



Aviation Investigation Final Report

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|--------------------------------|--------------------------------------|-------------------------|-------------|
| Location: | Woodward, Oklahoma | Accident Number: | CEN18LA156 |
| Date & Time: | May 2, 2018, 16:20 Local | Registration: | N92WL |
| Aircraft: | LAMINAR Lancair 360 | Aircraft Damage: | Substantial |
| Defining Event: | Fuel related | Injuries: | 2 None |
| Flight Conducted Under: | Part 91: General aviation - Personal | | |

Analysis

The airline transport pilot was conducting a personal flight with a pilot-rated passenger in an experimental, amateur-built airplane. The pilot reported that, during flight at 10,000 ft, the airplane experienced moderate to severe turbulence for a few seconds. Shortly after, the engine stopped producing power without warning. The pilot immediately attempted to restart the engine to no avail. He flew at best glide speed toward the nearest airport, located about 12 nautical miles away, but landed short of the runway in a pasture, during which the airplane encountered sagebrush, which caused the landing gear to collapse as the airplane bounced and skidded to a stop; the fuselage sustained substantial damage.

The examination of the airplane at the accident site revealed that the emergency fuel shutoff valve, which was located on the right side of the center console under the instrument panel, was about 1/4 of the way between the on (horizontal) position and the off (vertical) position. The valve could not be seen by the pilot. Further, the pilot-rated passenger stated that he could not see the emergency fuel shutoff valve. He was not sure if his knee hit the valve handle and shut off the fuel flow from the header fuel tank to the engine during the turbulence event. The onboard flight and engine monitoring system indicated that the airplane was about 10,000 ft mean sea level when it experienced about a 2g vertical acceleration. The engine data indicated a rapid decrease of fuel flow after the 2g acceleration with a coinciding decrease in exhaust gas temperatures and fuel pressure.

About 30 gallons of fuel was drained from the airplane before it was transported to the recovery facility. An engine examination and test run were conducted, and the engine performed satisfactorily. A second test was conducted to determine the effectiveness of the emergency fuel shut off valve and where it needed to be positioned before it cut off all fuel to the engine. There was no indication of a power loss until the valve handle was in the full vertical position, which then caused the engine to stop within about 10 seconds.

The pilot-rated passenger reported that he had recently purchased the airplane and that he and the pilot were flying the airplane to his home base. He stated that although he and the pilot were experienced pilots, neither had any flight time in the airplane except for the orientation flight that the pilot had received.

Given the engine data, it is likely that the pilot-rated passenger's knee inadvertently hit the emergency fuel shutoff valve during the turbulence event and caused it to shut off the fuel flow from the header tank to the engine. Further, had the pilot been familiar with the airplane, he would have known where the fuel selector valve was, regardless of whether it was easy to see, and would have checked it when the engine lost power as a memory item check in the emergency procedures.

Probable Cause and Findings

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

The pilot-rated passenger's inadvertent contact with and closure of the emergency fuel shutoff valve, which resulted in the total loss of engine power due to fuel starvation. Contributing to the accident was the pilot's lack of experience in the accident airplane.

Findings

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| Aircraft | Fuel - Fluid level |
| Personnel issues | (general) - Passenger |
| Personnel issues | Total experience w/ equipment - Pilot |

Factual Information

History of Flight

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|----------------------|------------------------------------|
| Enroute-cruise | Turbulence encounter |
| Enroute-cruise | Fuel related (Defining event) |
| Enroute-cruise | Fuel starvation |
| Enroute-cruise | Loss of engine power (total) |
| Emergency descent | Off-field or emergency landing |
| Landing-landing roll | Collision with terr/obj (non-CFIT) |
| Landing-landing roll | Landing gear collapse |

On May 2, 2018, about 1620 central daylight time, an experimental, amateur-built Laminar Lancair 360 airplane, N92WL, experienced a total loss of engine power during cruise flight and impacted terrain during a forced landing to a field about 1/2 mile from the Woodward Municipal Airport (WWR), Woodward, Oklahoma. The pilot and pilot-rated passenger were not injured, and the airplane sustained substantial damage. The airplane was owned by an individual and operated by the pilot under the provisions of the Title 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed at the time of the accident, which was operated on an instrument flight plan. The personal flight departed the Lee Summit Municipal Airport (LXT), Lee's Summit, Missouri, about 1416, and was en route to the Dalhart Municipal Airport, Dalhart, Texas.

