Aviation Investigation Final Report

Location:	Lovelock, Nevada	**Accident Number:**	WPR17LA012
Date & Time:	October 20, 2016, 07:30 Local	**Registration:**	N4YB
Aircraft:	NORTHLAND AVIATION LLC IVP	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation		

Analysis

The airline transport pilot reported that, while climbing to cruise altitude, about 9 minutes into the cross-country flight, he felt a severe shudder and the engine experienced a total loss of power. Simultaneously, oil began to coat the windscreen. The pilot maneuvered for a nearby airport; however, as he neared the airport, he realized that the airplane would not reach the runway and elected to land in an open area of desert vegetation.

Postaccident examination of the engine revealed a hole in the crankcase above the Nos. 3 and 4 connecting rod journals. The Nos. 3 and 4 pistons were fractured into several pieces, which were located within the engine. The No. 3 connecting rod had separated from the crankshaft. The No. 3 cylinder intake valve head was broken at the bottom of the valve guide; the valve head was not located within the engine.

A visual examination by a metallurgist was unable to determine the initial failure mode given the postfracture mechanical damage to the fractured end of the valve stem and the absence of the separated valve head; however, due to the quantity and severity of damage found throughout the engine, the likely initial point of failure was a fracture to the intake valve in the No. 3 cylinder.

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 the failure of the intake valve in the No. 3 cylinder for reasons that could not be determined based on the available information.

Findings

Aircraft	Recip engine power section - Failure
Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Enroute-climb to cruise	Loss of engine power (total) (Defining event)
Landing	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

On October 20, 2016, about 0730 Pacific daylight time, an experimental amateur-built Northland Aviation LLC Lancair IV-P airplane, N4YB, made a forced landing, following a total loss of engine power, near Lovelock, Nevada. The airline transport pilot sustained minor injuries. The airplane was substantially damaged to the wings and fuselage. The airplane was registered to Northland Aviation LLC and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal cross-country flight. Visual meteorological conditions prevailed, and no flight plan was filed. The flight departed from Fallon Municipal Airport (FLX), Fallon, Nevada, about 0710, and was destined for Burns, Oregon.

The pilot reported that he was climbing to his cruise altitude of 16,500 ft when, about 9 minutes into the flight, he felt a severe shudder and the engine lost power. Simultaneous to the shudder, oil began to coat the windscreen. The pilot headed for Derby Field Airport, Lovelock, for landing, however as he neared the airport, he realized that he was not going to make the runway and elected to land the airplane in an open area of desert vegetation.

A review of maintenance records indicated that the experimental Lancair IV-P, serial number LIV-482 was issued a special airworthiness certificate on February 7, 2003. The airplane was equipped with a Continental Motors TSIO-550-E, serial number 803075, 350 hp engine. The pilot reported at the time of the accident, the engine had accumulated about 865 hours since new.

Postaccident examination of the engine revealed a hole in the crankcase above the #3 and #4 connecting rod journals. The #3 and #4 pistons were fractured into several pieces that were located within the engine. The #3 connecting rod had separated from the crankshaft. The connecting rods and crankshaft journals exhibited signs of thermal distress. The camshaft was fractured into four pieces. The top and bottom spark plugs from cylinder #3 exhibited debris damage and the electrodes were missing. The combustion chamber of cylinder #3 exhibited impact marks from debris. The intake valve in cylinder #3 was broken at the bottom of the valve guide. The broken intake valve head was not located within the engine and the fracture surface of the valve stem was severely damaged from debris. A metallurgist from Continental Motors visually examined the parts and determined that further examination would prove to be inconclusive due to the mechanical damage the parts sustained.

Pilot Information

Certificate:	Airline transport	**Age:**	79,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Waiver time limited special	**Last FAA Medical Exam:**	September 5, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	7087 hours (Total, all aircraft), 865 hours (Total, this make and model), 12 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft), 0.3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	NORTHLAND AVIATION LLC	**Registration:**	N4YB
Model/Series:	IVP NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	2003	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	LIV-482
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	August 1, 2016 Condition	**Certified Max Gross Wt.:**	3500 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	865 Hrs at time of accident	**Engine Manufacturer:**	CONT MOTOR
ELT:	C126 installed, not activated	**Engine Model/Series:**	TSIO-550 SER
Registered Owner:	On file	**Rated Power:**	350 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:	KLOL,3904 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	29°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.36 inches Hg	**Temperature/Dew Point:**	-1°C / -3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Fallon, NV (FLX)	**Type of Flight Plan Filed:**	None
Destination:	Burns, OR (BNO)	**Type of Clearance:**	None
Departure Time:	07:10 Local	**Type of Airspace:**	Class E

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:**	40.05611,-118.577774(est)

Administrative Information

Investigator In Charge (IIC):	Shaver, Christopher
Additional Participating Persons:	Jim Richardson; FAA Reno FSDO; Reno, NV Christopher Lang; Continental Motors; Mobile, AL
Original Publish Date:	September 10, 2018
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=94280