
Department for Transport

AAIB Bulletin S3/2009

SPECIAL

Aircraft Type and Registration:	Eurocopter EC225 LP Super Puma, G-REDU
No & Type of Engines:	2 Turbomeca Makila 2A turboshaft engines
Year of Manufacture:	2008
Location:	Approximately 500 metres south of the ETAP platform in the North Sea Central Area
Date & Time (UTC):	18 February 2009 at 1835 hrs
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 2 Passengers - 16
Injuries:	Crew - None Passengers - 3 (Minor)
Nature of Damage:	Damaged beyond economic repair due to salt water immersion, impact and salvage damage
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	55 years
Commander's Flying Experience:	17,200 hours (of which 198 were on type) Last 90 days - 137 hours Last 28 days - 54 hours
Information Source:	Inspector's Investigation

This bulletin contains facts which have been determined up to the time of issue. This information is published to inform the aviation industry and the public of the general circumstances of accidents and must necessarily be regarded as tentative and subject to alteration or correction if additional evidence becomes available.

The investigations in this bulletin have been carried out in accordance with The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996, Annex 13 to the ICAO Convention on International Civil Aviation and EU Directive 94/56/EC.

The sole objective of the investigation of an accident or incident under these Regulations shall be the prevention of accidents and incidents. It shall not be the purpose of such an investigation to apportion blame or liability.

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The investigation

The Aeronautical Rescue and Coordination Centre (ARCC) notified the Air Accidents Investigation Branch (AAIB) of the accident at 1912 hrs on 18 February 2009 and the investigation commenced the following day.

The Chief Inspector of Air Accidents has ordered that an Inspector's Investigation be conducted into the circumstances of this accident under the provisions of the *Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996*. In accordance with established international arrangements, the Bureau d'Enquêtes et d'Analyses (BEA) of France, representing the State of Design and Manufacture of the helicopter, appointed an Accredited Representative to participate in the investigation. The investigation is being supported by all parties involved.

Because of the importance of helicopter operations in support of the offshore oil and gas industry, it is considered appropriate to disseminate the results of the initial investigation as soon as possible. No analysis of the facts has been attempted.

History of the flight

The EC225 LP (Super Puma) helicopter was being flown in support of offshore oil and gas operations in the North Sea. It departed Aberdeen Airport at 1742 hrs on a scheduled night flight consisting of three sectors. It climbed to FL55 (5,500 ft pressure altitude) for the transit to its first destination, the ETAP oil production platform located 132 nm to the east of Aberdeen. The commander was pilot flying (PF) and the autopilot (AP) was engaged in the four axis mode. At some point during the cruise the crew observed a Terrain Avoidance Warning System (TAWS) 'caution' caption illuminate for a few seconds and then clear. This caption (not

recorded on the Flight Data Recorder (FDR)) indicating there was a malfunction in the TAWS equipment.

Approximately 30 minutes from the ETAP platform, the crew obtained its latest actual weather. The conditions at 1800 hrs were reported to be: surface wind from 352° at 2 kt, cloud overcast at 800 ft, visibility 6 nm, temperature +7.9°C and the QNH pressure setting was 1024 hPa. With this information the crew decided to conduct an Airborne Radar Approach (ARA)¹. At a range of approximately 30 nm from the ETAP platform the helicopter descended to an altitude of 1,500 ft amsl and the crew set the radio altimeter (RA) warning bug to a height of 150 ft² during the initial Approach Checks.

Shortly before commencing the ARA, the crew were informed that the weather conditions at the ETAP platform had deteriorated. The visibility had reduced to 0.5 nm and the cloud base had lowered to 500 ft asl. In addition, they were advised that a nearby platform, about 12 nm away, could see the lights of the ETAP platform. At a range of approximately 13 nm, the commander could also see the platform and the crew agreed to descend to 500 ft asl and conduct a visual approach using the weather radar to assist with range information. The crew then elected to descend further, to a height of 300 ft asl, to ensure clearance from the reported cloudbase but on passing 400 ft the helicopter entered a bank of fog. The crew climbed the helicopter to 500 ft asl where they could again see the ETAP platform gas flare and platform lights, but not the helideck, which has an elevation of 166 ft.

