Aviation Investigation Final Report

Location:	Graniteville, South Carolina	**Accident Number:**	ERA14FA049
Date & Time:	November 25, 2013, 18:04 Local	**Registration:**	N4016P
Aircraft:	Piper PA-23-160	**Aircraft Damage:**	Substantial
Defining Event:	Fuel starvation	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During the initial climb after a night takeoff, the left engine lost power. A witness reported that the pilot attempted to return to the runway he had taken off from, but he lost control. The airplane descended, struck trees, and came to rest next to a taxiway that paralleled the departure runway.

Examination of the wreckage revealed that the airplane had not been configured for single engine flight; the left engine's propeller was not feathered, and the landing gear was down. Because the hydraulic pump was installed on the left engine, it would not have been operating after the engine lost power. Therefore, the pilot would have had to manually retract the landing gear by pumping the emergency pump handle 30 to 40 times. However, given the pilot's decision to return to the airport, he may have elected not to retract the landing gear. With the left engine's propeller not feathered and the landing gear down, the airplane would have rapidly decelerated unless the pilot lowered the airplane's nose to maintain airspeed. Additionally, in order to maintain control during the right turn, the pilot needed to counteract the tendency for the airplane's bank angle to increase due to the asymmetrical power from the right engine. The airplane's airspeed likely decreased below the single engine minimum controllable airspeed (Vmc), which resulted in the loss of control.

Before the accident, the pilot conveyed concerns about the airplane's left fuel valve control to two separate airframe and powerplant mechanics. During the conversations, he detailed his plans to troubleshoot and attempt to repair the problem himself. The mechanics urged the pilot not to perform the maintenance himself and to have the problem diagnosed by a knowledgeable certificated mechanic. The pilot was not a certificated mechanic and was not authorized to perform maintenance on the accident airplane.

Postaccident examination of the airplane's fuel system revealed that, although the left and right fuel valve controls were selected to the main tank positions, the left and right main fuel tank shutoff valves were closed, and the left and right auxiliary fuel tank shutoff valves were open. Therefore, the left and right engines were being supplied with fuel from their respective auxiliary tanks instead of from the

main tanks. The fuel tanks were damaged; however, fuel was observed in the corners of the left and right main tanks and in the right auxiliary tank, but the left auxiliary fuel tank was devoid of fuel. Therefore, the left engine loss of power was due to fuel starvation.

Examination of the fuel valve control cable assemblies revealed that neither the left or right cable assembly was connected to its respective auxiliary fuel valve arm assembly, which controlled both the main and auxiliary fuel shutoff valves. Because the securing hardware was still in place and was undamaged, it is likely that the control cable assemblies had, at some point, been disconnected from the arm assemblies and not reconnected. This resulted in the engines receiving fuel from the auxiliary tanks when the fuel valve controls were selected to the main tank positions. Given the pilot's discussions with the mechanics, it is likely that he disconnected the control cable assemblies from the arm assemblies when he attempted to troubleshoot the problem.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper maintenance of the airplane's fuel system, which resulted a loss of power in the left engine due to fuel starvation. Also causal was the pilot's failure to maintain minimum controllable airspeed following the loss of engine power, which resulted in a loss of airplane control.

Findings

Personnel issues	Unauthorized maint/repair - Pilot
Aircraft	(general) - Incorrect service/maintenance
Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Initial climb	Fuel starvation (Defining event)
Initial climb	Loss of engine power (total)
Emergency descent	Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On November 25, 2013, about 1804 eastern standard time, a Piper PA-23-160, N4016P, was substantially damaged when it impacted trees after a loss of engine power during departure from Twin Lakes Airport (S17), Graniteville, South Carolina. The airline transport pilot was fatally injured. Night visual meteorological conditions prevailed for the personal flight conducted under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91.

According to a witness, prior to the flight the pilot checked all of the airplane's external lights and ran both engines for a long period of time while in front of the hangar where it was kept. He next observed the airplane depart from runway 6. During the takeoff, the airplane lifted off about 1,500 feet down the runway from the point where the takeoff run began.

