



Australian Government  
Australian Transport Safety Bureau

*safe Transport*

MARINE SAFETY INVESTIGATION  
No. 176

Independent investigation into the grounding of the  
Panama registered bulk carrier

# La Pampa



at Gladstone, Queensland  
27 March 2002



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# CONTENTS

<b>1</b>	<b>SUMMARY</b>	<b>1</b>
<b>2</b>	<b>SOURCES OF INFORMATION</b>	<b>3</b>
	Acknowledgements	3
<b>3</b>	<b>NARRATIVE</b>	<b>5</b>
	<i>La Pampa</i>	5
	The port of Gladstone	6
	The incident	7
<b>4</b>	<b>COMMENT AND ANALYSIS</b>	<b>13</b>
	Evidence	13
	Technical aspects of the steering failure	13
	The ship	16
	Gladstone Port Authority – emergency response	18
<b>5</b>	<b>CONCLUSIONS</b>	<b>21</b>
<b>6</b>	<b>RECOMMENDATIONS</b>	<b>25</b>
<b>7</b>	<b>SUBMISSIONS</b>	<b>27</b>
<b>8</b>	<b>LA PAMPA</b>	<b>28</b>



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# 1 SUMMARY

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At about 0624 on 27 March 2002, the Panama flag bulk carrier *La Pampa* sailed from the Clinton Coal Terminal at Gladstone for Fos in France. A pilot was on board and three tugs assisted the ship off the berth. The vessel was loaded with 160 927 tonnes of coal and had a deepest draught of 17.825 m.

Both main steering pumps were tested satisfactorily before departure and were running when the vessel sailed. At about 0650, just before the tugs were released, a steering alarm sounded. The rudder was stopped at hard to port, but the problem quickly seemed to resolve itself. Then, at about 0710, by which time the tugs had been released and had returned to their berth, the steering alarm sounded again.

The steering continued to operate as the chief engineer went to the steering flat to investigate. There he found that both main hydraulic inlet and outlet lines on number one steering pump were leaking large quantities of oil under pressure. This pump was stopped and then restarted but at about 0712 the steering failed. The pilot asked for tug assistance, while the chief engineer tried, unsuccessfully, to operate the emergency steering system.

At 0714, before the tugs could assist the ship, *La Pampa* grounded on the northern side of the channel. At 0722 the vessel was refloated with the assistance of the tugs and was anchored at an emergency inner anchorage. Tank soundings established that number one double bottom ballast tank was taking in water and the ballast and stripping pumps were started to control the ingress of water. During this time the chief engineer was checking the steering gear and discovered pieces of piston seal from one of the hydraulic rams lodged in a control valve.

Later in the day the decision was made to shift the ship to the outer anchorage. At 1820, with number two steering pump operating, the anchor was weighed. *La Pampa* proceeded outward with three tugs in attendance but, at 1904, the steering failed once again. The vessel then had to be assisted by the tugs to the outer anchorage where it was anchored at 2345. Repairs to the hull and steering gear were then undertaken.

The Australian Maritime Safety Authority (AMSA) detained the vessel until 14 April when repairs to the steering gear were complete and they were satisfied that the vessel was seaworthy.

The report concludes that:

- the grounding was caused by a major failure of the steering gear.
- the steering gear failure was due to the disintegration of the piston seals in the starboard steering rams.
- the failure of the seals on the suction and discharge ports on number one steering pump was the result of an over pressurisation caused by debris from the failed piston seals being passed into the hydraulic system.
- the failure of the piston seals in the starboard steering rams meant that the steering system could not be operated using either the emergency pump or number two steering pump without isolating these rams.

- The master did not direct anybody to inspect the steering gear when the initial, transitory, malfunction occurred at 0650.

The report recommends that:

- Port authorities consider the risks associated with the passage of deep draught vessels within their ports and have appropriate contingency plans in place to deal with foreseeable emergencies.

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## 2 SOURCES OF INFORMATION

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Officers and crew of *La Pampa*

Gladstone Port Authority

Gladstone pilots

Rodds Bay Maritime

Bureau Veritas

### **Acknowledgements**

Admiralty Sailing Directions, Australia Pilot III, 8<sup>th</sup> edition, 1999

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### ***La Pampa***

*La Pampa* is a 'capesize' Panama flag bulk carrier of 165 289 deadweight tonnes at a summer draught of 17.825 m. At the time of the incident, it was owned by Oltramare Shipping Company of Panama and operated by Cetragna of France. Built in 1994 by Stocznia Gdynia SA in Gdynia, Poland, it was classed with Bureau Veritas.

*La Pampa* has an overall length of 281.84 m, a moulded breadth of 44.9 m and a moulded depth of 25.4 m. The ship, of standard bulk carrier design, has nine cargo holds forward of the accommodation superstructure (see figure 1). Propulsion is provided by a 6-cylinder Sulzer, single acting, 2-stroke diesel engine of 13 300 kW. The main engine drives a single, fixed-pitch propeller giving the ship a service speed of 13 knots when loaded.

The steering gear, manufactured by Hydroster of Gdansk, Poland, is an electro-hydraulic, four-ram system, type MS2500-31-3/NI, with two electric main pumps and an electric emergency pump.

At the time of the grounding, *La Pampa* had a complement of 23, including the master, three mates, the chief and three engineers and an electrical officer. The master, mate and second mate and the chief, second and third engineers were Croatian. The other officers and crew were Filipino.

The master had been at sea since 1978, initially as a cadet, and was promoted to third mate in 1980 after obtaining an officer's licence. In 1987, he obtained a master's licence and was promoted to second mate in 1987 and to mate in 1988. In 1990 he was given command and, since then, had sailed in command of general cargo vessels and bulk carriers. He had worked for the managers of *La Pampa* since 1999 and had been on the vessel for the previous four months.

**FIGURE 1:**  
***La Pampa***



The mate had been at sea for about 35 years. He had obtained a mate's licence in 1973 and had sailed as mate since 1975, mainly on bulk carriers. He had been employed by *La Pampa's* managers since 1999 and had joined the vessel about four months before the incident.

The chief engineer had been at sea for more than 30 years, initially as an assistant engineer. He had sailed as third engineer, then second engineer and had obtained a chief engineer's licence in 1976. Since 1977, he had sailed as chief engineer. He had been employed by a manning agency with which he had completed five contracts and had joined *La Pampa* a month prior to the incident.

The pilot went to sea as a cadet in 1968. He had obtained a master's certificate in the early 1980's and had been a pilot in London, UK, from 1989 until 1997. Since 1997, he had been employed as a pilot at Gladstone, Queensland.

