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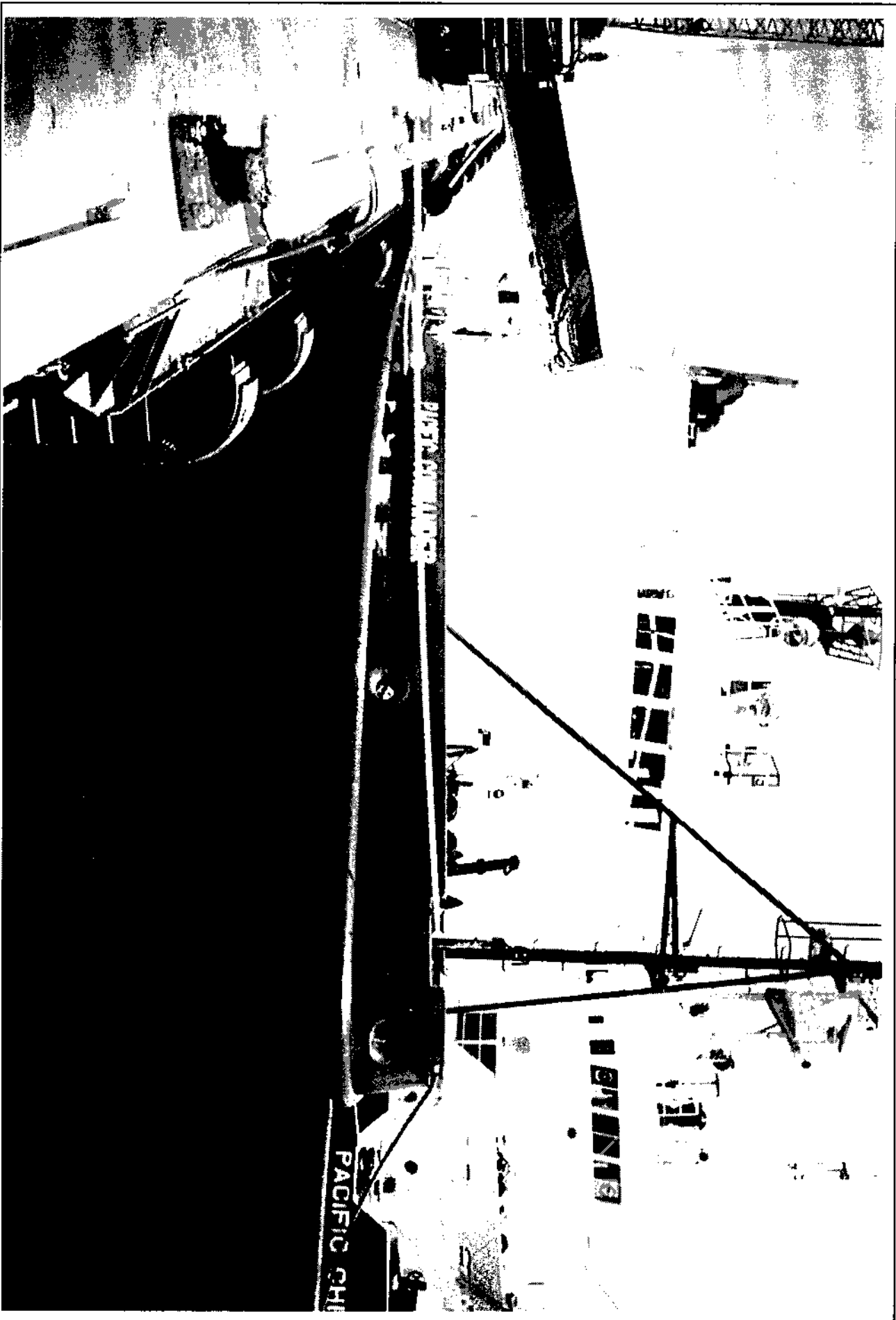
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Pacific Commander alongside at Darwin November 1993

# Summary

In the early hours of 29 October 1993, the offshore supply vessel Pacific Commander manoeuvred stern-to the semi-submersible drilling rig Atwood Falcon to back-load some sections of casing. The Master was advised the cargo operation would be of short duration and, as a result, he chose not to use an anchor, making fast with two lines aft and maintaining position, at right angles to the rig, with the bow thruster.

