Aviation Investigation Final Report

Location:	St. Petersburg, Florida	**Accident Number:**	ERA15FA378
Date & Time:	September 30, 2015, 11:47 Local	**Registration:**	N21ND
Aircraft:	Piper PA 30	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot, who had no documented previous experience in the make and model multiengine airplane, was performing touch-and-go landings on a 9,730-ft-long runway to familiarize himself with the airplane. Witnesses reported that, during the second takeoff, the airplane appeared to "struggle." Another witness reported the airplane was climbing at an unusually shallow angle. The airplane then drifted to the right of the runway centerline, rolled sharply to the right, and descended to ground impact in a steep, nose-low attitude. The airplane came to rest about 180 ft right of the runway centerline and about 1,450 ft before the end of the runway's paved surface.

Examination of the wreckage revealed that the right engine throttle was retarded, and the propeller lever was in the feather position. The right propeller blades displayed little damage and appeared to be in the feathered position. The left engine throttle and propeller levers were full forward, and damage to the left propeller was indicative of full left engine power at impact. Examination of the right engine revealed three anomalies; the diaphragm of the right fuel servo exhibited an unusual soot pattern; particulate contamination was in the fuel filter screen; and the spark plugs were in a degraded condition. However, none of these anomalies would likely have resulted in a total loss of engine power.

Based on the witness descriptions and the lack of damage to the right propeller blades, it is likely that during the climb, the right engine experienced, at least, a partial loss of power. Based on the postaccident positions of the right engine throttle and propeller levers and signatures observed on the right engine's propeller, the pilot likely responded to the loss of right engine power by retarding the right throttle and feathering the right propeller; however, he did not maintain the appropriate airspeed and subsequently lost control of the airplane. Given the airplane's impact location about 1,450 ft before the end of the runway, it is likely that, if the pilot had immediately retarded both throttles, maintained the appropriate airspeed, and landed straight ahead, he likely would have maintained control of the airplane. Additionally, the airspeed indicator did not have a marking for single-engine minimum controllable airspeed, nor was there a placard on the instrument panel as required by a Federal Aviation Administration airworthiness directive and the airplane flight manual. While the lack of these markings

was not causal to the accident, their presence might have reminded the pilot of this critical information, and might have changed the outcome of the event.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain single-engine minimum controllable airspeed following a loss of right engine power during initial climb. Also causal was the loss of right engine power for reasons that could not be determined because examination of the wreckage revealed no significant mechanical deficiencies. Contributing to the outcome was the failure of maintenance personnel to ensure that required airspeed markings and placards were installed in accordance with an airworthiness directive and the airplane flight manual.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Recip engine power section - Malfunction
Aircraft	Instrument panel - Incorrect service/maintenance
Personnel issues	Installation - Maintenance personnel

Factual Information

History of Flight

Initial climb	Loss of engine power (total)
Initial climb	Attempted remediation/recovery
Initial climb	Loss of control in flight (Defining event)

On September 30, 2015, at 1147 eastern daylight time, a Piper PA-30, N21ND, was substantially damaged when it impacted terrain during takeoff from St Pete-Clearwater International Airport (PIE), Clearwater, Florida. The commercial pilot was fatally injured. The airplane was registered to Sowards Aircraft Leasing, LLC, and was operated under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions were reported near the accident site, and no flight plan was filed.

The airplane owner, who purchased the airplane 3 days before the accident flight, stated that he dispatched the accident pilot from San Diego, California, to Saint Petersburg, Florida, to pick up the airplane and fly it back to southern California. The airplane had recently undergone maintenance and an annual inspection.

On the morning of the accident, the pilot arrived at the airplane to meet the previous owner, accept the airplane, and review airplane-specific procedures and systems before the flight to California. According to the previous owner, they reviewed the airplane systems and spent much of their time going over aircraft performance characteristics and airspeeds. In addition, the previous owner stated that he told the pilot, "…if an engine loses power, you've got to keep the speed up." The previous owner offered several times to fly with the accident pilot for some additional familiarization training, but the pilot declined. The pilot stated that he planned to perform some "touch-and-goes" to familiarize himself with the airplane before departing the area.

According to radio communications recordings provided by the Federal Aviation Administration (FAA), at 1125, the accident pilot contacted ground control at PIE, requested a radio check, and stated his intentions to perform a few touch-and-go landings. At 1131, the pilot performed engine run-up checks and, 3 minutes later, taxied to runway 36. At 1135, the pilot was cleared onto runway 36 for takeoff. Several minutes later, while in the traffic pattern, he was cleared for and successfully completed the first touch-and-go landing.

