



A U S T R A L I A N T R A N S P O R T S A F E T Y B U R E A U

MARINE SAFETY INVESTIGATION
REPORT 169

Independent investigation into the grounding of
the Kerguelen Islands (French) registered

Mirande



in Port Phillip Bay, Victoria
on 28 June 2001



**Department of Transport and Regional Services
Australian Transport Safety Bureau**

Navigation Act 1912
Navigation (Marine Casualty) Regulations
investigation into
the grounding of the Kerguelen Islands (French) registered ship
Mirande
in Port Phillip Bay, Victoria
on 28 June 2001

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Investigations into marine casualties occurring within the Commonwealth's jurisdiction are conducted under the provisions of the Navigation (Marine Casualty) Regulations, made pursuant to subsections 425 (1) (ea) and 425 (1AAA) of the *Navigation Act 1912*. The Regulations provide discretionary powers to the Inspector to investigate incidents as defined by the Regulations. Where an investigation is undertaken, the Inspector must submit a report to the Executive Director of the Australian Transport Safety Bureau (ATSB).

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FIGURE 1:

Mirande



Summary

On 27 June 2001, the multi-purpose cargo vessel *Mirande* berthed at Geelong to load a cargo of barley. Whilst alongside, an AMSA surveyor on board for an inspection, formed the opinion that the master and chief engineer were under the influence of alcohol and formally advised them to cease drinking so that they would be fit at sailing time.

When the pilot boarded for departure, the ship's chief engineer came to the bridge and whilst not claiming to be the master, he did not deny it when addressed as 'captain'.

During the outward passage, as the ship passed to the south of beacon 12 in the South Channel, the ship's steering gear suffered a telemotor system failure. None of the bridge team, however, attempted to change to the other system or attempted to use the non-follow-up (NFU) steering controls. The ship's momentum and the proximity of the edge of the channel, however, resulted in the ship grounding within a few minutes.

After the grounding, the pilot asked for the master to return to the bridge but to no avail. Eventually the pilot was told that the master was 'drunk'. The water police were called and arrived on board at 0020 on 29 June 2001. They performed preliminary breath tests on the pilot and the first, second and third mates. The results of all these tests were negative. The police officer then went below and tested the

master and chief engineer. The master's alcohol reading was 0.29 g/100 ml and that of the chief engineer was 0.13 g/100 ml.

The report conclusions include:

- Two fuses in the primary side of the transformer supplying power to the port telemotor system blew, causing failure of the hand steering in use at the time.
- The mate and third mate had inadequate knowledge of the bridge equipment, particularly the emergency steering change-over procedures.
- The helmsman had received no training in emergency steering procedures.
- Intoxication of the master resulted in his absence from the bridge at the time of the steering failure and hence in a lack of proper leadership, experience and knowledge at a time when it was particularly needed.

The report makes recommendations to:

- The Australian Maritime Safety Authority should seek legislation to allow suitably trained AMSA marine surveyors, where there are reasonable grounds to do so, to measure blood alcohol levels of ship's crews using breath analysis equipment. A positive test of a master or key operational crew should provide grounds for detaining the vessel. AMSA should also advise the relevant harbour master or marine authority of the situation.
- Ship's officers should ensure that they (and any appropriate seamen) are familiar with the emergency operation of all ship's equipment.

Sources of Information

Officers and crew of *Mirande*

The Port Phillip pilot

Australian Federal Police

Victoria Police Service

Electrotech Pty.Ltd

Victorian Channels Authority

Acknowledgements

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Narrative

Mirande

Mirande is a five-hold general-purpose cargo ship. It can carry general cargo, bulk cargo or containers in various combinations. There are five 30 tonne cranes on board which serve the hatches when loading or discharging. The ship was built by the Dalian Shipyard in China and was delivered to the present owners in March 1998. It is in class with Bureau Veritas.

The vessel has a length overall of 181.00 m, a beam of 26.00 m, a depth of 14.4 m and a summer draft of 10.02 m. Its gross tonnage (GT) is 18 597, net tonnage (NT) is 9 789 and deadweight is 29 538 tonnes. It has a container capacity of 1 172 twenty-foot equivalent units (TEU). The ship is powered by a single B&W 5S50MC slow speed diesel engine delivering 5 998kW to a single fixed-pitch propeller. The vessel's complement consists of five French and thirteen Indian nationals. The master, mate, second mate and chief engineer were French nationals.