After the planned cargo operation was completed and some further equipment transferred, Atwood Falcon then decided to take the opportunity to top up with cement from Pacific Commander, thereby extending the cargo operation significantly. Weather conditions were good and the Master continued to maintain position by use of the bow thruster. In the early afternoon, the Mate was unable to maintain the position and the Master decided to suspend operations and let go. During the operation of letting go, a nylon mooring line, jammed on the bitts, parted under strain, injuring the Mate.

# Information sources

Master, Mate and duty Integrated  
Ratings of Pacific Commander.

Senior Toolpusher/Offshore  
Installation Manager of Atwood Falcon

Steedman Science & Engineering,  
Jolimont, WA.

## Acknowledgements

The Inspector gratefully acknowledges  
the assistance provided by:

Australian Maritime Safety Authority,  
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field investigator.

Swire Pacific Offshore Pty Ltd.

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Tidewater Port Jackson Marine Pty  
Ltd.

Atwood Oceanics Australia Pty Ltd.

Section of Chart Aus 4060 reproduced  
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Photographs: Australian Maritime  
Safety Authority

# The ship

Pacific Commander is a Panamanian registered offshore supply and anchor handling vessel built in 1979, having a Gross Tonnage of 868 and an overall length of 64.54m. The vessel is powered by two 2624kW engines, driving two propellers and is fitted with a 485kW bow thruster. To facilitate deep water operations, the vessel is equipped with one length of anchor cable of 15 shackles [405m] and one length of 20 shackles [540m].

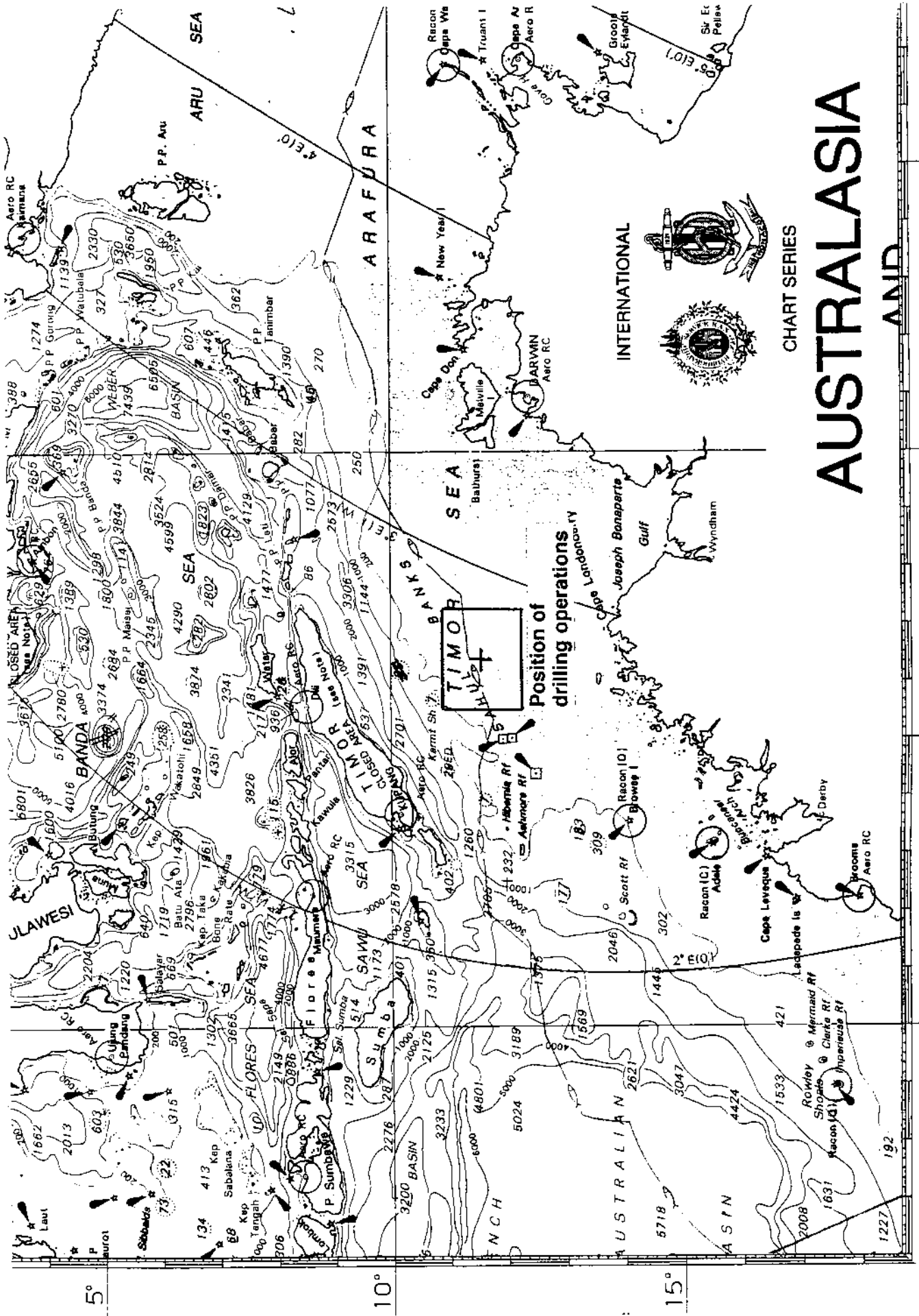
The vessel is owned by Swire Supply Vessels Corporation of Hong Kong and operated by Swire Pacific Offshore P/L of Fremantle, WA. Two Australian crews, each comprising master, mate, chief and second engineers and five integrated ratings (IRs), work a month on, month off "swing" system. The master and mate generally keep a watch routine of six hours on, six hours off, although this may be changed to a 12 hours on, 12 hours off routine for some operational schedules. Where the schedule allows for the vessel to anchor off a rig at night, IRs stand the bridge watches between 1800 and 0600. When the vessel is engaged in anchor laying, or anchor lifting operations, an additional mate and engineer are appointed.

