



# Aviation Investigation Final Report

<b>Location:</b>	Cottonwood, California	<b>Accident Number:</b>	WPR19LA017
<b>Date &amp; Time:</b>	October 30, 2018, 09:24 Local	<b>Registration:</b>	N6414X
<b>Aircraft:</b>	Cessna 180	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Fuel related	<b>Injuries:</b>	1 Serious
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The pilot was approaching the destination airport at an altitude of about 1,500 ft about 1.5 miles from the runway threshold, when he attempted to add power by advancing the throttle, but "nothing happened." He "cycled" the mixture and the magnetos, but there was no change, and the airplane descended below the desired glidepath. The pilot did not use carburetor heat during the approach, and he did not apply it following the engine's failure to respond to the advanced throttle setting. The pilot chose to conduct an off-airport landing in a field, during which the airplane stalled while the pilot attempted to maneuver over power lines.

There was no evidence of any fuel or oil leaks, thermal or fire damage, or any nonimpact-related deficiencies or damage. During a test run, the engine started and functioned normally, except that the maximum rpm achieved was slightly below the design specification. The examination and testing did not reveal any mechanical reasons for the power loss reported by the pilot.

The ambient temperature and dew point in the area of the accident site about the time of the accident were conducive to the development of carburetor icing. Given the lack of mechanical anomalies and the pilot's failure to apply carburetor heat during the descent and following the engine's lack of response to the power increase, it is likely that the engine developed carburetor ice during the approach at the reduced throttle setting, which resulted in the engine's failure to respond to the pilot's throttle change. The pilot's failure to apply carburetor heat during the reduced power descent was contrary to the airplane manufacturer's Owner's Manual guidance.

## Probable Cause and Findings

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

A partial loss of engine power due to carburetor icing as a result of the pilot's failure to apply carburetor heat during a reduced-power approach descent.

## Findings

Personnel issues	Use of equip/system - Pilot
Personnel issues	Lack of action - Pilot
Environmental issues	Conducive to carburetor icing - Effect on equipment

# Factual Information

## History of Flight

Approach	Fuel related (Defining event)
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On October 30, 2018, about 0924 Pacific daylight time, a Cessna 180D airplane, N6414X, was substantially damaged when it was involved in an accident near Cottonwood, California. The private pilot sustained serious injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot was conducting a cross-country flight to his mechanic’s facility to have maintenance completed on his airplane. About 4 miles from the destination, at an altitude of about 2,500 ft, the pilot extended the wing flaps about 20° and slowed the airplane to about 65 mph. When the airplane was about 1.5 miles from the runway threshold, at an altitude of about 1,500 ft and a power setting of about 17 inches of manifold pressure, the pilot advanced the throttle to add power to maintain altitude, but "nothing happened." He "cycled" the mixture and the magnetos, but there was no change, and the airplane descended below the desired glidepath. The pilot did not use carburetor heat during the approach, and he did not apply it in an attempt to rectify the lack of engine response. Because the airport was situated on a bluff that was about 300 ft higher than the flat terrain under the approach path, the pilot decided to conduct an off-airport landing in a field.

During the approach to the field, the pilot observed a set of power lines ahead and tried to maneuver the airplane over them to avoid a wire strike. The pilot reported that during the attempted maneuver, he "glanced at the airspeed indicator and saw 40 mph." The airplane experienced an aerodynamic stall and "pancaked" onto the ground.

The airplane came to rest upright in a level field about 3,300 ft short of the runway threshold. The engine cowling and forward fuselage were crushed and fractured, and the right-side cabin door had separated.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	62, Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<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>	BasicMed With waivers/limitations	<b>Last FAA Medical Exam:</b>	August 6, 2017
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	1282 hours (Total, all aircraft), 510 hours (Total, this make and model), 1178 hours (Pilot In Command, all aircraft), 65 hours (Last 90 days, all aircraft), 18 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N6414X
<b>Model/Series:</b>	180 D	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1960	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	18050914
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	September 21, 2018 Annual	<b>Certified Max Gross Wt.:</b>	
<b>Time Since Last Inspection:</b>	25 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	8190 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>	C91 installed, not activated	<b>Engine Model/Series:</b>	O-470 SERIES
<b>Registered Owner:</b>		<b>Rated Power:</b>	230 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

The airplane's most recent annual inspection was completed in September 2018, and the airplane had accumulated about 25 hours between that inspection and the accident.

The Owner's Manual (OM) BEFORE LANDING checklist stated that the fuel selector valve should be set to "BOTH" (ON).

The OM landing guidance included two mentions of carburetor heat. The LET-DOWN checklist stated, "Apply enough carburetor heat to prevent carburetor icing if icing conditions exist." The BEFORE LANDING checklist stated, "Apply carburetor heat before closing throttle."

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	RDD,505 ft msl	<b>Distance from Accident Site:</b>	10 Nautical Miles
<b>Observation Time:</b>	09:53 Local	<b>Direction from Accident Site:</b>	360°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	10 knots / 19 knots	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	340°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.2 inches Hg	<b>Temperature/Dew Point:</b>	17°C / 1°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Palo Alto, CA (PAO )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Cottonwood, CA (68CA)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	08:00 Local	<b>Type of Airspace:</b>	Unknown

The 0853 automated weather observation at Redding Municipal Airport (RDD), located about 10 miles north of 68CA, included wind from 340° at 9 knots with gusts to 15 kts, 10 miles visibility, clear skies, temperature 15°C, dew point 1°C, and an altimeter setting of 30.20 inches of mercury.

