Report No 158

# Navigation Act 1912
# Navigation (Marine Casualty) Regulations
# report of the investigation into
# the grounding of the Kuwaiti flag product tanker
# *Al Deerah*
# at Garden Island in the Tamar River, Tasmania
# on 30 April 2000

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**Figure 1:**
***Al Deerah***

# Summary

On the afternoon of 30 April 2000, the Kuwaiti flag product tanker *Al Deerah* arrived off the Tamar River. The tanker was carrying a cargo of gas oil, heating oil and unleaded petrol from Kwinana in Western Australia for discharge at Bell Bay and other Australian ports.

At 1600 a pilot embarked to conduct the ship to the oil berth in Bell Bay. On the bridge with the pilot were the master, the mate and a helmsman on the wheel. The tide was flooding at an estimated two knots. Shortly after boarding, the pilot ordered full ahead manoeuvring speed.

The passage through the entrance of the Tamar River is narrow and there are seven significant alterations of course within a distance of 5.5[1] miles. As the vessel entered the Tamar River and made the initial course alterations, the pilot found that the ship was sluggish to respond to the rudder. Later, on the Stone Quarry leads, significant angles of counter rudder were required to steady the vessel on course.

At about 1637 the vessel steadied on the Stone Quarry leads, approaching the wheel-over position to alter towards the south off Garden Island. At about 1639 the pilot ordered starboard rudder to bring the ship to the next heading. As the vessel altered course to starboard the pilot realised that it was turning too quickly. He ordered the rudder amidships, then to port. However, the vessel continued swinging to starboard, making contact with the bottom off the southeast edge of Garden Island. It heeled to port, then returned upright before listing to starboard.

*Al Deerah*'s cargo tanks are protected by ballast tanks and a check revealed that nos. 2 and 3 starboard combined bottom and side ballast tanks were filling with water. The master ordered that the port ballast tanks be filled to counteract the list.

At 1745, the vessel anchored in Bell Bay. The harbour master boarded the vessel to discuss the situation with the master and the pilot. He disembarked after deciding that it was safe to berth the vessel and *Al Deerah* was secured at its berth at 2215 without further incident.

Nobody was hurt as a result of the grounding, nor did any oil or other pollutant escape from the ship.

The Australian Maritime Safety Authority (AMSA) detained the vessel at 2240 on 30 April. The detention was lifted at 2100 on 1 May to permit the vessel to sail to Burnie after a classification society surveyor had viewed video footage of an underwater examination of the hull and had issued the vessel with a condition of class. The interim certificate from the class society stated that the vessel was to discharge its cargo at Burnie and Port Botany, then proceed directly to dry dock for repairs.

After discharging its cargo at Bell Bay, *Al Deerah* left the berth and anchored at Bell Bay at 0034 on 2 May, before sailing for Burnie at 0908 the same day.

[1] Miles refers to nautical miles (one nautical mile = 1852 metres)

# Sources of information

Master and crew of *Al Deerah*

The pilot

The harbour master, Port of Launceston Authority

Lloyd's Register of Shipping

Australian Maritime Safety Authority

*The Shiphandler's Guide*, (First edition 1996), Captain R W Rowe, FNI


## Acknowledgement

The Simulation Manager, Australian Maritime College

# *Al Deerah*

*Al Deerah* is a Kuwaiti flag product tanker owned by Kuwait Oil Tanker Co. (S.A.K.). At the time of the incident, the vessel was on time charter to D S Norden of Denmark and was on spot charter to BHP for a voyage from Kwinana to Bell Bay, Burnie and Port Botany.

The vessel, built in 1989 by Samsung Shipbuilding & Heavy Industries Co Ltd in Koje, South Korea, is of double hull construction and is classed with Lloyd's Register of Shipping. It has a gross tonnage of 26 356, a net tonnage of 8 643 and a summer deadweight of 35 643 tonnes at a draft of 11.28 m. It is 182.9 m in length overall, has a moulded depth of 16.5 m and a beam of 32.2 m. The accommodation and the machinery space are aft. The vessel, fitted with an inert gas system, has 8 centre tanks for cargo and five segregated ballast tanks which form the double hull around the cargo tanks.

*Al Deerah* is powered by a 5-cylinder B&W 5L60MC diesel engine developing 6 716 kW driving a single shaft and a fixed pitch propeller. The ship has a service speed of 13.5 knots. The engine room is operated as UMS (Unmanned Machinery Spaces).

The ship is equipped with the normal range of navigation equipment including 2 DGPS (differential GPS) receivers, fore and aft echo sounders, two radars and a rate of turn indicator. The bridge and chartroom are combined.

*Al Deerah* has International Safety Management (ISM) accreditation, its ISM Certificate being issued by Lloyd's Register.

At the time of the incident, the ship had 27 crew, 25 of Bulgarian and 2 of Indian nationality. The master had been at sea, on tankers, for 30 years. He had been with the company since 1982 and had sailed as 2nd mate and as mate before gaining command in 1993. The mate had 10 years experience as mate, the last two years with the owners of *Al Deerah*.

## Narrative

*Al Deerah* arrived at the pilot boarding ground for the River Tamar at 1500 on 30 April and drifted until the pilot boarded. The vessel, inbound for Bell Bay, was loaded with gas oil, heating oil and unleaded petrol from Kwinana in Western Australia. The draft was 9.38 m forward and 10.08 m aft.

The 2nd mate had drawn courses for the river passage as far as Bombay Rock. The pilot boarded at 1600 and provided the master with the passage plan from the pilot boarding ground to the berth.

Notes on the pilot's plan stated that the courses steered would vary from those shown depending on the type and size of vessel, including draft and speed, the handling characteristics and the influence of the weather and current. The master gave the pilot a pilot card with the required details of the ship on it. About ten minutes later, the engine was put to 'full ahead manoeuvring' revolutions and the vessel proceeded inward on a flood tide.

The pilot was aware from the ship's pilot card that, at full ahead manoeuvring, the engine revolutions (rpm) were supposed to be 75. The tachometer was indicating 66 rpm and the pilot brought this to the master's attention, asking for more revolutions. The rpm increased to 75 shortly after this.

The vessel was on manual steering and the mate, who was on the bridge for the passage

in the river, was monitoring the vessel's inward progress. He was plotting positions using bearings and radar distances off beacons and, later, also using landmarks. In addition, he was watching the echo sounders, advising the master of changes of depths. It was the master's first time in the river and he was making notes on the passage inward.

