MEMORANDUM OF RECORD

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Eastern Region Aviation **October 7, 2011**

Subject: ERA12FA012 – Wreckage and Impact description

The airplane was found inverted in a mountainous wooded area. The main wreckage was located at N38°50.919' W079°00.938' at an elevation of 2,936 feet above mean sea level (msl). The first tree impact point was located at N38°50.941' W079°00.989'. The crest of the hill was located at N38°50.868' W079°00.880' and at an elevation of 2,988. The debris path was 650 feet in length. The engine was impacted separated from the airplane and was in the vicinity of the main wreckage. The wreckage debris path was oriented on 045 degree magnetic heading. A review of Washington Center radar data indicates that the last radar return was at 2,200 feet agl and was 255 degrees and 0.62 miles from the accident location.

Examination of the wreckage indicated that the stabilator was impacted separated and the center section of the stabilator was located in a tree approximately 80 feet agl and in the vicinity of the initial tree strike. Sections of the left wing were located along the debris field prior to the main wreckage. The impact crater was 11 feet in length, 53 inches wide, and 22 inches in depth. Inside the impact crater was located the inboard section of the left flap, part of the cockpit instrument panel as well as numerous fragments of the left wing. The engine and cockpit area came to rest between a group of 3 trees. A section of the right wing including the retracted main landing gear was located up the hill, forward and to the right, and approximately 79 feet from the main wreckage. A fragmented portion of the right wing flap was located up the incline in front of the main wreckage approximately 107 feet. The flap handle was in the down position which correlates with flaps "UP" position. The stabilator trim indicator was not viewable and the landing gear handle was not located.

Photo 1: Main Wreckage

Fuselage

The fuselage was segmented and the cabin walls were breeched. All windows were separated from their normal positions; were cracked, splintered and segmented. The forward cabin and aft cabin doors were separated and impact damaged. The aft cargo door was separated and impact damaged. All six seats were recovered and noted to be separated from their fuselage floor mountings, all exhibited impact damage and some twisting. Seat restraints were located and all showed impact damage but were found to be connected to their mountings; however, the mountings were separated from the fuselage fragments. Only the co-pilot's seat restraint was found in the latched position. The seats all indicated torsion twisting. The seatbelts associated with the pilot, co-pilot, and the middle row seat located behind the co-pilot seat had web stretching.

Cockpit

The instrument panel was separated from the forward fuselage area. It was void of instrumentation and the instrumentation was located throughout the debris field and did not yield any information. The rudder pedals and flight control "T"-bar were impact damaged and control cable continuity was traced to all the cable breaks from the associated attach points and the breaks had the appearance of broomstrawing at the fracture point. The aileron chain was found impact separated from the "T" bar.

Photo 2: Cockpit Flap Handle

Photo 3: Magneto Ignition Switch in Both

Empennage

The vertical fin was impact separated from the fuselage and exhibited impact damage along the leading edge. The side skins were concave due to impact damage. The rudder was attached to the vertical fin at its hinge points and control cable continuity was traced to the tensile overload breaks. The stops were in place and exhibited some impact damage. The rudder balance weight was not located in or around the debris field. The rudder position at impact could not be determined.

The stabilator was separated from its mounting. Both tips sections were separated and examined and both tip weights were attached. The main stabilator assembly was located in an approximate 100 foot tall tree near the initial impact location. The primary balance weight was located in the ground impact debris field approximately 60 feet forward of the main impact area. Control cable sections were attached and exhibited tensile overload separation. The left and right tip sections were located on the ground forward of the tree impact area. The trim drum was not located.

Photo 4: Right Stabilator Tip

Photo 5: Left Stabilator tip

Left Wing

The left wing was separated and segmented. The fuel tank was impacted damaged, breeched and void of fuel. The fuel cap remained secure and in place. The flap was partially attached and segmented. The aileron was segmented and partially attached. Aileron balance weight was not located. An aftermarket gap seal kit was installed on the flap and aileron. The primary balance cable was segmented and showing tensile overload. Control continuity was partially established. The fiberglass wing tip was separated and segmented. The left main landing gear was separated and the strut tube was separated from its housing and located within the debris field.

