



National Transportation Safety Board Aviation Accident Final Report

Location:	Louisburg, NC	Accident Number:	ERA15LA343
Date & Time:	09/06/2015, 1540 EDT	Registration:	N181CS
Aircraft:	DEHAVILLAND DHC-6	Aircraft Damage:	Substantial
Defining Event:	Sys/Comp malf/fail (non-power)	Injuries:	1 Serious, 1 Minor, 1 None
Flight Conducted Under:	Part 91: General Aviation - Aerial Observation		

Analysis

The airline transport pilot was conducting a cross-country aerial observation flight in the multiengine airplane. The pilot reported that the airplane was on the final leg of the traffic pattern when he reduced the power levers for landing and noticed that the right engine sounded like the propeller was moving toward the beta position. The pilot increased the engine power, and the sound stopped. As the airplane got closer to the runway, he decreased the engine power, and the sound returned. In addition, the airplane began to yaw right. The pilot applied left aileron and rudder inputs to remain above the runway centerline without success. While over the runway, the pilot reduced the engine power to idle, and the airplane continued to yaw right. The pilot applied full power in an attempt to perform a go-around; however, the airplane yawed about 30 degrees off the runway centerline, touched down in the grass, and impacted trees before coming to rest. The right wing, right engine, and right propeller assembly were impact-separated. The right engine propeller came to rest about 50 ft forward of the main wreckage, and it was found in the feathered position.

A review of maintenance records revealed that the right propeller had been overhauled and reinstalled on the airplane 2 days before the accident and had operated 9 hours since that time. Subsequent testing of the right propeller governor revealed that it functioned without anomaly; however, the speed settings were improperly configured. Further, the testing revealed that the beta valve travel from the neutral position was out of tolerance. Although this could have let oil pressure port to one side of the spool or the other and, thus, changed the propeller blade angle, it could not be determined whether this occurred during the accident landing. Impact damage precluded examination of the right propeller governor control linkage; therefore, it could not be determined if it was inadequately installed or rigged, which could have resulted in the propeller moving into the beta position. The investigation could not determine why the right propeller moved toward the beta position as engine power was reduced, as reported the pilot.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The propeller's movement to the beta position during landing for reasons that could not be determined during postaccident examination and testing, which resulted in an attempted go-around and subsequent loss of airplane control.

Findings

Aircraft	Propeller feather/reversing - Malfunction (Cause) Performance/control parameters - Attain/maintain not possible (Cause)
Environmental issues	Tree(s) - Contributed to outcome
Not determined	Not determined - Unknown/Not determined (Cause)

Factual Information

On September 6, 2015, about 1540 eastern daylight time, a DeHavilland DHC-6-200, N181CS, operated by Rampart Aviation, LLC, sustained substantial damage during landing at North Raleigh Airport (00NC), Louisburg, North Carolina. The certificated airline transport pilot flying received minor injuries, the airline transport pilot not flying was seriously injured, and the passenger was not injured. Visual meteorological conditions prevailed and no flight plan was filed for the aerial observation flight that departed Washington County Airport (AFJ), Washington, Pennsylvania around 0915. The flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

According to the pilot, the airplane was on the final leg of the traffic pattern when he reduced the power levers for landing, and noticed that the right engine sounded like "the [propeller] was heading towards beta." The pilot increased the engine power and the sound "went away." Closer to the runway, he decreased engine power and the noise returned, the airplane yawed to the right, and he applied left aileron and rudder inputs in order to remain aligned with the runway centerline. While over the runway, the pilot reduced the engine power to idle and the airplane "pushed hard to the right." Then, the pilot applied full power in an attempt to perform a go-around maneuver; however, the airplane yawed about 30 degrees off the runway centerline, touched down in the grass, and impacted trees prior to coming to rest.

The airplane came to rest about 80 feet from the right side of the runway. The right wing, right engine, and right propeller assembly were impact separated. In addition, the right side of the cockpit exhibited crush damage. The right engine propeller came to rest approximately 50 feet forward of the main wreckage and was observed in the feather position. Examination of the bolt holes where the bolts secured the propeller to the right engine exhibited elongation and smearing.

According to Federal Aviation Administration records, the airplane was manufactured in 1968. It was equipped with two Pratt and Whitney Canada PT6A-27, 620 horsepower engines that utilized 4-bladed McCauley controllable pitch propeller assemblies, which were installed per Supplemental Type Certificate (STC) SA1385GL.

Postaccident examination of maintenance records indicated that the most recent continuous airworthiness inspection was performed on September 3, 2015. In addition, an overhauled propeller was installed on the right engine and a test flight was performed on September 4, 2015, which was 8.7 flight hours prior to the accident. The maintenance logbook entry for the right propeller stated: "Reinstalled propeller [in accordance with] McCauley Owner Operators Manual...[torqued] nuts to 57 ft lbs with [torque] wrench. No defects noted." At the time of the accident the airplane had accumulated 6,915.4 total hours.

