Aviation Investigation Final Report

Location:	New Smyrna Beac, Florida	**Accident Number:**	CHI07LA167
Date & Time:	June 7, 2007, 16:45 Local	**Registration:**	N15156
Aircraft:	Piper PA-34-200	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Minor, 1 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The certified flight instructor (CFI) reported that they were about to practice an engine failure at 6,000 feet mean sea level (msl). Upon shutting off fuel with the right fuel selector valve, a propeller blade separated from the right engine, and an unknown part penetrated the windshield. The CFI reported that the right engine "came almost completely apart and off in a matter of two seconds." The right engine was canted and hanging down, and altitude could not be maintained. The CFI maintained sufficient airspeed to maintain control during the descent, but he elected to do a forced landing to a field as a result of the loss of altitude. The airplane impacted the side of a creek during the forced landing, and ended right side up in about three feet of water in a creek. The Hartzell two bladed propeller hub and other components from the propeller assembly were sent to the National Transportation Safety Board's (NTSB) Materials Laboratory for examination. The hub from the right engine of the airplane was a left hand rotating (counterclockwise viewed from the rear) propeller. The inspection revealed that the hub was fractured around the socket for blade #1 (designated by serial number location) through both the forward and aft halves of the hub. The fracture surface contained features consistent with fatigue crack progression generally away from the grease fitting hole. The entire fatigue region measured about 3.1 inches in length from the grease fitting hole to near the forward centerline of the blade socket. On September 17, 2007, Hartzell Propeller Inc., issued an Alert Service Bulletin "HC-1SB-61-297, Propeller Hub Inspection." The bulletin stated in part: (1) There was a recent blade separation event originating in the lubrication hole located on the shoulder of the hub blade socket installed in a "left-hand" rotating propeller. (2) This Alert Service Bulletin introduces an initial and repetitive eddy current inspection of the area around the lubrication holes on "left-hand" rotating propellers on certain aircraft models.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The propeller blade separation from the propeller hub due to a fatigue fracture of the hub while in cruise flight. A factor was the embankment.

Findings

Occurrence #1: PROPELLER FAILURE/MALFUNCTION
Phase of Operation: CRUISE - NORMAL

Findings
1. (C) PROPELLER SYSTEM/ACCESSORIES,HUB - FATIGUE
2. (C) PROPELLER SYSTEM/ACCESSORIES,HUB - SEPARATION

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
3. (F) TERRAIN CONDITION - DIRT BANK/RISING EMBANKMENT
4. TERRAIN CONDITION - WATER

Factual Information

On June 7, 2007 at approximately 1645 eastern daylight time, a Piper PA-34-200, N15156, sustained substantial damage during a forced landing following an in-flight propeller separation near New Smyrna Beach Municipal Airport (EVB), New Smyrna Beach, Florida. The 14 Code of Federal Regulations Part 91 instructional flight departed Daytona Beach International Airport (DAB), Daytona Beach, Florida, at approximately 1545 for a local instructional flight. The certified flight instructor (CFI) was not injured. The student pilot and one passenger received minor injuries. Visual meteorological conditions prevailed at the time of the accident. No flight plan was filed.

The CFI reported that they were about to practice an engine failure during cruise flight at 6,000 feet mean sea level (msl). Upon shutting off fuel with the right fuel selector valve, a propeller blade separated from the right engine, and an unknown part penetrated the windshield. The CFI reported that the right engine "came almost completely apart and off in a matter of two seconds." The right engine was canted and hanging down, and altitude could not be maintained. The CFI declared an emergency and attempted to fly to EVB, which was 4 - 6 miles away. The drag on the right engine dictated a descending right hand turn. Controlled flight was maintained by using full aileron, full rudder input, and retarded power on the left engine. The CFI maintained sufficient airspeed to maintain control during the descent, but he elected to do a forced landing to a field as a result of the loss of altitude. He reported that he lowered the landing gear at 1,000 to 1,500 feet above ground level (agl), and brought the power to idle during the flare with the airspeed about 100 mph. The airplane impacted the side of a creek during the forced landing, and ended right side up in about three feet of water in the creek about 1/2 mile from EVB. The crew immediately departed the airplane and made their way to shore.

