



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	TEHACHAPI, California	Accident Number:	WPR18LA246
Date & Time:	August 30, 2018, 19:02 Local	Registration:	N2167V
Aircraft:	Cessna 140	Aircraft Damage:	Substantial
Defining Event:	Fuel exhaustion	Injuries:	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During the preflight inspection, the pilot determined that the left fuel tank was empty and the right tank contained 4 gallons of fuel (capacity 12 1/2 gallons). After discovering that the airport fuel pumps were inoperative, the pilot decided to proceed with the flight and remain in the airport traffic pattern.

The pilot performed a series of touch-and-go takeoff and landings and during the initial climb phase of the fifth takeoff, the engine lost total power. The pilot attempted a 180° turn back to the runway, during which the airplane impacted the taxiway, resulting in substantial damage.

Due to the airplane's vintage, operational and performance details such as fuel consumption and unusable fuel quantity were unavailable; however, a placard on the fuel gauges indicated that takeoff should not be attempted if the tank was filled to just under 1/4 of its capacity. It is likely that the airplane consumed the remainder of the usable fuel during the flight, which resulted in fuel exhaustion and the total loss of engine power.

Probable Cause and Findings

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

The pilot's inadequate fuel planning, which resulted in fuel exhaustion and a total loss of engine power during the initial climb.

Findings

Aircraft	Fuel - Fluid level
Personnel issues	Fuel planning - Pilot

Factual Information

History of Flight

Initial climb	Fuel exhaustion (Defining event)
Emergency descent	Collision with terr/obj (non-CFIT)

On August 30, 2018, at 1902 Pacific daylight time a Cessna 140, N2167V, was substantially damaged when it was involved in an accident near Tehachapi, California. The private pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot stated that during the preflight inspection, she utilized a dipstick and determined that the left fuel tank was empty and the right tank contained 4 gallons of fuel. She taxied the airplane to the fuel pumps, but upon arrival, discovered that they were inoperative. Based on fuel consumption during previous flights, she concluded that she had enough fuel for 30 minutes of flight, and decided to proceed with the flight and remain in the traffic pattern for runway 29.

The pilot performed a series of touch-and-go takeoff and landings. About 20 minutes into the flight, during the fifth landing roll, she decided to perform one more takeoff. Shortly after rotation, about 50 ft above ground level, the engine lost total power. With limited runway available, and hangars to the left and a busy highway to the right, she decided to attempt a 180° left turn back to the runway. During the turn, the airplane struck the adjacent taxiway to the south, its left main landing gear collapsed, and it came to rest left wing down.

According to Federal Aviation Administration (FAA) records, the high-wing airplane was manufactured in 1947 and purchased by the pilot in May 2018. It was originally equipped with a Continental C-90 engine and refitted with a Continental O-200-A engine in October 2000.

The airplane was equipped with 12 ½-gallon fuel tanks in each wing, both fitted with a mechanical direct reading fuel quantity gauge, installed at the wing roots and visible within the cabin. The fuel gauges were placarded with graduations noting F [full], 3/4, 1/2, and 1/4 tank capacity. The area below the 1/4 marking was shaded red in color with the marking, "NO TAKE OFF."

Fuel was gravity-fed from the tanks to a tank selector valve mounted on the cabin floor. The selector valve provided settings for fuel flow from either the right or left tank, shut-off, and a "both" position to provide fuel flow from both tanks simultaneously. The tanks were interconnected with a vent line.

Due to the vintage of the airplane, limited operational and performance details were available, and useable fuel and fuel consumption with the equipped O-200-A engine could not be confirmed. According to the 1969 Cessna 150(J) Owner's Manual, the Continental O-200-A engine consumed between 3.0 and 6.4 gallons of fuel per hour while flying at an altitude of 5,000 feet msl. The manual estimated the fuel used during takeoff and climb at sea level was 0.6 gallons, and 1.6 gallons from sea level to 5,000 ft. The climb consumption included allowances for engine warm-up and takeoff.

An FAA inspector and an A&P mechanic examined the airplane following the accident. They did not observe any indications of pre-accident mechanical failure, and the fuel selector valve appeared set to the right tank. During the examination, they drained about 4 1/2 gallons of total fuel from the airplane, 3 gallons of which they determined was from the right tank.

Pilot Information

Certificate:	Private	Age:	28,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:	Class 3 Without waivers/limitations	Last FAA Medical Exam:	July 20, 2015
Occupational Pilot:	No	Last Flight Review or Equivalent:	May 19, 2018
Flight Time:	173.8 hours (Total, all aircraft), 67.6 hours (Total, this make and model), 136.5 hours (Pilot In Command, all aircraft), 50 hours (Last 90 days, all aircraft), 15.1 hours (Last 30 days, all aircraft), 0.4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N2167V
Model/Series:	140 Undesignat	Aircraft Category:	Airplane
Year of Manufacture:	1947	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	14396
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	August 23, 2018 Annual	Certified Max Gross Wt.:	1450 lbs
Time Since Last Inspection:	2 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	3806.31 Hrs at time of accident	Engine Manufacturer:	Continental
ELT:	C91 installed, activated, did not aid in locating accident	Engine Model/Series:	O-200-A
Registered Owner:		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:	KTSP,4001 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	02:15 Local	Direction from Accident Site:	118°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	10 knots / 14 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	310°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.09 inches Hg	Temperature/Dew Point:	19°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	TEHACHAPI, CA (TSP)	Type of Flight Plan Filed:	None
Destination:	TEHACHAPI, CA (TSP)	Type of Clearance:	None
Departure Time:	19:01 Local	Type of Airspace:	Class G

Airport Information

Airport:	Tehachapi Muni TSP	Runway Surface Type:	Asphalt
Airport Elevation:	4001 ft msl	Runway Surface Condition:	Dry
Runway Used:	29	IFR Approach:	None
Runway Length/Width:	4040 ft / 75 ft	VFR Approach/Landing:	Forced landing;Traffic pattern

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:	35.137222,-118.444168

Administrative Information

Investigator In Charge (IIC):	Simpson, Elliott		
Additional Participating Persons:	Shane Cavette; Federal Aviation Administration FSDO ; Van Nuys, CA		
Original Publish Date:	May 27, 2021	Investigation Class:	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=98198		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).