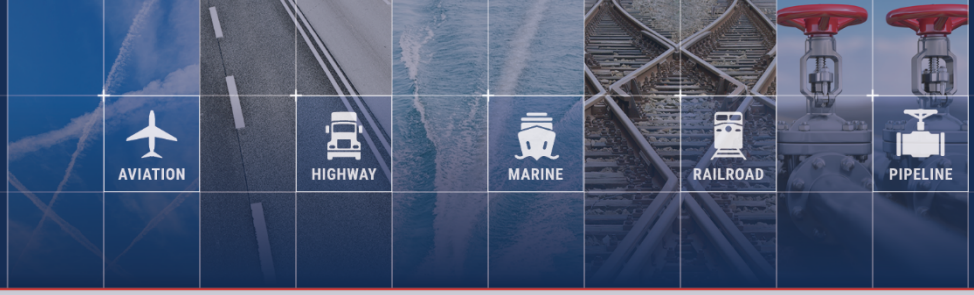

Aviation Investigation Final Report

Location:	Vero Beach, Florida	**Accident Number:**	ERA10LA162
Date & Time:	March 5, 2010, 14:37 Local	**Registration:**	N103GK
Aircraft:	Piper PA-34-200T	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Serious
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The certified flight instructor (CFI) and student had completed several multiengine maneuvers at altitude including single-engine procedures. During the approach, the CFI retarded the left throttle to simulate an engine failure, and the student correctly identified the affected engine. The CFI then set zero thrust on the left engine, and the student continued the approach, utilizing the right engine. On the downwind leg of the traffic pattern, the CFI noted that the altitude had dropped to about 500 to 650 feet above ground level and took control of the airplane. He stated that he added power on both engines; however, no increase in power was noted on either engine. The CFI attempted to troubleshoot the problem but, due to the low altitude, he elected to perform a forced landing; the airplane collided with trees and sustained substantial damage. A postaccident examination of the airplane and both engines and reports from the CFI did not reveal any mechanical malfunctions that would have precluded normal operation. It is likely that the CFI allowed the airspeed to decrease below the minimum controllable speed for single-engine operations.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The certified flight instructor's failure to monitor the airspeed while the student performed a single-engine approach.

Findings

Personnel issues	Lack of action - Instructor/check pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Altitude - Not attained/maintained

Factual Information

History of Flight

Approach	Simulated/training event
Approach-VFR pattern downwind	Altitude deviation
Approach-VFR pattern downwind	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On March 5, 2010, at 1437 eastern standard time, a Piper PA-34-200T, N103GK, received substantial damage when it collided with trees while on approach to Vero Beach Municipal Airport (VRB), Vero Beach, Florida. The certificated flight instructor (CFI) and the commercial-rated student pilot received serious injuries. Visual meteorological conditions prevailed and no flight plan was filed for the local, instructional flight. The airplane was registered to Lois Aviation LLC and operated by Paris Air, Incorporated under the provisions of 14 Code of Federal Regulations Part 91. The flight originated from VRB about 1320.

According to the owner of Paris Air, Inc., the purpose of the flight was instructional and when asked when the last time the airplane was fueled, he stated that it was topped off with 51 gallons of fuel just prior to the accident flight.

According to the CFI, the flight departed VRB, with full fuel tanks for a local training flight on multiengine procedures. Beginning with power-on and -off stalls, slow flight, and single engine demonstrations, he then contacted Miami Center for a visual practice approach. They were instructed to fly the Global Positioning System (GPS) approach to runway 11R, then circle to land runway 4. The throttle was pulled back to idle to simulate a left engine failure. The student correctly identified and verified the engine and the CFI set zero thrust on the left engine while continuing on the right downwind for runway 4.

The CFI said that at that time he noticed that they had lost altitude when at midfield downwind for runway 4. The airplane continued losing altitude until about 500 and 650 feet above ground level (AGL). The CFI took the controls in response to the altitude loss and attempted to add power to the left engine and operative right engine with no noted increase in power from either engine. When they approached the right base turn for runway 4, the CFI began searching for a place to put the airplane down for a forced landing. The airplane, as the CFI could best estimate, was at about 400 feet agl at this time and sinking rapidly with partial controllability to maneuver the airplane to where it finally impacted the trees.

