbourmaster would have difficulty carrying out the day-to-day duties and responsibilities required by the appointment. He had therefore to rely heavily on the co-operation, ability, and trust of the personnel who monitor the activities of the port and carry out these duties for him in absentia. Gisborne was 40 minutes by air, or 3 hours by road from Napier, distances that would render the harbourmaster temporarily unavailable in the case of an emergency. Air travel was dependent upon the weather conditions and aircraft availability.
11	The part time harbourmaster appointed by Gisborne District Council was not required under Part VIII of the General Harbour (Nautical and Miscellaneous) Regulations 1968 to hold a certificate of competency as master of a foreign ship but the council decided it was important to have a harbourmaster with the certificate even if it was for an extremely limited period each year. However, the harbourmaster being based

remote from Gisborne and holding the full-time position as harbourmaster for the port of Napier meant that he was unlikely to be able to effectively supervise the safety of navigation in Gisborne, or to attend promptly to an emergency.

12 The pilot did not have the authority to order the *Jody F Millennium* to leave the berth; such authority was only vested in the harbourmaster. However, the movement of the ship caused him sufficient anxiety that he decided the only action available to him was to sail the ship. The shore mooring gang supervisor's concern for the safety of his workers prevented him from replacing any more shore moorings that might have broken, contributing to the urgency for the pilot to resolve the situation by sailing the ship sooner than he intended.

13 Previously in Gisborne, the pilot had traditionally also been the harbourmaster. Many of those who had worked within the port for some time, such as Port Gisborne Limited employees, agents, lines gang supervisors and stevedores probably deferred, without question, to the pilot as the marine authority.

Mooring system, wharves and fendering

14 When the *Jody F Millennium* berthed at number 8 wharf on 3 February, because it was a large ship and expected to remain alongside for 3 days, it was secured by both ship and shore moorings. Conversely, the *Asian Briar* was a relatively small ship and was expected to remain alongside for only 24 hours, so it was secured using ship's lines only. Each of these decisions complied with the normal operating practice of the port.

15 When the *Jody F Millennium* was initially secured, all the ship and shore mooring lines would have been tensioned but during the ship's stay in port its draught would have increased as loading progressed so changing its height in relation to the wharf. Inevitably, the mooring lines would have become slack and unequally tensioned. The shore moorings had to be tensioned from ashore, whereas the ship's moorings were tensioned from on board.

16 The shore mooring lines were re-tensioned on 5 February and inspected again on the morning of 6 February, but it is unclear at what times the ship's lines were re-tensioned during the stay in port, as this is an ongoing duty of the watchkeeping crew. When shorelines are used, it is usual that they are expected to take the majority of the shock loading caused by the ship moving at the wharf, while the ship's lines are less tight and not necessarily under constant tension. This might partially explain why the shore lines parted but the ship's lines remained intact throughout. In the circumstances of 6 February it would have been prudent to have tensioned the ship's nylon lines to share the loading. There was conflicting evidence regarding whether additional ship's lines were offered by the ship's crew and refused by the mooring gang, or were requested by the mooring gang and refused by the ship's crew.

17 On the afternoon of 6 February, while the shore mooring gang were tightening the shore lines on the *Jody F Millennium*, the supervisor indicated that they were moving between forward and aft, tightening one line at a time. The forward and aft lines were not simultaneously tensioned, which would have led to unequal load being on the individual lines, making each of them more susceptible to uneven shock loading and liable to break.

18 The position and number of the bollards on the wharf did not always allow the optimum mooring system to be used. For a comparatively new wharf in a port subject to surge conditions, the mooring arrangement for number 8 wharf was not as effective as it could have been.

19 Shore mooring lines similar to those used in Gisborne were used effectively in ports throughout the world where surge was experienced. The effectiveness of such systems relies heavily on the quality of the equipment and the people charged with securing and managing it.

20 Since the casualisation of labour in the port, the mooring gang had been made up of temporary and part-time labour. The mooring system had come in for criticism from ship's masters and pilots on numerous occasions. The composition of the mooring gang had changed over recent years and at the time of this occurrence the pilot considered that an effective team was being developed. The lack of a dedicated employed mooring gang detracted from the efficiency of the mooring system and limited regular monitoring of the tautness of the shore mooring lines during a ship's stay.

21 The shore mooring lines were left lying on the wharves when not being used, exposing them to physical damage, the effects of the sun, the salt-laden atmosphere and any contaminating substances that might be on the wharf. This would have resulted in their degrading more quickly than if they had been stored under cover when not in use. Individual parts of the system were not identified and marked nor was there an inventory. Consequently, their age, when they were put into service, the materials used and their safe working certificates were not consolidated. The suppliers of the wire rope did have its original manufacturer's certificate, but it was impossible to audit that against the made-up parts through the lack of inventory and marking. Notwithstanding the above, there was no evidence that the shore moorings parted because they were in poor condition.

22 The fenders fitted to the wharves in Gisborne were sufficiently robust to prevent ships damaging the face of the wharves. The hard rubber-like composition surface of the fenders provided little friction and did little to reduce the movement of ships ranging along the wharf. In addition, the sprung rubber mountings of the fenders allowed ships to bounce off them and thus possibly perpetuate the athwartships movement of the ships.

23 There was hearsay evidence that the different construction of numbers 7 and 8 wharves caused the ships secured to them to react differently. It was suggested that the solid construction of the outer half of number 8 wharf prevented the surge from dissipating under the wharf and therefore caused ships to range violently. The open wharf construction at the inner end allowed the surge to flow under the wharves and onto the graduated shore thus reducing its effect.

