No: 8/87 Ref: 2a

Aircraft type

and registration: Aerospatiale AS 332L Super Puma G-BKZH

No & Type of engines: Two Turbomeca Makila 1A turbine engines

Year of Manufacture: 1983

Date and time (UTC): 20 May 1987 at 1350 hrs

Location: 60.58.6 N 000.12.8 E, 33 nm ENE of Unst, Shetland Islands

Type of flight: Public Transport, Charter

Persons on board: Crew — 2 Passengers — 17

Injuries: Crew — None Passengers — None

Nature of damage: Half of the trailing edge of one tail rotor blade detached. Partial

failure of inclined pylon structure. Both main artificial horizons

failed and the Public Address amplifier disabled.

Commander's Licence: Airline Transport Pilots Licence (H)

Commander's Age: 39 years

Commander's Total

Flying Experience: 6000 hours (of which 400 were on type)

Information Source: AIB Field Investigation

The aircraft lifted off from Sumburgh, Shetland Isles, at 1300 hrs and climbed, in cloud, to 3000 feet en-route to an oil rig, Sedneth 701.

At 1350 hrs, whilst still in cloud, the aircraft suddenly began to vibrate violently and the nose pitched up. Simultaneously, both the primary flight instruments (attitude director indicators) indicated a roll and oscillating pitch-up indication which the pilots estimated was about 30 degrees. The standby artificial horizon confirmed the pitch-up but not the roll, and gave a steady indication. Reference to the other flight instruments confirmed the credibility of the standby horizon and so the crew used it as the attitude reference. The commander immediately lowered the collective lever, reducing the rotor blade pitch angle to 12 degrees, thus relieving the tail rotor load and, using the standby artificial horizon, established a gentle descent. As the descent was begun, the vibration decreased to a tolerable level such that an emergency diversion, rather than a ditching, became a possibility. The commander decided to make a land diversion and fly the aircraft using the "Tail Rotor Control Failure" drill which precluded use of the yaw pedals.

The co-pilot transmitted a mayday call to "Brent Log" on the control radio frequency in use, followed by another to "Shetland Radar" requesting radar direction to Unst. During the descent, the crew attempted to brief the passengers about the emergency and the intention to land at Unst but the public address system amplifier had failed. By the time this was realized a little while later, the passengers had already carried out their own emergency drill and a series of hand signals sufficed for the remainder of the briefing. The descent was continued until the

aircraft broke cloud and levelled at 800 feet, en-route to Unst, some 30 nm west.

A coastguard S61 Search and Rescue (SAR) helicopter was already airborne on exercise in the Thistle Field, some 80 nm distant, and was vectored towards ZH. The SAR Bell 212 was also launched from Unst. At 1508 hrs, the Bell 212 made visual contact with ZH and escorted it to Unst.

The surface wind at Unst was 330/20—28 kt. This greatly assisted a straight-in run-on landing on runway 33. A successful landing was made in accordance with the "Tail Rotor Control Failure" drill and the touchdown made without use of the yaw pedals or the collective lever. Directional control was maintained using the nose-wheel lock and the brakes when required.

Initial examination of the aircraft, after landing, showed that the centre portion of the trailing edge of one tail rotor blade was missing and that the structure of the inclined pylon, just below the tail rotor gearbox mounting, was partially failed.

More detailed investigation showed that a part of the channel section which lies under the opening edge of the inclined driveshaft fairing had become detached and fallen free. There was evidence that this part had struck the leading edge of two successive tail rotor blades, wrapping round the second blade and damaging its trailing edge sufficiently to cause part of it to become separated. The piece of channel which separated had only recently been fitted, replacing a part which had become severely worn in service.

The Chief Inspector of Accidents has ordered that an Inspectors Investigation be conducted into this accident.