After lifting off, the airplane turned abruptly to the left while climbing. When it was just above the approximately 90-foot high trees located on the north side of the field, the airplane appeared to enter an aerodynamic stall, strike the trees, and then fall to the ground. The witness believed the pilot was trying to turn back to the runway when the accident occurred.

According to another witness, who was in a hangar after the airplane departed from runway 6, he heard "chatter" on the radio in the hangar but could not understand what the accident pilot was saying. About 10 seconds later, the airplane passed behind the hangar he was in, sounding "low" to the ground and possibly running on one engine. Moments later he heard the airplane impact trees. The witness stated that he believed that the accident pilot may have been attempting to land on Rachel Avenue when the accident occurred.

PERSONNEL INFORMATION

According to Federal Aviation Administration (FAA) and pilot records, the pilot held an airline transport pilot certificate with a rating for airplane multi-engine land, commercial privileges for airplane single engine land, and a flight instructor certificate with ratings for single, multiengine, and instrument airplane. He also held a ground instructor certificate with ratings for advanced and instrument, a repairman experimental aircraft builder certificate for a Sonex kit airplane he built, and a control tower operator certificate, which he was issued when he was previously employed as an air traffic controller. He did not hold an FAA mechanic certificate

His most recent FAA first-class medical certificate was issued on October 24, 2013. According to FAA and pilot records, he had accrued approximately 1,652 total hours of flight experience. Approximately 361 of those hours were in multi-engine airplanes, of which, 26 hours were in the accident airplane make and model.

AIRCRAFT INFORMATION

The accident aircraft was a twin engine, low wing airplane of metal construction. It was equipped with retractable landing gear and powered by two 160 horsepower, air cooled, normally aspirated engines equipped with two bladed constant speed propellers.

According to FAA airworthiness and registration records the airplane was manufactured in 1958 and was purchased by the pilot on May 9, 2013. Review of maintenance records revealed, it had been modified from its original configuration by the addition of numerous upgrades including updated avionics, an autopilot system, dual alternators, and dual vacuum pumps the airplane's most recent annual inspection was completed on August 1, 2013. At the time of the accident, the airplane had accrued 3675.6 total hours of operation.

METEOROLOGICAL INFORMATION

The recorded weather at Aiken Municipal Airport (AIK), Aiken, South Carolina, located 9 nautical miles east of the accident site, at 1755, approximately 9 minutes prior to the accident, included: winds 070 at 5 knots, 10 miles visibility, overcast clouds at clouds at 3,000 feet, temperature 08 degrees C, dew point -03 degrees C, and an altimeter setting of 30.40 inches of mercury.

According to the United States Naval Observatory on the day of the accident, the moon had set at 1236 and was in its last quarter at 1428. Sunset occurred at 1720, and the end of civil twilight occurred at 1747.

AIRPORT INFORMATION

Twin Lakes Airport was a privately-owned fly-in residential community, located four miles northwest of the central business district of Graniteville, South Carolina. It was classified by the FAA as a non-towered public use airport. The airport elevation was 540 feet above mean sea level and there was one runway oriented in a 06/24 configuration. Runway 6 was asphalt, and in good condition. The total length was 4,000 feet long and 60 feet wide. It was marked with basic markings in good condition. Runway 6 was surrounded by buildings and trees, and the threshold was displaced by 390 feet on the approach end, and 421 feet on the departure end.

Obstacles were present off the approach end of the runway in the form of a 52-foot-tall tree, located 624 feet from the runway threshold, and 89 feet left of the centerline, which required an 8:1 slope to clear. The approach ratio to the displaced threshold was 20:1. Obstacles were also present on the departure end of the runway in the form of a 43-foot-tall tree, located 877 feet from the departure end of the runway, 187 feet left of the centerline, which took a 15:1 slope to clear.

WRECKAGE AND IMPACT INFORMATION

Accident Site Examination

The accident site was located north-northwest of the airport, at the edge of a forested area. Examination of the accident site revealed that the airplane after striking trees and falling to the forest floor came into contact with the ground with its left wing, then nose, at an approximately 45-degree nose down attitude while turning to the left. It then slid approximately 15 feet, until it came into contact with the bases of some trees, where it came to rest in a nose down, left wing low attitude against their trunks. There was no appreciable wreckage path present, and all of the primary components of the airplane were collocated within 15 feet of the first point of ground impact, near where the airplane came to rest.

