



# Aviation Investigation Final Report

|                                |                                      |                         |             |
|--------------------------------|--------------------------------------|-------------------------|-------------|
| <b>Location:</b>               | St. Augustine, Florida               | <b>Accident Number:</b> | ERA18LA259  |
| <b>Date &amp; Time:</b>        | September 8, 2018, 10:45 Local       | <b>Registration:</b>    | N6469P      |
| <b>Aircraft:</b>               | Cessna 152                           | <b>Aircraft Damage:</b> | Substantial |
| <b>Defining Event:</b>         | Loss of engine power (partial)       | <b>Injuries:</b>        | 1 None      |
| <b>Flight Conducted Under:</b> | Part 91: General aviation - Personal |                         |             |

## Analysis

The private pilot was conducting a personal, cross-country flight. He reported that, when the airplane was about 12 miles from the departure airport, the engine started running roughly, and the airplane was "violently shaking." He decided to conduct a forced landing in a field, during which the nose landing gear dug into the soft ground, and the airplane flipped over.

Postaccident examination of the engine revealed that the No. 4 cylinder exhaust valve was fractured, and although the head of the exhaust valve was not recovered, the fracture features on the exhaust valve stem were consistent with fatigue. A review of maintenance records revealed that the exhaust valves were installed during an overhaul of the engine about 28 years before the accident. The engine manufacturer recommended that the engine be overhauled every 12 years or 2,400 hours, whichever comes first.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The partial loss of engine power due to a fractured exhaust valve, which resulted in a forced landing on unsuitable terrain and a subsequent rollover.

## Findings

|                             |  |
|-----------------------------|--|
| <b>Aircraft</b>             | Recip eng cyl section - Fatigue/wear/corrosion |
| <b>Environmental issues</b> | (general) - Effect on operation                |

## Factual Information

### History of Flight

|                          |   |
|--------------------------|---|
| <b>Enroute</b>           | Powerplant sys/comp malf/fail                   |
| <b>Enroute-cruise</b>    | Loss of engine power (partial) (Defining event) |
| <b>Emergency descent</b> | Off-field or emergency landing                  |
| <b>Landing</b>           | Collision with terr/obj (non-CFIT)              |
| <b>Landing</b>           | Roll over                                       |

On September 8, 2018, about 1045 eastern daylight time, a Cessna 152, N6469P, was substantially damaged after it impacted terrain during a forced landing in St. Augustine, Florida. The private pilot was not injured. The airplane was owned and operated by Sunshine Aviation. Visual meteorological conditions prevailed, and no flight plan was filed for the flight that originated from the Palatka Municipal Airport (28J), Palatka, Florida, about 1030, destined for Ormond Beach Municipal Airport (OMN), Ormond Beach, Florida. The personal flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

According to the pilot, he departed OMN at 1000 and flew to 28J. He practiced some landings and started his return back to OMN. About 12 miles east of 28J, at 2,000 ft., the engine started running rough and the airplane was "violently shaking." He also heard "clanking" that "sounded like something was loose in the engine." He saw a field to the right side of the airplane and set up for an off-airport landing. At 1,000 ft. he tried to apply power to the engine, but the engine started violently shaking again so he reduced the power. At 800 ft. he secured the airplane by turning off the magnetos, shutting the fuel off, and turning the avionics master switch off. When the airplane was 200 ft. above the field, the pilot could see crops that were higher than he thought, but he could not turn away at that point. The airplane touched down on the main landing gear and when the nose landing gear touched down in the soft ground, it dug into the ground and the airplane flipped over. The pilot subsequently egressed through the door.

Examination of the wreckage by a Federal Aviation Administration (FAA) inspector revealed that the airplane sustained damage to the firewall and cockpit floor. The nose landing gear was fractured off, the right-wing leading edge was crushed, and the outboard main spar was wrinkled. The oil filter was removed and cut open. Metallic pieces were noted in the filter element.

Examination of the engine by a National Transportation Safety Board investigator revealed that the No. 4 cylinder exhaust valve was fractured, and the fracture features observed on the valve stem were consistent with fatigue. The piston, cylinder head, and cylinder walls were gouged consistent with repeated contact with the exhaust valve; however, no portions of the valve head remained in the cylinder.

The two-seat, single-engine, high-wing airplane was built in 1981, and equipped with a Lycoming O-235-series engine. The most recent annual inspection was completed on June 11, 2018. Review of

maintenance records revealed that at the time of the accident, the airframe total time was 8,139.7 hours. The airplane had flown 95.4 hours since its last annual inspection and the engine had accumulated 1,608.7 hours since major overhaul. The last engine overhaul was performed in 1995; however, the parts replaced did not include the exhaust valves. The exhaust valves were replaced on June 4, 1990 during an engine overhaul with a total engine time of 5,186.4 hours. The engine manufacturer recommended that the engine be overhauled every 12 years or 2,400 hours, whichever comes first.

The pilot held a private pilot certificate, with a rating for airplane single-engine land. His most recent FAA second class medical certificate was issued on March 5, 2018. He reported 228 total hours of flight experience at the time of the accident.

