



MEMORANDUM FOR RECORD

Todd Gunther
Air Safety Investigator
Eastern Region

Date: June 28, 2021
Subject: Accident Site and Wreckage Examination
NTSB Case Number: ERA21FA253

Initial examination of the accident site and wreckage took place on June 16, 2021. The wreckage was subsequently recovered by Anglin Aircraft Recovery Services and transported to their facility in Clayton, Delaware, where further examination of the wreckage took place on June 18, 2021, and June 21, 2021, with the NTSB, FAA, and Lycoming Engines in attendance.

During examination of the accident site and wreckage, the following information was acquired:

- On the morning of the accident, the pilot was going to fly and meet friends for breakfast. About 0817, he departed Doylestown Airport (DYL), Doylestown, Pennsylvania for Sky Manor Airport (N40), Pittstown, New Jersey, as he believed that his friends were going to meet him there. He arrived at N40 about 0827. His friends had flown though to South Jersey Regional Airport (VAY), Mount Holley, New Jersey. About 0857, the pilot then departed N40 to meet up with his friends at VAY. He arrived there about 0913 and departed about 1013 to return to DYL.
- About 1020, the pilot transmitted over the common traffic advisory frequency for DYL that he had an emergency and was making a straight in landing to runway 5. About 1021, he transmitted that he had an inflight fire, that he was landing on runway 5, and he was inbound, to DYL. This was the last transmission from the pilot.
- According to witnesses, the airplane was observed flying in a northwest direction just prior to the accident. The engine sounded rough, and the engine was heard to sputter and then pop. The airplane appeared to be on fire, and trailing smoke. It then appeared to bank right, then left, and then followed what looked like a flight path towards DYL, except it appeared to be losing altitude quickly. About 1031, the airplane was next observed to clip trees, the sound of impact was heard, and flames were observed. A

review of video camera footage indicated that the smoke trailing from the airplane was bluish gray, and that the airplane prior to coming to rest, had struck a large tree, and had fallen to the ground below.

Accident Site

- Examination of the accident site revealed that the airplane had come to rest upright in a wastewater spray field on a 148° magnetic heading, about 0.5 nm from runway 5, after striking the tree about 50' above ground level, then impacting a tree limb in a nose down attitude about 36' above ground level, and then pivoting to an upright position before coming to rest.

Airplane

- Examination of the airplane revealed that it had come to rest on top of a standpipe mounted sprinkler head which had vertically punctured and went through the right wing.
- The right wing had remained attached. A large depression was visible on the leading edge which extended about 1/4 way into the wing structure near the wing root, and which matched the diameter of the tree limb. The outboard section of the wing's leading edge had also been crushed inward, and the right-wing fuel tank was breached.
- The left wing was still attached to the fuselage, and the left-wing tank was about half full of a blue colored liquid which was consistent with 100LL aviation gasoline. The outboard section of the left wing displayed an approximate 45° upward bend, and the wingtip had separated and was found about 10' behind and to the right of the main wreckage.
- The wing flaps and ailerons had remained attached to their respective wings though the left aileron displayed bending and was impact damaged. The vertical stabilizer, rudder, horizontal stabilizers, and elevators had also remained attached, though the left stabilizer and elevator displayed impact damage and wrinkling. Control continuity was established for pitch, roll, and yaw.
- Most of the instrument panel had been consumed by fire, and the forward portion of the cabin back to the front of both seats, had been burned out, with portions of the right seat displaying fire damage on the upper surface of the bottom seat cushion. The fuel selector handle was in the left-wing fuel tank position. The canopy displayed both thermal, and impact damage, and was almost completely separated from the fuselage. The exterior of the fuselage and wings also displayed sooting, on the sides and top surfaces, along with more delineated areas which displayed heavy thermal and fire damage toward the front of the airplane both near, and adjacent to the firewall, on the sides and bottom of the fuselage.
- The fuel selector was in the "LEFT" tank position.

Propeller and Engine

- Records from the logbooks indicated that the engine was purchased by the airframe builder from a previous airplane that was in an accident (N245DF) that occurred on August 8, 1998, in Bainbridge, GA. That airplane was substantially damaged, and the pilot was seriously injured.
- The propeller remained attached to the crankshaft flange. The propeller showed minimal damage and no signs of rotational damage.
- The propeller governor remained attached to the accessory housing of the engine. The governor oil line remained secured to the engine. No oil was found in the governor oil line. An incorrect gasket (a gasket without an oil screen) was installed between the governor and the accessory pad. The governor would not rotate by hand.
- The carburetor remained attached to the bottom of the engine with the mixture and throttle cables attached. The carburetor displayed minimal impact damage but showed signs of thermal damage. The fuel inlet screen was found to be contaminated by thermal exposure. The floats had melted and were unrecognizable.
- The fuel pump remained attached to the accessory housing but was destroyed by thermal forces. The remains of the pump were removed and actuated by hand.
- The spark plugs remained installed in their cylinder heads with minor thermal signatures noted. The spark plugs on cylinders No.1 and No.3 top, and No. 2 and No. 4 bottom locations had visibly larger gaps for the electronic magneto that was installed.
- The ignition harness was impact damaged and destroyed by fire.
- The starter remained attached to the engine and displayed thermal damage. The starter was removed to facilitate engine disassembly. The data sticker was not recovered.
- The alternator remained attached to the engine and displayed thermal damage. The alternator drive belt was fire destroyed and portions of the belt were found around the starter ring gear assembly.
- The oil suction screen remained safety wired into the oil sump. The suction screen was found to be fully packed with ferrous metal debris.
- The oil filter remained attached to the accessory housing but displayed thermal damage. The element was burned, and minor metal contamination was noted.
- The oil pump displayed rotational signatures internally and minor amounts of metal was found in the pump.
- The oil sump had large quantities of ferrous and non-ferrous metal of various sizes. The material was cleaned and collected for further examination. During this process, it was noted that the oil quick drain unit was not seating properly, allowing fluid to exit the sump. The unit was disassembled, and the "O-Rings" were found to be melted. Portions of connecting rod material and connecting rod bolts were found in the sump.
- Drive train rotation was achieved, and thumb compression and valve train continuity were established on cylinders No.1, No. 2, and No. 3. Cylinder No. 4 compression could not be established because of damage to the connecting rod and valve train in that area.

- Cylinder removal attempts commenced, but damage to the cylinder skirts prevented easy removal. Cylinder No. 2 was found to have a substance similar to orange/red RTV at the base of the cylinder. Cylinder No.1 was eventually able to be removed.
- To further examine the engine, the case halves were separated with the remaining three cylinders still installed. The connecting rod bolts on the No.3 cylinder were removed to separate the case halves the remainder of the way.
- The crankshaft showed damage and heat signatures to the No. 4 connecting rod journal consistent with an oil starvation event. A portion of the connecting rod bearing was melted to the crankshaft journal.
- The faces of the No. 3 cylinder exhaust tappet, and both tappets for the No. 4 cylinder were fractured. The camshaft displayed bending consistent with impact forces with the connecting rod. The multiple markings on the cam suggested overhaul work was completed on the unit.
- Oil passages on the crankshaft and crankcase were checked with compressed air for any blockages, none were found. The oil lines for the oil cooler were checked for blockages, none were noted. The oil pressure line above the right-hand magneto was checked for blockages. The 90-degree fitting on the end away from the accessory housing appeared blocked. The fitting at the start of the oil line appeared to be blocked. The passage through the accessory housing to the oil pressure point appeared to not be blocked.