Aviation Investigation Final Report

Location:	McCarthy, Alaska	**Accident Number:**	ANC16LA047
Date & Time:	July 19, 2016, 10:00 Local	**Registration:**	N151J
Aircraft:	AEROPRO CZ A220	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot reported that, during the takeoff roll in the experimental amateur-built light-sport airplane, the engine began surging. He was unable to compensate for the sudden increase in left turning tendency when the engine power increased, and subsequently experienced a loss of control. Video footage of the accident was consistent with the pilot's statement. Examination of the engine, which was equipped with a two-carburetor system, revealed that one carburetor throttle valve lever was bent inward and made contact with the carburetor chamber top. While manipulating the throttle control from inside the cockpit, the throttle valve lever was observed moving only slightly before contacting the carburetor chamber top, which restricted its movement. This resulted in the carburetor being at the idle position during the point of contact. The other carburetor was free of anomalies and operated as designed.

During an engine test run with an exemplar engine of the same make and model, the carburetor throttle valve lever was modified to duplicate that found on accident engine. The engine was run at various power settings before applying full power. At full engine power, the carburetor throttle valve lever stuck against the chamber top and the engine ran rough and would not accelerate to maximum rpm. The carburetor throttle valve lever was then manually pushed forward past the point of contact on the carburetor chamber top, resulting in a burst of engine power immediately followed by smooth engine operation at maximum rpm.

Probable Cause and Findings

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

The pilot's failure to maintain directional control during the takeoff roll, which resulted in a loss of control and impact with terrain. Contributing to the accident were engine power surges due to the bent carburetor throttle valve lever.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Directional control - Not attained/maintained
Aircraft	Fuel control/carburetor - Damaged/degraded

Factual Information

History of Flight

Takeoff	Loss of engine power (partial) (Defining event)
Takeoff	Loss of control on ground

On July 19, 2016, about 1000 Alaska daylight time, a tail-wheel equipped, Aeropro CZ A220 airplane, N151J, sustained substantial damage following a loss of directional control during takeoff from an unimproved airstrip about 5 miles south of McCarthy, Alaska. The certificated private pilot was not injured. The airplane was registered to a private individual and operated by the pilot under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91 as a personal cross-country flight. Visual meteorological conditions prevailed and a visual flight rules flight plan was filed. The flight was planned from the airstrip to the Wasilla Airport (IYS), Wasilla, Alaska.

The pilot stated that while attempting to takeoff, shortly after raising the tail of the airplane, a partial power loss occurred. While attempting to maintain directional control, the power loss ceased, and full power returned. The pilot was unable to input the correct amount of rudder pressure quickly enough to compensate for the increase in left turning tendencies resulting in the airplane impacting surrounding terrain and sustaining substantial damage to the wings, tail and fuselage.

A video of the attempted takeoff shows that during the takeoff sequence, as the tail lifts, sound changes consistent with engine surging can be heard. This occurs three times during the takeoff roll before directional control is lost. The video is located in the public docket for this accident.

The aircraft was equipped with a Rotax 912 ULS engine with a dual carburetor system. The 1/3 carburetor was associated with cylinders 1 and 3, while the 2/4 carburetor was associated with cylinders 2 and 4.

A postaccident examination revealed that the throttle valve lever on the 1/3 carburetor was bent inwards and made contact with the carburetor chamber top. The throttle control was actuated inside the cockpit several times, and would eventually push the throttle valve lever past the point of contact on the carburetor chamber top. The throttle valve lever would travel just off the idle stop prior to contacting carburetor chamber top, resulting in the 1/3 carburetor near the idle position during the point of contact, as shown in this photo.

