

The crew of a CHC Scotia Aérospatiale SA 365N Dauphin 2 lost control during a nighttime approach to a gas platform in the Irish Sea, overflying the landing site and striking the water.

The helicopter disintegrated on impact and sank in the Dec. 27, 2006, crash, killing the two pilots and all five passengers.

The U.K. Air Accidents Investigation Branch (AAIB), in its final report on the accident, cited three contributory factors, including the lack of a “precise” transfer of control from the copilot to the commander after the copilot lost control of the helicopter during the approach in poor weather conditions. Four seconds elapsed after the copilot’s request for help before the commander took control of the helicopter, the report said.

“The commander’s initial actions to recover the helicopter were correct, but the helicopter subsequently descended into the sea,” the report said.

The AAIB also cited “the approach profile flown by the copilot, [which] suggests a problem in assessing the correct approach descent angle, probably ... because of the limited visual cues available to him.”

The third contributing factor was the company’s failure to use “an appropriate synthetic training device,” although one was available, the report said. “The extensive benefits of conducting training and checking in such an environment were therefore missed.”

The report said that the helicopter had departed at 1800 local time from Blackpool Airport, a base for helicopter

support for gas operations in the East Irish Sea, for a planned eight-segment flight to offshore gas production platforms operated by Hydrocarbon Resources Limited (HRL).

The crew had flown a similar multi-segment flight earlier in the day and had completed the first two segments of the accident flight without incident. As they began the third segment, from the Millom West platform, five passengers boarded. Plans called for a seven-minute flight to the North Morecambe platform to pick up a passenger and some freight before continuing to another platform.

The helicopter left Millom West at 1826, climbed to 500 ft and accelerated to 125 kt. The automatic flight control system was engaged, and the helicopter

Investigators said that a lack of visual cues likely led the pilots of an SA 365N to lose control during a nighttime approach to an Irish Sea gas platform.



BY LINDA WERFELMAN

‘Flying Into the Sea’