The 0953 RDD automated weather observation included wind from 340° at 10 knots with gusts to 19 kts, 10 miles visibility, clear skies, temperature 17°C, dew point 1°C, and an altimeter setting of 30.21 inches of mercury.

When the temperature and dew point values were located on a chart that depicted carburetor ice envelopes, the points were either in the envelope labeled "Icing (glide and cruise power)" or "Serious Icing (glide power)."

## Airport Information

<b>Airport:</b>	Lake California Air Park 68CA	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	615 ft msl	<b>Runway Surface Condition:</b>	Vegetation
<b>Runway Used:</b>	32	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	3000 ft / 75 ft	<b>VFR Approach/Landing:</b>	Forced landing;Straight-in

## 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>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious	<b>Latitude, Longitude:</b>	40.351112,-122.205276

The left main landing gear was fracture-separated from the airframe, and the outboard left wing was crumpled. One blade of the all-metal, two-blade propeller was bent aft, while the other blade appeared undamaged. There was no fire. Both fuel caps were securely installed. The responding fire chief reported that he found the fuel selector valve set to the left tank and that he turned it to the BOTH OFF position as a safety precaution. Law enforcement photographs indicate that the carburetor heat control was in the full-forward position, which is the carburetor heat off position.

The mechanic who had previously worked on the airplane, and who was notified of the accident by the pilot, responded to the scene. He reported that there were no indications of any fuel leakage on the exterior of the airplane or on the ground beneath the airplane.

Examination of the accident site revealed that the airplane impacted the ground prior to reaching the powerlines, slid about 75 ft, and came to rest under the powerlines.

There was no evidence of any fuel or oil leaks. The fuel selector valve was tested with both low-pressure air and water, and, in all position, test cases, the selector valve functioned per design.

The engine was relatively undamaged. Parts of the exhaust system were crushed, bent, or displaced from impact, and the carburetor airbox was crushed. The forward oil sump pan was pushed in/up and aft, but it was not cracked or otherwise breached. The throttle and mixture cables had been cut forward of the firewall by the first recovery mechanic. The throttle and mixture cockpit controls moved freely, and their motion was observed at the respective cable cuts. The other cable ends remained attached to the carburetor. The carburetor heat control cable was uncut and continuous. The carburetor heat control and door appeared undamaged but were extremely difficult to move/actuate.

The magnetos and all other engine accessories remained securely attached. All leads and spark plugs were securely and properly installed. The upper six spark plugs were removed, and all exhibited clean, normal-appearance electrodes. With the upper spark plugs still removed, the engine crankshaft was rotated via the propeller flange, and thumb compressions were achieved on all six cylinders.

The engine was prepared for test runs in an engine cell, which required removal or installation of some ancillary components. The carburetor, which had been removed for shipping, was reinstalled. The magneto timing was found to be advanced about 2° from the specification value of 22°. The cylinders were borescoped via the top spark plug holes. All spark plugs, cylinder walls, valves, and valve seats were unremarkable in appearance. Some minor debris (consistent with flaked-off combustion deposits)

was observed in a few cylinders.

After installation in the test cell, the engine was started successfully. It was allowed to warm up, and then run briefly at all the test rpm values except the maximum (redline) value of 2,600 rpm; the maximum (full throttle) rpm achievable was about 2,400 rpm. The engine was shut down and the propeller blades re-pitched about 1° flatter.

The engine was re-started and run to determine the maximum achievable (full throttle) rpm; this value improved to about 2,485. The full test run was accomplished again, except for the 2,600-rpm test point. The engine operated normally at all tested rpm values, including the full throttle value that was just short of 2,600 rpm. All EGT, CHT, and oil pressure values were normal. Fuel flow values were all normal except at full throttle; the observed full throttle fuel flow value of 21.5 gallons per hour at 2,485 rpm was higher than expected/normal. The engine shut down normally after the test.

The carburetor was removed from the engine, examined, and disassembled. No external irregularities were noted. All internal components were normal in appearance, except for the fuel inlet screen. The fuel inlet screen had several hair-like fibrous strands of undetermined origin or composition, but their size and quantity were insufficient to result in any fuel flow decrease.

The examination and testing did not reveal any reasons for the power loss reported by the pilot. The reason(s) that the engine was unable to reach redline full throttle rpm were not conclusively determined but based on the high fuel flow values observed at full throttle, it was likely that the engine was running too rich to achieve the target 2,600 rpm value. However, the issue was likely unrelated to the loss of engine power because the pilot-reported engine power loss occurred at a low engine power setting.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Huhn, Michael		
<b>Additional Participating Persons:</b>	Craig Miller; FAA; Sacramento, CA Kurt Gibson; Continental Motors; Mobile, AL Henry Soderlund; Textron Aviation; Wichita, KS		
<b>Original Publish Date:</b>	September 16, 2021	<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.nts.gov/Docket?ProjectID=98571">https://data.nts.gov/Docket?ProjectID=98571</a>		

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