



# Aviation Investigation Final Report

<b>Location:</b>	Upland, California	<b>Accident Number:</b>	WPR19LA129
<b>Date &amp; Time:</b>	May 1, 2019, 10:01 Local	<b>Registration:</b>	N156LZ
<b>Aircraft:</b>	STORCH FL-156C	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	1 Serious
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

Shortly after takeoff, the engine lost oil pressure and subsequently lost total power. The pilot maneuvered the airplane to return to the airport, but the airplane touched down in a field and came to rest upright.

Postaccident examination of the engine revealed evidence of an oil leak. The leak likely came from the No. 3 cylinder, as the valve cover was loose, with a gap between the cylinder and the valve cover, which was likely the result of an improperly torqued allen screw. The improper torquing likely occurred during the pilot's recent inspection of the crankcase throughbolts and re-installation of the engine's four valve covers. Eventually, the No. 3 allen screw became loose during the engine run-up and continued to loosen during the taxi, takeoff, and climb phases of flight, which resulted in a loss of engine oil and a subsequent total loss of engine power due to oil starvation.

## Probable Cause and Findings

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

The pilot's improper installation of the No. 3 cylinder valve cover, which resulted in an oil leak, oil starvation, and a subsequent total loss of engine power.

## Findings

Personnel issues	Installation - Pilot
Aircraft	Recip eng oil sys - Incorrect service/maintenance
Aircraft	Oil - Fluid level

## Factual Information

### History of Flight

<b>Initial climb</b>	Loss of engine power (total) (Defining event)
<b>Initial climb</b>	Attempted remediation/recovery
<b>Emergency descent</b>	Collision with terr/obj (non-CFIT)

On May 1, 2019, about 1001 Pacific daylight time, a special light sport Storch Aircraft LLC, N156LZ, was substantially damaged when it was involved in an accident near Upland, California. The pilot was seriously injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, after takeoff, as the airplane climbed through about 300 ft, the engine lost oil pressure but continued to produce power. As the pilot maneuvered the airplane toward the departure airport, the engine suddenly stopped developing power. The airplane touched down in a field east of the airport and came to rest upright.

A review of photographs provided by the Federal Aviation Administration (FAA) revealed substantial damage to the forward cabin and engine truss.

An examination of the engine performed by the FAA revealed that the No. 3 cylinder valve cover was loose (see figure 1), with a gap about 1/4-inch between the cylinder and the cover; oil was found throughout the engine and the engine compartment. Oil was discovered outside the hangar where the pilot started the engine for the accident flight, and an oil trail led to the runup area he used, which also exhibited oil spray (see figure 2).

