Aviation Investigation Final Report

Location:	Ocean Shores, Washington	**Accident Number:**	WPR16LA164
Date & Time:	August 12, 2016, 10:00 Local	**Registration:**	N619LD
Aircraft:	Zenith CH601	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was conducting a local personal flight in an experimental, amateur-built airplane. The pilot reported that, during cruise flight, the voltmeter's indications became erratic and that, shortly after, the airplane experienced a total loss of electrical power. The engine subsequently lost power, and the pilot conducted an emergency landing, during which the bottom of the fuselage contacted surrounding vegetation. The right wing then dipped, and the airplane impacted terrain. The pilot reported that, following the accident, he checked the battery's charge, and it was 11 volts; however, the electrical system on the airplane required 12 to 13 volts for operation.

The pilot partially disassembled the airplane following the accident, and the engine, most of the flight instruments, the tachometer, and the interior components were not available for examination. Therefore, a thorough evaluation of the airplane's electrical system was not possible. However, the battery examination revealed that it had a 10-volt charge, indicating that either a battery or charging system failure occurred. The fuel delivery system included two electronic fuel pumps connected in series with no mechanical or auxiliary pumps installed. Therefore, the loss of electrical power would have disabled both fuel pumps and resulted in fuel starvation and a loss of engine power. There was no other method to deliver fuel to the engine if the battery power was insufficient to power the fuel pumps.

Probable Cause and Findings

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

A reduction in electrical power, which disabled both fuel pumps and resulted in fuel starvation and a loss of engine power.

Findings

Aircraft	(general) - Failure
Aircraft	Fuel - Fluid level
Environmental issues	(general) - Contributed to outcome

Factual Information

History of Flight

Enroute-cruise	Electrical system malf/failure
Enroute-cruise	Loss of engine power (total) (Defining event)
Landing	Collision with terr/obj (non-CFIT)

On August 12, 2016, about 1000 Pacific daylight time, a Zenith CH601, N619LD, sustained substantial damage when it impacted the ground near Ocean Shores, Washington. The private pilot, the sole occupant, sustained minor injuries. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed, and no flight plan had been filed. The local flight originated from Bowerman Airport (HQM), Hoquiam, Washington at 0900.

The pilot reported that he was in cruise flight when the voltmeter's indications became erratic. Shortly thereafter, the airplane experienced a complete loss of electrical power, followed by a loss of engine power. He immediately executed an emergency landing, and established the best glide speed at 70 mph. Prior to impact, the bottom of the fuselage contacted surrounding vegetation, the right wing dipped, and the airplane impacted the terrain.

The airplane was equipped with an Odyssey Extreme Series PC-680 battery which required a 14.4 charging voltage. In a phone conversation with the National Transportation Safety Board investigator-in-charge, the pilot stated that had checked the battery's state of charge after the flight, and the battery indicated 11 volts. He added that the electrical system on the airplane requires 12-13 volts for operation.

A Federal Aviation Administration (FAA) Inspector examined the airplane's logbook, and the majority of the wreckage. The airplane logbook showed the last condition inspection occurred on September 20, 2015; an Experimental Airworthiness certificate for the purpose of Amateur Built was issued on May 20, 2016. The airplane was in Phase 1 operation test flight, and it was restricted to a 25-mile radius of HQM.

The engine, most of the flight instruments, the tachometer, interior components, and damaged canopy pieces were removed by the owner following the accident, and were not present for the examination.

The nose gear was bent to the right. The fuselage exhibited compression wrinkles in the top skin between the empennage and the cabin. The right wing was removed, and showed some outboard leading edge damage. The right elevator was significantly damaged. The skin below the horizontal stabilizer was wrinkled. The left aileron and wingtip sustained damage. The main landing gear was partially folded under the fuselage.

The battery showed a 10-volt charge. The airplane was equipped with two Facet 12 volt electronic fuel pumps. Both pumps were connected in series; therefore, fuel to the engine had to pass through both

pumps. There were no other mechanical or auxiliary pumps installed. The wire and connectors that remained in the fuselage were automotive type. All circuit breakers were observed in, and no overheated wiring or arcing was found.

The airplane was powered by a Continental O-200-A engine, serial number 72 JACH-A-48, and was installed on the airplane with about 250 hours since major overhaul. Initially, the engine was equipped with an external oil filter and an adapter on the oil cooler pad, but the pilot removed the filter assembly and installed the cooler pad cover on the engine case. The oil screen did not contain any metal particles.

The carburetor was separated from the engine, and it appeared largely intact. Neither the carburetor bowl nor the accelerator pump contained fuel. The complete statement from the FAA inspector detailing the examination is appended to the accident in the public docket.

Pilot Information

Certificate:	Private	**Age:**	73,Male
Airplane Rating(s):	Single-engine land	**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:	Sport pilot Unknown	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 1, 2016
Flight Time:	(Estimated) 720 hours (Total, all aircraft), 720 hours (Pilot In Command, all aircraft), 11 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Zenith	**Registration:**	N619LD
Model/Series:	CH601	**Aircraft Category:**	Airplane
Year of Manufacture:	2016	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special); Experimental light sport (Special)	**Serial Number:**	66980
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	May 20, 2016 Unknown	**Certified Max Gross Wt.:**	1329 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	11 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-200
Registered Owner:	On file	**Rated Power:**	100 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:	KHQM,15 ft msl	**Distance from Accident Site:**	9 Nautical Miles
Observation Time:	08:53 Local	**Direction from Accident Site:**	98°
Lowest Cloud Condition:	Clear	**Visibility**	6 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.07 inches Hg	**Temperature/Dew Point:**	18°C / 16°C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	HOQUIAM, WA (HQM)	**Type of Flight Plan Filed:**	VFR
Destination:	HOQUIAM, WA (HQM)	**Type of Clearance:**	None
Departure Time:	09:00 Local	**Type of Airspace:**	Class C

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	46.992221,-124.140274(est)

Administrative Information

Investigator In Charge (IIC):	Smith, Maja
Additional Participating Persons:	Gaddie Orcullo; FAA
Original Publish Date:	May 25, 2017
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=93820