



# Aviation Investigation Final Report

<b>Location:</b>	Jerome, Idaho	<b>Accident Number:</b>	WPR19LA157
<b>Date &amp; Time:</b>	May 14, 2019, 09:19 Local	<b>Registration:</b>	N965CV
<b>Aircraft:</b>	Vought F4U-7	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Miscellaneous/other	<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

Following an annual inspection, the mechanic who conducted the inspection was unable to conduct a test flight due to weather conditions but did perform several engine runs, during which he adjusted the fuel enrichment setting. The mechanic told the pilot before the accident flight that he would have to lean the engine manually while on the ground instead of using the auto-lean mixture setting, as the engine would run rich.

Before taking off, the pilot placed the mixture in the auto-lean position. The engine sputtered, and the pilot saw black smoke originate from the exhaust. The pilot then manually leaned the engine, and “it cleared up.” The pilot placed the mixture in the auto-rich position, performed a magneto check, then taxied onto the runway, but the engine “loaded up” a second time. The pilot stated that he manually leaned the engine, then moved the mixture to the auto-rich position while he advanced the throttle to 30 inches of manifold pressure. He said that he held this power setting for about 1 minute before initiating the takeoff. As the airplane accelerated past about 100 to 110 knots, the engine “coughed”, and the pilot reduced power to idle and aborted the takeoff but “ran out of runway.” The airplane exited the right side of the runway and impacted a dirt berm and fence before it came to rest upright.

Postaccident examination of the engine revealed no evidence of any mechanical malfunction that would have precluded normal operation and production of power, which included no evidence of preignition or detonation within each cylinder. During functional tests of the carburetor, it was found that, at high power settings, the fuel flow was lower than specified limits and would result in a lean fuel/air mixture. However, at lower power settings, the fuel/air mixture was within or slightly higher than specified limits. While it is likely that the lean fuel/air mixture at higher power settings could have resulted in detonation, no signatures were observed to suggest that it occurred.

The pilot stated that he wanted to get the airplane to an airshow and relied on the information provided to him by the mechanic. He reported that, in hindsight, he should have not flown the airplane and had the carburetor removed for overhaul.

# Probable Cause and Findings

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

The pilot’s decision to fly the airplane with a known mechanical deficiency.

## Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Use of equip/system - Pilot
Aircraft	Fuel control/carburetor - Incorrect use/operation

# Factual Information

## History of Flight

Takeoff	Miscellaneous/other (Defining event)
Takeoff-rejected takeoff	Runway excursion
Takeoff-rejected takeoff	Collision with terr/obj (non-CFIT)

On May 14, 2019, about 0919 mountain daylight time, a Vought F4U-7 airplane, N965CV, was substantially damaged when it was involved in an accident near Jerome, Idaho. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that the airplane had just finished undergoing an annual inspection that spanned 8 months. After arriving to the airport, he looked over the airplane and asked his mechanic if he had flown the airplane. The mechanic responded that he “couldn’t get it running;” however, “he adjusted everything, and got things working.” The pilot said that his mechanic told him that the engine was “loading up” on the ground and that the engine would have to be manually leaned instead of using the mixture in the auto-lean position; however, it should not be a problem in the auto-rich position.

The pilot conducted a preflight inspection and taxied the airplane to the end of the runway, where he placed the mixture in the auto-lean position. He subsequently saw black smoke originate from the exhaust, and the engine sputtered. The pilot manually leaned the engine, and “it cleared up.” The pilot placed the mixture in the auto-rich position, performed a magneto check, then taxied onto the runway, where the engine “loaded up” a second time. The pilot stated that he manually leaned the engine, then moved the mixture to the auto-rich position while he advanced the throttle to 30 inches of manifold pressure. He said that he held this power setting for about 1 minute, and, after detecting no anomalies, he initiated the takeoff roll.

The pilot stated that, as the airplane accelerated beyond 100 to 110 knots, the engine “coughed” and he reduced power to idle and aborted the takeoff but “ran out of runway.” The airplane exited the right side of the runway and impacted a dirt berm and fence before it came to rest upright.

