Aviation Investigation Final Report

Location:	Rock Hill, South Carolina	**Accident Number:**	ERA22FA047
Date & Time:	November 5, 2021, 19:26 Local	**Registration:**	N8924Y
Aircraft:	Piper PA30	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot had recently purchased the airplane and departed on a multileg flight to pick up the airplane and its logbook and return to the pilot's home airport. Automatic dependent surveillance-broadcast (ADS-B) data showed that about 2 hours into the last leg of the flight, the pilot descended and began to maneuver several miles from the intended airport. At that time, the pilot initiated several phone calls to a mechanic to report that the landing gear circuit breaker kept popping. The mechanic provided guidance on the manual gear extension process. About 45 minutes later, during the final call to the mechanic, the pilot stated that he needed to add "some power," and then the call dropped. At that time ADS-B data showed the airplane at an altitude of 1,025 ft mean sea level (msl) and a groundspeed of 63 knots.

Examination of the engines and airframe revealed no evidence of any preimpact mechanical malfunctions that would have precluded normal operation. All landing gear were in the down-and-locked positions at the time of the accident. Laboratory testing of the green landing gear "down locked" light bulb revealed that the bulb filament had fractured and that no hot filament stretching was present, indicating that the bulb was either burned out before impact or not illuminated at the time of impact. The timing of the filament fracture could not be determined.

Given the burned-out light bulb and the position of the landing gear at the time of the accident, it is likely that the landing gear indication (the popped circuit breaker) was erroneous and that the gear was down and locked while the pilot was attempting to manually lower the landing gear. Given that ADS-B data showed that the airplane was at 1,025 ft msl and 63 knots groundspeed at the time that the pilot indicated that he needed to add power, it is likely that, with his focus on the manual gear extension process and phone calls, the pilot failed to monitor his airspeed. The airplane likely slowed below its stall speed, resulting in an

exceedance of the airplane's critical angle of attack, which led to an aerodynamic stall from which the pilot could not recover because of the airplane’s low altitude.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot’s exceedance of the airplane's critical angle of attack while troubleshooting a landing gear indication, which resulted in an aerodynamic stall at low altitude.

Findings

Aircraft	Gear position and warning - Malfunction
Personnel issues	Task monitoring/vigilance - Pilot
Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Angle of attack - Capability exceeded

Factual Information

History of Flight

Enroute-descent	Sys/Comp malf/fail (non-power)
Enroute-descent	Aerodynamic stall/spin (Defining event)

On November 5, 2021, about 1926 eastern daylight time, a Piper PA-30, N8924Y, was substantially damaged when it was involved in an accident near Rock Hill (York County) Airport-Bryant Field (UZA), Rock Hill, South Carolina. The commercial pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

Earlier in the day, the pilot was a passenger in a friend's airplane that departed UZA for Savannah-Hardin County Airport (SNH), Savannah, Tennessee, where the accident pilot would pick up the accident airplane, which he had recently purchased. The mechanic who had performed the last annual inspection on the airplane received a call from the pilot while he was at SNH; during the call, the pilot told the mechanic that he would be making his first flight in the Piper PA-30 Twin Comanche and asked him about the fuel tanks. The pilot indicated that he was going to fly to Hartselle-Morgan County Regional Airport (5M0), Hartselle, Alabama, to pick up the airplane's logbooks.

The pilot later called the mechanic from 5M0; according to the mechanic, the pilot stated, "well, I made my first flight in the Twin Comanche" and "everything went great." The pilot further stated that he had picked up the airplane's logbooks and that his next stop was LaGrange-Callaway Airport (LGC), LaGrange, Georgia, before returning to UZA. Fuel purchase receipts indicated that 35.8 gallons of 100 low-lead aviation gasoline were purchased at LGC about 1620.

Automatic dependent surveillance-broadcast (ADS-B) data indicated that the airplane departed LGC about 1636 and flew in a northeasterly direction, climbing to a cruise altitude between about 3,000 and 3,500 feet mean sea level (msl). About 1835 and about 4 nautical miles from UZA, the airplane began a descent to 2,000 ft msl.

