

National Transportation Safety Board

Office of Aviation Safety

Denver, CO 80239



CEN20FA070

WRECKAGE EXAMINATION SUMMARY

ACCIDENT

Location: Springfield, Illinois
Date: January 28, 2020
Time: 1503 central standard time
Airplane: Piper PA-60-601P, Registration No. N6071R

WRECKAGE EXAMINATION GROUP

Investigator-In-Charge	Andrew Todd Fox National Transportation Safety Board Denver, Colorado
Group Member	Nick Loftus Federal Aviation Administration – Springfield FSDO Springfield, Illinois
Group Member	Clive Adams Federal Aviation Administration – Springfield FSDO Springfield, Illinois
Group Member	Mark Platt Lycoming Engines Chandler, AZ
Group Member	Les Doud Hartzell Propeller Piqua, Ohio

ACCIDENT SYNOPSIS

On January 28, 2020, about 1503 central standard time, a Piper PA-60-601P airplane, N6071R, was destroyed when it was involved in an accident near Springfield, Illinois. The pilot, 2 passengers, and a dog were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The airplane impacted terrain during an instrument landing system (ILS) runway 31 approach to Abraham Lincoln Capital Airport (SPI), Springfield, Illinois.

AIRPLANE DESCRIPTION

The airplane was a 1979 Piper PA-60-601P (Aerostar), serial number (s/n) 61P-0686-7963324. On June 19, 1992, the two Lycoming IO-540-AA1A5 reciprocating engines were modified by supplemental type certificate (STC) Nos. SA4156NM and SE4157NM to include twin-turbochargers and intercoolers. The modified engines were rated at 350 horsepower when operated at 42 inches-of-mercury and 2,500 rpm. The engines provided thrust through constant-speed, full-feathering, three-blade, Hartzell HC-C3YR-2UF/FC8468B-8R propellers. The mid-wing airplane was of conventional aluminum construction with a retractable tricycle landing gear and wing flaps. The airplane had a pressurized cabin configured to seat six people. The airplane was equipped for operations in instrument meteorological conditions (IMC) and icing conditions.

Engine 1 (left)	Lycoming IO-540-AA1A5; s/n L-32219-48E
Engine 2 (right)	Lycoming IO-540-AA1A5; s/n L-32893-48E
Propeller 1 (left)	Hartzell HC-C3YR-2UF/FC8468B-8R; s/n CK3849A
Propeller 2 (right)	Hartzell HC-C3YR-2UF/FC8468B-8R; s/n CK5427B

DETAILS OF THE EXAMINATION

1.0 Accident Site Description

The airplane impacted a harvested cornfield about 6.3 nm southeast of the runway 31 threshold, and about 1 nm left of the localizer centerline. A 200 ft long debris path, oriented on a 248° magnetic heading, preceded the location of the main wreckage. The airplane's left wingtip impacted the ground first, followed by the left and right propellers, respectively. The nose landing gear wheel was found separated from the fork assembly about 40 ft from the initial point of impact. The outboard 2.5 ft of the left aileron was found separated from the left wing along the wreckage debris path.

The main wreckage came to rest at the western edge of the cornfield amongst several trees and a wire fence, and consisted of the entire fuselage, both wings, and the empennage. The fuselage cabin and cockpit exhibited extensive damage from the postaccident fire.

1.1 Flight Controls

Both wing spars were fractured at their wing roots and each wing remained partially attached to the fuselage by engine control cables. Flight control continuity could not be verified because the control push/pull tubes for the ailerons, elevators, and rudder exhibited extensive impact and fire damage. Both ailerons and flaps exhibited impact and fire damage. The hydraulic flap actuators were found extended about 1.5"

consistent with about 20° of flap extension. The flap control handle was found in an intermediate position. Both elevators remained attached to the horizontal stabilizer and exhibited fire damage. The rudder remained attached to the vertical stabilizer; however, most of the rudder was destroyed by fire.

1.2 Landing Gear

The landing gear selector handle was not located during the investigation, but the landing gear was found extended at the accident site.

