

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Aerospatiale SA365N Dauphin, G-BKXD	
<b>No &amp; Type of Engines:</b>	2 Turbomeca ARRIEL 1C turboshaft engines	
<b>Year of Manufacture:</b>	1983	
<b>Date &amp; Time (UTC):</b>	9 March 2008 at 1712 hrs	
<b>Location:</b>	Leman 27 AD helideck, southern area of the North Sea	
<b>Type of Flight:</b>	Commercial Air Transport (Passenger)	
<b>Persons on Board:</b>	Crew - 2	Passengers - 5
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Fenestron tail fairing damaged, possibly more extensive damage to tailboom	
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence	
<b>Commander's Age:</b>	48 years	
<b>Commander's Flying Experience:</b>	6,513 hours (of which 6,300 were on type) Last 90 days - 113 hours Last 28 days - 40 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot, operating company's report and helicopter flight recorders	

## Synopsis

While manoeuvring to land on an offshore helideck, the helicopter's Fenestron tail fairing struck the guardrails of a deck mounted crane. Choice of approach profile, limited helicopter performance, approach technique and possible fatigue were considered to be factors in the accident.

## History of the flight

The flight crew reported for duty at Humberside Airport just before 0600 hrs for a duty day consisting of two duty periods with a rest period in between. The accident occurred in the early evening, soon after the crew had started the second of the duty periods. Although the crew

normally remained offshore for two weeks at a time, the helicopter had required minor rectification of a door fault and so the crew had flown it to their engineering base at Humberside the previous afternoon. The fault had been rectified overnight and the helicopter left Humberside at 0626 hrs to return to the main installation in the Leman Gas field, some 41 nm north east of Norwich. The purpose of the day's tasking was to transfer personnel in the morning from the Leman 27A installation to various satellite installations for their days work before returning them to the Leman 27A in the evening.

The weather was fair, with occasional showers in the

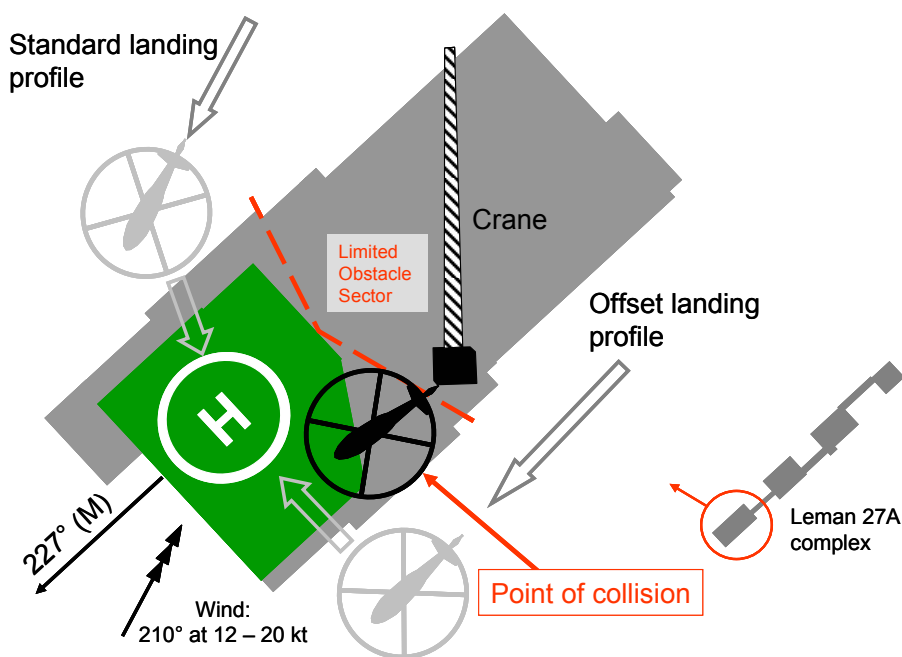
area. The surface wind was generally south-westerly at between 10 and 20 kt. During the morning detail the co-pilot, in the left hand seat, flew as the Handling Pilot. After the transit to the Leman 27AD helideck, the crew flew eight shuttle sectors of between two and ten minutes duration, mainly between the Leman 27AD and 27D platforms. The helicopter landed at 0810 hrs on the Leman 27AD platform and was shut down.

The crew spent the time before the evening detail resting, attending to minor administrative matters and taking a meal. The rest facilities on the installation were reported to be very good. Engines were started again at 1659 hrs. This time the commander was to fly as Handling Pilot from the right seat. The weather was similar to before, with a reported wind from 210°(M) at 12 to 20 kt.

The first sector to the Leman 27D was flown empty, and five passengers were then boarded for the return three minute flight. The helicopter was close to its maximum operating weight for the return flight but retained the

ability to hover out of ground effect (OGE) within the certified power limits. The helicopter approached the platform from the east, positioning on its southern side before translating to the right towards the helipad. As it approached the landing point, the rearmost part of the helicopter struck a deck-mounted crane adjacent to the helipad. The crew, who were immediately aware that they had struck the crane, continued with the landing on the helideck. The passengers disembarked normally and the helicopter was shut down.

The helicopter had struck guardrails on the crane at a point 12 ft above the deck (Figure 1). It suffered damage to the tail Fenestron fairing and the emergency locating transmitter, which was housed within, was triggered. The helicopter was subsequently transferred by surface vessel to an onshore engineering base for a more detailed inspection. The full extent of the damage was still to be determined at the time of writing, but was likely to be more extensive than the first assessment indicated.



**Figure 1**

Helicopter's position at point of collision, with examples of standard and offset approaches as described in the operations manual.