Pilotage

Port Phillip in Victoria is the site of two ports, the port of Melbourne and the port of Geelong. The Victorian Channels Authority is responsible, under the Port Services Act 1995, for the management of port waters for both ports. Port Phillip Sea Pilots is the pilot service provider for both ports.

Sailing from Geelong, ships negotiate a channel of about 16 miles in length before reaching open water. The channel consists of four legs, Corio Channel, Hopetoun Channel, Wilson Spit Channel and Point Richards Channel. The Port of Geelong and its channels have a collective minimum depth of 12.3 m.

After clearing Point Richards Channel, ships have a run of about 21 miles in open water, with depths from 15 m to 24 m, to Hovell Pile. Hovell Pile marks the entrance to South Channel from where there is a run of just over 13 miles to clear Port Phillip entrance, known as the Rip. South Channel has a maintained minimum depth of 13.1 m.

A pilot is said to have the 'conduct of the ship' although he does not belong to the ship's crew. He is not in command of the ship but he/she is there to manage the navigation of the ship, while at all times the master remains in command. The pilot provides ship handling skills and knowledge of local conditions. The master remains responsible for the safe navigation, the proper conduct of the crew and the efficient operation of the engine(s) and all other equipment.

Section 410B of the *Navigation Act 1912* provides:

A pilot who has conduct of a ship is subject to the authority of the master of the ship and the master is not relieved from responsibility for the conduct and navigation of the ship by reason only of the ship being under pilotage.

The pilot

The pilot assigned the pilotage for *Mirande* that evening had about 25 years seagoing experience in a variety of ship types. He held a Class 1 Masters certificate and had been a licenced pilot (restricted) for about one year.

When the pilot arrived at the berth at about 1730 and checked the draught he immediately realised that his licence did not qualify him to conduct the pilotage for *Mirande*, given its maximum draught of 10.05 m. He contacted the managing director of Port Phillip Sea Pilots himself a very experienced senior pilot, for instructions.

The managing director gave the pilot a verbal dispensation to pilot the vessel that evening. This dispensation was given under a long-standing, but unwritten, arrangement between the Pilot Service and the Marine Board of Victoria, whereby, under special circumstances, the managing director was empowered to provide such a temporary dispensation.

The managing director knew that it would take at least two hours to provide a substitute pilot. He was under the impression that any delay to *Mirande* would delay an incoming tanker which had a limited tidal window and for which tugs had been ordered.

The incident

On 08 June 2001, *Mirande* arrived at Port Pirie, its first Australian port of call, after a voyage from Singapore. At Port Pirie the ship loaded two holds (Nos. one and four) with 11 228 tonnes of zinc concentrate before sailing, on 11 June 2001, to Geelong anchorage to await the final part of its cargo. A cargo of barley was to be loaded in the other three, empty, holds. When the ship arrived at the Geelong anchorage on 13 June 2001, the master and some crew undertook a routine crew change.

The ship had not participated in the AusRep system, which it is required to do, neither on arrival in Australian waters nor between Port Pirie and Geelong.

On 27 June 2001, the ship berthed at No.3 bulk grain berth and loaded the barley cargo in holds two, three and five. The loading of 17 164 tonnes of cargo was completed at 1525 on 28 June 2001. During the time in port, AMSA conducted a Port State Control inspection. On 28 June 2001, at about 1200, an AMSA surveyor returned to the ship to check on the progress of rectification of a number of deficiencies. He formed the opinion that the master and chief engineer were under the influence of alcohol and advised them to cease drinking so that they would be fit at sailing

time. The master acknowledged this advice and agreed to stop drinking forthwith.

