Aviation Investigation Final Report

Location:	Dalton, Georgia	**Accident Number:**	ERA12FA423
Date & Time:	June 30, 2012, 16:20 Local	**Registration:**	N33CG
Aircraft:	Piper PA-31P	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

According to a friend of the pilot, the pilot was taking the airplane to have an annual inspection completed. The friend assisted the pilot before departure and watched as the airplane departed. He did not notice any anomalies with the airplane during the takeoff or the climbout. According to a witness in the vicinity of the accident site, he heard the airplane coming toward him, and it was flying very low. He looked up and saw the airplane approximately 200 feet over his house and descending toward the trees. As he watched the airplane, he noticed that the right propeller was not turning, and the right engine was not running. He stated that the left engine sounded as if it was running at full power. The airplane pitched up to avoid a power line and rolled to the right, descending below the tree line. A plume of smoke and an explosion followed.

Examination of the right propeller assembly revealed evidence of significant frontal impact. The blades were bent but did not have indications of rotational scoring; thus they likely were not rotating at impact. One preload plate impact mark indicated that the blades were at an approximate 23-degree angle; blades that are feathered are about 86 degrees. Due to fire and impact damage of the right engine and related system components, the reason for the loss of power could not be determined. An examination of the airframe and left engine revealed no mechanical malfunctions or failures that would have precluded normal operation.

A review of the airplane maintenance logbooks revealed that the annual inspection was 12 days overdue. According to Lycoming Service Instruction No. 1009AS, the recommended time between engine overhaul is 1,200 hours or 12 years, whichever occurs first. A review of the right engine maintenance logbook revealed that the engine had accumulated 1,435 hours since

major overhaul and that neither engine had been overhauled within the preceding 12 years.

Although the propeller manufacturer recommends that the propeller be feathered before the engine rpm drops below 1,000 rpm, a review of the latest revision of the pilot operating handbook (POH) revealed that the feathering procedure for engine failure did not specify this. It is likely that the pilot did not feather the right propeller before the engine reached the critical 1,000 rpm, which prevented the propeller from engaging in the feathered position.

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 airplane control following loss of power in the right engine for reasons that could not be determined because of fire and impact damage. Contributing to the accident was the pilot's delayed feathering of the right propeller following the loss of engine power and the lack of specific emergency procedures in the pilot operating handbook indicating the need to feather the propellers before engine rpm falls below 1,000 rpm.

Findings

Aircraft	(general) - Failure
Not determined	(general) - Unknown/Not determined
Aircraft	Propeller feather/reversing - Incorrect use/operation
Organizational issues	Adequacy of policy/proc - Manufacturer
Personnel issues	Delayed action - Pilot
Aircraft	Altitude - Attain/maintain not possible
Aircraft	(general) - Not serviced/maintained

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) (Defining event)
Emergency descent	Off-field or emergency landing
Emergency descent	Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On June 30, 2012, about 1620 eastern daylight time, a Piper PA-31P, N33CG, collided with terrain while descending following loss of power in one engine shortly after takeoff from Dalton Municipal Airport (DNN), Dalton, Georgia. The private pilot was fatally injured, and the airplane sustained substantial damage by impact forces and postcrash fire. Visual meteorological conditions prevailed, and no flight plan was filed. The personal flight was conducted under 14 Code of Federal Regulations Part 91. The flight originated from DNN at 1615.

According to a friend of the pilot, the pilot was en route to Douglas Municipal Airport (DQH), Douglas, Georgia, to have an annual inspection completed on the airplane. The friend said that he assisted the pilot prior to departure and watched as the airplane departed. He did not notice any anomalies with the airplane during the takeoff or the climbout, it seemed normal.

According to witnesses, they heard an airplane coming towards them, and it sounded like it was flying very low. One witness looked up and saw the airplane 200 feet over his house and descending towards the trees. As he watched the airplane, he noticed that the right propeller was not turning, and the engine was not running. He went on to say that the left engine sounded as if it was running at full power. The airplane pitched up to avoid a power line and rolled to the right, descending below the tree line. A plume of smoke and an explosion followed.