At 1144, the pilot was cleared for the second touch-and-go landing. After the second landing and subsequent takeoff, several witnesses reported that, during the initial climb, the airplane seemed to "struggle" between 100 and 200 ft above the ground. A pilot holding short of the runway stated that the airplane had an unusually shallow climb and started drifting to the right of the runway centerline; at an altitude of about 100 ft, the airplane rolled sharply to the right then pitched 90° nose-down before colliding with the ground.

Video recorded by security cameras at the airport showed the airplane climbing with the landing gear

extended during the takeoff. The flap position could not be ascertained from the video. The airplane rolled sharply to the right and descended in a steep nose-down attitude before it disappeared out of camera view.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	24,Male
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 Without waivers/limitations	**Last FAA Medical Exam:**	January 16, 2014
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	January 18, 2015
Flight Time:	768 hours (Total, all aircraft), 0.4 hours (Total, this make and model), 690.2 hours (Pilot In Command, all aircraft), 221 hours (Last 90 days, all aircraft), 84.9 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

According to FAA airman, personal logbook, and employment records, the pilot held a commercial pilot certificate with ratings for airplane single-engine land, airplane multiengine land, and instrument airplane. He also held a flight instructor certificate, with ratings for airplane single-engine, airplane multiengine, and instrument airplane. He held a first-class medical certificate, issued January 16, 2014. He had accrued about 768 total hours of flight experience, with 166 hours of flight experience in multiengine airplanes. In the previous 90 days, the pilot had flown 221 hours, with 85 hours in the previous 30 days. The pilot's multiengine experience was limited to Piper PA-44 and Beechcraft BE-55 airplanes. There were no entries in his pilot logbook for the Piper PA-30.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N21ND
Model/Series:	PA 30 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1963	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	30-86
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	September 10, 2015 Annual	**Certified Max Gross Wt.:**	2381 lbs
Time Since Last Inspection:	2 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	7251.9 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-320 SERIES
Registered Owner:	Sowards Aircraft Leasing, LLC	**Rated Power:**	160 Horsepower
Operator:	Sowards Aircraft Leasing, LLC	**Operating Certificate(s) Held:**	None

According to FAA airworthiness and registration records, the airplane was manufactured in 1963. It was a twin-engine, low-wing, four-place airplane of metal construction. It was equipped with retractable tricycle landing gear and powered by two Lycoming IO-320-B1A engines, each equipped with a two-blade, constant-speed propeller. According to the maintenance logbooks, the most recent annual inspection of the airframe and engines was completed on September 10, 2015. At that time, the airframe had accumulated 7,252 total flight hours, and the left and right engines each had accumulated 1,583.4 hours since overhaul.

According to the mechanics who had most recently worked on the airplane, it arrived at their facility in March 2015 for an annual inspection, but, due to the amount of maintenance that needed to be performed and the length of time it took to order and receive parts, the maintenance was not completed until September 10, 2015. Prior to this maintenance, the last airframe and engine maintenance was accomplished on August 13, 2013.

Several mechanics stated that the airplane needed "a lot of work" when it arrived, and it required a significant amount of troubleshooting to determine why the left engine would not produce more than 1,600 rpm. Additionally, the right engine displayed low cylinder compression and was operating too lean. After successfully troubleshooting these issues and performing maintenance on the engines, the airplane was returned to service. According to the airplane's previous owner, the maintenance facility installed new fuel lines and drained the fuel tanks because the airplane had not flown for an extended period of time. The owner of the maintenance facility stated that they "flushed" the fuel system. Work order and airframe maintenance records showed that left and right fuel hoses were purchased and installed, and Federal Aviation Administration (FAA) airworthiness directive (AD) 83-10-01 for fuel contamination was accomplished.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PIE,10 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	15:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 2300 ft AGL	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.81 inches Hg	**Temperature/Dew Point:**	29°C / 24°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	St. Petersburg, FL (PIE)	**Type of Flight Plan Filed:**	None
Destination:	St. Petersburg, FL (PIE)	**Type of Clearance:**	None
Departure Time:	11:45 Local	**Type of Airspace:**	Class D

The recorded weather at PIE, at 1153, about 11 minutes after the accident, included wind from 300°at 10 knots, 10 statute miles visibility, few clouds at 2,300 ft, scattered clouds at 3,800 ft, and overcast clouds at 3,000 ft, temperature 29°C, dew point 24°C, and an altimeter setting of 29.82 inches of mercury.

