



MEMORANDUM OF RECORD

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Subject: On-Scene Examination of Airframe and Engine – ERA14FA168

The investigator-in-charge performed an on-scene examination of the airplane and engines at the accident recovery site on March 26-27, 2014 with party members from Piper Aircraft, ATP flight schools and Federal Aviation Administration personnel. The following is an account of the wreckage examination.

Overall

The airplane was found in a marsh area, in about 15 feet of water. The main wreckage was located inverted at N 31°16.793 W 081°24.687 at an elevation of 4 feet above mean sea level (msl). The debris path was about 2 miles in length and along a linear path. The engines remained attached to the airplane with lines and cables, and were co-located with the main wreckage. The wreckage debris path was oriented on 225 degree heading from the main wreckage, which was located on a 130 degree heading and about one-half mile from the last radar return. Both outboard wing sections were located about nine-tenths of a mile from the main wreckage and the vertical stabilizer was located about 2 miles from the main wreckage.





Photo 2: Aircraft Being Lifted out of Water - As Found

1. Aircraft

1.1. Fuselage

The fuselage assembly with inboard wing sections, engines and propellers was located inverted in about 16 feet of water. Recovery was facilitated by first partially raising it by the main gear so straps could be secure around the inboard wing sections. The entire assembly was then lifted out of the water and placed on a barge for transport to a secure facility for investigation.

The fuselage was fragmented and displayed substantial compression damage to the top of the cabin area. The top fuselage forward of the windshield was separated and recovered with the heater and other components. The nose gear was in place and in the retracted position. The roof was loose at the windshield pillar and both forward side pillars. The cabin door was separated and fragmented.

Numerous instruments could not be located. The only recovered air driven gyro was the pilot side HSI directional gyro. Disassembly of the gyro found no scoring or rotational damage to the pendulous vane housing or rotating assembly. It should also be noted that although no scoring was noted, the housing of the instrument contained minimal damage and no evidence of crush damage was noted.

The fuselage aft of the rear baggage area was mostly separated. The cargo straps were in place and secure. Personal backpacks and baggage were recovered unsecured from the back seat area.

All four seats were in place and secured to the seat tracks. The right seatback was bent aft slightly and the left side was straight. Both occupants had seatbelts and shoulder harnesses secure when recovered.

The flap handle was in the up (retracted) position. The fuel selectors were both in the ON positions. The engine controls were in the forward position.



Photo 3: Cockpit Area Post Recovery



Photo 4: HSI - Post Disassembly

1.2 Left Wing

The outboard section of the left wing, about 6 feet 6 inches, was separated and found along the debris path. Examination of the separation found structural deformation consistent with positive overload. Additional damage was noted to the trailing edge with blue paint transfer in several places including the flap hinge and bottom skin. The impact damage was consistent in size and shape to the vertical stabilizer. The aileron and wingtip were separated and not recovered. Both aileron control cables were in place and secured to the bellcrank. One control cable measured 17 feet 6 inches and the other measured 5 feet to the separation. Both cables were broomstrawed at the end. The remaining portion of the control cable was secured to the control wheel chain and the remaining portion of the balance cable secure to the right side aileron bellcrank.

The inboard section of the wing was recovered still in place, secure to the fuselage and displayed compression impact damage to the top surface. The forward portion of the nacelle was separated from the wing. The engine mount and engine were attached to the firewall and connected to the nacelle by the control cables and wires. The fuel bladder was ruptured. The left main gear was extended but not locked when found. The flap was in place, retracted and secure.



Photo 5: Left Wing - Post Recovery (Courtesy of Piper Aircraft)

1.3 Left Engine

The left engine remained attached to the airframe via cables and wires. The engine was an O-360-E1A6D, Serial Number L-522-77T 180 hp. The propeller remained attached to the propeller hub which remained attached to engine. The carburetor was a Marvel Schebler Model HA-6 Part Number 10-6019, Serial Number MS817201, it remained attached to the engine and when removed exhibited no damage. The carburetor was disassembled and fuel was present with water visible with the fuel. The float remained attached, was operated by hand, and exhibited no damage. The fuel inlet screen was removed and was free of debris. The butterfly valve operated smoothly with no abnormalities noticed. The top spark plugs were removed and appeared normal in wear with a dark oily film on the even spark plugs. The magnetos were removed and when

spun utilizing a cordless 20-volt drill, spark was observed on one lead. No others leads produced spark and during the testing, and the one that did produce spark ceased emitting a spark. The engine driven fuel pump was removed and disassembled the diaphragm was normal and free of debris, and no abnormalities were noted.

The vacuum pump was removed; however, the shaft exhibited a shear fracture but no other external damage was noted, it was noted that the engine was rotated during the recovery process, as well as during the initial examination. The vacuum pump indicated a recorded time of 1207.8 hours of total flight time since overhaul and was installed on May 13, 2011.

The engine was rotated by hand utilizing the propeller and it rotated smoothly. Thumb compression was observed on cylinders and continuity was observed to the rear accessory pad.

The oil dipstick was secured and in place; however, no oil was present on the dipstick but water was present within the engine.



