# Aviation Investigation Final Report

| | | | |
|---|---|---|---|
| **Location:** | Watkins, Colorado | **Accident Number:** | CEN17LA220 |
| **Date & Time:** | June 8, 2017, 13:40 Local | **Registration:** | N7328V |
| **Aircraft:** | Bellanca 17 30 | **Aircraft Damage:** | Substantial |
| **Defining Event:** | Fuel starvation | **Injuries:** | 2 Serious |
| **Flight Conducted Under:** | Part 91: General aviation - Personal | | |

## Analysis

The commercial pilot and passenger planned to complete touch-and-go takeoffs and landings in order for the pilot to build time in the airplane. The pilot reported that the main fuel tanks were full before takeoff and that he began the flight with the left main fuel tank selected. After the final touch-and go, while on the upwind leg of the traffic pattern and 700 ft above ground level, the engine experienced a total loss of power. The pilot was unable to troubleshoot the loss of power and made a forced landing to a field, where the airplane impacted a ditch and came to rest upright.

The airplane's owner reported that he flew the airplane the day before the accident for about 1 hour, during which the engine performed normally with no anomalies noted. He added that no fuel had been added to the tanks in the previous 2.5 flight hours. There was no evidence of additional fuel being added to the airplane after the owner's flight and before the accident flight.

A postaccident examination of the airplane revealed that the left main fuel tank was empty; the right main tank and the two auxiliary tanks contained a combined 45 gallons of fuel. The fuel selector was found positioned to the left main fuel tank. Although the amount of fuel onboard the airplane at the beginning of the flight could not be determined, it is likely that the pilot kept the fuel selector selected to the left main fuel tank throughout the entire flight, and the loss of engine power occurred when the tank was exhausted of usable fuel.

An engine test run did not reveal any preimpact anomalies that would have precluded normal engine operation. The electric fuel boost pump was inoperative for undetermined reasons and a replacement fuel boost pump was installed only for the purposes of starting the engine. Since the electric boost pump is not required for engine operation in flight, its inoperative state would not have contributed to the loss of engine power. The fuel selector valves were free of obstructions.

## Probable Cause and Findings

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

The pilot's in-flight fuel mismanagement, which resulted in fuel starvation and a total loss of engine power.

### Findings

| | |
|---|---|
| **Aircraft** | Fuel - Fluid management |
| **Personnel issues** | Use of equip/system - Pilot |

# Factual Information

## History of Flight

| | |
|---|---|
| **Initial climb** | Fuel starvation (Defining event) |
| **Initial climb** | Loss of engine power (total) |
| **Landing** | Off-field or emergency landing |
| **Landing-landing roll** | Collision with terr/obj (non-CFIT) |

On June 8, 2017, about 1340 mountain daylight time, a Bellanca 17-30 airplane, N7328V, made an forced landing in a field near Front Range Airport (FTG), Watkins, CO. The commercial rated pilot and passenger sustained serious injuries and the airplane sustained substantial damage. The airplane was registered to and operated by a private individual under the provisions of *14 Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan had been filed. The local flight originated from FTG at an unknown time.

The pilot reported that he and the passenger planned to conduct touch-and-go landings at FTG. He added that the main fuel tanks were full before takeoff and he began the flight with the left fuel tank selected. After performing an unknown number of landings, he reportedly switched from the left to the right fuel tank, while in the traffic pattern. He completed one more touch-and-go landing and the engine experienced a loss of power on the on the upwind leg of the traffic pattern. The engine did not show signs of a problem before the loss of power and the fuel gauge indicated full during the entire flight. He reportedly switched back to the left tank and was unable to restart the engine. During the forced landing the airplane impacted a ditch and came to rest upright (figure 1).

Figure 1 – Accident airplane

The passenger stated to the police that the airplane was at 6,100 ft above mean sea level (700 ft above ground level) when the loss of engine power occurred, and that they "were too low to troubleshoot the problem."

The airplane owner reported that he and his wife flew the accident airplane on June 7, 2017 for about 1 hour, during which time the engine performed normally with no anomalies noted. He reportedly told the pilot that he would need to top off the fuel tanks before the next flight because fuel had not been added after the last 2.5 flight hours. He was unaware of any fuel being added to the tanks after this flight and before the accident flight. There were no fuel receipts discovered during the investigation.

A postaccident examination of the airplane by the responding Federal Aviation Administration inspector revealed damage to the airplane's firewall. The fuel selector was positioned to left main fuel tank. The two auxiliary tanks contained fuel to the top of the tanks at the fuel filler port. The right wing was slightly elevated at the accident sight and an undetermined about of fuel was clearly visible from the right main fuel tank filler port. During the recovery process, left main fuel tank was empty and the other 3 fuel tanks contained about 45 gallons of fuel combined.

The airplane owner reported that the pilot had accumulated over two hours of flight time in the accident airplane prior to the accident flight. The owner added that he and the pilot received informal training on the airplane systems and fuel management in February and a refresher on fuel management two weeks before the accident.

The pilot reported 3.4 total hours in the accident airplane type.

