

National Transportation Safety Board

Office of Aviation Safety

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N529KC - AIRFRAME AND ENGINE EXAMINATION REPORT

July 24, 2024

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A. ACCIDENT

Location: Hebron, North Dakota
Date: June 17, 2024
Time: 1000 Central Time
Airplane: N529KC, Thrush S2R-G10

B. N529KC - AIRFRAME AND ENGINE EXAMINATION REPORT

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C. DETAILS OF THE EXAMINATION

1.0 Onsite Examination

The investigative team arrived at the Aerial Crop Care Company on July 23, 2024. The examination concluded on July 24, 2024. The investigative team was assisted by various staff members from the Aerial Crop Care Company, including the pilot, who is also the mechanic.

Prior to the investigative team arriving, Honeywell shipped an engine crate to the Aerial Crop Care Company, so the engine can later be transported to Honeywell in Phoenix, Arizona, for an examination.

The operator is a member of the National Agricultural Aviation Association.

2.0 Airframe Examination

The airframe is a Thrush S2R-G10 airplane, serial number G10-173. The airframe data plate was identified.

The airplane sustained substantial damage to the bottom of the rudder. The tailwheel was found separated from the airframe, however the left and right main landing gear were found intact. The spray boom for each wing was found removed, however all the rest of the spray equipment was found installed on the airframe. The hopper was found installed in the airframe. The left side main landing gear strut shock was found damaged.

The airframe was equipped with a wire strike cutting system.

The pilot reported there were no issues with the flight controls during the entire accident flight.

The left-wing flap indicator showed 15 degrees. The pilot confirmed that he had 15 degrees of flaps applied when he performed the forced landing.

There were no signs of loose connections, damaged hoses, or loose b-nuts.

The operator reported that the airplane was filled with JET-A fuel for the accident flight.

Both fuel tanks were found intact. Both fuel tanks caps were found installed, intact, and appeared to be in working condition. Both fuel tank vents were checked via forced air, and both fuel tanks vents appeared to be clear.

The fuel level for both fuel tanks, according to the tabs installed inside of the fuel tank, was found slightly above the 66-gallon marker.

The firewall fuel filter bypass was found not extended.

The fuel boost pump was turned on, after the hose to the engine fuel control unit was removed, and the hose was inserted into a bucket. The fuel boost pump was turned on (via the battery switch in the cockpit) and fuel flowed freely into the bucket.

Fuel samples were retrieved from the left wing fuel tank, the right wing fuel tank, the header fuel tank, and the firewall fuel filter. All four samples produced a clear liquid, with no visible contaminants. All four samples were colorless, per the fuel chart located in the Federal Aviation Administration Aviation Maintenance Technician Handbook - Airframe (FAA-H-8083-31B). The firewall fuel filter sample was included inside of the engine crate.

There were no signs of a fuel leak on the airframe. The airplane was equipped with a single point fueling port.

The four-point restraint systems and the seat were found intact and were attached to the airframe. The airplane was not equipped with a cockpit airbag system.

No cockpit circuit breakers were found extended. The Hobbs meter showed 2,185.0 hours. All of the cockpit warning lights were tested with the power on, with no issues noted.

The airframe airflow induction system was found clear.

For the avionics, a Shadin fuel flow indicator, an Appareo Stratus, an AgPilot X, and a GT-50 flight data system were removed from the airframe and were shipped to the NTSB Vehicle Recorders Laboratory. Per the pilot, a Garmin GPSMap 496 was not onboard the airplane, since the accident flight was a short distance away from the operator's airstrip.

There were no mechanical anomalies noted with the airframe.

3.0 Engine Examination

The engine is a Honeywell TPE331-10-511M turboprop engine, serial number P-36258C. The engine data plate was identified.

The engine was found intact inside of the engine mount, with no damage sustained.

Airframe to engine control continuity was established with no issues noted.

There were no signs of loose connections, damaged hoses, or loose b-nuts.

The engine air intake was found clear and unobstructed.

There were no signs of fuel leaks from the engine.

The first stage centrifugal compressor disk (located in the intake section), was found intact with no damage observed.

The rearmost three-stage axial turbine disk (located in the exhaust section) was found intact with no damage observed. Oil was coated in various locations on the turbine scavenge pump cover and on the bottom of the interior exhaust duct (about the 6 o'clock position).

The propeller was rotated by hand and internal continuity to the gearbox scavenge pump and engine power section were confirmed.

The exhaust system was not obstructed.

The starter generator and tachometer generator were removed from the engine. All the engine accessories were left on the engine for future examination work.

The engine oil was drained from the oil tank. An engine oil sample was obtained and no visible contaminants were noted in the sample. The engine oil sample was included inside of the engine crate.

Various fluid ports on the engine and engine accessories were plugged with caps, except for the various drainage ports, for the shipment to Honeywell.

An engine monitoring device was not installed.

The engine was removed from the engine mount and was placed inside of the engine crate for shipment to Honeywell in Phoenix, Arizona.

Except for the oil coating the turbine scavenge pump cover and on the bottom of the interior exhaust duct, there were no mechanical anomalies noted with the engine.

4.0 Propeller Examination

The propeller is a Hartzell HC-B3MN-5L/LM11693N propeller, hub serial number BUA33587.

The three-blade aluminum propeller was found attached to the crankshaft.

Blade A (serial number L67673) sustained minor bending and chordwise scratching toward the outboard portion of the blade. Blade B (serial number L67674) and blade C (serial number L67669) did not sustain any noticeable damage. There was no leading-edge damage noticed on all three blades.

The hub was found intact with no damage. There were no signs of fluid leaks with the propeller.

The beta tube was removed, and it was included inside of the engine crate.

The spinner sustained no damage.

The propeller was removed from the propshaft, to facilitate the engine removal from the airframe.

There were no mechanical anomalies noted with the propeller.

5.0 Maintenance Records Review

The airframe, engine, and propeller maintenance records were reviewed and were documented. The engine maintenance records were included inside of the engine crate.

The airframe weight and balance record was documented.

The historical FAA airworthiness and registration records were retrieved and were reviewed.

Submitted by:

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Investigator-In-Charge