Photo 6: Left Engine after Removal from Airframe



Photo 7: Left Magneto - Post Recovery



Photo 8: Left Engine Vacuum Pump



Photo 9: Left Engine Vacuum Pump Data Tag



Photo 10: Left Engine Vacuum Pump with Sheered Shaft



Photo 11: Left Engine Top Spark Plugs



Photo 12: Left Engine Driven Fuel Pump - Post Disassembly



Photo 13: Left Engine Carburetor and Throttle Arm

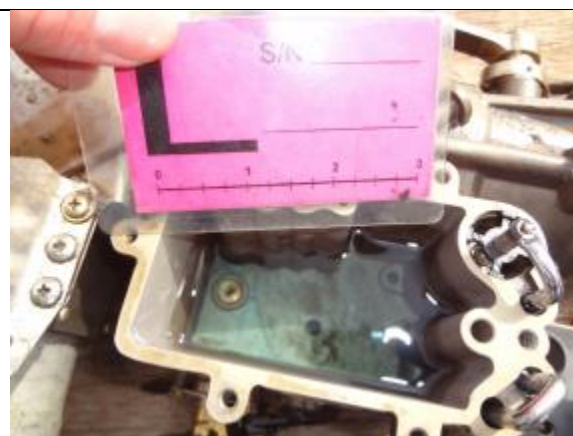


Photo 14: Left Engine Carburetor with Fuel Present



Photo 15: Left Engine Carburetor Float Assembly - Post Disassembly



Photo 16: Left Engine Fuel Strainer

1.4 Left Propeller

The Hartzell 2-bladed propeller remained attached to propeller hub, and exhibited no S-bending or leading edge damage. However, the pitch of the blades were in low pitch and not in the feather position. The spinner exhibited crush damage on one half of the circumference.

1.5 Vertical Stabilizer

The empennage assembly was separated from the fuselage. The forward vertical attachment bolt was pulled through the mounting bracket. The aft attachment bracket was in place but all attach rivets to the vertical were sheared. The vertical was found along the debris trail and displayed substantial impact damage along the leading edge. The rudder was not recovered during the on-site investigation. The rudder cable was in place, secure and continuous to the rudder bar in the cockpit. The rudder stops were in place and secure.

The horizontal stabilator was separated and was not recovered during the on-site investigation. Both stabilator control cables were secured to the bellcrank and continuous to the T-bar in the cockpit. The stabilator push-pull tube was impact separated a few inches above the bellcrank. The separation was consistent with impact forces.



Photo 17: Left Side of Vertical Stabilizer - Post Recovery



Photo 18: Aft View of Vertical Stabilizer (Devoid of Rudder)



Photo 19: Right Side View of Vertical Stabilizer

1.6 Right Wing

The outboard section of the right wing, measuring approximately 6 feet 9 inches, was separated and found along the debris trail. Examination of the separation found structural deformation consistent with positive overload. Impact damage with blue paint transfer was noted in several places on the separated outboard wing section. The aileron and wingtip were separated and not recovered. Both aileron control cables were secure to the aileron bellcrank. Both cables measured about 5 feet and were broomstrawed on the ends.

The inboard section of the wing was recovered still in place, secured to the fuselage and displayed compression impact damage to the top surface. The forward portion of the nacelle was separated from the wing. The engine mount and engine were attached to the firewall and connected to the nacelle by the control cables and wires. The fuel bladder was ruptured. The right main gear was extended but not locked when found. The flap was in place, retracted and secure.



Photo 20: Right Wing as Viewed - Post Recovery

1.7 Right Engine

The right engine remained attached to the airframe via cables and wires. The engine was an LO-360-E1A6D, Serial Number RL-572-72T 180 hp. The propeller remained attached to the propeller hub which remained attached to engine. The carburetor was a Marvel Schebler Model HA-6 Part Number 10-6019, it remained attached to the engine and when removed exhibited no damage. The carburetor was disassembled and fuel was present with water visible with the fuel. The float remained attached, was operated by hand, and exhibited no damage. The fuel inlet screen was removed and was free of debris. The butterfly valve operated smoothly with no abnormalities noticed. The top spark plugs were removed and appeared normal in wear with a dark oily film on the even spark plugs. The magnetos were removed and when spun utilizing a cordless 20-volt drill spark was observed on one lead. No others leads produced spark and during the testing the one that did produce spark ceased emitting a spark.

The engine driven fuel pump was removed and disassembled. The diaphragm was normal, free of debris, and no abnormalities were noted.

The vacuum pump was removed. The shaft exhibited a shear fracture and would not rotate, the unit was retained for further testing and examination. The vacuum pump at 172.5 hours of total flight time since overhaul; however, the serial number of the pump installed on the right engine was not the same serial number noted in the records.

The engine was rotated by hand utilizing the propeller and it rotated smoothly. Thumb compression was observed on Cylinders 1 and 2; however, no compression was observed on Cylinders 3 and 4. The cylinder caps were removed and movement of the lifter arms was noted during rotation. The piston face was observed moving within the cylinder. The lift rods exhibited crush damage on the exterior of the engine cylinder and continuity was observed to the rear accessory pad.

The oil dipstick remained secured and in place; however, was devoid of oil and water was present.



Photo 21: Right Engine



Photo 22: Right Engine Magneto - Post Removal



Photo 23: Right Vacuum Pump - Post Removal



Photo 24: Right Vacuum Pump with Sheered Shaft – as Viewed Post Removal



Photo 25: Engine Driven Fuel Pump - Post Disassembly



Photo 26: Right Engine Carburetor with Fuel Present - Post Disassembly



Photo 27: Right Engine Carburetor Butterfly Valve as Viewed - Post Recovery

1.8 Right Propeller

The Hartzell 2-bladed propeller remained attached to propeller hub, and exhibited no S-bending or leading edge damage. However, the pitch of the blades were in low pitch and not in the feather position. The spinner exhibited crush damage on one half of the

circumference. The right engine propeller exhibited slight torsional twisting on the spinner.

1.9 ELT

The ELT cover was located in the tail section; however, was impact damaged and no battery was located.



Photo 28: ELT Battery cover