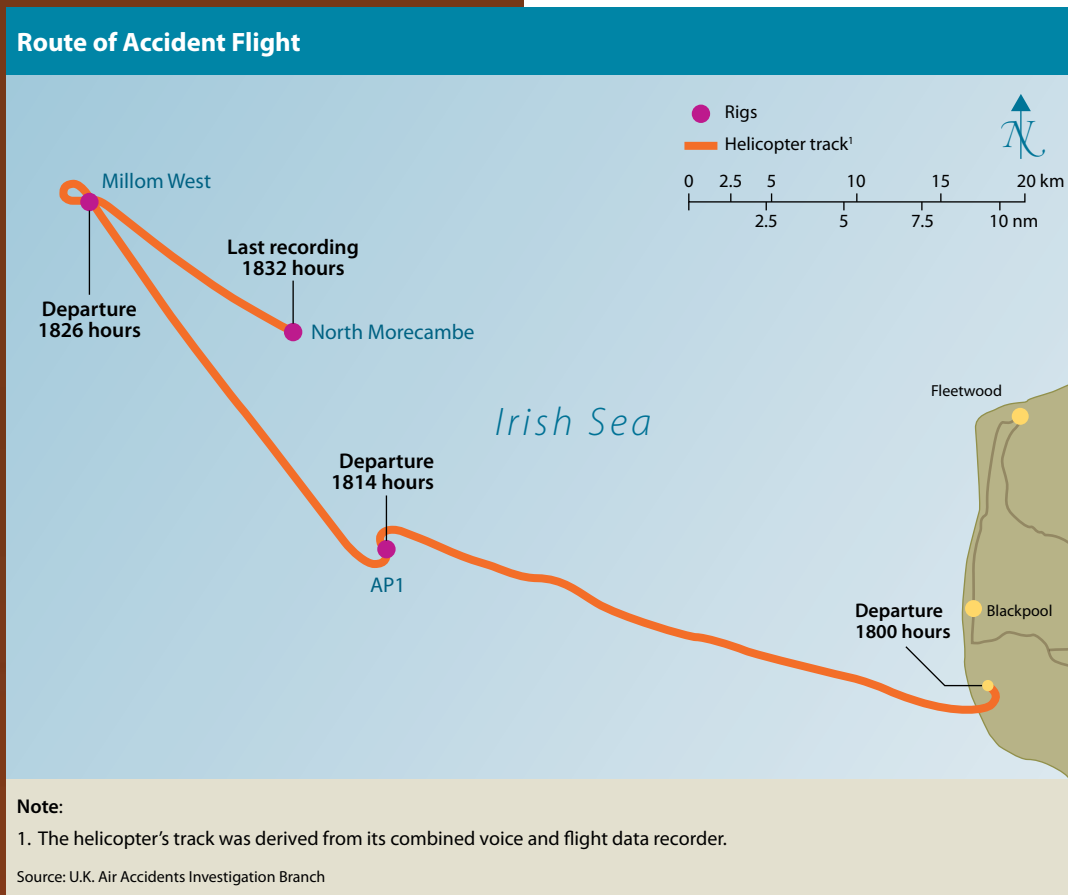


Figure 1

his sighting of the platform but climbed to just over 400 ft and then began another descent.

The helicopter's combined voice and flight data recorder (CVFDR), which records five hours of data and one hour of audio from the commander's, copilot's and cockpit area microphones, at 1832:21, recorded the commander saying, "You get no depth perception, do you?"

The copilot replied, "Yeah, not on this one, not tonight, no." During this part of the approach, there were "steady increases in the collective, tail rotor input, cyclic

pitch and cyclic roll input," and radio height decreased, then increased, the report said.

At 1832:33 — with cyclic pitch and roll inputs increasing and oscillating, the collective increasing at an escalating rate and the helicopter pitching nose down and rolling right — the commander asked, "You all right?" and the copilot answered, "No, I'm not happy, mate."

As the combined engine torques exceeded 100 percent, the commander asked, "We going round?" and the copilot replied, "Yeah, take ... help us out."

The report said, "This request was not initially understood by the commander, and the copilot

was in the normal stabilization mode for flight, the report said. The commander, the pilot not flying, confirmed that lights on the North Morecambe platform were properly illuminated.

"Shortly after the 4 nm [7 km] GPS [global positioning system] call made by the commander, the crew became visual with the rig, and the copilot said, 'I got the deck now,'" the report said. "Allowing for the speed of the helicopter at the time, this equates to a visual range of about 6,800 m [4 mi]. The commander then completed before-landing checks, which included arming the floats."

The helicopter was at about 270 ft when the copilot announced

reiterated his request, saying, ‘Help us out.’ The commander took control approximately four seconds after the initial request for help and said, ‘I’ve got it, I’ve got it, I have got it, I have control, I have control.’” At the time, the helicopter’s right bank angle increased to 38 degrees, its nose was about 38 degrees down, indicated airspeed (IAS) was 90 kt and increasing, and radio altitude was 290 ft, with a descent rate of 2,000 fpm.

A second after the commander took control, the report said, “a large left cyclic roll input was made, followed one second later by an aft cyclic pitch input.” The helicopter’s bank angle shifted to 7 degrees left, and pitch attitude shifted to 13 degrees nose-down; as the helicopter descended through 180 ft, IAS increased through 100 kt. Over the next six seconds, IAS continued to increase; vertical speed, which initially had been reduced to 1,320 fpm, increased to 1,690 fpm.

‘You All Right?’

“At 1832:45, the copilot uttered an expletive, as though disappointed, and the commander asked, ‘You all right?’; the copilot said, ‘Yep ... no,’ in a resigned manner,” the report said. At 1832:47, the automatic voice alert device, which provided audio warnings of the helicopter’s height above the surface, sounded a “100 feet” call.

The report described cockpit communications as “calm” and said that there were no indications of other problems. The helicopter was last recorded at 30 ft in a 12-degree nose-down attitude, a 20-degree right bank and an IAS of 126 kt. The recording ended at 1832:50.

Witnesses on the North Morecambe platform told investigators that the helicopter appeared to be on a standard approach until it “appeared to initiate a go-around, although it seemed faster and closer to the platform than

normal,” the report said. The helicopter then banked right and disappeared into darkness before the witnesses heard an impact with the water.