1.3 Instrument Panel

The instrument panel sustained significant thermal damage during the postaccident fire. The airspeed indicator and altimeter were destroyed by fire. The attitude indicator and horizontal situation indicator (HSI) were extensively damaged by fire and could not be tested. The internal gyros of the attitude indicator and HSI did not exhibit any evidence of rotational scoring. The turn indicator gyro was found separated from its instrument case that was not located during the investigation. The turn indicator gyro did not exhibit any evidence of rotational scoring. The backup course deviation indicator was destroyed by fire. The electronic engine trend monitor was destroyed by fire. The engine tachometer indicated 1,200 rpm for both engines. The manifold pressure gauge indicated 28 and 30 inches of mercury for the left and right engines, respectively.

The database cards for the airplane's Garmin 430 and 530 panel-mounted GPS navigation/communication devices were recovered at the accident site and placed in a test device to determine their expiration dates. The obstacle database and IFR database cards expired on September 13, 2018. Further review of the IFR database cards established that the stored localizer frequency for the ILS runway 31 approach at SPI was the same frequency (110.15 MHz) that was listed on the current approach plate.

1.4 Engines

Both engines remained attached to their respective engine mounts and nacelles. The throttle quadrant was destroyed by impact and fire damage. Internal engine and valve train continuity were confirmed for each engine. Compression and suction were noted on all cylinders in conjunction with crankshaft rotation. Both magnetos on each engine were damaged by fire and could not be tested. The spark plugs exhibited features consistent with normal engine operation. Borescope examination of each cylinder did not reveal any anomalies with the cylinders, pistons, valves, or valve seats. Both oil pumps discharged oil when their respective engine crankshaft was

rotated. The pressure pump installed on each engine could not be rotated because of fire damage to their respective drive gears; however, a partial disassembly of both pumps revealed no evidence of internal failure that would have precluded normal function during flight. The turbocharger system components remained secured at their respective mounts. The turbocharger compressors and turbine impellers remained intact and undamaged. The turbine impellers rotated freely by hand. The exhaust bypass valves remained secured at each turbocharger exhaust pipe and their butterfly valves remained intact and undamaged. The postaccident engine examinations did not reveal any anomalies that would have precluded normal operation during the flight.

1.5 Propellers

The left propeller remained attached to the engine propeller shaft flange. One propeller blade appeared to be in the feathered position, and the remaining two blades appeared to be in the normal range of operation. Two propeller blades were bent in the aft direction, and the remaining blade appeared to be slightly bent aft. Two propeller blades had indications of heat exposure such as charring, sooting, and paint blistering. One propeller blade could be partially rotated by hand force. The spinner dome was dented with one counterweight mark on the internal surface in the normal blade angle range of operation. The hydraulic unit remained intact and undamaged, and the piston/pitch change mechanism appeared to be on the start locks. Propeller blade no. 1 was bent aft, bent opposite rotation and twisted towards low pitch. Propeller blade no. 2 was bent slightly aft with no remarkable twisting. Propeller blade no. 3 was bent aft, opposite rotation and twisted towards low pitch. All three propeller blades exhibited chordwise/rotational scoring isolated to the leading edges on both the camber and face side. The low pitch stop had an impact mark consistent with the propeller operating on or near the low pitch stop angle. The preload plate for propeller blade no. 3 had knob impact marks in the range of 26°-31° consistent with a blade angle between 17°-22°.

The right propeller remained attached to the engine propeller shaft flange. All three propeller blades appeared to be in the normal blade angle range. The spinner dome was dented with counterweight impressions that were consistent with normal blade angle range of operation. All three propeller blades were bent aft, opposite rotation in varying degrees and twisted towards low pitch. One propeller blade had indications of heat exposure such as charring, sooting and paint blistering. All three propeller blades could be partially rotated by hand force. The hydraulic unit remained intact and undamaged, and the piston/pitch change mechanism appeared to be in the feathered position. All three propeller blades exhibited chordwise/rotational scoring isolated to the leading edges on both the camber and face side. The pitch change knob on all three blades were fractured. The low pitch stop had an impact mark suggesting the propeller was operating on or near the low

pitch stop angle. The preload plate for propeller blade no. 2 had a knob impact mark in the slot at about 45° consistent with a blade angle of about 3°. The preload plate for propeller blade no. 3 had a knob impact mark in the slot at about 21° consistent with a blade angle of about 27°.

