



Aviation Investigation Preliminary Report

Location:	Windsor Locks, CT	Accident Number:	ERA23LA135
Date & Time:	March 3, 2023, 16:00 Local	Registration:	N300ER
Aircraft:	BOMBARDIER INC BD-100-1A10	Injuries:	1 Fatal, 4 None
Flight Conducted Under:	Part 91: General aviation - Personal		

On March 3, 2023, about 1600 eastern standard time, a Bombardier BD-100-1A10 (Challenger 300) airplane, N300ER, was involved in an accident while en route from Dillant/Hopkins Airport (EEN), Keene, New Hampshire to Leesburg Executive Airport (JYO), Leesburg, Virginia. The flight diverted to Bradley International Airport (BDL), Windsor Locks, Connecticut. One passenger was fatally injured. The two airline transport pilots and two other passengers were not injured. The airplane was not damaged and was operated as a personal flight under the provisions of Title 14 *Code of Federal Regulations* Part 91.

The flight crew reported that after a routine preflight inspection, engine start, and taxi for departure, a takeoff was initiated. The second-in-command (SIC) reported that during the takeoff roll on runway 2, the airplane accelerated normally, however, he observed that the right primary flight display (PFD) airspeed indicator mis-compared to the left side airspeed indicator and an aborted takeoff was performed. The pilot-in-command (PIC) slowed the airplane without issue and exited the runway onto a taxiway. The left engine was shutdown, the SIC opened the main cabin door and walked to the front of the airplane where he subsequently observed that the red pitot probe cover remained installed on the right-side pitot probe. The SIC removed the cover, did not see any damage to the probe, and returned to the cockpit.

The PIC restarted the left engine and resumed the taxi to runway 2. Shortly after the left engine was started, the crew reported that an Engine Indicating and Crew Alerting System (EICAS) advisory message of 'RUDDER LIMITER FAULT' annunciated. The PIC reported that he attempted two ground avionics "stall tests" to clear the message, as he had received this advisory message in past ground operations, however, the tests did not clear the annunciation. The flight was continued given that the message was an advisory, and not a caution or warning.

The flight crew further reported that during the second takeoff, the acceleration was normal, however, the SIC noticed that the V-speeds were not set. The SIC called V1 and rotate at 116 knots from memory and the PIC entered the climb without issue. As the initial climb and turn on course progressed, the PIC reported that the autopilot was engaged, and they continued a climb to 6,000 ft mean sea level (msl) and were subsequently cleared to flight level 240 (24,000 ft msl). The flight crew reported that around 6,000 ft, they observed multiple EICAS caution messages. The crew recalled EICAS messages of 'AP STAB TRIM FAIL' [autopilot stabilizer trim failure] 'MACH TRIM FAIL' and 'AP HOLDING NOSE DOWN'. Neither crewmember could recall exactly what order the EICAS messages were presented. They also reported that additional EICAS messages may have been annunciated.

The PIC asked the SIC to refer to the quick reference handbook. The SIC, via an electronic flight bag (iPad), located the quick reference card and the 'PRI STAB TRIM FAIL' [Primary Stabilizer Trim Failure] checklist. The SIC visually showed the PIC the checklist, and they both agreed to execute the checklist. The first action on the checklist was to move the stabilizer trim switch ('STAB TRIM'), located on the center console, from 'PRI' (Primary) to 'OFF.' The SIC read the checklist item aloud and he subsequently moved the switch to off.

As soon as the switch position was moved, the airplane abruptly pitched up. The PIC reported that his left hand was on the flight controls and his right hand was guarding the right side of the flight controls. He immediately with both hands regained control of the airplane in what he estimated to be a few seconds after the airplane's pitch oscillated up and down. During the oscillations, the PIC instructed the SIC to move the stabilizer trim switch back to the primary position, which the SIC accomplished. The PIC reported that preceding the rapid pitch event, the autopilot was on, and he expected that once the stabilizer trim switch was turned off, the autopilot would disconnect, which it did.

The PIC reported that he had no problem manually flying the airplane after the in-flight upset, nor did he experience any abnormalities trimming the airplane using the manual pitch trim switch, located on the control column, at any point during the flight. Shortly after the in-flight upset, the flight crew were alerted by a passenger that another passenger had been injured. The SIC exited the cockpit to check on the passenger and to provide medical attention for a short period of time. He subsequently informed the PIC that there was a medical emergency and that they needed to land.

The flight crew informed air traffic control of the medical event and began a diversion to BDL. The PIC did not reengage the autopilot for the remainder of the flight. After landing, the airplane taxied to the ramp where an ambulance was waiting. Paramedics entered the airplane and subsequently transported the injured passenger to a nearby hospital. The passenger succumbed to her injuries later in the day at the hospital.

