Departmental investigation into the marine aspects of a helicopter crash during marine pilot transfer operations from the Maltese flag cargo vessel CAPE ARNHEM off Gladstone on 25 February 1997

MIIU

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Department of Workplace Relations and Small Business

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Navigation Act 1912
Navigation (Marine Casualty) Regulations
investigation into the marine aspects of a helicopter crash
during marine pilot transfer operations
from the Maltese flag cargo vessel
CAPE ARNHEM
off Gladstone on 25 February 1997

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Summary

The Maltese flag general cargo/container vessel *Cape Arnhem* sailed from the port of Gladstone, Queensland just before midnight on 24 February 1997. As No.2 hatch was clear of containers, the Agent had informed the Master that the Pilot would be taken off by helicopter. The Master had queried this, but was assured by the marine Pilot that there was ample room at No.2 hatch for safe helicopter operations.

At 0045, 25 February, the marine Pilot asked the Master to have all the deck lights switched on and for No.2 crane to be topped and swung out to port in readiness for the helicopter. These requests were complied with, No.2 crane being topped and slewed to maximum, the hook also being raised to "cut-out" position. When this had been carried out, the Pilot informed the helicopter that it was safe to approach the vessel from the starboard side.

The helicopter landed on the starboard side of No.2 hatch at 0105, when the vessel was in the vicinity of S1 and S2 buoys. The marine Pilot went down to the deck and boarded the helicopter, fastening himself into the starboard front seat, next to the helicopter pilot.

The helicopter lifted off the hatch, hovered briefly, tilted and started to move forward, across the hatch, towards the port side. It then started to climb, accelerated and, according to those watching and to their concern, it banked to the left. There was then a loud bang as the main rotor blades struck the hook block of the topped No.2 crane. The helicopter started to rotate, the tail rotor also striking the hook block. The helicopter then flipped upside down and fell to the sea, about 20 m from the ship's side.

The Master immediately informed Gladstone Port Control, started to slow the vessel down and mustered the emergency lifeboat's crew. As soon as way was off the vessel, the lifeboat was launched and sent to the area of the accident.

A local fishing vessel was first on the scene, rescuing the helicopter pilot and recovering the body of the marine Pilot. A marine rescue boat from Gladstone was able to retrieve the upturned helicopter.

The helicopter/aviation aspects of the incident were investigated by the Bureau of Air Safety Investigation (BASI).

Sources of Information

Master, officers and crew of *Cape Arnhem*

Agent

Harbour Master’s Office, Gladstone

B A S I

Chopperline, Gladstone

Acknowledgment

Portion of chart Aus 366 reproduced by permission of the Hydrographic Office, RAN.

Narrative

Cape Arnhem is a Maltese flag general cargo vessel having a Gross Tonnage of 13,607. Built in 1988 at Warnemuende, Germany, and launched as the Ivangrad, the vessel has four holds serviced by four pedestal cranes, located on the centre line between the hatches. Accommodation and the engine room are situated aft. The vessel has an overall length of 165.5 m, a beam of 23.05 m and a summer load draught of 10.07 m. Propulsion is provided by a single Sulzer, 5 cylinder 6804kW diesel engine, driving a single, controllable pitch propeller.

The vessel is manned by a total crew of 26, from the former Yugoslavia and, with its sister ship Cape Cleveland, is engaged on a regular service for Australasia Line (AAL) between Surabaya, Jakarta, Keelung, Singapore and Port Moresby, and Gladstone, Brisbane, Townsville and Darwin.

Cape Arnhem arrived at Gladstone at 1730 on 24 February 1997, where both containers and general cargo were discharged and back-loaded. As No. 2 hatch was to be clear of containers on departure, the agent informed the Master that the Pilot would be taken off by helicopter. The Master's previous experience of helicopter operations had been on bulk carriers, with large clear areas, and they had been winch type, not land-on operations. He expressed the view that *Cape Arnhem* was not a suitable vessel for helicopter operations, but was advised that such operations were normal in Gladstone.

When the Pilot boarded, after cargo operations were completed, the Master expressed his concerns to him and they inspected the No. 2 hatch area together. The Pilot informed the Master that there was ample room, the clear distance being 25 m, whereas the helicopter (a Hughes 369 HS, more commonly referred to as a Hughes 500C) required only 16 m.