The pilot reported he was in cruise flight at 8,000 ft but requested 10,000 ft to stay clear of clouds. As the airplane reached 10,000 ft, the airplane experienced moderate to severe turbulence for a few seconds. Shortly after the turbulence, the engine stopped producing power without any prior indications, such as sputtering. The pilot immediately started a descent and turned on the fuel boost pump, fuel transfer pumps, and changed throttle and mixture settings to try restart the engine but without success.

The pilot-rated passenger declared a MAYDAY and determined the course to the nearest airport, which was WWR located about 12 nautical miles to the southeast. The pilot flew the airplane at best glide airspeed by putting the propeller lever to the coarsest pitch, which produced a glide ratio with a 1,000 to 1,100 fpm rate of descent. About 5,700 ft above mean sea level (msl), the pilot decided that it did not look favorable to make it to the airport, so he pushed the propeller back in and attempted to restart the engine. However, the rate of descent increased to 1,800 to 2,000 fpm. The engine did not restart so the pilot decided to conduct a forced landing to a road, but once he saw that power lines and trees near the road, he decided to land in a pasture. He lowered the landing gear (the flaps were found in the retracted position).

As the airplane landed in the pasture, the airplane encountered sagebrush which caused the landing gear to collapse as the airplane bounced and skidded to a stop. Later, the pilot examined the airplane and the only anomaly he reported was that "the main fuel cutoff valve (hidden in the co-pilot's foot well) was

just partially moved." He stated that he was not sure if the valve was moved during the turbulence event or while bouncing across the pasture.

The pilot-rated passenger stated that he could not see the main fuel cutoff valve located on the right side of the center console and under the instrument panel. He was not sure if his knee hit the valve handle and shut off the fuel flow from the header fuel tank to the engine during the turbulence event. He stated that the fuel valve handle was found about ¼ of the way from the on position (horizontal) to the off position (vertical). He stated that the handle moved without much resistance.

The airplane's builder reported that he used 2 similar stainless steel, Teflon coated ball valves with 3/8-inch lines in constructing the airplane. Both valves had orange handles. One of the valve handles was located on the left side of the center console on the pilot's side and under the instrument panel. The pilot's side valve was an emergency gear dump valve. The valve dumped hydraulic pressure to allow the landing gear to lower if the hydraulic pumps were inoperative. The other orange valve handle was the emergency fuel shutoff valve located on the right side of the center console on the passenger's side, which could not be seen by the pilot. The valve shut the fuel off from the airplane's header tank to the engine. The handle for the emergency fuel shutoff valve was in the horizontal position for normal operations. To turn the fuel off, the handle was placed in the vertical position.

The airplane was equipped with a Garmin EFIS which provided flight and engine monitoring data. The SD card was downloaded, and it provided engine performance data that included exhaust gas temperatures (EGT) for all cylinders, tachometer (rpm), fuel flow, oil pressure, and manifold pressure. The flight data indicated that the airplane was at about 10,000 ft msl when it experienced about a 2g vertical acceleration. The data for the engine indicated a rapid decrease of fuel flow within 20 seconds of the 2g acceleration with a coinciding decrease in EGTs and fuel pressure.

The airplane wreckage was partially disassembled and transported to an aircraft recovery facility. About 30 gallons of fuel was drained from the airplane before transporting it to the recovery facility. The header tank was found "nearly" full, and the rest of the fuel came from the wing tanks.

The National Transportation Safety Board conducted an examination/engine run at the recovery facility. The engine was a 180-horsepower four-cylinder Lycoming IO-360-C1E6 engine. The engine was started and run at various power settings. The magneto drop was "high" but similar between both left and right magnetos. The engine performed satisfactorily during the test, and a reason for the lost power on the accident flight was not found.