The Lycoming LIO-360-C1E6 engine was shipped to Textron Lycoming for an engine teardown inspection. The engine logbook indicated that the last engine overhaul had been accomplished on November 1, 1996, and had accumulated approximately 5,405 hour since the last overhaul. The manufacturer's recommended time between overhaul (TBO) was 2,000 hours time in service since new or previous overhaul. The engine disassembly inspection revealed no pre-impact abnormalities or mechanical malfunctions. However, most of the counterweight bushings were worn out of limits, but the counterweight bushings exhibited no signs of failure.

The Hartzell two bladed propeller hub and other components from the propeller assembly model HC-CYR-2CLGUF, serial number AU1465E, were sent to the National Transportation Safety Board's (NTSB) Materials Laboratory for examination. The propeller logbook indicated the propeller was overhauled on May 21, 2001, but the accumulated time in service since the overhaul was not determined from the maintenance records. The hub from the right engine of

the airplane was a left hand rotating (counterclockwise viewed from the rear) propeller. The hub design was the same for either right or left hand rotating propellers. The locations of the grease fittings indicated that the hub was manufactured prior to 1983 when the location of the grease fitting was moved. The chamfer at the inside edge of the fitting hole indicated that the hub had been modified per applicable service bulletin HC-SB-61-213 and subsequent overhaul manual (Manual 202A) revisions.

The inspection revealed that the hub was fractured around the socket for blade #1 (designated by serial number location) through both the forward and aft halves of the hub. The fractures intersected the grease fitting holes in both the forward and aft hub halves. The examination of the fracture surface revealed a smoother faceted region on the forward half adjacent to the forward side of the grease fitting hole. The faceted region was lighter in color than the remainder of the fracture and contained features consistent with fatigue crack progression generally away from the grease fitting hole. The entire fatigue region measured about 3.1 inches in length from the grease fitting hole to near the forward centerline of the blade socket.

On September 17, 2007, Hartzell Propeller Inc., issued an Alert Service Bulletin "HC-1SB-61-297 Propeller Hub Inspection." The bulletin stated in part:

(1) There was a recent blade separation event originating in the lubrication hole located on the shoulder of the hub blade socket installed in a "left-hand" rotating propeller.

(2) This Alert Service Bulletin introduces an initial and repetitive eddy current inspection of the area around the lubrication holes on "left-hand" rotating propellers on certain aircraft models.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	25,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 multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	June 1, 2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 1, 2006
Flight Time:	1430 hours (Total, all aircraft), 530 hours (Total, this make and model), 1330 hours (Pilot In Command, all aircraft), 220 hours (Last 90 days, all aircraft), 70 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Private	**Age:**	27,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:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 1, 2007
Flight Time:	245 hours (Total, all aircraft), 25 hours (Total, this make and model), 150 hours (Pilot In Command, all aircraft), 80 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N15156
Model/Series:	PA-34-200	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	34-7350028
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	March 1, 2007 Annual	**Certified Max Gross Wt.:**	4200 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	5605 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	LIO-360-C1E6
Registered Owner:	David L. Alber Sr. & Susan Alber	**Rated Power:**	200 Horsepower
Operator:	Cloud Dancer Aviation	**Operating Certificate(s) Held:**	None
Operator Does Business As:	Flight Training Academy	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KEVB,10 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	16:39 Local	**Direction from Accident Site:**	250°
Lowest Cloud Condition:	Scattered / 3000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	120°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	29°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	DAYTONA BEACH, FL (DAB)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	VFR
Departure Time:	15:45 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Minor, 1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor, 1 None	**Latitude, Longitude:**	29.050556,-80.958335

Administrative Information

Investigator In Charge (IIC):	Silliman, James
Additional Participating Persons:	Frank E Weber; FAA Orlando FSDO; Orlando, FL Tom McCreary; Hartzell Propellers Inc.; Piqua, OH Greg Erikson; Textron Lycoming; Wayne, IL
Original Publish Date:	March 31, 2008
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=65977