



# Aviation Investigation Final Report

<b>Location:</b>	Fresno, California	<b>Accident Number:</b>	WPR16LA050
<b>Date &amp; Time:</b>	January 10, 2016, 11:35 Local	<b>Registration:</b>	N1950J
<b>Aircraft:</b>	MOORE ONEX	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The pilot/builder was carrying out the initial flight test after recently building the amateur experimental airplane. Shortly after takeoff, the airplane's engine experienced a total power loss and the pilot initiated a descending left turn in order to avoid an airport fence. Subsequently, the airplane impacted terrain, in a nose down attitude with the left wing low.

An examination of the engine revealed that the Force One Main Bearing seized to the crankshaft. Further, there were multiple circular impressions on the bearing surface. Based on this evidence, it is likely that while building the experimental engine, the pilot did not properly align the Force One Main Bearing, and the oil feed hole was inadvertently used as the dowel pin hole, which resulted in a blockage of the oil transfer hole, thus preventing oil into the bearing and resulted in engine seizure and total power loss.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot/builder's failure to properly align the Force One Main Bearing, which resulted in a blockage of the oil transfer hole and culminated with a total engine power loss. Contributing to the accident was the pilot's failure to arrest the bank and sink rate prior to impact.

## Findings

Personnel issues	Installation - Owner/builder
Personnel issues	Aircraft control - Pilot
Personnel issues	Decision making/judgment - Pilot

# Factual Information

## History of Flight

Prior to flight	Aircraft maintenance event
Initial climb	Loss of engine power (total) (Defining event)
Landing-flare/touchdown	Collision with terr/obj (non-CFIT)

On January 10, 2016, about 1135 Pacific standard time, an experimental amateur built airplane, Moore Onex, N1950J, experienced a loss of engine power shortly after takeoff from the Fresno Chandler Executive Airport (FCH), Fresno, California. The commercial pilot, who was the sole person on board, was fatally injured. The airplane sustained substantial damage during the forced landing. The airplane was registered to and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed and no flight plan was filed for the local flight.

The pilot received serious injuries during the accident and succumbed to his injuries several days after the accident.

At 11:24, airport security camera video showed the accident airplane taxi to the run-up area to prepare for its initial flight test. At 11:34, the video showed the airplane depart from runway 29 and climb out normally through about 200 feet above ground level (agl). Another video from a witness, who was located near the taxiway, depicts the engine failure. The video audio echoed a smooth and complete engine shutdown that occurred in about 1.5 seconds.

According to the pilot, shortly after the engine failure, he initiated a descending, left turn, in order to avoid an airport fence. Multiple witnesses, located at the airport, observed the airplane enter a steep left bank and rapidly descending as it pitched down. Subsequently, the airplane impacted terrain in a nose down, left wing low attitude.

The accident airplane was equipped with a Garmin GPS 296, which revealed the airplane's flight path. The data revealed that the accident flight was about 46 seconds in duration. During the last 13 seconds of recorded data, the airplane was initially at an airspeed of 72 knots. The data then showed a continuous and rapid loss of airspeed. Additionally, the data showed the airplane starting to descend at that time. About the last 7 seconds of recorded data, the airplane made a left turn off the runway centerline that continued to the accident site. The data stopped recording at 11:35.

Postaccident examination revealed that the airplane came to rest upright, nearly 180° from the runway heading and 800 ft from the runway threshold. The ground scars and airplane damage were consistent with the airplane impacting the ground in a nose down attitude, with left bank. The engine was partially attached to the airframe and found to be seized.

A disassembly was accomplished of the experimental engine. During the teardown examination, about 24 ounces of oil drained from the sump and internal portions of the engine. The oil screen was examined

and was clear of metal contamination. The engine was disassembled and the center main bearing was galled, but was not seized, to the crankshaft journal. The force one main bearing was observed to be seized to the crankshaft.

According to the Airframe & Powerplant mechanic and the Federal Aviation Administration (FAA) inspector, during the assembly of the engine, improper indexing of the Force One Main Bearing to the crankcase resulted in a complete misalignment of the oil passages. This misalignment blocked the oil transfer hole to the bearing, near the bearing retention dowel pin, thus preventing oil flow into the bearing. Circular impressions were observed on the force one main bearing crankshaft surface and on the crankcase bearing support, which would be consistent with the misalignment, where the oil feed hole was inadvertently used as the dowel pin hole.

In the airplane engine assembly manual, it states: "First, check the fit of the Force One Main Bearing. Take one dowel pin and place it in the engine case bearing dowel pin hole. You have to place the dowel pin at the end of a drill and use a file to remove several thousandths from it's diameter to get it to fully seat in the dowel pin hole. When the dowel pin is installed, place the bearing in position, lining up the dowel pin hole in the bearing with the dowel pin in the engine case. Make sure the bearing is not held from seating fully in the case by a down pin that is too "high" by completing a visual check." Following this passage, the manual states: "Be careful not to mistake the oil feed hole for the dowel pin hole!"

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	70, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Front
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Sport pilot	<b>Last FAA Medical Exam:</b>	
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 484 hours (Total, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	MOORE	<b>Registration:</b>	N1950J
<b>Model/Series:</b>	ONEX	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2011	<b>Amateur Built:</b>	Yes
<b>Airworthiness Certificate:</b>	Experimental light sport (Special)	<b>Serial Number:</b>	ONX0118
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	1
<b>Date/Type of Last Inspection:</b>	December 30, 2015 Condition	<b>Certified Max Gross Wt.:</b>	
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	0 Hrs as of last inspection	<b>Engine Manufacturer:</b>	VW
<b>ELT:</b>		<b>Engine Model/Series:</b>	Type 1VW
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KFAT, 336 ft msl	<b>Distance from Accident Site:</b>	7 Nautical Miles
<b>Observation Time:</b>	11:53 Local	<b>Direction from Accident Site:</b>	65°
<b>Lowest Cloud Condition:</b>	Few / 2200 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 3000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	3 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/ None
<b>Wind Direction:</b>	300°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.21 inches Hg	<b>Temperature/Dew Point:</b>	12°C / 7°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Fresno, CA (FCH )	<b>Type of Flight Plan Filed:</b>	Unknown
<b>Destination:</b>	Fresno, CA (FCH )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	11:34 Local	<b>Type of Airspace:</b>	Class C

## Airport Information

<b>Airport:</b>	Fresno Chandler Executive Apt FCH	<b>Runway Surface Type:</b>	Grass/turf
<b>Airport Elevation:</b>	280 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	29L	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	8008 ft / 150 ft	<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Fatal	<b>Latitude, Longitude:</b>	36.732223,-119.820274(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Nixon, Albert
<b>Additional Participating Persons:</b>	Fritz Bayer; Federal Aviation Administration; Fresno, CA
<b>Original Publish Date:</b>	January 25, 2018
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=92554">https://data.nts.gov/Docket?ProjectID=92554</a>

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 [here](#).