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Subject: CEN24LA061 - Exam Notes

Right Engine

The right engine was removed from the airframe and sent to Continental Aerospace in Mobile, Alabama, for further examination.

The engine was removed from the shipping container and prepared for the test run. A cylinder leakage test was performed before the test run in accordance with the latest revision of Continental's M-0 Standard Practice Maintenance Manual with the engine at room temperature with the following results (master orifice reading - 43 PSI):

Cylinder #1 - 5/80 PSI (exhaust valve/rings)

Cylinder #2 - 61/80 PSI (exhaust valve/rings)

Cylinder #3 - 15/80 PSI (exhaust valve/rings)

Cylinder #4 - 50/80 PSI (exhaust valve/rings)

Cylinder #5 - 28/80 PSI (exhaust valve/rings)

Cylinder #6 - 63/80 PSI (exhaust valve/rings)

The crankshaft end play measured 0.013" and the run-out was 0.050". The engine was then prepared for operation by installing the appropriate thermocouples, pressure lines and test pads for monitoring purposes. The engine was then moved to Continental's test cell number 43 and mounted for operation. The engine was fitted with a Flight propeller for the GTSIO520L engine model. It was noted during the inspection that the propeller flange had impact damage and had .050 run out. The run out on the flange resulted in 1.5" out of track on the propeller tips. The propeller governor was removed and inspected. There was no metal found in the screen. The

governor rotated by hand with no anomalies noted. The propeller governor was reinstalled on the engine for the test run.

The engine started quickly and settled into an idle. It was noted the engine had no oil pressure and was shut down in 10 seconds. The screen housing was filled with oil and a second attempt was performed. After 10 seconds the engine had no oil pressure. The engine was then pre-oiled with a pressure pot. A third attempt was completed still no oil pressure after 10 seconds. It was decided to remove the engine from the cell and inspect the oil pump and pick-up tube, no anomalies were noted with the oil system.

Right Propeller Assembly

It was reported all eight mounting nuts were secure before the propeller was removed from the engine. The propeller mounting flange surface appeared undamaged with no evidence of fretting or galling. All three blades were cut by ASOD about 12-13" from the blade butt to facilitate shipment. The blades were labeled A-B-C by ASOD recovery personnel counter-clockwise (opposite sequence of rotation) as viewed from the front side, with the assembly S/N between blades B and C.

Blade B was rotationally loose and could be rotated by hand force. Blades A and C were secure and appeared to be on/near the start lock angle. All three counterweights were secure on their respective blade boss. There was no evidence of oil leaking from the propeller mounting flange area or hydraulic unit area. The spinner dome and bulkhead were secure and undamaged except for small impact bends in the blade apertures near the blade trailing edges of A and B. The aircharge valve and cap were intact. The aircharge was measured to be 38 psi at 71°F.

All three blades were bent aft with chordwise/rotational scoring primarily on the camber side near the tips. Blades B and C appeared twisted toward low pitch. Blade B also had some leading edge gouges at 4" from the tip.

The hub unit was intact with no visible fractures or cracks and all thru-bolts secure. There was no evidence of fretting or galling on the mounting flange face. The cylinder was securely mounted on the forward hub half with no evidence of oil leaks. The hydraulic unit appeared undamaged. The low pitch stop assembly was removed and exhibited a light contact mark on the surface. The pitch stop sleeve assembly was loaded against the start locks by the feathering spring.

The pitch stop sleeve assembly was removed and blade stubs A and C moved swiftly and smoothly toward the feathered position. The propeller was then cycled with shop

air pressure from a feathered position to a low pitch position. Blades A and C moved toward low pitch with air pressure and returned to the feathered position by the feathering spring. Blade B only moved slightly and not in proportion with Blades A and C.

The cylinder was removed from the hub with the feathering spring and spring retainer intact. The cylinder mounting boss was intact with no apparent fractures. There was no effort made to remove the feathering spring from the cylinder. There was no evidence of engine oil on the front side of the piston. The piston and pitch change rod were removed from the hub and appeared intact and undamaged.

The hub halves were separated to inspect the fork and hub internals. The fork appeared intact and undamaged. Blade B was removed from the hub retention pocket and had a fractured pitch change knob. The fracture surface was consistent with overload. The blade bearings in all three blades were intact with what appeared to be excessive amounts of non-authorized black grease

All visible damage was consistent with impact into terrain at a shallow angle while turning with low-or-no power. Blade angle at impact was on or near the low pitch stop; the propeller was not feathered. All damage was consistent with high impact forces. There were no visible discrepancies on the propeller components examined that would prevent normal operation. All three mechanisms that affect propeller control and feathering (aircharge, feathering spring and counterweights) were intact and functional.