Airport Information

Airport:	ST PETE-CLEARWATER INTL PIE	**Runway Surface Type:**	Asphalt
Airport Elevation:	10 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36R	**IFR Approach:**	None
Runway Length/Width:	9730 ft / 150 ft	**VFR Approach/Landing:**	Touch and go

St Pete-Clearwater International Airport was located on the east coast of the Tampa Bay peninsula at an elevation of 10.5 ft msl. The airport comprised two asphalt runways, oriented 18/36 and 04/22. Runway 18/36 was 9,730 ft long by 150 ft wide. From the center of runway 36, adjacent to the accident site, about 1,300 ft of runway remained with an additional 150 ft of displaced threshold. Beyond the paved surface of the runway, a level grass area of about 750 ft by 500 ft was bisected by a Medium Intensity Approach Lighting System (MALSR) and a service road that extended out from the centerline of the runway.

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:**	27.919721,-82.689163

The airplane impacted a service road and came to rest upright in the grass 180 ft east of runway 36, about 1,450 ft before the end of the runway's paved surface. There was no postcrash fire, and all major components of the airplane were located near the site. The debris path consisted of small pieces of Plexiglas, heater hoses, the nose cone, a cabin door, and landing gear assembly that were outside of the immediate site near where the airplane first made contact with the ground, about 20 ft west of the main wreckage. Both the left and right engines remained attached to their mounts. The wreckage path was oriented perpendicular to runway 36 with the airplane upright and oriented on a magnetic heading of 280°.

The forward and lower portion of the cabin exhibited aft and upwards crushing. Both rudder pedals were compacted by the floor upwards under the instrument panel and could not be moved. The floor of the forward cabin was deformed by impact damage, but both seats remained attached to the floor-mounted seat rails. The pilot seat on the left side was moveable along the seat rails for several stops and was slightly deformed. The head rest was damaged. The right seat was jammed and could not be moved. Both front and back seats were functional and in place. The front seatbelts were functional and remained attached to their anchor points. There were no shoulder harnesses installed. Both fuel sector valves were on and functioned normally.

The fuselage aft of the rear seat, and immediately aft of the left wing, exhibited longitudinal tearing with the tail section twisted 10°to the right. The tear traversed the fuselage over the cabin roof and continued to the right side, where it terminated just aft of the baggage compartment. Control continuity was established by accessing the rudder, elevator and trim cables through the tear in the fuselage. All of the cables were intact and on their respective pulleys and guides. The cables were continuous and could be traced to their termination point in the tail.

The airspeed indicator was dislodged from the faceplate but appeared intact. The needle indicated 68 mph, which is just below the lower limit of the white arc. The left engine throttle, propeller and mixture controls were positioned fully forward, and the right engine throttle and right propeller levers were in the aft position and the mixture fully forward. The left cowl flap was in the closed position and the right cowl flap was in the fully opened position.

The left wing was crushed and bent upwards approximately 30°. The engine remained attached to the engine mount and wing. There was rippling and deformation in the upper surface of the skin, but the wing appeared to be structurally intact. The flap remained attached, but was deformed. Both inboard and outboard fuel tanks remained intact and about 15 gallons of fuel were recovered from the tanks. The engine cowling was attached. The air intake cowling was damaged and separated from the lower portion but remained in place around the spinner.

The left engine's spark plugs were secure. The spark plugs were removed and displayed signatures consistent with normal wear but were oil-soaked. The No. 2 bottom spark plug was impact-damaged and could not be removed from the cylinder. Rotation of the magneto input drive produced spark at all terminal leads.

The left fuel servo was impact-damaged and broken at its mount. The fuel servo was removed and inspected. The throttle plate was free to move when hand actuated at the throttle linkage. The throttle cable was secured to the arm. The mixture arm was also free to rotate when hand actuated. The mixture cable was secure to the arm. The fuel servo diaphragm was visually inspected for tears and rips with no defects noted. The inlet fuel strainer was removed from the fuel servo with no contaminants noted. The flow divider was removed and opened to inspect the diaphragm for tears or cuts with no defects noted. The fuel injector nozzles were removed from their respective mounts at each individual cylinder and checked for obstructions with no obstructions noted. The fuel lines from the flow divider to the fuel injector nozzles were inspected and tested with air; no blockage was noted in any of the four lines. Functional testing of the left engine's fuel servo revealed that it operated normally and within limits under controlled conditions.

The left engine-driven diaphragm fuel pump was found secure to its mount and the pump created suction and compression when hand-actuated. The body was removed to inspect the diaphragm for tears or cuts with no defects noted.

The left engine's oil suction screen was removed and was found to have a few large (0.2"-0.5") particles inside the screen, as well as some smaller particles. The oil filter housing was impact-damaged at the accessory housing. The oil sump was visibly breached, and oil was observed in a spray pattern over the wing and inboard of the engine nacelle and fuselage.

