



National Transportation Safety Board Aviation Accident Final Report

Location:	Dayton, OH	Accident Number:	CEN10FA180
Date & Time:	04/01/2010, 1253 EDT	Registration:	N4BA
Aircraft:	BEECH B36TC	Aircraft Damage:	Destroyed
Defining Event:	Loss of engine power (total)	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

Approximately 1 minute after takeoff, as the airplane was about 1 mile southwest of the airport, the pilot reported an engine failure to air traffic controllers and initiated a return to the airport. One witness, located about 1 mile west of the airport, reported that the sound of the engine changed abruptly; noting that the engine seemed to lose power completely. Another witness, located near the airport, observed the airplane approach from the west and turn to align with the downwind runway. During the turn, the left wingtip struck the ground and the airplane impacted short of the runway. A postimpact fire ensued. Although the pilot initiated a return to the airport, an interstate highway and an open grass area short of the runway were both potentially available for an emergency landing. A postaccident examination of the engine revealed that the No. 1 (aft) main crankshaft bearing failed due to unknown circumstances. The progressive failure of the bearing likely precipitated secondary failures of the crankcase through-bolt and the fuel pump coupling, which resulted in a complete loss of engine power.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The complete loss of engine power due to failure of the No. 1 main bearing, and the secondary failure of a crankcase through-bolt and the fuel pump drive coupling. Contributing to the accident was the pilot's decision to attempt a return to the airport for a downwind forced landing, despite having an interstate highway and an open grass area short of the runway as available emergency landing sites.

Findings

Aircraft	Recip eng rear section - Failure (Cause)
Personnel issues	Decision making/judgment - Pilot (Factor)

Factual Information

HISTORY OF FLIGHT

On April 1, 2010, at 1253 eastern daylight time, a Beech B36TC Bonanza, N4BA, impacted terrain short of the runway during a forced landing following a loss of engine power at the Dayton-Wright Brothers Airport (MGY), Dayton, Ohio. A post-impact fire ensued and the airplane was destroyed. The pilot and sole passenger on-board sustained fatal injuries. The airplane was registered to Poelking LLC and operated by the pilot under the provisions 14 Code of Federal Regulations Part 91 on an instrument flight rules (IFR) flight plan. Visual meteorological conditions prevailed. The flight departed from MGY about 1250. The intended destination was DuPage Airport (DPA), West Chicago, Illinois.

The pilot initially contacted Dayton Approach Control while he was on the ground at MGY and requested an IFR clearance to DPA. However, before a clearance was issued, the pilot informed the controller that he needed to return to the ramp due to a magneto problem. Thirty minutes later, the pilot again contacted Dayton Approach while on the ground at MGY and requested a clearance to DPA. A clearance was issued at 1248 and the flight was released for takeoff at 1249.

At 1251:11 (hhmm:ss), the pilot contacted Dayton Approach Control. He informed the controller that they were airborne and climbing through 1,300 feet mean sea level (msl). At 1251:32, the controller replied that radar contact was established 1 mile south of MGY. However, 14 seconds later, the pilot stated that he was “going to circle around for a landing” at MGY because a “compartment [had] come open.” The controller acknowledged and cleared the flight to return to MGY. At 1252:16, the pilot stated that he was declaring an emergency due to an engine failure.

Radar data depicted the airplane tracking the Runway 20 extended centerline after takeoff. The initial radar data point was recorded at 1251:05 and indicated that the airplane was near the departure end of Runway 20 at 1,300 feet msl. About 1251:42, the airplane entered a right turn and remained in that turn until the final data point, which was recorded at 1252:46. At that time, the airplane was approximately 1/2 mile southwest of the Runway 2 threshold at 1,200 feet msl, and on an approximate magnetic course of 094 degrees. The radar track data indicated that the airplane was within 1/4 mile of an interstate highway during the right turn.

A witness reported that she was working in her yard, about 1 mile southwest of the airport, when the accident airplane flew over. Initially, the sound of the engine was completely normal. However, the routine engine sound changed abruptly, noting that the engine seemed to completely cut out. She added that the engine did not sputter, or increase and decrease pitch, during that time. The change in engine sound caused her to look up. She reportedly observed the airplane in a right turn with an estimated bank angle of 45 degrees. The airplane was heading northwest when she first saw it. It remained in that right turn until she lost sight of it, at which time it was on an easterly heading. She added that nothing about the airplane seemed unusual except for the abrupt change in the engine sound and a lower than normal flight profile.