24 The organisational structure of the port should have allowed for an efficient operation had all the separate parts been able to fulfil their respective roles, carried out those roles in an effective manner and maintained timely effective communication with the other parts of the organization. The port did not operate effectively as evidenced by:

- area weather and swell forecasts were obtained separately by Gisborne District Council, Port Gisborne Limited and the pilot, but those forecasts were not shared
- weather, sea and swell conditions were estimates only, with no instrumentation to monitor and possibly assist prediction of severe conditions
- because of his remote location and limited contractual time dedicated to Gisborne, the harbourmaster was unlikely to be able to effectively monitor or supervise the safety of navigation or compliance with regulations in the port
- no working relationship had been built between the harbourmaster, the pilot and Port Gisborne Limited which led to a complete lack of communication at the time when critical safety decisions needed to be made

- there was no direct communication between the master and the pilot to co-ordinate a plan of action to manage the exceptional circumstances faced on 6 February 2002
- There was no contingency planning to cover such extraordinary circumstances
- The shore mooring gang and the ship's crew were not co-ordinated in an effort to set a combination of moorings which might have reduced the movement of the ship alongside
- there were no clearly defined areas of responsibility with regards to the inventory, maintenance and repair of those parts making up the shore moorings
- there was conflicting evidence whether the pilot had received the latest hydrographic survey results from August 2001, whereas those results should have been given to him as a matter of course
- Although maintenance dredging was carried out after the August 2001 survey, no further survey was carried out to determine the results of that dredging.

1.10 Vessel Information

1.10.1 The *Jody F Millennium* was a geared bulk carrier, powered by a 6156 kW diesel engine, with a single propeller and a single rudder. It was built in Japan and delivered to the owners in February 2000. The ship was Panamanian owned and registered and operated by a Korean company. It was on a time charter to News Maritime Company Limited, to load pinus radiata logs at Wellington and Gisborne for discharge in South Korea and China.

1.10.2 The ship was under Nippon Kaiji Kyokai classification society (Class NK). Its certification was current at the time of the accident.

1.10.3 The ship had an overall length of 159.94 m, a beam of 26.00 m and a summer load draught of 9.815 m with a corresponding deadweight of 25 369 t and a summer displacement of 30 869 t.

1.10.4 The manoeuvring speeds of the *Jody F Millennium* were as follows:

	R.P.M.	Speed in knots	
		Loaded	Ballast
Full ahead (harbour)	100	11.6	12.3
Half ahead	85	9.9	10.7
Slow ahead	62	7.4	8.2
Dead slow ahead	45	5.5	6.1
Dead slow astern	45		
Slow astern	62		
Half astern	85		
Full astern	100		

1.10.5 The steerage of a ship is dependent on water passing the rudder. All ships lose the ability to steer at low speeds. The actual speed at which a ship loses steering depends on the shape of the underwater hull, the size and design of the rudder, and the number and configuration of propellers and rudders. The effectiveness of a rudder diminishes with the reduction of the under keel clearance and requires more helm to be applied. The master of the *Jody F Millennium* estimated that the ship would lose steerage below about 4 knots.

1.10.6 The *Jody F Millennium* had a crew complement of 19, which was 5 above the minimum required by the safe manning certificate. All officers were correctly certificated for their positions. The master and chief engineer were Korean and the remainder of the crew were Filipino.

1.10.7 The master of the *Jody F Millennium* obtained his Korean masters certificate in 1974 and had sailed in the capacity of master since then. His certificate had been re-validated under the International Convention on Standard of Training, Certification and Watchkeeping for Seafarers1995 (STCW 95). In his capacity as master, he had sailed on a variety of ship types with both Korean and international companies but had never been to Gisborne before. He had been on the *Jody F Millennium* for a continuous period of 13 months and was due to go on leave the following month.

1.10.8 Prior to sailing, the chief officer and third officer read the draught, which was 8.8 m forward and 9.5 m aft. The chief officer calculated the ship's stability, and determined a GM of 1.5 m. The master timed the ship's period of roll; from which he was able to calculate the GM to be between 1.7 m and 1.9 m. The master considered this to be a large GM and thought the ship was stiff. With such a large GM, a larger moment was required to incline the ship but, once inclined it would return quickly and its momentum would carry it through the upright to roll to the other side. As a result, the ship would have a short period of roll, which might have been violent.

1.10.9 When a ship rolls and pitches, there is an increase in draught at its extremities. In the case of the *Jody F Millennium*, a heel angle of 5° increased the draught by approximately 1.0 m (see Figure 6). This is one of the factors that had to be allowed for when determining a safe under keel clearance.

1.10.10 Resulting from the risk analysis carried out by the tanker company, and Port Gisborne Limited's wish to service larger vessels, the port had provided an extra tug and was serviced by 2 azimuthing propeller tractor tugs. The *Turihaua* was of the Schottel type with its 2 units in the forepart of the vessel. It was 25 m long, had engine power of 820 kW (1100 hp), which developed 18.6 t bollard pull. The *Titirangi* had a length of 30 m and used azimuth stern drives. It had 1342 kW (1800 hp) engine power, which developed 30 t bollard pull. Owing to the restrictive nature of the swinging basin, large ships had to be accurately controlled while turning, which required 2 powerful manoeuvrable tugs. The tugs were operated and crewed by Adsteam Port Services Limited.

1.10.11 The pilot considered the *Turihaua*, although the smaller and less powerful of the 2 tugs, to be more suitable to manoeuvring in the tight constraints of the port than the *Titirangi*.

1.11 Weather and Forecasting

1.11.1 Tidal information for Gisborne for 6 and 7 February 2002 is tabulated below. The range of tide was approximately that of the spring range. The calculation to obtain the height of tide for 2152 on 6 February was carried out using the graphical method contained in the New Zealand Nautical Almanac.