Cape Arnhem sailed from its berth at 2359 on Tuesday 25 February. The bridge team consisted of the Master, the Second Mate, a marine Pilot and the Cadet, the latter acting as helmsman.

At 0045, the Pilot requested that all the deck lights be switched on and No.2 crane, located between Nos. 2 and 3 hatches and the jib of which is stowed along the centre line of No.2 hatch, be topped and swung

clear to the port side, in preparation for the helicopter landing on No.2 hatch. The floodlights were up to full luminescence and the crane topped and swung to port to the maximum amounts by 0055, ten minutes before the scheduled arrival time of the helicopter. The crane hook and block were also raised to the "cut-out" point, and hung suspended outboard of the ship's side, about 18 m from the head of the jib and about 15 m above the level of the hatch lid. The Bosun and seaman who had topped the crane took up station at the forward end of No.2 hatch, under the break of the forecastle, on the starboard side, to await the arrival of the helicopter.

When all was ready, the Pilot made contact with the helicopter pilot and informed him that all was ready for his approach from the starboard side. He also informed him that the ship would be steering a course of 044º True at a speed of 14.5 knots and that the wind was light from the east-north-east.

The helicopter was heard before it was seen by those on the bridge and it landed, on schedule, very shortly afterwards. It approached from the starboard side and landed on the starboard side of No.2 hatch, just forward of mid length, as the vessel cleared Nos. 1 and 2 buoys.

The Second Mate relieved the Cadet at the wheel, and the Cadet was detailed to escort the Pilot to No.2 hatch. The Second Mate maintained the course steady on 044°.

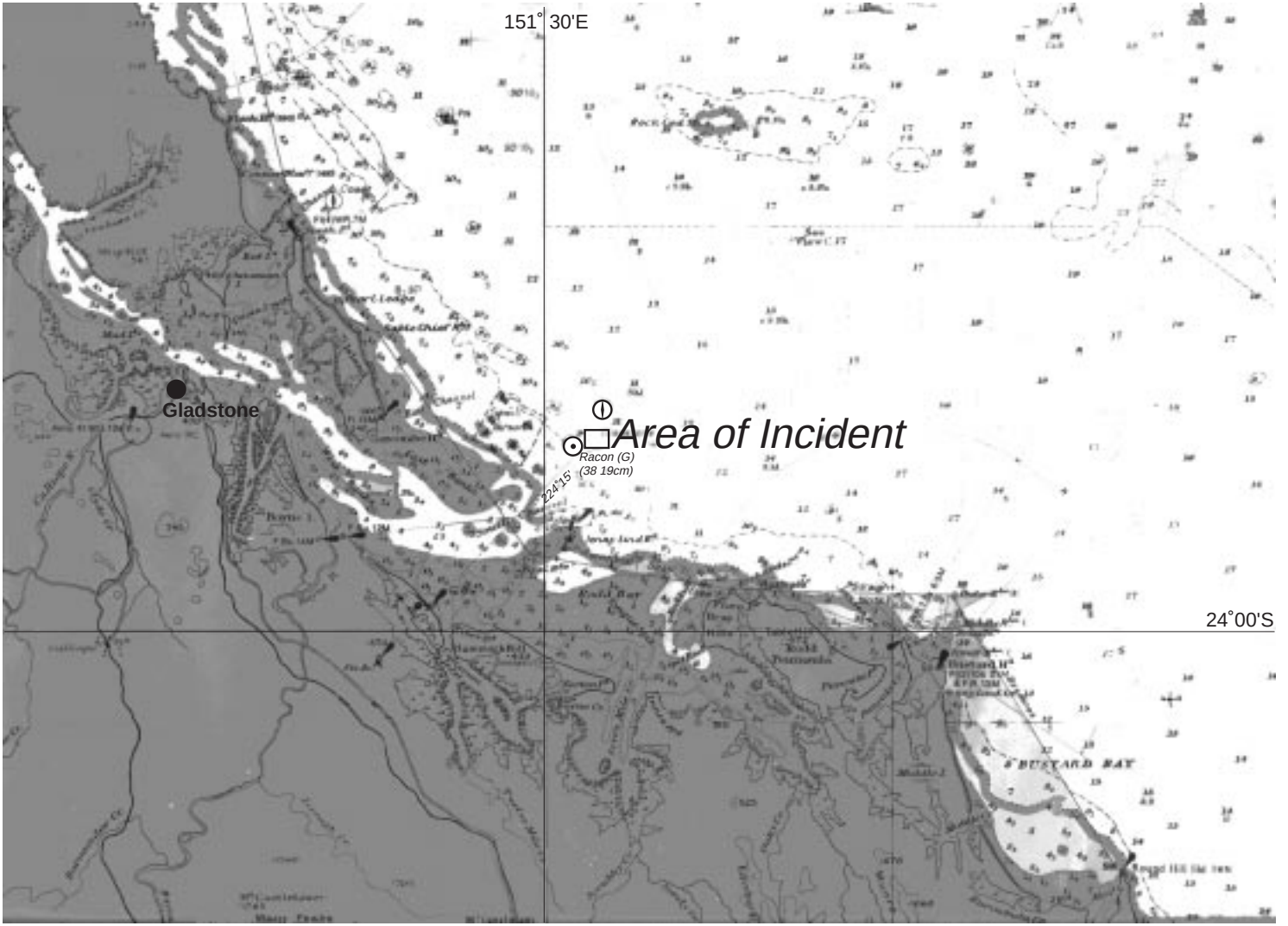
On arriving at No.2 hatch, the Pilot instructed the Cadet to remain at the after starboard corner, then walked inboard to the centre line, then forward, across the front of the helicopter, to its right-hand side. He placed his bag in the rear of the helicopter then climbed into the front right-hand seat.

