Aviation Investigation Final Report

Location:	Athens, Georgia	**Accident Number:**	NYC08LA112
Date & Time:	February 26, 2008, 16:45 Local	**Registration:**	N623CQ
Aircraft:	Beech A36	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

After takeoff on the first flight following a propeller overhaul, the airplane was leveled at 7,000 feet, and as the pilot and pilot-rated passenger discussed engine management, they noted the propeller rpm was high. They diverted to an alternate destination, and notified air traffic control (ATC). The propeller was adjusted but continued to overspeed. The pilot rated passenger managed engine and propeller rpm while the pilot flew the airplane at the manufacturer's best glide speed of 110 knots, but the engine continued to overspeed as the propeller provided no thrust. As propeller thrust and altitude decayed, the airplane descended through a cloud layer. When the airplane broke out beneath the cloud layer, the pilot selected a field for a forced landing area due to the fact that the surrounding terrain was wooded. Upon touchdown, the airplane bounced, the nose gear collapsed, and the airplane skidded to a stop. The pilot and pilot rated passenger stated that prior to the accident flight an annual inspection was completed and a newly overhauled propeller was installed. Disassembly of the propeller system after the accident revealed the rear pitch change rod bushing separated from the rear hub half and became loose in the hub. The bushing displayed traces of bonding sealant; however, the hub bore for the bushing did not. The hub cavity and the area on the aft side of the propeller piston, which are normally dry, contained "significant" amounts of oil. Pressurized oil on both sides of the propeller piston resulted in a hydraulic lock, fixed pitch condition. Using the as-found condition of the accident propeller system, engineers determined that airspeed of 97 knots or slower would be required to create positive thrust from the propeller system. After the accident, the propeller manufacturer revised its inspection and repair criteria, and changed the pitch change rod bushing installation procedure from one that used bonding sealants, to one that required a spiral retaining ring. The use of bonding sealants was no longer permitted.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The loss of propeller thrust due to the unseating of an internal propeller hub bushing. Contributing to the accident was the manufacturer's inadequate procedure to secure the bushing.

Findings

Aircraft	Propeller controlling system - Malfunction
Environmental issues	Rough terrain - Contributed to outcome
Organizational issues	Adequacy of policy/proc - Manufacturer

Factual Information

History of Flight

Enroute-cruise	Powerplant sys/comp malf/fail (Defining event)
Emergency descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On February 26, 2008, at 1645 eastern standard time, a Beech A36, N623CQ, was substantially damaged following a forced landing near Athens, Georgia. The certificated pilot and pilot rated passenger, the aircraft owners, were not injured. Visual meteorological conditions prevailed and an instrument flight rules (IFR) flight plan was filed for the personal flight conducted under the provisions of 14 Code of Federal Regulations Part 91. The airplane departed Gwinnett County Airport (LZU), Lawrenceville, Georgia, and was destined for Charlotte-Douglas International Airport (CLT), Charlotte, North Carolina.

The pilot and pilot rated passenger stated that prior to the accident flight an annual inspection was completed and a newly overhauled propeller was installed. The pilots completed a preflight inspection, engine run-up, and high-speed taxi checks prior to takeoff.

According to the pilot rated passenger, he wanted to fly with the pilot, his new co-owner, because the pilot had just completed training for the A36. The airplane was leveled at 7,000 feet and as they discussed engine management, they noted the propeller rpm was high. They decided to divert to Athens, Georgia, and notified air traffic control (ATC). The propeller was adjusted but continued to overspeed. The pilot rated passenger managed engine and propeller rpm while the pilot flew the airplane, but the engine continued to overspeed as the propeller provided no thrust.

As propeller thrust and altitude decayed, the airplane descended through a cloud layer. When the airplane broke out beneath the cloud layer, the pilot selected a field for a forced landing area due to the fact that the surrounding terrain was wooded. Upon touchdown, the airplane bounced, the nose gear collapsed, and the airplane skidded to a stop.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with a rating for airplane single engine land and instrument airplane. He held a Federal Aviation Administration (FAA) third-class medical certificate which was issued in April 2006. The pilot reported approximately 417 total hours of flight experience, of which 48 hours were in make and model.

The co-owner/pilot rated passenger reported he held a commercial pilot certificate with ratings

for airplane single engine land and instrument airplane. He was issued an FAA third-class medical certificate in August 2006, and he reported 1,736 hours of total flight experience with 1,207 hours in make and model.