PERSONNEL INFORMATION

The pilot, age 52, held a private pilot certificate for airplane single-engine land and multi-engine land with instrument airplane issued August 8, 1998, and a third-class airman medical certificate issued on May 1, 2012, with limitations for corrective lenses. Review of the pilot's logbook revealed that he accumulated 1,614 flight hours as pilot in command and a total of 1,132 multi-engine flight hours as of June 16, 2012. Further review of the current logbook showed 155 multi-engine flight hours were completed during the 6 years before the accident.

AIRCRAFT INFORMATION

The six-seat, low-wing, retractable-gear airplane, serial number 31P-7300157, was manufactured in 1973. It was powered by two Lycoming TIGO-541-E1A 310-hp engines equipped with Hartzell HC-C3YN-2LUF hubs and FJC9684-3R blades. This type propeller is a 3-blade single-acting, hydraulically operated, constant-speed model with feathering capability. Oil pressure from the propeller governor is used to move the blades to the low pitch blade angle direction. A spring, counterweights, and an air charge move the blades to the high pitch/feather direction in the absence of governor oil pressure. The propeller incorporates a start lock mechanism that holds the blades at a low blade angle during engine start. Propeller rotation is counterclockwise
as viewed from the rear.

Review of copies of maintenance logbook records showed an annual inspection was completed June 18, 2011, at a recorded Hobbs reading of 981.5 hours, airframe total time of 4445.6 hours. The left engine was overhauled on November 10, 1998, and its time since major overhaul as of June 18, 2011, was 580.8 hours. The right engine was overhauled on October 28, 1988, and its time since major overhaul as of June 18, 2011, was 1,435 hours. According to the Lycoming service instruction No. 1009AS, 1,200 hours are recommended between overhaul, and all engines that do not accumulate the hourly period of time between overhauls are recommended to be overhauled in the 12th year. The tachometer and the Hobbs hour-meter were not observed at the accident site.

According to the airport manager at the Taylor County Airport (AAS), Campbellsville, Kentucky, the pilot took on fuel on June 24, 2012, but he fueled his own airplane, and no records were recovered showing the amount of fuel that received. The pilot did not refuel at the airport on the day of the flight. Video footage showed the airplane climbout normally prior to the accident.

METEOROLOGICAL INFORMATION

The reported weather at DNN, which was located about 2 miles east of the accident site, at an elevation 709 feet, at 1615, was: winds calm, visibility 10 statute miles; clear skies; temperature 39 degrees Celsius (C); dew point 15 degrees C; altimeter 29.87 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane was examined at the accident site on June 30 and July 1, 2012. The accident site was located about 2 miles west of the runway 14 in a wooded area with varied tree heights up to about 80 feet. The airplane came to rest upright in a flat attitude on a course of about 102 degrees. The cockpit, cabin, and everything forward of the empennage and wings were fire-damaged. A series of tree strikes were observed about 50 feet above the ground, south of the main wreckage. All major flight components were accounted for at the accident site. Continuity of the flight controls could not be manipulated but were verified to their respective

flight control surfaces.

The instrument panel was totally destroyed by impact and post impact ground fire. No useful information was acquired from any instrumentation. The engine power controls quadrant was separated from the instrument panel. The controls preimpact positions could not be reliably verified due to impact and post impact fire damage of the components.

The cockpit section from the instrument panel area aft to the rear pressure bulkhead was breached and completely destroyed by ground impact and post impact ground fire. All windows and seats were destroyed by fire. No seat restraints were noted or located. Seat tracks were damaged or destroyed by impact and post impact fire. All doors were destroyed by impact and post impact ground fire. Viewable doors were noted to have the locking pins extended.

The fuel selector valves were located, the left valve was heat-damaged, and the right valve was heat-damaged and exhibited some molten metal adhering to it. Due to the impact damage of the fuel valves, the preimpact position of the fuel tank selection could not be determined. The left and right control wheels were separated from the panel and severely damaged by impact and the post impact fire. The rudder pedals were impact and fire damaged and could not be manipulated; control cables were noted in the vicinity of the pedals. Impact damage prevented fully tracing control cable continuity to the forward cabin area. The landing gear selector and flap selector were each noted in the up position. The nose gear was located under the cabin section and impact- and fire damaged.