## **The port of Gladstone**

The port of Gladstone, one of Australia's major coal exporting ports, is a natural harbour.

The harbour is entered through the South and Gatcombe Channels, with widths of 183 metres, from sea to the outermost berths at South Trees Point. From there, the Auckland, Clinton and Targinnie Channels together lead 9 miles<sup>1</sup> west-north-west towards berths at Barney Point, Auckland Point, Clinton Wharf and Fishermens Landing. All berths are on the south-western side of the harbour.

The outer harbour channels, with a total length of 12.12 miles, are maintained to a minimum depth of 16.3 metres at low water ordinary spring tides (LWOST). Auckland and Clinton inner harbour channels, with widths of 180 metres, have lengths of 4.7 and 1.18 miles respectively and depths of 15.8 and 16 metres (at LWOST).

There are swinging basins off South Trees Point, the Clinton Coal Loader Wharf and off Fishermens Landing Wharf.

The inner anchorage areas for the harbour lie between Gatcombe Head and a position 5 miles to the north-west.

According to the Admiralty Sailing Directions, Australia Pilot III (8<sup>th</sup> edition, 1999), Gatcombe anchorages and South Trees anchorages 2½ miles north-west, in depths between 13 and 17 metres are suitable for deep-draught vessels. However, there is no definition for the term 'deep-draught vessel'.

A computerised static UKC (underkeel clearance) program is used in the port of Gladstone for vessels arriving or departing. The maximum allowable draught of a vessel passing through the various channels is based on the dredged depth of the channel plus the tide height less the underkeel clearance allowance. For *La Pampa*, the underkeel clearance allowances in the inner harbour and the outer channels were 1.2 metres and 1.8 metres respectively. The UKC program generates a schedule for the passage from the berth to the Fairway Buoy using the predicted height of the tide. Deep draught coal vessels departing the port must leave on a rising tide and maintain the schedule provided by the UKC program to ensure that they have adequate underkeel clearance throughout the 18 mile passage to the Fairway Buoy.

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<sup>1</sup> Miles refers to nautical miles. One nautical mile = 1852 metres.

## The incident

At 1848 on 25 March 2002, *La Pampa* berthed at the Clinton Coal Terminal in Gladstone. The vessel was part loaded with 73 047 tonnes of coal from Dalrymple Bay, loaded on 21 to 23 March. The vessel commenced loading at Gladstone at 1940 on 25 March.

At 0310 on 27 March *La Pampa* completed loading. The vessel was at a draught of 17.62 m forward, 17.825 m midships and 17.82 m aft, loaded with 160 927 tonnes of coal for Fos in France.

At 0500 on 27 March, using a checklist, the second mate tested the bridge equipment, main engines and steering gear, in preparation for sailing. All tests proved satisfactory.

At 0605, a harbour pilot boarded to conduct the vessel's outward passage. After being given the vessel's pilot card, the pilot discussed the procedure for departure, the passage plan and underkeel clearance, with the master.

Low water had been at a predicted time of 0202. High water was predicted for 0812 with a height of tide of 4.55 m. The passage outward was timed for a tidal 'window' on the flood tide to ensure that there was adequate static underkeel clearance in the channels.

At 0624, *La Pampa* sailed from number one berth at the Clinton Coal Terminal, with both main steering pumps running. An able-bodied seaman (AB) was at the wheel and the mate was on the bridge to assist the master and the pilot.

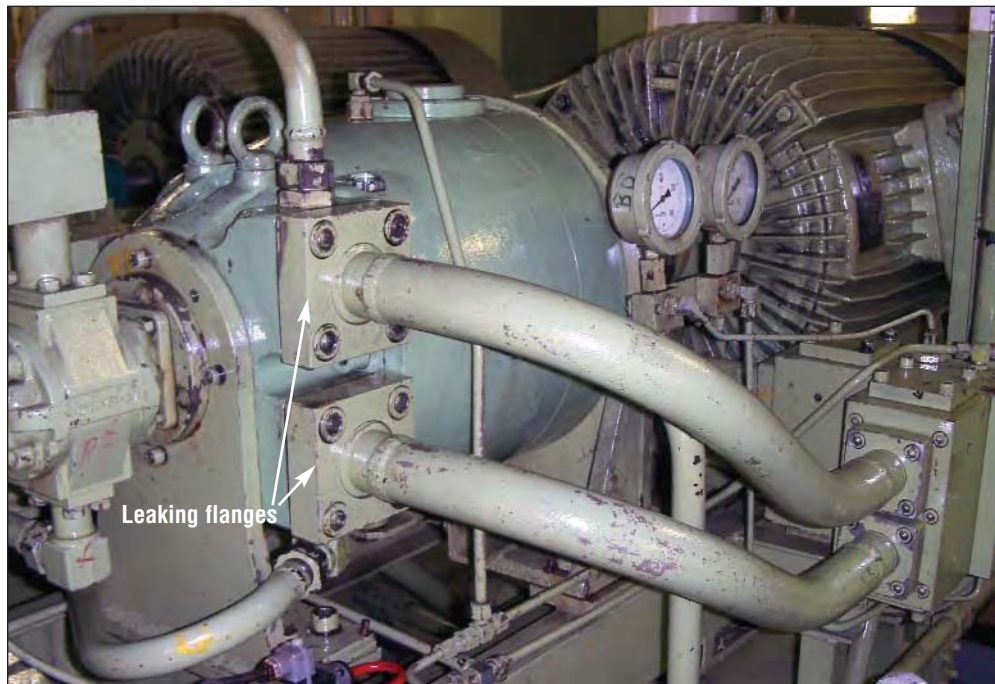
All three harbour tugs, *Wistari*, *Tom Tough* and *Kuttabul* were made fast to assist with the vessel's departure. After *La Pampa* was safely off the berth, the tug aft was released to assist the ship at the adjoining berth at the coal terminal in the event of interaction between the two ships. The other tugs remained secured to *La Pampa*, one on the port bow, the other to port abreast of the forward hatch.

*La Pampa* was stemming the flood tide and was slow to increase speed over the ground. The pilot noticed that the helmsman had been using appreciable amounts of helm to steer the required courses and ordered the engine put to half ahead, then full ahead to increase the water flow past the rudder.

At about 0650, while *La Pampa* was passing the ship at the adjoining berth, making about two knots over the ground, an alarm at the steering console sounded. The pilot was informed that the rudder was stuck hard over to port. This problem, however, seemed to resolve itself almost immediately and the rudder returned to amidships. The rudder responded to the wheel and the helmsman was able to steer the required courses.

