



National Transportation Safety Board Aviation Accident Final Report

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|--------------------------------|---|-------------------------|-------------|
| Location: | Sebring, FL | Accident Number: | ERA16LA299 |
| Date & Time: | 08/23/2016, 1500 EDT | Registration: | N801SR |
| Aircraft: | PROGRESSIVE AERODYNE INC SEAREY | Aircraft Damage: | Substantial |
| Defining Event: | Electrical system malf/failure | Injuries: | 2 Serious |
| Flight Conducted Under: | Part 91: General Aviation - Instructional | | |

Analysis

During initial climb on an instructional flight in the experimental amateur-built airplane, about 200 ft above ground level, the engine began running rough. The flight instructor immediately decreased the airplane's angle of attack and the engine subsequently experienced a total loss of power. The flight instructor tried to land on the remaining runway; however, the airplane landed hard and struck an embankment.

Examination of the airplane revealed wiring that contained mismatched wire gauges and splices throughout the wiring harnesses. The ground wire for the master arm solenoid was disconnected from the back of the ignition switch. Without this ground wire, the battery was disconnected from the airplane's electrical system. The airplane's rectifier kept the fuel boost pumps running per the wiring diagrams; however, a postaccident engine run revealed that the rectifier was weak and only displacing 12.3 volts, rather than its nominal output voltage of 13.5 +/- 0.2 volts. It is likely that, during takeoff, the ground wire became disconnected from the ignition switch and the weak rectifier could not adequately supply the high electrical load requirements imposed by the fuel boost pumps, the landing gear motors retracting the gear, and the strobe lights. This degraded the performance of the fuel boost pumps, resulting in fuel starvation and a total loss of engine power.

Probable Cause and Findings

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

A disconnected ground wire during initial climb, which degraded the fuel boost pumps' performance and resulted in a total loss of engine power due to fuel starvation.

Findings

Aircraft

Electrical pwr sys wiring - Malfunction (Cause)

Fuel pumps - Damaged/degraded (Cause)

Fuel - Related operating info (Cause)

Factual Information

On August 23, 2016, about 1500 eastern daylight time, an experimental amateur-built Searey, N801SR, was substantially damaged during a forced landing, following a total loss of engine power during initial climb from Sebring Regional Airport (SEF), Sebring, Florida. The flight instructor and student pilot sustained serious injuries. Visual meteorological conditions prevailed and no flight plan was filed for the local instructional flight. The airplane was registered to and operated by the student pilot under the provisions of 14 *Code of Federal Regulations* Part 91.

According to the flight instructor, he and the student pilot flew the airplane earlier during the day from Bartow, Florida to Sebring. The airplane was to remain in Sebring for the duration of the instructional lessons. After lunch and a brief overview of the lesson to follow, the flight instructor and student pilot performed another preflight inspection of the airplane and taxied to the runway. Immediately after takeoff, approximately 200 feet above ground level, the engine started running rough and "sputtering." The flight instructor immediately decreased the angle of attack and the engine lost all power. The flight instructor then tried to land on the runway. The airplane landed "hard," slid into an embankment and became airborne briefly before coming to rest.

The two-seat, high-wing amphibious airplane, serial number 1MK283, was assembled from a kit in 2001. It was powered by a Rotax 914ULS, 115-horsepower engine, equipped with a three-blade INO propeller. Review of the maintenance records revealed that the most recent annual condition inspection was completed on March 3, 2016. At that time, the total airframe time was 1,058 hours, and the total time for the engine was 358 hours.

Examination of the wreckage revealed that the airplane had incurred damage to the fuselage and the left main landing gear had separated from the fuselage. The examination further revealed that the electric turbo control unit had been removed from the airplane. Instead, a manual lever installed in the cockpit, operated by the pilot, moved the waste gate open and closed. The manifold air pressure gauge line was disconnected and capped off at the engine; however, the gauge was not marked "inoperative." The tachometer was also inoperative. A small amount of fuel was siphoned out of the main fuel tank and it was observed to be automotive fuel with no water present. There were numerous wire splices behind the instrument panel with different gauge wiring on each wire run. It was noted that the wrong size wire connectors were used on different instruments with the blade type connectors. One ground wire was found off the back of the starter key switch, which was the ground for the master arm solenoid. With this wire off the switch, power from the battery was disconnected from the electrical system.

The airplane was secured to a trailer and the engine was started. A magneto check was performed on the engine and both magnetos operated normally. The ground wire was then removed from the back of the starter switch to test the rectifier system on the engine. The engine continued to run without the battery connected to the system as per the manual. The voltage was checked on the output of the rectifier and it was measured to be 12.3 volts. Without the battery connected, the fuel boost pumps, landing gear motor, and the strobe lights would

all be placing a load on the rectifier. The normal rectifier output was 13.5 + .2 volts. The engine was shut down with normal procedures.