In October 1993 the vessel was on charter to SAGASCO (South Australian Gas Company), for

operations in the Timor Sea. The IRs' swing change took place in Darwin on 4 October and the Master returned to the vessel from leave on 12 October. The Mate had joined the vessel as Extra Mate on 18 September, after a year's absence from the industry, and was promoted to Mate on 29 September.

For most of that month Pacific Commander was engaged in general supply and support duties attached to Atwood Falcon, also under contract to SAGASCO. Atwood Falcon is an 18744 tons displacement mobile offshore drilling unit, commonly referred to as a rig, owned and operated by Atwood Oceanics Australia Pty Ltd. During drilling operations, a representative of the oil company [SAGASCO] remains on board, to ensure the company's drilling requirements are met and is responsible for liaising with the base ashore and organising supplies for the operation.

In the latter part of the month the vessel was involved in a relocation move of Atwood Falcon. The rig's anchors were lifted on 24 and 25 October, after which the vessel accompanied the tow to the new drilling location, 270 miles to the west of Darwin, in 119m of water. The rig's anchors were re-run at the new location between 1200 and 1920 on 27 October. Pacific Commander then anchored in a position two miles northward, in a support capacity to the rig, remaining at anchor throughout 28 October.



Portion of chart Aus 4060 showing drilling location

# The incident.

On 29 October 1993, just after midnight, the Master was called by the duty IR, who informed him that Atwood Falcon had called on the radio, requesting the vessel to go alongside to back-load cargo (receive cargo from the rig). Although the Mate would normally weigh anchor, the Master decided to carry out the operation himself and, due to the Mate's relative inexperience, manoeuvre the vessel alongside the rig himself. However, he instructed the IR to call the Mate, so that the Mate could observe the operation.

The anchor was aweigh at 0015 on 29 October and, as the vessel proceeded towards the rig, the Master was advised that there were only four lifts, after which Pacific Commander could return to anchor. Based on this information, the Master decided that it would not be necessary to use an anchor for mooring at the rig. The wind was from the west at 8 knots, the sea slight with a low westerly swell.

The Master manoeuvred Pacific Commander towards the starboard side of Atwood Falcon, turning the vessel short-around for the final, stern first approach. The vessel was made fast stern-to the rig, using the rig's two mooring lines, one to each quarter. First, a 64mm diameter nylon rope was taken on the starboard (weather) quarter, lowered to the vessel by the rig's crane and passed under the safety rail, through the bitts to the capstan. Once hove tight, and with the vessel in position, the line was turned up on the bitts, leaving the turns on the capstan. The port quarter line, an 80mm

diameter polypropylene rope, was taken aboard and made fast in similar fashion. The vessel was fast at 0050.

Position was maintained using the main engine to keep the stern off the rig and the bow thruster to keep the vessel aligned at right angles to the rig. The current was running from the starboard side of the vessel, requiring the bow thruster to be run on port thrust.