According to the McCauley Propeller Owner/Operator Manual, the propeller was designed to operate in two modes of operation, the beta mode and the governor mode. The beta mode could be selected "for ground reversing or taxi operation by means of the aircraft engine mechanical linkage. The linkage repositions the propeller reversing lever and beta valve to provide access for high pressure oil to reach the propeller piston and move the blades toward reverse pitch." In addition, "Propellers are a single acting unit in which hydraulic pressure opposes the forces of springs and counterweights to obtain the correct pitch for engine load. Hydraulic pressure urges blades toward low pitch (increasing RPM), while springs and counterweights urge blades toward high pitch (decreasing RPM)."

According to STC SA1385GL, the McCauley propeller installation on the accident airplane required the propeller retaining nuts to be torqued to 68 to 72 foot pounds.

The right propeller governor was sent to the manufacturer for examination and testing. During the examination, the governor functioned without anomaly. Nicks and "chatter marks" were observed around the mounting hole of the base closest to the drain port. The speed setting lever was bent outward, the max stop screw had been adjusted out an "excess number" of threads, and the control lever return spring was not engaged to the speed setting lever. The maximum speed was set about 170 rpm below the factory specification, and the pneumatic control valve settings for overspeed and underspeed were reset to compensate for the incorrect maximum speed setting. In addition, the beta valve travel from null, or the neutral position, was out of tolerance; however, during testing, the governor operated without anomaly. [Additional information about the governor examination can be found in the public docket for this case.]

The right propeller governor control rigging was unable to be examined and tested due to the damage to the right wing that incurred during the accident sequence. However, according to manufacturer installation guidelines "make sure of proper rigging of engine controls. Refer to aircraft maintenance manual or STC maintenance manual supplement." In addition, it stated that "feather, reverse, and low blade angles are set during assembly or overhaul. These angles are NOT adjustable in the field."

Also, the propeller manufacturer preflight checklist indicated, "the control system (governor) should be checked to determine whether the system is operating properly and is not leaking."

History of Flight

Approach-VFR pattern final	Sys/Comp malf/fail (non-power) (Defining event)
Approach-VFR go-around	Loss of control in flight Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Airline Transport; Flight Instructor	Age:	37, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
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 2 Without Waivers/Limitations	Last Medical Exam:	12/15/2014
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	06/22/2015
Flight Time:	7337 hours (Total, all aircraft), 1058 hours (Total, this make and model), 6415 hours (Pilot In Command, all aircraft), 43 hours (Last 90 days, all aircraft), 23 hours (Last 30 days, all aircraft)		

Co-Pilot Information

Certificate:	Airline Transport	Age:	44, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
Instrument Rating(s):	Airplane; Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 With Waivers/Limitations	Last Medical Exam:	08/12/2015
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	06/30/2015
Flight Time:	3187 hours (Total, all aircraft), 1180 hours (Total, this make and model), 2980 hours (Pilot In Command, all aircraft), 132 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	DEHAVILLAND	Registration:	N181CS
Model/Series:	DHC-6 200	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	181
Landing Gear Type:	Tricycle	Seats:	
Date/Type of Last Inspection:	09/03/2015, Continuous Airworthiness	Certified Max Gross Wt.:	11579 lbs
Time Since Last Inspection:	9 Hours	Engines:	2 Turbo Prop
Airframe Total Time:	26915.4 Hours	Engine Manufacturer:	Pratt & Whitney Canada
ELT:	C126 installed, activated, did not aid in locating accident	Engine Model/Series:	PT6-27
Registered Owner:	FHC GROUP LLC	Rated Power:	620 hp
Operator:	Rampart Aviation	Air Carrier Operating Certificate:	On-demand Air Taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	LHZ, 369 ft msl	Observation Time:	1535 EDT
Distance from Accident Site:	4 Nautical Miles	Direction from Accident Site:	151°
Lowest Cloud Condition:	Scattered / 2200 ft agl	Temperature/Dew Point:	26°C / 21°C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	5 knots, 30°	Visibility (RVR):	
Altimeter Setting:	30.16 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	WASHINGTON, PA (AFJ)	Type of Flight Plan Filed:	None
Destination:	Louisburg, NC (00NC)	Type of Clearance:	VFR Flight Following
Departure Time:	0915 EDT	Type of Airspace:	

Airport Information

Airport:	NORTH RALEIGH (00NC)	Runway Surface Type:	Asphalt
Airport Elevation:	348 ft	Runway Surface Condition:	Dry; Rough
Runway Used:	05	IFR Approach:	None
Runway Length/Width:	2650 ft / 36 ft	VFR Approach/Landing:	Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Serious, 1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	1 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Serious, 1 Minor, 1 None	Latitude, Longitude:	36.084722, -78.371944 (est)

Administrative Information

Investigator In Charge (IIC):	Heidi Moats	Adopted Date:	06/01/2016
Additional Participating Persons:	Tim McQuain; FAA/FSDO; Greensboro, NC		
Publish Date:	06/01/2016		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=91932		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report.