History of Flight

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| Takeoff | Electrical system malf/failure (Defining event) |
| Initial climb | Fuel starvation Loss of engine power (total) |
| Landing-flare/touchdown | Hard landing |

Flight Instructor Information

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|---------------------------|--|-----------------------------------|------------|
| Certificate: | Airline Transport; Flight Instructor; Flight Engineer | Age: | 78, Male |
| Airplane Rating(s): | Multi-engine Land; Multi-engine Sea; Single-engine Land; Single-engine Sea | Seat Occupied: | Right |
| Other Aircraft Rating(s): | Glider; Helicopter | Restraint Used: | 3-point |
| Instrument Rating(s): | Airplane | Second Pilot Present: | No |
| Instructor Rating(s): | Airplane Multi-engine; Airplane Single-engine; Instrument Airplane | Toxicology Performed: | No |
| Medical Certification: | Class 2 Without Waivers/Limitations | Last FAA Medical Exam: | 11/16/2015 |
| Occupational Pilot: | Yes | Last Flight Review or Equivalent: | |
| Flight Time: | (Estimated) 34000 hours (Total, all aircraft), 95 hours (Total, this make and model) | | |

Student Pilot Information

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|---------------------------|---|-----------------------------------|---------|
| Certificate: | | Age: | , Male |
| Airplane Rating(s): | None | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | 3-point |
| Instrument Rating(s): | None | Second Pilot Present: | No |
| Instructor Rating(s): | None | Toxicology Performed: | |
| Medical Certification: | None | Last FAA Medical Exam: | |
| Occupational Pilot: | No | Last Flight Review or Equivalent: | |
| Flight Time: | 0 hours (Total, all aircraft), 0 hours (Total, this make and model) | | |

Aircraft and Owner/Operator Information

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|-------------------------------|----------------------------------|--------------------------------|-----------------|
| Aircraft Make: | PROGRESSIVE AERODYNE INC | Registration: | N801SR |
| Model/Series: | SEAREY NO SERIES | Aircraft Category: | Airplane |
| Year of Manufacture: | 2001 | Amateur Built: | Yes |
| Airworthiness Certificate: | Experimental | Serial Number: | 1MK283 |
| Landing Gear Type: | Amphibian | Seats: | 2 |
| Date/Type of Last Inspection: | 03/03/2016, Condition | Certified Max Gross Wt.: | 1370 lbs |
| Time Since Last Inspection: | | Engines: | 1 Reciprocating |
| Airframe Total Time: | 1058 Hours as of last inspection | Engine Manufacturer: | Rotax |
| ELT: | Installed, not activated | Engine Model/Series: | 914ULS |
| Registered Owner: | On file | Rated Power: | 115 hp |
| Operator: | On file | Operating Certificate(s) Held: | None |

Meteorological Information and Flight Plan

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|----------------------------------|----------------------------------|--------------------------------------|-------------------|
| Conditions at Accident Site: | Visual Conditions | Condition of Light: | Day |
| Observation Facility, Elevation: | KOBE, 33 ft msl | Distance from Accident Site: | 29 Nautical Miles |
| Observation Time: | 1500 EDT | Direction from Accident Site: | 114° |
| Lowest Cloud Condition: | Scattered / 5000 ft agl | Visibility | 10 Miles |
| Lowest Ceiling: | | Visibility (RVR): | |
| Wind Speed/Gusts: | 5 knots / | Turbulence Type Forecast/Actual: | / |
| Wind Direction: | 20° | Turbulence Severity Forecast/Actual: | / |
| Altimeter Setting: | 30.12 inches Hg | Temperature/Dew Point: | 33°C / 23°C |
| Precipitation and Obscuration: | No Obscuration; No Precipitation | | |
| Departure Point: | Sebring, FL (SEF) | Type of Flight Plan Filed: | None |
| Destination: | Sebring, FL (SEF) | Type of Clearance: | None |
| Departure Time: | 1500 EDT | Type of Airspace: | Class E |

Airport Information

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|----------------------|--------------------------------|---------------------------|----------------|
| Airport: | Sebring Regional Airport (SEF) | Runway Surface Type: | Asphalt |
| Airport Elevation: | 62 ft | Runway Surface Condition: | Dry |
| Runway Used: | 19 | IFR Approach: | None |
| Runway Length/Width: | 5234 ft / 100 ft | VFR Approach/Landing: | Forced Landing |

Wreckage and Impact Information

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|----------------------------|-----------|-----------------------------|-----------------------|
| Crew Injuries: | 2 Serious | Aircraft Damage: | Substantial |
| Passenger Injuries: | N/A | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 2 Serious | Latitude, Longitude: | 27.462222, -81.344167 |

Administrative Information

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| Investigator In Charge (IIC): | Daniel P Boggs | Report Date: | 09/11/2018 |
| Additional Participating Persons: | Robert E Haynes; FAA/FSDO; Orlando, FL | | |
| Publish Date: | 09/11/2018 | | |
| Note: | The NTSB did not travel to the scene of this accident. | | |
| Investigation Docket: | http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=93890 | | |

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](#).