Cargo operations commenced at 0100, two IRs working on deck directing the positioning of the lifts and releasing the cargo hook. The Master handed over the controls to the Mate and then remained on the bridge for about an hour, observing how the Mate coped with maintaining position, before going to bed at about 0200.

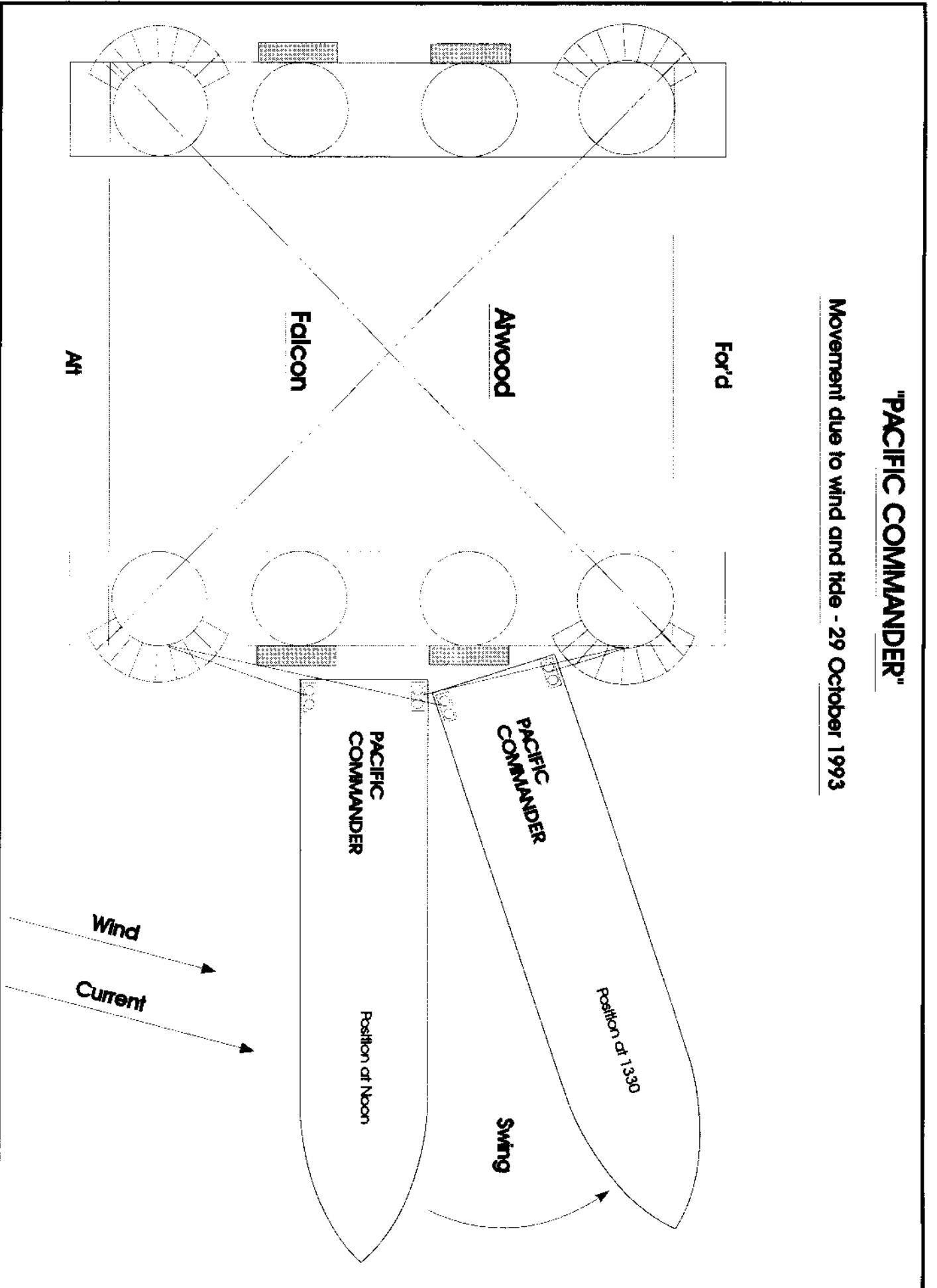
Back-loading of a number of 30inch [76mm] casing sections was completed at 0415, but then Pacific Commander received instructions from Atwood Falcon to remain alongside to back load some drilling equipment. When the Master arrived on the bridge to take over the watch just before 0600, he was surprised to find the vessel still alongside. He asked the rig why they hadn't been released and was advised that the rig might want to take some cement. He expressed his displeasure at not being properly informed before coming alongside, as he would have used an anchor had he realised that the operation would be prolonged.