The postaccident examination and engine functional test was performed under the supervision of the FAA. Before the functional test began, a replacement propeller was installed, and an external fuel tank was connected to the engine fuel line. The airplane's electrical power was turned on, but the electric boost pump did not operate. After several unsuccessful attempts to start the engine without priming the fuel system a replacement electric boost pump was installed into the external fuel tank. The replacement boost pump was only necessary for engine start and not needed for engine operation after it started. Then, the fuel system was bled, primed and started on the first attempt. The engine was operated at 1,500 rpm until it was warm. The engine would not operate below 1,500 rpm due to impact damage to the throttle cable end. Then the throttle was advanced to yield 2,100 rpm with no anomalies noted. After about 2 minutes the throttle was advanced full forward and the engine operated at 2,800 rpm; after a couple of seconds the propeller governor reduced the engine to 2,600 rpm. After running the engine for about 1 minute the mixture control was pulled to idle-cutoff and the engine was stopped.

After the engine functional test, the fuel selector valves were tested by blowing compressed air into the fuel tank outlets and air was observed coming out of the engine driven fuel pump inlet line. Both fuel selectors operated normally and there were no blockages noted within the fuel lines. The examination did not reveal any preimpact anomalies that would have precluded normal operation.

## Pilot Information

| | | | |
|---|---|---|---|
| **Certificate:** | Commercial; Flight instructor | **Age:** | 36,Male |
| **Airplane Rating(s):** | Single-engine land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | Lap only |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | Airplane single-engine | **Toxicology Performed:** | No |
| **Medical Certification:** | Class 1 Without waivers/limitations | **Last FAA Medical Exam:** | July 15, 2016 |
| **Occupational Pilot:** | Yes | **Last Flight Review or Equivalent:** | June 3, 2017 |
| **Flight Time:** | 411.1 hours (Total, all aircraft), 3.4 hours (Total, this make and model), 327.7 hours (Pilot In Command, all aircraft), 144.6 hours (Last 90 days, all aircraft), 81 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft) | | |

## Passenger Information

| | | | |
|---|---|---|---|
| **Certificate:** | | **Age:** | 46,Male |
| **Airplane Rating(s):** | | **Seat Occupied:** | Right |
| **Other Aircraft Rating(s):** | | **Restraint Used:** | Lap only |
| **Instrument Rating(s):** | | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | | **Toxicology Performed:** | No |
| **Medical Certification:** | | **Last FAA Medical Exam:** | |
| **Occupational Pilot:** | No | **Last Flight Review or Equivalent:** | |
| **Flight Time:** | | | |

## Aircraft and Owner/Operator Information

| | | | |
|---|---|---|---|
| **Aircraft Make:** | Bellanca | **Registration:** | N7328V |
| **Model/Series:** | 17 30 | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | 1969 | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 30207 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | |
| **Date/Type of Last Inspection:** | May 3, 2017 Unknown | **Certified Max Gross Wt.:** | |
| **Time Since Last Inspection:** | | **Engines:** | 1 Reciprocating |
| **Airframe Total Time:** | 2670 Hrs at time of accident | **Engine Manufacturer:** | CONTINENTAL MOTORS |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | IO-520-D |
| **Registered Owner:** | | **Rated Power:** | 300 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:** | KFTG,5513 ft msl | **Distance from Accident Site:** | 4 Nautical Miles |
| **Observation Time:** | 13:55 Local | **Direction from Accident Site:** | 206° |
| **Lowest Cloud Condition:** | Few / 8000 ft AGL | **Visibility** | 10 miles |
| **Lowest Ceiling:** | | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 8 knots / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 110° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 30.04 inches Hg | **Temperature/Dew Point:** | 25°C / 10°C |
| **Precipitation and Obscuration:** | No Obscuration; No Precipitation | | |
| **Departure Point:** | DENVER, CO (FTG ) | **Type of Flight Plan Filed:** | None |
| **Destination:** | DENVER, CO (FTG ) | **Type of Clearance:** | VFR |
| **Departure Time:** | | **Type of Airspace:** | Class D |

## Airport Information

| | | | |
|---|---|---|---|
| **Airport:** | FRONT RANGE FTG | **Runway Surface Type:** | |
| **Airport Elevation:** | 5512 ft msl | **Runway Surface Condition:** | Vegetation |
| **Runway Used:** | | **IFR Approach:** | None |
| **Runway Length/Width:** | | **VFR Approach/Landing:** | Forced landing |

## Wreckage and Impact Information

| | | | |
|---|---|---|---|
| **Crew Injuries:** | 1 Serious | **Aircraft Damage:** | Substantial |
| **Passenger Injuries:** | 1 Serious | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 2 Serious | **Latitude, Longitude:** | 39.809722,-104.4925(est) |

## Administrative Information

| | |
|---|---|
| **Investigator In Charge (IIC):** | Lindberg, Joshua |
| **Additional Participating Persons:** | Sidney Jensen; Federal Aviation Administration; Denver, CO<br>Kurt Gibson; Continental Motors; Mobile, AL |
| **Original Publish Date:** | November 15, 2018 |
| **Note:** | The NTSB did not travel to the scene of this accident. |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=95338 |