Date	High Water		Low Water	
	Time	Height (m)	Time	Height (m)
6 February	0136	2.0	0742	0.6
	1353	2.0	2012	0.5
7 February	0226	1.9	0835	0.6

High water 7 February:	0226	1.9 m
Low water 6 February:	2012	0.5 m

Range of tide:		1.4 m

Height at 2152, 6 February 0.80 m above chart datum

The tide gauge reading at Gisborne was observed by the pilot to be 0.8 m about 20 minutes before sailing.

1.11.2 Gisborne was in the sea area Portland weather area, which covered the east coast of North Island from Cape Turnagain in the south to Cape Runaway in the north, a distance of 200 nm that encompassed the north Wairarapa, Hawkes Bay, Poverty Bay and East Cape.

1.11.3 The weather and sea state as forecasted by the meteorological service of New Zealand for sea area Portland was as follows:

> Issued 06/02/2002 0029 valid until 2400 06/02/02
> *GALE WARNING IN FORCE*
> Westerly 30 knots, rising to southwest 35 knots south of Cape Kidnappers this morning. Sea becoming very rough in south. Southwest swell rising to 4 metres this afternoon. Easterly swell 1 metre. Fair visibility in showers, mainly south of Cape Kidnappers.
> OUTLOOK FOLLOWING 12 HOURS: Southwest easing to 25 knots.
>
> Issued 06/02/2002 0421 valid until 2400 06/02/2002
> *GALE WARNING IN FORCE*
> Westerly 25 knots, rising to southwest 35 knots south of Cape Kidnappers this morning. Sea becoming very rough in south. Southwest swell rising to 4 metres this afternoon. Easterly swell 1 metre. Fair visibility in showers, mainly south of Cape Kidnappers.
> OUTLOOK FOLLOWING 12 HOURS: Southwest easing to 25 knots.
> Issued 06/02/2002 1240 valid until 1200 07/02/2002
> *GALE WARNING IN FORCE*
> Westerly 25 knots, but southwest 35 knots south of Cape Kidnappers, becoming southwest 25 knots throughout overnight. Very rough sea in the south easing. Southerly swell rising to 4 metres. Easterly swell 1 metre. Fair visibility in showers, south of Cape Kidnappers.
> OUTLOOK FOLLOWING 12 HOURS: Southwest 20 knots.
>
> Issued 06/02/2002 1606 valid until 1200 07/02/2002
> *GALE WARNING IN FORCE*
> Westerly 25 knots, but southwest 35 knots south of Cape Kidnappers, becoming southwest 25 knots throughout overnight. Very rough sea in the south easing. Southwest swell rising to 5 metres. Fair visibility in showers in south.
> OUTLOOK FOLLOWING 12 HOURS: Southwest 20 knots.

1.11.4 The metrological notes in the New Zealand Almanac for 2002/2003 stated that coastal weather forecasts are a general indication of average conditions expected in a particular coastal area. The forecasts are for open waters to within 60 nm of the coast and do not apply to enclosed areas such as small bays and harbours. There was no weather forecast specifically for the port of Gisborne.

1.11.5 Observations at the Gisborne automatic weather station showed that the mean wind between 2100 and 2200 on 6 February was 250° at 4 km/h (2 kts) with an air temperature of 16.0°C. Observations by the ship's crew, the pilot, port service vessels' crew and the mooring gang supervisor indicated that the wind was more than that recorded but not as strong as that forecasted.

1.11.6 An intense low pressure system situated to the east of the south island was slowly moving to the south east, bringing gales to the central east coast areas.

1.11.7 On 6 February 2002 the Baring Head wave rider buoy, off Wellington Harbour entrance, recorded a maximum wave height of about 13 m with an average of about 11 m. The average significant wave height during 6 February was of about 7.5 m.

1.11.8 The Gisborne District Council had an arrangement with Meteorological Service of New Zealand that it would be supplied with swell forecasts in excess of 3.5 m for the Gisborne coast. This forecast was primarily used to warn of possible coastal erosion. A forecast issued at 1305 on 6 February was sent by facsimile to the Gisborne District Council. The forecast stated:

> Southerly swell expected to rise to 4-5 metres late Wednesday or early Thursday, then slowly ease during Friday.

The forecast was not passed to Port Gisborne Limited, the harbourmaster or the pilot.

1.11.9 Sea waves are usually caused by wind, their height being dependent on the duration, the speed and the fetch of the wind. Swell and surge develop from prolonged sea wave action often at a distance from the immediate sea region. When a swell reaches shallow water it steepens abruptly, increases in height and sweeps ashore as rollers.

1.11.10 Swell forecasts were issued by the meteorological service of New Zealand as part of the coastal weather forecasts. Swell warnings were only issued when the swell was expected to be above a certain threshold, usually one metre. Significant wave height was not measured except at the wave rider buoys at Baring Head and Taharoa Terminal on the west coast of North Island.

1.11.11 The pilot's office was equipped with a facsimile machine, that was programmed to receive the New Zealand Meteorological Office coastal forecasts and warnings for the Portland area together with analysis and prognosis isobaric weather maps. The general manager of Port Gisborne Limited independently monitored the weather using information accessed via the internet and from the interactive weather service provided on Sky Television. There was no established communication between the pilot and the general manager regarding weather information.

1.11.12 At about 1100 on 6 February, the pilot checked the sea state and noted there was minimal significant swell. He was aware that the weather conditions were forecast to deteriorate and that there was a severe storm to the south, around Wellington.

