Aviation Investigation Final Report

Location:	PALMER, Alaska	**Accident Number:**	ANC97LA112
Date & Time:	July 25, 1997, 17:15 Local	**Registration:**	N9412Z
Aircraft:	Cessna 206	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Serious, 2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

While in cruise flight at 3,000 feet MSL over remote terrain, the engine suddenly quit. The pilot selected a flat area for an emergency landing. After touchdown, the float assemblies were torn off the fuselage, and the airplane nosed over. During the postaccident examination of the engine, one cylinder bolt was found loose, and the engine case displayed evidence of fretting. The crankshaft was broken. A metallurgical examination of the crankshaft revealed a fracture pattern typical of fatigue cracking. The number one engine cylinder had been replaced about 585 service hours before the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A fatigue failure of the engine crankshaft, and an inadequate engine cylinder replacement by maintenance personnel. A factor in the accident was unsuitable terrain for a forced landing.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: CRUISE

Findings
1. (C) ENGINE ASSEMBLY,CRANKSHAFT - FATIGUE
2. (C) MAINTENANCE,REPLACEMENT - INADEQUATE - OTHER MAINTENANCE PERSONNEL

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
3. (F) TERRAIN CONDITION - NONE SUITABLE
4. LANDING GEAR,FLOAT ASSEMBLY - SEPARATION

Occurrence #4: NOSE OVER
Phase of Operation: EMERGENCY DESCENT/LANDING

Factual Information

On July 25, 1997, about 1715 Alaska daylight time, a float equipped Cessna 206 airplane, N9412Z, crashed during a forced landing in a remote area about 25 miles east-southeast of Palmer, Alaska. The airplane was being operated as a visual flight rules (VFR) local area personal flight when the accident occurred. The airplane, operated by the pilot, sustained substantial damage. The certificated commercial pilot, and one passenger received minor injuries. A second passenger received serious injuries. Visual meteorological conditions prevailed. The flight originated at Campbell Lake, a private lake in Anchorage, Alaska, about 1630.

On July 26, 1997, during a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), the pilot reported he was in cruise flight about 3,000 feet mean sea level over the Knik Glacier when the engine suddenly quit. Emergency procedures failed to restore engine power. The pilot made a "Mayday" radio call, and selected an emergency landing area on flat, mud/gravel covered terrain between the glacier, and the shore line of Lake George. During the touchdown, both float assemblies were torn off the fuselage, and the airplane nosed over.

The airplane, and engine, had accrued 1,382.9 service hours since new. The most recent annual inspection of the engine was September 1, 1996, 32.6 service hours before the accident. On August 10, 1990, the number one engine cylinder was replaced by an airframe and powerplant mechanic. The cylinder had accrued about 585 service hours at the time of the accident.

After recovery, the engine, a Continental IO-520F, was examined at Sea Air Inc., Anchorage, Alaska, on August 21, 1997. The examination revealed the presence of oil around the base and underside of the number one cylinder. No torque paint was evident on the cylinder bolts. One of the cylinder bolts was not tight. The remaining cylinder bolts required little effort to loosen. Removal of the oil sump pan revealed the presence of metal shavings, and fractured portions of main engine crankshaft bearing material, Superior Part number SA642720. Examination of the oil filter revealed metal contamination. The interior surfaces of the oil pump housing exhibited light scoring.

The engine case exhibited fretting around the number one main journal mating surfaces. The number one main bearing was displaced slightly aft. The number two main bearing saddle was extensively deformed. The number two main bearing was destroyed.

The crankshaft was fractured at the number three short cheek, between the number two, and number three rod bearings.

The crankshaft was examined at the NTSB Materials Laboratory, Washington, D.C. The examination of the fracture site revealed heavy rubbing damage. The origin of the fracture displayed a crack arrest pattern typical of fatigue cracking. Multiple ratchet marks were noted in the fatigue origin area.

Pilot Information

Certificate:	Commercial	**Age:**	77,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	April 14, 1997
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	606 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N9412Z
Model/Series:	206 206	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	U20606473
Landing Gear Type:	Float	**Seats:**	6
Date/Type of Last Inspection:	September 1, 1996 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	33 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1383 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-520-F
Registered Owner:	RAYMOND A. POWELL	**Rated Power:**	300 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	30 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	16°C
Precipitation and Obscuration:	N/A - None - Smoke		
Departure Point:	ANCHORAGE , AK	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	16:30 Local	**Type of Airspace:**	Class G

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**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 Serious, 1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 2 Minor	**Latitude, Longitude:**	61.620243,-148.980133(est)

Administrative Information

Investigator In Charge (IIC):	Erickson, Scott
Additional Participating Persons:	TONY ACCURSO; ANCHORAGE , AK MICHAEL GRIMES; LANCASTER , CA LEAH RIDDLE; WICHITA , KS
Original Publish Date:	May 4, 1998
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=3035