The vessel entered the river just after 1616 and was off Middle Bank at 1621. At 1624 the vessel passed Shear Rock and at 1634 it was just north of the alteration off Bombay Rock. The speed made good up to this point was 10.9 knots.

The pilot had found that the vessel was sluggish to start turns. He attempted some course alterations to position the vessel on leading lines using 10° of rudder. He found that if this was done early enough, he obtained the required result. If he required the vessel to turn faster, he used 20° of rudder to start the turns before easing the rudder to 10°.

The pilot found that the bridge team gave him adequate support. He was aware that the mate was plotting positions on the chart. He was also aware that the master was making notes on what seemed to be the progress of the passage.

The predicted time of low water at Georgetown was at 1406 with a height of 0.88 metres. Bell Bay Control informed the pilot that the height on the tide gauge at Bell Bay was 1.5 metres, confirming to him that the vessel had adequate underkeel clearance.

At 1637, *Al Deerah* was on a heading of 140°, coming to the required heading of 126° on the Stone Quarry leads. After the course had been altered to port off Bombay Rock, the pilot found that full starboard rudder was required to steady the vessel on the Stone Quarry leads. He also found that large amounts of starboard rudder were required to hold the vessel on the leads.

At 1640 the mate plotted a position indicating that the vessel was south west of Windmill Point, just south of the Stone Quarry leads.

The pilot estimated that the tide was astern at the time at about 2 knots. He ordered 20° of starboard rudder to start the vessel turning off Garden Island. The master, watching the rate of turn indicator, thought that the vessel was turning satisfactorily.

The pilot ordered the rudder angle reduced to starboard 10°, before ordering it amidships. As the vessel turned off the island, its rate of turn to starboard seemed to him to increase. The pilot ordered counter rudder of port 20° and, almost immediately thereafter, hard to port. Despite this, the ship continued swinging to starboard. *Al Deerah* closed on Garden Island, making contact with the bottom off the south east edge of the island at 1642.

The mate plotted a position off Garden Island on the ship's chart at this time. The distance off the island, measured from the side of the ship, was about 60 metres.

*Al Deerah* heeled about 4° or 5° to port, then returned upright. The vessel continued on at full speed, listing to starboard and, as it finally came round to port, the heel to starboard increased.

The pilot notified Bell Bay Control of the incident and requested the pilot launch to check for any oil leaking from the ship, while the master ordered a check of the ballast tanks. The master also ordered the 2nd mate, at aft stations, to see if there was

any oil from the ship in the river, whereupon he received a report that there was no oil outflow.

The pumpman sounded the tanks and found that there was water flooding into nos. 2 and 3 starboard combined bottom and side ballast tanks. The mate checked tank gauges on the bridge, estimating that no. 2 tank was filling at the rate of about 2 000 tonnes per hour and no. 3 tank was filling at about 600 tonnes per hour.

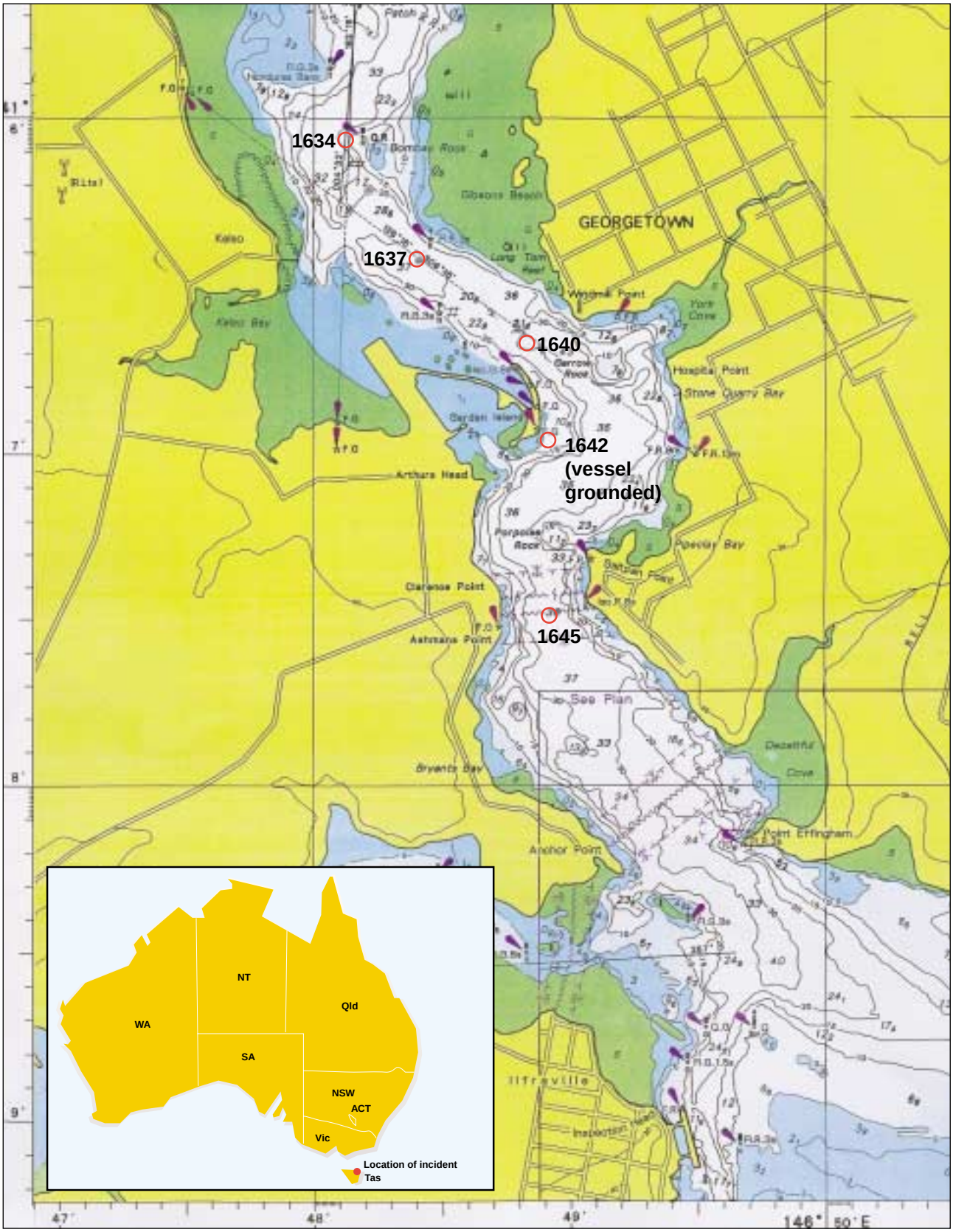
The master ordered nos. 3, 4 and 5 port ballast tanks to be filled by gravity to bring the vessel upright. At 1645½, just south of Ashmans Point, the engine was put to half ahead. Two tugs had been standing by at Sawyer's Point and, at 1700, in the vicinity of the Bell Bay Beacons, both tugs were made fast to the ship for the passage to the anchorage. At 1753, after the vessel anchored in Bell Bay, the tugs were cast off.