1.11.13 When the *Asian Briar* departed, in daylight hours, the pilot observed the swell at the breakwater to be 2 to 3 m. When the *Jody F Millennium* departed, in darkness, the pilot thought that the swell was about the same, but increased rapidly to 6 m during the departure. Other witnesses variously thought that the swell was between 3 and 6 m. The wind was reported to be from the south at about 15 knots when the *Jody F Millennium* left the berth but increased dramatically as it left the harbour. A large percentage of those people spoken to were of the opinion that the conditions in the afternoon and evening of 6 February were the worst they could remember.

1.12 Damage

1.12.1 While alongside, the *Jody F Millennium* was ranging along and rolling against the fenders. This resulted in sections of paint being rubbed from its hull. The only other damage noted was to a porthole and the washplate above it as a result of contact with the wire section of a shore mooring line.

1.12.2 The damage suffered by the *Jody F Millennium* during the grounding was extensive, varied and consistent with that of a ship having stranded and worked hard on a sand and mud bottom for a period of nearly 3 weeks. The rudder had been set up and rotated to an approximate angle of 120° to starboard. The propeller had been damaged by the rudder being rotated and hitting 2 of the stationary blades. The ship's hull plating had been set up between the frames in way of the engine room space and throughout the mid body section of the bottom with the severest damage on the starboard side. The forepart was also set in between the frames to a less severe extent, but once again with the severest damage to the starboard side. Both bilge keels had been flattened against the ship's hull. No. 3 centre double bottom fuel oil tank had split in several places where the plating had been set up. No. 5 starboard double bottom water ballast tank had

been split and holed with the internal framing separated from the hull plating. Nos. 2, 3 and 4 starboard water ballast tanks had small holes along the turn of bilge, which was indented, and the tanks were probably common at the joining bulkheads.

1.13 Human Factors

1.13.1 The shipping in Gisborne was sporadic with about 200 movements per year; consequently the pilot was not usually overworked. In the days preceding the incident the pilot had berthed the *Jody F Millennium* on Sunday and the *Asian Briar* on Monday. He was the sole manager for Adsteam Port Services in Gisborne and was responsible for the tug crews and the general day-to-day administration. Wednesday 6 February was Waitangi Day, a public holiday in New Zealand, so the pilot was not required to carry out any administrative duties during that day.

1.13.2 The pilot had been at the port for nearly 3 years and had taken only short periods of leave during that time. As a sole pilot it was difficult to arrange any absence from the port, and unless a relief pilot could be employed, his leave had to be arranged during times of no shipping movements. His last extended period of leave was between 21 September 2001 and 4 October 2001 and he stated that he had 116 days annual leave outstanding.

1.13.3 The process of decision-making falls into 2 main categories: analytical and intuitive. Analytical decisions are based on rules and are used primarily by operators who are unfamiliar or inexperienced in a particular task. Intuitive decisions are based on an operator's knowledge and experience. They are usually accomplished quickly and do not require in-depth thought. Unfortunately, intuitive decisions are subject to biases, which allow errors to occur. Confirmation bias relates to the human response when information is sought to confirm a particular decision and information that negates the decision is rejected.

1.13.4 In addition to biases, human thought processes also affect the standard of decision-making. Bridge Resource Management training emphasises the need to recognise "hazardous thoughts" and replace them with opposite "safe thoughts". Three hazardous thoughts and their opposite safe thoughts, as used in Bridge Resource Management concepts, that were relevant to the decisions made prior to the *Jody F Millennium* sailing were:

Hazardous Thought	Safe Thought
It won't happen to me	It could happen to me
I can do it	Why take chances
Do something quickly	Not so fast, think

Analysis 3

1. The *Jody F Millennium* was only 2 years old. As with most modern ships, it was designed to spend the majority of its life at sea with minimal time in port; consequently, it was not built for frequent manoeuvring in restricted harbours. It was typically powered for a bulk carrier, with steering adequate for harbour transits. As with similar vessels, variations in speed could be slow to take effect and steerage at low speeds was slow.. Notwithstanding these characteristics, the ship had adequate manoeuvrability. As with any other ship, the handling characteristics deteriorated when the under keel clearance was small.

2. The sea and the tidal conditions were outside the pilot's own criteria for a large ship such as the *Jody F Millennium* at its draught of 9.5 m to negotiate the approach channel, yet he chose to discount this information, concentrating on getting the ship out of the port.

3. The ship had adequate stability, and was possibly a little stiff. As a result, its period of roll was short.

4. The 2 tugs, in addition to the ship and shore moorings, were unable to prevent the *Jody-F Millennium* from ranging along the wharf and were unable to stabilize the ship sufficiently to enable the shore lines gang to safely run mooring lines to replace those that had broken. To run additional ship's moorings, regardless of the conflicting evidence of them being offered and refused, the mooring gang would have had to work in close proximity to the shore mooring lines, a situation already deemed as unsafe.

5. The forecast weather for the Portland area during 6 February was for westerly winds of about 25 knots becoming south-west overnight and the swell forecast was easterly 1 m and between south-westerly and south 4 to 5 m. The actual wind recorded at the Gisborne automatic weather station at 2200 was 250° at 4 km/h (2 knots). Reports from observers indicated that the wind was light but the swell was between 3 and 6 m. After the grounding, when the pilot launch and tugs went out to the ship to attempt assistance, the swell was reported to be about 6 m in height. An intense low pressure system to the east of the south island was responsible for the exceptional swells experienced in Wellington and the severe surge experienced in Gisborne about 12 hours later.