Footnote

¹ A non precision approach to a Missed Approach Point (MAP) 0.75 nm from the platform, with a Minimum Descent Height (MDH) of 300 ft above sea level (asl), based on the radio altimeter (RA).

² Descent below 150 ft, generates an audio voice warning of "CHECK HEIGHT". This warning can be suspended to prevent activation. A second audio voice height warning of "ONE HUNDRED FEET", which cannot be suspended, is automatically activated by the TAWS when descending through a height of 100 ft RA.

At a distance of 0.75 nm from the platform, the commander disengaged the AP hold modes to fly the helicopter manually. The crew then suspended the 'CHECK HEIGHT' audio warning. The helicopter commenced a turn to the left and began to descend and reduce speed. When it rolled out of the turn the visibility appeared to have reduced but the crew could still see the bright glow of the platform flare. The co-pilot was visual with what he believed was the platform's helideck lighting as well as the lights of the platform and the commander was visual with what he believed were the lights of the platform but could not identify the helideck. Shortly after that, at about 1835 hrs, the aircraft landed heavily on the surface of the sea.

The helicopter remained upright and its flotation equipment inflated automatically. The crew shut the helicopter down and they and the passengers evacuated through various exits into the helicopter's two liferafts. Three of the passengers were subsequently winched up into a Search and Rescue (SAR) helicopter and the remaining 15 passengers and crew were picked up by an Autonomous Rescue and Recovery Craft (ARRC) and transferred to another surface vessel. All the passengers and crew survived the accident. There were a few minor injuries.

Search and Rescue

Several witnesses on the ETAP platform saw the lights of the approaching helicopter descend in the fog. Then they heard the sound of an impact and, realising the helicopter had descended into the sea, they raised the alarm with the oil company's Jigsaw Co-ordinator; Jigsaw is the oil company's SAR organisation, consisting of vessels and helicopters, which covers an area that includes the ETAP platform. The Maritime Rescue Co-ordination Centre (MRCC) was notified at

1840 hrs and the Aeronautical Rescue Co-ordination Centre (ARCC) was contacted at 1843 hrs.

Six helicopters, a Nimrod Maritime Patrol Aircraft, a Rig Support Vessel (RSV), two ARRCs and several other ships proceeded to the area to assist with the Search and Rescue (SAR).

The first SAR asset, a helicopter, arrived at the ETAP platform at 1930 hrs. The search began but it was hampered by limited homing transmissions from Personal Locator Beacons and poor visibility. When the liferafts were discovered, three of the occupants were winched into a helicopter. At 2023 hrs the first ARRC reached the liferafts and the 15 remaining crew and passengers were picked up and transferred to another surface vessel.

Weather

The significant weather chart for the North Sea, for the period 1400 hrs to 2300 hrs, showed a warm front lying north south to the east of the ETAP platform. The weather conditions in the region of the ETAP platform and further east were forecast to be: visibility 17 km with no weather, occasionally reducing to 7 km in haze and light drizzle, with isolated areas of 4,000 m visibility in rain. Occasionally the visibility would be 2,000 m in mist and drizzle and in isolated areas it would reduce to 200 m in fog.

The general cloud cover was forecast to be broken or overcast cumulus and stratocumulus at 1,500 ft to 2,500 ft asl. There were also forecast to be areas of broken or overcast stratus at 200 to 500 ft asl, with the base of the cloud descending in places to the surface in fog.

A meteorological observation, recorded at the ETAP platform at 1708 hrs, was provided to the crew before their departure from Aberdeen. It reported that the conditions at the platform were: weather fine and dry,

surface wind from 069° at 10 kt, visibility 8 nm, overcast cloud estimated at 800 to 1,000 ft, temperature +7°C and QNH pressure setting 1024 hPa.