Additional witnesses reported observing the airplane approach the airport from the west with the landing gear in the retracted position. They stated that the airplane banked to the left in an apparent attempt to line-up with runway 2. The left wingtip struck the ground and the airplane

impacted an open grass area south of the runway. A post impact fire ensued.

PERSONNEL INFORMATION

The pilot, age 50, held a private pilot certificate with airplane single engine land and instrument airplane ratings. He was issued a third-class airman medical certificate on March 26, 2009, with a restriction for corrective lenses. FAA records indicated that the pilot added an instrument rating to his private pilot certificate on August 31, 2009.

The pilot's flight time logbook was not available to the NTSB. On his instrument rating application, the pilot noted a total flight time of 182.5 hours, with 102.7 hours of instruction received. He reported a total of 93.1 hours in B36TC airplanes at the time of that exam.

AIRCRAFT INFORMATION

The accident airplane was a 1983 Beech B36TC (Bonanza), serial number EA-356. It was a six-place, single-engine airplane, with a retractable tricycle landing gear configuration. The airplane was powered by a 300-horsepower Continental TSIO-520-UB turbo-charged engine, serial number 515941. It was equipped with a 3-bladed, constant speed (adjustable pitch) McCauley model 3A32C406 propeller assembly, serial number 983648.

Maintenance records indicated that an annual inspection was completed on March 11, 2010, at a total airframe time of 2,283.9 hours. The records noted that the engine had accumulated 997.8 hours since overhaul at the time of the annual inspection. There was no record of maintenance issues subsequent to the annual inspection.

Maintenance records also indicated that aluminum fragments were found in the filter during an oil change conducted in July 2009. The engine was disassembled as a result and several piston pins were found to be frozen. The connecting rods were repaired and new cylinders were installed. The airplane was subsequently returned to service with no further issues noted.

METEOROLOGICAL CONDITIONS

Weather conditions recorded by the MGY Automated Surface Observing System (ASOS) at 1253 were: Clear skies; 10 miles visibility; winds from 210 degrees at 9 knots, gusting to 22 knots; temperature 22 degrees Celsius; dew point 9 degrees Celsius, altimeter 29.98 inches of mercury.

AIRPORT INFORMATION

Dayton-Wright Brothers (MGY) was a non-towered airport; served by a single runway. Runway 2-20 was 5,000 feet long by 100 feet wide and constructed of asphalt. The approach area to Runway 2 consisted of an open grass area extending approximately 1,000 feet from the threshold. A localizer antenna was located in this area on the runway centerline about 900 feet from the threshold.

The east side of Runway 2 was bordered by an open grass area about 500 feet wide. Commercial/business areas bordered the airport to the south. Residential areas bordered the airport to the east. A residential area was located about 1,200 feet east of the Runway 2 threshold, with an open grass area between the threshold and the nearest residences.

WRECKAGE AND IMPACT INFORMATION

Initial ground impact was on the airport property about 860 feet south-southwest of the Runway 2 threshold. The debris path was oriented on an approximate 024-degree magnetic

bearing. The main airplane wreckage, which consisted of the fuselage, engine, empennage, and wings, came to rest about 179 feet from the initial impact point. Grass scorched by the post impact fire extended to approximately 120 feet north-northeast of the main wreckage.

The nose section of the airplane was fragmented. The upper portion of the fuselage and aft fuselage structure remained. The lower fuselage was consumed by the postimpact fire. The engine had separated from the airframe. It came to rest inverted with the main wreckage. The propeller assembly was separated from the engine crankshaft flange. The propeller blades remained attached at the hub. The left wing tip separated from the airframe and came to rest about 75 feet south of the main wreckage. The empennage was partially separated from the aft fuselage. The vertical stabilizer, with the rudder attached, had separated from the empennage. The flight controls and flaps sustained damage consistent impact forces and the postimpact fire.

No anomalies consistent with a pre-impact failure or malfunction of the airframe were observed. A teardown examination of the engine was conducted subsequent to the accident. (A summary of those findings is included later in this report.)

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was performed by the coroner's office of Montgomery County, Ohio, on April 5, 2010. The FAA Civil Aerospace Medical Institute forensic toxicology report was negative for all substances in the screening profile.