### Pilot Information

|                                  |   |  |                 |
|----------------------------------|---|--|-----------------|
| <b>Certificate:</b>              | Private   | <b>Age:</b>                              | 19, Male        |
| <b>Airplane Rating(s):</b>       | Single-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>     | None  | <b>Second Pilot Present:</b>             | No              |
| <b>Instructor Rating(s):</b>     | None  | <b>Toxicology Performed:</b>             | No              |
| <b>Medical Certification:</b>    | Class 2 Without waivers/limitations   | <b>Last FAA Medical Exam:</b>            | March 5, 2018   |
| <b>Occupational Pilot:</b>       | No  | <b>Last Flight Review or Equivalent:</b> | August 31, 2018 |
| <b>Flight Time:</b>              | 228 hours (Total, all aircraft), 200 hours (Total, this make and model), 159 hours (Pilot In Command, all aircraft), 121 hours (Last 90 days, all aircraft), 43 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft) |  |                 |

## Aircraft and Owner/Operator Information

|                                      |                                |                                       |                    |
|--------------------------------------|--------------------------------|---------------------------------------|--------------------|
| <b>Aircraft Make:</b>                | Cessna                         | <b>Registration:</b>                  | N6469P             |
| <b>Model/Series:</b>                 | 152 No Series                  | <b>Aircraft Category:</b>             | Airplane           |
| <b>Year of Manufacture:</b>          | 1981                           | <b>Amateur Built:</b>                 |                    |
| <b>Airworthiness Certificate:</b>    | Normal                         | <b>Serial Number:</b>                 | 15285019           |
| <b>Landing Gear Type:</b>            | Tricycle                       | <b>Seats:</b>                         | 2                  |
| <b>Date/Type of Last Inspection:</b> | June 11, 2018 Annual           | <b>Certified Max Gross Wt.:</b>       | 1669 lbs           |
| <b>Time Since Last Inspection:</b>   | 95 Hrs                         | <b>Engines:</b>                       | 1 Reciprocating    |
| <b>Airframe Total Time:</b>          | 8139.7 Hrs at time of accident | <b>Engine Manufacturer:</b>           | Lycoming           |
| <b>ELT:</b>                          | C91 installed, not activated   | <b>Engine Model/Series:</b>           | O-235 SERIES       |
| <b>Registered Owner:</b>             |                                | <b>Rated Power:</b>                   | 100 Horsepower     |
| <b>Operator:</b>                     | On file                        | <b>Operating Certificate(s) Held:</b> | Pilot school (141) |

## Meteorological Information and Flight Plan

|   |                                  |   |                   |
|---|----------------------------------|---|-------------------|
| <b>Conditions at Accident Site:</b>     | Visual (VMC)                     | <b>Condition of Light:</b>                  | Day               |
| <b>Observation Facility, Elevation:</b> | KSGJ, 10 ft msl                  | <b>Distance from Accident Site:</b>         | 15 Nautical Miles |
| <b>Observation Time:</b>                | 14:56 Local                      | <b>Direction from Accident Site:</b>        | 28°               |
| <b>Lowest Cloud Condition:</b>          |                                  | <b>Visibility</b>                           | 10 miles          |
| <b>Lowest Ceiling:</b>                  | Broken / 2000 ft AGL             | <b>Visibility (RVR):</b>                    |                   |
| <b>Wind Speed/Gusts:</b>                | 6 knots /                        | <b>Turbulence Type Forecast/Actual:</b>     | None / None       |
| <b>Wind Direction:</b>                  | 30°                              | <b>Turbulence Severity Forecast/Actual:</b> | N/A / N/A         |
| <b>Altimeter Setting:</b>               | 29.98 inches Hg                  | <b>Temperature/Dew Point:</b>               | 29°C / 24°C       |
| <b>Precipitation and Obscuration:</b>   | No Obscuration; No Precipitation |   |                   |
| <b>Departure Point:</b>                 | Palatka, FL (28J )               | <b>Type of Flight Plan Filed:</b>           | None              |
| <b>Destination:</b>                     | Ormond Beach, FL (OMN )          | <b>Type of Clearance:</b>                   | None              |
| <b>Departure Time:</b>                  | 10:30 Local                      | <b>Type of Airspace:</b>                    | Class G           |

## Wreckage and Impact Information

|                            |        |                                 |                           |
|----------------------------|--------|---------------------------------|---------------------------|
| <b>Crew Injuries:</b>      | 1 None | <b>Aircraft Damage:</b>         | Substantial               |
| <b>Passenger Injuries:</b> |        | <b>Aircraft Fire:</b>           | None                      |
| <b>Ground Injuries:</b>    | N/A    | <b>Aircraft Explosion:</b>      | None                      |
| <b>Total Injuries:</b>     | 1 None | <b>Latitude,<br/>Longitude:</b> | 29.741666,-81.473892(est) |

## Administrative Information

|  |   |
|--|---|
| <b>Investigator In Charge (IIC):</b>     | Boggs, Daniel   |
| <b>Additional Participating Persons:</b> | Theodore Rodriguez; FAA; Orlando, FL  |
| <b>Original Publish Date:</b>            | April 13, 2020  |
| <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=98350">https://data.nts.gov/Docket?ProjectID=98350</a> |

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](#).