Examination of the accident site by a Federal Aviation Administration (FAA) inspector and a representative from Piper Aircraft revealed that the airplane was impaled on a large tree limb

that penetrated the airplane's floor at the right crew seat position; rising up between the right seat occupant's leg area and exiting the forward cabin door window. The trees in contact with the airplane were also in contact with overhead power lines and in turn were providing an electrical charge to the airframe. Power to the residential area was subsequently turned off to allow first responders and investigators to proceed unimpeded and to eliminate a possible ignition source for leaking fuel which pooled in a shallow ditch adjacent to the airplane's left wing. Once the two occupants were removed, the accident site was shut-down for the evening.

The following morning examination of the wreckage revealed that the airplane had come to rest in the upright position. Broken tree limbs came to rest on top of the wreckage. The nose cone was separated and damaged. The left side of the windshield was destroyed. The top and bottom cabin area had impact damage. All engine control levers were full forward. Both control yokes were turned to the right.

The electrical switches on the pilot's left side panel were all in the off position except for the magneto switches which were all in the on position. The flap handle was in the flaps up position. The nose gear was down and in the locked position. The landing gear lever was in the up position. The fuel selector valves were both found in the crossfeed position. Flight control continuity was established from the flight control surfaces to their respective cockpit controls except for impact-related separations.

The pilot reported no anomalies with the airframe and none were noted during the examination.

Both engines were transported to Air & Sea Recovery in Fort Pierce, Florida, for further examination. On May 28, 2010, representatives from the FAA, Teledyne Continental Motors, and Piper Aircraft were present during the examinations.

The right engine was found separated from the airframe and placed on a rack. The three-bladed constant speed propeller remained attached to the crankshaft flange. All of the cylinders and accessories remained attached to the crankcase. The oil dip stick revealed oil present in the engine. All damage observed was consistent with the impact. The fuel manifold valve exhibited a lead seal and was safety wired. The fuel manifold valve was disassembled and a liquid with an odor consistent with that of aviation fuel was observed. The fuel manifold valve screen exhibited no obstructions or debris. No indication of fuel leakage was observed in the vent chamber side of the diaphragm. No damage was observed to the fuel manifold valve body or diaphragm, and the plunger and diaphragm retaining nut were tight and secure. The exhaust system was damaged. The induction system was intact. The impulse coupling engagement was observed from both left and right magnetos and a blue spark was observed at all ignition leads when the crankshaft was turned by hand with the propeller.

The ignition harness was intact. The top spark plugs exhibited normal operating signatures in accordance with the Champion Aviation Check-a-Plug comparison chart. The bottom spark plugs were inspected using a light borescope and exhibited normal operating signatures in

accordance.

The fuel pump mixture control cable remained attached to the fuel pump mixture control lever, which exhibited damage. The fuel pump mixture control lever was observed near the mid-travel position, and moved freely by hand. The fuel pump was removed from the engine and examined. An undetermined quantity of liquid with an odor consistent with that of aviation fuel was observed when the fuel pump outlet fuel line was removed. No indication of water in the liquid was observed when water indication paste was applied. The fuel pump drive shaft rotated freely when turned by hand. The fuel pump drive coupling was intact. A lead seal and safety wire were present. The fuel pump functioned through its full range of operation when the fuel pump drive shaft was turned using a hand tool.

The right propeller governor control cable remained attached to the propeller governor control arm, which was observed near the mid-travel position. All three blades were loose in the hub, and exhibited leading edge damage. Propeller blade number 3 exhibited a twisting bend. The inspection of the engine did not reveal any anomalies that would have prevented the ability to produce rated horsepower.

The left engine was found separated from the airframe and placed on a rack. The three-bladed constant speed propeller remained attached to the crankshaft flange. All of the cylinders and accessories remained attached to the crankcase. The oil dip stick revealed oil present in the engine. All damage observed was consistent with the impact. The fuel manifold valve exhibited a lead seal and was safety wired. The fuel manifold valve was disassembled and a liquid with an odor consistent with that of aviation fuel was observed. The fuel manifold valve screen exhibited no obstructions or debris. No indication of fuel leakage was observed in the vent chamber side of the diaphragm. No damage was observed to the fuel manifold valve body or diaphragm, and the plunger and diaphragm retaining nut was tight and secure. The exhaust system was damaged. The induction system was intact. The impulse coupling engagement was observed from both left and right magnetos and a blue spark was observed at all ignition leads when the crankshaft was turned by hand with the propeller.

The ignition harness was intact. The top spark plugs exhibited normal operating signatures.. The bottom spark plugs were inspected using a light borescope and exhibited normal operating signatures.

No anomalies with the engines were noted during the examination.

