



NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety

STRUCTURES GROUP CHAIRMAN'S FACTUAL REPORT

November 23, 2021

A. ACCIDENT

CEN20LA175

Operator: Ameriflight, LLC
Location: San Antonio, Texas
Date: May 8, 2020
Time: 2050 Central Daylight Time (CDT)
Aircraft: Beechcraft 1900C, SN UB-12
Registration: N31704

B. STRUCTURES GROUP

Chairman: Clinton R. Crookshanks
National Transportation Safety Board
Denver, Colorado

Member: Christy Eckerman
Federal Aviation Administration
Wichita, Kansas

Member: Casey Love
Textron Aviation
Wichita, Kansas

Member: Patrick Kremer
Ameriflight, LLC
Dallas, Texas

C. SUMMARY

On May 8, 2020, about 2050 central daylight time, a Beechcraft 1900C, N31704, sustained substantial damage when it was involved in an accident near San Antonio, Texas. The airline transport pilot sustained no injury. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 135 cargo flight, as Ameriflight 1829.

The operator reported that the flight departed the Corpus Christi International Airport (CRP), Corpus Christi, Texas, at 2004 with 631 lbs of cargo and a fuel load of 2,800 lbs. During the initial climb, the captain selected the landing gear handle to the UP position to retract the landing gear. The attempt was unsuccessful, and the captain cycled the landing gear handle once more yielding the same result. Following the second unsuccessful gear retraction, the captain elected to leave the landing gear handle in the DN position and continued to the San Antonio International Airport (SAT), San Antonio, Texas. Prior to landing, the pilot noted three green lights and no red lights, which indicated the landing gear was down, locked, and safe for landing. The airplane touched down on runway 4, after which, the left main landing gear collapsed, the red unsafe light in the landing gear handle illuminated, and the aural landing gear warning horn sounded. The airplane sustained substantial damage to the left wing.

D. DETAILS OF THE INVESTIGATION

1.0 Aircraft

The Beechcraft 1900C is a pressurized, twin engine turboprop airplane that is equipped with a low wing, T-tail, and retractable tricycle landing gear. The airplane can carry two pilots and 19 passengers or freight in its current configuration. The airplane is 57 feet, 10 inches long, 14 feet, 11 inches high at the tail, and has a wingspan of 54 feet, 6 inches. The airplane is powered by two Pratt & Whitney Canada PT6A turbine engines.

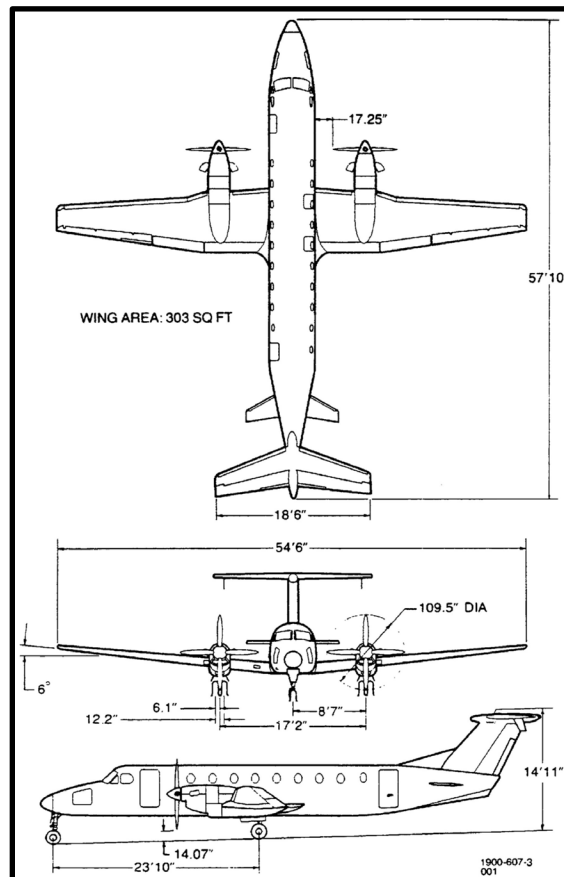


Figure 1-Beechcraft 1900C airplane 3-view drawing.