The helmsman was instructed to tell the pilot if the rudder did not respond to movements of the wheel again. The master mentioned to the pilot that the brief malfunction was 'probably due to the use of maximum rudder angle, as the steering was of the type that the wheel had to be kept over to maintain the rudder at the required position'. The pilot informed the master that he would endeavour not to use more than 20° of rudder.

**FIGURE 2:**  
**No.1 main steering pump and motor**



At 0655, the tugs were released. The pilot had advised them that the vessel had experienced a temporary malfunction of the steering gear and they should be prepared to assist if necessary. With the vessel steering normally on the leads in the Auckland Channel, the tugs returned to their base.

At about 0710, east of Barney Point wharf, the steering console alarm sounded again. The ship was making about six knots on full ahead. Although the alarm sounded, the rudder continued to respond when the AB applied helm movements.

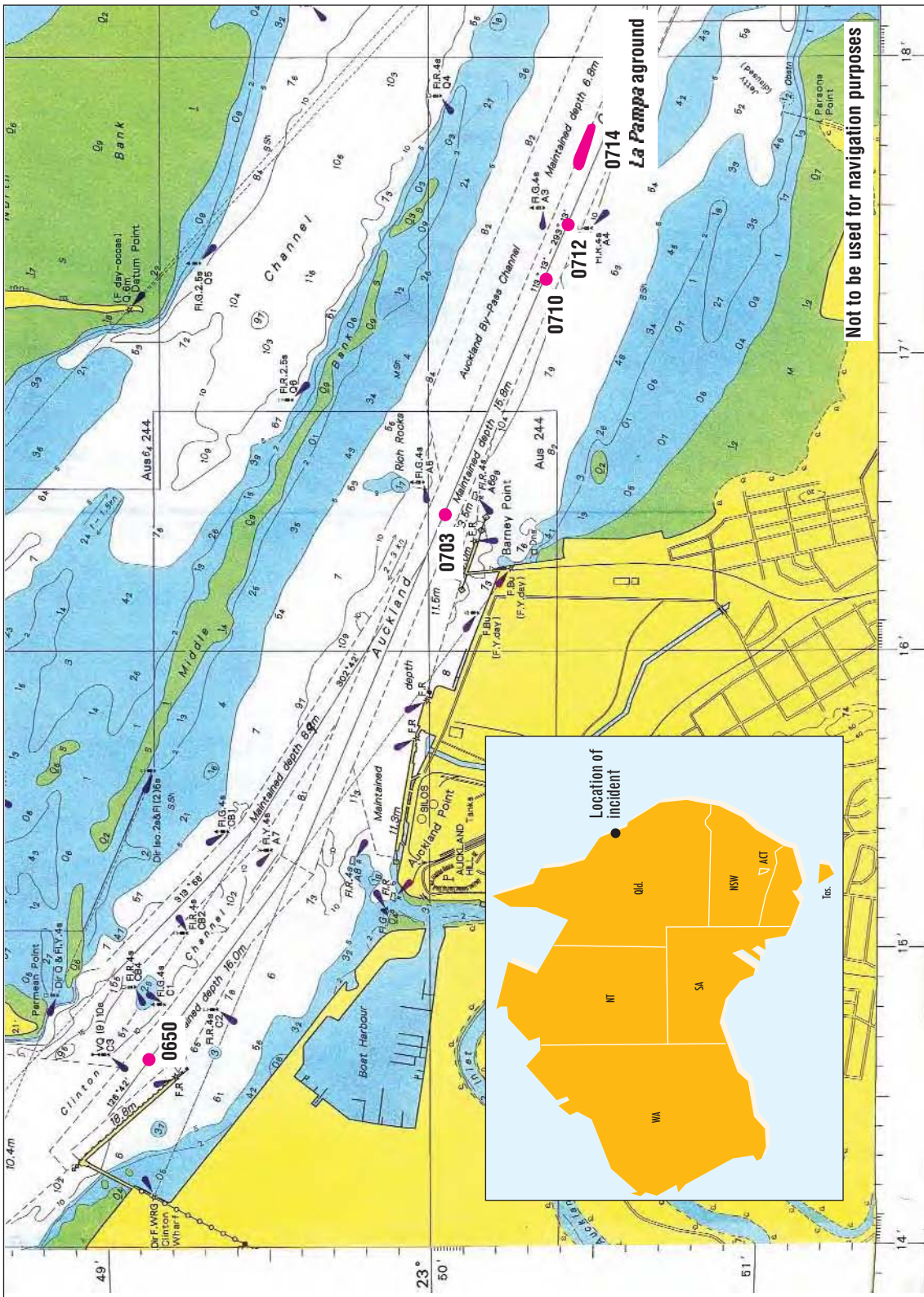
The master contacted the chief engineer in the engine control room, who went to the steering flat to investigate. The master informed the pilot that he did not know what the problem was but that the chief engineer was checking the steering gear.

In the steering flat, the chief engineer found that the suction and discharge flanges of number one main steering pump were leaking, with oil spraying out over a distance of some metres (see figure 2). He telephoned the mate on the bridge and asked him to stop number one pump. Around this time the low-level alarm on the steering gear header tank sounded.

The chief engineer assumed that the steering would continue to operate with number two pump running. However, when the mate stopped number one pump, there was an immediate loss of steering, with the rudder moving of its own accord to port. The mate, on instruction from the chief engineer, restarted number one pump but, at about 0712, the steering failed again and the rudder moved to the hard-to-port position.

Meanwhile, the master had informed the pilot that pressure might be lost in the steering system. The pilot contacted all three tugs, asking them to assist the vessel as soon as possible. He also advised the port's vessel traffic system (VTS) operator of the problem.

**FIGURE 3:**  
**Portion of chart Aus 245 showing *La Pampa's* track outward to position of grounding**



Shortly after 0712, the master informed the pilot that the steering had failed. The pilot stopped the engine, requesting that the emergency steering system be engaged.

The tugs had not yet arrived to assist the vessel when the master informed the pilot that there had been a failure of all steering systems. The pilot then ordered full astern on the engine and informed VTS of the steering failure.

**FIGURE 4:**  
**Tugs assisting *La Pampa***



The vessel developed a swing to port and, at 0714, at a speed of about 5 knots, it made contact with the bottom on the northern side of the channel, grounding on a heading of about 105°, about a cable (185 metres) east of beacons A3 and A4 (see figure 3).

