



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Western Pacific Region

May 19, 2020

AIRFRAME & ENGINE EXAMINATION

WPR19LA141

(6 Pages)

A. ACCIDENT

Location: Boulder City, Nevada

Date: May 7, 2019

Aircraft: Flight Design CTLSi

NTSB IIC: Stephen Stein

B. EXAMINATION PARTICIPANTS

Stephen Stein
Air Safety Investigator (IIC)
National Transportation Safety Board
Federal Way, Washington

John Waugh
Principal Maintenance Inspector
Federal Aviation Administration
Las Vegas, Nevada

Jordan Paskevich
Air Safety Investigator
Rotax Flight Safety
Vernon, British Columbia

Arian Foldan
Technical Advisor
Flight Design
Woodstock, Connecticut

C. DETAILS OF THE INVESTIGATION

C.1 Accident Background

HISTORY OF FLIGHT

On May 7, 2019, about 1600 Pacific daylight time, a Flight Design CTLS, N423EB, was substantially damaged during a go-around attempt at Boulder City Municipal Airport (BVU), Boulder City, Nevada. The private pilot was seriously injured and the passenger received minor injuries. The airplane was registered to and operated by the pilot as a personal flight, conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed and a flight plan was not filed for the local flight.

The pilot was hospitalized after the accident and unavailable for an interview. According to a witness who observed the accident from about halfway down the runway, the winds were gusty at the time of the accident, but favored runway 15. The airplane caught his attention during its approach to the runway as it appeared to be excessively fast and high for its position on the final approach leg of the airport traffic pattern. As the airplane descended to the runway surface, it initially floated over the runway at the 1,000 ft for about 1,700 feet near the runway 09/27 intersection. At this point, the airplane appeared to initiate a go-around maneuver as the engine power increased and the airplane began a climb. After it reached about 200 ft above ground level near the end of runway 15, the airplane entered a nose high attitude, which was immediately

followed by a nose down dive in a slight left turn. The airplane impacted terrain beyond airport property.

A review of photographs furnished by the operator revealed substantial damage to the wings and fuselage.

Pilot Statement and Interview

In a written statement to the NTSB dated June 12, 2019, the pilot stated that he departed runway 15 at approximately 1537 and subsequently climbed to 4,000 ft mean sea level (MSL) on a northern heading. While flying near a local Lake with the airplane's autopilot function engaged at 95 kts airspeed, 5,000 engine rpm, at the same altitude, the pilot observed a sudden increase in airspeed to 134 kts. He immediately responded by retarding the throttle to the IDLE position, but did not observe a response from the engine for several seconds. After the engine power responded, the pilot advanced the throttle to 5,000 rpm and observe a warning message on the lower right corner of one of his glass panels that stated "Rotax: Land Airplane," which was accompanied by an illuminated "Channel B" malfunction light on the annunciator panel. During a follow-up interview, the pilot re-stated this as a "Lane B" malfunction light. At 1550, the pilot discontinued the flight and began a return flight to BVU.

The pilot announced his position and intentions about 5 nm from the airport and descended to 3,000 ft msl. After reaching this altitude, the pilot retarded the throttle to the IDLE position, but his airspeed would not slow to 80 kts, the required maximum airspeed to deploy 15° of flaps. He stated that he executed an "emergency descent, as indicated on the POH (3.4.3)" but later clarified that his process included reducing engine power to IDLE and pitching the nose down to descend promptly. After the airplane reached the runway touchdown zone, the pilot rotated the airplane into a slight nose high attitude to "overfly" the runway at the approximate altitude of 100 ft above ground level. The pilot observed that his airspeed was 90 kts, too fast for him to touch down until he reached the last third of available runway when his airspeed reduced to 70 kts. He initiated a go-around maneuver as the remaining runway was not sufficient to land and brake to a full stop. After he advanced the throttle to FULL POWER and announced his intentions over the airport's common traffic advisory frequency,

PERSONNEL INFORMATION

The pilot, age 61, held a private pilot certificate with a rating for airplane single-engine land. The pilot's most recent third-class medical certificate was issued on September 1, 2017, which did not include any medical restrictions. At the time of the accident, the pilot had logged about 480 total flight hours in all aircraft, of which, 232 flight hours were amassed in the accident airplane make and model. In the 90 days that preceded the accident flight, the pilot accumulated a total of about 15 flight hours.

AIRCRAFT INFORMATION

Federal Aviation Administration records showed that the airplane was manufactured in 2013 and was registered to the owner on October 6, 2016. The helicopter was powered by a Rotax 912 is,

air cooled, 4 stroke, horizontally opposed, 100 horsepower reciprocating engine. Maintenance records showed that the airplane's most recent annual inspection was completed on December 24, 2018 at 470 flight hours. According to the hobbs meter, the airplane had accumulated a total of 512 flight hours.

METEOROLOGICAL INFORMATION

The 1355 recorded weather observation at BVU included wind from 230° magnetic at 8 knots, variable between 190° and 260° magnetic, visibility 10 statute miles, broken 10,000 ft, temperature 29° C, dew point 01° C, and an altimeter setting of 29.79 inches of mercury.