The pilot called the mechanic from the airplane about 1838 to report that he was near UZA and that the landing gear circuit breaker kept popping. ADS-B data showed that the airplane was maneuvering southwest of UZA at an altitude between 1,000 and 2,000 ft msl while the mechanic provided guidance on the manual gear extension process. The calls repeatedly dropped, but the final call began about 1913 and dropped about 1926 after the pilot stated that he needed to add "some power." ADS-B data at that time showed the airplane at an altitude of 1,025 ft msl and a groundspeed of 63 knots.

The last flight track data point showed the airplane at 625 ft msl near the accident site. The airplane impacted a wooded area about 3.5 nautical miles south of UZA. The airplane came to rest in an upright, nose-down attitude oriented on a true heading of 297°. All major components of the airplane were located at the accident site.

Pilot Information

Certificate:	Commercial; Flight instructor; Private	**Age:**	49,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	May 24, 2021
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 1046.9 hours (Total, all aircraft), 9 hours (Total, this make and model)		

Review of the pilot's logbook revealed that he had logged a total of 62 hours of multiengine flight time at the time of the accident. The pilot’s logbook included two entries regarding flights in the accident airplane make and model: a multileg flight on May 20, 2020, with a reported duration of 15 hours and a flight on March 23, 2021, with a reported duration of 5 hours. Both of these flights were conducted at Pickens County Airport (LQK), Pickens, South Carolina. The flight on May 20, 2020 (which included time from a flight conducted the day before) was confirmed, but ADS-B information for March 23, 2021, revealed only a 54-minute local flight at Goshen Municipal Airport (GSH), Goshen, Indiana.

According to the mechanic who had spoken with the pilot during the accident flight, the pilot asked him earlier in the day about the locations of the main tanks and the auxiliary tanks. The mechanic responded that there were eight fuel tanks on the airplane but that, to return home, the pilot would need to fill only the main and auxiliary tanks. The pilot then responded that he wanted to fill only the main tanks and asked which ones those were. The mechanic provided the requested information to the pilot, but the conversation concerned the mechanic. He encouraged the pilot to leave the airplane at SNH and return to the airport the following week so that he could be checked out on the airplane, but the pilot indicated that he needed to get back to UZA.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N8924Y
Model/Series:	PA30 C	**Aircraft Category:**	Airplane
Year of Manufacture:	1969	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	30-1997
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	August 26, 2021 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	6.4 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	6723 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-320
Registered Owner:	On file	**Rated Power:**	160 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

According to the *Piper Turbo Twin Comanche 'C' PA-30 Owner's Handbook*, the stalling speed with gear and flaps down was 69 mph, and the stalling speed with gear and flaps up was 76 mph. Vortex generators were installed on the airplane's wings and vertical fin in 2002, in accordance with a supplemental type certificate.

The handbook also stated the following:

> The gear indicating lights are located conveniently by the gear selector switch. The green indicating light below the selector switch shows that all gear and down and locked. The amber light above the gear selector switch is the gear up indication.... The white light indicates that the landing gear is in transit. The gear up warning horn will sound when power is reduced (below approximately 12 inches of manifold pressure) on both engines and the gear is not down and locked.... *GEAR INDICATION LIGHTS ARE DIMMED WHILE THE INSTRUMENT LIGHTS ARE ON.*

The handbook's "Instructions for Emergency Extension of Landing Gear" stated the following:

1. *Reduce power – airspeed not to exceed 100 MPH.*
2. *Place Landing Gear Selector Switch in "GEAR DOWN LOCKED" position.*
3. *Disengage motor – Raise motor release arm and push forward thru full travel.*
4. *Remove gear extension handle from stowage. If left socket is not in clear position, place handle in right socket. Engage slot and twist clockwise to secure handle. Extend handle and rotate forward until left socket is in clear position. Remove handle and*

place in left socket and secure. Extend handle. Rotate handle FULL forward to extend landing gear and to engage emergency safety lock.

5. *Handle locked in full forward position indicates landing gear is down and emergency safety lock engage. Gear 'DOWN LOCKED' indicator light should be 'ON.'*

A laminated, commercially purchased checklist found in the airplane listed the following manual gear extension instructions:

AIRSPEED – 87 KIAS (100 MPH) OR LESS

LOWER GEAR LEVER OR IF 3 POSITION SWITCH – CENTER OFF

DISENGAGE MOTOR – RAISE RELEASE ARM & PUSH FORWARD

PLACE HANDLE IN LEFT SOCKET – LOCK AND EXTEND HANDLE

If Left Socket Not Clear Use Right Socket,

Twist Clockwise to Lock, Then Left Socket.