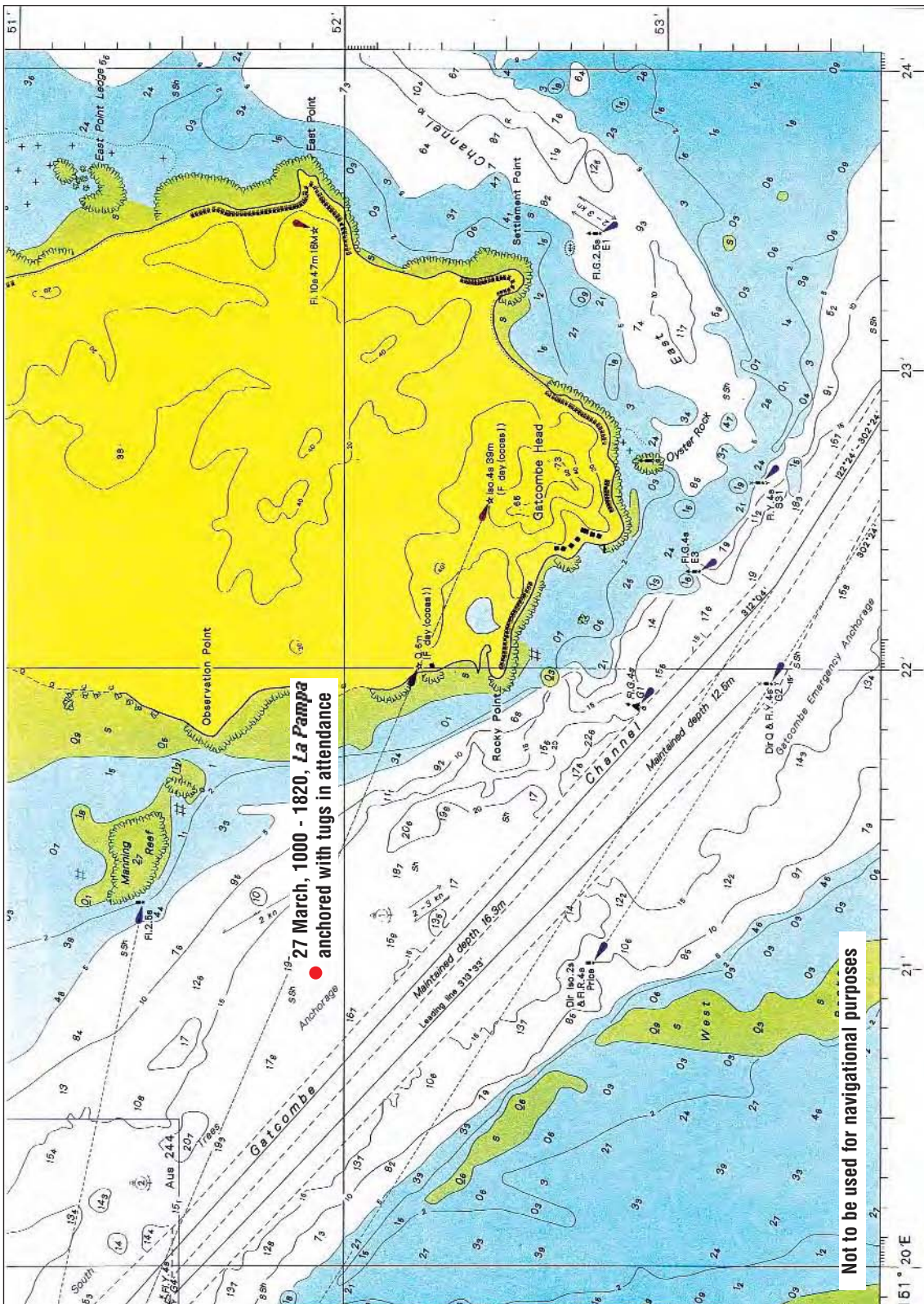
By about 0725, a tug was positioned on the ship's port bow. The tug was ordered to push the bow back into deeper water and *La Pampa*'s main engine was run full astern until the ship was back in the channel. During this time the other two tugs arrived and were made fast. All three tugs were then used to hold the vessel in the middle of the channel. Soundings of double bottom tanks indicated that number one double bottom ballast tank was taking in water. The ingress of water was controlled by using the ballast and stripping pumps.

In the steering flat, the engineers could not immediately establish the reason why the suction and discharge flanges on number one steering pump were leaking, so the chief engineer decided to concentrate on rectifying the problem with number two pump. At about 0732, the rudder was freed from its position hard-to-port, but it immediately moved hard over to starboard. The chief engineer noted that the indicating 'tell-tales' on the E2 directional control valve in the main hydraulic line for the steering were not indicating travel of the directional valve spool. The valve was not working. The chief engineer dismantled the valve and found two large pieces of rubber, later determined to be pieces of cylinder ram seal, obstructing it. He removed the pieces of seal, and, once the valve had been reassembled, the system was tested by running number two pump. At about 0821, the rudder was brought amidships, but the master informed the pilot that the steering was still not fully operational.

After consulting the master and the port authority, the pilot decided to anchor at the 'emergency' inner anchorage using all three tugs for assistance (see figure 4). The ship's steering was used until, at 0831, the rudder jammed hard over to port once more. At 0930, the harbour master and another pilot boarded the vessel.

At 1020, *La Pampa* was anchored, with 7 shackles of cable, at South Trees anchorage at 23° 51.9' S, 151° 21' E (see figure 5). The tugs remained secured to the ship, holding

**FIGURE 5:**  
**Portion of chart Aus 245 showing *La Pampa's* position at South Trees Anchorage**



it in position as swinging room was restricted. At the change of tide the tugs were used to swing the ship to the ebb tide to enable it to remain in the deepest water available.

The port authority decided to move the vessel to the outer anchorage and, at 1205, a third pilot boarded the vessel.

At 1420, number two steering pump was tested and found operational. At 1820 the anchor was weighed and, with number two steering pump running, *La Pampa* proceeded outwards with three tugs assisting. At 1904, the steering failed again, but the vessel continued outward, assisted by the tugs.

At 2345, *La Pampa* anchored off the Fairway Buoy for inspection and repairs and the harbour master and pilots disembarked. The vessel was detained by the Australian Maritime Safety Authority (AMSA) until both AMSA and the classification society were satisfied that it was seaworthy.

Repairs were carried out to both the steering gear and the hull while the vessel was at anchor. Cracks in the hull were plugged and cement boxes were fitted over the cracks in the ballast tank.

At 1700 on 14 April, *La Pampa* sailed from the anchorage for France.

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## 4 COMMENT AND ANALYSIS

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### Evidence

After the grounding, the ATSB interviewed the master, mate and chief engineer of *La Pampa*, the pilot and port authority officials. The ATSB also obtained copies of relevant documents and logbooks from the ship, together with a closed circuit TV tape from the Port Control Tower.