Wreckage Examination

Flight control continuity was established from the control wheel and rudder pedals in the cockpit and to all of the flight control surfaces. The fuselage and wings displayed multiple areas of crush and compression damage. The aft fuselage was bent about 20 degrees to the left of the fuselage centerline and the right wing was bent down and aft, and was partially separated at the wing root. The left wing was also partially separated at a point about 2 feet outboard of the wing root, was displaced aft, and was folded under the fuselage. The fuel tanks were damaged during the accident however, evidence of fuel being onboard the airplane was present in the form of fuel odors, and fuel being observed in the corners of the left and right main tanks, and the right auxiliary tank. No fuel was visible in the left auxiliary tank.

The master switch was in the on position, the flaps were retracted, and the landing gear was extended. The emergency hydraulic pump handle was stowed. The magneto switches were on, the carburetor heat controls were off, and the engine fuel primers were in and locked. The throttle control levers, propeller control levers, and mixture control levers were full forward prior to impact, and the left and right fuel valve controls were in the main tank positions.

Right Engine and Propeller Examination

The right engine remained attached to the airplane by the tubular engine mount. A tool was inserted in the vacuum pump drive pad and the drive train was rotated. Continuity of the crankshaft to the rear gears and to the valve train was confirmed. Compression and suction was observed on all engine cylinders. The interiors of the cylinders were examined using a lighted borescope and no anomalies were noted.

The carburetor remained attached to the engine. The bowl screw safety washers were in place and no fuel stains were noted on the external surfaces of the carburetor. The venturi was observed to be secure. About an ounce of blue liquid with an odor consistent with that of aviation gasoline was observed in the carburetor bowl. The liquid tested negative for water using water finding paste. No damage was noted to the brass floats or the other internal carburetor components. The carburetor fuel inlet screen was absent of debris. The engine driven fuel pump remained attached to the engine and no damage was noted and the pump would produce air at the outlet port when operated by hand.

Both magnetos remained attached to the engine and no damage was noted. The magnetos were removed and both produced spark from all electrode towers when rotated by hand. No damage was noted to the engine ignition harness, and the spark plugs electrodes were undamaged and displayed normal coloration.

Oil was observed in the engine and no debris was noted in the oil pressure screen. No damage was noted to the oil cooler or associated hoses.

The propeller remained attached to the engine crankshaft flange. One propeller blade displayed evidence of S-bending and was curved aft about 30-degrees at approximately the mid-span point of the blade, and curved forward approximately 20-degrees at a point about 8 inches inboard of the blade tip. The other propeller blade displayed chordwise scratching.

Left Engine and Propeller Examination

The engine remained attached to the airplane by the tubular engine mount. A tool was inserted in the vacuum pump drive pad and the drivetrain was able to be rotated. Continuity of the crankshaft to the rear gears and to the valve train was confirmed. Compression and suction were obtained from all engine cylinders. The interiors of the cylinders were examined using a lighted borescope and no anomalies were noted.

The carburetor was fractured across the throttle bore and partially separated from the engine. The bowl screw safety washers were in place and no fuel stains were noted on the external surfaces of the carburetor. The venturi was secure. About 2 teaspoons of blue liquid with an odor consistent with that of aviation gasoline was observed in the carburetor bowl. The liquid tested negative for water using water finding paste. No damage was noted to the brass floats or the other internal carburetor components. The carburetor fuel inlet screen was absent of debris.

The engine driven fuel pump remained attached to the engine and no damage was noted. The pump produced air at the outlet port when operated by hand. Partial disassembly of the pump revealed no damage to the rubber diaphragms or other internal components. Both magnetos remained attached to the engine and no damage was noted. The magnetos were removed and both produced spark from all electrode towers when rotated by hand. No damage was noted to the engine ignition harness, and the spark plugs electrodes were undamaged and displayed normal coloration.

Oil was observed in the engine and no debris was noted in the oil pressure screen. No damage was noted to the oil cooler or associated hoses.

The vacuum pump remained attached to the engine. No damage was noted, and when removed the pump produced air at the outlet port when rotated by hand. The drive coupling, carbon rotor and carbon vanes were intact.

