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ATSB TRANSPORT SAFETY REPORT
Aviation Occurrence Investigation AO-2008-008
Interim Factual Report

Engine failure – Jabiru, NT

11 February 2008

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Australian Transport Safety Bureau
PO Box 967, Civic Square ACT 2608
Australia
1800 621 372
www.atsb.gov.au

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Abstract

On 11 February 2008 at about 0720 Central Standard Time, following takeoff from runway 27 at Jabiru Airport, NT, a Beech Aircraft Corporation 1900D, registered VH-VAZ, sustained an auto-feather of the left propeller and subsequent left engine failure.

The aircraft was being operated on a charter flight to Darwin with two pilots and a passenger on board. The pilots reported that, following the engine failure, they completed a single-engine circuit and landing at Jabiru. Subsequent examination of the left engine revealed catastrophic internal damage to the power section of the engine.

The investigation is continuing.

FACTUAL INFORMATION

The information contained in this interim factual report is derived from initial investigation of the occurrence. Readers are cautioned that there is the possibility that new evidence may become available that alters the circumstances as depicted in the report.

On 11 February 2008 at about 0720 Central Standard Time¹, following takeoff from runway 27 at Jabiru Airport, NT, a Beech Aircraft Corporation 1900D, registered VH-VAZ, sustained an auto-feather of the left propeller and subsequent left engine failure.

The aircraft was being operated on a charter flight to Darwin with two pilots and a passenger on board. The pilots reported that, following the engine failure, they completed a single-engine circuit and landing at Jabiru.

The flight crew later reported that, at the time of the engine failure, the aircraft's landing gear was retracted and that the engine was in the TAKEOFF POWER configuration. They further reported that the engine failure occurred shortly after selecting the engine bleed air OPEN, and that it was preceded by a loud 'banging' noise, followed by a left yaw of the aircraft.

Subsequent analysis of the aircraft's flight recorder data indicated that the engine failure occurred about 20 seconds after takeoff, at about 600 ft above ground level (AGL) and at an indicated airspeed of 169 kts. The data indicated normal operation of the engine prior to the occurrence.

The passenger reported to the flight crew that debris, which was described as possibly being 'white chunks of metal', was coming out of the exhaust of the left engine. Observers on the ground reported seeing a puff of smoke, followed by flames coming from the left engine. Ground

1 The 24-hour clock is used in this report to describe the local time of day, Central Standard Time (CST), as particular events occurred. Central Standard Time was Coordinated Universal Time (UTC) + 9.5 hours.

personnel reported that, on inspection, there was visual evidence in the engine exhaust of catastrophic damage to the power, or hot section of the engine (Figure 1).

Figure 1: View looking into the exhaust of the left engine



The left engine was removed from the aircraft by the operator's maintenance personnel and shipped to an approved engine overhaul facility for disassembly and examination under the supervision of the Australian Transport Safety Bureau (ATSB).

ENGINE DISASSEMBLY

The engine disassembly, examination and inspection confirmed catastrophic damage to the power section of the engine. That included to the:

- exhaust duct
- hot section shroud housing
- hot section shroud segments
- power turbine housing
- power turbine 1st and 2nd stage vane rings
- 1st stage power turbine disc blades
- 2nd stage power turbine disc blades (Figure 2).

Figure 2: Power turbine disc 2nd stage



The compressor turbine disc sustained minor impact-related damage to the aft side (power turbine side) of the blades. There was minor splatter of molten metal on the compressor turbine disc blades. There was minor damage to the leading edges of the compressor blades.

The components of the power section were sent to the ATSB laboratories for further examination.

ENGINE HISTORY

The Pratt and Whitney Canada PT6A-67D engine, serial number 114239, was installed in the aircraft in May 2007. The last overhaul of the power section was completed on 24 May 2005. At that time, the power section had accumulated 18,058 hrs total time in service (TTIS), with 26,100 cycles since new (CSN). On 8 February 2007, the time of the last maintenance carried out on the engine, the power section had accumulated 21,466.2 hrs TTIS, 29,054 CSN, 3,408 hrs time since overhaul (TSO) and 2,954 cycles since overhaul (CSO).

ENGINE COMPONENT EXAMINATION

Further examination of the, 2nd stage power turbine disc² indicated that one of the disc blades had released at the 'fir tree' area or base of the blade. The fracture surface of the blade indicated that it may have failed as a result of a pre-existing anomaly (Figure 3).

² Part number 3037313 serial number A00087CM

Figure 3: 2nd stage power turbine blade fracture surface (potential pre-existing anomaly indicated)



The 2nd stage disc was installed during the power section overhaul on 25 May 2005, at 8,951 CSN³. On 8 February 2007, during the last maintenance to the engine, the disc had accumulated 3,411.0 hrs TSO and 2,954 CSN, indicating a total of 11,905 CSN.

TESTING

The engine fuel pump and fuel control unit (FCU) were sent to the engine manufacturer for testing under the supervision of the Transportation Safety Board of Canada. That testing confirmed the normal operation of the fuel pump and FCU.

FURTHER INVESTIGATION

The investigation is continuing and will include further examination of the:

- 2nd stage disc blade fracture surface and any possible initiators
- engine historical documentation
- engine condition trend monitoring.

³ The time before overhaul limit of the disc was 15,000 CSN.