ADDITIONAL INFORMATION

C.2 Airframe and Engine Examination

The airplane was examined at a recovery facility in Phoenix, Arizona on August 13, 2019. Both wings had been removed from the fuselage to facilitate the recovery. The left wingtip was broken and the outboard lower wing skin had separated. A tear in the flap was observed about midspan. The right wing outboard leading edge was broken and the wingtip was partially separated. A dent was observed in the top surface of the flap about midspan.

The empennage had separated from the main fuselage aft of the cargo compartment. Most of the empennage was unremarkable with the exception of a tear at the horizontal stabilizer and vertical stabilizer junction. The aft outboard horizontal stabilizer was broken.

The forward cockpit displayed aft crush damage from the rudder pedals to the instrument panel. Both seats had separated from their floor mounts. The seat restraints did not exhibit any fraying or wear. Both right and left seat lap belt attachments were connected to the airframe, but the shoulder attachment had separated.

Fuel line continuity was traced from both wings through a separation in each rubber hose at the wing roots, that were likely cut by recovery personnel, to the right and left side fuel rails. Continuity was traced from the wing roots to the fuel selector valve to the header tank and gascolator, which displayed several ounces of automotive gasoline with trace amounts of debris. The fuel line was secure at both fuel pumps to the right and left side fuel rails through a fuel shut off valve. According to the manufacturer, a light will appear on the airplane's annunciator panel when the header tank is 1.5 inches below its full capacity.

Flight control continuity was traced from the ailerons, rudder, and elevator to the cockpit.

Throttle control continuity was confirmed from the throttle lever to the throttle body, which moved from the IDLE stop to the FULL stop positions.

Cockpit

Auxiliary Pump: OFF

Avionics Master: ON

Beacon Light: OFF

Position Light: OFF

Intercom: OFF

Cockpit Light: OFF

Landing Light: OFF

Power Backup: OFF

Ignition: Broken

Flaps: 0°

Fuel Selector: Both

Engine Examination

The engine mount was broken at the left side firewall and the engine was crushed vertically. The oil cooler was damaged and was exhibited a slow oil leak. Both the cylinder nos. 2 and 3 exhaust tubes were dented at the cylinder attachment and cylinder no. 4 exhaust tube was displaced. The muffler was crushed.

Mechanical continuity was confirmed from the accessory case to the propeller through the crankshaft as the propeller was rotated by hand. Thumb compression and suction were verified for all four cylinders. Successful movement of the valvetrain was confirmed for cylinder nos. 2 and 4. The propeller seized before the remaining valves could be verified.

Seven of the spark plugs were gray in appearance consistent with normal wear and operation. The cylinder no. 2 bottom spark plug was oily due to the sitting position of the engine after the accident. Most of the ignition harness leads were securely fitted to their respective spark plugs, with the exception of the top and bottom leads from cylinder no. 3, which were both loose, but still attached.

The cylinder heads were removed from their respective cylinders in the following order: cylinder no. 1, cylinder no. 3, cylinder no. 2, and cylinder no. 4. The valve faces and piston faces contained lead deposits consistent with running the engine on automotive gasoline. Cylinder no. 4 displayed a buildup of lead deposits along the bottom face of the piston between the cylinder head and piston. The buildup reduced the clearance between the no. 4 cylinder head and the piston, which inhibited the engine from achieving full rotation during the examination.

The fuel injectors were normal in appearance, but could not be inspected for obstructions without a functional test.

All three propeller blades were attached at the blade hub. One propeller blade was fractured at the blade root, another blade was fractured outboard, and the final blade was intact, but cracked about midspan.

C.3

Airplane and Engine Performance Data

The airplane was equipped with two Dynon Skyview primary flight displays that recorded numerous parameters. The data was downloaded during the examination and mapped using a web-based 3-dimensional mapping program. The airplane began a takeoff roll at 1544 and entered a climb. In his statement, the accident pilot indicated that he heard a noise while flying over a nearby lake followed by a sudden increase in airspeed to 134 kts IAS. During a subsequent interview he stated that he may have been looking at the TAS window on his display at the time. He then adjusted his throttle to a new position and observed a delay in the engine response. Subsequently, he observed that the “Lane B” annunciator light had illuminated accompanied by a message on the Dynon PFD screen “Rotax: Land Airplane” and then returned to the airport immediately, about 1350.

Additionally, the engine was equipped with an engine control unit (ECU) that controlled and monitored numerous engine parameters with redundancy. Further, the ECU recorded these parameters and fault detections internally, which were downloaded during the examination. The ECU data showed two failures during the accident flight. One failure was recorded about 7 minutes prior to the accident and indicated “Nominal current not reached” during a “TPU Test” for “Ignition 1 (Cyl 1 and 2)”. The other fault was captured at the time of the accident and indicated “Generated Select in Failsafe” during a “Test While Not Commanding Gen” for “Generator Select.”