A second test was conducted to determine the effectiveness of the emergency fuel shut off valve and where it needed to be positioned before it cut off all fuel to the engine. The engine was started and run at 2,090 rpm at 18.3 inches of manifold pressure. The emergency fuel shut off valve was slowly moved from the on position (horizontal) to the vertical position. There was no indication of a loss of power until the valve handle was in the full vertical position, which then caused the engine to stop within about 10 seconds.

The pilot-rated passenger reported that he had recently purchased the airplane and that he and the pilot were flying the airplane to his home base. He stated that although he and the pilot were experienced pilots, neither had any flight time in the airplane except for the orientation flight that the pilot had received.

Pilot Information

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|----------------------------------|---------------------------------------|--|----------------|
| Certificate: | Airline transport; Commercial | Age: | 41,Male |
| Airplane Rating(s): | Single-engine land; Multi-engine land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | 4-point |
| Instrument Rating(s): | Airplane | Second Pilot Present: | Yes |
| Instructor Rating(s): | Airplane single-engine | Toxicology Performed: | No |
| Medical Certification: | Class 2 Without waivers/limitations | Last FAA Medical Exam: | March 26, 2018 |
| Occupational Pilot: | Yes | Last Flight Review or Equivalent: | |
| Flight Time: | 5000 hours (Total, all aircraft) | | |

Aircraft and Owner/Operator Information

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|--------------------------------------|--|---------------------------------------|-----------------|
| Aircraft Make: | LAMINAR | Registration: | N92WL |
| Model/Series: | Lancair 360 | Aircraft Category: | Airplane |
| Year of Manufacture: | 2016 | Amateur Built: | Yes |
| Airworthiness Certificate: | Experimental (Special) | Serial Number: | 719-320-563 |
| Landing Gear Type: | Tricycle | Seats: | 4 |
| Date/Type of Last Inspection: | Condition | Certified Max Gross Wt.: | |
| Time Since Last Inspection: | | Engines: | 1 Reciprocating |
| Airframe Total Time: | 90 Hrs at time of accident | Engine Manufacturer: | Lycoming |
| ELT: | Installed, activated, did not aid in locating accident | Engine Model/Series: | IO-360-C1E6 |
| Registered Owner: | | 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: | WWR,2189 ft msl | Distance from Accident Site: | 1 Nautical Miles |
| Observation Time: | 15:55 Local | Direction from Accident Site: | 90° |
| Lowest Cloud Condition: | Scattered / 4700 ft AGL | Visibility | 10 miles |
| Lowest Ceiling: | None | Visibility (RVR): | |
| Wind Speed/Gusts: | 23 knots / 32 knots | Turbulence Type Forecast/Actual: | / |
| Wind Direction: | 160° | Turbulence Severity Forecast/Actual: | / |
| Altimeter Setting: | 29.78 inches Hg | Temperature/Dew Point: | 27°C / 15°C |
| Precipitation and Obscuration: | No Obscuration; No Precipitation | | |
| Departure Point: | Lee Summit, MO (LXT) | Type of Flight Plan Filed: | IFR |
| Destination: | Dalhart, TX (DHT) | Type of Clearance: | IFR |
| Departure Time: | 14:16 Local | Type of Airspace: | |

Wreckage and Impact Information

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|----------------------------|--------|-----------------------------|---------------------------|
| Crew Injuries: | 1 None | Aircraft Damage: | Substantial |
| Passenger Injuries: | 1 None | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 2 None | Latitude, Longitude: | 36.443611,-99.514999(est) |

Administrative Information

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| Investigator In Charge (IIC): | Silliman, James |
| Additional Participating Persons: | Todd Evans; Oklahoma City FSDO; Oklahoma, OK |
| Original Publish Date: | November 19, 2019 |
| Note: | The NTSB did not travel to the scene of this accident. |
| Investigation Docket: | https://data.nts.gov/Docket?ProjectID=97159 |

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](#).