Aviation Investigation Final Report

Location:	Peach Springs, Arizona	**Accident Number:**	LAX08LA153
Date & Time:	May 23, 2008, 11:50 Local	**Registration:**	N4753K
Aircraft:	Cessna P210N	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During an instrument flight rules cross-country flight at 16,000 feet msl, the pilot reported to air traffic control that he had a total loss of engine power and was attempting to land at an airport about 12 miles from his current position. The pilot was unable reach the airport, and while trying to land on the desert floor, one of the main landing gear wheels hit a cactus and the airplane nosed over. During the recovery of the airplane, internal components of the engine where found in the debris field. The time recorded on the engine at the last annual inspection was 978 hours since major overhaul. A review of the airplane logbooks revealed that a top overhaul was completed on March 21, 2007, which included all 6 cylinders being removed, overhauled, and replaced. The engine failure occurred 120 hours since completion of the top overhaul. During the engine examinations, thermal discoloration of the crankshaft main journals and damage to various other internal components were noted. The crankshaft was fractured just forward of the number 2 main bearing. The number 2 main bearing was not located; however, the bearing support exhibited evidence of bearing shift, tang slot elongation, and rotation. The crankshaft main bearings and the connecting rod bearings were also damaged as a result of oil starvation, due to the number 2 main bearing rotation. The crankcase itself had been compromised just above the numbers 3 and 4 cylinders. The crankshaft was metallurgically examined at a laboratory. The crankshaft chemistry, case depth, surface hardness, and core hardness met specifications. The fracture initiated at the surface adjacent to the number 2 main bearing and progressed toward the number 3 rod journal in fatigue.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power due to induced catastrophic internal failure of the engine as a result of

the displacement and rotation of the number 2 main bearing that resulted in a fatigue fracture of the crankshaft.

Findings

Aircraft	Recip engine power section - Failure

Factual Information

History of Flight

Enroute-cruise	Powerplant sys/comp malf/fail (Defining event)
Enroute-cruise	Loss of engine power (total)
Emergency descent	Off-field or emergency landing

HISTORY OF FLIGHT

On May 23, 2008, about 1150 mountain standard time (MST), a Cessna P210N, N4753K, experienced a total loss of engine power during cruise flight and collided with the terrain during the forced landing near Peach Springs, Arizona. The owner/pilot was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The certificated private pilot was not injured; the airplane sustained substantial damage to both wings by impact forces. The cross-country personal flight departed Grand Canyon National Park Airport, Grand Canyon, Arizona, about 1100, with a planned destination of Bullhead City, Arizona. Visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan had been filed.

The pilot reported that while flying at 16,000 feet mean sea level (msl), the engine experienced a total loss of power. He reported to air traffic control (ATC) that he was going to try and land at Grand Canyon Caverns Airport (L37), about 12 miles from his current position.

The pilot was unable to reach the airport. While trying to land on the desert, one of the main landing gear wheels hit a cactus, and the airplane nosed over.

During the recovery of the airplane, it was observed that internal components of the engine where found in the debris field. The airplane was recovered for further examination.

AIRCRAFT INFORMATION

The airplane was a 1979 Cessna P210N, serial number 21000284. A review of the airplane's logbooks revealed that the airplane had a total airframe time of 2,950 hours at the last annual inspection. The logbooks contained an entry for the annual inspection dated October 4, 2007. The tachometer read 1,483.6 at the last inspection. The tachometer read 1,519.6 at the accident site.

The engine was a Teledyne Continental Motors (TCM) TSIO-520-P5B, serial number 278661-R. Total time recorded on the engine at the last annual inspection was 978 hours since major overhaul.

A review of the airplane logbooks revealed that on March 21, 2007, a field top overhaul was completed, which included removing all 6 cylinders, overhauling the cylinders, and reinstalling the cylinders on the engine. The tachometer reading was recorded in the logbook write-up as 1,399.2 hours. The engine failure occurred 120 hours after the overhaul.

TESTS AND RESEARCH

During the engine teardown inspection, thermal discoloration was noted to the main journals of the crankshaft, as well as damage to the counterweight hanger blade. The crankshaft separated forward of the number two main journal, and the number two main bearing was not found during the inspection. It was the decision of the Safety Board to continue the engine inspection at the TCM Analytical Department, Mobile, Alabama.

During the inspection, it was noted that the crankshaft exhibited a fracture just forward of the number 2 main bearing journal. The crankshaft main bearings and connecting rod bearings exhibited signatures of lubrication distress. The number 2 main bearing support exhibited signatures of bearing shift, tang slot elongation, and rotation. The crankcase exhibited an approximate 4- by 6-inch breach of the crankcase above both the number 3 and number 4 cylinders. The crankshaft fracture was sectioned and forwarded to the TCM Metallurgical Laboratory for further examination.

On December 12, 2008, the TCM Metallurgical Laboratory conducted an examination of the crankshaft fracture.

Hardness at the journal surface measured 70R30N, which met specification. The sectioned piece perpendicular to the surface showed a case depth of .020 and a core hardness of 35 HRC, both which meet specification. The fracture surface indicated the fracture initiated at the surface adjacent to the number 2 main bearing and progressed toward the number 3 rod journal in fatigue. Much of the fracture surface was damaged, presumably due to continued operation during and after separation.

Pilot Information

Certificate:	Private	**Age:**	52,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
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:**	August 30, 2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	July 25, 2007
Flight Time:	3090 hours (Total, all aircraft), 2018 hours (Total, this make and model), 3090 hours (Pilot In Command, all aircraft), 17 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N4753K
Model/Series:	P210N	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	P21000284
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	October 4, 2007 Annual	**Certified Max Gross Wt.:**	4000 lbs
Time Since Last Inspection:	36 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2950 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-520 SER
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:	PRC	**Distance from Accident Site:**	54 Nautical Miles
Observation Time:	11:30 Local	**Direction from Accident Site:**	65°
Lowest Cloud Condition:	Scattered / 6000 ft AGL	**Visibility**	20 miles
Lowest Ceiling:	Broken / 8000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	20 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.76 inches Hg	**Temperature/Dew Point:**	7°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	GRAND CANYON, AZ (GCN)	**Type of Flight Plan Filed:**	IFR
Destination:	BULLHEAD CITY, AZ (IFP)	**Type of Clearance:**	IFR
Departure Time:	11:00 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	35.536109,-113.242225(est)

Administrative Information

Investigator In Charge (IIC):	Jones, Patrick
Additional Participating Persons:	James D Brownell; Federal Aviation Administration; Las Vegas, NV Andrew Swick; Teledyne Continental Motors; Mobile, AL
Original Publish Date:	May 12, 2009
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=68088