Aviation Investigation Final Report

Location:	Gainesville, Florida	**Accident Number:**	ERA16LA114
Date & Time:	February 28, 2016, 12:00 Local	**Registration:**	N2861R
Aircraft:	Cessna 182	**Aircraft Damage:**	Substantial
Defining Event:	Collision during takeoff/land	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot stated that, before takeoff, he conducted a preflight inspection of the airplane and added 1 quart of oil to make a total of 8 quarts of oil in the airplane; the engine runup was normal. He further stated that the approximate 2-hour flight was uneventful until after he was cleared to land, when the engine began to run "rough." He enriched the mixture and reduced power, but the engine began shaking, oil sprayed onto the windshield, and then the engine lost total power. He declared an emergency and conducted a forced landing on a road, during which the left wing impacted a tree.

An examination of the engine revealed that the crankshaft's Nos. 4 and 5 connecting rod journals exhibited discoloration and heat damage, consistent with oil starvation, and that the rods had separated from the crankcases at their respective journals. The main bearing support mating surfaces were intact and exhibited no signs of fretting, bearing movement, or bearing rotation. The oil galleys and passages in the crankshaft and engine case halves were clear and unrestricted. Although an unmeasured quantity of oil was noted in the engine's oil sump, due to the damage of the sump and crankcase, the quantity of oil in the engine before the accident could not be determined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the engine crankshaft near the Nos. 4 and 5 crankshaft journals due to oil starvation. The reason for the oil starvation could not be determined during postaccident examination.

Findings

Aircraft	Recip engine power section - Failure
Not determined	(general) - Unknown/Not determined
Aircraft	Oil - Fluid level
Environmental issues	Tree(s) - Contributed to outcome

Factual Information

History of Flight

Approach	Loss of engine power (total)
Emergency descent	Off-field or emergency landing
Landing-landing roll	Collision during takeoff/land (Defining event)
Landing-landing roll	Collision with terr/obj (non-CFIT)

On February 28, 2016, about 1200 eastern standard time, a Cessna 182K, N2816R, experienced a total loss of engine power and performed a forced landing to a road near Gainesville, Florida. The commercial pilot and passenger incurred minor injuries. Visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the flight, which originated at Fort Lauderdale Executive Airport (FXE), Fort Lauderdale, Florida, around 1000. The airplane was owned and operated by the pilot. The personal cross-country flight was conducted under the provisions of 14 Code of Federal Regulations Part 91 and had an intended destination of Gainesville Regional Airport (GNV), Gainesville, Florida.

According to the pilot, he performed a preflight inspection, added 1 quart of oil to the engine, which totaled 8 quarts of oil, and then performed an engine run up with no anomalies noted. The takeoff, climb, and beginning of the descent phase of flight were "uneventful." The pilot was cleared to land on runway 7 when the engine began to run "rough." He unsuccessfully attempted to alleviate the rough engine noise by enriching the mixture and then reducing the power. The engine began shaking, oil sprayed onto the windscreen of the airplane, and then the engine experienced a total loss of power. The pilot declared an emergency, and elected to land on a road. After touching down on the paved surface, the left wing of the airplane impacted a palm tree and the airplane stopped on the road.

A postaccident examination of the airplane revealed that the wings and fuselage were substantially damaged. In addition, the engine cowling was removed to facilitate an engine examination, and a hole was noted in the top of the crankcase in the vicinity of the No. 4 cylinder. In addition, the No. 4 cylinder connecting rod was located on the top of the engine. The engine was retained for further examination.

According to Federal Aviation Administration (FAA) records, the airplane was manufactured in 1967, and registered to the pilot/owner in 2014. It was equipped with a Continental Motors IO-550 D series, 300-hp engine, which was installed in February 2000 in accordance with a supplemental type certificate. According to the pilot, the engine had accumulated 2,135 total hours of time in service since the time of rebuild in 1999, and had approximately 130 flight hours since the most recent annual inspection, which was completed on November 3, 2015. The most recent oil change occurred approximately 32 flight hours prior to the accident. Engine manufacturer guidance recommended that the time-based overhaul of the engine occur at 1,700 flight hours or every 12 years.