Photo 6: Fragments of the Left Wing

Right Wing

The right wing was impact separated and segmented. The wing root section was located forward of the main impact area in the debris field. It contained the right main landing gear and appeared to be in the "UP" position. The outboard wing section was segmented from impact and the fuel tank was fragmented; void of fuel, and the fuel cap was impact separated and was located approximately 40 feet from the fuel tank. The wing tip was separated, segmented, and impact damaged. The aileron was separated and the aileron control sector was located within the debris field. It contained segments of the primary and balance cables attached and they exhibited tensile overload condition. The right flap was impact damaged, partially attached and segmented. The control rod was broken and the flap and aileron had aftermarket gap seals installed. The wingtip was fiberglass but was separated, impact damaged, and segmented.

Photo 7: Right Wing at Rest

The doors were all impacted separated and indicated the door was in the close and locked position.

Engine

The 300 hp Lycoming engine was an IO-540-K1650, serial number L-15035-48A was impacted separated from the engine mounts. The No.s 2, 4, and 6 cylinders exhibited impact damage and the No.2 cylinder was the most extensively damaged. The top spark plugs were removed except for cylinder No. 2 which was absent from the spark plug cylinder hole. The No.s 4 and 6

cylinders spark plugs remained attached in the cylinder plug hole but were fractured slightly above the threads. Cylinder No.s 1, 3, and 5 remained attached and all plugs appeared gray in color with no wear indicated. The engine sump pump exhibited impact damage and oil was present.

The engine power controls were viewable; however, they were severely bent and were difficult to move to impact damage and the position could not be accurately obtained. Engine control continuity was not established on the mixture, propeller, and throttle due to impact separation. The alternator and starter were separated and found forward of the debris field.

The fuel injector and engine driven fuel pump contained a blue fluid and had a smell similar to 100 LL aviation fuel. The engine driven fuel pump was disassembled and the diaphragm remained intact and no damage was noted. The fuel pump armature operated smoothly. The fuel servo was impacted separated, the throttle valve was jammed with dirt, and the airplane fuel servo diaphragm was impact damaged. The electric driven fuel pump was located within the debris field, impact damaged, and no fuel was found. The fuel selector valve was found in the right fuel tank position.

Oil was present on the engine oil dipstick and the Champion oil filter was removed from the rear of the engine, contained oil, and was free of debris.

The right oil cooler was impact damaged but remained attached to the engine. The left oil cooler was impact separated and damaged.

The magneto was impacted separated, located 68 feet forward of the main wreckage. When rotated by hand spark was observed. The magneto switch was located in the impact crater and was found in the both position; however, the key was sheered and part remained inside the key hole.

Photo 8: Engine After Recovery from Impact Crater

The vacuum pump remained attached, was disassembled and the vanes were cracked with rotational scoring noted inside the case.

Photo 9: Vacuum Pump After Disassmbly

The turn coordinator, HSI [horizontal situational indicator], and directional gyro were all examined, exhibited extensive impact damage. The gyro was removed and all exhibited rotational scoring on the inside of the gyro case.

Propeller

The Hartzell 3-bladed propeller was impacted separated and located up the hill and 40 feet in front of the main wreckage, partially imbedded in the ground and all three blades remained attached to the spinner. Two of the propeller blades exhibited extensive tip curling on the outboard approximate one-third, and S-bending. One propeller blade remained relatively straight, embedded in the ground and exhibited chordwise scratches. The propeller governor was impacted separated, fractured, and remained in the vicinity of the engine.

Photo 10: Propeller at Rest

Photo 11: Propeller Governor

Emergency Locator Transmitter (ELT)

The ELT was located in the impact crater. The unit was a C-91 type ELT unit, had a replace battery date of "APR 13," and was fragmented due to impact forces,

Photo 12: ELT