The airplane is equipped with hydraulically actuated retractable landing gear. The main landing gear (MLG) are installed in the engine nacelles and incorporate an air-oil type shock strut filled with compressed air and hydraulic fluid. Two wheels with brakes are installed on each MLG. The MLG are retracted and extended by an individual actuator and drag brace assembly on each. The actuator extends to retract the MLG and retracts to extend the MLG. Cockpit visual indication of the landing gear positions are provided by two red in-transit lights in the landing gear control handle and dual redundant green gear-down indicator lights on the subpanel for each landing gear.

The installation of the actuator and drag brace assembly is shown in Figure 2. The aft end of the actuator is connected to the wing structure and the forward end is connected to the upper drag leg arm. The drag leg assembly consists of the upper and lower drag legs and the upper drag leg arm along with the fasteners shown. A position switch is installed at the pivot point between the upper and lower drag legs.

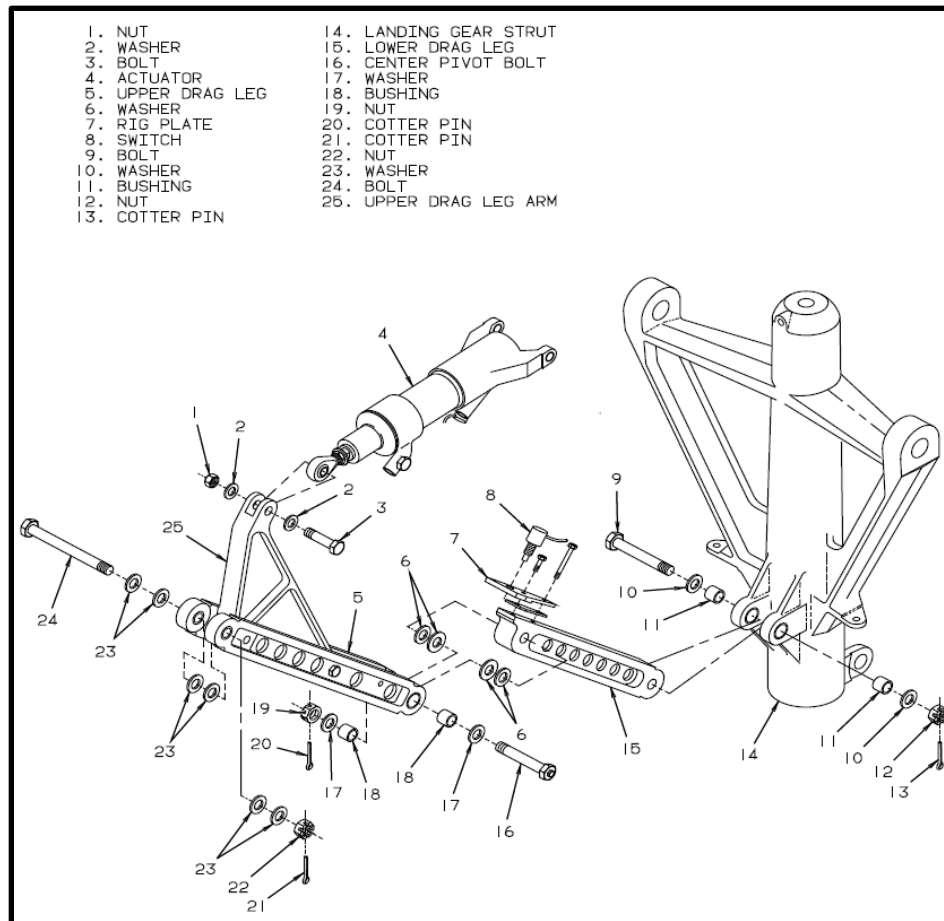


Figure 2-Beechcraft 1900C main landing gear illustration.

2.0 Accident Aircraft Examination

The NTSB did not travel to the accident site due to COVID-19 pandemic travel restrictions in place. The following information was developed from photos and notes obtained from the operator and the

FAA inspector that examined the airplane.