At 1800, the harbour master boarded the vessel to discuss the situation with the master and the pilot. The master informed his owners of the grounding and, after discussions with the owners and the harbour master, it was decided that it was safe to berth the vessel. The vessel was upright by then and the drafts were recorded as 11m forward and 10.85m aft. The harbour master disembarked at 2033, the anchor was weighed at 2054 and, with tug assistance, the vessel berthed at 2215 at no. 4 berth to discharge its cargo.

The Australian Maritime Safety Authority (AMSA) detained the vessel at 2240 on 30 April. The classification society inspected the vessel, determining the extent of damage with the assistance of underwater footage obtained by a diver. The vessel was subsequently issued with a condition of class. The interim certificate of class stated that the vessel was to discharge its remaining cargo at Burnie and Port Botany before proceeding directly to drydock for permanent repairs. At 2100 on 1 May, AMSA lifted the detention order and permitted the vessel to sail to Burnie. The vessel sailed from Bell Bay at 0908 on 2 May.

On 2 May, the water in the damaged tanks was examined by a class surveyor who found no trace of oil contamination. The vessel was unconditionally released from detention by AMSA at 1020 on 3 May, with the proviso that any pending class society requirements were to be met.

**Figure 2:**
**Portion of chart Aus167 showing positions of *Al Deerah***



# Comment and analysis

## Evidence

An investigator from the Australian Transport Safety Bureau (ATSB) interviewed the master, the mate, 2nd and 3rd mates, the radio officer and the helmsman who had been at the wheel at the time of the grounding. The interviews were conducted while the vessel was berthed at Bell Bay on 1 May 2000. The pilot was interviewed on 4 May 2000.

The following documents were obtained to assist with the investigation:

- A copy of the vessel's chart of the Tamar River with positions and times for the inward passage
- Copies of relevant pages of the deck log and bell book
- A copy of the pilot's passage plan
- The vessel's passage plan as far south in the river as Bombay Rock
- The vessel's pilot card
- The pilot's report to the harbour master
- A copy of the data logger for the engine telegraph
- The course recorder chart with rudder angle indication
- Copies of fore and aft echo sounder graphs
- The general arrangement and midship section plans.

## The pilot

The pilot was an experienced seafarer. He first went to sea as an apprentice with the Australian National Line (ANL) in 1962. He obtained a 2nd mate's certificate of competency in 1966, a mate's certificate in 1968 and a master's certificate in 1971. He remained at sea until 1973, by which time he was sailing as mate. From 1973 until 1979 he was a nautical officer with the Navigation and Survey Authority in Tasmania.

In March 1979, he was appointed assistant harbour master/pilot at Devonport, a position which he held for about 6 years. His next position was assistant harbour master/pilot at Gladstone, from 1985 until 1987, where he mainly handled bulk carriers up to 300 metres in length and 17 metres draught.

He returned to Devonport as harbour master in 1987 and, in 1989, obtained a licence for the Tamar River from Long Reach to Bass Strait. He became a full-time pilot in the Tamar in 1998.

## Bridge organisation

After the pilot boarded, the master and he exchanged information in respect of the ship's details and the plan for the passage inwards, as well as the berthing arrangements.

The pilot found that the bridge equipment was operating satisfactorily and that the bridge teamwork was of a high standard. The master was attentive to the navigation of the vessel and the mate plotted frequent positions on the chart. The helmsman understood the pilot's orders and, according to the pilot, appeared competent. In general the bridge organisation conformed with recognised practice.

## The channel

The pilotage, from the boarding ground to Bell Bay, is about 11 miles in length. Most of the passage is in a narrow channel between the east and west banks of the Tamar River. From the mouth of the river, there are seven alterations of course in the channel as far south as Point Effingham, a distance of about 5.5 miles. The channel is about 280 m wide at the entrance and has a minimum width of about 210 m.

About three miles into the channel, inbound ships alter course to port off Bombay Rock, through almost 60°, to bring the Stone Quarry leading marks into transit. This leg of the passage, from settling on course to the wheel-over position off Garden Island, is just over half a mile in length. Off Garden Island, where the channel width between Garden Island and Garrow Rock is about 250 m, ships make an alteration to starboard of about 90°.

## The pilot's report

The pilot's report to the harbour master after the grounding contained details of the passage from the time that he boarded *Al Deerah* until he anchored the vessel at Bell Bay anchorage after the incident.

The following are extracts from that report:

> I boarded the vessel at approx. 1600 hours in the vicinity of the Pilot Boarding Ground. The weather was North Westerly 20 knots with occasional rain squalls.
>
> During the usual alterations of course to put the vessel on the Entrance leads, the steering was sluggish. Further south in the river, turning to port off Bombay Rock, it was noted that the steering was sluggish, but consistent with her form and proportion and the stated draught…
>
> The alteration of course round the Shear Reef Beacon was carried out normally, although it was noted that if I had delayed the alteration I would have needed extra starboard helm which would have resulted in considerably more counter helm to settle the vessel on her new course to pass NW Bank beacon.
>
> Rounding Bombay Rock, I took into account these handling characteristics, but still required a considerable period of hard to starboard helm to settle the vessel on to the Stone Quarry leads. I commenced the turn to starboard at about the usual position for a vessel of that type. My distance off the island was also normal. I reduced the helm from starboard 20 to starboard 10, then midships, as I could see that the flood tide run off from the northern end of the island was going to continue the starboard swing without the starboard helm. This proved to be the case.
>
> About halfway round the island the rate of turn to starboard appeared to increase slightly. I applied port 20 helm and almost immediately applied full port helm. Full port helm was maintained for approx. 45 seconds before 1642 hours. The rate of turn to starboard did not reduce, in fact appeared to be increasing. The vessel was consequently coming closer to the island. At 1642 the vessel grounded on the South East corner of Garden Island. At about this time, the vessel began to swing to port.
>
> Prior to the grounding the vessel's speed was in excess of 10 knots, reducing to just over 9 knots at the larger course alteration points.

