



# Aviation Investigation Final Report

|                                |                                      |                         |             |
|--------------------------------|--------------------------------------|-------------------------|-------------|
| <b>Location:</b>               | Helena, Montana                      | <b>Accident Number:</b> | WPR21LA313  |
| <b>Date &amp; Time:</b>        | August 11, 2021, 09:00 Local         | <b>Registration:</b>    | N783MB      |
| <b>Aircraft:</b>               | Cessna 425                           | <b>Aircraft Damage:</b> | Substantial |
| <b>Defining Event:</b>         | Loss of engine power (total)         | <b>Injuries:</b>        | 3 Serious   |
| <b>Flight Conducted Under:</b> | Part 91: General aviation - Business |                         |             |

## Analysis

The pilot stated that on the morning of the accident he filled both wing fuel tanks to full. After takeoff, he climbed to his planned cruise altitude of 24,000 ft mean sea level (msl). While en route to his destination, the pilot reported that the left engine experienced a flame-out. The pilot opted to divert from the originally planned destination and descended. When the airplane was about 7,900 ft msl, the pilot reported that the right engine experienced a loss of power and that he was not going to be able to make it to the airport. Shortly thereafter, the airplane collided with trees and the airplane came to rest with the right wing and empennage severed from the fuselage.

There was fuel in the wing tanks at the time of the impact. Postaccident examination of the wreckage did not reveal any anomalies. A partial amount of fuel was found in both of the filter bowls, but it is unknown if fuel was able to reach the engines. A complete examination of the fuel system could not be completed due to the damage incurred to the airplane at impact. Both engines flaming out within a short time of one another is likely indicative of a fuel supply or delivery issue; however, the nature of the problem could not be identified during postaccident examination.

## Probable Cause and Findings

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

A flameout of both engines due to fuel starvation for reasons that could not be determined due to the airplane’s damage.

## Findings

**Aircraft**

(general) - Unknown/Not determined

# Factual Information

## History of Flight

|                   |   |
|-------------------|---|
| Emergency descent | Loss of engine power (total) (Defining event) |
|-------------------|---|

On August 11, 2021, about 0900 mountain daylight time, a Cessna 425 Conquest 1, N783MB, sustained substantial damage when it was involved in an accident near Helena, Montana. The pilot and two passengers sustained serious injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 business flight.

The pilot stated that on the morning of the accident he refueled the airplane to full wing tanks by adding an additional 207 gallons of Jet A. Shortly thereafter, he departed from his home airport in Faribault, Minnesota and continued to his destination at a cruise altitude of 24,000 ft mean sea level.

Air Traffic Control transmissions and automatic dependent surveillance-broadcast data indicate that, while en route at 0847:35, the pilot reported to an air traffic controller that the airplane had an engine [left engine] flame-out and requested a descent. The pilot opted to divert from the originally planned destination and contacted Helena approach control. He stated that the airplane was 16 miles from Helena and descending through 19,000 ft, advising the controller that he may need to lose altitude to land on runway 27. The controller responded that the pilot could maneuver north of the airport to align with the right base leg of the traffic pattern to the runway.

At 0852:59 the pilot reported to the air traffic controller that he had an hour and a half of fuel on board and about 3 minutes later the airplane made a right turn to the north. At 0857:15, with the airplane about 7,900 ft msl, the pilot reported that the right engine experienced a loss of power (see Figure 1 below). At 0859:02, the pilot reported the airplane was going to collide with trees. The airplane came to rest with the right wing and empennage severed from the fuselage. There was fuel onboard the airplane at the time of impact, the quantity is unknown due to the fuel tanks being breached. The pilot estimated there was about 400 pounds in each tank at the time of the occurrence.