6. The Portland weather area covered a considerable length of coastline and while giving a good general overview of the expected weather could not hope to accurately forecast the localized weather for each of the bays within that area. No wave monitoring equipment was established in Poverty Bay, neither was there any system that would warn the port of impending storm surges.

7. The pilot, while aware of the adverse Portland weather forecast and also the storm that was occurring to the south in Cook Strait, was unsure what impact, if any, that weather would have on the ships in Gisborne and was unable to identify what measures could be taken to minimize the effect of the weather.

8. The presence of unusually high significant wave heights at Baring Head, although a significant distance to the south of Gisborne, should have acted as a warning of the increase in swell and surge at Gisborne. However, there was no system in place that allowed for such warnings to be noticed and promulgated. The pilot was aware that there were heavy swells further south, but there was no established formula for determining how long it may take for the swell affecting other parts of the New Zealand coast to begin to influence the sea state at Gisborne. A swell in Poverty Bay would not necessarily produce surge in Gisborne harbour. The direction of that swell and the continued presence of an off-lying storm would decide the magnitude, if any, of the surge.

9. The Gisborne District Council had received a forecast specifically for Gisborne indicating 4 to 5 m swells. Although this forecast was received to warn against possible coastal erosion, it would have been prudent for the Council to immediately share the information with the harbourmaster, the pilot and Port Gisborne Limited.

10. A possible preventative action that the pilot could have taken was to have put the ship to anchor on the high water at 1353 on 6 February. Such a decision would have had to be made in sufficient time to remove the loading equipment, secure the deck cargo and cranes, and prepare the ship for sea. Depending on the condition at the time, such a

process could take several hours. The ship was still loading cargo and the weather conditions during the morning were not sufficiently bad, nor was the weather forecast adequately certain, for the pilot to reasonably make that decision in sufficient time. Consequently, once the high water in the afternoon had passed, the ship was captured in the port.

11. Communication between the pilot and the ship's staff was made difficult by the lack of easy access to the ship, and the ship's agent relayed messages by cellular telephone. This form of communication was susceptible to misunderstanding, and mistaken inferences and inflections could be conveyed. It would have been prudent of the pilot to have at least spoken directly to the master using cellular telephone or VHF radio.

12. For whatever reason, the pilot made no attempt to board the vessel to speak with the master, nor did the master attempt to go ashore to speak with the pilot. Had either done so, they could have discussed the situation in a less hurried manner than in the heat of departure. There were times when others had boarded or left the ship during the late afternoon and early evening, by which time the pilot had made up his mind that the ship had to leave the berth, and conveyed that decision to the master through the agent. An unhurried discussion between the pilot and master would have been prudent and led to a joint decision as to the earliest possible time of departure and the measures to be taken in the meantime.

13. The pilot carried out on average of less than one pilotage act per day and the 2 movements in the 3 days leading up to the accident support this statistic. Administrative duties did take up some time but did not require him to remain at the office continuously throughout the day. He was able to structure his workload around shipping movements. The duties and workload of the pilot did not indicate that fatigue was a contributory factor in this incident.

14. The pilot was the only experienced person with relevant nautical qualifications employed at the port of Gisborne. He assumed that he had to make decisions regarding the safety of ships in the port. He was aware of the appointment of the part time harbourmaster but considered him too remote to consult over the day-to-day activities of the port. The pilot was also aware that he was not empowered to order the ship from the port and assumed his role to be that of an adviser to the master through the agent.

15. As with all decision-making, the process by the pilot was to assimilate all the information to hand and formulate a plan that would best serve all the parties concerned. Decision-making is a fluid process that evolves as more information becomes available. Protection of the port infrastructure was of paramount concern to the pilot and he was also concerned for the safety of the ship and its crew. He was using his experience and knowledge as best he could to accomplish this.

16. Initially the ship was scheduled to complete cargo and sail in the afternoon of 6 February. Had it done so the grounding would not have occurred. However, cargo operations were delayed and sailing postponed until the 0226 high tide on 7 February.

17. The conditions for the shore mooring gang were dangerous. The pilot was aware of the danger, which probably increased the pressure for him to do something quickly to relieve the situation. Had the pilot been able to detach himself and discuss the situation with a peer ashore, he might have realised that the ship could not possibly negotiate the channel more than 4 hours before high water, particularly with the sea conditions as they were.

18. The pilot discussed the situation with the ship's agent and the general manager of Port Gisborne Limited, neither of whom had any marine experience or could be aware of the difficulties that could be experienced sailing the ship in such conditions. Having

decided that the ship was to sail, the pilot closed his mind to any other possibilities and then proceeded to ignore his own minimum criteria resulting in his bringing the departure time forward. It is likely he justified these decisions to himself by thinking that the ship would be safer outside, consequently, ignoring the problem of actually getting it there.

19. Not having any other senior or experienced mariners ashore with whom to discuss the situation, and having chosen not to communicate directly with the master, the pilot was subject to one-man error, making decisions in isolation without anyone else to challenge the assumptions made and confirm that the decisions were prudent in the situation.

20. Where possible, there is always the desire to remove a problem from one's immediate vicinity. This might have been one of the subconscious factors that persuaded the pilot that the ship had to leave the port.

21. There was a considerable cultural and language gap between the master and the pilot. This may have led to some misunderstanding and a difference between the pilot's intentions and the master's interpretation of them, and might have contributed to the lack of communication between them.

22. The master deferred to the pilot, assuming him to be the spokesperson for the port authority. The pilot was under the impression that, through the agent, he had "discussed" the situation fully with the master who had willingly agreed to sail his ship and was happy with the proposed pilotage plan. The master, however, was of the opinion that he had been "ordered" to sail from the port by the port authority and was unable to question that order. Notwithstanding the foregoing, the master and pilot both considered sailing the ship was the only solution to prevent damage to the ship and wharf and injuries to the personnel. Direct discussion between the master and pilot did not occur until the pilot boarded the ship, at which time only the sailing plan was briefly discussed. Whether or not the ship should sail was not discussed; that was a foregone conclusion.