At 0800, the wind was recorded as being from the south-west at 8 knots, the sea slight with a low swell.

Atwood Falcon requested that Pacific Commander start pumping cement at

# "PACIFIC COMMANDER"

Movement due to wind and tide - 29 October 1993



0955 and the cement pump was started.

From about 1030, the Master experienced increasing difficulty in maintaining position against the current, having to increase the bow thruster power to 80-90 percent at times. The wind was also increasing slightly, being recorded as being 12 knots from the west-south-west at noon.

The Mate took over the watch at noon, at which time Atwood Falcon requested water from the vessel, but the Master refused this request, advising that as soon as the cement was finished he would let go, then re-moor using an anchor.

For about ten minutes and before going down to lunch, the Master observed how the Mate managed maintaining the vessel in position. Having eaten, he checked with the Mate that everything was all right and then went to his cabin.

The Mate found that he was having to use increased bow thruster power to maintain position against the wind and current and called the Master at 1315. Arriving on the bridge, the Master found that although the bow thruster was on full thrust, Pacific Commander had "fallen off" to port. The vessel had also moved bodily to port, putting great weight on the nylon starboard quarter line, which had stretched considerably. He therefore advised Atwood Falcon that he was going to let go and move out. The cement pump was stopped and the hose disconnected, the port quarter line was let go and the hose and line lifted clear by the rig's crane at 1324.

The Mate appreciated that the IRs would have difficulty letting go the starboard quarter line and went aft to assist. The Master tried to manoeuvre the vessel, to take the weight off the line, and although he achieved this momentarily, it was insufficient to enable the crew to let the line go.

Realising that the line might break, the Mate told the two IRs to stand well clear. Whereas the two IR's moved straight up the deck, he moved across the deck to the port side before moving forward towards some 30inch [76cm] casing stowed on deck. The two IRs had just moved clear when the line parted, at some distance from the vessel's side. The elasticity of the nylon rope caused it to whip back across the deck of the vessel and strike the Mate.

The Master immediately called Atwood Falcon and asked for medical assistance, their medical orderly arriving aboard within five minutes. In the meantime the IRs had collected some blankets and made the Mate as comfortable as they could. The Mate was put into the stretcher and transferred to Atwood Falcon at 1340, a "MEDIVAC" having been requested.

At 1740, a doctor arrived by helicopter from Darwin and found the Mate to be in a stable condition, having suffered a gross compound fracture of the right hand and fingers, possible fractures of right forearm and right leg and contusions and abrasions to abdomen and chest. The Mate was flown to Darwin for hospitalisation, where it was ascertained that injuries sustained were mainly in the right wrist, hand and fingers, with severe bruising to the chest and right leg.

# Comment

The Mate was injured when a nylon mooring rope parted under great strain, brought about by the vessel not being able to maintain position. The Master's decision not to use an anchor, based on the information received from Atwood Falcon, raises a number of issues, including mooring methods, mooring equipment and communications.

## Mooring methods

The method of mooring to a rig or platform adopted by a master depends upon a number of variables - vessel manoeuvrability, depth of water, ocean current, weather and the length of time the vessel is to be alongside.

For cargo operations, it is usual practice for supply vessels to lie stern-to the rig or platform, with the master or mate at the control station located at the after end of the bridge. Pacific Commander, built in 1979, has twin "fixed" propellers and a single bow thruster, so has limited manoeuvrability when compared to a vessel with directional/azimuth thrusters aft. Therefore, when working cargo it is normal to moor the vessel to the rig, using two mooring ropes, one to each quarter. To hold the bow in the correct position, an anchor is let go about 200m from the rig, on the final approach.

Pacific Commander is equipped with sufficient anchor cable to permit anchoring in deeper water, but this requires the precautionary and, to a certain extent, time consuming procedure of walking the anchor back to the sea bed, rather than letting the anchor go.

Where the depth of water is too great to use an anchor, or where the cargo transfer operation is to be of short duration, an anchor is not used. In these instances, position is maintained using the bow thruster which, on Pacific Commander, is effective in currents of up to two knots.

The Master of Pacific Commander had considerable experience in the offshore industry, having held command for a number of years. In his experience, the currents in the Timor Sea are generally less than two knots.

