



# **Aviation Investigation Final Report**

Location:	Boulder City, Nevada	Accident Number:	WPR23LA003
Date & Time:	October 2, 2022, 20:00 Local	Registration:	N511W
Aircraft:	Cessna 182C	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	1 Minor, 1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

# Analysis

The pilot and pilot-rated passenger departed Grand Canyon National Park Airport after a fuel stop in Las Vegas, Nevada. About 30 minutes into the flight the pilot noticed a low oil pressure indication and declared an emergency. Moments later the engine sustained a total power loss and the engine seized. When it became evident the airplane could not make it to the airport, the pilot made the decision to ditch the airplane into a nearby lake. The airplane was substantially damaged during the water landing.

Postaccident examination of the engine revealed discoloration of the cylinder and bearing surfaces consistent with high heat signatures due to oil starvation. The engine examination revealed no preimpact mechanical anomalies except for the oil filter adapter housing, which was loose, and the gasket was torn and deformed. As the oil level was likely normal at the pilot's previous stop and the pilot did not notice any unusual reductions in oil quantity during the service life of the engine, it is likely that the oil started to leak during the accident flight. The failure of the gasket likely allowed engine oil to exit the crankcase rapidly, resulting in oil starvation and the subsequent catastrophic failure.

A review of the engine maintenance records revealed no entries that the oil filter gasket had been inspected in accordance with the mandatory service bulletin, nor was it required.

## **Probable Cause and Findings**

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

A total loss of engine power due to oil starvation resulting from the failure of an engine oil filter adapter fiber gasket.

**Findings** 

Aircraft

Recip eng oil sys - Malfunction

## **Factual Information**

History of Flight	
Enroute-cruise	Loss of engine power (total) (Defining event)

On October 02, 2022, about 2000 Pacific standard time, a Cessna 182C airplane, N511W, was substantially damaged when it was involved in an accident near Boulder City, Nevada. The pilot and passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot had planned a flight to Las Vegas, Nevada, with the pilot-rated passenger. The crosscountry flight originated in Amarillo, Texas, refueled in Santa Fe, New Mexico, and then refueled again at Grand Canyon National Park Airport (GCN), Grand Canyon, Arizona. After the pilot verified the oil and fuel quantity at GCN, they departed for Las Vegas, Nevada. They climbed to an altitude of 11,000 ft mean sea level (msl) and intercepted an instrument flight rules clearance toward their destination. However, about 30 minutes into the flight, the instructor declared an emergency with air traffic control (ATC) after he observed a decline in engine oil pressure.

During the descent to 7,000 ft msl, the instructor observed the oil pressure decline to 0 psi and then diverted to Boulder City, which was at their 11 o'clock position and about 10 minutes away. Shortly after, the engine speed became erratic, described by the pilot as a pop and a bang followed by the cabin filling with smoke. This was followed by a total loss of engine power, at which time the propeller stopped rotating. The pilot queried the controller about nearby roads for an emergency landing and was advised that they were directly above Lake Mead. They circled the lake under a lit moon while the pilot and passenger reviewed the emergency checklist to prepare for the lake ditching.



Figure 1: Google Earth overlay of final segment track log recorded on Appareo Stratus 3

After the airplane touched down on the water, it nosed over, came to rest inverted, and sank. The pilot and passenger were able to exit the airplane and swim about 200 yards to shore. Law enforcement personnel located and rescued them a few hours later.



Figure 2: Recovery of airplane out of Lake Mead.

Examination of the engine revealed a large hole located in upper side of the crankcase halves between cylinders No. 3 and 4 and was about 3 to 4 inches wide. The number 4 connecting rod was not recovered. The discoloration of the cylinder and bearing surfaces were consistent with high heat signatures due to oil starvation. The engine examination revealed no preimpact mechanical anomalies. The engine was void of any oil. An examination of the oil filter adapter revealed a loose fit between the oil pump housing and oil filter adapter sleeve. The oil filter adapter fiber gasket was torn and deformed, and the gasket was stretched and protruded (extruded) out beyond the adapter flange edge. The safety wire securing the spool and the sleeve remained attached. The oil pump could be moved by hand and no contaminant blockages were found in the oil scavenge screens and oil filters.