The propeller remained attached to the engine crankshaft flange. The spinner displayed heavy crush damage only on one side of the spinner, and minimal damage on the other. One propeller blade was bent forward about 10-degrees approximately 18 inches inboard of the propeller tip and exhibited trailing edge gouging and chord-wise scuffing near the trailing edge of the blade. The other propeller blade was bent aft about 5 degrees at about 18 inches outboard of the hub.

SURVIVAL ASPECTS

Examination of the wreckage revealed that the tubular steel structure which surrounded the cabin had remained relatively intact and that cabin volume integrity had only been minimally reduced during the impact sequence. Examination of the occupant restraint system revealed that shoulder harnesses were not installed in any of the seat positions and the lap belts on the front left and right seats were anchored to the seat structure, and not the airplane structure. The pilot's lap belt did not display evidence of stretching, the latching mechanism had remained latched, and the belt attachment fittings had remained

attached to the seat. The seat had been displaced from its mounting location, and there was evidence of the pilot having struck the front of the cabin area during the impact sequence.

No shoulder belts were required to be installed under the regulations that were in effect at the time of the airplane's manufacture. As of December 12, 1986, the FAA required that shoulder belts be installed for all seats in small airplanes manufactured since that date. There was no requirement that shoulder belts be retrofitted to airplanes made prior to that date but. Piper Aircraft issued Service Bulletin (SB) 980 on January 18, 1995, which required the installation of shoulder belts in any airplanes where they were not originally equipped. Piper considered compliance with the SB mandatory.

According to the FAA Civil Aerospace Medical Institute's publication AM-400-90/2, seat belts alone only protect occupants in minor impacts; however, the use of shoulder belts was found to reduce major injuries by 88 percent and fatalities by 20 percent.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot at the Newberry County Memorial Hospital Morgue on behalf of the Edgefield County Coroner. The listed cause of death was blunt force injury of the head.

Toxicological testing of the pilot was conducted at the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The specimens from the pilot were negative for carbon monoxide, basic, acidic, and neutral drugs with the exception of:

- Ibuprofen which was detected in Urine, and was a nonsteroidal anti-inflammatory drug with analgesic and antipyretic activity.

- Ranitidine which was detected in Blood and Urine, and was an over-the-counter (OTC) histamine H2-receptor antagonist used to decrease the production of gastric acid, treat ulcers, and a number of other stomach ailments.

- Salicylate which was detected in Urine, and was an aspirin metabolite, an OTC anti-inflammatory medication to treat aches and pains, an antipyretic to reduce fever, and also had an antiplatelet effect used to reduce the risk of myocardial infarction.

TESTS AND RESEARCH

Checklists

Review of the documentation found in the wreckage revealed that a checklist was onboard within reach of the pilot which listed both normal and emergency procedures.

Further review of the checklist revealed information in the pretakeoff checklist which required that the electric auxiliary fuel pumps be selected to the "On" position. The checklist also addressed engine failure in flight. It required that the pilot to "Maintain Control/Pitch/Airspeed" which directed that the airplane's speed be maintained at critical engine-out minimum controllable airspeed (Vmc) of 73 miles per hour, that the landing gear and the wing flaps be moved to the "Up" position and that the inoperative engine's propeller be selected to "Feather." It further required that the pilot accelerate to 95 mph, which was the best rate of climb speed single engine (Vyse) for the airplane.

At the time of the airplane's manufacture, the Civil Aviation Regulations only required that flight at Vyse to assure minimum sink rate. It did not guarantee that the airplane would be able to maintain altitude, particularly in the takeoff or landing configuration with one engine inoperative.

Propeller Feathering

The propellers on the airplane were constant speed, controllable, fully feathering units. These were controlled by the use of propeller pitch levers in the center of the control quadrant. Feathering of the propellers was accomplished by moving the controls fully aft through the high pitch detent into the feathering position. Feathering was expected to occur within 10 seconds. The propellers could be unfeathered by moving the propeller control forward, and pressing the engine starter buttons. Examination of both propellers revealed that neither was feathered.

Landing Gear System

The airplane was equipped with retractable tricycle configuration landing gear system, incorporating a steerable nose wheel. Examination of the system did not reveal evidence of any preimpact malfunction or failure, that the landing gear handle was in the neutral position, and all three landing gear were down.