ROTATE FORWARD FULL TRAVEL – VERIFY GREEN LIGHT

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	UZA,669 ft msl	**Distance from Accident Site:**	4 Nautical Miles
Observation Time:	18:54 Local	**Direction from Accident Site:**	354°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	Unknown / Unknown
Wind Direction:	50°	**Turbulence Severity Forecast/Actual:**	Unknown / Unknown
Altimeter Setting:	30.3 inches Hg	**Temperature/Dew Point:**	9°C / 2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	LaGrange, GA (LGC)	**Type of Flight Plan Filed:**	None
Destination:	Rock Hill, SC	**Type of Clearance:**	None
Departure Time:	16:36 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	ROCK HILL/YORK COUNTY/BRYANT FLD UZA	**Runway Surface Type:**	
Airport Elevation:	666 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	34.922803,-81.049551

The airplane came to rest upright in a nose-down attitude oriented on a true heading of 297°. All major components of the airplane were located at the accident site.

Examination of the wreckage revealed that the airplane's nose was impact crushed upward and aft and that the nose and cockpit area were fragmented. The fuselage was fractured aft of the wing roots and displaced upward. The empennage was found resting on the right wing. The stabilator and rudder were intact, but the empennage was fractured about 2 ft aft of the baggage door and deformed over the top of the fuselage.

The right wing was accordion crushed aft and fractured about 9 ft from its root, with the outer wing section laying on top of the inboard section. The left-wing leading edge was impact damaged. The right main landing gear remained attached to the wing and was noted to be in the down-and-locked position. The left main landing gear was noted to be in the down-and-locked position with its fractured oleo tube deformed aft at the fractured area.

Flight control continuity was established from all flight control surfaces to the cockpit area. The stabilator and rudder trims were neutral, and the flaps were in the retracted position.

The right engine compartment and engine were intact, but the propeller was impact separated from the engine at the crankshaft flange and was mostly buried in the soil. The main landing gear remained attached to the wing and was noted in the "down and locked" position.

The left wing leading edge was impact damaged. The left engine compartment and engine were intact with the propeller attached to the crankshaft flange. Examination of both the right

and left propellers revealed leading-edge damage, twisting, and chordwise scratches. The left main landing gear was noted in the “down and locked” position with its fractured oleo tube deformed aft at the fractured area.

Both engines were rotated via the crankshaft flange, and thumb compressions, valve action, and crankshaft continuity were confirmed. All magnetos were impulse coupled and sparked at all towers. All spark plugs remained installed and displayed normal coloration compared with the Champion AV-27 chart except for the right engine’s No. 1 bottom spark plug, which was impact destroyed. Oil was found in various oil lines throughout the engines and rocker covers. The oil filters were opened and found to have minor carbon, ferrous, and nonferrous material. Examination of both engines revealed no preimpact anomalies or malfunctions that would have precluded normal operation.

There was an odor consistent with aviation fuel at the accident site. Fuel was found within the gascolator bowls, engine-driven fuel pumps, fuel lines, and fuel servos. Recovered fuel tested negative for water contamination.

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The nose landing gear transmission exposed no threads, consistent with the gear in the down position. Field testing of the transmission with a drill motor revealed no obstructions or resistance. Field testing of the gear motor in the “down” position with a DC power source determined that the motor was functional.

The landing gear lights (up, in transit, and down locked) were field tested with a DC power source. The amber “up” and white “in transit” lights were determined to be functional, but the green “down locked” light was found not to be functional. Further examination revealed the “down locked” light’s element was fragmented. Radiograph of the green landing gear light revealed that the bulb filament was fractured into several pieces and that no hot filament stretching was present, consistent with either the bulb burning out before impact or not being illuminated at the time of impact. The timing of the filament fracture could not be determined.

Administrative Information

Investigator In Charge (IIC):	Spencer, Lynn
Additional Participating Persons:	Todd Clamp; FAA FSDO; Columbia, SC Ryan Enders; Lycoming; Williamsport, PA Damian Galbraith; Piper Aircraft; Vero Beach, FL
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Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=104210

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