The left wing was separated from the fuselage attachment. It was completely destroyed by impact and the post impact fire. The outboard section was located in tree approximately 105 feet behind the main wreckage. The landing gear and a portion of the flap, which were in the up position, were attached and destroyed by post impact fire. All fuel tanks were breached and destroyed by post impact fire. All viewable fuel caps appeared in the closed, locked position. Aileron cables were traced from overload separation point to the cabin area.

The right wing was separated from the airframe. It was destroyed by impact and the post impact fire. The landing gear and flap remnant were attached and were noted to be in the up position. Both were destroyed by post impact fire. All fuel tanks were breached and destroyed by post impact fire. All viewable fuel caps appeared in the closed, locked position. Control cable continuity was traced to the wing root separations and from there to the cabin area. The aileron trim drum indicated that the tabs were trailing-edge-down.

The vertical fin was noted to be attached to the tail cone. It was impact-and fire-damaged. The rudder remained attached to the vertical fin and exhibited impact damage and post impact fire damage. It was positioned to the left of vertical fin center line with the trim tab off-set to the right. Control cable continuity was traced from the cable breaks to the rudder and from the breaks forward. Rudder movement was noted when the rudder cables were manipulated at the cable breaks. The ELT was noted in the wreckage, and it was destroyed by post impact fire.

The left and right horizontal stabilizers showed impact and post impact fire damage. The elevators were attached. The left horizontal and elevator were bent upward, and both elevator trim tabs were trimmed down. No airframe preimpact anomalies were noted during the on-site inspection.

Examination of the right engine revealed it remained attached to the right wing nacelle assembly frame. The propeller was broken away from the engine gear drive. All of the cylinders remained attached to the crankcase. The accessories on the engine were fire-damaged. The exhaust and induction systems exhibited damage. Both magnetos were fire-damaged and were separated from the engine. The top spark plugs were removed, and their electrodes were intact and exhibited normal operating signatures in accordance with the Champion aviation check-a-plug comparison chart.

The fuel pump exhibited fire damage. The fuel pump drive gear was removed, and its respective coupling was intact. The crankshaft was turned, and the fuel pump gear rotated accordingly.
The fuel manifold was fire-damaged, and the intake tubes were crushed. The throttle fuel control assembly exhibited fire damage. The throttle plate position was unreliable due to fire damage. No fuel was noted within the fuel system. All cylinders were inspected using a lighted borescope. The piston heads did not exhibit damage. The turbocharger exhibited impact and fire damage. The turbocharger was fire and impact damaged and remained attached to the engine. The turbocharger drive shaft partially rotated by hand. The wastegate assembly exhibited fire damage. The wastegate valve was observed in approximately the half-open position. The vacuum pump was separated from the engine and exhibited impact damage. No anomalies were noted during examination of the right engine.

Examination of the left engine revealed it remained attached to the left wing nacelle assembly frame. The propeller was broken away from the engine gear drive. All of the cylinders remained attached to the crankcase. The accessories on the engine were fire-damaged. The exhaust and induction systems exhibited damage. Both magnetos were fire-damaged and were separated from the engine. The engine sump was melted away from the case, and the engine could not be rotated. The top spark plugs were removed, and their electrodes were intact and exhibited normal operating signatures in accordance with the Champion aviation check-a-plug comparison chart.

The fuel pump exhibited fire damage. The fuel pump drive gear was removed, and its respective coupling was intact. The crankshaft was unable to be turned due to fire and impact damage. The fuel manifold was fire-damaged, and the intake tubes were crushed. The throttle fuel control assembly exhibited fire damage. The throttle plate position was unreliable due to fire damage.
No fuel was noted within the fuel system. All cylinders were inspected using a lighted borescope. The piston heads did not exhibit damage. The turbocharger exhibited impact and fire damage and was separated from the engine. The turbocharger drive shaft could not be

rotated by hand. The wastegate assembly exhibited fire damage, and the wastegate valve was impact-damaged. The vacuum pump was separated from the engine and exhibited impact damage. No anomalies were noted after examination of the right engine.