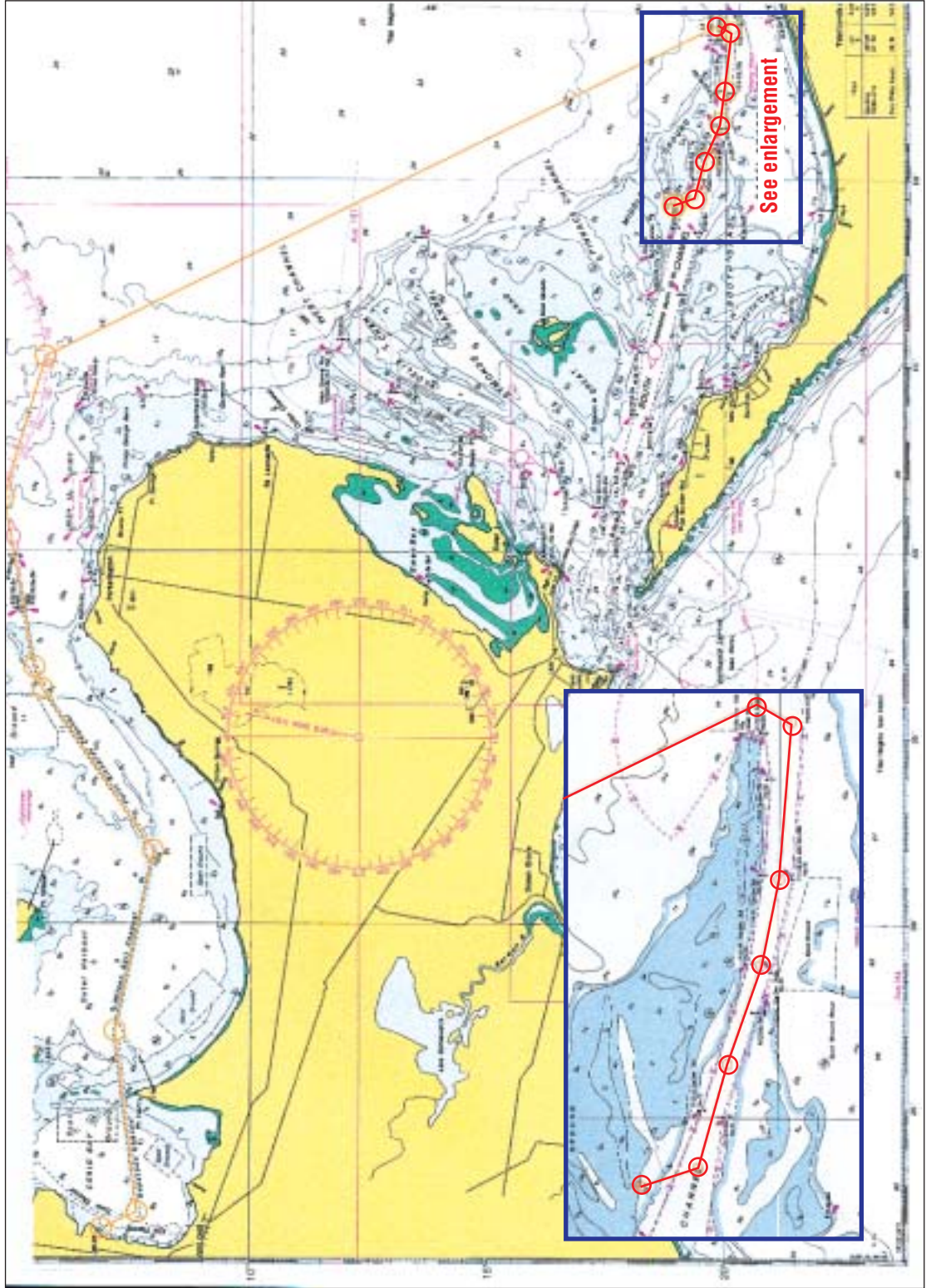
At 1700, the second and third mates, together with the deck cadet, tested the bridge equipment in preparation for departure. Sailing was scheduled for 1800. At 1730, near to completion of the tests, the deck cadet went down to the main deck to meet the pilot whom he had seen arriving at the wharf.