23. The pilot had spent many years piloting in Napier. It was usual practice in Napier that in adverse weather the pilot disembarked a departing ship shortly after passing the breakwater. While Napier and Gisborne are similar in that each has a breakwater and they are subject to surge, the approach to Napier is less restrictive, being open with a greater depth of water.

24. Another factor that may have influenced the pilot to leave the ship at the breakwater was that he had disembarked the *Asian Briar* in a similar position a few hours earlier and that vessel had successfully negotiated the channel. Also, being the sole pilot in the port might also have influenced the pilot's decision to leave the ship early, not wanting to be either confined to the ship until the weather abated or over-carried to another port.

2. Findings

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

2.1 Heavy swells off the port of Gisborne and a deep depression to the south caused surge in the harbour creating movement of ships moored there to such an extent that shore mooring lines parted on the *Jody F Millennium*.

2.2 The *Jody F Millennium* was moored, in accordance with the standard practices of the port, with a combination of shore and ship's mooring lines.

2.3 The shore mooring gang replaced lines as they broke but were unable to continue working in the vicinity as the ship continued to move violently against the wharf, despite the assistance of the 2 harbour tugs.

2.4 The pilot made the decision to remove the ship to an anchorage outside the port to prevent damage to the ship and wharf and possible injury to personnel.

2.5 The pilot conned the ship off the wharf and lined it up with the channel before passing the con to the master and disembarking when the ship was abeam of Butlers Wall.

2.6 As the *Jody F Millennium* left the shelter of the southern breakwater, large swells hit its port bow, pushing it to starboard and as the ship rolled and pitched, it touched bottom in the channel just after clearing the breakwater.

2.7 After initially touching bottom, the ship lost steerage and the master was unable to regain control. The ship travelled a short distance further down the channel before being driven by the sea and swell on to the shoal ground to the north of the channel.

2.8 The decision to remove a vessel from the port was outside the pilot's authority, but his assuming control was understandable owing to the absence of other appropriately senior experienced and qualified mariners employed within the port. The pilot made the decision to sail the ship in isolation, with no one to challenge such a decision.

2.9 The authority to remove a ship from a port lay with that port's harbourmaster. The harbourmaster for Gisborne was recently appointed, part-time and resident in Napier. He was not consulted regarding the decision to remove the *Jody F Millennium* from the port.

2.10 The master considered that the ship was being ordered from the port by the port authority so did not challenge the decision believing that, had he refused, he would have been liable for any damage that occurred to the infrastructure. Given the prevailing conditions, it would have been prudent of the master to have at least challenged the need for immediate departure.

2.11 At no time, other than immediately before departure, did the pilot and master discuss a departure plan.

2.12 Both the ship and the pilot's passage planning was rudimentary at best.

2.13 The pilot and master were separately operating under extreme pressure causing them to exclude or misinterpret information that would have made them realise the ship could not safely negotiate the channel at the state of the tide at the time the ship actually left the wharf.

2.14 The master and pilot independently believed that the ship could not safely remain alongside.

2.15 The ship was too deeply laden to negotiate the approach channel more than 4 hours before high water.

2.16 Because the depth of available water in the channel on the evening of 6 February 2002 could not be established with certainty, the actual under keel clearance of the *Jody F Millennium* could also not be established with certainty, but whatever its actual value, it was insufficient for the conditions prevailing at the time of departure.

2.17 The pilot's decision to disembark the ship early was inappropriate and the subsequent slowing of the ship removed any remaining possibility that the ship might negotiate the channel successfully. By disembarking within pilotage limits, the pilot deprived the master of pilotage assistance at a time of particular need.

2.18 Surge was not uncommon in the harbour at Gisborne but that experienced on 6 February was more severe than previously experienced.

2.19 Since the channel was deepened in 2000, the effect of the surge alongside the wharves had become more pronounced.

2.20 The pilot did not have a copy of the most recent hydrographic survey and so was working from dated information and was using as a reference a greater channel depth than was available. In some cases the actual depth was 0.7 m less than the limiting draught used by the pilot. For whatever reason, the results of the maintenance dredging completed on 4 December 2001 were not measured and therefore not available.

2.21 A number of factors influenced the pilot's decision making process that concluded with the ship's departure:

- no ship had previously grounded in the channel and so grounding was not considered as a possibility
- the urgency to fix one problem without the possible consequences being fully investigated
- the ship would be safer in the bay rather than being pounded alongside the wharf
- the limited number of replacement shore moorings remaining, and anyway the situation was too dangerous to replace any more that may break
- the danger that the ship would break adrift and ground in the harbour.

2.22 The ship's mooring lines, with one possible exception, remained intact throughout. Had the combination of the ship and shore moorings been suitably tensioned then, together with the assistance of the 2 harbour tugs, the ship might have been able remain alongside at least until there was sufficient water to increase the possibility that the ship might negotiate the channel successfully. This possibility was overlooked in the urgency to depart.

2.23 The care and maintenance system for the shore mooring lines was inadequate, but there was no evidence to suggest that the lines were defective on 6 February 2002.

2.24 The pilot's local knowledge was questioned at the time of his appointment, but after 3 years' experience in the port he was probably the person most conversant with local conditions at the time of the accident.

2.25 The port company promoted the port as being suitable for ships, the size of which was in excess of the recommended PIANC guidelines when applied to the Port of Gisborne.