Examination of the left propeller assembly revealed that the piston/cylinder assembly had separated from the propeller and was missing. The spinner dome was severely damaged due to frontal impact. Blade damage included multiple bends, rotational scoring, twisting, and leading edge damage consistent with rotation with power ON at the time of impact. An estimate of power output could not be determined. There were no anomalies noted that would preclude normal operation. All damage was consistent with impact damage.

Examination of the right propeller assembly revealed evidence of significant frontal impact. The blades were bent but did not have indications of rotational scoring. One preload plate impact mark indicated that the blades were at an approximate 23-degrees blade angle, which is consistent with the start lock blade angle position. There were no anomalies noted that would preclude normal operation. All damage was consistent with impact damage.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was conducted by the Division of Forensic Sciences, Georgia Bureau of Investigation, Georgia. The cause of death was reported as blunt force injuries.

The FAA's Civil Aerospace Medical Institute performed forensic toxicology on specimens from the pilot. The report stated no carbon monoxide, cyanide or ethanol was detected in the blood. According to the FAA medical examiner, 10.18 (ug/ml, ug/g) Acetaminophen was detected in Blood. This over-the-counter analgesic medication is used to treat aches and pains as well as fever. The report stated that 0.079 (ug/mL, ug/g) Dihydrocodeine was detected in Liver. Dihydrocodeine is a prescription medication that is a semi-synthetic opioid analgesic (pain control). It is also is a Metabolite of Hydrocodone. The report stated that Dihydrocodeine was not detected in Blood, 0.195 (ug/ml, ug/g) Hydrocodone was detected in Liver and 0.079 (ug/ml, ug/g) Hydrocodone was detected in Blood. This prescription medication is an opioid analgesic (pain control) and antitussive (cough control). Metabolites include Hydromorphone and Dihydrocodeine, and may impair mental and/or physical ability.

ADDITIONAL INFORMATION

A review of the pilot operating handbook (revision date December 4, 1981), revealed in the Emergency Procedures section 3; Engine Failure During Takeoff (101 KIAS or above), Engine Failure During Takeoff (Below 101 KIAS), Engine Failure During Climb, Engine Failure During Flight (Below 83 KIAS), Engine Failure During Flight (Above 83 KIAS), Single Engine Landing, and Single Engine Go-Around did not have the feathering procedure nor did it have the Engine Securing Procedure in any of the task. The Engine Securing Procedure (Feathering Procedure) advises the pilot that the propellers must be feathered before (1,000 rpm minimum).

A review of the latest revision (revision date November 1, 2001) of the pilot operating handbook revealed no mention of feathering the propellers before (1,000 rpm minimum).

Pilot Information

Certificate:	Private	**Age:**	52,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 16, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1685 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N33CG
Model/Series:	PA-31P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal; Restricted (Special)	**Serial Number:**	31P-7300157
Landing Gear Type:		**Seats:**	8
Date/Type of Last Inspection:	July 1, 2011 Annual	**Certified Max Gross Wt.:**	6500 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	LYCOMING
ELT:	C91 installed, not activated	**Engine Model/Series:**	TIGO-541SER
Registered Owner:	HOLBROOK DONALD L	**Rated Power:**	400 Horsepower
Operator:	HOLBROOK DONALD L	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	DNN,709 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	16:15 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.87 inches Hg	**Temperature/Dew Point:**	39°C / 15°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Dalton, GA (DNN)	**Type of Flight Plan Filed:**	None
Destination:	Dalton, GA (DNN)	**Type of Clearance:**	None
Departure Time:	16:15 Local	**Type of Airspace:**	

Airport Information

Airport:	Dalton Municipal Airport DNN	**Runway Surface Type:**	
Airport Elevation:	709 ft msl	**Runway Surface Condition:**	
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:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 Fatal	**Latitude, Longitude:**	34.726943,-84.887222

Administrative Information

Investigator In Charge (IIC):	Alleyne, Eric
Additional Participating Persons:	Don W Brown; FAA/FSDO; Atlanta, GA Michael Childers; Textron Lycoming; Williamsport, PA Ronald Maynard; Piper; Vero Beach, FL Thomas McCreary; Hartzell Propeller; Piqua, OH
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