

AAIB Bulletin No: 10/95

Ref: EW/G95/05/28

Category: 1.1

INCIDENT

Aircraft Type and Registration: BAe ATP, G-BTPF

No & Type of Engines: 2 Pratt & Whitney PW-126 turboprop engines

Year of Manufacture: 1989

Date & Time (UTC): 25 May 1995 at 0658 hrs

Location: 10 nm north west of Newcastle Airport

Type of Flight: Scheduled Passenger

Persons on Board: Crew - 4 Passengers - 43

Injuries: Crew - None Passengers - None

Nature of Damage: Air Cycle Machine failed

Commander's Licence: Airline Transport Pilot's Licence

Commander's Age: 46 years

Commander's Flying Experience: 10,800 hours (of which 800 were on type)
Last 90 days - 50 hours
Last 28 days - 4 hours

Information Source: Aircraft Accident Report Form submitted by the pilot

The aircraft was operating a scheduled flight from Aberdeen to Manchester. Whilst climbing through FL 100, the co-pilot noticed an uncommanded torque increase on the right engine which he adjusted using the power lever. The crew also heard an unusual "cyclic" sound. Shortly afterwards the cabin staff reported a burning smell in the rear galley and aft cabin at the same time as the flight crew also detected smoke and a smell described as like "burning oil".

As the aircraft was only about 10 nm north west of Newcastle Airport, the captain decided to divert there and made a 'PAN' call to that effect. He then depressurised the aircraft during the descent which cleared the smoke. An uneventful landing was made and, after an external inspection by the fire services, the aircraft taxied to a stand and the passengers disembarked via the forward airstairs.

Examination of the aircraft

The operator initially despatched a powerplant engineer to examine the aircraft but, after examination of the No 2 Air Cycle Machine (ACM) and engine runs, it became clear that the problem lay in the ACM

which bore signs of severe distress and appeared seized. Readout of the Flight Data Recorder confirmed a maximum of 4% uncommanded torque increase on the right engine. The aircraft manufacturer advised that seizure of the ACM would lead to a rise of engine torque of this order as the engine air bleed would be throttled which would result in an increase in power to the propeller.

Examination of the ACM

The operator despatched the ACM to its manufacturer in the United States with clear instructions that it should be investigated prior to repair. Unfortunately, due to an error on the part of the manufacturer, it was merely subjected to the normal repair procedures so that it is not known precisely what was the cause of failure. It is known, however, that the compressor and turbine bearings had broken-up, allowing gross rubbing of the rotor to occur on the case.

The unit, Part No 784630-2 had run some 1,630 flying hours since overhaul. It did not incorporate two optional modifications which may have been relevant to the failure. The first, Hamilton-Standard Service Bulletin (SB) 21-2105, improved the lubrication of the bearings and took the unit to -3 standard. A second SB, 21-2116, takes the -3 unit to -4 standard by incorporating a stiffer shaft connecting the compressor and turbine.

The operator advises that they are planning a programme to upgrade all their ACMs to the -4 standard.