The general depth of water was over 100m and the operation initially requested by the rig could reasonably have been expected to take no more than a few hours. Also, the weather during the night was calm with a light breeze.

It is considered that, based on the information provided to him by Atwood Falcon early on the morning of 29 October and his experience in the industry, the Master's decision not to use an anchor on that particular occasion was not unreasonable.

However, in the offshore industry changes in plans can occur at short notice. As the operations of anchoring and weighing anchor are routine, it is

considered that, provided water depth permits, an anchor should be used during cargo transfer operations as a standard procedure for vessels not equipped with directional/azimuth thrusters, unless the operation is limited to a single lift.

Although supply vessels are at the call of the rigs and although operational pressures are ever present to avoid any delays, the final decision on whether it is safe to go alongside, and to remain alongside, rests entirely with the supply vessel master. As the Master of a vessel chartered by his owners to the rig operators, the Master had a duty to his owners, as well as to the rig, to operate to the maximum efficiency within the bounds of safety. The problem for all masters is to define reasonable bounds of safety. Where weather conditions change slowly and the time to completion of an operation reduces, the temptation is to try and complete the task.

It is considered that, in this instance, it would have been prudent for the Master to have exercised his power of discretion at the time the request was made for cement, or even earlier, at 0600, when he became aware that the operation had been extended.

## **Currents**

No evaluation of currents was undertaken prior to positioning of Atwood Falcon on location and the rig does not monitor, as a matter of course, currents and tides. Thus there was no local current data readily available to the Master to assist him in making his decisions.

The Inspector contracted Steedman Science and Engineering, of Western Australia, to estimate the surface currents at the drilling site for 29 October. Utilising wind data from Skua Field [12.5°S : 124.5°E], tidal/current information for Jabiru [12°S : 125°E] and a knowledge of general circulation in the region, they estimated a current of 0.4m/sec [minimum accuracy + 0.2m/sec] towards the north-east at the time of the incident, providing a maximum current of 1.2 knots.

The Master, however, estimated the current as being well in excess of two knots. Atwood Falcon was drilling in a trench, 119m deep in surrounding depths of 50-60m, and from observations appeared to experience stronger currents than at Pacific Commander's stand-by anchorage position 2 miles northward. Reportedly, the Master of the seismic survey vessel Magnificent Creek experienced a current of about 3.5 knots in that particular area.

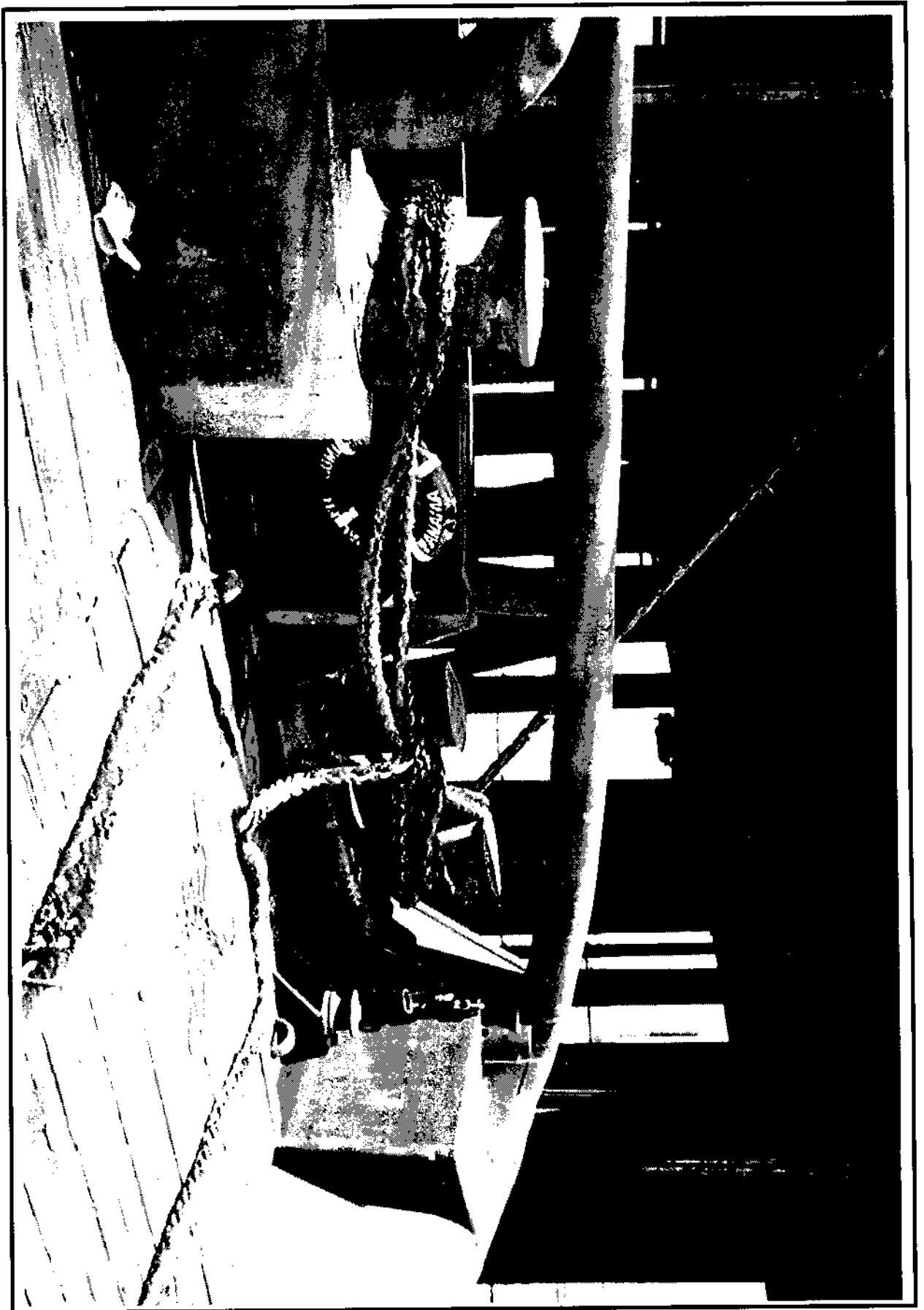
The wind too had increased during the morning, from 8 knots at 0800 to an estimated 14 knots at 1330. This would have had a significant effect on the high forward end of the vessel and, therefore, on the ability of the Master and Mate to maintain the vessel's position.