Witnesses on the ETAP platform at the time of the accident described the platform as being in a 'fog bank', the top of which was estimated to be some 10 ft above the platform's helideck. These witnesses were able to see the gas flare at the top of the structure through the fog from the helideck.

Wreckage recovery

The helicopter's tail boom detached from the main structure on impact with the water and subsequently sank. The remainder of the fuselage, with the main rotor blades still attached, continued to float but became inverted sometime after the rescue and was recovered from the sea early on 21 February. The tail boom, containing the Combined Voice and Flight Data Recorder (CVFDR) and the TAWS computer, was located on the seabed on 22 February by a specialist vessel utilising sonar and video equipped Remotely Operated Vehicles (ROVs). It was approximately 750 m south of the ETAP platform and, following a delay due to poor weather conditions, it was recovered onto the deck of the ROV mother ship on 23 February. The ROVs also located and enabled recovery of additional debris and components from the seabed, 450 m to the southwest of the ETAP platform. These items included the left main door, four fuselage windows and some small pieces of wreckage from the underside of the fuselage and inside the tail boom. The right main door remained attached to the fuselage. The two life-rafts and some of the location and survival equipment had been recovered earlier.

All the recovered wreckage was transported to the AAIB's headquarters at Farnborough.

Recorded data

The helicopter was fitted with a solid state CVFDR. The recordings, which also covered previous flights, were successfully replayed. The data indicates that the departure from Aberdeen Airport and cruise at FL55, on an easterly track, was uneventful. When the crew initially observed the ETAP platform, its gas flare was visible but the platform lights were not.

From its cruising level the helicopter descended steadily to a height of just under 300 ft asl before climbing back up to 400 ft asl and then to just under 500 ft asl. A further descent to a height of 400ft asl and then to 300 ft asl was carried out and, shortly after reaching a distance of 0.75 nm from the ETAP platform, the helicopter began to climb again. Approximately half a mile from the platform, the helicopter turned left on to a north-easterly track taking it towards the platform. The co-pilot indicated that he was visual with the helideck whilst the commander was not.

Power was reduced and the rate of descent settled at about 1,000 ft/min, with the helicopter slowly pitching up and reducing speed. As it descended through a height of 200 ft asl, the ROD was 1,000 ft/min and the indicated airspeed (IAS) was 50 kt. The helicopter's nose-up pitch attitude increased to a maximum of 22.5° whilst the roll attitude remained level. The steady descent profile continued until the recording ended at a height of 1.75 ft asl, when the helicopter was approximately 500 m from ETAP platform. Two seconds before the end of the recording, the IAS had reduced to 24 kt. It then reduced to zero, which often occurs when there is insufficient airspeed to sustain accurate measurement.

During a review of the recorded data from the accident flight no "ONE HUNDRED FEET" audio voice warning

was evident. This callout cannot be suspended and it was clearly audible in the recording of the landing at the end of the previous flight. Furthermore, there was no evidence of a “CHECK HEIGHT” callout, although the position of the switch, which is used to suppress this function, was not a recorded parameter. No warning parameters were triggered and no alerts were evident in the audio recordings.

Engineering

A preliminary examination of the recorded information and the wreckage revealed no evidence of any pre-impact malfunction of any major mechanical components, including the engines, main rotor, tail rotor and its drive shaft. Further examinations are planned on the avionic components, including warning systems.

Safety actions

Since the accident, the operator has amended the procedures in its Operations Manual for offshore night operations. For night visual approaches Stable

Approach Configuration (SAC) criteria have been specified. They are to be met by a Visual Gate Point, 2 nm from the destination installation or vessel. In addition:

‘if at any time after the Visual Gate Point visual contact with the installation/vessel is lost or becomes uncertain, a Go-around is mandatory.’

On *Short Finals*, only after the helideck name has been confirmed, the “CHECK HEIGHT” audio warning is suspended.

Further investigation

Analysis of the recorded data is continuing, together with a detailed examination of the wreckage, a review of the performance of the emergency and survival equipment and an assessment of the operational aspects of the accident.