The airplane sustained abrasion damage to the lower surface of the left wing, left aileron, left flap, and LMLG doors. In places, the abrasion penetrated the skin causing damage to the underlying structure. The outboard portion of the 4 blades on the left propeller were separated. The left wing leading edge had two impact impressions. There was damage to the outboard portions of the wing spars. The airplane was lifted to allow the LMLG to be manually extended and pinned in place. The upper drag leg arm was fractured, and the actuator forward rod end was bent (Figure 3).



Figure 3-Fractured left Upper Drag Leg Arm on accident airplane.

The LMLG actuator (Beech PN 114-380041-21, APPH PN 40600-12, SN 14) and left drag arm assembly (PN 114-810023-1, SN ARC31209-5) were retained for further examination.

3.0 Maintenance Records Examination¹

On April 15, 2014, the landing gear on the accident airplane would not extend during approach. The landing gear were manually extended, and the airplane landed safely. Inspection revealed that the wire harness to the LMLG actuator limit switches was damaged. The actuator was replaced with PN 114-380041-21, SN 14. The installed actuator was last overhauled in August 2013 when it was upgraded to APPH PN 40600-12. The overhaul was performed by the manufacturer, APPH Wichita, and the unit passed the functional test. On May 15, 2019, the RMLG and LMLG were

¹ The pertinent maintenance records are contained in Appendix A.

replaced with overhauled units due to hard time limits on the units installed. On February 3, 2020, the landing gear wouldn't retract during a flight even after the pilot reset the circuit breaker and cycled the handle. The hydraulic fluid level and accumulator pressure were found to be good, and the squat and position switches were cleaned. The mechanic performed 3 gear swings with no faults noted. On April 28, 2020, the landing gear failed to retract after takeoff. The pilot wrote up that the handle operated normally, and all three green lights stayed illuminated. The handle was cycled again with no effect, so the pilot put the handle in the DN position and landed safely. The mechanic cleaned and resecured the control handle and cleaned the position switches before performing several gear swings with no fault. On April 29, 2020, the LMLG and RMLG drag brace assemblies were replaced on the airplane because they were due for overhaul. The LMLG drag brace assembly installed was the unit removed after the accident (SN ARC31209-5). The drag brace assembly had been overhauled by Ameriflight in February 2020. Based on the paperwork, the overhaul entailed disassembly, stripping of paint, inspection, repaint, and reassembly with new hardware. On May 5, 2020, the landing gear failed to retract after takeoff. The pilot cycled the handle with no effect and noted that the red in-transit lights did not illuminate and the green gear-down lights stayed illuminated. The write-up included a note that this was a repeat event. The mechanic jacked the airplane and performed 5 cycles of the landing gear with no faults noted. Subsequently, a different mechanic removed and replaced the landing gear control handle and noted no further faults.

4.0 Tests and Research

The accident airplane LMLG actuator and fractured drag brace assembly were sent to the Textron Aviation Material and Process group for examination under the direction of the NTSB. The FAA attended the examination in person and the NTSB and Ameriflight participated virtually. Ameriflight records indicated that the drag leg assembly had accrued 7.1 hours and 8 landing cycles since overhaul. The actuator was unbolted from the upper drag leg arm. See Appendix B for the Textron Aviation report of the examination. The Textron report shows that the upper drag leg arm fractured in bending and twisting overload. There was no evidence of pre-existing cracking or corrosion. The dimensions of the part were consistent with the drawing and the chemical composition and microstructure were consistent with 7075 aluminum alloy as required. The mechanical properties were lower and the electrical conductivity was higher than the requirements for 7075-T6 aluminum alloy. The measured mechanical properties and electrical conductivity did not conform to any standard temper for 7075 aluminum alloy.

The LMLG actuator was taken to the manufacturer, Heroux Devtek (formerly APPH), for examination under the supervision of the NTSB. Representatives from the FAA and Textron Aviation were also present for the examination. See Appendix C for the Heroux Devtek report of the examination. Visual examination showed that the forward rod end was bent and had to be replaced to perform the functional test. A hydraulic fluid sample was retrieved from the actuator before testing. The actuator passed the functional test with no anomalies. The actuator was torn down and examined showing no anomalies.