AIRCRAFT INFORMATION

According to FAA records, the airplane was a 1978 Beech A36. The airplane had accrued 7,588 aircraft hours. The owners reported the last annual inspection was performed on February 24, 2008, at 7,588 aircraft hours. The accident flight was the first after completion of the annual inspection.

METEOROLOGICAL INFORMATION

At 1558, the weather reported at AHN, 6 miles northeast, included a broken cloud layer at 2,800 feet with an overcast layer at 3,700 feet. The winds were from 280 degrees at 17 knots gusting to 28 knots. The temperature was 6 degrees Celsius, and the dew point was 3 degrees Celsius.

WRECKAGE AND IMPACT INFORMATION

Examination of photographs of the wreckage revealed that the airplane appeared mostly intact. The damage was limited to the separation of the nose landing gear, and buckling of the forward cowling.

TESTS AND RESEARCH

A detailed examination and disassembly of the propeller system was performed by a representative of Hartzell Propeller, Inc., on March 28, 2008, under the supervision of an FAA inspector. According to the Hartzell representative, disassembly of the propeller system revealed the rear pitch change rod bushing separated from the rear hub half and was loose in the hub. The hub cavity and the area on the aft side of the propeller piston, which are normally dry, contained "significant" amounts of oil. The bushing displayed traces of sealant, however, the hub bore for the bushing did not. Locquic and Loctite sealants were prescribed for both the bushing and the bore.

The Hartzell representative stated that pressurized oil on both sides of the propeller piston resulted in a hydraulic lock, a fixed pitch condition. Using the as-found condition of the accident propeller system, Hartzell engineers determined that airspeed of 97 knots or slower would be required to create positive thrust from the propeller system. The pilot reported that the airplane manufacturer's recommended best-glide speed of 110 knots was maintained throughout the descent.

As a result of the investigation, Hartzell Propeller, Inc., published Revision 31 to Standard Practices Manual No. 202A, Volume 3, Aluminum Hub Overhaul, in December 2008. The revision outlines inspection and repair criteria, and modified the pitch change rod bushing

installation that required a spiral retaining ring instead of adhesive bonding.

A caution states, "DO NOT INSTALL A BUSHING BONDED WITH ADHESIVE IN THE HUB. INSTALLING A BUSHING THAT USES AN INTERNAL SPIRAL RETAINING RING IS THE ONLY PROCEDURE PERMITTED."

Pilot Information

Certificate:	Private	**Age:**	47,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	April 13, 2006
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	December 14, 2007
Flight Time:	417 hours (Total, all aircraft), 48 hours (Total, this make and model), 392 hours (Pilot In Command, all aircraft), 39 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft)		

Co-pilot Information

Certificate:	Commercial; Private	**Age:**	49,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
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 3 With waivers/limitations	**Last FAA Medical Exam:**	August 23, 2006
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	December 6, 2006
Flight Time:	1736 hours (Total, all aircraft), 1207 hours (Total, this make and model), 1874 hours (Pilot In Command, all aircraft), 25 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N623CQ
Model/Series:	A36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	E-1382
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	February 24, 2008 Annual	**Certified Max Gross Wt.:**	3700 lbs
Time Since Last Inspection:	0.5 Hrs	**Engines:**	1
Airframe Total Time:	1061 Hrs at time of accident	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO 520 SERIES
Registered Owner:	C & S AVIATION INC	**Rated Power:**	285 Horsepower
Operator:	C & S AVIATION INC	**Operating Certificate(s) Held:**	None
Operator Does Business As:	C&S Aviation	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	AHN,808 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	15:58 Local	**Direction from Accident Site:**	60°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	Broken / 2800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	17 knots / 28 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	280°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.79 inches Hg	**Temperature/Dew Point:**	6°C / 3°C
Precipitation and Obscuration:			
Departure Point:	LAWRENCEVILLE, GA (LZU)	**Type of Flight Plan Filed:**	IFR
Destination:	CHARLOTTE, NC (CLT)	**Type of Clearance:**	IFR
Departure Time:	16:20 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	33.993057,-83.183334

Administrative Information

Investigator In Charge (IIC):	Rayner, Brian
Additional Participating Persons:	Ray Belcher; FAA FSDO; Atlanta, GA Tom McCreary; Hartzell Propeller; Piqua, OH
Original Publish Date:	May 12, 2009
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=67576