After a brief pause, and as the vessel was coming up to the Fairway Buoy, the helicopter lifted off the hatch at 0112, hovered for a few seconds, then tilted nose down and started to move across the hatch towards the port side. Those watching from the deck and from the bridge stated the helicopter then accelerated, rose and banked to the left as it did so. Suddenly there was a loud bang and those watching realised the helicopter main rotor blades had struck the cargo hook, or block, of No.2 crane. The helicopter started to pivot in an anticlockwise direction and the tail rotor also struck the hook, after which the helicopter rolled to its right and, upside down, plunged into the sea, about 15 m to 20 m from the ship's side.

Before the helicopter actually hit the water the Master had ordered “stop engines” and moved to the VHF radio and was calling Gladstone Port Control to report the accident. He also gave orders to muster the emergency boat crew and a lifeboat was launched as soon as all way was off the vessel, at 0135. The lifeboat headed towards the crash area, but a local fishing vessel, the Serenity, arrived on the scene first. The crew of Serenity rescued the helicopter pilot, who was clinging to the upturned helicopter, at 0144, and retrieved the body of the marine Pilot, which was still strapped inside.

After consultation with Gladstone Port Control, the Master received clearance to proceed to Brisbane and the lifeboat was recalled.

At 0405, the Gladstone Marine Rescue Boat took the crashed helicopter in tow and towed it back to Gladstone.



Portion of chart Aus 366 showing location of incident

Comment and Analysis

Helicopters have been used for transferring marine pilots to and from ships, as an alternative to pilot launches, for more than twenty years. The Port of Gladstone pilots have been using helicopters for boarding and leaving vessels at the Gladstone Fairway Buoy for more than ten years and, until this incident, the operation had enjoyed a perfect safety record, the helicopter service having the full confidence of the marine pilots.

The helicopter pilot operating the service on 25 February 1997 was well experienced in such operations, having flown the company's helicopters on similar assignments for four years, prior to which he had flown helicopters with another operator. The aviation aspects of the incident are the subject of an investigation by the Bureau of Air Safety Investigation, to be reported upon separately by the Bureau.

Procedures

During ship/helicopter transfer operations, the normal requirement is for the ship to maintain a previously agreed course and speed. The evidence provided by the Master and officers of *Cape Arnhem* indicates that *Cape Arnhem* maintained a steady course and a steady speed, as required, during the off-lift of the marine pilot on 25 February 1997.

Guidelines on helicopter operations for ships' masters and officers are available in the International Chamber of Shipping's publication "Guide to Helicopter/Ship Operations". Also, for such operations in Australia, the Australian Maritime Safety Authority has issued a booklet entitled "SHIP - HELICOPTER TRANSFERS Australian Code of Safe Practice". The latter reflects the modern trends in reduced manning aboard ships, which precludes the sizeable stand-by parties suggested in the former.