According to *Al Deerah*'s pilot card, the speed at full ahead manoeuvring rpm was 12.1 knots for the loaded condition. The vessel's manoeuvring characteristics for loaded and ballast conditions were based on calm weather, no current, water depth twice the draft or greater and a clean hull. A warning, appended to the manoeuvring characteristics, cautioned that the response of the vessel might differ if there was a difference in any of those conditions or at intermediate drafts or unusual trim.

The course recorder and rudder angle traces support the pilot's account of events.

## The course recorder chart

The accuracy of the times of the ship's plotted positions on the navigation chart against the times of course alterations as shown on the course recorder could not be established. However, the course recorder does provide an accurate record in terms of relative time and, for this analysis, the time of the contact with the ground is taken as 1642.

The vessel's course recorder also recorded rudder angles.

It is possible that both the course and rudder angle traces were out of calibration. The course recorder showed a course of 130° instead of 126° while the vessel was on the Stone Quarry leads, indicating a possible error of 4°.

The rudder angle trace showed 2 1/2° to port when the rudder was amidships, indicating an offset of 2 1/2°. In addition, during the river passage, when the rudder was moved in a direction from port to starboard, the stylus produced a trace which sloped slightly backward in relation to the time base, indicating some distortion in the instrument.

To assist with the analysis of the incident the course and rudder angle traces were expanded along the length of the course recorder chart (see diagrams on pages 10 & 11 for copies of the original trace and the expanded chart).

From the course recorder and the rudder angle recorder, it was possible to verify courses and rudder angles off Bombay Rock as well as on the Stone Quarry leads and up to a point shortly after the grounding.

The course south of Toroa Patch was 184 1/2°. The next course, on the Stone Quarry leads, was 126 1/4°. At 1634, to turn the vessel to port off Bombay Rock and on to the Stone Quarry leads, the pilot used 20° of port rudder for about a minute, before the rudder was brought amidships. The recorded rudder angles showed that the pilot then used full starboard rudder for about a minute and a quarter to steady the vessel on the leads after the course alteration.

Within the next two minutes, various large angles of starboard rudder were applied to maintain the vessel on the Stone Quarry leads, confirming the pilot's statement in his report to the harbour master that he had used large rudder angles to steady the vessel on those leads.

The course recorder chart shows that the ship was steady on the Stone Quarry leads on a heading of just over 130° from shortly after 1637 until shortly after 1639 1/2. To start the vessel turning to starboard off Garden Island, the pilot recalled that he ordered starboard 20° for about 20 seconds.

There are discrepancies in recollection of the amount of helm used to start the turn off Garden Island. The master's recollection was that the rudder was put to about starboard 10-15° to commence the turn. However, in the opinion of the mate and the helmsman, the rudder was put hard to starboard to commence the turn.

The rudder angle recorder shows that the rudder was put over to about 22° to starboard.

The course recorder shows that the change of course as a result of this helm movement started at 1639 1/2. The course changed from about 130° to 160° in about a minute. In the meantime, the pilot had ordered port 20° and then full port rudder to slow the turn.