The flight crew reported that they did not experience any remarkable turbulence during the flight, nor during the time immediately surrounding the in-flight upset event.

According to preliminary data recovered from the airplane's flight data recorder (FDR), the airplane during the first takeoff attempt reached a maximum airspeed of 104 kts displayed on the left PFD airspeed indicator and 2 knots on the right PFD airspeed indicator before the abort was initiated. No significant difference in airspeed was observed in the data for the remainder of flight, following the SIC's removal of the pitot probe cover. Throughout the initial climb, multiple pilot commanded manual pitch trim inputs and corresponding movements from the horizontal stabilizer were observed.

During the climb, the preliminary FDR data showed that the autopilot had been engaged and disengaged three separate instances. With each autopilot engagement, an immediate master caution was annunciated (Note, the FDR does not record specific EICAS caution messages). The autopilot disconnected in the first two instances after the manual pilot pitch trim was activated and small pitch oscillations were observed after the disengagement. The autopilot was reengaged for the final time at 6,230 ft msl and remained on until reaching 22,780 ft msl. The airplane's airspeed had increased from 238 knots to 274 knots in this segment of the climb.

Immediately preceding the in-flight upset event, the autopilot abnormal disconnect parameter was activated, and no manual pitch trim inputs were recorded. This data was consistent with flight crew's report that the stabilizer trim switch was moved from 'PRI' (Primary) to 'OFF', which resulted in the autopilot disengaging.

The airplane immediately pitched up to about 11° and reached a vertical acceleration of about +3.8g. The airplane subsequently entered a negative vertical acceleration to about -2.3g. The airplane pitched up again to about 20° and a vertical acceleration of +4.2g was recorded. The stall protection stick pusher activated during this pitch up; subsequently, vertical acceleration lowered to about +2.2g which was followed by a cutout of FDR data. The FDR and cockpit voice recorder (CVR) were equipped with an impact switch g switch. The CVR continued to record for an additional 10 minutes as it was equipped with a back-up power supply, however, the CVR also stop recording data prior to landing at BDL.

A representative with Executive Flight Services (EFS) LLC., reported that they managed the accident airplane and employed the flight crew. EFS reported that the flight was operated as a non-revenue Part 91 flight operated by the owner of the airplane Conexon LLC.

According to Federal Aviation Administration (FAA) airman records, the PIC held an airline transport pilot certificate and held a PIC type rating in the accident airplane, in addition to other type ratings held. EFS reported that the PIC had accumulated 5,061 total flight hours, and 88 hours in the accident make and model airplane. The SIC held an airline transport pilot certificate and held a PIC type rating in the accident airplane, in addition to other type ratings held. EFS reported that the SIC had accumulated 8,025 total flight hours, and 78 hours in the accident make and model airplane. In October 2022, both pilots completed initial ground and simulator training and earned their PIC type rating in the Challenger 300.

The airplane was retained for further examination and the CVR was retained for read-out and transcription.

Aircraft and Owner/Operator Information

Aircraft Make:	BOMBARDIER INC	Registration:	N300ER
Model/Series:	BD-100-1A10 NO SERIES	Aircraft Category:	Airplane
Amateur Built:			
Operator:		Operating Certificate(s) Held:	None
Operator Designator Code:			

Meteorological Information and Flight Plan

Conditions at Accident Site:	VMC	Condition of Light:	Day
Observation Facility, Elevation:	BDL,173 ft msl	Observation Time:	15:51 Local
Distance from Accident Site:	25 Nautical Miles	Temperature/Dew Point:	7°C /-7°C
Lowest Cloud Condition:		Wind Speed/Gusts, Direction:	6 knots / , 10°
Lowest Ceiling:	Broken / 16000 ft AGL	Visibility:	10 miles
Altimeter Setting:	30.01 inches Hg	Type of Flight Plan Filed:	IFR
Departure Point:	Keene, NH (EEN)	Destination:	Leesburg, VA (JYO)

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	None
Passenger Injuries:	1 Fatal, 2 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal, 4 None	Latitude, Longitude:	41.938425,-72.688307

Administrative Information

Investigator In Charge (IIC):	Gerhardt, Adam
Additional Participating Persons:	Daniel Ferlatte ; Transportation Safety Board of Canada ; Gatineau, OF Michael Lemay; Bombardier; Dorval, OF Paul Hawthorne; Moog Aircraft ; East Aurora, NY Brian Jewell; Executive Flight Services LLC.; Lenexa, KS Jennifer McDuffie; Honeywell Aerospace; Phoenix, AZ
Note:	The NTSB did not travel to the scene of this accident.