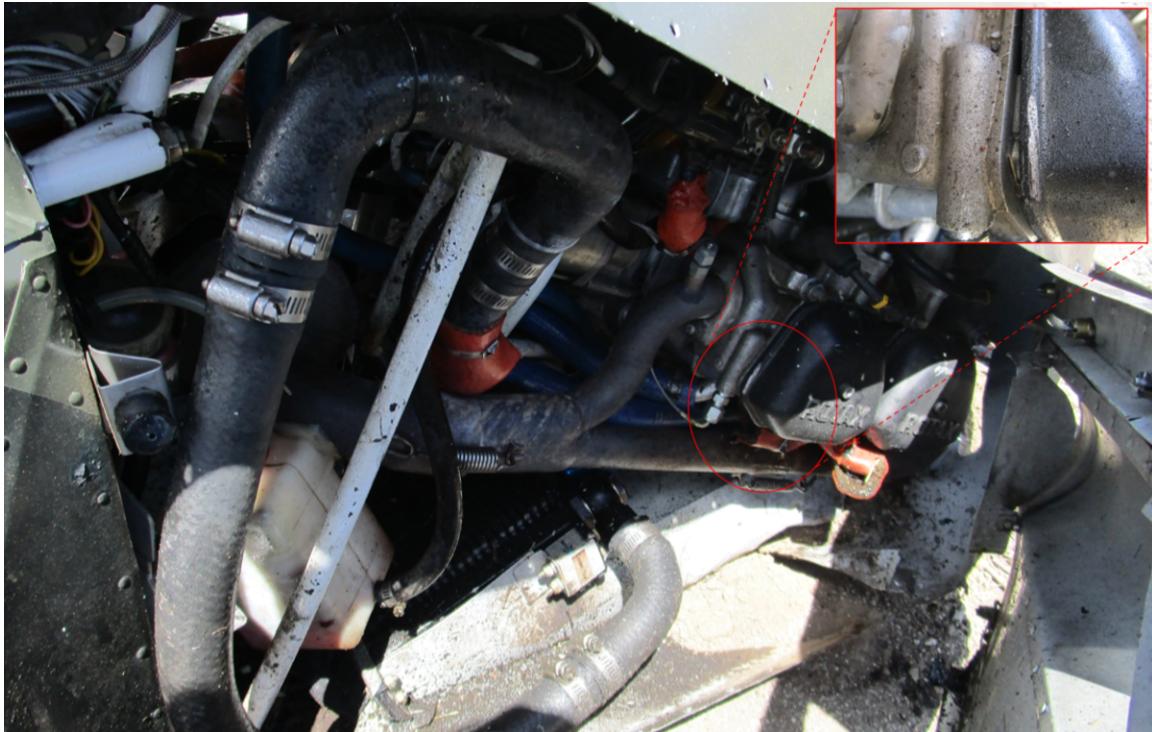


Figure 1. Close-up view of No. 3 cylinder valve cover



Figure 2. Oil residue discovered on taxiway in relation to pilot's hangar and wreckage site

A review of the airplane's maintenance records revealed that the engine was removed on May 24, 2018, and reinstalled on August 31, 2018, by the pilot. No other maintenance on the engine was recorded in the logbooks. The pilot reported that before the last flight, he removed the valve covers to inspect the crankcase throughbolts and "thought" he retorqued all four valve cover screws. He re-examined the valve covers after the accident and confirmed that the No. 3 cylinder valve cover was loose.

The Rotax Powertrain Maintenance Manual 72-00-00 pg. 93, instructs, "fit valve cover and tighten with allen screw M6x30 and washer to a tightening torque of 10 Nm (90 in. lbs)." The caution associated with the tightening of the allen screw at reinstallation stated:

*IF THIS SCREW IS LOOSE OR IF THE VALVE COVER IS LEAKING, THE OIL RETURN TO THE OIL TANK BY "BLOW-BY GAS" WILL NOT WORK PROPERLY AT ALL OR ONLY INSUFFICIENTLY.*

According to the engine manufacturer, the oil system relies on crankcase pressure to return oil back to the tank from the crankcase. The valve covers need to be sealed, as this crankcase pressure will escape from that location and oil will not return to the tank. If the No. 3 valve cover is loose during an engine start-up, the inadequate seal would result in a substantial oil leak, followed by an imminent engine failure due to oil starvation.

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	72, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Unknown
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	October 15, 2018
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 10000 hours (Total, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	STORCH	<b>Registration:</b>	N156LZ
<b>Model/Series:</b>	FL-156C	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2009	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Special light-sport (Special)	<b>Serial Number:</b>	SA-001K
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>		<b>Certified Max Gross Wt.:</b>	1320 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>		<b>Engine Manufacturer:</b>	Rotax
<b>ELT:</b>		<b>Engine Model/Series:</b>	912ULS
<b>Registered Owner:</b>		<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>	CCB,1440 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	09:55 Local	<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>	Few / 2700 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	3 knots /	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	210°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	30.02 inches Hg	<b>Temperature/Dew Point:</b>	15°C / 7°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Upland, CA (CCB )	<b>Type of Flight Plan Filed:</b>	Unknown
<b>Destination:</b>	Upland, CA	<b>Type of Clearance:</b>	Unknown
<b>Departure Time:</b>	10:01 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	Cable CCB	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>		<b>Runway Surface Condition:</b>	Rough;Vegetation
<b>Runway Used:</b>	24	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	3863 ft / 75 ft	<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious	<b>Latitude, Longitude:</b>	34.140239,-117.65024(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Huhn, Michael	
<b>Additional Participating Persons:</b>	Robert Michaelson; FAA FSDO; Riverside, CA	
<b>Original Publish Date:</b>	February 9, 2022	<b>Investigation Class:</b> 3
<b>Note:</b>	The NTSB did not travel to the scene of this accident.	
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=99360">https://data.ntsb.gov/Docket?ProjectID=99360</a>	

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).