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Subject: CEN22LA341, N21GF, FAA Examination Summary

Contact: Craig Brumley, FAA Aviation Safety Inspector

The NTSB did not travel for the fuel system or engine examinations of the accident airplane. An airframe and powerplant mechanic was hired and oversight was provided by the Federal Aviation Administration's Mr. Craig Brumley. Inspector Brumley provided the following information following each examination:

The engine inspections are complete. We did not find any anomalies with either engine that would indicate they were not capable of producing power or were a contributing factor in the accident.

The ignition system was intact and functional when the mags were spun with a drill. The sparkplugs were all in good condition with the exception of one plug that had a cracked insulator. That single plug would not be a source for engine failure and may not be identifiable during a preflight ignition system test. (Mag Drop Test).

The fuel system was intact, routed correctly, free of leaks and with no indication that it would not operate as designed. Without the ability to test run the engines fuel pressures and fuel nozzle flow could not be tested.

The turbocharging system was intact with no indication of leakage from the exhaust system driving the turbochargers or from the pressure side delivering pressurized air to the engines. Neither engine's turbocharger would turn initially by hand. When a ratchet and socket were applied to the retaining nut of the turbocharger compressor, the turbocharger would turn. Once freed the turbo could then be turned by hand. This

is an indication that, without a proper cool down of a hot turbocharger, oil coking of the turbocharger shaft occurred post-accident.

The compression tests were satisfactory for all cylinders on both engines. The #6 cylinder of the left engine did require staking of its exhaust valve to achieve a good compression reading. If we were able to run the engines prior to compression testing, it is doubtful that staking of the valve would have been necessary. If you need the results of the compression test Inspector Gomon has them and can provide them to you.

All engine controls were intact and functional post-accident. There was no discontinuity within either engine with regards to crankshaft, camshaft, gear reduction unit, quill shaft and any accessory drives. All valve covers were removed from both engines and valve train movement was satisfactory as the propellers were rotated through 720+ degrees of rotation.

With regard to the fuel and fuel quantity system inspection on N21GF:

The aircraft was disassembled in the field for transport out of the accident site and to the aircrafts current location at Seward Nebraska Airport. Initial examination in the field did not indicate any leakage from the fuel caps, fuel tank or fuel lines for the components still attached to the airframe post-accident. The left wing main tank, which is the wing tip tank in the case of a CE-421B aircraft, was broken loose from the left wing during impact with the ground.

Examination of the fuel tanks in the hangar did reveal that a small puncture hole was located in the right main tank. This hole was post-accident and matches up with a screw location that holds the wing to tank faring in place. The puncture hole is located approximately midlevel on the tank and would not have allowed fuel to completely drain from the tank post-accident. At the time of examination in the hangar, all tanks on the aircraft were empty. The aircraft recovery team drained all fuel from the aircraft at the accident site. During recovery of the aircraft, the recovery team found approximately five gallons total fuel in all tanks still attached to the aircraft. The main and auxiliary wing tanks on both wings combined held approximately three quarters of a gallon of fuel. The remainder of the five gallons drained from the aircraft during recovery came from the wing locker tank located in the aft nacelle of the left wing. No evidence of fuel leaks prior to the accident was found from any of the fuel tanks.

The fuel quantity indicating system wiring was disconnected during recovery operations. The right wing fuel quantity system, main and auxiliary tank systems, were still intact post-accident. The left wing main tank fuel quantity system could not be

tested due to the tank separating from the aircraft during the accident. The wiring for the right wing fuel quantity system was reconnected to the aircraft via the use of "jumper wires" and electrical power was restored to the aircraft for testing. Jumper wires were used to reconnect the fuel quantity system due to the wings to fuselage separation from aircraft recovery. Once fully connected the right wing fuel quantity system functioned as designed. When a known quantity of fuel was poured into the main tank, the fuel quantity gauge indicator responded to the fuel level change and indicated roughly the amount of fuel poured into the tank. The fuel quantity gauge indicates in pounds of fuel. Using the right wing tank system, the wiring from the right wing fuel quantity sending system was connected to the left side of the indicator system. As with the previous test, when a known quantity of fuel was poured into the wing, the left gauge responded correctly to the amount of fuel poured into the wing tanks. It was concluded from this testing that the fuel quantity system and indicator were working correctly at the time of the accident.

Another FAA Inspector, David Gomon, provided the following results from the compression test for each engine (note: the left engine #6 cylinder information is pre and post staking):

L/H	R/H
Cont. 261	Cont. 261
GTS10-520-14	GTS10-520H
S/N-267265-R	S/N 235189-R
Rebuilt-Factory	Rebuilt-Factory
Compression Test	Compression Test
1) 57	1) 30
2) 60	2) 61
3) 44	3) 50
4) 55	4) 70
5) 68	5) 42
6) 75 70	6) 58

END