

ACCIDENT

Location : Lubbock, Texas
Date : February 04th, 2015
Aircraft : Piper PA46-500TP
Aircraft Reg. No. N301D
NTSB ID : CEN15FA135
Pratt & Whitney Canada File # 15-008

EXAMINATION PARTICIPANTS

Jerry Morgan
Aviation Safety Investigator
Federal Aviation Administration (FAA)

Jeff Davis
Investigator
Pratt & Whitney Canada

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Investigator
Pratt & Whitney Canada

SUMMARY

Examination of the engine was conducted on April 21st, 2015 at Pratt & Whitney Engine Services, Bridgeport West Virginia. The engine examination did not reveal any evidence of any pre-impact mechanical anomalies that would have precluded normal operation. A final report of the engine examination will be provided by Pratt & Whitney Canada.

DETAILS OF THE EXAMINATION

The engine was a Pratt & Whitney Canada PT6A-42A model, serial number PC-E RM0052 (Ref. Photo No. 1). The engine was received in a wood crate. The accessory gearbox was separated from the engine, and the fuel control and fuel pump assembly were separated from accessory gearbox (Ref. Photo No. 2). The fuel oil heat exchanger, the P3 filter assembly and the fuel flow divider valve were not received with the engine.

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Photo No. 1, Engine data plate



Photo No. 2, As-received condition of engine

The reduction gearbox housing was intact. The propeller shaft was intact. The propeller governor, propeller overspeed governor and the Np tachometer generator were in place and intact. The reduction gearbox chip detector was removed and found unremarkable in appearance. The exhaust duct exhibited moderate compressional deformation, heaviest on the top side.

The gas generator case exhibited significant impact compressional deformation (Ref. Photo No. 3). The flow divider valve was missing. The remaining fuel nozzle manifold

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assembly was in place and secure. Both compressor bleed valves were intact and secure.

The compressor inlet case was fractured exposing the compressor inlet. An airframe component (flow control valve assembly) was found lodged in the compressor inlet (Ref. Photo No. 4). The blade leading edges were gouge and deformed due to contact with ingested debris. The blade tips and shroud exhibited light circumferential rubbing. The 1st stage stator airfoils were intact with the tips rubbed from radial contact with the adjacent spacer.



Photo No. 3, Gas generator case



Photo No. 4, Compressor inlet

The accessory gearbox assembly, including a portion of the inlet case was separated from the gas generator case. The housings were fractured at the top, exposing the accessory gearbox internal components and the oil tank (Ref. Photo No. 5). The accessory gearbox was capable of manual rotation. The oil filter and chip detector were removed and found unremarkable in appearance.



Photo No. 5, Accessory gearbox

The engine was split at the “C” flange to expose the hot section components. The compressor turbine disk exhibited light circumferential wear from contact with the power turbine vane. The compressor turbine shroud housing was locally deformed inwards from impact/ compressional deformation of the power turbine vane (Ref. Photo No. 6). The compressor turbine shroud segments exhibited rotational scoring from the blade tips (Ref. Photo No. 7). The compressor turbine vane displayed no indications of operational distress.

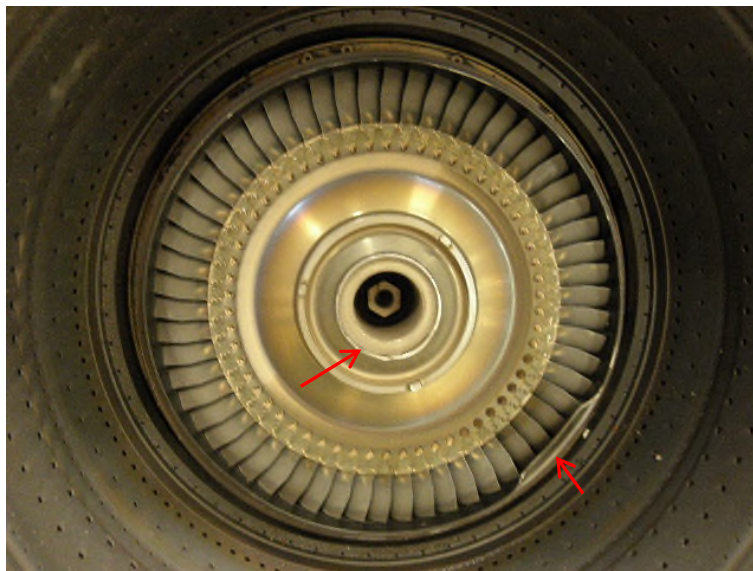


Photo No. 6, Compressor turbine in-situ

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Photo No. 7, Compressor turbine shroud segment rubs

The power section was not capable of manual rotation. Two temperature probe ends were found fractured. The 1st stage power turbine vane exhibited localized deformation of the outer shroud, and all the vanes exhibited cracks/ fractures at the airfoil to inner shroud area. Circumferential scoring was evident on the downstream side of the inner shroud. The baffle exhibited contact marks from the power turbine shaft and retention nut (Ref. Photos No. 8 - 10). The power turbine disks were removed. Circumferential scoring was evident on the power turbine shrouds. Approximately half of the 1st stage power turbine blades had shifted forward in the disk (Ref. Photos No. 11 & 12). The 2nd stage power turbine disk assembly was relatively unremarkable in appearance. With the power turbines removed, the power section was capable of manual rotation. No further disassembly of the power section was performed.

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Service Investigation
Factual Notes



Photo No. 8, 1st stage power turbine vane and housing



Photo No. 9, 1st stage power turbine vane



Photo No. 10, 1st stage power turbine vane

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Photo No. 11, 1st stage power turbine disk



Photo No. 12, 1st stage power turbine disk

The fuel control unit and fuel pump were capable of manual rotation. The fuel filter was removed and the residual fuel in the filter bowl and the filter were clean (Ref. Photos No. 13 & 14).

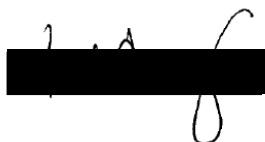


Photo No. 13, Residual fuel in filter bowl



Photo No. 14, Fuel filter

These factual notes are based upon observations made on April 21st, 2015 and may be altered or corrected on the basis of further information.

A handwritten signature in black ink, which appears to be "K. Currey", is written over a black rectangular redaction box.

Submitted by : Karel Currey
April 22nd, 2015

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