**Figure 3:**
**Course and rudder angle traces of *Al Deerah***

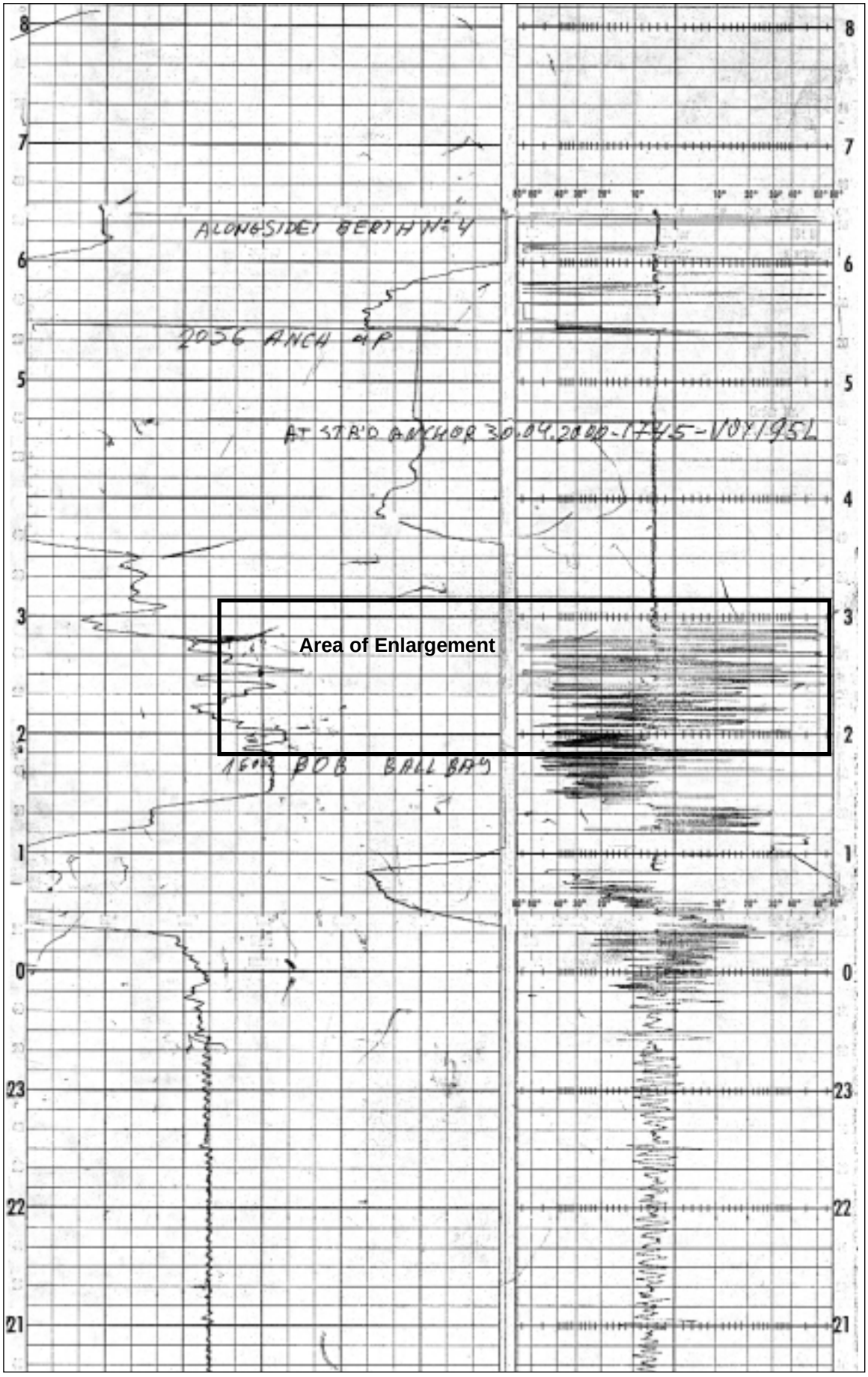
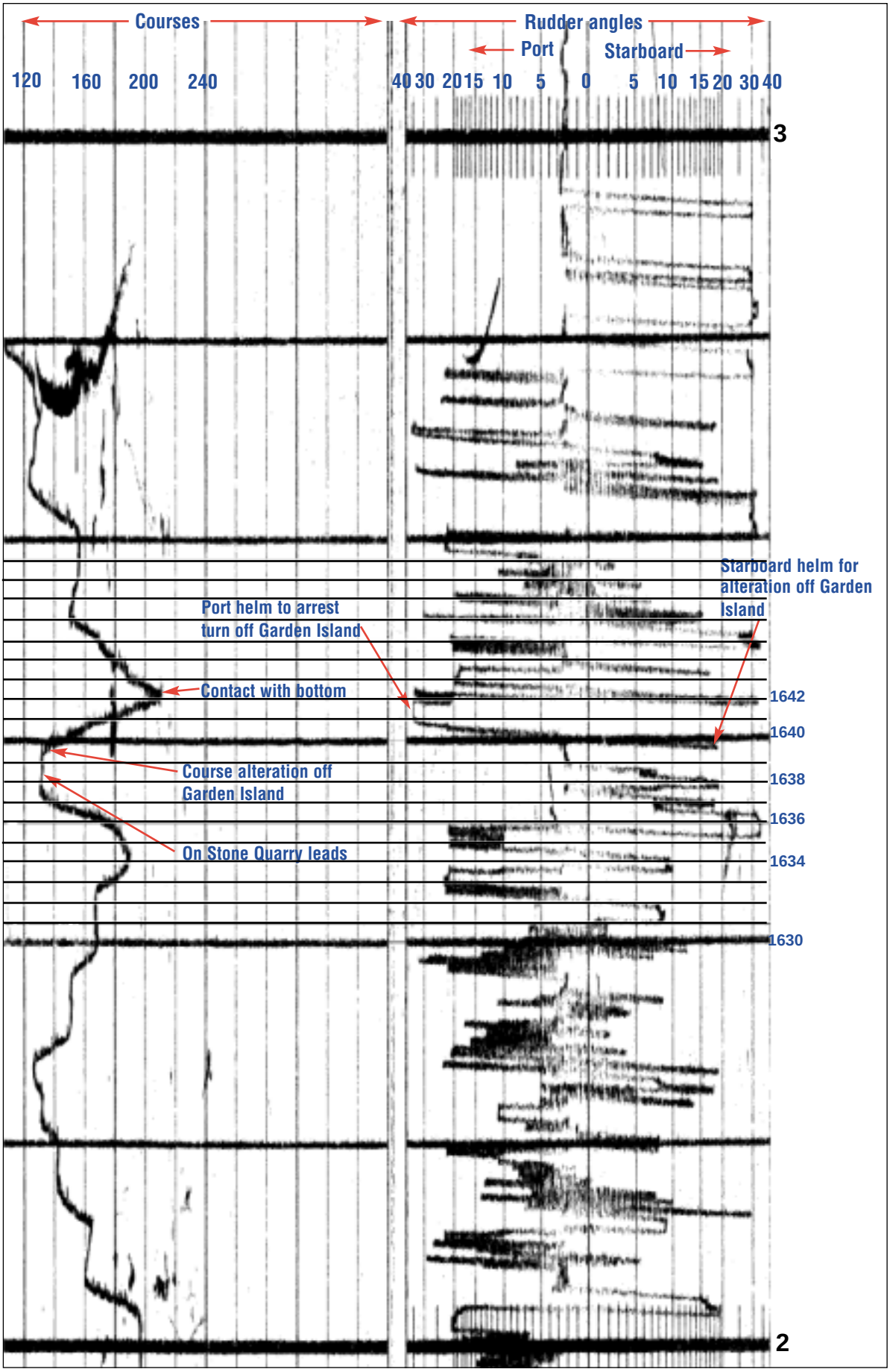


**Figure 4:**
**Enlargement of course and rudder angle traces (in ship's time)**



The rudder angle recorder appears to indicate that it took almost a minute for the rudder to move from amidships to hard over to port. However, given the distortion in the trace together with any cumulative delays in issuing and responding to helm orders, first to port 20°, then hard over to port, the time taken is not considered significant.

Despite the rudder being put over to port, the course recorder shows that the ship's head went to about 170° at 1641, from which time, after the rate of turn appeared to have slowed momentarily, the course increased to a maximum of 210° at 1642. Contact with the bottom off Garden Island is considered to have occurred at this time.

The vessel then came around to port from 210° to 150° as the pilot conned the vessel off Garden Island and round Saltpan Point.

## The alteration off Garden Island

A local pilot advised that the optimum wheel-over mark to start an alteration off Garden Island on a southbound passage is when the first and third lights on that island are in transit. As the turn is made, the least distance off the island can be maintained at about 0.05 miles or about 90 metres.

The course recorder chart shows that the alteration to starboard commenced shortly before 1639 1/2. The amount of rudder used to start the turn was about 22° to starboard. Counter rudder was applied within a minute of the start of the turn, increasing to full port rudder for about a minute before the grounding. Despite the counter rudder, *Al Deerah* sheered to starboard, grounding at about 1642 in position 41° 06.96'S, 146° 48.90'E, with Point Effingham light bearing 154° (T) distance 1.34 miles.

The grounding occurred about 2 1/2 minutes after the ship's head started to move to starboard following the wheel-over command to alter course to pass to the east of Garden Island.