## **Mooring arrangements**

Because of the height of the decks of rigs above the water, making it very difficult to use a vessel's own mooring lines, it is customary to use the rig's mooring lines to secure a vessel



The parted mooring line - showing areas of general chafing



Method of "turning up" mooring lines aboard Pacific Commander

alongside. These lines are shackled to the rig structure above the water line, closer to the level of the decks of the supply vessels.

As supply vessels vary in size, a rig's mooring lines need to be of a size appropriate to the largest supply vessel likely to moor alongside. With the modern practice of using synthetic ropes, rather than natural fibre, both nylon and polypropylene ropes are available. Although nylon has the advantage of having a greater strength/weight ratio and of being easier to handle, its elasticity makes it very dangerous, due to recoil if it breaks.

Opinions received from a number of masters and crew in the offshore industry support the view that full length nylon ropes should not be used, a view the Inspector supports.

On the other hand, the larger size of polypropylene ropes not only makes them very cumbersome for the supply vessel crews to handle, but also difficult to turn-up on the bitts. The Inspector considers that this is an area that warrants further investigation by the offshore industry, in consultation with masters and crews of offshore vessels.

Where the mooring lines on rigs are permanently shackled to the columns, the lines are fully exposed at all times, with the result that they are prone not only to physical damage but also to Ultra-Violet degradation. It is essential, therefore, that these mooring lines are inspected on a frequent basis and replaced as soon as damage or degradation, sufficient to impair strength, is evident.

In this instance, the 64mm mooring line had a theoretical minimum breaking strain of 72 tonnes when new, but this would have been reduced somewhat by the "wear and tear" as evidenced in the photograph. At the time of the failure, while the weight of the vessel was on the rope, there was little extra strain imposed by the engines, which had been manoeuvred in an attempt to reduce the strain.

The after mooring arrangements aboard Pacific Commander are similar to those aboard other offshore supply vessels - a set of bitts located at the ship's side at the after end on each side and a capstan located forward of each set of bitts. Because the majority of the vessels are also towing vessels, they are fitted with tow line rails, which pass above the bitts, thus mooring lines have to be passed under this rail.

The mooring lines have to be taken inboard, around the after post, under the horn of the bitts and then forward to the capstan. The practice on board Pacific Commander, in common with many other offshore supply vessels, after the line has been hauled tight, is for the free end to be turned up on the bitts, as a back-up to the turns on the capstan. As the lead from the bitts to the capstan is upward and the lead between the bitts and the capstan is not very open, this has the inherent disadvantage that the rope part leading from the bitts to the capstan can override and jam the turns on the bitts when under considerable tension.