The position of the landing gear was indicated by four lights located on the pedestal. When the green lights were illuminated, all three legs of the landing gear were down and locked; when the amber light was illuminated, the landing gear was up, and when no lights were illuminated, the landing gear was in an intermediate position. A red light in the landing gear control handle knob would flash when the landing gear was up and either one of the throttle levers were reduced below approximately 12 inches of manifold pressure. With the landing gear not in the down position, a landing gear warning horn would annunciate.

To guard against inadvertent retraction, of the landing gear on the ground, a mechanical latch, which must be operated before the landing gear control could be moved upward, was positioned just above the control lever.

A hydraulic system was used for the extension and retraction of the flaps and landing gear. Pressure was supplied to the control unit from an engine driven pump that was mounted on the left engine. Examination of the hydraulic system did not reveal any preimpact failures or malfunctions.

In the case of the landing gear, when the landing gear handle was moved from the center "Off" position and placed in either the retraction or extension (up or down) position, the hydraulic system would actuate the landing gear, and when it was either fully up or fully down, hydraulic pressure within the selector valve unit would force the landing gear control lever back to the "OFF" (neutral) position, which would then allow the hydraulic fluid to circulate freely between the pump and control unit. Landing gear retraction or extension would normally take between 10 and 12 seconds.

The airplane was also equipped with an emergency hydraulic pump which was integral with the selector valve unit and was used to obtain hydraulic pressure in the event of a hydraulic pump failure or failure of the left engine. To operate the emergency pump, the retract or extend the landing gear or flaps, the pilot would have to extend the handle to its full length by pulling aft and then position the landing gear handle to the position desired, then pump the handle 30 to 40 strokes to either raise or lower the landing gear.

The airplane was also equipped with an emergency hydraulic pump which was integral with the selector valve unit, and was used to obtain hydraulic pressure in the event of a hydraulic pump failure or failure of the left engine. Operation of the pump required the pilot to manually articulate handle between 30 and 40 strokes to either raise or lower the landing gear. In the event that a hydraulic system failure should occur due to a line breakage or selector valve malfunction, an independent system that could be pressurized with carbon dioxide from an onboard bottle was installed to enable the pilot to lower the landing gear.

Fuel System

The fuel system consisted of two 36 gallon main fuel cells (tanks) located outboard of the engines, and two 18 gallon auxiliary fuel cells located in the outboard sections of the wing. Fuel could be pumped by the engine driven fuel pumps from the tanks directly to the adjacent carburetors. The fuel valves could be left open at all times, and the crossfeed left in the off position.

Electric auxiliary fuel pumps were also installed in by-pass fuel lines between the tanks and the engine driven pumps. The electric pumps could be used to provide pressure in the event of a failure of the engine driven pumps. They would normally be turned on to check their operation before starting the engines, and left on during takeoff and landing, to preclude the possibility of fuel pressure loss in the event of an engine driven pump failure at critical times. Examination of the electric auxiliary fuel pumps switches revealed that they were in the "OFF" position.

If desired by the pilot, the fuel could also be pumped by the operating engine driven pump to the engine with the failed engine driven pump, by turning on the crossfeed. The good pump would then supply both engines from its tank. If this tank ran low on fuel, fuel could then be drawn from the opposite tank by turning on the electric pump on the failed engine driven pump side, leaving the crossfeed on, and turning the fuel valve on the empty tank off. Then the electric pump on the failed pump side would be supplying both engines from its tank.

Fuel could then be used from one tank or the other, by shutting off one main valve and turning on the crossfeed to balance fuel loads. For normal operation, it was recommended that fuel be pumped directly from the tanks to their respective engines with the crossfeed off.

The fuel valve controls and crossfeed control were located with the engine primer pumps in the fuel control panel between the two front seats. Examination of the crossfeed control revealed that it was in the "OFF" position. The left and right fuel valve controls were in the "ON MAIN 36 GAL" (main tanks) positions, and the spring-loaded locks, which prevented unwanted movement, were engaged. Examination of the fuel tanks' fuel shutoff valves revealed that the position of the valves did not agree with the fuel valve controls' positions, as the main fuel tanks' shutoff valves were closed, and the auxiliary fuel tanks' shutoff valves were open.