In January 2004 the final report on the steering failure was supplied to ATSB by the engineering contractors.

### Technical aspects of the steering failure

*La Pampa's* steering gear is a four-ram system, which utilises two main variable displacement pumps (swashplate) and a fixed displacement emergency pump. The four rams are double acting and arranged with two port and two starboard rams which are attached to the forward and after sides of the rudder tiller (see figure 6). The main pumps and associated control valves are mounted over the number two rams on the starboard side.

The system is designed so that a single main pump is normally used to operate the steering gear, with complete redundancy of both the main and control system hydraulics provided by the second pump. Both pumps may be used when the ship is navigating in confined waters where a faster response to helm orders is desirable. Variable displacement pumps deliver oil at varying flow rates in both directions, that is the ports on the pump may be either suction or discharge depending on the position of the pump control rod. When the control rod is in the neutral position, there is no flow of oil to or from the pump.

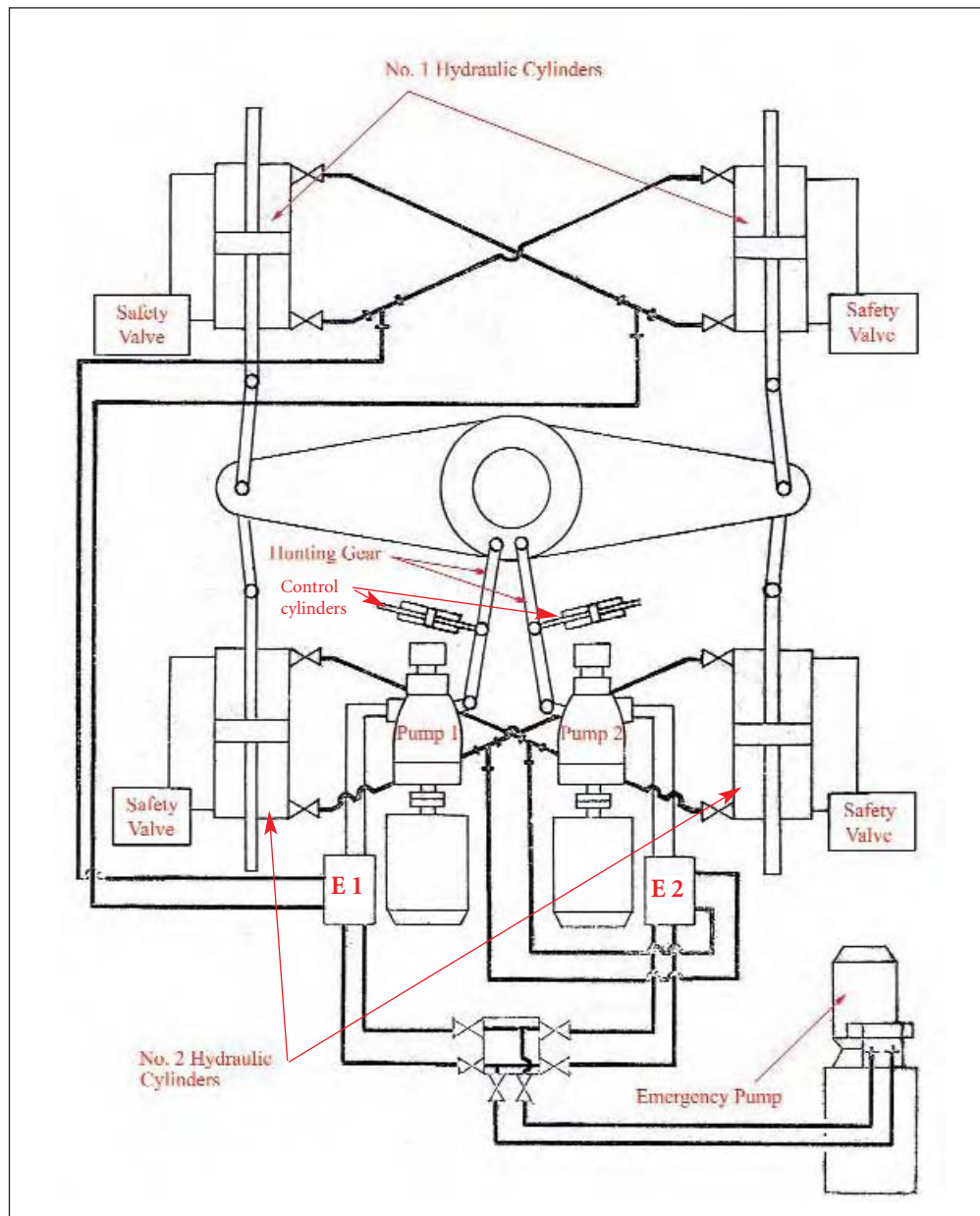
A movement of the steering wheel results in the admission of oil, through a solenoid operated valve, into one side of a double acting control cylinder. The control cylinder is attached to the mid-point of a control lever (hunting gear), which is fixed at one end to the tiller and at the other end to the control rod of a main pump. This system of control cylinder and lever is duplicated for each main pump. Admission of oil into the control cylinder results in movement of the control lever which pivots about the end fixed to the tiller. The pump control rod, attached to the other end of the control lever, is thus moved from its 'neutral' position and the pump starts delivering oil to the main rams to move the tiller in the desired direction.

The main flow of oil from each pump is via a self cut-off and a pressure valve arrangement at a rate proportional to the position of the control rod. As the wheel is rotated (and the rudder moves) to the desired position, the control lever is moved, pivoting about the fixed point formed by the control cylinder, until the pump control rod is moved back to its neutral position and flow from the pump stops. A large helm order results in higher initial pump flow which moves the tiller relatively rapidly, but as the tiller approaches the desired position, the pump flow rate falls progressively until the tiller stops at the set point. The rate of tiller rotation is thus proportional to the distance from its desired position.

Each main pump system is directly coupled to a pair of main rams. Number one pump is connected to number one (or port) rams and number two pump is connected to number two (or starboard) rams. In normal operation, with a single pump running, all four rams are actuated via a cross connection valve. The E1 valve cross-connects number one pump to number two rams and the E2 valve cross-connects number two pump to number one rams. When both main pumps are operating, the cross connection valves E1 and E2 remain open, balancing the pressures in each half of the system and the flow of oil to all of the rams. If oil is lost from either half of the system during operation, (ie. a low-level alarm occurs on a circulating tank for one of the main pumps) the relevant cross connection valve, E1 or E2 is closed splitting the system in half. The remaining pump continues to operate but only drives the two rams to which it is directly connected.