When the cadet arrived on the main deck he saw the pilot on the wharf. The pilot was standing on the wharf talking with the agent and berthing superintendent and making some calls on his mobile phone. The pilot had previously been advised by the Geelong Harbour Control that the departure draught would be 9.5 m, but on arrival the pilot read the drafts and found the maximum draught to be 10.05 m. The pilot was licensed to take vessels with a maximum draught of only 9.5 m so sought advice from the management of the pilotage company. He was granted permission to undertake this pilotage. At 1755, the pilot and cadet went from the wharf directly to the bridge in preparation for sailing.

The mate was on the bridge together with the third mate and a seaman/helmsman. According to the ship's staff, the master was sitting unobtrusively at the after end of the chart room area and did not identify himself to the pilot. The third mate then went aft for departure stations. The pilot had not met the master and asked to meet him for the routine information exchange prior to sailing. The ship's chief engineer, however, came to the bridge dressed in full blue uniform and, whilst not claiming to be the master, did not deny it when addressed as 'captain'. With the mate standing between the pilot and the chief engineer, the pilot explained his plan for sailing and the passage through Port Phillip Bay to the pilot disembarkation point.

At 1816 on 28 June 2001, the ship let go and proceeded to sea. Both steering motors were operating and the port system was engaged.

FIGURE 2:
Portion of chart Aus 143 showing track of *Mirande*



Shortly afterwards, the master went below to his cabin and did not return again to the bridge. The chief engineer remained on the bridge until the vessel passed Point Henry, then went back down to the master's cabin where they continued to drink together. The chief engineer returned frequently to the bridge for short intervals, apparently to monitor the ship's progress and to try and cover for the master's absence. When addressed as 'captain' by the pilot on several occasions during this time, the chief engineer did not correct the pilot on the matter of his identity.

The departure pilotage from Geelong and across Port Phillip proceeded without problem and, at about 2115, the ship rounded the Hovell Pile and commenced its passage through the South Channel to sea. The ship was, at this time, on full sea speed at about 12.8 knots with the helm on 'hand' steering. As the ship passed to the south of beacon 12, the ship's steering gear suffered a telemotor system failure and the alarm started ringing. The port steering system had failed.

The ship began to veer slowly to starboard. The mate tried to cancel the alarm while the third mate rang the engine room. None of the bridge team attempted either to change to the starboard telemotor system or to use the non-follow-up (NFU) steering controls.

Shortly afterwards, at about 2135 it was confirmed to the pilot that there was a steering failure and, as the ship continued sheering toward the northern side of the channel, he requested 'full astern'. The ship's momentum, however, and the proximity of the shallows near the channel edge meant the ship was very soon aground. The grounding, according to the pilot, occurred at 2137.

The pilot asked the chief officer to call the captain (the chief engineer) to return to the bridge but was told that he was busy. He

insisted that the captain should come to the bridge, but was again told that he was busy. The third mate intervened and said to the mate that if the pilot wanted to see the captain, he must get him. By this time, the pilot was becoming extremely suspicious about the master's absence.

The pilot ran the engine astern for ten to fifteen minutes in an attempt to free the vessel and, being unsuccessful, contacted harbour control to advise them of the situation and also to request the assistance of a representative of the pilotage company. The company sent a senior pilot to the ship and also called for the attendance of the Water Police.

The pilot, who did not want to leave the bridge, made numerous further requests for the captain to come to the bridge and was repeatedly told that he was with the chief engineer. At 2340, he asked the third mate if he, personally, would get the captain. At this point he was told that 'the captain is drunk'.

When, at 2352, the senior pilot arrived on board and was unable to contact the master, he went below to the master's cabin where he found the master slumped on the deck. The Water Police arrived on board at 0020 on 29 June 2001 and performed preliminary breath tests on the pilot and the first and third mates. The results of these were all negative. The police officer then went below and tested the master and chief engineer. The ship's pilot also went below and was surprised when told that the man on the deck before him was the master. The master's breathalyser reading was 0.29 gm/100 ml and that of the chief engineer was 0.13 gm/100 ml.

After the master, who was unable even to kneel without assistance, struck his head on the deck and started bleeding, the water police made a call for medical assistance. At about 0210, paramedics arrived on board by helicopter. The master, however, refused to be taken ashore by the paramedics.

