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AS-ERA

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Subject: ERA24LA152, Engine Examination Summary

Contact: Russel Gait, Supervisor, Air Safety, Lycoming Engines

An examination of the accident engine took place on April 18, 2024, at the recovery facility under the federal oversight of Federal Aviation Administration inspector Danny Cox from the Atlanta flight standards district office. The following observations were provided to the IIC by the Lycoming Engines representative who performed the examination.

“Lycoming’s records show this engine was originally sold to Cessna aircraft with a final inspection date of January 24, 2020. The IO-360-L2A is a direct drive, four cylinder, fuel injection, horizontally opposed, air cooled engine with a down exhaust and has a maximum rated continuous power of 160 HP at 2400 rpm and an alternative rating of 180 hp at 2700 rpm.

As first viewed the engine cowling remained installed on the aircraft, it was subsequently removed to begin the engine examination. The engine was secured to the airframes fuselage via its tubular mounting system. The tubular mounts on the R/H side were bent and broken, allowing the engine to lean to the right and angle down. The airframe baffling, all four rocker box covers, and the top spark plugs were removed to facilitate the examination of the engine.

Mechanical continuity was established by rotating the crankshaft through multiple 360 degrees of rotation utilizing the propeller, rotation was smooth. Normal “valve action” was noted on the intake and exhaust rocker arms on all four cylinders. Thumb compression and suction was observed on all four cylinders in the correct firing order. Cylinder #2’s compression felt lower than the other three cylinders.

Audible clicking from the magneto's impulse couplings could be heard while rotating the crankshaft, and oil was pumping out the open oil cooler line while the crankshaft was being rotated. Cylinder #4 appears to have been replaced in the field.

The fuel injection servo remained secured to the engine's induction plenum and the air induction inlet remained secured to the inlet of the fuel injection servo. The throttle control cable remained secured to the throttle arm lever via castle nut and cotter pin and the throttle lever was secured to the throttle arm with the serrated teeth securely mated via castle nut and cotter pin. The throttle control could not be moved in the cockpit, once the throttle arm was disconnected from the throttle cable, the throttle arm moved freely. The mixture control cable was secured to the mixture arm via castle nut and cotter pin, the mixture control arm was operated from stop-to-stop with mixture control in cockpit. Fuel was present in the fuel servo and in the inlet and outlet fuel lines. The fuel in servo was tested with water detecting paste, no water detected. The fuel inlet screen was removed and examined, no contamination was noted. Diaphragm assembly was disassembled, diaphragms appeared undamaged and pliable, oil contamination was noted in the air side of the fuel servo diaphragm assembly.

The flow divider remained secured to its mounting brackets which remained secured to the spline of the crankcase assembly. The fuel injection lines remained secured to the flow divider and their respective fuel injection nozzles. The flow divider was disassembled, fuel was present in the flow divider, the diaphragm appeared undamaged and pliable, and no contamination was noted.

The two-piece fuel injection nozzles were removed and inspected, no contamination or obstructions were observed within the fuel injection nozzles. The injection nozzle from cylinder #2 was bent.

The fuel pump remained secured to the engines accessory house. The fuel pump was removed and examined. No discrepancies were noted with the engine driven fuel pump. The fuel pump plunger was installed in the accessory house and moved freely.

The magnetos remained secured to engines accessory house. A timing check was performed and both magnetos were advanced to about 28 degrees BTC. Per the engine's data tag, timing should be set to 25 degrees BTC. The magnetos were removed and rotated by hand and with the assistance of the impulse coupling, spark was noted coming from all four posts on both magnetos.

All sparkplugs were gray in color and appeared undamaged. Oil pooling noted in cylinders 2 and 4, likely from impact sequence and transport to the recovery

center and the bottom 2 and 4 plugs were oil soaked as a result. The ground electrodes on the top 1 and 3 plugs and bottom 2 appeared worn, the wear noted is consistent with in-service use.

The ignition lead caps remained secure to their respective magnetos and the leads remained secured to their respective sparkplugs. Minor impact energy damage noted on the leads. The ignition leads were not examined further.

The starter remained secured to the engine's crankcase and the power cable was secured to its post.

The alternator remained secured to its mounting brackets and was unremarkable.

The vacuum pump remained secured to its mounting flange on the accessory house and was not examined further.

5 quarts of oil was noted on the oil dipstick. The oil suction screen was removed and examined, no contamination was noted. The oil filter was removed and cut open; no contamination was noted in the pleats of the oil filters paper element.

The McCauley two bladed fixed pitch propeller remained secured to the engine starter ring gear and crankshaft propeller flange. The blades were labeled A and B for narrative purposes. Blade A exhibited signs of leading edge polishing and leading edge damage and chordwise scoring. Blade B exhibited signs of leading edge polishing and a minor amount of chordwise scoring. The propeller was removed from the engine during the examination.

Total hours listed are based on the Hobbs meter which read 2181.2 at the time of the examination."