The emergency steering pump may be coupled to either half (or both sides) of the steering system via a manual valve block. The tiller may be then actuated in either direction using a manually operated spool valve.

**FIGURE 6:**  
*La Pampa steering gear schematic*



After the incident, a local marine engineering contractor, Rodds Bay Maritime, were appointed, by solicitors for the owners of the ship, to report on the technical aspects and circumstances of the steering failure, as well as on the history of the maintenance of the steering system. Extracts from their report are reproduced below.

### **Inspection during repairs**

The hydraulic rams, control valves, piping and booster pumps were dismantled and cleaned aboard the vessel by shore contractors working under the supervision of owner's superintendent, once the vessel was safely anchored.

Hydraulic system oil appeared to be in good condition, with no obvious visible signs of contamination, following sampling and allowing samples to settle. Small bronze particles, consistent with wearing of the cylinder ram seal bronze backing rings, were entrained in the oil removed from stagnant areas in the bottom, blanked ports of the cylinders in normal quantity only.

The two no. 2 starboard rams, located beneath the swashplate pumps, were found to have severely damaged rubber seals, in numerous segments. The surfaces on the remnants of the seals were smoothed.

The seals in the two no. 1 port rams were in good condition, but were renewed as part of good engineering practice.

No evidence of foreign matter was found during the dismantling, however there was:

Heavy scoring of bronze seal backing rings on both no. 2 starboard rams forward and aft. This was not in evidence on the no. 1 port seal backing rings, which indicated a smooth, bright surface.

Heavier scoring of no. 2 starboard chrome rams than in evidence on no. 1 port rams, without any evidence of any oil leakage.

No. 2 starboard aft outboard seal retaining ring was found distorted and was renewed.

No. 1 port ram seals were found to be in good condition. Reportedly all no. 1 and 2 piston seals are from original manufacture.

The self cut-off valve of no. 1 pump piloted by boost pressure from the boost pump was dismantled and proven clear by blowing out with air pressure at an early stage. No obstruction was found and the pump was also inspected and tested satisfactorily at that time.

...the Hydroster service engineer, when controlling/adjusting the no. 1 pump, found that it was not possible to operate the pressure valve located after the self cut-off valve. After investigation, some foreign matter was found obstructing the block internal balancing restriction (0.5 mm diameter), preventing the proper operation of the self cut-off valve. After freeing of this hole, the system was proved to work properly.

### **History**

The steering system had recently undergone Class survey and was tested, in accordance with normal procedures, prior to departure. Class records on board show that the steering system was surveyed in accordance with Continuous Survey of Machinery, on 08/08/01, with no noted irregularities.

The service report states that the nitrile rubber seals on the pistons in number two rams had failed completely. With the seals in this condition, oil was free to pass from

one side of the piston to the other thereby connecting the pressure side of the system to the drain side. With the cross connection valve E2 open, the whole system was effectively crippled. From the damage to the seals and seal backing rings, it is not possible to determine exactly when the seal failure occurred. However, once the seals started to break down and pick-up on the inside of the cylinder bore, disintegration would have been rapid. It is also probable that the debris, resulting from failure of the seals in one ram, flowed to the other cylinder and caused the seal failure there.

The piston seals fitted in hydraulic rams, in a properly maintained steering system, should normally last the life of the system. Given that *La Pampa* was only eight years old at the time of the incident, the age of the piston seals cannot be considered to be a factor. The system was surveyed by the classification society on 8 August 2001 and no irregularities were noted. However, this survey was a running survey and test and did not involve the inspection of internal components.

The steering gear was tested satisfactorily prior to the ship departing Gladstone, which suggests that, at that time, the starboard rams were still working satisfactorily. However a small leak across the starboard ram seals may not have had a noticeable effect on the system performance particularly when the ship was stationary and there were no hydrodynamic forces on the rudder.

When the chief engineer went to the steering flat at 0710, he found that number one steering pump was leaking oil from both flanges (its suction and discharge ports). It would appear that the seals on the pump flanges had failed as a result of over-pressurisation. The service report states that the pressure valve assembly (which includes the pump relief valves), after the self cut-off valve, was not operating correctly after the incident due to some debris lodged in the balance line in the self cut-off valve. Had this valve failed at the time of the incident, the pump would have been isolated from its relief valves and this is one possible explanation for the over-pressurisation which caused the seals to fail at the pump ports.

The chief engineer stated that the leaks from number one pump caused a low-level alarm on the number one circulation tank. At this time, the E2 valve would have closed and split the system. This is why steering was immediately lost a short time later when number one pump was stopped by the mate. At this point only number two pump was running and was only supplying the defective number two rams.

Later the chief engineer stated that he had found rubber debris jamming the E2 cross-connection valve (see figure 7). He knew it was likely that the rubber debris was from ram seals but he could not ascertain which ram or rams were faulty. It is not clear whether the cross-connection valves (E1 and E2) were both open during the subsequent operation of the system when further steering failures occurred. In any case, if the system was still split, number two pump, which was being run, would have been supplying the defective number two rams (see figure 8). If the system was cross-connected, flow across the defective number two ram piston seals meant that pressure could not be built up to drive the sound number one rams. The only way that emergency steering could have been effected at this point was by isolating number two rams and using either number two pump or the emergency pump to drive the cross-connected number one rams.

**FIGURE 7:**  
Piston seal and debris



**FIGURE 8:**  
Starboard ram piston showing damaged seal rings



## **The ship**

In terms of operational procedures, *La Pampa* followed the standard practice of running two steering pumps while in pilotage or confined waters.

The four-ram/variable displacement pump on the steering gear is considered a reliable system which would not normally require disassembly during periodic maintenance. The engineering report commissioned by the owners after the steering failure indicated no evidence of poor maintenance or any hydraulic oil contaminant, which may point to the root cause of the failure of the piston seals.

The pilot was engaged by the ship owner. While he had an obligation to conduct the ship safely, the master and the ship staff had an obligation to assist the pilot as necessary and provide him with correct information. The master, in offering an explanation for the initial, transitory, rudder malfunction at about 0650, may have confused himself and the pilot. The explanation offered made little sense as the master described a normal primary steering system. The master did not direct anybody to go to the steering flat at this stage. Had a visual inspection been made at this stage the loss of hydraulic oil would in all probability have been obvious. There was a delay of 20 minutes before a visual inspection was made and a serious problem was apparent.

Both the master and the pilot were focused on the need to generate more speed over the ground to keep the ship within the optimum tidal window and clear the 18 miles of channel. Failure to adhere to the static UKC program's time frame would result in the vessel grounding in the main channel.