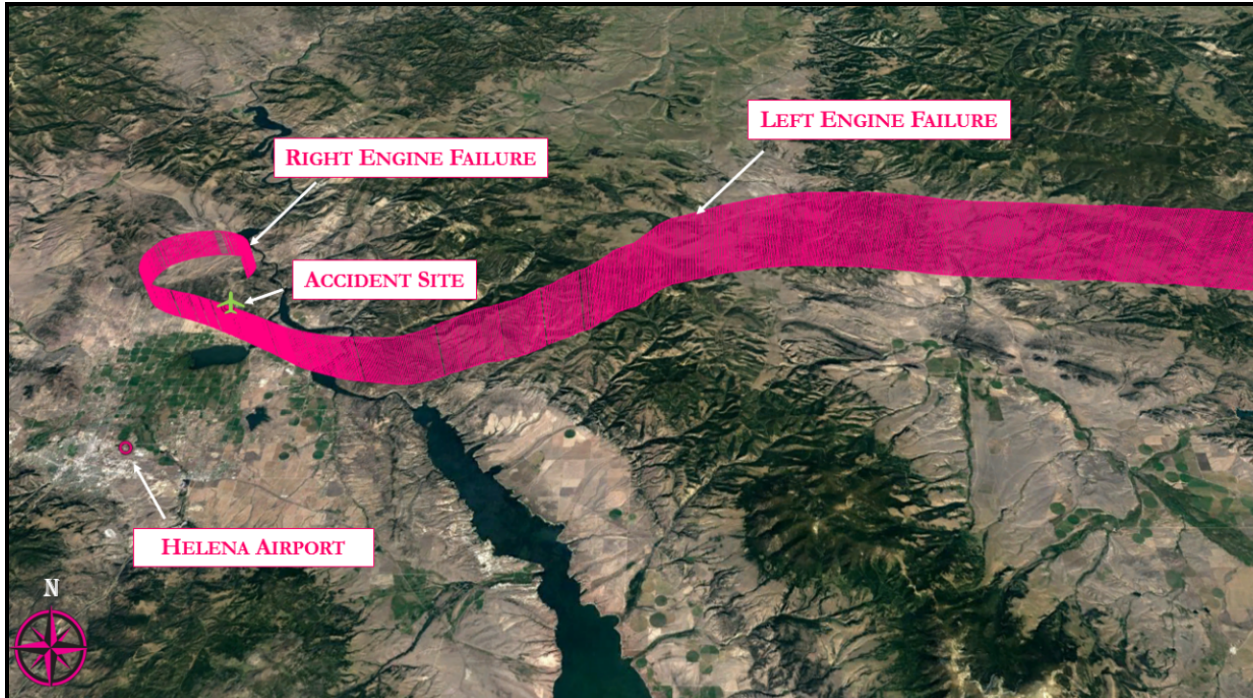


Figure 1: Flight Track Plot

The pilot noted that the airplane had undergone an annual inspection about 5 months before the accident, in March 2021. The airplane had accumulated about 20 flight hours since that inspection.

During the examination of both the left and right engines, no evidence of a failure or anomaly was found. The left engine's compressor section showed the ability to rotate the first stage compressor wheel by hand, but the power section, specifically the propeller shaft, could not be manually rotated. The reduction gearbox had no damage to the case, but the propeller shaft was broken and the propeller flange was missing. Buckling was observed in the exhaust duct. The gas generator case, accessory gearbox, inlet case, and inlet screen were undamaged. The fuel control unit's (FCU) connecting arm moved freely, but the reversing lever guide pin was bent and the carbon block was missing. The pneumatic lines, oil and fuel filters, power turbine (PT) blades, and first stage blades in the compressor section were intact and without damage. In the right engine, similar findings were observed with intact components in the compressor section, reduction gearbox, gas generator case, accessory gearbox, inlet case, and inlet screen. The power control linkage and reversing linkage were properly connected with intact hardware and safety mechanisms. The pneumatic lines, oil and fuel filters, PT blades, first stage blades in the compressor section, propeller shaft, and propeller retention bolts were undamaged. The controls and accessories, including the FCU, fuel pump, ignition system, fuel nozzles, flow divider, air system's bleed valve, propeller governor, and torque transducer, were all undamaged.

Both fuel pumps were inspected, and no contamination was detected in the removed filters. A partial amount of fuel was found in both filter bowls. A complete examination of the fuel system could not be completed due to the damage incurred to the airplane at impact.

According to the engine manufacturer, if an engine flames out in flight due to fuel starvation, it does not leave behind unique evidence different than a normal engine shut down. He added that both engines flaming out within a short time is not consistent with any dual-engine aircraft systemic design behaviors that could have occurred other than a fuel supply or delivery issue.

### Pilot Information

|                                  |  |  |                   |
|----------------------------------|--|--|-------------------|
| <b>Certificate:</b>              | Private  | <b>Age:</b>                              | 61, Male          |
| <b>Airplane Rating(s):</b>       | Single-engine land; Single-engine sea; Multi-engine land                             | <b>Seat Occupied:</b>                    | Left              |
| <b>Other Aircraft Rating(s):</b> | None   | <b>Restraint Used:</b>                   | 3-point           |
| <b>Instrument Rating(s):</b>     | Airplane   | <b>Second Pilot Present:</b>             | No                |
| <b>Instructor Rating(s):</b>     | None   | <b>Toxicology Performed:</b>             |                   |
| <b>Medical Certification:</b>    | Class 2 With waivers/limitations   | <b>Last FAA Medical Exam:</b>            | December 19, 2019 |
| <b>Occupational Pilot:</b>       | No   | <b>Last Flight Review or Equivalent:</b> |                   |
| <b>Flight Time:</b>              | (Estimated) 6000 hours (Total, all aircraft), 800 hours (Total, this make and model) |  |                   |

### Passenger Information

|                                  |  |  |         |
|----------------------------------|--|--|---------|
| <b>Certificate:</b>              |  | <b>Age:</b>                              |         |
| <b>Airplane Rating(s):</b>       |  | <b>Seat Occupied:</b>                    | Unknown |
| <b>Other Aircraft Rating(s):</b> |  | <b>Restraint Used:</b>                   |         |
| <b>Instrument Rating(s):</b>     |  | <b>Second Pilot Present:</b>             | No      |
| <b>Instructor Rating(s):</b>     |  | <b>Toxicology Performed:</b>             |         |
| <b>Medical Certification:</b>    |  | <b>Last FAA Medical Exam:</b>            |         |
| <b>Occupational Pilot:</b>       |  | <b>Last Flight Review or Equivalent:</b> |         |
| <b>Flight Time:</b>              |  |  |         |

