National Transportation Safety Board
Office of Aviation Safety
Washington, DC 20594

CEN21FA459

AIRCRAFT EXAMINATION SUMMARY

September/November, 2021

A. ACCIDENT

Location: Hiles, WI
Date: September 28, 2021
Time: 09:00 Central Daylight Time
Aircraft: Rockwell International 690B

B. AIRCRAFT EXAMINATION SUMMARY

IIC	Aaron Sauer NTSB Denver, CO
Party Coordinator	Timothy Spreen Federal Aviation Administration
	John Boeding Surdex Corporation
	Brandon Nevels Twin Commander LLC
	John (Jay) Eller Honeywell
	Les Doud Hartzell Propeller

C. SUMMARY

On September 28, 2021, about 0900 central daylight time, a Rockwell International 690B airplane, N690LS, was destroyed when it was involved in an accident near Hiles, Wisconsin. The pilot and two passengers sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 aerial imagery survey flight.

According to the operator, the flight mission was to obtain aerial imagery of the forest vegetation for the Wisconsin Department of Natural Resources.

Automatic dependent surveillance-broadcast (ADS-B) and ATC information provided by the Federal Aviation Administration (FAA) indicated the airplane departed the Rhinelander-Oneida County Airport, Rhinelander, Wisconsin, about 0850. About 0858, the airplane began to level off about 15,600 ft msl with a

maximum groundspeed of 209 kts. Between 0858 and 0900, the airplane continued level flight; however, the groundspeed decreased to about 93 kts. The ADS-B data ended at 0900:56. According to ATC, a "mayday, mayday, mayday…we're in a spin" transmission was broadcast. The airplane was not under air traffic control during the flight or at the time of the accident.

The wreckage was distributed in heavily wooded and wetlands terrain in a diameter of about 50 yards. A majority of the main wreckage, which was highly fragmented, was found beneath the water surface with some debris located in the adjacent trees (see figure 1). The forward fuselage, fragmented sections of the wings, and a portion of the rear fuselage was submerged in the wetlands. An odor and sheen on the wetlands water of Jet A aviation fuel was noted at the accident site by first responders.

Figure 1. Accident site and main wreckage

Airframe:

The cockpit and fuselage were crushed aft and fragmented by impact forces. Flight control cable continuity could not be established due to the fragmentation of the airplane. All flight control cable connections exhibited tensile overload fractures.

The primary and secondary control surfaces were fragmented and located within the debris field.

The left and right wings were fragmented into multiple sections. Fragmented leading edge sections displayed forward to aft crush damage. Both wing flaps and ailerons were separated from the wings, partially fragmented, and displayed heavy impact damage. The left and right elevators were separated from the horizontal stabilizer and displayed impact damage. The vertical stabilizer remained partially attached to the aft fuselage structure and was crushed aft. The rudder remained attached to the vertical stabilizer. The aileron trim was found in about a 1° left bank position, the elevator trim was about 1° nose down position, and the rudder trim was neutral. The flaps were found in the UP position.

Engines:

Examination and disassembly of the left engine revealed the engine was fractured into two basic sections: the gearcase and power section. Impact damage was noted to the lower portion of the compressor and combustion housings, and the engine's rotating group would not rotate. All 1st stage compressor impeller vanes were bent opposite the direction of travel. Rotational scoring from 180° through 360° was noted on output gearbox (nose cone), compressor, and turbine section components within the engine. Earthen debris was found within combustion section. Metal spray deposits were noted on rotor blades, stator vanes, and shrouds throughout the turbine section. The fuel system components displayed impact damage and could not be functionally tested. The type and degree of damage was consistent with engine rotation and operation at the time of the impact.

Examination and disassembly of the right engine revealed the engine was fractured into two basic sections: the gearcase and power section. Impact damage was noted to the lower portion of the compressor and combustion housings, and the engine's rotating group would not rotate. After removal of the rear exhaust, the rotating assembly was manually rotated with resistance via the aft turbine nut. The 1st stage compressor impeller shroud was fractured into multiple pieces and displayed heavy rubbing signatures. The 1st stage compressor impeller was not located in the debris field. Two of the 2nd stage compressor impeller vanes were bent opposite the direction of travel, and the forward curvic coupling teeth were smeared. Rotational scoring from 90° through 360° was noted on output gearbox (nose cone), compressor, and turbine section components within the engine. Earthen debris was found within combustion section. Metal spray deposits were noted on rotor blades, stator vanes, and shrouds throughout the turbine section. The fuel system components displayed impact damage and could not be functionally tested. The type and degree of damage was consistent with engine rotation and operation at the time of the impact.

Propellers:

Both the left and right propeller hubs and six blades (3 blades on each propeller assembly) were located at the accident site. Examination of the propeller blades indicated similar characteristics between both left and right blades; aft bending and twisting to low pitch position. Rotational signatures, under an undetermined power level on both propellers, included blades separating from the clamps, pilot tube fractures, clamp fractures, compound blade bending and twisting, and leading edge gouging. One right propeller blade tip was fractured, and a left propeller blade retention radius was sheared. Blade butt impact marks indicated aft impact loads consistent with a low blade angle, low power, and a steep impact angle.

Submitted by:

Aaron Sauer
Sr. Air Safety Investigator