The mate had plotted two positions while the vessel was on the Stone Quarry leads. The distance between the two positions was 0.39 of a mile (723 m), indicating a speed of about 7.8 knots. The average speed from the time of embarking the pilot to the 1640 position was about 10.54 knots. When fixing a ship's position there are inherent inaccuracies caused by the time lapse between observing angles, distances or positions and recording the time. These inaccuracies are amplified over short distances and when navigation marks are close to the ship. How closely the mate's time base was aligned with the course recorder could not be established. For these reasons, it is not possible to reconcile the ship's plotted positions with the course recorder chart to allow any form of accurate comparative analysis.

## Effects of tides

*The Shiphandler's Guide*[2], a Nautical Institute publication, contains information relevant to the grounding of *Al Deerah*.

On the effect of tides, the publication states:

> Whilst on the one hand, it is possible to offer easy explanations concerning the effect of the tide, it is on the other hand difficult, because the tidal flow in and around jetties and waterways can be extremely complex.
>
> It should also be borne in mind that a mass of water on the move is several hundred times denser than air and thus by comparison is capable of generating forces of enormous magnitude.

[2] *The Shiphandler's Guide*, Capt R W Rowe, FNI

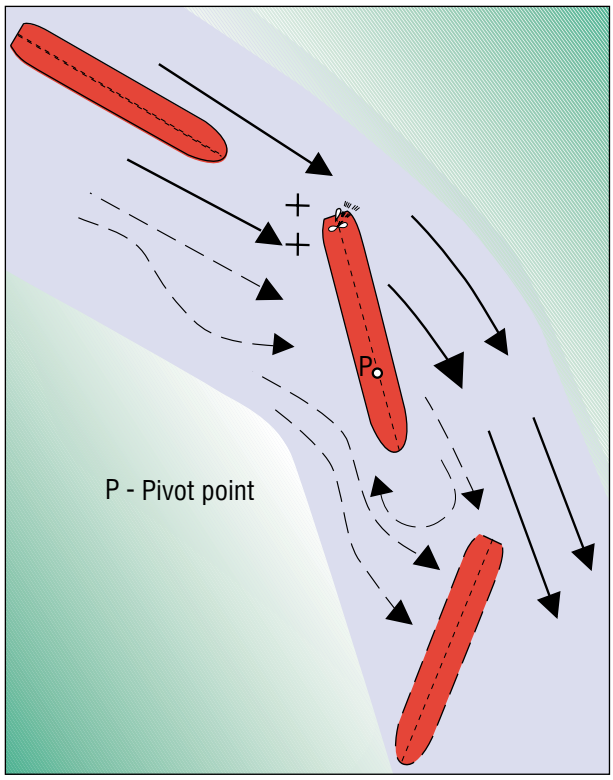
With the tide from astern: This is a most unsatisfactory situation and one where it is extremely difficult to maintain positive control of the ship…In order to maintain headway over the tide (with a 1.5 knot tide from astern), or through the water and so keep the pivot point forward, the ship would have to be running at a speed over the ground which is considerably higher than the speed of the tide. This will often be far too fast!

…It can be very difficult to keep control of a ship with a following tide. If practicable it is always preferable to stem the tide!

…The bends in a tidal river are a good example of areas where the tide may be of differing strengths, perhaps running very rapidly on the outside of the bend but relatively weaker on the inside of the bend.

With a following tide: If a relatively large ship is rounding a bend in a channel, with a strong following tide, it is possible for the ship to be positioned so that the strong tide is working on the after body of the ship, whilst only the weaker tide is influencing the fore body. With the pivot point forward the strongest tide is thus working on a good turning lever and a turning force of considerable magnitude is created (see diagram, below).

**Figure 5:**
**Possible effect of tide**




A ship can react both violently and rapidly to this force and it should never be underestimated.

Whilst it may be anticipated and corrected with a kick ahead of full power, sometimes this will not be sufficient to counteract the large force involved and the ship will continue to swing around, with the serious possibility of subsequently going aground.

## The grounding

At the time of the grounding, the engine was at full ahead manoeuvring revolutions (75 rpm) with the tide from astern, estimated by the pilot to be about 2 knots.

Off Garden Island, when the ship did not respond to counter rudder, the only means of increasing the water flow past the rudder to increase its effectiveness would have been to increase the engine revolutions by overriding the engine load program. While this could have been done quite quickly, it is unlikely, given the very short span of time and the confined boundaries of the fairway, whether the increase from 75 rpm to 87 rpm (full sea speed) would have had any effect.

It is normal practice to enter and navigate the approaches to Bell Bay at full ahead manoeuvring revolutions at any stage of the tide. This increases the manoeuvrability of the ship and particularly the effect of the rudder.

It is possible that, as the vessel turned to starboard approaching Garden Island, the bow encountered the effects of a tidal stream flowing at a slower rate than that at the stern. This would have accentuated the effect of the starboard rudder that was used to start the turn.

With the bow canted in towards the island and in close proximity to it, the restriction to the flow of water between the island and the bow could have resulted in an increased velocity of the flow. This would create a low

pressure area between the bow of the ship and the bank with the result that the bow would be drawn towards the island. In the case of *Al Deerah* it is possible that this occurred causing additional movement of the bow towards Garden Island.

Despite the pilot's use of the rudder hard over to port there was insufficient rudder effect to arrest the turn and prevent the vessel contacting the bottom. The effect of the tide on the stern was probably much greater than the effect of the rudder, causing a large turning force to starboard acting on the pivot point situated forward.

There were no problems with the vessel's steering gear.

## Damage to *Al Deerah*

An underwater examination just after the grounding revealed that the vessel had sustained damage to the bottom in way of no. 2 starboard and no. 3 starboard combined bottom and side water ballast tanks. The bottom plating in way of the starboard bilge at about frame 160 was set up about 500 mm.

The shell plating was holed at about frame 166 with a 1.2 metre longitudinal split about 150 mm in width. There was also a hole in the shell 400 mm long, 250 mm wide at frame 143, below and around the starboard bilge keel. A crack extended from the top of this hole around the bilge keel pad.

The ballast tanks were protectively arranged around the cargo tanks, but no. 1 heavy fuel oil storage tank, between the fore peak tank and no. 1 cargo oil tank was unprotected. Damage to this area of the ship could have resulted in an outflow of heavy fuel oil into the river.

# 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 incident:

1. The effects of starboard rudder and differing tidal strengths at the bow and the stern of the vessel resulted in the vessel sheering to starboard.