As the potential seriousness of the initial malfunction was not realised, the master was not sufficiently concerned to retain a tug escort. The pilot was not aware of the problem with the steering gear, but he did inform the tugs of the initial steering malfunction and that they might be required to assist. In the event the tugs returned to their base.

The pilot called for the tugs when he was notified that the steering was losing oil pressure when the ship had passed Barney Point at about 0710, some minutes before the steering failed altogether. When the ship did call for assistance the response by the tugs was prompt.

The ship was making about six knots. Given the limited UKC and the danger of the ship sitting on an anchor, the decision to use the main engine astern without dropping either, or both, anchors was sensible.

## **Gladstone Port Authority – emergency response**

The channel, with a length of 18 miles in restricted depths, would normally have taken *La Pampa* about two hours and twenty minutes to transit. This is a long passage when the possibility of problems being encountered with a deep draught ship's main engines or steering is considered. While the failure mode of *La Pampa's* steering gear was unusual, critical machinery or equipment failure as a class of incident on board ships are a foreseeable risk. In the last three years the ATSB has investigated four such incidents in port limits and has been notified of at least two others.

In terms of the ship this can result in serious or catastrophic hull damage. In terms of port operation, possible consequences include a blocked channel or serious pollution as the result of a ship running aground. Planning against, or mitigation of, such a contingency is an obligation placed on a ship owner through the International Safety Management certification. For the port authority it is an element of providing a safe port as well as being a commercial imperative to maintain port operations.

At the time of the incident, the port authority had an oil spill emergency plan and an effective 'call out' system. The authority did not, at that time, have a specific contingency plan for vessels experiencing critical machinery breakdown.

In the event, *La Pampa's* steering failed relatively soon after the vessel had left the berth. Given the vessel's draught, the time allowed by the tide was insufficient to tow the vessel to deeper water outside the port. The decision to anchor the vessel in the deepest available water at the South Trees anchorage with tugs on stand-by was the only feasible alternative despite the significant risk of the vessel grounding on the next low tide.

One other contingency plan would involve tugs acting as an escort, either as a matter of routine, or, as in this case, where a ship experiences some problem which is not properly resolved. It must be recognised, however, that an escort tug (or tugs) is no guarantee of preventing groundings. Much depends on whether the tug is tethered, the width and alignment of the channel, and environmental factors. In addition, Hensen (1997)<sup>2</sup> comments that the full advantage of escort tugs can only be achieved by proper training of the tug crew and pilot, training which includes, procedures, communications, escort speeds, limitations of tugs, direct and indirect towing and equipment.

It is problematic whether the grounding could have been prevented if a tug, or two tugs, had been retained as escorts. *La Pampa* was under its own power and had developed a speed of 6 knots over the ground. Notification of the loss of oil from the steering system was made about five minutes before the grounding and the total loss of steerage occurred between two or three minutes before the ship took the ground. Unless already tethered at the stern, there would have been insufficient time for a tug to be made fast to exert a steering force on the ship. Given that the ship's displacement was about 185 000 tonnes and it was making six knots there was probably insufficient time to prevent the grounding, even had the tugs been present.

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<sup>2</sup> Capt H. Hensen, FNI, Tug Use in Port - A Practical Guide.



