

Aerospatiale AS332L Super Puma, G-PUMH

AAIB Bulletin No: 11/99 **Ref:** EW/G99/07/31 **Category:** 2.1

Aircraft Type and Registration: Aerospatiale AS332L Super Puma, G-PUMH

No & Type of Engines: 2 Turbomeca Makila 1A turboshaft engines

Year of Manufacture: 1984

Date & Time (UTC): 23 July 1999 at 0735 hrs

Location: Kirkwall Airport, Orkney Islands

Type of Flight: Public Transport

Persons on Board: Crew - 2 - Passengers - 17

Injuries: Crew - None - Passengers - None

Nature of Damage: Slight buckling and skin damage to underside of fuselage with broken aerials below cockpit

Commander's Licence: Airline Transport Pilot's Licence (Helicopters) with Instrument Rating

Commander's Age: 42 years

Commander's Flying Experience: 4,994 hours (of which 3,995 were on type)

Last 90 days - 72 hours

Last 28 days - 54 hours

Information Source: Aircraft Accident Report Form submitted by the pilot

The helicopter departed from Aberdeen at 0615 hrs for the North Alwyn Platform in the East Shetland Basin, with the commander as the handling pilot. Due to passenger load and forecast route winds, which were north-westerly at 20 kt, the crew planned to refuel at Sumburgh in Shetland. In order to achieve the maximum payload, the aircraft departed from Aberdeen with the minimum fuel required for an IFR flight.

The after take-off checks were carried out at the normal point in the departure, including the landing gear being selected UP. The helicopter climbed to its cruising altitude of 3,000 feet for the transit to Sumburgh. The actual winds experienced were stronger than forecast (up to 46 kt). In addition, the commander noticed that the fuel burn was slightly higher than expected at 500 kg/hr instead of 490 kg/hr and the TAS of 118 kt was about 5 kt lower than expected. In order to maintain sufficient fuel for the flight the commander elected to divert to Kirkwall, Orkney Islands for a refuelling stop. ATC cleared the aircraft to route to Kirkwall and to carry out a VOR/DME

procedure for Runway 27. Although both pilots had been to Kirkwall before they did not know the airfield or procedure well and therefore carried out a comprehensive approach brief.

Initial approach checks were carried out by the co-pilot at 10 DME; he noted that the landing gear indications showed three greens but he did not move the selector. Final approach checks were carried out at 5 DME, by which time the pilots were visual with the airfield. The commander brought the helicopter to a hover over the runway and then hover taxied to the entrance to taxiway Delta, where he landed, intending to ground taxi along Delta to the apron. The landing appeared normal, all wheels were felt to be down and the collective lever was lowered. Some 40 seconds later the nose landing gear collapsed and the aircraft pitched forwards. Both crew members noted a 'travel' light on the landing gear panel. Whilst the commander cushioned the descent with collective lever the main landing gear also retracted and the aircraft gently came to rest upright on the taxiway. The commander called for the fire services which attended immediately and the passengers were evacuated using the normal cabin door. He then shut down the aircraft using the general cutout handle. The commander noted that the landing gear selector was still in the UP position.

The FDR trace shows that the landing gear selector was moved to the UP position at 70 feet Radio Altimeter on departure from Aberdeen but that the ground/flight logic had remained in 'ground' and so the landing gear did not retract. This condition remained until some 40 seconds after landing at Kirkwall when the ground/flight logic changed to 'flight'. At that point, because the landing gear selector was still in the UP position, the landing gear retracted, nose gear first. The damage to the nose landing gear actuator was due to the leg being compressed when retracting thus causing the scissors link to extend upwards into the nosewheel bay and contacting the actuator. When retracted the main landing gear wheels protrude below the underside of the aircraft and this prevented damage to the skin in this area.

The crew was not aware of seeing 'three greens' during the flight, although the commander was aware of a slight shortfall in performance which was in fact due to the landing gear being DOWN. The workload was high due to the significantly increased winds and activity required in diverting to Kirkwall. When the co-pilot carried out the initial approach checks, he saw three greens but did not note the position of the landing gear selector, assuming that the commander had already made the selection. The commander confirmed the 'three greens' but also did not observe the position of the selector. The selector is black on a black background and its position is not therefore obvious at a cursory glance; attention is however drawn naturally to the indicator lights especially if three greens are showing. Since a mismatch between the selector position and status lights is the only way of diagnosing a ground/flight logic reversal in the air, the operator intends to introduce a colour marking of the selector to improve the ability to check for such a mismatch. Operationally, the checklist has been amended to include a check of the position of the landing gear selector as well as the indicator lights.

A company engineering investigation has identified the technical cause of the failure to be a faulty nose landing gear 'centre extended' proximity sensor giving an erroneous 'in air' signal to the Landing Gear Logic PCB (100G PCB).