The airplane was equipped with an engine data monitor (EDM) which was sent to the National Transportation Safety Board’s Vehicle Recorder Division in Washington, DC, for examination. The J.P. Instruments EDM-760 was a panel-mounted gauge that the operator could monitor and record up to 24 parameters related to twin engine operations.

The accident flight data, covered a time period from 13:23:44 to 14:37:22. Five power cycles

were recorded in the data and were noted in the plot with “Data On” and “Data Off.” During the flight, two events were recorded that showed power being reduced to the left engine and then subsequently power being reapplied. At the end of the recorded data, the data recorded a power reduction in the right engine. The data did not record a reapplication of power to the right engine prior to the end of the recorded data.

A review of the Pilot’s Operating Handbook, Section 3, Emergency Procedures, Single engine landing, stated in part: “Maintain additional altitude and speed during approach, keeping in mind that landing should be made right the first time and that a go-around should be avoided if at all possible. A final approach speed of 91 knots indicated air speed (KIAS) and the use of 25-degree rather than full wing flaps will place the airplane in the best configuration for a go-around should this be necessary. Under some conditions of loading and density altitude a go-around may be impossible, and in any event the sudden application of power during single engine operation makes control of the airplane more difficult. A single engine go around should be avoided if at all possible.”

In addition, under Section 4, Normal Procedures, Paragraph 4.50 VSSE-Intentional one engine inoperative speed: “Vsse is a speed selected by the aircraft manufacturer as a training aid for pilots in the handling of multi-engine aircraft. It is the minimum speed for intentionally rendering one engine inoperative in flight. This minimum speed provides a margin the manufacturer recommends for use when intentionally performing engine inoperative maneuvers during training in the particular airplane. The intentional one engine inoperative speed, Vsse, for the Seneca II is 76 KIAS.”

Paragraph 4.51, VMC-Minimum Single Engine Control Speed: “Vmc is airspeed below which a twin-engine aircraft cannot be controlled in flight with one engine operating at takeoff power and the other engine wind milling. Vmc for the Seneca II has been determined to be 66 KIAS. Under no circumstances should an attempt be made to fly at a speed below this Vmc with only one engine operating. As a safety precaution, when operating under single-engine flight conditions either in training or in emergency situations, maintain an indicated airspeed above 76 KIAS, Vsse. Reduce airspeed approximately 1 knot per second until Vmc is reached.

The Vmc demonstration required for the FAA flight test for the multi-engine rating approaches an uncontrolled flight condition with power reduced on one engine. The demonstration should not be performed at an altitude of less than 3500 feet above the ground. Initiate recovery during the demonstration by immediately reducing power on the operating engine and promptly lowering the nose of the airplane to accelerate to Vsse.”

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	28,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	January 20, 2010
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	December 20, 2008
Flight Time:	1928 hours (Total, all aircraft), 18 hours (Total, this make and model), 1758 hours (Pilot In Command, all aircraft), 120 hours (Last 90 days, all aircraft), 60 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Commercial; Private	**Age:**	22,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	February 22, 2010
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	February 18, 2010
Flight Time:	223 hours (Total, all aircraft), 0 hours (Total, this make and model), 147 hours (Pilot In Command, all aircraft), 9 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N103GK
Model/Series:	PA-34-200T	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	347970330
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	January 12, 2010 Annual	**Certified Max Gross Wt.:**	4570 lbs
Time Since Last Inspection:	15 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	5640 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-360 SER
Registered Owner:	LOIS AVIATION LLC	**Rated Power:**	225 Horsepower
Operator:	Paris Air, Inc	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	VRB,24 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	40°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.05 inches Hg	**Temperature/Dew Point:**	16°C / 2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Vero Beach, FL (VRB)	**Type of Flight Plan Filed:**	None
Destination:	Vero Beach, FL (VRB)	**Type of Clearance:**	None
Departure Time:	13:20 Local	**Type of Airspace:**	

Airport Information

Airport:	Vero Beach Municipal Airport VRB	**Runway Surface Type:**	
Airport Elevation:	24 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Serious	**Latitude, Longitude:**	27.655555,-80.417778(est)

Administrative Information

Investigator In Charge (IIC):	Wilson, Ralph
Additional Participating Persons:	Frank Rios; FAA/FSDO; Orlando, FL Rodney M Martinez; Continental Engines; Mobile, AL Ron Maynard; Piper Aircraft Company; Vero Beach, FL
Original Publish Date:	November 17, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=75444