



Memorandum For Record

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Several loose flight instruments were recovered but the type and readings for most could not be determined. The following readings were noted:

Compass – Located but Unknown Reading
Directional Gyro – 330°
Garmin GPS Receiver – Exhibited Extensive Fire Damage
Ballistic Parachute T-Handle – Emergency Pin not in position. Pin located among wreckage.

Examination of the engine following recovery was performed by technical advisor to the Accredited Representative with NTSB oversight. The engine remained attached to the engine mount but was separated from the airframe and sustained extensive heat damage which precluded rotation of the crankshaft.

Borescope inspection through the crankcase cylinder openings or holes drilled into the crankcase for cylinders where the borescope could not get past the pistons revealed all connecting rods remained connected to the crankshaft. Although the crankshaft could not be rotated, the positions of the front and rear pistons relative to each other were in a normal pattern consistent with an intact crankshaft.

Camshaft –

All lobes of the camshaft visible by borescope inspection were satisfactory. All lifters appeared satisfactory.

Cylinders –

No. 1 Cylinder –

It exhibited evidence of normal lubrication. The intake and exhaust valves were normal. The intake valve was dark in color while the exhaust valve was tan/light brown in color. Very slight

residual oil was noted inside the rocker box cover. Inside the rocker box cover there was congealed oil. The top and middle compression ring gaps were aligned and the piston crown appeared normal. Unapproved sealant was noted on the crankcase and cylinder faying surfaces. About 3 to 4 ounces of oil was drained from the exhaust pipe.

No. 2 Cylinder –

It exhibited evidence of normal lubrication. The intake and exhaust valves were normal. The intake valve was sooty while the exhaust valve was light tan in color. The rocker arms were corroded. Very slight residual oil was noted inside the rocker box cover. The ring gaps were not aligned and the piston crown was normal. Unapproved sealant was noted on the crankcase and cylinder faying surfaces. Hone marks were visible in the cylinder. The exhaust pushrod and pushrod tube separated during cylinder removal. The exhaust pipe interior had normal coloration.

No. 3 Cylinder –

It exhibited evidence of normal lubrication. The intake valve was slightly open while the exhaust valve was closed; both valves appeared normal. The intake valve was light brown in color while the exhaust valve was slightly darker. Very slight residual oil was noted inside the rocker box cover. Inside the rocker box cover there was congealed oil. The ring gaps were not aligned and the piston crown was normal. Unapproved sealant was noted on the crankcase and cylinder faying surfaces.

No. 4 Cylinder –

It exhibited evidence of normal lubrication. The intake and exhaust valves were normal and both were light tan in color. The rocker arms were corroded. Very slight residual oil was noted inside the rocker box cover. The ring gaps were not aligned and the piston crown was normal. Unapproved sealant was noted on the crankcase and cylinder faying surfaces. The exhaust pipe was slightly dented and the interior had normal coloration.

AIR INDUCTION SYSTEM

The air induction manifolds remained attached to the engine. Part of the Nos. 1/3 and 2/4 induction manifolds were damaged by the postcrash fire.

FUEL SUPPLY/METERING SYSTEM

The engine-driven fuel pump remained attached to the engine but exhibited extensive heat damage. The diaphragm was destroyed by the postcrash fire.

Both carburetors were separated from the engine. Remains of heat damaged carburetor bowl drip pans were in place beneath the location where both carburetors would have been installed.

1/3 Carburetor-

Was extensively heat damaged. The top of the carburetor was heat damaged. The carburetor bowl was missing. The throttle plate was in the wide-open position while the position of the

throttle slide could not be determined. The throttle cable remained connected to the throttle lever. The carburetor was retained for examination by the NTSB Materials Laboratory.

2/4 Carburetor –

Was extensively heat damaged. The top of the carburetor bowl was missing. The throttle plate was wide-open while the piston slide was all the way down (implies mis-correlation of the throttle plate position vs. the slide position), i.e. the throttle plate was near full power while the slide was near idle power. The throttle cable remained attached to the throttle lever, and the choke cable remained attached to the attach bolt. The main jet was a 155. The piston slide was twisted slightly from center. The carburetor was retained for examination by the NTSB Materials Laboratory.

IGNITION SYSTEM

The two ignition modules, and four ignition coils were consumed by the postcrash fire. The ends of all ignition leads remained connected to each spark plug. All ignition leads were nearly consumed by the postcrash fire. The No. 2 cylinder top spark plug ignition connection post was bent. The ignition triggers were mostly consumed by the postcrash fire.

Examination of the spark plugs revealed the following results. The electrode gaps were not checked.

#1 Top – NGK DCPR8E – Oil soaked – electrode color is normal – Terminal was straight
#1 Bottom – NGK DCPR8E – Oil soaked - electrode color is normal – Terminal was slightly bent

#2 Top – NGK DCPR8E – Dry – electrode color is normal – Terminal was bent over
#2 Bottom – NGK DCPR8E – Dry – electrode color is normal – Terminal was straight

#3 Top – NGK DCPR8E – Slightly wet from oil – electrode color is normal – Terminal was slightly bent
#3 Bottom – NGK DCPR83 – Slightly wet from oil – electrode color is normal – Terminal was straight

#4 Top – NGK DCPR83 – Dry – electrode color is normal – Terminal was straight
#4 Bottom – NGK DCPR83 – Dry – electrode color is normal – Terminal was straight

COOLING SYSTEM

Examination of the cylinders revealed all the rubber coolant hoses were destroyed by the postcrash fire. The expansion chamber was not present. Hose clamps were noted at all cylinder coolant fittings except for the Nos. 4T, 4B, and 1B. The water pump and radiator/oil cooler sustained impact and/or fire damage.

LUBRICATION SYSTEM

Examination of the oil filter revealed it was heat damaged. Congealed oil was noted in the well of the oil filter adapter. The oil filter element which was heat damaged was excised from the filter and inspected. No ferrous or non-ferrous material was noted. The oil pump was removed from the engine and disassembled which revealed the drive pin was intact. Residual oil was noted inside the pump. The pump turned freely by hand and all gears of the pump appeared satisfactory. The oil supply and scavenge hoses were destroyed by the postcrash fire.

The magnetic chip detector contained some ferrous fuzz (normal).

Examination of the oil tank which was separated from the engine revealed it sustained impact and heat damage. The oil cap was in place. The supply/return/vent lines were not connected. The drain plug was intact. The oil tank contained residual oil. The oil screen was deformed and contained evidence of very slight contamination.

EXHAUST

The muffler sustained impact damage. Rotation of the muffler revealed no loose internal baffles.

REDUCTION GEARBOX

Examination of the reduction gearbox revealed evidence of normal lubrication and no damage to any gear teeth. The gearbox was not disassembled.

PROPELLER EXAMINATION

All 3 propeller blades were fractured at varying lengths.