The Master of *Cape Arnhem* was persuaded, against his own judgement, to agree to a helicopter operation. However, No.2 hatch was clear of obstructions and the distance between the crane housings, at the forward and after ends of the hatch, was 25 m, well in excess of the 16 m clear space required by the

Hughes 500 helicopter. Even though the intended helicopter landing site was not marked as prescribed, the operation was “normal” and not unsafe.

Although the matter had no bearing on the incident, it is worthy of note that the *Cape Arnhem* crew were neither well versed nor drilled in helicopter/ship operations. As a result, none of the usual safety precautions were put in place on board. This does raise the question of the advisability of the use of a helicopter for such operations where the crew have not been drilled in the operation and the emergency procedures, as detailed in the “Guide to Helicopter/Ship Operations”, are unlikely to be in place. In the event, the emergency boat’s crew responded well and the boat was ready for launching as soon as way was off the vessel. However, the 22 minutes taken to take the way off the vessel, and the distance the emergency boat had to travel, could have been reduced had the Master executed a Williamson turn, there being sufficient searoom in the area of the Fairway Buoy for such a manoeuvre.

Although, in the past, the Master had had experience of helicopter winching operations, he appears to have relied entirely on the Pilot for direction on what was required. The Guide to Ship/Helicopter Operations, at 3.2.2, states “A pennant or windsock should be flown by the ship to give the helicopter pilot an indication of the speed and direction of the wind relative to the ship’s deck.”. However, 7(c) of “Ship - Helicopter Transfers” also states “...this is not necessary if the ship can confirm the relative wind.” The Pilot had passed information about the wind force and direction to the helicopter pilot, therefore it is probable that he considered a pennant not to be necessary.

No.2 hatch was sheltered by containers stowed on No.1 hatch. The air conditions experienced by the helicopter while hovering above the hatch, before moving off, were likely to be considerably different to the air conditions at the ship’s side. In such circumstances, a windsock, or pennant, could have been of benefit to the helicopter pilot. A windsock needs to be flown from a point visible to the helicopter pilot at all times and in this instance, a pennant flown from the suspended crane hook would have provided visual indication of the relative wind to the helicopter pilot both during approach and take off, it would have also drawn the helicopter pilot’s attention to the suspended hook.

Conclusions

These conclusions should not be read as apportioning blame or liability to any particular organisation or individual.

The clear area available at no.2 hatch was in excess of the 16 m required for a Hughes 500 helicopter.

From the evidence provided by the master and officers:

- *Cape Arnhem* maintained a steady course and speed during the helicopter operation;
- the helicopter banked to the left as it climbed from the hatch.

Although it had no bearing on this incident, the crew were neither well versed nor drilled in helicopter operations, which raises the question of the advisability of utilising a helicopter when there is likely to be no emergency support procedure in place.

The helicopter/aviation aspects of the incident will be the subject of a report by the Bureau of Air Safety Investigation (BASI).

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 was sent to the following:

The Master and Cadet, *Cape Arnhem*

Chopperline, Gladstone

Accident Investigation Squad, Queensland Police, Alderley

Bureau of Air Safety Investigation

However, no submissions were received.

In May 1997, the Australian Maritime Safety Authority reissued Marine Orders Part 57 , "Helicopter operations", which stipulates that ship/helicopter transfers must not take place unless the necessary, specified crew training has been carried out.

Details of Cape Arnhem

Former names	Brisa (‘96) Ivangrad (‘93)
IMO No.	8701076
Flag	Maltese
Classification Society	Bureau Veritas
Ship type	General cargo
Owner	Oktoih Overseas Shipping Ltd, Valetta
Manager	Prekookeanska Plovidba, Bar, Yugoslavia
Year of build	1988
Builder	VEB Warnowwerft Warnemuende
Gross tonnage	13,607
Net tonnage	7,090
Summer deadweight	18,183 tonnes
Length overall	165.5 m
Beam	23.05 m
Draught (summer)	10.07 m
Engine	5 cylinder Sulzer diesel
Engine power	6,804kW
Crew	26 Yugoslavian

Photo: Chopperline

Photo: BASI

Cape Arnham No.2 hatch

Cape Arnham: No.2 hatch

Cape Arnham No.2 crane block showing rotor blade contact

Cape Arnham No.2 crane swung outboard viewed from the bridge