Aviation Investigation Final Report

Location:	Oxnard, California	**Accident Number:**	WPR22LA243
Date & Time:	July 10, 2022, 14:25 Local	**Registration:**	N6416U
Aircraft:	Mooney M20C	**Aircraft Damage:**	Substantial
Defining Event:	Fuel starvation	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that, the day before the accident, he filled the airplane to capacity with fuel and then flew 50 miles to his home base. On the day of the accident, he visually examined the fuel tanks through the filler caps but did not use a dipstick. The right tank was full, and he determined that the left fuel tank contained about 15 gallons. He selected the right tank for takeoff and initial cruise, however the selector valve handle felt stiffer than usual.

About halfway into the flight as he was about to switch tanks, he noticed that the right fuel tank gauge was still indicating full, but the left tank was empty. He confirmed the right tank was selected, but a short time later the engine lost all power. He performed trouble shooting steps and moved the fuel selector valve back and forth, but it now felt loose. A forced landing was initiated at a nearby airport, however, the airplane landed short of the runway, struck a fence, and the right wing sustained substantial damage.

Post-accident examination revealed that the right fuel tank had been breached on impact and contained no fuel, and although the left fuel tank was intact, it was empty. There was no fuel in the line from the fuel selector valve to the carburetor, and the carburetor bowl was empty. Both fuel caps were in place at their respective filler necks, all fuel lines fittings were tight, and there was no evidence on the airframe or wings of staining or streaks to indicate an inflight fuel leak.

The fuel selector valve handle was pointing to the right tank and could be moved between positions but felt tight and had a rasping action. Once in the respective tank positions, the handle was loose, and no definitive detent was felt. Further examination revealed that the handle was slipping on the selector shaft, which remained stationary at the left tank position.

Mooney specifications called for the handle to be keyed in position with a roll pin fitted to the shaft and secured with a set screw. Examination revealed that the roll pin had previously broken, and the handle was instead held in place with an oversized stainless-steel screw in place of the set screw. The screw appeared to have come loose, such that without the roll pin it was not positively attached to the shaft.

Under this condition, movement of the handle did not result in movement of the fuel sector valve, and it was stuck in the left position throughout the accident and previous flights.

A photo of the instrument panel that the pilot stated he took about 40 minutes before the loss of engine power indicated that the airplane was flying at an altitude of 6,500 ft. The left tank contained between 8 and 10 gallons of fuel. This should still have been sufficient for continued flight beyond the accident location. However, the accuracy of the gauges could not be determined, and the airplane was not equipped with a secondary fuel quantity reference device such as a totalizer. Additionally, because the pilot did not dip the tank before takeoff, the true quantity of preflight fuel could not be determined.

Probable Cause and Findings

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

Fuel starvation due to an inappropriately maintained and modified fuel selector valve.

Findings

Aircraft	Fuel selector/shutoff valve - Fatigue/wear/corrosion
Personnel issues	Modification/alteration - Other
Aircraft	Fuel - Fluid management

Factual Information

History of Flight

Enroute-cruise	Fuel starvation (Defining event)
Enroute-cruise	Loss of engine power (total)
Approach-VFR pattern final	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Private	**Age:**	30,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	June 1, 2021
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	January 3, 2022
Flight Time:	(Estimated) 100.4 hours (Total, all aircraft), 17.4 hours (Total, this make and model), 50 hours (Pilot In Command, all aircraft), 10 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N6416U
Model/Series:	M20C	**Aircraft Category:**	Airplane
Year of Manufacture:	1962	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	2163
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 5, 2021 Annual	**Certified Max Gross Wt.:**	2575 lbs
Time Since Last Inspection:	16 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5089.34 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	O-360-A1D
Registered Owner:	On file	**Rated Power:**	180 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:	OXR	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	14:51 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	260°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	22°C / 15°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Carlsbad, CA (CRQ)	**Type of Flight Plan Filed:**	None
Destination:	Oxnard, CA (OXR)	**Type of Clearance:**	None
Departure Time:	13:35 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	OXNARD OXR	**Runway Surface Type:**	Asphalt
Airport Elevation:	44 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	25	**IFR Approach:**	None
Runway Length/Width:	5953 ft / 100 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	34.200673,-119.19487

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott
Additional Participating Persons:	Jeffrey W. Fritz; FAA FSDO; Van Nuys, CA
Original Publish Date:	May 11, 2023
Last Revision Date:	
Investigation Class:	Class 4
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=105445