Aviation Investigation Final Report

Location:	Dixie, Georgia	**Accident Number:**	ERA12FA017
Date & Time:	October 8, 2011, 14:50 Local	**Registration:**	N41907
Aircraft:	Luscombe 8A	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that he noted the engine oil temperature rising during cruise flight. He elected to reduce power and fly to the nearest airport. While en route, at an altitude of about 1,000 feet above ground level and a distance of 4 miles, the engine experienced a catastrophic failure. The pilot landed the airplane on an open field; however, he could not stop the airplane on the remaining surface and it impacted two trees in a wooded area beyond the field.

A postaccident examination revealed that the No. 2 cylinder piston connecting rod had separated from the crankshaft. One of the bolts securing the rod cap was missing. The bolt and nut were recovered from internal engine debris; however a safety cotter pin necessary to secure the bolt was not located. About 20 engine-operating hours before the accident, all of the engine's the piston connecting rod bearings and their respective bolts and nuts were replaced. Thus, it is likely that at that time one of the two nuts was not properly secured with a cotter pin on the No. 2 cylinder piston connecting rod, allowing the nuts to slowly unthread over time.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Maintenance personnel's improper installation of the No. 2 cylinder's connecting rod, which resulted in the disconnection of the rod and a subsequent loss of engine power.

Findings

Aircraft	Recip eng cyl section - Incorrect service/maintenance
Aircraft	(general) - Failure

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Enroute-cruise	Loss of engine power (total) (Defining event)
Emergency descent	Off-field or emergency landing
Emergency descent	Collision with terr/obj (non-CFIT)

HISTORY

On October 8, 2011, about 1450 eastern daylight time, a Luscombe 8A, N41907, sustained substantial damage when it impacted trees during a forced landing following a total loss of engine power near Dixie, Georgia. The pilot received serious injuries and the passenger was fatally injured. Visual meteorological conditions prevailed at the time and no flight plan was filed for the Title 14 Code of Federal Regulations, Part 91 personal flight. The flight originated from the Thomasville Regional Airport (TVI), Thomasville, Georgia, earlier that day, about 1420.

The pilot stated that he and his passenger departed from Flying Harness Farms Airport (37FL), Bell, Florida at about 0830 that Saturday for the TVI fly-in. The flight was unremarkable. He checked the weather and noted the unfavorable weather conditions were going to develop and decided to depart TVI early. The planned return flight to 37FL departed around 1420. About 20 minutes into the flight while cruising at 1500 feet above ground level (agl), the pilot noted the engine oil temperature was rising. It was increasing above the normal operating temperature that he was accustomed to. Once the engine temperature passed the 200 degree point, he checked the onboard GPS for the nearest airport to land and elected a direct course to Jefferson Landing Airport (74FL), Monticello, Florida (15 miles away from their present location). The pilot reduced engine power to curtail the rising oil temperature. He noted the engine oil temperature continued to rise and reached 240 degrees. He recalls telling his passenger that they may have to do a forced landing. When they were about 4 miles from 74FL, the engine started knocking and increased in intensity until it “Blew Up.” A white cloud of smoke came out of the engine cowling area and into the cockpit and the engine stopped producing power.. He switched the magnetos off and turned the cockpit fuel selector valve to the off position. The airplane was about at a 1000 feet agl when the engine blew up. He maneuvered the airplane to an open field that he saw below. The airplane had too much energy to land on the remaining surface and he flew between two trees at the edge of the forest, in the hope of reducing speed and energy.

The airplane impacted the trees, separating the right wing and the airplane came to rest on its right side. The pilot and passenger remained in the wreckage. The pilot was able to call for assistance with his cell phone and directed the emergency personnel to their location.

PERSONNEL INFORMATION

The pilot, age 71, held a private pilot certificate with ratings for airplane single engine. He was issued a third-class medical certificate on March 03, 2011, with limitation of must have available glasses for near vision. He documented 1400 total hours at that time.

AIRCRAFT INFORMATION

The Luscombe 8A was built in 1941, serial number 1868, and was issued a standard airworthiness certificate and registered in the normal category. The airplane is high wing, two place, side-by-side seating, design, and incorporated a tail wheel gear configuration. The airplane was equipped with a Continental A-65 engine, which was converted to 75 horsepower with a McCauley fixed two bladed propeller. A review of the airplane's maintenance records revealed the airplane had an annual inspection on the airframe, propeller, and engine on November 12, 2010, at which time the airplane had accumulated a total of 2,289 hours.