Figure 3: Oil filter adapter housing and filter. Figure 4: Oil filter adapter housing gasket.



Figure 5: Additional example of Mill Creek, California accident oil filter adapter attached to similar engine.

According to maintenance records, the engine was overhauled as a rebuild on October 30, 2010. A review of the maintenance history did not reveal any historical anomalies with the engine following its overhaul. No record was found of the fiber gasket being replaced on the oil filter adapter or inspected in compliance with Stratus Tool Technologies Mandatory Service Bulletin SB-001.

Other oil filter adapter gasket failures resulting in oil starvation were investigated by the National Transportation Safety Board (NTSB). On December 3, 2020, the NTSB recommended that the Federal Aviation Administration (FAA), "Issue an Airworthiness Directive to address the unsafe conditions of F&M Enterprises Inc. or Stratus Tool Technologies (Stratus) oil filter adapters that have led to oil starvation and loss of engine power by requiring owners of airplanes equipped with the adapters to repetitively inspect and, if necessary, reinstall the adapters in compliance with Stratus' service bulletin SB-001.".

As a result, on February 22, 2022, the FAA published Airworthiness Directive (AD) 2022–04–04, "Continental Aerospace Technologies, Inc. and Continental Motors Reciprocating Engines," which requires replacing the oil filter adapter fiber gasket (fiber gasket) with an oil filter adapter copper gasket (copper gasket), prohibits any future use of the fiber gasket, and mandates compliance with Stratus Mandatory SB-001 Rev B..

Certificate:	Commercial; Flight instructor; Private	Age:	34,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	
Instructor Rating(s):	Airplane single-engine	Toxicology Performed:	No
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	September 15, 2022
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	September 7, 2022
Flight Time:	815 hours (Total, all aircraft), 384 hours (Total, this make and model), 782.5 hours (Pilot In Command, all aircraft), 321 hours (Last 90 days, all aircraft), 114 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

#### **Pilot Information**

## **Co-pilot Information**

Certificate:	Private	Age:	46,Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Lap only
Instrument Rating(s):	None	Second Pilot Present:	
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 3 None	Last FAA Medical Exam:	August 11, 2022
Occupational Pilot:	No	Last Flight Review or Equivalent:	August 1, 2022
Flight Time:	540 hours (Total, all aircraft), 12 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft)		

# Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N511W
Model/Series:	182C	Aircraft Category:	Airplane
Year of Manufacture:	1959	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	52495
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	August 16, 2022 Annual	Certified Max Gross Wt.:	2650 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	4616.6 Hrs as of last inspection	Engine Manufacturer:	CONT MOTOR
ELT:	Installed	Engine Model/Series:	0-470 SERIES
Registered Owner:	On file	Rated Power:	230 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Night
<b>Observation Facility, Elevation:</b>	KBVU,2202 ft msl	Distance from Accident Site:	20 Nautical Miles
Observation Time:	20:15 Local	Direction from Accident Site:	238°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	3 knots / None	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	40°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	29.91 inches Hg	Temperature/Dew Point:	28°C / 12°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Grand Canyon National Park Airport, AZ (KGCN)	Type of Flight Plan Filed:	IFR
Destination:	North Las Vegas Airport, NV (KVGT)	Type of Clearance:	IFR
Departure Time:	06:57 Local	Type of Airspace:	Air traffic control;Class E

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	1 Minor	Aircraft Fire:	In-flight
Ground Injuries:		Aircraft Explosion:	None
Total Injuries:	1 Minor, 1 None	Latitude, Longitude:	36.12266,-114.51346(est)

#### **Administrative Information**

Investigator In Charge (IIC):	Johnson, Scott
Additional Participating Persons:	Richard Ramirez; Federal Aviation Administration; Las Vegas, NV
Original Publish Date:	April 25, 2024
Last Revision Date:	December 13, 2024
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=106043

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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 <u>here</u>.