Aviation Investigation Final Report

Location:	Urbana, Indiana	**Accident Number:**	CEN13LA557
Date & Time:	September 24, 2013, 09:20 Local	**Registration:**	N8910M
Aircraft:	Beech 35 B33	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	1 Serious, 1 Minor, 1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that, while in cruise flight, he noticed a change in the engine sound and a 100-rpm increase on the tachometer. He adjusted the propeller control to lower the rpm, but the rpm immediately increased to over 3,500, which is above the red line. The pilot reduced the propeller and throttle controls, but the propeller continued to overspeed. The propeller then separated from the airplane, and engine oil covered the windscreen. The pilot subsequently made a forced landing to a soft bean field, which resulted in substantial damage to the fuselage, wings, and engine mounts. A postaccident examination of the engine revealed that the crankshaft was fractured forward of the No. 6 rod journal across the oil transfer collar area and that the No. 6 rod had separated from the crankshaft. An examination of the fracture revealed evidence of several overheating events at the surface of the crankshaft next to the oil transfer collar hole. A crack had formed adjacent to the overheated surface, and the surface crack led to a stress crack, which formed the surface of the main separation fracture.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The failure of the crankshaft following several overheating events that had led to a stress crack and the subsequent fracture forward of the No. 6 rod journal.

Findings

Aircraft	Recip engine power section - Fatigue/wear/corrosion
Aircraft	(general) - Failure
Environmental issues	(general) - Effect on equipment

Factual Information

History of Flight

Enroute-cruise	Powerplant sys/comp malf/fail (Defining event)
Landing	Off-field or emergency landing

On September 24, 2013, about 0920 eastern daylight time, a Beech 35-BE33 Debonair airplane, N8910M, conducted a forced landing in a field near Urbana, Indiana. The pilot received minor injuries, the first passenger received serious injuries, and the second passenger was uninjured. The airplane sustained substantial damage. The airplane was registered to and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which operated without a flight plan, but received flight following services from air traffic control. The flight originated from the Washington Municipal Airport (KAWG), Washington, Iowa, about 0730 and was destined for the Van Wert County Airport (KVNW), Van Wert, Ohio.

In a statement provided by the pilot, the airplane's engine began to malfunction while enroute to the destination. He noticed a change in the engine sound and the tachometer indicated above 3,500 RPM, which is above the red line. He reduced the propeller and throttle controls, but the propeller continued to over speed. The propeller then separated from the airplane. The pilot declared an emergency and searched for a landing location when oil covered the wind screen and side windows. He conducted a forced landing into a bean field.

Pilot Information

Certificate:	Private	**Age:**	62
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 10, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 28, 2012
Flight Time:	(Estimated) 1348 hours (Total, all aircraft), 126 hours (Total, this make and model), 1212 hours (Pilot In Command, all aircraft), 18 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

The pilot, age 62, held a private pilot certificate with ratings for single engine land airplane. He was issued a third class medical certificate on May 10, 2012, with limitations to wear corrective lenses. His most recent flight review was completed in the accident airplane on May 28, 2012. According to the pilot, he had accumulated 1,348 total flight hours and 126 hours in

the make and model of the accident airplane.

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N8910M
Model/Series:	35 B33	**Aircraft Category:**	Airplane
Year of Manufacture:	1963	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	CD-690
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	November 21, 2012 Annual	**Certified Max Gross Wt.:**	3000 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	6691 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-470 N
Registered Owner:	Rex A Ott	**Rated Power:**	250 Horsepower
Operator:	Rex A Ott	**Operating Certificate(s) Held:**	None

The Beechcraft 35-BE33 Debonair airplane, serial number CD-690, was a single engine, low-wing, retractable tricycle landing gear, which was manufactured in 1963. The airplane was powered by a Continental Motors IO-470N engine, which drove a three bladed McCauley propeller.

On October 10, 2008, the engine received a D-Shannon engine upgrade, Supplemental Type Certificate (STC) #SA5527SW. This upgraded the engine to the Continental IO-470N engine with the McCauley propeller.

On March 21, 2009, the propeller was removed, repaired and reinstalled.

On August 10, 2010, all cylinders were removed, de-glazed and reinstalled.

On August 13, 2009, a complete top overhaul was completed at a tachometer time of 2,158.

On November 21, 2012, an annual inspection was completed on the airframe, engine and propeller with no anomalies noted.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	ASW,850 ft msl	**Distance from Accident Site:**	30 Nautical Miles
Observation Time:	09:35 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	120°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	10°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	WASHINGTON, IA (AWG)	**Type of Flight Plan Filed:**	None
Destination:	VAN WERT, OH (VNW)	**Type of Clearance:**	VFR flight following
Departure Time:	07:30 Local	**Type of Airspace:**	

At, 0935 the weather reported at Warsaw Municipal Airport (KASW), which was 24 miles north of the accident site, reported wind 120 at 4 knots, visibility 10 miles, sky clear, temperature 50 degrees Fahrenheit (F), dew point 45 degrees F, and altimeter setting 30.12 inches of mercury.

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious, 1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 1 Minor, 1 None	**Latitude, Longitude:**	40.878334,-85.778053(est)

The airplane landed upright in an open bean field. The engine compartment was displaced to the left. The wings were slightly bent aft and wrinkled and the leading edges sustained damage during the landing.

The propeller was located by a land owner two months after the accident. The propeller was shipped to the engine manufacturer to be examined with the engine.

Additional Information

The engine was shipped to Continental Motors for further examination and testing. The examination, which was observed by the NTSB investigator-in-charge, revealed that the crankshaft was fractured forward of the number six rod journal across the oil transfer collar area. All rod journals exhibited oil starvation signatures. The number six rod had released from the crankshaft. The forward portion of the crankshaft and flange remained attached to the propeller. The crankshaft cluster gear was intact and exhibited normal operating signatures. The gear bolts were tight and safety wired and the gear teeth were undamaged. The crankshaft main bearing journals were intact, undamaged and exhibited normal operating signatures. The counterweight assemblies were intact and had unrestricted movement on the hanger blades. The crankcase exhibited exterior damage concentrated at the nose and the area above the number six cylinder. Further examination of the crankshaft revealed that the fracture surface had considerable corrosion. The fracture surface was cleaned with a strong alkaline mixture and most of the rust was removed, which revealed a fatigue fracture surface indicated by beach marks. There was subsurface growth of the crack which emanates from an area below the surface, and was a secondary crack from the first crack that originated from the surface perpendicular to the axis. The crankshaft was sectioned near the initiation area. The cross section revealed several overheating events at the surface between the fracture surface and oil transfer hole. The presence of white untempered martensite indicates temperatures at the surface in excess of 1,400 degrees F. The overlapping heat affected zones indicate several heating events.

Administrative Information

Investigator In Charge (IIC):	Lindberg, Joshua
Additional Participating Persons:	Mike Kenna; FAA; South Bend, IN Chris Lang; Continental Motors; Mobile, AL
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