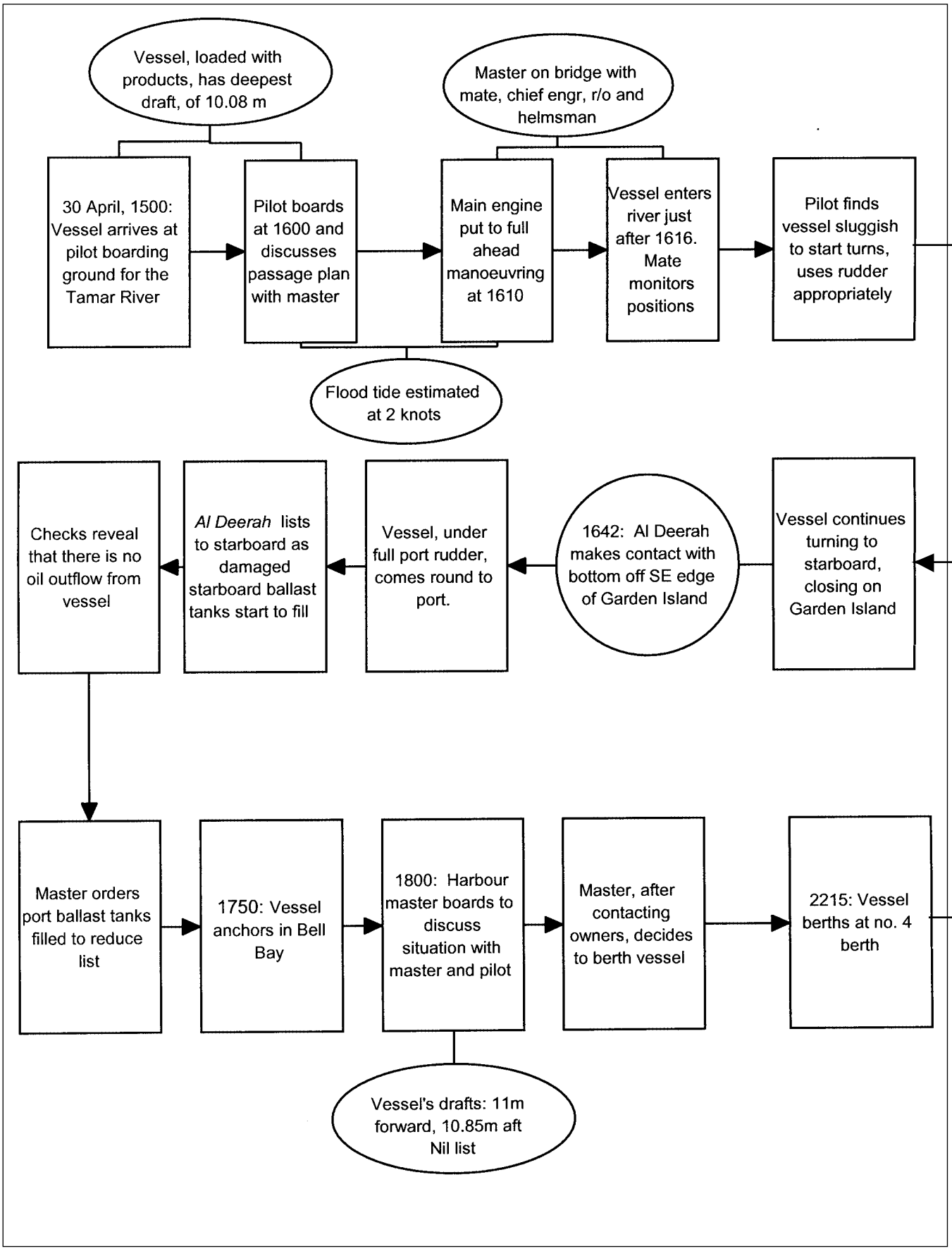
2. The sheer to starboard may have been accentuated by a hydrodynamic force to starboard acting on the bow as the vessel closed on Garden Island.

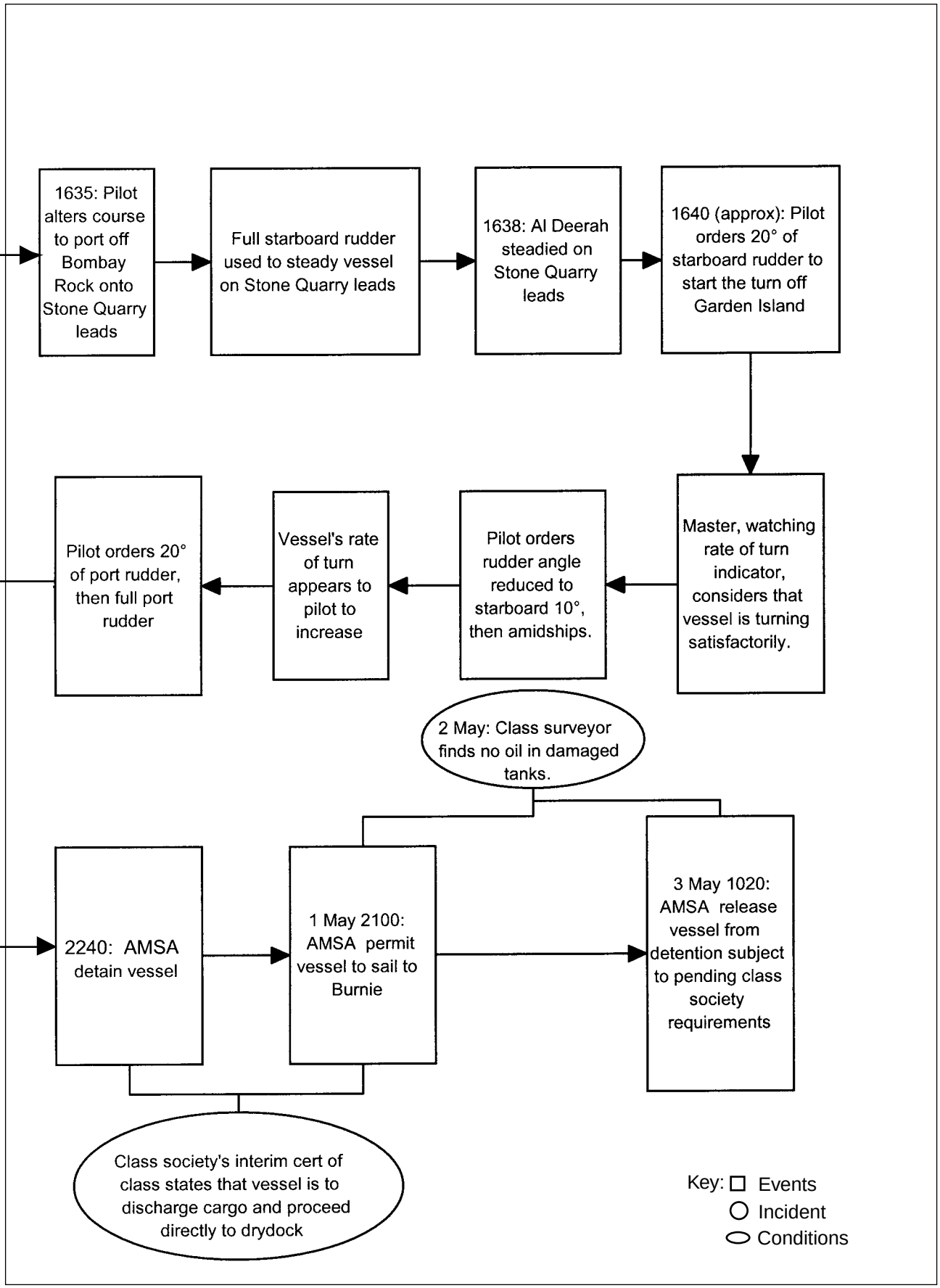
3. The rate of turn from the wheel-over position north of Garden Island was more rapid than had been anticipated and could not be reduced although full counter rudder was applied.