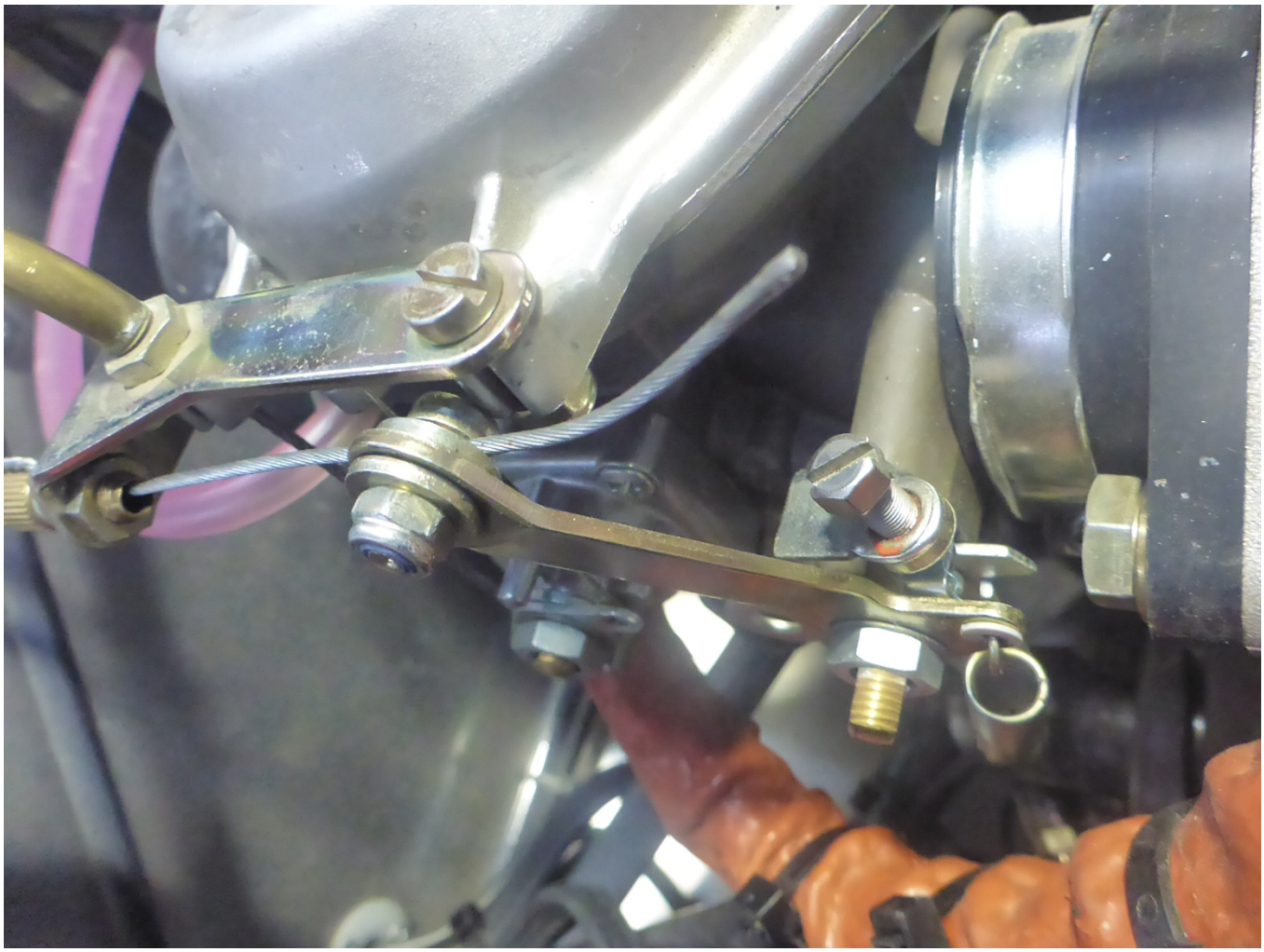

Figure 1: 1/3 carburetor contacting the chamber top

The throttle valve lever on the 2/4 carburetor was in good condition and did not make contact with the carburetor chamber top. The throttle control was actuated inside the cockpit several times and it would reach its full travel from idle stop to the full throttle stop position. No anomalies were found with the 2/4 Carburetor.

A postaccident engine test run was performed with the engine still mounted on the accident airplane's airframe. The engine was not run at full power due to impact damage sustained to the propeller, but it was operated at various idle power settings. The effects of the throttle valve lever on the 1/3 carburetor making contact with the carburetor chamber top was inconclusive during this test run. However, the run verified the engines ignition, fuel, oil and coolant systems were operating normally. The engine run revealed no mechanical anomalies that would have precluded normal operation.

A second engine test took place in Vernon B.C, Canada on February 2nd under the direction of the NTSB. A different Rotax 912ULS engine was mounted on an engine test stand with a calibrated propeller. The 1/3 carburetor throttle valve lever was modified to duplicate the 1/3 carburetor throttle valve lever that was found on the accident engine. The 1/3 carburetor throttle valve lever was bent inward to make contact with the carburetor chamber top. The engine was run at various power settings

prior to applying full power. The 1/3 carburetor throttle valve lever stuck against the chamber top, the engine ran rough and would not accelerate to maximum RPM.

The 1/3 carburetor throttle valve lever was then manually pushed forward past the point of contact on the carburetor chamber top resulting in a burst of engine power, immediately followed by a smooth running engine at maximum RPM. This scenario was consistent with video evidence obtained by the NTSB during the investigation.

The closest weather reporting facility is Valdez Airport, Valdez, Alaska, about 98 miles southwest of the accident sire. At 0956, a METAR was reporting in part: wind from 080° at 16 knots, gusting to 21 knots; sky condition, clear; visibility, 10 statute miles; temperature 77° F; dewpoint 48° F; barometric pressure 29.88 inches of mercury.

Pilot Information

Certificate:	Private	**Age:**	67,Female
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Sport pilot None	**Last FAA Medical Exam:**	April 22, 2010
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	September 23, 2015
Flight Time:	558 hours (Total, all aircraft), 110 hours (Total, this make and model), 433 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AEROPRO CZ	**Registration:**	N151J
Model/Series:	A220	**Aircraft Category:**	Airplane
Year of Manufacture:	2013	**Amateur Built:**	
Airworthiness Certificate:	Experimental light sport (Special)	**Serial Number:**	37513
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	March 22, 2016 Condition	**Certified Max Gross Wt.:**	1235 lbs
Time Since Last Inspection:	13 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	179.1 Hrs at time of accident	**Engine Manufacturer:**	Rotax
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	912ULS
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:	PAVD,60 ft msl	**Distance from Accident Site:**	98 Nautical Miles
Observation Time:	17:56 Local	**Direction from Accident Site:**	261°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	16 knots / 21 knots	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	29.87 inches Hg	**Temperature/Dew Point:**	25°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	McCarthy, AK (15Z)	**Type of Flight Plan Filed:**	VFR
Destination:	WASILLA, AK (IYS)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	MCCARTHY 15Z	**Runway Surface Type:**	Dirt;Grass/turf
Airport Elevation:	1532 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	61.428611,-142.925003(est)

Administrative Information

Investigator In Charge (IIC):	Williams, David
Additional Participating Persons:	William Lowen; FAA; Anchorage, AK Jordan Paskevich; Rotax Aircraft Engines; Vernon
Original Publish Date:	September 11, 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=93647