INITIAL REPORT

ACCIDENT

Aircraft Type and Registration:	Eurocopter AS332L2 Super Puma, G-REDL
No & Type of Engines:	2 Turbomeca Makila 1A2 turboshaft engines
Year of Manufacture:	2004
Date & Time (UTC):	1 April 2009 at 1255 hrs
Location:	Approximately 11 miles north-east of Peterhead, Scotland
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 2 Passengers - 14
Injuries:	Crew - 2 (Fatal) Passengers - 14 (Fatal)
Nature of Damage:	Helicopter destroyed
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	31 years
Commander's Flying Experience:	2,575 hours (of which 1,870 were on type) Last 90 days - 96 hours Last 28 days - 37 hours
Information Source:	AAIB Field Investigation

The helicopter was operating a return scheduled passenger flight from Aberdeen to the Miller Oil Platform, situated in the North Sea approximately 145 nm north-east of Aberdeen. When it arrived from its previous flight to the Bruce Platform, approximately 190 nm north-east of Aberdeen, a 'rotors running' crew change was carried out. The helicopter was serviceable except for a deferred defect affecting a part of its ice detection system. The daily in-flight checks had already been completed satisfactorily by the off-going crew. The helicopter was refuelled, the passengers boarded, and it lifted off at 1040 hrs. The helicopter landed on the Miller platform, after an uneventful flight, at 1149 hrs, where it was refuelled again with the rotors-running. Fourteen passengers boarded the helicopter for the return flight to Aberdeen when the refuelling was complete. The weather conditions were benign with light south to south-easterly winds, good visibility with generally clear skies but with occasional broken cloud at 5,000 to 6,000 ft. Flying conditions were reported as smooth and the sea was calm.

The helicopter lifted from the Miller Platform at 1203 hrs and climbed to 2,000 ft, tracking inbound towards Aberdeen. Recorded information on the combined Cockpit Voice and Flight Data Recorder (CVFDR) shows that the crew were engaged in routine cockpit activities and there were no operational abnormalities. At 1254 hrs

the co-pilot made a routine call on the company operating frequency stating that the helicopter was serviceable and the ETA was 1314 hrs. Twelve seconds later one of the pilots made a brief MAYDAY call on the ATC frequency. This was followed by a similar call, that included some position information, from the other pilot. The radar controller at Aberdeen acknowledged the MAYDAY call and tried unsuccessfully to contact the crew of G-REDL. He then asked the crew of another helicopter, outbound on a similar routing, to examine the sea in the area of the last radar position.

Recorded radar information showed the aircraft flying inbound towards Aberdeen at 2,000 ft, climbing momentarily to 2,200 ft and then turning right and descending rapidly. Surface visibility was good and an eye witness, working on a supply vessel approximately 2 nm from the accident site, heard the helicopter and saw it descend rapidly before it hit the surface of the sea. Immediately after impact he saw the four main rotor blades, still connected at their hub, strike the water. Around this time, he also heard two bangs close together. He immediately raised the alarm and the ship turned towards the accident site, which by now was marked by a rising column of grey then black smoke. The ship launched a fast rescue boat whilst making way towards the scene. The crew of the fast rescue boat and the helicopter arrived promptly on the scene to discover an area of disturbed water, roughly 150 m in diameter containing debris from the helicopter. Other search and rescue vessels, aircraft and helicopters arrived on scene within 40 minutes. All persons on board were fatally injured.

The Air Accidents Investigation Branch (AAIB) was notified of the accident within minutes and a team of inspectors, including engineers, pilots and flight recorder specialists deployed to Aberdeen that evening. In accordance with established International arrangements the Bureau d'Enquetes et d'Analyses Pour la Securitie de l'Aviation Civile (BEA), representing the State of Manufacture of the helicopter, and The European Aviation Safety Agency (EASA), the Regulator responsible for the certification and continued airworthiness of the helicopter, were informed of the accident. The BEA appointed an Accredited Representative to lead a team of investigators from the BEA, Eurocopter - the helicopter manufacturer, and Turbomeca - the engine manufacturer. The EASA and the UK Civil Aviation Authority also provided assistance to the AAIB team.

Floating wreckage from the helicopter was brought ashore towards the end of the search and rescue phase. As a priority, the CVFDR was located in the debris field and transported to the AAIB as soon as it was raised from the sea bed on Sunday 5 April 2009. By Monday 6 April 2009 the helicopter fuselage with the engines and main rotor gear box attached, the separated rotor head with the main rotors blades still attached and the separated tail boom had been recovered from the sea bed and transported to the AAIB facilities at Farnborough, Hampshire. The CVFDR was successfully downloaded at the AAIB and contained 24 hours of flight data and one hour of cockpit voice recording. A large number of parameters were recorded including engine data and some system warnings which are still being analysed. The CVFDR recording ceased just prior to the first MAYDAY transmission.

In common with similar helicopters operating in the North Sea, the helicopter was additionally equipped with a Health and Usage Monitoring System (HUMS), which comprises a system of sensors around the engines, airframe and drive train. Recorded information includes vibration levels together with gearbox chip detection from a series of magnetic plugs. The data accumulated during

helicopter operations is transferred, usually on a daily basis, to the operator's ground-based computer system. The data is then subjected to mathematical processes that establish basic signatures and enable trends to be monitored for individual components. The HUMS data for the day's operation, including the accident flight, has also been recovered. As the result of the discovery of a particle on the main rotor gearbox epicyclic module magnetic chip detector on 25 March a daily inspection of the epicyclic gearbox magnetic chip detector was initiated. Also, the HUMS data was downloaded and analysed each time the helicopter returned to its base at Aberdeen for the next 25 flying hours. No further abnormalities were identified during this period.

Examination of the wreckage indicates that the accident occurred following a catastrophic failure of the main rotor gearbox (MGB). This resulted in the detachment of the main rotor head from the helicopter and was rapidly followed by main rotor blade strikes on the pylon and tail boom, which became severed from the fuselage. It is apparent that there was also a rupture in the right hand (No2) engine casing, in the plane of the second stage power turbine. This is currently believed to be a secondary feature. Investigations are continuing in order to understand completely the accident sequence.

The investigation has so far revealed that the MGB had suffered from a major failure within the epicyclic module. This is supported by HUMS data; however, this is not yet fully understood. The examination of the MGB is continuing in conjunction with detailed analysis of the HUMS and other recorded information.

Based on the initial findings of the investigation the following three Safety Recommendations are made:

Safety Recommendation 2009-048

It is Recommended that Eurocopter issue an Alert Service Bulletin to require all operators of AS332L2 helicopters to implement a regime of additional inspections and enhanced monitoring to ensure the continued airworthiness of the main rotor gearbox epicyclic module.

Safety Recommendation 2009-049

It is Recommended that the European Aviation Safety Agency (EASA) evaluate the efficacy of the Eurocopter programme of additional inspections and enhanced monitoring and, when satisfied, make the Eurocopter Alert Service Bulletin mandatory by issuing an Airworthiness Directive with immediate effect.

Safety Recommendation 2009-050

It is Recommended that Eurocopter improve the gearbox monitoring and warning systems on the AS332L2 helicopter so as to identify degradation and provide adequate alerts.