The mechanic reported that, while watching the airplane during the takeoff, the engine gradually came up to power, and appeared to reach full power. The mechanic said that, at the time he would have expected the airplane to become airborne, the airplane remained on the runway in a tail-high attitude. The mechanic said that about that time, the airplane was passing midfield, and the tail of the airplane appeared very high shortly before the pilot aborted the takeoff.

A video of the takeoff and accident sequence was captured by a witness located on the airport property. The video showed the airplane in a slight tail-low attitude during the takeoff roll. Shortly after the airplane passed the windsock and airport weather reporting station, a reduction in engine power was heard (refer to the following figure). Shortly thereafter, a streak of smoke originated from the left main

landing gear. About 3 seconds later, as the tail of the airplane transitioned onto the ground, another streak of smoke originated from the left main landing gear. The airplane was observed exiting the right side of the runway and became airborne briefly before it impacted the ground and cartwheeled.

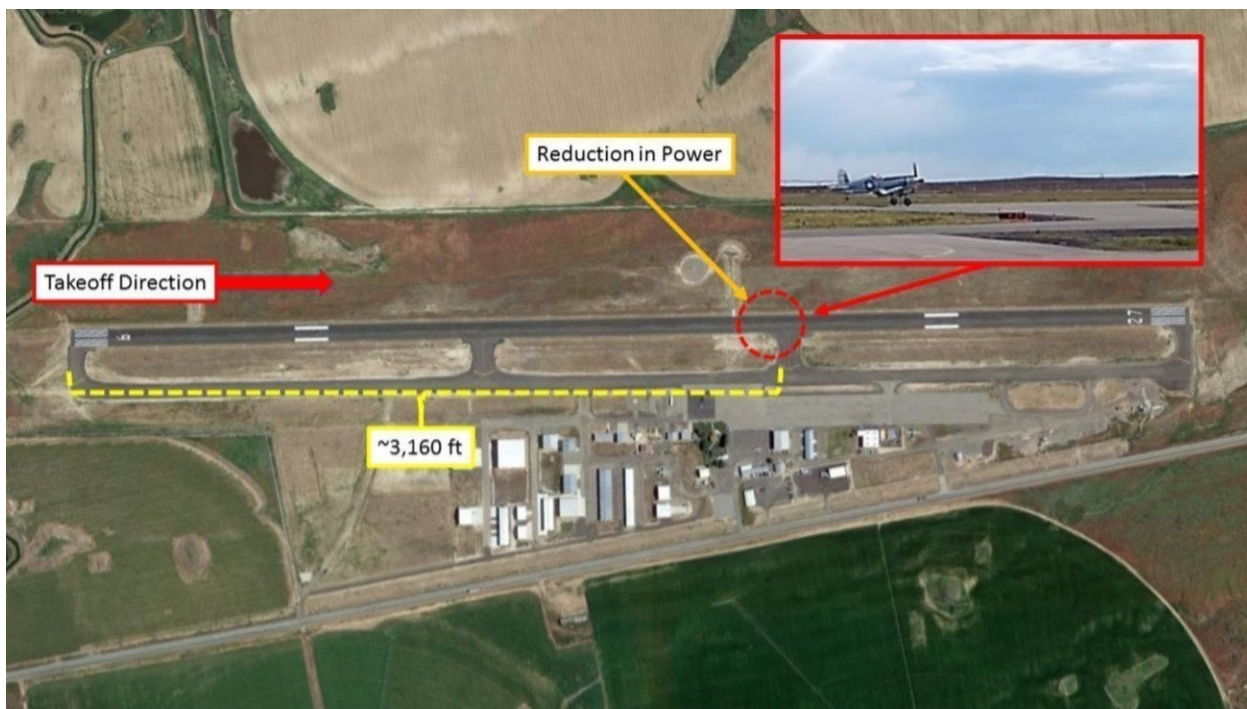


Figure 1: Diagram showing the area where a reduction of power was heard along with a screen shot from the captured video.