1.6 Propeller Slash Mark Analysis

Both propellers left three distinct slash marks in the soil at the accident site. The average distance between the left propeller strike marks was 2.50 ft. The average distance between the right propeller strike marks was 2.64 ft. An estimation of the airplane's ground speed at impact was calculated using the average distance between the propeller strike marks and a propeller rotation speed of 1,200 rpm (as determined by the electronic tachometer and the sound spectrum analysis from the video footage). The propeller strike marks calculations provided an estimated of the airplane's ground speed was between 88 and 94 knots at impact.

MAINTENANCE SUMMARY

2.0 Annual Inspection

The airplane's hour meter was destroyed by the postimpact fire, which prevented a determination of the airplane's total service time at the time of the accident. According to available maintenance documentation, the last annual inspection of the airplane was completed on August 1, 2019, at 3,542.7 total airframe hours. At the annual inspection, the left and right engines had accumulated 1,691 hours and 1,571.5 hours since new, respectively.

2.1 Recent Maintenance

On November 26, 2019, the airplane's left propeller collided with bird(s) while on approach to Sarasota/Bradenton International Airport (SRQ), Sarasota, Florida. The left propeller was removed and sent to an overhaul facility to be inspected. The damaged propeller exceeded repair limits and another overhauled propeller was installed on the left engine on-or-before January 27, 2020. Additional recent maintenance actions included servicing the turbocharger waste gates on both engines, replacement of the pressure pump and its outlet hose on the left engine, replacement of the cabin heater thermostat, and adjustment of the pilot seat track guides and locks. The maintainer stated that "all systems were working properly" during an approximately 20-minute test flight that he performed on January 25, 2020, following the recent maintenance. The pilot retrieved the airplane from the maintenance facility on January 27, 2020, at which time airplane had accumulated 3,584.7 total airframe hours.

2.2 Static System, Altimeter System, Automatic Pressure Altitude Reporting System, and Transponder Testing

The last test of the static system, altimeter system, automatic pressure altitude reporting system, and transponder was completed on May 10, 2016. Title 14 CFR Part 91.411 stipulates that no person may operate an airplane or helicopter in controlled airspace under IFR unless within the preceding 24 calendar months each static pressure system, each altimeter instrument, and each automatic pressure altitude reporting system has been tested and inspected.

2.3 Horizontal Situation Indicator Malfunction

Shortly after the purchase of the airplane in August 2019, the pilot had an issue with the airplane's horizontal situation indicator (HSI) not syncing with the remote compass. According to the airplane's current maintainer, an overhauled HSI was purchased and shipped directly to the pilot to be installed in the airplane; however, a review of available maintenance documentation and a canvassing of several maintenance facilities where the pilot might have contracted maintenance did not establish if the malfunctioning HSI was indeed replaced before the flight. The HSI installed in the airplane at the time of the accident sustained significant thermal/fire damage which prevented testing.

2.4 Fueling

The airplane's total fuel capacity of 173.5 gallons (165.5 gallons usable) was distributed between two wing fuel tanks and a fuselage tank. According to fueling documentation, before departing on the flight, the airplane was serviced with 87.1 gallons of 100 low-lead aviation fuel by Signature Flight Support at Huntsville International Airport (HSV), Huntsville, Alabama. According to the line technician who serviced the airplane, the fuel dispensed topped-off the airplane's fuel system.



Figure 1 - Initial Impact Point



Figure 2 - Main Cabin



Figure 3 - Left Wing



Figure 4 - Right Wing



Figure 5 - Empennage



Figure 6 - Left Engine and Propeller



Figure 7 - Right Engine and Propeller



Figure 8 - Right Wing Layout



Figure 9 - Instrument Panel Overview



Figure 10 - Instrument Panel (Right Side)



Figure 11 - Attitude Indicator (foreground) and HSI (background)



Figure 12 - HSI, Face of Instrument



Figure 13 - HSI, Top of Instrument



Figure 14 - HSI, Bottom of Instrument