TESTS AND RESEARCH

Teardown examination of the engine revealed that the #1 (aft) main bearing had failed. Specifically, the right half of the #1 main bearing was fractured into 5 pieces. A portion of the right bearing was located under the left bearing. In addition, the lower, aft crankcase through-bolt was fractured near mid-length. Finally, the fuel pump drive coupling and the standby alternator drive shaft were fractured.

Metallurgical examination of the #1 main bearing revealed damage consistent with contact of the fracture faces between other bearing sections. No fracture features were visible.

The crankcase through-bolt was fractured at one of the o-ring grooves at the case split line. The adjacent o-ring was hardened and partially charred. The cadmium surface plating was bubbled and solidified into surface beads on either side of the split line. The fracture surface exhibited features and deformation patterns consistent with bending over-stress. The overstress region appeared to emanate from a crescent-shape area that exhibited intergranular separation. Cadmium was identified on portions of the crescent-shaped area.

The fuel pump coupling was fractured at the reduced diameter shear section. The fracture surface exhibited crack arrest lines and surface topography consistent with high-stress reverse bending fatigue. The standby alternator driveshaft was also fractured at a reduced diameter section. Otherwise, the driveshaft appeared straight and undamaged. The fracture surface exhibited features consistent with rotational bending fatigue fracture.

ADDITIONAL INFORMATION

The Director of Maintenance at the fixed base operator (FBO) met the accident pilot when he returned to the ramp with a rough magneto. The pilot informed the maintenance director that the drop in engine speed exceeded limitations on one of the magnetos, and that he did not

observe any drop on the second magneto.

The maintenance director got in the airplane and conducted a run-up. He stated the engine started without hesitation, and went to 1,200 or 1,300 rpm. He conducted at least two magneto checks and the drop in engine speed was about 100 rpm. Engine operation was smooth the entire time.

The pilot reportedly commented to the mechanic that he had been idling for a long time and had not leaned the mixture. He noted that he did not observe any issues with the operation of the engine or the magnetos during the time he was in the airplane.

The airplane flight manual specifies a maximum drop in engine speed of 150 rpm during a magneto check.

Airport records indicate that the accident airplane was fueled with 61.6 gallons of 100 low lead aviation fuel about 1815 on March 31, 2010; the evening prior to the accident flight.

History of Flight

Initial climb	Loss of engine power (total) (Defining event)
Emergency descent	Off-field or emergency landing
Landing	Landing area undershoot Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Private	Age:	50, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last Medical Exam:	03/26/2009
Occupational Pilot:	No	Last Flight Review or Equivalent:	08/31/2009
Flight Time:	182 hours (Total, all aircraft), 93 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	BEECH	Registration:	N4BA
Model/Series:	B36TC	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Utility	Serial Number:	EA-356
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	03/11/2010, Annual	Certified Max Gross Wt.:	3850 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	2284 Hours	Engine Manufacturer:	CONT MOTOR
ELT:	Installed, not activated	Engine Model/Series:	TSIO-520 SER
Registered Owner:	POELKING AIR LLC	Rated Power:	300 hp
Operator:	POELKING AIR LLC	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	MGY, 957 ft msl	Observation Time:	1253 EDT
Distance from Accident Site:	1 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	200°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	22° C / 9° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	9 knots/ 22 knots, 210°	Visibility (RVR):	
Altimeter Setting:	29.98 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Dayton, OH (MGY)	Type of Flight Plan Filed:	IFR
Destination:	West Chicago, IL (DPA)	Type of Clearance:	IFR
Departure Time:	1250 EDT	Type of Airspace:	

Airport Information

Airport:	Dayton-Wright Brothers (MGY)	Runway Surface Type:	Asphalt
Airport Elevation:	957 ft	Runway Surface Condition:	Dry
Runway Used:	20	IFR Approach:	None
Runway Length/Width:	5000 ft / 100 ft	VFR Approach/Landing:	Forced Landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	On-Ground
Total Injuries:	2 Fatal		

Administrative Information

Investigator In Charge (IIC):	Timothy Sorensen	Adopted Date:	06/20/2011
Additional Participating Persons:	Gary L Middleton; FAA-Cincinnati FSDO; Cincinnati, OH Ernest Hall; Hawker Beechcraft Corp.; Wichita, KS Sara Irwin; Teledyne Continental Motors, Inc.; Mobile, AL		
Publish Date:	06/20/2011		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=75624		

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