At 2205 on 29 June 2001, the ship was refloated by salvors with the assistance of three tugs and anchored off Williamstown while divers checked for damage. The master and chief engineer, aboard at the time of the grounding, were relieved by the owners and, after a new master and chief engineer joined the ship, AMSA released *Mirande* to continue its voyage to Ma Ta Phut in Thailand.

The master later appeared in the Melbourne Magistrates' court charged, under section 386A of the Navigation Act, with being drunk on board the vessel and being unable to carry out his duties as master. He was also charged, under section 386A of the Navigation Act, with having failed to furnish a sailing plan in the prescribed manner after taking a ship to sea. He was convicted and fined on both counts.

Comment and analysis

Evidence

Interviews were conducted with the mate, third mate, the deck cadet, the helmsman, and the chief engineer of *Mirande*. The master was in an unfit state to be interviewed, even two days after the grounding. The pilot who was aboard at the time of the grounding was later also interviewed.

A technician from Electrotech, the Australian agents for Litton Marine Systems, who manufacture Sperry Marine equipment, was called to inspect the Sperry autopilot to ascertain the source of the failure, while an electrician was also engaged to examine the electrical supplies feeding the steering gear systems.

The course recorder was in operation. It was not aligned to the correct time so the offset was noted and, when checked against the compass, it was also established that the heading was six degrees low.

Steering gear

Mirande is fitted with a Porsgrunn S1230 rotary vane steering system driving a single rudder.

The steering gear is controlled by a Sperry type ADG 3000 VT Adaptive Digital Gyropilot unit fitted in the wheelhouse. This equipment is only three years old and is a high specification unit.

The bridge steering pedestal (see fig 3) has easily accessible and well-marked controls both for NFU control as well as for changing over systems and modes of operation.

The steering motor control panel is immediately to the right of the steering pedestal and contains

the start buttons, as well as alarms, lights and buzzers, for these pumps and motors.

This steering control console is supplied by two independent power supplies:

1. a 450/110 volt transformer from the port steering gear pump starter located on the port side of the steering flat.
2. a 450/110 volt transformer from the starboard steering pump starter located on the starboard side of the steering flat.

Both 450/110 volt power supplies are live at all times irrespective of whether the pump motors are running or not.

The primary side of each of these 450/110 volt transformers is fitted with two 2-amp fuses.

All this equipment was fully functional until the time of the incident. There was no record or recall of any alarms having been initiated from this unit since the ship entered service. There had been some problems earlier with an alarm on the hydraulic pumps but this problem had been rectified some months before the incident.

The examination of the Sperry Gyropilot unit and its electrical supplies, which are fed to the wheelhouse from the steering flat, revealed that the two 2-amp fuses, fitted at the primary side of the 450/110 volt transformer in the port telemotor system, had blown, causing the failure of the steering at the time of the incident.

The tests and checks carried out included measurement of the transformer temperatures of both systems (both found to be 47–48°C), measurement of the current drawn by the primary side of the transformer on each system, and measurement of the surge current drawn at 'switch on'. These parameters were also the same for both port and starboard systems.

At the end of the tests, the attending Sperry engineer and the electrician had found no

FIGURE 3:
Steering motor control panel



apparent reason for the fuses to have blown. They did, however, identify that these fuses should have been of the 'slow blow' type and not of the 'instantaneous' type which had, at some time, been fitted.

Litton Marine Systems did not comment on the fitting of 'fast blow' fuses, but did however say:

'the primary of the transformer should not be fused. The US Coast Guard requires that the secondary should have a disconnect switch and the secondary should be fused with anywhere between a 10 and 30 amp fuse after the disconnect. That is what our drawing shows for the *Mirande*. The fuses are there to protect the steering flat equipment in case remote steering shorts out. The regulation is there to prevent an autopilot system malfunction from taking out the complete steering system. Mind you this regulation only applies to ships that come under US Coast Guard rules and does not cover other regulatory bodies'.

The drawings issued by Porsgrunn Steering Gear A/S, the manufacturers of the rotary-vane steering gear, however, show the fuses fitted on the primary side of the transformers. The Inspector finds it difficult to see how fuses fitted in the secondary side of the transformer would provide protection for the power supplies to the steering flat equipment in the case of a transformer failure. For this reason it is customary to fit the fuses on the primary side of the transformer. The remote steering unit (on the secondary side of the transformer) is also fitted with fuses.

