Aviation Investigation Final Report

Location:	Abilene, Texas	**Accident Number:**	CEN18LA084
Date & Time:	January 22, 2018, 08:45 Local	**Registration:**	N3600A
Aircraft:	Beech A36	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was conducting a cross-country, personal flight. He stated that, upon leveling off at cruise altitude, there was a "severe vibration" coming from the engine compartment, followed by a sound of the engine "coming apart." Oil covered the windshield, and the smoke entered the cockpit. The pilot was unable to return to the departure airport because it was beyond gliding distance, so he performed a forced landing on a field with the landing gear and flaps retracted. The pilot sustained serious injuries.

Postaccident examination of the engine revealed a large hole in the left crankcase half over the No. 2 cylinder attachment point and a small hole in the right crankcase half over the No. 5 cylinder attachment point. The No. 2 main bearing had shifted in the bearing saddle, which cut off the oil supply to the No. 2 rod cap bearing. Shifting/slipping of the bearing can result from either improper torque application during cylinder replacement or improper grinding of the bearing journal during maintenance.

The engine had been disassembled twice before the accident. An engine logbook entry showed that the No. 2 cylinder had been removed and replaced about 328 hours before the accident. It is likely that maintenance personnel did not conduct proper maintenance on the No. 2 cylinder during reassembly of the engine and that this ultimately led to the catastrophic engine failure due the shifting/slipping of the No. 2 bearing and the subsequent oil starvation and total loss of engine power.

Probable Cause and Findings

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

Maintenance personnel's improper maintenance of the engine, which resulted in a catastrophic engine failure due the shifting/slipping of the No. 2 bearing and the subsequent oil starvation and total loss of engine power during cruise flight.

Findings

Personnel issues	Repair - Maintenance personnel
Aircraft	(general) - Failure
Aircraft	Oil - Not specified
Aircraft	Scheduled maint checks - Incorrect service/maintenance

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Enroute-climb to cruise	Powerplant sys/comp malf/fail (Defining event)
Enroute-climb to cruise	Loss of engine power (total)
Landing	Off-field or emergency landing
Landing	Miscellaneous/other

On January 22, 2018, at 0845 central standard time, a Beech A36, N3600A experienced a total loss of engine power during climb after departing from Abilene Regional Airport (ABI), Abilene, Texas. The private pilot then performed a forced landing to a field near Abilene, Texas. The pilot sustained serious injuries and the airplane sustained minor damage. The airplane was registered to and operated by the pilot under Title 14 *Code of Federal Regulations* Part 91 as a personal flight that was operating on a visual flight rules flight plan. Day visual meteorological conditions prevailed at the time of the accident. The flight originated from ABI at 0835 and was destined to Sierra Blanca Regional Airport (SRR), Ruidoso, New Mexico.

The pilot stated that upon level off at cruise altitude, there was a "severe vibration" from the engine compartment followed by a sound of the engine "coming apart." Oil covered the windshield and the smoke entered the cockpit. The pilot stated that he was unable to return to ABI due to its distance from his position and attempted a forced landing to Dyess Air Force Base (AFB), Texas. The pilot was unable to attain Dyess AFB due to the airplane's altitude. The pilot performed a forced landing to a field about one mile southwest of Dyess AFB with the landing gear and flaps retracted.

Post-accident examination revealed the engine was intact with all the accessories attached. A large hole was observed in the left crankcase half over the number two-cylinder attachment point, and a small hole was observed in the right crankcase half over the number five-cylinder attachment point. Cylinders two, four, and six were Continental cylinders and had chrome markings. Cylinders one, three, and five were ECI cylinders.

The number 2 main bearing shifted in the bearing saddle, which cut off the oil supply to the number 2 rod cap bearing. The number 2 connecting rod separated from the connecting rod journal on the crankshaft. The number 2 rod journal on the crankshaft was very dry and partly melted. The number 2 rod cap bearing was melted and most of it was found in the oil sump.

The engine logbook had an entry dated January 23, 2015, at a tachometer time of 4,173 hours, for the removal and replacement of the number two cylinder.

The most recent entry for disassembly of the engine, as part of an annual inspection, was dated February 12, 2016, at a tachometer time of 4,299.6 hours and 1,796.0 hours since overhaul. The entry states, "#4 and #6 cylinders were removed due to exhaust leaks." The mechanic who performed the annual

inspection dated February 12, 2016 performed the most recent annual dated February 9, 2017, at a tachometer time of 4,442.7 hours.

The tachometer indication at the time of the accident was 4,501.0 hours.

Pilot Information

Certificate:	Private	**Age:**	71,Male
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:**	September 22, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 2, 2016
Flight Time:	702 hours (Total, all aircraft), 350 hours (Total, this make and model), 702 hours (Pilot In Command, all aircraft), 7 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N3600A
Model/Series:	A36	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	E-1328
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	February 9, 2017 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	58 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4501 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-520-BA
Registered Owner:	Pilot	**Rated Power:**	285 Horsepower
Operator:	Pilot	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	DYS,1790 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:		**Direction from Accident Site:**	225°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	280°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	5°C / -8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Abilene, TX (ABI)	**Type of Flight Plan Filed:**	VFR
Destination:	Abilene, TX (DYS)	**Type of Clearance:**	VFR
Departure Time:	08:35 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	Dyess Air Force Base DYS	**Runway Surface Type:**	Grass/turf
Airport Elevation:	1790 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	32.448612,-99.733055(est)

Administrative Information

Investigator In Charge (IIC):	Gallo, Mitchell
Additional Participating Persons:	Anthony Leinneweber; Federal Aviation Administration; FSDO SW-13; Lubbock, TX John Kent; Continental Motors; Mobile, AL
Original Publish Date:	November 6, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96651