4. According to the rudder angle recorder, the rudder was hard to port for about a minute, but there was no response until contact with the bottom off Garden Island, when the vessel began swinging to port.

5. The vessel was at full ahead manoeuvring speed and it is probable that any attempt to increase the propeller revolutions, after it became apparent that counter rudder was not affecting the rate of turn, would not have prevented the grounding.

**Figure 6:**
***Al Deerah* grounding off Garden Island: Events and causal factors chart**




1635: Pilot alters course to port off Bombay Rock onto Stone Quarry leads
Full starboard rudder used to steady vessel on Stone Quarry leads
1638: Al Deerah steadied on Stone Quarry leads
1640 (approx): Pilot orders 20° of starboard rudder to start the turn off Garden Island
Master, watching rate of turn indicator, considers that vessel is turning satisfactorily.
Pilot orders rudder angle reduced to starboard 10°, then amidships.
Vessel's rate of turn appears to pilot to increase
Pilot orders 20° of port rudder, then full port rudder
2 May: Class surveyor finds no oil in damaged tanks.
2240: AMSA detain vessel
1 May 2100: AMSA permit vessel to sail to Burnie
3 May 1020: AMSA release vessel from detention subject to pending class society requirements
Class society's interim cert of class states that vessel is to discharge cargo and proceed directly to drydock
Key: Events
Incident
Conditions

# 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 pilot and the harbour master of the Port of Launceston, the master, the mate, owners of the vessel and the Australian solicitors for the owners of the vessel.

Submissions were received from the harbour master, the pilot, the owners and their solicitors and the report was amended where appropriate.

The pilot's submission stated in part:

> I was comfortable with the point at which I initiated the turn round Garden Island, and was satisfied with my distance off the Island during the first (approx) ½ of the turn from (approx) 126° True to complete the turn to steady on (approx) 190° True towards Ashmans Point, prior to turning to port to round Saltpan Point.
>
> Given that the tidal flow is variable and at times not in line with the channel, only experience can dictate the amount of helm required to (a) initiate, and (b) to maintain and control, the safe negotiation of the alteration.
>
> By the time I realised that, in spite of hard-to port helm, the vessel was heading into danger, there was no time (and no point) in asking for Emergency Full Ahead revolutions. I did not consider stopping the main engine because I would have lost control and grounded elsewhere. As it turned out, I required every amount of control available to keep the vessel in the channel until the tugs could attend to assist the directional stability of *Al Deerah*.
>
> ...With the flood tide acting on the starboard quarter and the flow coming out of York Cove on to the port shoulder towards Ashmans Point, there is a couple created to keep the vessel swinging to starboard round Garden Island. Experience dictated that the swing should be kept under close control, which is what I endeavoured to maintain.

The owner's submission contained the comments,

> With reference to the draft investigation report
>
> ...it states that the pilot ordered 20° of starboard rudder to start the turn off Garden Island. However, the course recorder / helm indicator shows the helm at 25 degrees (hard over). In addition, the master and helmsman have stated that the pilot ordered the helm hard over. The helmsman did not put the helm over the extra amount, he put the helm hard over as instructed.
>
> We believe that given the small margins of error off Garden Island the river transit should have been planned for an ebb tide.

Solicitors for the owners stated in part,

> We set out the following issues and comments raised by our client in relation to the draft report in the hope that it will be of some further assistance:-
>
> The pilot, upon boarding the vessel, handed the Master a passage plan, presumably based upon his experience and local knowledge of the river, and a comprehensive evaluation of the courses to be steered and conditions that might be encountered on the passage from the pilot's boarding ground to the berth.
>
> The draft report refers to The Shiphandlers Guide insofar as it relates to 'the effect of tides'. Our clients accept the relevance and accuracy of the points raised.

# Recommendation

These recommendations are published recognising that corrective action may already have been taken by parties to address the safety issues identified by the investigation.

The duties of a port authority include an obligation to facilitate the safe use of that port.

The owners of *Al Deerah* have stated that they believed, given the small margins of error off Garden Island, that the river passage should have been planned for an ebb tide.

The Inspector recommends that the Port of Launceston Authority review the conditions, including tidal conditions, under which vessels enter and depart the port, consulting as appropriate with the owners and managers of such vessels.

# Details of *Al Deerah*

| | |
|---|---|
| IMO Number | 8619455 |
| Flag | Kuwait |
| Classification Society | Lloyd's Register of Shipping |
| Ship Type | Oil tanker |
| Builder | Samsung Shipbuilding & Heavy Industries, Koje, Korea |
| Year Built | 1989 |
| Owner | Kuwait Oil Tanker Co. S.A.K. |
| Gross Tonnage | 25 356 |
| Net Tonnage | 8 643 |
| Summer deadweight | 35 643 tonnes |
| Summer draught | 9.76 m |
| Length overall | 182.88 m |
| Breadth | 32.23 m |
| Moulded depth | 16.5 m |
| Engine | B&W 5L60MC 2SA 5 cyl |
| Power | 6 716 kW |
| Crew | 27 |