



Aviation Investigation Final Report

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|--------------------------------|--------------------------------------|-------------------------|-------------|
| 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

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

Factual Information

History of Flight

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|-----------------------------------|------------------------------------|
| 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

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|----------------------------------|---|--|-----------------|
| 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

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|--------------------------------------|-----------------------------------|---------------------------------------|-----------------|
| 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

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|---|----------------------------------|---|------------------|
| 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

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|-----------------------------|------------------|----------------------------------|----------------|
| 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

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|----------------------------|--------|-----------------------------|----------------------|
| 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

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| Investigator In Charge (IIC): | Simpson, Elliott |
| 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 |

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](#).