There was no record of these fuses being fitted at any time after the initial installation of the steering gear and visual examination indicated that they were probably fitted as part of the vessel's original outfit.

According to the Porsgrunn drawings, the fuses in the supply to the primary side of the transformers for the autopilot are fitted at the interface between the equipment supplied by Porsgrunn and that supplied by Litton Marine Systems.

If, indeed, the drawings held by Litton Marine show the fuses fitted in the secondary side, then it would appear that the discrepancies between the drawings held by Litton Marine Systems and Porsgrunn Steering Gear A/S and the Dalien Shipyard were not detected at the time that the systems were installed during the building.

The pilot and ship's bridge team

The pilotage company did not provide any written instructions in their procedure manuals to cover the situation confronting the pilot when he arrived at the wharf. This pilot was aware of the commercial pressure upon him in this situation but had no procedures to guide his subsequent actions. He was left with the only option of calling his superiors for instructions.

After the pilot boarded the vessel he did not see the ship's master. He believed that the chief engineer, who was conducting a 'passive' impersonation of the master, was the master. With the mate standing between him and the chief engineer during the routine pilot/bridge team exchange of information before the pilotage, he had little reason to believe otherwise.

The pilotage proceeded routinely and the mate, third mate and helmsman seemed attentive and efficient. However, the pilot was not told that the steering had failed until he asked. His first indication that something was wrong was when, after giving an order to alter about two degrees to port, he heard a high pitched sound from the area of the steering console and noticed the mate, third mate and helmsman close together looking at the steering console. Initially he was not unduly concerned. The ship was on a steady course and there was six miles of clear water

ahead. Almost immediately, however, the ship took a sheer to starboard. Initially the ship turned at a rate of 22°/min for just under three minutes slowing to about 12°/min for two minutes before slowing again to 5°/min. The course recorder indicates that, in all, between the start of the sheer to becoming hard-a-ground, 6 minutes elapsed. This is considerably longer than the time indicated by the pilot, but there is some uncertainty about the time at which the steering actually failed, the time at which the failure was confirmed to the pilot (who was initially not unduly concerned) and the time at which he might have made his notes.

The grounding should have been avoided. The ship's staff had three alternative actions to take, each of which would have restored steering. The NFU lever was just to the right hand side of, and next to, the steering wheel. Just operating this lever would have overridden the steering wheel and operated the rudder. Also at the top left of the control panel was a mode selection switch. Had this switch been turned to NFU, the NFU steering lever would have maintained steering in the non-follow-up mode. Finally, the telemotor control selection switch was switched to the port telemotor control. By turning the switch to the starboard telemotor control, full steering would have been restored.

The master did not contribute in any direct way to the grounding. His absence from the bridge, however, removed a layer of experience and knowledge, which was absent in the mate and third mate. The master has overall responsibility for the ship and, while the pilot had the conduct of the ship for the pilotage passage, the master remained responsible for the efficient operation of the ship and its equipment.

The mate had limited qualifications though he carried a dispensation to sail as mate. The fact that he, as senior officer on the bridge, either did not know or did not understand the NFU system, calls into question the validity of the dispensation. During the investigation, when

operating the course recorder, he showed a complete lack of understanding or comprehension of that equipment also.

The third mate had recently qualified after attending the Australian Maritime College. Although having limited experience as a watchkeeping officer, he should have understood, and been able to operate, the steering equipment in emergency as well as normal operating modes. The third mate's reaction was to telephone the engine room. During the investigation, when asked why he did this, he stated that there had been steering problems on previous occasions - an assertion that the chief engineer at interview denied. There had, some time ago, been alarms relating to the pumps but not to the control systems which activate a different alarm light and buzzer.

It is clear that neither the mate, third mate nor helmsman understood the operation of the steering console. The helmsman had never been instructed in reverting to emergency steering although the pilot reported that he had steered properly and responded to his helm orders promptly.

The chief engineer

The chief engineer did not correct the pilot at any time when referring to him as 'captain', either when the vessel sailed, or during any of the subsequent, brief, visits he made to the bridge. It is apparent however that, whilst he didn't actually say that he was the master, he played the role, deliberately setting out to deceive the pilot into believing that he was the master. This he later admitted in an interview with the Victoria police.