Basically this is seen as a design problem, one which has apparently not been fully addressed in some vessel designs. However, the view of the

vessel's operators, a view not shared by all offshore supply vessel operators, is that making mooring lines fast on the bitts while they are still turned around the capstan drum is not good seamanship practice, particularly as it can result in damage to the capstan and associated machinery.

## **Communications**

While proceeding from the anchorage position to Atwood Falcon on the morning of 29 October, the Master sought information from the rig on the cargo operation to be carried out. He was advised that there were only four sections of 30inch casing to be backloaded, after which the vessel could return to anchor.

The information provided to the Master prior to Pacific Commander going alongside Atwood Falcon gave no indication the operation would be other than relatively short and it was on this information that he made his decision not to use an anchor.

Inadequate communication appears to be a major issue of contention in the offshore industry, masters of supply vessels claiming they are not kept fully informed.

According to the Offshore Installation Manager of Atwood Falcon, it is not possible to give a master a reliable time frame, as the rig crane may be required for other jobs during cargo operations. However, in this instance the SAGASCO representative reportedly

decided only that morning to top up the cement tanks, although there were already 3700 sacks of cement on board the rig.

The Inspector considers that it would be neither unreasonable nor unduly burdensome, under normal conditions, for the management on board rigs to fully plan cargo transfer operations at the daily morning meetings, before a supply vessel is called in and for either the oil company representative, or the Offshore Installation Manager to hold a full pre-operation briefing with the master, so allowing the master proper operational input. This briefing should not be delegated beyond the offshore installation manager's immediate deputy.

## **Experience**

Although the Mate had very limited experience on offshore supply vessels, that being his first spell, he was not inexperienced as a mariner. He sufficiently appreciated the dangers of the weight on the mooring rope to warn the two IRs to stand clear.

Moving to where he had, he would have been about 11m or 12m from the starboard bitts and so may have felt sufficiently safe, although he was in the act of moving further up the deck. However, he would have been directly in line with the lie of the rope and the span of the mooring rope, between its securing point on the column of the rig and the vessel's starboard bitts, would have been a minimum of 18m.

# Conclusions

It is considered that:

1. The information provided to the Master prior to Pacific Commander going alongside Atwood Falcon gave no indication that the operation would be other than relatively short.
2. Based on the initial information provided to him and his experience in the industry, the Master's decision not to use an anchor on that particular occasion was not unreasonable. However, an earlier exercising of his power of discretion to suspend operations, while he remoored using an anchor, would have been appropriate.
3. Full length nylon mooring ropes should not be used, because of the inherent dangers of their elasticity.
4. The configuration of the capstans and bitts on Pacific Commander, with capstans at a higher level than the bitts and close in fore and aft alignment, is such that the mooring lines are prone to becoming jammed when turned up on both and under tension.
5. As changes in plans can occur at short notice, and as the operations of anchoring and weighing anchor are routine, provided water depth permits, an anchor should be used during cargo operations as a standard procedure for vessels not equipped with directional/azimuth thrusters, unless the operation is limited to a single lift.
6. The planning of cargo transfer operations by rig staff was deficient and subject to ad hoc alterations without proper consultation with the Master of the support vessel.

# 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 the person a copy of the report or the relevant part of the report. Sub-regulation 16(4) provides that any such person may provide written comments or information relating to the report.

The report was sent to the operators, Master, Mate and duty Integrated Ratings of Pacific Commander and to the owners and Offshore Installation Manager of Atwood Falcon.

Submissions were received from the operators and Mate of Pacific Commander and from the owners of Atwood Falcon. These submissions were carefully considered and where appropriate the text amended to reflect the facts of the incident.

# Particulars of ship

Name:	Pacific Commander
IMO number:	7808487
Flag:	Panama
Year of build:	1979
Place:	Sterkoder M/V A/S, Kristiansund
Type:	Offshore supply, tug, anchor handling vessel
Classification:	Det norske Veritas
Owner:	Swire Supply Vessels Corporation, Hong Kong
Operator:	Swire Pacific Offshore Pty Ltd
Charterer:	SAGASCO (South Australia Gas Company)
Crew:	9 Australian
GRT:	498
NRT:	220
Length overall:	64.55m
Breadth:	13.82m
Engine power:	5248kW
Propellers:	two
Bow thruster:	one 485kW