The mechanic reported that, in the days before the accident, he secured the airplane and conducted an engine run at full power. The mechanic said that he made fuel enrichment changes on the ground and told the pilot that the engine would run rich on the ground and that he should manually lean it but to use auto-rich at full power. The mechanic added that the engine ran well for him during all previous engine runs. Additionally, the mechanic said that he did not test fly the airplane before the pilot's arrival due to weather conditions and was later told by the pilot that he would fly it.

The pilot stated that, in hindsight, he should not have flown the airplane but that he did because he wanted to get the airplane to an airshow and relied on the information provided by the mechanic. The pilot stated that he should have removed the carburetor for overhaul instead.

Postaccident examination of the airplane revealed that the left-wing aft spar was structurally damaged. Examination of the engine by a mechanic under the supervision of a Federal Aviation Administration inspector revealed that magneto-to-engine timing was correct. Thumb compression was obtained on all cylinders. Borescope examination of the cylinders revealed no evidence of detonation or preignition. The magnetos were removed and installed on a test bench. When tested, both magnetos functioned normally. The carburetor was undamaged and was removed for functional testing.

The carburetor was further inspected at the facilities of Vintage Carburetors, Tehachapi, California, under the supervision of a National Transportation Safety Board investigator. The carburetor was

installed on a test bench and functionally tested at various settings. During the flow tests, the fuel flow rates for higher power settings were below, or leaner, than the specified fuel flow limits. At lower power settings, the fuel flow rates were either within or slightly higher than specified limits.

The carburetor was removed from the test bench and disassembled and inspected. During the disassembly, the enrichment valve diaphragm was found intact; however, the diaphragm was noted to be stiff. According to representatives from Vintage Carburetors, the stiff enrichment valve diaphragm would cause the fuel flow at the higher settings to be lower than required and would affect the fuel flow in both the auto-lean and auto-rich settings. The company representative further stated that, when the diaphragm of the enrichment valve begins to stiffen, power settings from idle to high cruise power settings will run rich with the mixture lever in the auto-rich and auto-lean positions; however, at higher power settings, such as takeoff power, the fuel flow would be lean if the mixture lever is in the auto-rich position, inducing the possibility of detonation.

### Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	70, Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea	<b>Seat Occupied:</b>	Center
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 With waivers/limitations	<b>Last FAA Medical Exam:</b>	March 4, 2019
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	September 27, 2018
<b>Flight Time:</b>	2160 hours (Total, all aircraft), 51.6 hours (Total, this make and model), 1950 hours (Pilot In Command, all aircraft), 37.08 hours (Last 90 days, all aircraft), 12.7 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Vought	<b>Registration:</b>	N965CV
<b>Model/Series:</b>	F4U-7	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1952	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Experimental (Special)	<b>Serial Number:</b>	965
<b>Landing Gear Type:</b>	Retractable - Tailwheel	<b>Seats:</b>	1
<b>Date/Type of Last Inspection:</b>	January 31, 2021	<b>Certified Max Gross Wt.:</b>	12000 lbs
<b>Time Since Last Inspection:</b>	1632.8 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	at time of accident	<b>Engine Manufacturer:</b>	Pratt & Whitney
<b>ELT:</b>	C126 installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	R2800
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	2000 Horsepower
<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>	KJER, 4048 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	14:53 Local	<b>Direction from Accident Site:</b>	285°
<b>Lowest Cloud Condition:</b>	Few / 11000 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>		<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	5 knots / None	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	130°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	29.97 inches Hg	<b>Temperature/Dew Point:</b>	17°C / 7°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Jerome, ID (JER)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Rock Springs, WY (RKS)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	09:19 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	JEROME COUNTY JER	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	4053 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	09	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	5001 ft / 75 ft	<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Minor	<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 Minor	<b>Latitude, Longitude:</b>	42.725276,-114.447219(est)



## Administrative Information

<b>Investigator In Charge (IIC):</b>	Cawthra, Joshua
<b>Additional Participating Persons:</b>	Cara Barbera; Federal Aviation Administration; Boise, ID
<b>Original Publish Date:</b>	May 3, 2022
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<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=99515">https://data.nts.gov/Docket?ProjectID=99515</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).