METEOROLOGICAL INFORMATION

The closest official weather observation was at the Valdosta Regional Airport (VLD), Valdosta, Georgia, 21 miles east of the accident site. The VLD October 8, 2011, 1453 automated weather observing system (AWOS) was wind from 060 degrees at 6 knots; gusting 17 knots; visibility, 10 statute miles; scattered 3800; broken 4700; temperature 27 degrees Celsius (C); dew point 17 degrees C; altimeter 30.17 inches of mercury.

WRECKAGE and IMPACT INFORMATION

The airplane's right wing separated from the fuselage, ripping open the cockpit roof section when it impacted a tree. The right side of the fuselage impacted the ground. The left wing buckled at the wing root to fuselage section and bent forward, coming to rest parallel and on top of the left side of the fuselage. The main wreckage came to rest about 30 feet forward of the impacted trees.

A post recovery wreckage examination was conducted by the National Transportation Safety Board (NTSB). A 6 inch diameter section from the top crankcase flange area, between the number 2 and 1 cylinder, had separated exposing the piston rods and crankshaft section. The engine teardown examination discovered that the number 2 cylinder piston connecting rod and cap assembly had separated from the crankshaft. On one side of the cap, a fractured section of the rod that was still attached by the bolt and nut, with the safety cotter key installed. On the other side of the cap, the bolt and nut were missing, which were located among the fragments and engine debris pieces recovered from the engine's oil sump. The safety cotter key for that bolt and nut assembly was not located. The damaged number 2 cylinder piston rod assembly and an exemplar piston rod assembly from the same engine were sent to the NTSB Material Laboratory for further examination.

MEDICAL AND PATHOLOGICAL INFORMATION

The Georgia Bureau of Investigation, Division of Forensic Sciences in Decatur, Georgia, conducted a postmortem examination of the passenger. The cause of death was multiple blunt force trauma.

TEST AND RESEARCH

The airplane's engine maintenance records reflected that on November 12, 2010, the engine was removed due to aluminum particles found in the engine oil screen and that the number 2 cycler piston pin plug haddisintegrated. All the crankshaft bearings were replaced with new bearing and "replaced all rod bolts and nuts" among other components replaced before the engine was re-installed on the airplane. The maintenance entry showed that the engine had a total of 32 hour since major overhaul (SMOH) at that time. The pilot stated that the engine had accumulated about 20 hours of operation since November 12th repair.

The NTSB Material Laboratory examination revealed the damaged piston connecting rod assembly was deformed and had sustained considerable damage to the crankshaft attachment end. The microscope examination revealed a region with a flat fracture surface exhibiting crack arrest fronts consistent with a fatigue fracture. The mating fracture surface attached to the cap had a similar flat fracture region with the crack arrest fronts. The fracture origin areas were diffuse with no apparent defects and were consistent with fatigue fracture.

A Lowrance AIRMAP 1000 GPS was recovered from the wreckage and sent to the NTSB Vehicle Recorder Laboratory for data retrieval. The unit only captured latitude and longitude data, which was recorded in chronological order. The accident flight was recorded as it circled onto an opened field and stopped in a wooden area.

Pilot Information

Certificate:	Private	**Age:**	71,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	March 4, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	January 23, 2011
Flight Time:	1400 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Luscombe	**Registration:**	N41907
Model/Series:	8A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	1869
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	November 12, 2010 Annual	**Certified Max Gross Wt.:**	1260 lbs
Time Since Last Inspection:	20 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2283 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	C91 installed, not activated	**Engine Model/Series:**	A&C65 SERIES
Registered Owner:	On file	**Rated Power:**	75 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	VLD,203 ft msl	**Distance from Accident Site:**	26 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	90°
Lowest Cloud Condition:	Scattered / 3800 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 4700 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots / 17 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	60°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.17 inches Hg	**Temperature/Dew Point:**	27°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Thomasville, FL (TVI)	**Type of Flight Plan Filed:**	VFR
Destination:	Bell, FL (37FL)	**Type of Clearance:**	None
Departure Time:	14:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 Serious	**Latitude, Longitude:**	30.784444,-83.637222

Administrative Information

Investigator In Charge (IIC):	Obregon, Jose
Additional Participating Persons:	James R Massey; FAA/FSDO; Atlanta, GA
Original Publish Date:	July 18, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=82017