

EXAMINATION NOTES

ENGINE AND FUEL SYSTEM EXAMINATION

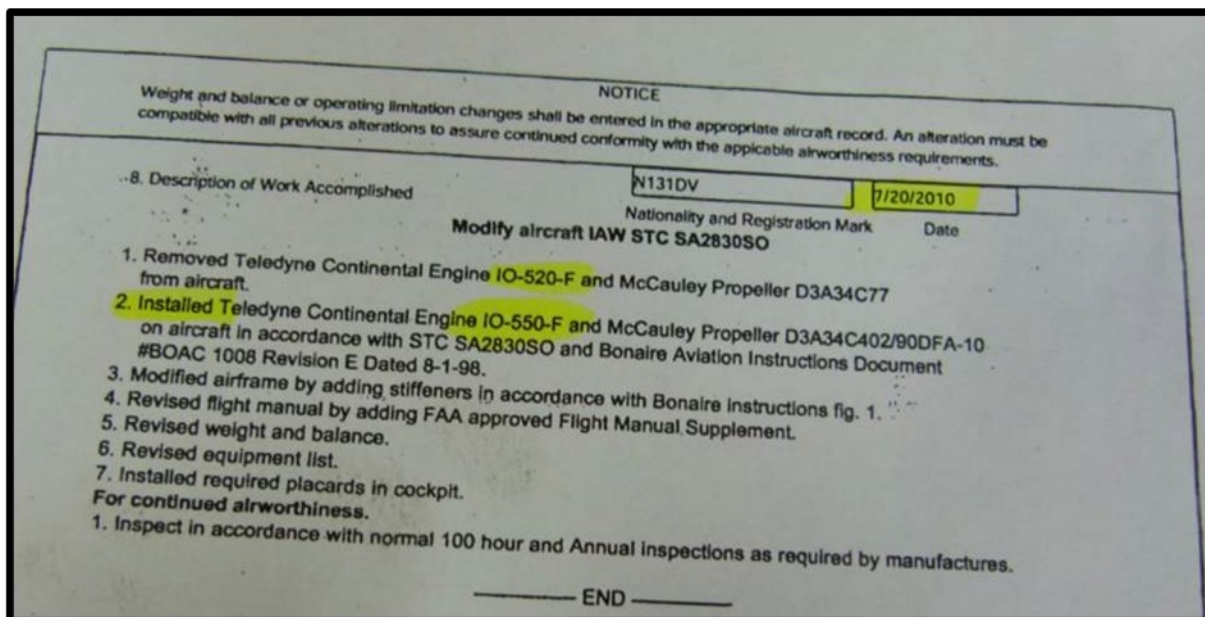
A post-accident examination was performed on the engine. Investigators established control continuity from the cockpit's engine controls to the engine. An external engine examination of the Continental Motors IO-550-F engine (installed in July 2010) revealed no anomalies. The integrity of the fuel system was confirmed between the fuel selector and the engine by operating the electric fuel pump and observing fuel flow from the line to the manifold. The fuel screen on the fuel control was removed and free of debris.

Removal of the upper spark plugs revealed that the electrodes were undamaged, displaying a gray coloration, which the Continental representative stated was consistent with normal operation. Investigators examined the cylinder combustion chambers utilizing a lighted borescope; the cylinders all displayed normal deposits and upon rotation, the valves appeared to seat uniformly. The engine was turned by hand; internal continuity was established and compression and suction was confirmed on all six cylinders.

To ascertain the functionality of the powerplant, a test run of the engine was performed at the recovery facility. The propeller, damaged from the accident, was removed from the engine and a comparable propeller was installed on the engine. A fuel source was attached to the right inlet fuel line prior to entering the fuel selector. The engine was successfully started and run for over 5 minutes at various power settings from idle to about 1,500 to 1,600 rpm. A magneto check was conducted on the left and right magnetos with a minimal rpm drop on each magneto noted. The engine was shut down utilizing the mixture control lever.

During the engine run, when the auxiliary fuel pump was turned on "high," the engine ran rough and began to lose rpm until the mixture was leaned. When the fuel selector handle was changed to the "off" position, the engine would run for about 10 seconds, and then would have a temporary decline in rpm (about 5 seconds) before completely losing power.

No mechanical anomalies were noted with the recovered engine or airframe that would have precluded normal operation.



Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

NOTICE

8. Description of Work Accomplished

N131DV 7/20/2010
Nationality and Registration Mark Date

Modify aircraft IAW STC SA2830SO

1. Removed Teledyne Continental Engine IO-520-F and McCauley Propeller D3A34C77 from aircraft.
2. Installed Teledyne Continental Engine IO-550-F and McCauley Propeller D3A34C402/90DFA-10 on aircraft in accordance with STC SA2830SO and Bonaire Aviation Instructions Document #BOAC 1008 Revision E Dated 8-1-98.
3. Modified airframe by adding stiffeners in accordance with Bonaire Instructions fig. 1.
4. Revised flight manual by adding FAA approved Flight Manual Supplement.
5. Revised weight and balance.
6. Revised equipment list.
7. Installed required placards in cockpit.

For continued airworthiness.

1. Inspect in accordance with normal 100 hour and Annual inspections as required by manufactures.

END

Figure 1: Excerpt of Maintenance Entry for Engine Change

AIRPLANE INFORMATION

According to the airplane Owner's Manual, the auxiliary fuel pump was a split switch with two sides. If the LOW side were turned on, the fuel pump would not operate unless the engine starter was engaged. The HIGH side was used if there was a failure of the engine driven pump. In that position, the output of the pump was dependent upon the throttle position. With the throttle at high settings, the auxiliary fuel pump output was high. When the throttle was reduced or closed, the output of the auxiliary fuel pump was designed to be reduced to prevent flooding the engine.

The airplane was modified with a Davis Aviation Supplemental Type Certificate (STC). According to the STC holder, Davis Aviation supplied the factory reman IO-550 F20BR (s/n 1002424), rated 300 HP @ 2700 RPM continuous, as part of his STC propeller kit package. The owner turned in an IO-520F engine (300 HP @ 2850 RPM for takeoff, 285 HP @ 2700 RPM continuous) s/n 553378 as the core. Original equipment on the 1965 P206, s/n P2060131 would have been an IO-520A (285 HP @ 2700 RPM).

Davis supplied a new McCauley D3A34C402/90DFA-10 propeller and standard Cessna spinner (the same on he had - just a new replacement). The engine would have had an engine driven fuel pump with it; the boost pump was unchanged. The aircraft would have had a boost pump, which is not changed. The STC is designed for the owner to change the tachometer and manifold pressure/fuel flow gauge and trim up the metal baffling for a tapered cylinder design of the 550 engine. There is a SID 97-3 supplied that gives the parameters for setting up the fuel flow (metered and unmetered).

Recommended TBO on the engine would have been 1700 hours or 12 years. That's since been changed to 1900 hours or 12 years (with an optional 200 hours if you meet the criteria). The propeller 6 years or 2000 hours.