2.26 The ship was adequately crewed by appropriately certificated master and officers.

2.27 The Gisborne District Council complied with the Part VIII of the General Harbour (Nautical and Miscellaneous) Regulations 1968 in relation to the appointment of a part time harbour master. However, the conditions of his employment and his remote location made it unlikely that he could adequately carry out the statutory and regulatory functions as harbourmaster for Gisborne or attend promptly in the event of an emergency.

2.28 The Portland weather forecast area covered a large coastal area and was not necessarily accurate with respect to the effect the weather would have on ships in the port of Gisborne.

2.29 There was no established procedure to forecast adverse surge conditions at the port.

2.30 The organisations responsible for managing and operating the port did not interact in an effective manner.

3. Safety recommendations

3.1 On 31 January 2003 the Commission made preliminary recommendations to the General Manager of Port Gisborne Limited. However, on 1 March 2003 Eastland Port Limited bought the Port Gisborne Limited operation and took over the running of the port. Accordingly, on 24 April 2003 the Commission made the same recommendations, as final, to the General Manager of Eastland Port Limited, and were that he:

3.1.1 investigate and improve the mooring system so that it is effective for the size and type of vessels expected to utilise the port. Such improvement should include the provision of sufficient adequately trained personnel to operate the system (060/02).

3.1.2 create an auditable system for the inventory, care and maintenance of the shore mooring lines and associated spares, to ensure that the equipment is in a serviceable condition at all times (061/02).

3.1.3 install suitable weather, tide and swell monitoring equipment to better forecast adverse conditions. For such a system to be effective, it should be monitored and the information gathered, disseminated to the relevant persons (062/02).

3.1.4 review the limiting dimensions of ships allowed to use the port to better reflect the PIANC guidelines (063/02).

3.1.5 institute standard operating procedures for maritime based activities in the port. These procedures should be prepared in conjunction with the port marine services provider. Items to be covered, but not limited to, should include limiting conditions, critical decision processes and chain of command (064/02).

3.1.6 determine the least depth of the channel to establish the maximum size of vessels. Channel depths should be confirmed at sufficiently regular intervals to provide early indication of in-filling, and maintained by regular dredging. Changes in least depth should be promulgated to all appropriate persons at the earliest opportunity (065/02).

3.2 On 5 May 2003 the Acting Operations Manager of Eastland Port Limited responded, in part, as follows:

3.2.1 Whilst Eastland Port Limited acquired the operating assets of Port Gisborne Limited on 1st March 2003, we are cognisant of a number of safety issues identified by the Commission and Maritime Safety Authority in their draft and final reports into the grounding of the Jody F Millennium.

To this end, Eastland Ports are presently considering a number of tenders from Independent Marine Experts to carry out a Risk Assessment of the Port.

In the interim, Eastland Port Limited comment as follows in response to the Commission's recommendations.

3.2.2 Commission Recommendation 060/02:

Eastland Port intends to implement this recommendation. As indicated below, timing for complete implementation is uncertain. It is dependent upon investigation reports yet to be received.

A team comprised of CentrePort marine consultants, Gisborne Pilot and linesmen, intend to visit New Plymouth port during May and review the mooring system employed by Westgate, with a view to formulating a best practice mooring and linesmen training system for

Gisborne.

Eastland Port believe that it would be prudent to defer any implementation of such a revised system until the Independent Risk Assessment is carried out, during which the present practice and any proposed revision to that practice will be critically analysed.

Once a best practice system has been determined and critically reviewed, Eastland Port intend to replace all existing ships lines (except Lanyards – see item 2 below) and purchase sufficient lines of the appropriate configuration to enable such a system to be introduced.

3.2.3 Commission Recommendation 061/02:

Eastland Port intends to implement this recommendation. As indicated below, implementation is partially completed. The timing of full completion of the implementation will be dependent on an investigation report which is yet to be received.

A maintenance and recording system, as recommended in 061/02, was implemented in February 2003, when the previous owners purchased new lanyards and has continued under new ownership.

This system will be extended to encompass the new ships lines when acquired.

3.2.4 Commission Recommendation 062/02:

Eastland Port intends to implement this recommendation. Timing for completion of the implementation will depend on an investigation report yet to be received.

Eastland Port's marine consultants CentrePort have identified 2 possible sources for such equipment and are presently reviewing the second. We have requested that their recommendations are available by 31st May 2003.

3.2.5 Commission Recommendation 063/02

Eastland Port needs to carry out further work before deciding whether to implement this recommendation.

Eastland Port has reservations about the appropriateness of PIANC Guidelines in this regard and, as indicated above, is commissioning independent marine experts to carry out a Risk Assessment for the port which will address these issues.

It is not possible at this stage to indicate when Eastland Port will be in a position to decide whether or not to implement the recommendation. That will depend on the timing and contents of the Risk Assessment report.

However, it is important to record that Eastland Port has adopted the following requirement, which was promulgated by Port Gisborne Limited on 20th February 2003 to all port users. It will continue to remain in force until Eastland Port has taken decisions following the completion of the Risk Assessment.

That, Ships of 150 m LOA and above are required to be assisted by two tugs unless otherwise directed by the Pilot.