## Passenger Information

|                                  |  |
|----------------------------------|--|
| <b>Certificate:</b>              | <b>Age:</b>                              |
| <b>Airplane Rating(s):</b>       | <b>Seat Occupied:</b> Unknown            |
| <b>Other Aircraft Rating(s):</b> | <b>Restraint Used:</b>                   |
| <b>Instrument Rating(s):</b>     | <b>Second Pilot Present:</b> No          |
| <b>Instructor Rating(s):</b>     | <b>Toxicology Performed:</b>             |
| <b>Medical Certification:</b>    | <b>Last FAA Medical Exam:</b>            |
| <b>Occupational Pilot:</b>       | <b>Last Flight Review or Equivalent:</b> |
| <b>Flight Time:</b>              |  |

## Aircraft and Owner/Operator Information

|   |  |
|---|--|
| <b>Aircraft Make:</b> Cessna  | <b>Registration:</b> N783MB                |
| <b>Model/Series:</b> 425  | <b>Aircraft Category:</b> Airplane         |
| <b>Year of Manufacture:</b> 1982  | <b>Amateur Built:</b>                      |
| <b>Airworthiness Certificate:</b> Normal                                | <b>Serial Number:</b> 425-0103             |
| <b>Landing Gear Type:</b> Retractable - Tricycle                        | <b>Seats:</b> 12                           |
| <b>Date/Type of Last Inspection:</b> May 28, 2021 Annual                | <b>Certified Max Gross Wt.:</b> 8600 lbs   |
| <b>Time Since Last Inspection:</b> 10 Hrs                               | <b>Engines:</b> 2 Turbo prop               |
| <b>Airframe Total Time:</b> 9576 Hrs at time of accident                | <b>Engine Manufacturer:</b> P&W            |
| <b>ELT:</b> C126 installed, activated, did not aid in locating accident | <b>Engine Model/Series:</b> PT6A-112       |
| <b>Registered Owner:</b> On file  | <b>Rated Power:</b> 550 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> | KHLN,3868 ft msl                 | <b>Distance from Accident Site:</b>         | 8 Nautical Miles |
| <b>Observation Time:</b>                | 07:53 Local                      | <b>Direction from Accident Site:</b>        | 186°             |
| <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>                | 14 knots / 25 knots              | <b>Turbulence Type Forecast/Actual:</b>     | None / None      |
| <b>Wind Direction:</b>                  | 270°                             | <b>Turbulence Severity Forecast/Actual:</b> | N/A / N/A        |
| <b>Altimeter Setting:</b>               | 30.03 inches Hg                  | <b>Temperature/Dew Point:</b>               | 23°C / 8°C       |
| <b>Precipitation and Obscuration:</b>   | No Obscuration; No Precipitation |   |                  |
| <b>Departure Point:</b>                 | Fairbault, MN (FBL)              | <b>Type of Flight Plan Filed:</b>           | IFR              |
| <b>Destination:</b>                     | Missoula, MT (MSO)               | <b>Type of Clearance:</b>                   | IFR              |
| <b>Departure Time:</b>                  | 11:05 UTC                        | <b>Type of Airspace:</b>                    |                  |

## Airport Information

|                             |                 |                                  |                |
|-----------------------------|-----------------|----------------------------------|----------------|
| <b>Airport:</b>             | HELENA RGNL HLN | <b>Runway Surface Type:</b>      |                |
| <b>Airport Elevation:</b>   | 3877 ft msl     | <b>Runway Surface Condition:</b> | Dry;Vegetation |
| <b>Runway Used:</b>         |                 | <b>IFR Approach:</b>             | None           |
| <b>Runway Length/Width:</b> |                 | <b>VFR Approach/Landing:</b>     | None           |

## Wreckage and Impact Information

|                            |           |                             |                           |
|----------------------------|-----------|-----------------------------|---------------------------|
| <b>Crew Injuries:</b>      | 1 Serious | <b>Aircraft Damage:</b>     | Substantial               |
| <b>Passenger Injuries:</b> | 2 Serious | <b>Aircraft Fire:</b>       | None                      |
| <b>Ground Injuries:</b>    |           | <b>Aircraft Explosion:</b>  | None                      |
| <b>Total Injuries:</b>     | 3 Serious | <b>Latitude, Longitude:</b> | 46.740278,-111.94416(est) |



## Administrative Information

|  |  |                             |   |
|--|--|-----------------------------|---|
| <b>Investigator In Charge (IIC):</b>     | Keliher, Zoe   |                             |   |
| <b>Additional Participating Persons:</b> | Bill Thomas; Federal Aviation Administration; Helena, MT<br>Jennifer Barclay; Textron - Cessna; Wichita , KS |                             |   |
| <b>Original Publish Date:</b>            | September 20, 2023   | <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=103681">https://data.nts.gov/Docket?ProjectID=103681</a>      |                             |   |

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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](#).