The fuselage broke apart on impact, and most sections of the helicopter sank. Rescue boats arrived 16 minutes after the crash from a multipurpose standby vessel that was near the platform. Bodies of six of those in the helicopter were recovered, but the seventh was not found.

The commander, who had flown helicopters in the Morecambe Bay gas field for 20 years, was the base chief pilot, a line training captain and a crew resource management instructor. He had an airline transport pilot license and an instrument rating, and had accumulated 8,856 flight hours, including 6,156 hours in type. Records showed he had completed 34 instrument approaches and 37 night deck landings in the 90 days before the crash.

The copilot had received helicopter flight training in the British Army and had flown emergency medical services helicopters for 2 ½ years. He had been working for CHC Scotia for 13 months at the time of the accident and had 3,565 flight hours, including 377 hours in type. He had 467 hours of night flight — three of which were recorded in the three months prior to the accident. He had completed nine instrument approaches and seven night deck landings in the 90 days before the crash.

The helicopter was manufactured by Aérospatiale (now Eurocopter) in 1985 and had accumulated 20,469 airframe hours and 13,038 cycles. Records showed that it had been maintained in accordance with an approved maintenance schedule and was in compliance with all applicable airworthiness directives. Maintenance records for the 12 months preceding the accident showed no defects had been reported

that related to the crash. A routine 50-hour maintenance check had been performed the day of the accident, and no problems were reported.

‘A Particularly Dark Night’

Weather at the time of the accident included visibility of 3 to 7 km (2 to 4 mi) in mist and light rain or drizzle, scattered to broken clouds with a base at 700 ft, broken to overcast clouds with a base at 1,200 to 1,500 ft and surface wind from 130 degrees at 15 kt. A weather observer on a platform near the accident site said that conditions about 90 minutes before the accident included 4,000 m (2.5 mi) visibility in rain and skies obscured; an accurate assessment of the cloud base was not possible because the observer did not have appropriate equipment to measure it.

The report said that, although there was a half moon, the clouds completely obscured any light from the moon, and “it was a particularly dark night.”

Data from the helicopter’s integrated health and usage monitoring system (IHUMS), which incorporated the CVFDR, showed that no system fault warnings were activated during the accident flight. Two main gearbox exceedances were recorded — the first, when the combined engine torque exceeded 100 percent at an airspeed below 75 kt, and the second, after the commander took the flight controls, when the torque exceeded 94 percent with the airspeed above 75 kt.

Data also showed that, during the accident segment of the flight, the autopilot heading hold, IAS hold, altitude hold and area navigation (RNAV) modes were not used.

Two Distinct Phases

The report said that, because there was no evidence of any technical problem,

investigators focused on human factors issues “to understand why two experienced pilots were unable to stop a serviceable helicopter [from] flying into the sea.”

Investigators identified “two distinct phases” of the final approach. The first involved a “steady reduction in collective demand and a steady, positive change in pitch attitude,” the report said. The second — which began after the commander’s callout of “fifty-five,” a reference to airspeed — involved a steady increase in collective demand as the helicopter began to climb, suggesting “a change in the appreciation of the helicopter’s position or motion relative to the deck,” the report said.

“The approach was flown essentially by reference to visual cues. In dark, overcast conditions, it is likely that some cues were degraded or absent. For example, without a distinct horizon, the assessment of pitch attitude and approach angle (by reference to the depression of the deck below the horizon) would be compromised.”

The report noted that if recommended changes in helideck lighting had been implemented, better visual cues might have been available, perhaps enabling the crew to determine earlier in their approach that they had deviated from a safe approach path. The recommendations — to be mandated by the International Civil

Aviation Organization beginning in 2009 — call for installing green lights instead of yellow lights on helideck perimeters as a means of enhancing pilot situational awareness. Further trials by the U.K. Civil Aviation Authority (CAA) have led to the development of other helideck lighting patterns now being tested on offshore platforms.¹

The report said that judging the approach angle apparently had presented the crew with a significant challenge that might have been met by minimizing the number of variables involved — “by commencing the descent at a specified height and range, and maintaining a stable pitch attitude and a fixed relationship to the intended landing area” — or by using instrument references in

Aérospatiale SA 365N Dauphin 2



The Aérospatiale (now Eurocopter) SA 365N, first flown in 1979, is a twin-engine helicopter designed to carry two pilots and up to eight passengers. It is equipped with Turbomeca Arriel 1C gas turbine engines, each rated at 530 kW (710 shp).