## Operating procedures

The operating company's operations manual described two landing profiles applicable to helideck operations (Figure 1). The standard landing profile was an into wind approach to a point outboard of the helideck, with the helicopter slowing to 10 kt groundspeed as it neared the deck, and maintaining 40 ft above the deck. When the aiming point for landing appeared 45° forward of the helicopter, the pilot was to manoeuvre forwards, sideways and downwards to achieve a hover over the landing point.

If the normal landing profile was impractical due to obstructions or the prevailing wind, an alternative offset approach procedure could be flown. This involved flying to a hover position about 90° offset from the landing point before flying slowly but positively sideways and down to a hover over the landing point.

The non-handling pilot was required to monitor the approach and call out any deviations from normal approach parameters. He was also required to call "55 KNOTS" when appropriate and advise the handling pilot if torque exceeded 90%. The handling pilot would call "COMMITTED" when the helicopter reached a point near the deck beyond which the helicopter would be committed to a landing on the deck if an engine failed. During the final stages of the approach, the handling pilot was to use the forward edge of the helideck as his forward visual reference rather than the 'H', thus increasing tail clearance during transition across the helideck.

The operations manual allowed for an abbreviated approach and landing briefing for offshore operations. In the example given in the manual, the briefing should include the type of landing, heading, the "COMMITTED" call, go-around flight path and a reminder that standard

calls should be used. If this did not give the necessary level of information, a full briefing was to be given.

## Recorded information

The helicopter's Flight Data Recorder (FDR) was downloaded by the operator and the Cockpit Voice Recorder (CVR) was downloaded by the AAIB. The FDR showed that the speed profile was normal but that the helicopter had approached the deck at a lower height than normal. After approaching the installation on a heading of 310°(M), the helicopter had turned left onto about 240° which it maintained (+/- 10°) until it struck the crane.

The CVR captured the last six flights of the morning period and both evening flights. Apart from occasional short periods of unrelated conversation, there was very little communication between the two pilots concerning the helicopter's operation. No briefings were recorded and there were no discussions about the helidecks being used or potential hazards. With one exception, neither pilot made any of the standard calls of "55 KNOTS" or "COMMITTED" as defined in the operations manual. The exception was on the accident flight, when the co-pilot first said "ALL GOOD", and then made the "55 KNOTS" call. The only other exchange between the crew during the final approach to the helideck was when the co-pilot called that torque was at 90%. This was almost coincident with the helicopter striking the crane.

From comments made prior to engine start on the evening detail, it was clear that the crew knew they would be operating at maximum weight early in the period. There was no further discussion about the effect that this might have on the operation of the helicopter. As far as could be told from the recording, both pilots were relaxed and comfortable with the operation, and neither voiced any concerns.

## Helicopter performance

The helicopter was operating close to its maximum operating weight when it approached the helideck on the accident flight. The commander believed that the helicopter's performance at that weight was such that it would not be possible for it to hover OGE with the power available. Changes in airflow around and through the rotor disc of a helicopter hovering close to the surface in ground effect (IGE) lead to increased rotor blade efficiency. Less power is therefore required to hover at a given weight when compared to a higher, OGE hover. In situations where performance is limited, the helicopter needs to make a continuous and steady approach to a landing site, so that it gains the benefits of ground effect before losing the extra lift that is a function of forward airspeed.

## Operating company's report

An investigation was conducted by the helicopter operator. Its internal report observed that the flight crew were on day 12 of a 14 day tour of duty. Although the crew were reportedly well rested and were operating to a Flight Times Limitation scheme accepted by the Civil Aviation Authority, it was thought that accumulated fatigue could have been a contributory factor.

The report considered the commander's decision to make the approach to the helideck on its south side (the same side as the crane), noting that the wind would have been slightly more favourable for an approach from the north side. This would have required the approach to have been flown by the co-pilot from the left seat. However, the report observed that a safe approach from the south side was achievable. It was noted that the helicopter was lower than recommended as it crossed the deck edge, as evidenced by the damage to the crane. The part of the crane that was struck was closest to

the landing point; had the helicopter been nearer the recommended height (around 30 ft above deck level at that stage) the tail may have passed over that part of the crane structure. Additionally the report stated that the commander used the 'H' circle as a visual reference rather than the forward edge of the helideck, which would have contributed to reduced tail clearance from obstacles at the rear of the helideck.

The operator's investigation did not have access to the CVR recording,<sup>1</sup> but information from the crew indicated that standard calls were not always made. Because of this and other factors such as the possibility of crew fatigue, the repetitive nature of the task and familiarity with the environment, the report surmised that the crew may not have maintained the expected standards in terms of crew communication and flight management.

A number of internal safety recommendations were made. These included improvements to Crew Resource Management (CRM) training programmes and guidance to crews concerning handover of control between pilots to suit varying landing situations. The report also called for a review of the operator's existing offshore shuttle operation in the light of the investigation's findings.

## AAIB comment

Given the helicopter's weight and restricted performance, an approach from the north side of the helideck would have been more prudent, as this would have allowed a standard approach profile, directly into wind and with greater separation from the crane. However, this would have required a handover of control to the co-pilot in

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### Footnote

<sup>1</sup> Disclosure by the AAIB of CVR recordings is prevented under normal circumstances by national and international regulations.

the left seat. As the evening detail was notionally to be flown by the commander, this may have influenced his decision to approach from the south side.

As performance was limiting, an offset approach as described in the operations manual would not have been the preferred option, but the presence of the crane prevented a standard approach profile from the south side. The commander was committed to keeping

the helicopter moving until it could come to an IGE hover over the landing point. It would seem that this consideration, together with the use of an incorrect visual reference point, led to the helicopter crossing the deck edge before it had moved sufficiently far forward. The same consideration would also account for the helicopter's relatively low height as it crossed the deck edge.