Mechanical continuity of the left engine was established with hand rotation of the crankshaft and assisted by turning the vacuum pump drive in the accessory drive area. All cylinders produced suction and compression, and all intake and exhaust valves moved when the crankshaft was rotated. The left propeller governor was broken from its mount on the rear accessory case. The solid oil line steel fittings were secure at the case and at the governor. The propeller governor oil screen was clear of obstructions.

The left propeller remained attached to the engine via the engine crankshaft flange and the propeller blades exhibited S-bending, gouging, and chordwise scratches. The cylinder and feathering spring assembly were unremarkable and the preload plates exhibited impression marks consistent with being in the normal operating range at impact.

The right wing showed significantly less damage than the left. The engine remained attached to the engine mount and wing. There was rippling and deformation in the upper surface of the skin, but the wing appeared to be structurally intact. The right outboard aileron was detached from the right connector point and remained attached on the left side. The flap was retracted and remained attached, but was deformed. Both inboard and outboard fuel tanks remained intact, and about 20 gallons of fuel were recovered from the tanks. The engine cowling was attached. The air intake cowling was damaged and separated from the lower portion, but remained in place around the spinner. The right landing gear severed during impact with the ground.

The right engine's spark plugs remained secure and were removed for examination. The removed spark plugs were heavily carbon-coated, consistent with a rich fuel mixture. The center electrodes were worn. When the crankshaft was rotated by hand, all of the cylinders produced compression and suction, with the exception of the No. 2 cylinder, and all intake and exhaust valves were visually confirmed to move during crankshaft rotation. The No. 2 exhaust valve was lightly tapped with a hammer and compression was checked again, this time providing compression and suction in the No. 2 cylinder.

The right fuel servo was intact and secure on the angled air induction tube that was impact-damaged at the oil sump mounting location. The throttle plate was free to move when hand-actuated at the throttle linkage. The mixture arm was also free to rotate when hand-actuated. The fuel servo diaphragm was visually inspected for tears and rips. When opened, there was a visible black stain on the diaphragm from the stem assembly to the static port passage. Functional testing of the right engine's fuel servo revealed that it operated normally and within limits under controlled conditions. Additionally, no contamination was noted flowing from the unit, and the hysteresis and pressure checks were within limits. Disassembly of the unit revealed that the inlet fuel strainer in the fuel servo was contaminated with approximately ¼ teaspoon of small granular particulate matter varying in size and color.

The right flow divider was removed and opened to inspect the diaphragm for tears or cuts, with no defects noted. The fuel injector nozzles were removed from their respective mounts at each individual cylinder and checked for obstructions with no obstructions noted. The fuel lines from the flow divider to the fuel injector nozzles were inspected and tested with air, with no blockage noted in the four lines. The right engine-driven diaphragm fuel pump was found secure to its mount. The pump created suction and compression when hand-actuated. The body was removed to inspect the diaphragm for tears or cuts, with no defects noted.

The right oil suction screen was clear of contaminants. The right propeller governor was secure on its mount on the rear accessory case. The solid oil line with steel fittings was secure at the case and at the governor. The propeller governor oil screen was clear of obstructions.

The right propeller blades showed little signs of damage; one blade was slightly bent forward. No rotational scoring, bending, or twisting was observed. The right preload plates were unremarkable; there were no impression marks on the plates and a pre-impact blade angle could not be determined. The cylinder and feathering spring assembly was fractured off the propeller hub during impact and the propeller was noted to be in the feathered position.

Medical and Pathological Information

An autopsy was performed on the pilot by the Office of the Medical Examiner, District 6, Largo, Florida. The autopsy findings included multiple blunt force injuries. Forensic toxicology was performed on specimens from the pilot, by the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The testing found no traces of ethanol or drugs in the samples submitted.

Additional Information

FAA Airworthiness Directive, AD 69-24-04, required a placard that stated, "Minimum Single Engine Control Speed 90 mph CAS [calibrated airspeed]." Additionally, the Piper PA-30 Airplane Flight Manual (AFM), revised March 1975, specified in its limitations section that the minimum single-engine control speed must be placarded on the instrument panel. No such placard was discovered during the examination of the accident airplane. Additionally, the AFM limitations section required that a red radial line depicting the minimum single-engine control speed and a blue radial line depicting the single-engine best rate of climb speeds be placarded on the airspeed indicator. There were no radial lines present on the accident airplane's airspeed indicator. The single-engine minimal control speed (Vmca) was 90 mph, and the best single-engine rate-of-climb speed (Vyse) was 105 mph.

Administrative Information

Investigator In Charge (IIC):	Mccarter, Lawrence
Additional Participating Persons:	Randy Ryhal; FAA/FSDO; Tampa, FL Judson Rupert; Lycoming Engines; Williamsport, PA Robert Martellotti; Piper; Vero Beach, FL
Original Publish Date:	May 3, 2017
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=92059