Empty weight is 2,017 kg (4,447 lb) and maximum takeoff weight is 4,000 kg (8,818 lb). Maximum cruising speed at sea level is 140 kt, maximum rate of climb is 1,515 fpm, and service ceiling is 15,000 ft. Maximum range, with standard fuel at sea level, is 475 nm (880 km).

Source: *Jane's All the World's Aircraft*, U.K. Air Accidents Investigation Branch

addition to the limited visual cues. However, the radio altimeter was not in a location that enabled it to be conveniently included in the copilot's instrument scan, the report said, and the cockpit voice recorder indicated that the crew was not "using range information to determine the initiation of the descent or cross-checking with height, and except for the 'fifty-five' call and one height call at 400 ft, the commander did not provide any information that may have assisted the copilot.

"The nature of the copilot's difficulty is open to conjecture; he may have commenced the descent too early or initially too steeply; or he may have used an inappropriate control strategy or inadvertently changed the pitch attitude. The underlying causes, however, most likely stem from the limited visual cues available and the paucity of instrument checks. Inadequate monitoring of the approach by the commander must also be regarded as a contributory factor."

The report also said that the commander appeared "ill-prepared" to take control of the helicopter and that both the go-around decision and the subsequent transfer of control to the commander appeared to have been handled inappropriately.

"It is possible that more positive crew interaction and a more active participation in approach profile monitoring by the non-handling pilot may have resulted in a positive outcome," the report said.

Monitoring the Approach

The report included a safety recommendation that CHC Scotia review its standard operating procedures (SOPs) for helideck approaches "to ensure that the non-handling pilot actively monitors the approach and announces range to touchdown and height information to assist the flying pilot with his execution of the approach profile."

The recommendation said that the non-handling pilot's assistance is especially important when an SA 365N copilot is flying an approach in poor visual conditions "and cannot easily monitor a poorly positioned radio altimeter."

A second recommendation to the operator called for a review of all SOPs concerning

helideck approaches flown by all of its types "with the aim of ensuring safe operations."

Another recommendation called on the European Aviation Safety Agency (EASA) to ensure the prompt completion of research into instrument landing systems that would aid helicopter crews in monitoring approaches in poor visual conditions to oil and gas platforms.

A second recommendation to the EASA said the agency should investigate methods of increasing the conspicuity of immersion suits worn by flight crewmembers. Rescuers had told accident investigators that the yellow immersion suits worn by passengers of the accident helicopter were easier to see than the blue suits worn by the pilots.

The AAIB also recommended that the CAA ensure that recurrent training and checking of JAR-OPS (Joint Aviation Requirements–Operations), Part 3 approved operators be conducted in an approved synthetic training device.

A second recommendation to the CAA called on the agency to ensure that personnel who conduct weather observations from offshore facilities are "suitably trained, qualified and provided with equipment than can accurately measure the cloud base and visibility." The report noted that the employee who compiled weather data on the evening of the accident had not received formal training and had no equipment to aid in his observations.

After the accident, the operator provided more specific procedures and guidance for actions to be taken in the event of pilot disorientation or incapacitation; developed go-around procedures that included use of the autopilot coupler; developed and published a night circuit pattern; and continued development of its policy to train all pilots in synthetic training devices. 🌀

This article is based on AAIB Accident Report No. 7/2008: *Report on the Accident to Aerospatiale SA 365N, Registration G-BLUN, Near the North Morecambe Gas Platform, Morecambe Bay, on 27 December 2006.*

Note

1. CAA. *Enhancing Offshore Helideck Lighting*, CAA Paper 2004/01.