That, Ships greater than 175 LOA but less than 200 LOA may transit in and out of port if the following criteria are all satisfied:

- **i. Swell conditions in the channel and port are less than 2 metres in height; and**
- **ii. The cross wind conditions in the channel less than 15 knots; and**
- **iii. There is an under-keel clearance of at least 2 metres; and**
- **iv. The ship's transit is during daylight hours; and**
- **v. Conditions of unrestricted visibility prevail: and**
- **vi. The Harbourmaster is in attendance at the port of Gisborne and the Pilot and the Harbourmaster have conducted a risk assessment of weather conditions and ship particulars before the vessel enters or departs the port of Gisborne; and**
- **vii. The Harbourmaster is to closely monitor weather and sea conditions and the weather and swell forecast while the ship is berthed at the port of Gisborne in order to determine whether there is any risk from weather which may result in the ship being unable to leave the port.**

3.2.6 Commission Recommendation 064/02
Eastland Port accepts this recommendation. Implementation is now complete.

Such standard operating procedures for maritime based activities was introduced on 28th April 2003 as the *Eastland Port Limited Procedures Manual* and encompasses 33 Standard Operating Procedures (SOP's).

3.2.7 Commission Recommendation 065/02
Eastland Port accepts this recommendation. Implementation is now complete.

Eastland Port in conjunction with the Harbour Master, has determined the depth limits for the channel at 10.3m. On 17th April 2003 this was promulgated to all relevant parties, including Pilot, Agents and port users.

This limit was established after:

a dredging program conducted by NZ Dredging and General Works between 20th March and 9th April 2003.

a survey carried out by Hunter Hydrographic on 9th April 2003, which confirms the depth in the channel was between 10.3 and 11m. The Harbourmaster and Pilot are in receipt of these surveys.

Included in the Procedures Manual previously referred is a stipulation that surveys be carried out by in-house personnel at the end of each month, and that a monthly program of 5-6 days dredging be performed by the dredge owned by Eastland Port to remedy any in-filling which has occurred at the commencement of each month.

Additionally, the Procedures Manual stipulates that Eastland Port will contract an independent hydrographic surveyor at 4-month intervals.

> It is anticipated that these measures will ensure that the channel remains at an operation depth of at least 10.3m on an ongoing basis, and provide the new owners with a data base of hydrographic surveys going forward.

3.3 On 24 April 2003 the Commission recommended to the Chief Executive of the Gisborne District Council that he:

> ensure that the duly appointed harbourmaster for the Port of Gisborne is employed on terms and conditions which enable him or her to properly fulfil the statutory function of the position at all material times (066/02).

3.4 On 19 May 2003 the Chief Executive of the Gisborne District Council responded, in part, as follows:

> As the result of surge conditions in the Port of Gisborne on 19 January 2003 and their effect on the vessel "Lyra", the Maritime Safety Authority (MSA) conducted a safety audit at the Port under Section 54 of the Maritime Transport Act 1954. As a consequence of that audit the MSA made certain recommendations regarding the organisation of Harbourmaster services at Gisborne.
>
> Council is co-operating with the MSA to ensure that a satisfactory solution to Harbourmaster issues is put in place and is continuing to work on those issues.
>
> In particular, Council sought expressions of interest from suitably qualified persons by advertising both in Gisborne and on a national basis. There was limited response. Only one Gisborne resident with suitable experience responded. While there were responses from two Master Mariners, one lived in Tauranga and the other in Kati Kati and neither was prepared to move to Gisborne to take up limited part time employment.
>
> On 12 May 2003 Council engaged the services of [the Gisborne applicant] to assist the Harbourmaster by providing local representation. [The Gisborne applicant's] credentials are as follows:
>
> 1) he has recently retired after 25 years' service with the Royal New Zealand Navy having reached the rank of warrant officer and held a Grade 3 Bridge Watchkeeping Certificate for the last seven years.
> 2) he has extensive OOW experience over the last seven years around the New Zealand coast.
> 3) he has considerable experience in hydrographic survey work with the Royal New Zealand Navy and as a consequence has expert knowledge in this area and useful contacts with the relevant Government agencies.
>
> [He] has been engaged on a retainer but directed to work on an "as required" basis without any restriction being placed on his hours of work. He will have assistance from the Harbourmaster and Chief Environmental Health Officer who is also an enforcement officer at the Port. It is proposed that over the next three months [he] will undergo training and gain experience which may result in it being appropriate to appoint him as Deputy Harbourmaster.
>
> Ongoing steps are being taken to ensure that the Harbourmaster is supported by at least a Deputy Harbourmaster based in Gisborne. Council will continue to monitor the availability of suitable personnel who may be sufficiently qualified and experienced to be appointed as

> Deputy Harbourmaster should [he] not for any reason ultimately fill that role.
>
> I trust from the above the Commission will accept that the provision of additional support for the Harbourmaster at Gisborne will enable him to be employed on terms and conditions which enable him to properly fulfill the statutory function of the position at all material times.

3.5 On 24 April 2003 the Commission recommended to the General Manager of Adsteam Port Services Limited (New Zealand) that he:

3.5.1 investigate the role of a sole pilot and provide sufficient assistance for that pilot, including regular relief pilot(s) and a system of peer support (067/02).

3.5.2 arrange for the Gisborne pilot to attend a Bridge Resource Management course (068/02).

3.6 On 24 April 2003 the Commission recommended to the Gisborne Adsteam Port Services Limited pilot that he:

> prepare and use a comprehensive pilotage passage plan. The plan should be readily understandable and have sufficient detail to inform visiting ship's masters of procedures and operating criteria, in order that they are able to safety navigate the port. Such a plan should be given to and explained to masters before commencing any transit (069/02).

3.7 On 12 May 2003 the Gisborne Adsteam Port Services Limited pilot responded, in part, as follows:

> I accept the recommendations made in the report. A new passage plan has been forwarded to you and is being used in the port. Ongoing reviews of this plan are being carried out and will be forwarded to you when completed.

Approved for publication 12 May 2003

Hon. W P Jeffries
Chief Commissioner

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