The engine was examined at the manufacturer's facility under NTSB oversight. Examination of the cylinders revealed normal operating signatures and combustion deposits. The intake and exhaust valve

faces and seats exhibited full seat contact signatures, and the intake and exhaust valve guides exhibited normal wear and operating signatures. The intake and exhaust rocker arms and shafts also exhibited normal operating signatures. All piston heads exhibited normal combustion deposits. The Nos. 4 and 5 pistons exhibited impact damage and the No. 4 piston was fractured.

Disassembly of the engine revealed the Nos. 4 and 5 connecting rods had separated from the crankshaft at their respective journals. The Nos. 4 and 5 journals exhibited discoloration and heat damage, consistent with oil starvation. The oil galleys and passages in the crankshaft were clear and unrestricted.

The engine oil sump was removed from the engine and the forward section exhibited impact damage. In addition, an unmeasured amount of oil and metal particles were noted inside the oil sump. The oil filter remained attached to the engine and was removed. It was disassembled and metal particles were noted in the filter.

The crankcase exhibited exterior damage concentrated at the No. 4 cylinder. Cylinder bays Nos. 4 and 5 were mechanically damaged, with portions of the crankcase missing above the No. 4 cylinder. The main bearing support mating surfaces were intact, exhibited no signs of fretting, and exhibited no signs of bearing movement or rotation. The oil galleys and passages in the left and right crankcase halves were intact, clear, and unrestricted.

The airplane was equipped with a JPI engine data monitor that was capable of recording engine performance data. The engine data monitor was removed and successfully downloaded at the NTSB's Vehicle Recorder Division in Washington, D.C. The data parameters that were recorded for the accident flight included, fuel flow, exhaust gas temperature, cylinder head temperature, oil temperature, fuel used, battery voltage, and outside air temperature.

According to the data, the flight was uneventful until about 1156, when the oil temperature began a steady increase. In the 4 minutes that followed, oil temperature continued to rise and peaked at 202 degrees F prior to the end of the data. According to the engine instruments in the cockpit, the DO NOT EXCEED oil temperature was 225 degrees F. Below 225 degrees F was the normal oil temperature operating range.

Pilot Information

Certificate:	Commercial; Foreign; Private	**Age:**	61,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	October 1, 2013
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	October 6, 2015
Flight Time:	1900 hours (Total, all aircraft), 800 hours (Total, this make and model), 1500 hours (Pilot In Command, all aircraft), 130 hours (Last 90 days, all aircraft), 40 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N2861R
Model/Series:	182 K	**Aircraft Category:**	Airplane
Year of Manufacture:	1967	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18258461
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	November 3, 2015 Annual	**Certified Max Gross Wt.:**	2348 lbs
Time Since Last Inspection:	130 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2139 Hrs at time of accident	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550 Series
Registered Owner:	On file	**Rated Power:**	300 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KGNV,123 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	11:53 Local	**Direction from Accident Site:**	148°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.29 inches Hg	**Temperature/Dew Point:**	18°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	FORT LAUDERDALE, FL (FXE)	**Type of Flight Plan Filed:**	IFR
Destination:	Gainesville, FL (GNV)	**Type of Clearance:**	IFR
Departure Time:	10:00 Local	**Type of Airspace:**	

Airport Information

Airport:	GAINESVILLE RGNL GNV	**Runway Surface Type:**	Asphalt
Airport Elevation:	151 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	29.698055,-82.280281(est)

Administrative Information

Investigator In Charge (IIC):	Kemner, Heidi
Additional Participating Persons:	Peter Kandravi; FAA/FSDO; Orlando, FL Mike Council; Continental Motors, Inc.; Mobile, AL Henry Soderlund; Cessna Aircraft; Wichita, KS
Original Publish Date:	June 5, 2018
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=92775

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties … and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.