

National Transportation Safety Board

Office of Aviation Safety
Central Region



CEN21LA402

WRECKAGE EXAMINATION SUMMARY

ACCIDENT

Location: Sheridan, Illinois
Date: September 5, 2021
Time: 1323 central daylight time (1823 UTC)
Airplane: Murphy Renegade II, Registration No. N490DJ

PARTICIPANTS

Investigator-In-Charge	Andrew Todd Fox National Transportation Safety Board Denver, Colorado
Group Member	John W. Shaver Federal Aviation Administration – Greater Chicago FSDO Des Plaines, Illinois
Group Member	Paul A. Adams Federal Aviation Administration – Greater Chicago FSDO Des Plaines, Illinois

ACCIDENT SYNOPSIS

On September 5, 2021, about 1323 central daylight time, a Murphy Renegade II experimental airplane, N490DJ, was substantially damaged when it was involved in an accident near Sheridan, Illinois. The pilot and passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The uncertificated pilot stated that he was conducting fast taxi operations and did not intend to fly the airplane; however, the airplane's tail became airborne during the fast taxi, and he elected to continue the takeoff. The pilot stated that after liftoff, about 500 ft above the ground, he heard a "click" before there was a total loss of engine power. The pilot made a forced landing to a soybean field where the airplane nosed over shortly after touchdown.

WRECKAGE EXAMINATION TIMELINE

On September 9, 2021, National Transportation Safety Board (NTSB) Investigator Fox documented the main wreckage and examined engine with the assistance of two Federal Aviation Administration (FAA) inspectors.

AIRPLANE DESCRIPTION

The Murphy Renegade II biplane, serial number 0028, was equipped with two-seats (tandem) and a conventional landing gear. On June 13, 2013, the FAA issued the airplane an experimental (amateur-built) airworthiness certificate and associated operating limitations.

The fuselage was constructed of aluminum tube extrusions and fittings, fastened with rivets. The turtle deck and engine cowling are made from fiberglass. The vertical stabilizer, rudder, horizontal stabilizer, and elevators were built from aluminum tubing and channel sections. The tail surfaces were wire braced. The conventional landing gear incorporated a bungee suspension.

The upper and lower wings had a positive stagger and incorporated a single faired interplane strut and cabane struts as well as wire-bracing. The ribs were stamped aluminum and mated with an aluminum sheet leading edge. All surfaces were covered with aircraft fabric. The flight controls were controlled via torque tubes.

The engine was a 120 horsepower, two cylinder, two stroke, Rotax model 670, serial number 4179531. Thrust was generated by a fixed pitch, 3 blade, composite Warp Drive propeller, serial number N18253.

According to the airplane designer, the Murphy Renegade II empty and maximum gross weights are 375 lbs and 850 lbs, respectively, and has a single fuel tank with a 14 gallon capacity.

MAINTENANCE SUMMARY

Condition Inspection

Although requested, the pilot/owner of the airplane did not provide a copy of the airplane maintenance records and, as such, a review of the airplane's operation history and recent maintenance was not conducted.

WRECKAGE EXAMINATION (SEPTEMBER 9, 2021)

Accident Site and Main Wreckage

An onsite examination of the biplane airplane revealed a fractured engine mount tube and the outboard 3 ft of the upper right wing's leading edge was crushed aft. The left main landing gear wheel separated from the gear leg during the forced landing. The remaining fuselage, wings, and empennage were relatively undamaged. Flight control continuity was confirmed from the cockpit controls to each flight control surface.



Figure 1 - Main Wreckage at Accident Site, Right Side



Figure 2 - Main Wreckage at Accident Site, Left Side



Figure 3 - Front of Airplane and Propeller

Engine Examination and Disassembly

The engine remained attached to the fuselage through the engine mounts, as shown in figure 4 and figure 5. A partial teardown examination of the engine revealed that the magneto-side piston had seized in the cylinder. The piston and cylinder bore exhibited scrape marks consistent with a piston seizure, as depicted in figure 6. There was piston and ring material missing, with associated batter to the cylinder head, piston dome, and sparkplug, as depicted in figure 7. The power-takeoff piston and cylinder did not exhibit any evidence of piston seizure. Other than the magneto-side piston seizure and associated secondary damage, the engine did not exhibit any evidence of a mechanical malfunction that would prevent normal operation.



Figure 4 - Engine, Left Side



Figure 5 - Engine, Right Side



Figure 6 - Magneto-Side Cylinder and Piston



Figure 7 - Magneto-Side Piston, Cylinder Head, and Sparkplug