AMSA

The AMSA surveyor was aware of a potential problem on the ship at about midday.

He spoke with the master about the situation and received assurances that the master would cease drinking and therefore, in the opinion of the surveyor, he would have been sober at the time of departure. AMSA do not have procedures detailing the actions to be taken in these circumstances for the guidance of its officers.

No other authorities or organisations were advised of this situation by AMSA and no follow-up actions, after the verbal advice given by the surveyor, were taken.

Conclusions

These conclusions identify the different factors contributing to the incident and should not be read as apportioning blame or liability to any particular individual or organisation.

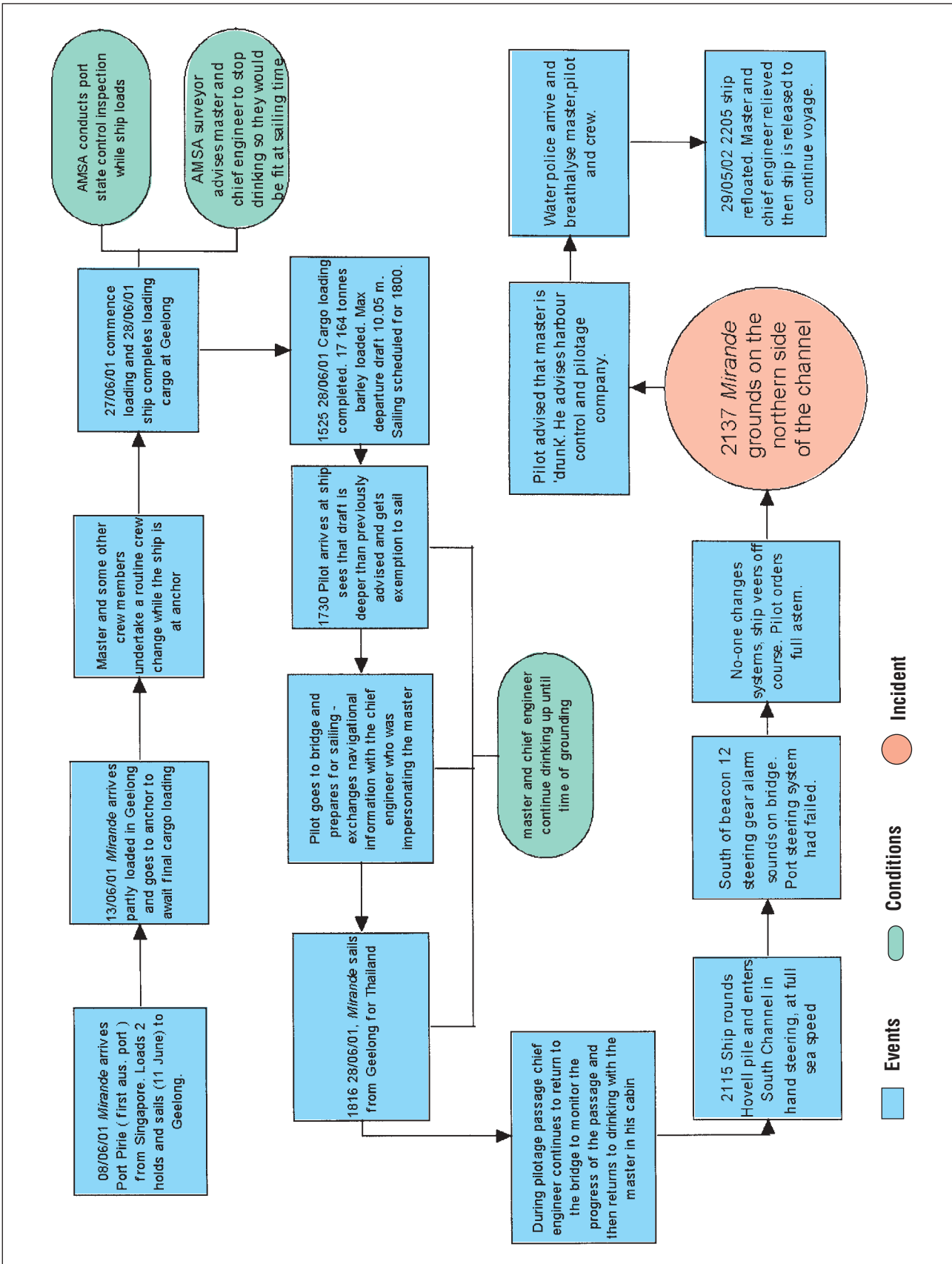
Based on the evidence available, the following factors are considered to have contributed to the grounding:

1. For a reason which could not be determined, two fuses in the primary side of the transformer supplying power to the port telemotor system blew, causing failure of the hand steering in use at the time.
2. Fuses of the 'instantaneous' rather than the 'slow blow' type had been fitted.
3. The mate and third mate had inadequate knowledge of the bridge equipment, particularly the emergency steering change-over procedures.
4. The helmsman had received no training in emergency steering procedures.

Additionally but not directly:

5. Intoxication of the master resulted in his absence from the bridge at the time of the steering failure and hence in a lack of proper leadership, experience and knowledge at a time when it was particularly needed.
6. The pilot was licensed only to 9.5 m maximum draught, however the draught was 10.05 m and he had obtained a verbal exemption from his managing director to undertake this passage. He had been advised that the sailing draught would be 9.5 m by the ship's agent.

FIGURE 4:
Mirande: Events and causal factors chart



Recommendations

MR20030012

The Australian Maritime Safety Authority should seek legislation to allow suitably trained AMSA marine surveyors, where there are reasonable grounds to do so, to measure blood alcohol levels of ship's crews using breath analysis equipment. A positive test of a master or key operational crew member should provide grounds for detaining the vessel. AMSA should also advise the relevant harbour master or marine authority of the situation.

MR20030013

The Marine Board and any pilot provider should formalise the circumstances under which exemptions from the limitations placed on a pilot's certificate may be granted. The granting of such exemptions should be reviewed by the Marine Board to monitor the frequency at which this occurs.

MR20030014

Port Phillip Sea Pilots Pty Ltd should provide written procedures to pilots operating with limited pilotage certificates and should maintain a record of all exemptions granted.

MR20030015

Ship's agents should ensure that the information provided to port operations centres and pilotage services are accurate, particularly that relating to the ship's dimensions and draught. If in doubt about the order of accuracy for requested information or the reason that the information is required, agents should seek clarification.

MR20030016

Ship's officers should ensure that they (and any appropriate seamen) are familiar with the emergency operation of all ship's equipment.

Submissions

Under sub-regulation 16(3) of the Navigation (Marine Casualty) Regulations, if a report, or part of a report, relates to a person's affairs to a material extent, the Inspector must, if it is reasonable to do so, give that person a copy of the report or the relevant part of the report. Sub-regulation 16(4) provides that such a person may provide written comments or information relating to the report.

The final draft of the report, or relevant parts thereof, was sent to:

The Australian Maritime Safety Authority;

The master, chief engineer, and owners of *Mirande*;

The Port Phillip Sea Pilots Pty. Ltd.;

The pilot;

The Marine Board of Victoria;

Harbour Master, Victorian Channels Authority.

Submissions were received from:

Marine Safety Victoria (formerly Marine Board of Victoria);

Harbour Master, Victorian Channels Authority;

The pilot;

The owners of *Mirande*;

The first mate of *Mirande*.

Mirande

IMO Number	9149689
Flag	Kerguelen Islands
Port of Registry	Port-aux-Francais
Classification Society	Bureau Veritas
Ship Type	Multi-Purpose Ship
Builder	Dalian Shipyard, China
Year Built	1998
Owner	Transmer SPM
Ship Managers	Dockendale Shipping Co Ltd, Bahamas
Gross Tonnage	18 597
Net Tonnage	9 789
Deadweight	29 538 tonnes
Summer draught	10.02 m
Length overall	181 m
Breadth	26 m
Moulded depth	14.40 m
Engine	1 x B&W 5S50MC 5 cylinder, single acting, direct reversing, slow speed diesel engine
Total power	5 998 kW
Crew	18

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