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## 5 CONCLUSIONS

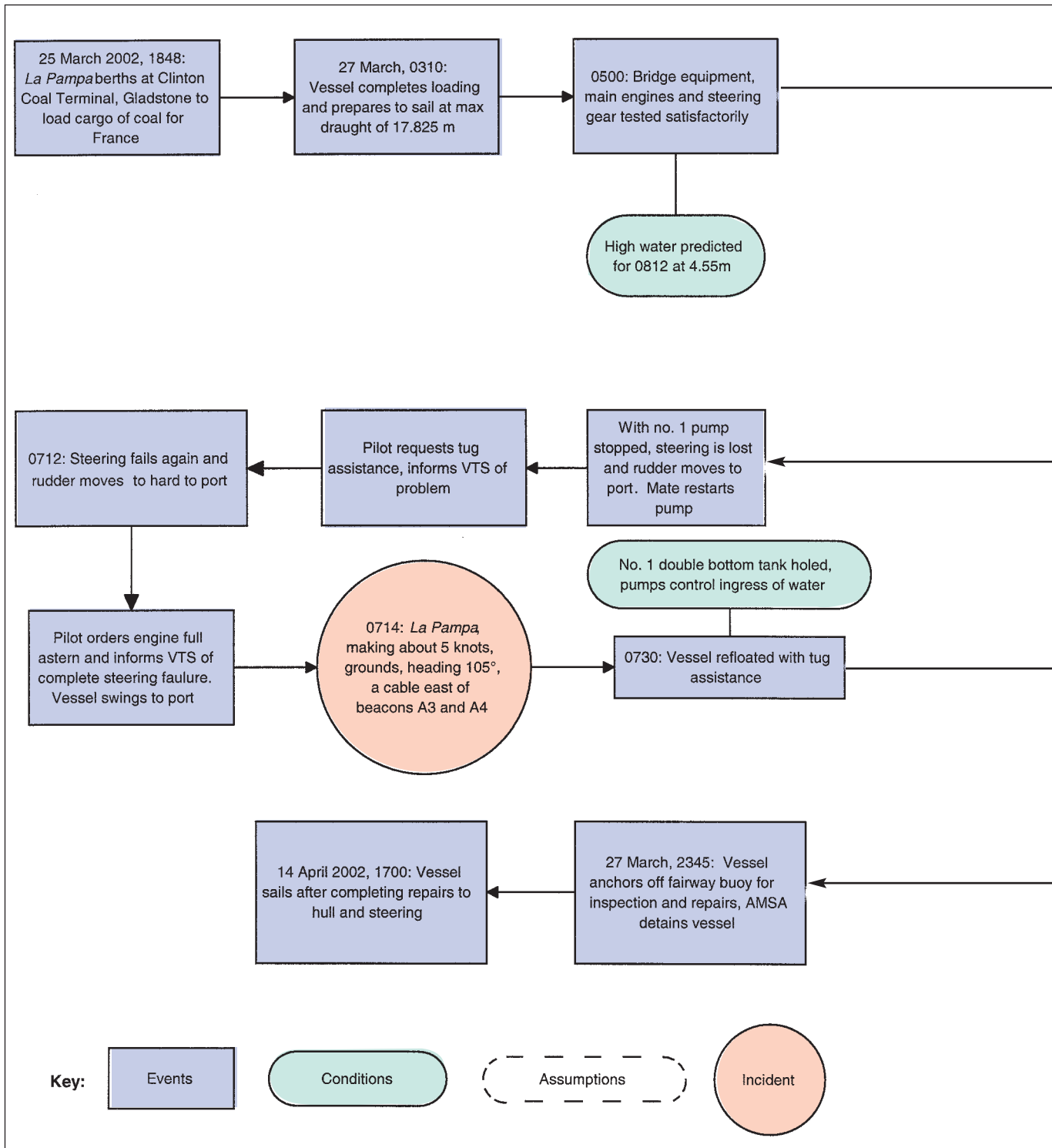
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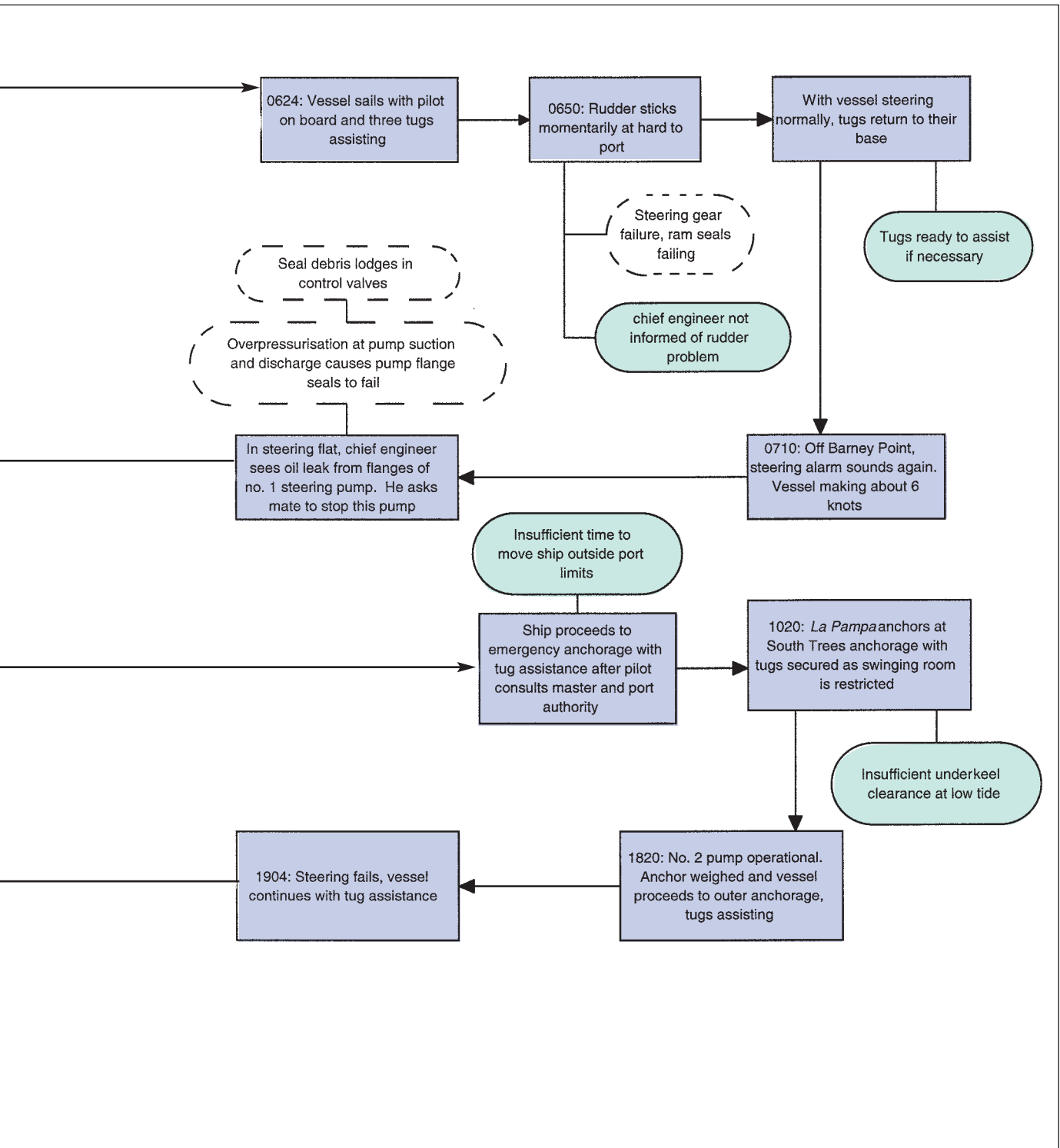
These conclusions identify the different factors contributing to the incident and should not be read as apportioning blame or liability to any particular individual or organisation.

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

1. The grounding was caused by a major failure of the steering gear.
2. The steering gear failure was due to the disintegration of the piston seals in the starboard steering rams.
3. The failure of the seals on the suction and discharge ports on number one steering pump was the result of an over pressurisation caused by debris from the failed piston seals being passed into the hydraulic system.
4. The failure of the piston seals in the starboard steering rams meant that the steering system could not be operated using either the emergency pump or number two steering pump without isolating the damaged rams.
5. The master did not direct anybody to inspect the steering gear when the initial, transitory, malfunction occurred at 0650.

**FIGURE 8:**  
**La Pampa: Events and causal factors chart**







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## **6 RECOMMENDATIONS**

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The ATSB recommends that:

**MR 20040019**

Port authorities consider the risks associated with the passage of deep draught vessels within their ports and have appropriate contingency plans in place to deal with foreseeable emergencies.



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## 7 SUBMISSIONS

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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 was sent to:

The owners of *La Pampa*;

The master of *La Pampa*;

The pilot of *La Pampa* at the time of the incident;

The chief executive officer of Gladstone Port Authority;

The manager, BV Queensland.

A submission was received from the pilot and the report was amended where necessary to reflect his comments

IMO Number	9000649
Flag	Panama
Classification Society	Bureau Veritas
Ship type	Bulk Carrier
Builder	Stocznia Gdynia SA, Gdynia, Poland
Year built	1994
Owners	Oltramare Shipping Co SA, Panama
Ship operators	Cetragpa, France
Gross tonnage	91 651
Net tonnage	50 709
Deadweight (summer)	165 289 tonnes
Summer draught	17.825 m
Length overall	281.84 m
Moulded breadth	44.9 m
Moulded depth	25.4 m
Engine	Sulzer 6RTA76
Engine power	13 300 kW
Crew	23 (6 Croatian, 17 Filipino nationals)

**Independent investigation into the grounding of the Panama registered bulk carrier**

***La Pampa* at Gladstone, Queensland on 27 March 2002**

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