Examination of the fuel valve control cable assemblies which actuated the main fuel shutoff valve, and the auxiliary fuel shutoff valve, revealed that right fuel valve control cable assembly was of a different type than the left fuel valve control cable assembly, and appeared to be newer.

Further examination of the fuel valve control cable assemblies also revealed, that the cables were each attached to their respective fuel valve controls on the fuel control panel, and were connected to their respective fuel control cable support arms which were also used through the use of switch assemblies

mounted above the support arms, to communicate to the fuel gauges which tank was selected, so the gauge could indicate the fuel quantity in the selected tank. It was discovered however, that neither the left or right cable assemblies were connected to their respective auxiliary fuel valve arm assembly which controlled both the main fuel shutoff valve, and through a turnbuckle and control arm, the auxiliary fuel shutoff valve. This was despite the fact that the securing hardware which consisted of two AN 393-15 pins secured by two AN 380-2-2 cotter pins, were still in place and were undamaged.

ADDITIONAL INFORMATION

A few weeks before the accident the pilot had flown the airplane to Pennsylvania to visit a relative. Upon his return he had contacted an airframe and powerplant mechanic that had previously performed an annual inspection on the airplane, and advised him that when he had switched tanks while flying the airplane home, the left engine "stumbled."

The mechanic advised the pilot that a cable might have gotten stuck, that he could check it for him, and that it probably needed lubrication. The pilot then told him that "he might try to lubricate it." The mechanic then advised him once again, to call him if he wanted to look at it but, the pilot advised him that "he would take the mid-belly pan off of the left side and take a look at it."

The pilot never called him back.

According to another airframe and powerplant mechanic the pilot had called him about 7 to 14 days prior to the accident about having a problem with the left fuel valve control. The pilot advised him that the fuel valve control was stiff or binding and that "he had gained access to the selector" and noted flexing in the cable upon tank selection. He asked what would cause this, and were there any adjustments that could be made to the linkage to ease the binding. The mechanic advised the pilot that there could be a number of reasons for the binding including a clogged, corroded, or dirty fuel valve, internal corrosion, friction in the cable, or the cable coming loose somewhere in the airframe where it was attached along its routing between the valve and the fuel valve control, thus causing the cable to flex and bind rather than operate normally. He strongly urged the pilot to get together with a knowledgeable mechanic with proper tools and documentation and have the problem thoroughly troubleshot and solved.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	56
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
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:**	October 24, 2013
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	September 5, 2012
Flight Time:	1653 hours (Total, all aircraft), 28 hours (Total, this make and model), 1449 hours (Pilot In Command, all aircraft), 16 hours (Last 90 days, all aircraft), 12 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N4016P
Model/Series:	PA-23-160	**Aircraft Category:**	Airplane
Year of Manufacture:	1958	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	23-1491
Landing Gear Type:	Tricycle	**Seats:**	5
Date/Type of Last Inspection:	August 1, 2013 Annual	**Certified Max Gross Wt.:**	3801 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	3671.8 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	O-320-B
Registered Owner:	On file	**Rated Power:**	160 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	KDNL,423 ft msl	**Distance from Accident Site:**	14 Nautical Miles
Observation Time:	18:08 Local	**Direction from Accident Site:**	218°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 2800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.37 inches Hg	**Temperature/Dew Point:**	9°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Graniteville, SC (S17)	**Type of Flight Plan Filed:**	None
Destination:	Graniteville, SC (S17)	**Type of Clearance:**	None
Departure Time:	18:04 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Twin Lakes Airport S17	**Runway Surface Type:**	Asphalt
Airport Elevation:	540 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	06	**IFR Approach:**	None
Runway Length/Width:	4000 ft / 60 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	33.646945,-81.868888

Administrative Information

Investigator In Charge (IIC):	Gunther, Todd
Additional Participating Persons:	John V Gunter; FAA/FSDO; West Columbia, SC James M Childers; Lycoming Engines; Williamsport, PA Michael McClure; Piper Aircraft; Vero Beach, FL
Original Publish Date:	October 21, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=88475