# Aviation Investigation Final Report

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| **Location:** | New York, New York | **Incident Number:** | DCA22LA179 |
| **Date & Time:** | July 7, 2022, 17:30 UTC | **Registration:** | N181DN |
| **Aircraft:** | Boeing 767-332 | **Aircraft Damage:** | None |
| **Defining Event:** | Flight control sys malf/fail | **Injuries:** | 233 None |
| **Flight Conducted Under:** | Part 121: Air carrier - Scheduled | | |

## Analysis

The flight crew of Delta Air Lines Flight 211reported that they experienced roll control difficulties after being informed of a water leak emanating from the two mid cabin lavatories while enroute from the Václav Havel Prague Airport (PRG), Prague, Czechia to the John F Kennedy International Airport (JFK), New York, New York.

The event flight was a Line Check flight flown by two complete crews, each consisting of a captain and a first officer (FO). The flight crew who was flying at the time of the event indicated that a flight attendant called and informed them of water leaking from the two mid cabin lavatories.

The flight crew who was not flying at the time confirmed that one lavatory was leaking water from under the lower right side of the toilet onto the floor; the water supply was subsequently shut off and the lavatory was locked to prevent further use. The other lavatory was leaking water from on top of the filter canister under the sink; the water supply to the sink was subsequently shut off and the lavatory was left open for toilet use only. The crew cleaned up as much excess water from the floor as possible.

The FO who was the pilot flying during the event stated that shortly after the water leak was reported, an AUTOPILOT caution message was displayed on the engine indicating and crew alerting system (EICAS) screen, along with an audible annunciation. The FO disengaged and reengaged the autopilot several times, however the caution messages, and audible indication persisted, and the aircraft made no lateral course corrections. The FO stated that he then disengaged the autopilot and attempted to make the course corrections manually; however, he was unable to move his control wheel to the left more than a couple of degrees of deflection and was thus unable to input the needed corrections. He then transferred control of the airplane

to the captain, who confirmed the FO's findings of minimal control to the left about the longitudinal axis of the airplane.

The FO stated that a "Jammed or Restricted Flight Controls" procedure was performed, and, in coordination with dispatch and maintenance control, it was determined that frozen water was a suspected cause due to the multiple water leaks. The flight crew declared an emergency and was given clearance to descend to 9,000 ft where the temperature was above freezing.

As the airplane descended through 12,000 ft, a minor "jolt" was felt by the flight crew. After this, the control wheel operated normally, and the flight continued to and landed safely at JFK. There were no injuries to the 233 passengers and crew onboard the airplane.

A review of flight data by Boeing revealed evidence of a temporary restriction in the lateral control system, starting shortly before the initial disconnect of the center autopilot. The evidence of a restriction was apparent in both automatic and manual flight and continued until shortly after the descent began from flight level (FL) 360. During the period of restricted movement, the captain's control wheel showed a restriction at approximately 7 degrees of deflection to the left.

Boeing indicated that the 767 lateral flight control system is designed to allow for the override of a restriction in either the captain's or FO's flight controls by applying a breakout force to the control wheel on the opposite side. Boeing's review of the flight data did not find evidence that the airplane lost the ability for an override to take place. The FO's control wheel position, and control wheel forces for both wheels, is not recorded on the flight data recorder (FDR). The FDR data and statements by the flight crew on the incident flight were inconclusive about the total force input into the flight control system during the event.

According to Delta Air Lines, during corrective action after the subject event, the forward and aft lavatory drain mast heater circuit breakers (CBs), located in the electronic equipment bay, were found open. Although there were no current or previous maintenance write-ups on these heaters, Delta removed and replaced them as a precaution. Subsequent testing found the heater elements for the forward drain mast functioned normally.

Delta Air Lines reported that before the subject event, this airplane was out of service for maintenance which required pulling the forward and aft lavatory drain mast heater CB's. It is possible that these CBs were inadvertently left open when the airplane was returned to service on June 23, 2022.

Due to the open drain mast heater CBs, it is likely that ice formed in the forward drain mast, allowing drain water from all equipment routed to the forward drain mast to back up in the lines until it leaked outside of the drain system plumbing. The water likely traveled into and drained through the canted pressure bulkhead in the vicinity of aileron control system components located within the main landing gear wheel well. The water likely froze on one or more of the components which led to the pilots' limited control of the ailerons. Boeing could

not identify a location in the roll flight control system where ice formation could restrict both the left and right ailerons if the control wheel breakout was activated.

## Probable Cause and Findings

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

The failure of maintenance personnel to close the drain mast heater circuit breakers which resulted in the formation of ice in the forward drain mast, an improper flow of wastewater into the main landing gear wheel well, and the formation of ice on one or more aileron system components.

### Findings

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| **Personnel issues** | Scheduled/routine maintenance - Maintenance personnel |
| **Aircraft** | Water - Fluid management |
| **Environmental issues** | Low temperature - Effect on equipment |

# Factual Information

## History of Flight

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| **Enroute-cruise** | Flight control sys malf/fail (Defining event) |

## Check pilot Information

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| **Certificate:** | Airline transport | **Age:** | 58,Male |
| **Airplane Rating(s):** | Single-engine land; Multi-engine land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | | **Restraint Used:** | Unknown |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | |
| **Medical Certification:** | Class 1 Unknown | **Last FAA Medical Exam:** | January 3, 2022 |
| **Occupational Pilot:** | Yes | **Last Flight Review or Equivalent:** | |
| **Flight Time:** | 10165 hours (Total, all aircraft), 3449 hours (Total, this make and model), 165 hours (Last 90 days, all aircraft), 0 hours (Last 24 hours, all aircraft) | | |

## Pilot Information

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| **Certificate:** | Airline transport; Commercial; Private | **Age:** | 29,Male |
| **Airplane Rating(s):** | Single-engine land; Multi-engine land | **Seat Occupied:** | Right |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | Unknown |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | |
| **Medical Certification:** | Class 1 Unknown | **Last FAA Medical Exam:** | June 3, 2022 |
| **Occupational Pilot:** | Yes | **Last Flight Review or Equivalent:** | May 21, 2022 |
| **Flight Time:** | 753 hours (Total, all aircraft), 189 hours (Last 90 days, all aircraft), 0 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | Boeing | **Registration:** | N181DN |
| **Model/Series:** | 767-332 | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | 1992 | **Amateur Built:** | |
| **Airworthiness Certificate:** | Transport | **Serial Number:** | 25986 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | 237 |
| **Date/Type of Last Inspection:** | July 7, 2022 Continuous airworthiness | **Certified Max Gross Wt.:** | 409000 lbs |
| **Time Since Last Inspection:** | | **Engines:** | 2 Turbo jet |
| **Airframe Total Time:** | 131342 Hrs as of last inspection | **Engine Manufacturer:** | P&W |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | PW4000 SER |
| **Registered Owner:** | DELTA AIR LINES INC | **Rated Power:** | 60000 Lbs thrust |
| **Operator:** | DELTA AIR LINES INC | **Operating Certificate(s) Held:** | Flag carrier (121) |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Unknown | **Condition of Light:** | Not reported |
| **Observation Facility, Elevation:** | | **Distance from Accident Site:** | |
| **Observation Time:** | | **Direction from Accident Site:** | |
| **Lowest Cloud Condition:** | | **Visibility** | |
| **Lowest Ceiling:** | | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | | **Temperature/Dew Point:** | |
| **Precipitation and Obscuration:** | | | |
| **Departure Point:** | Prague, Czech Republic (PRG) | **Type of Flight Plan Filed:** | IFR |
| **Destination:** | New York, NY (JFK) | **Type of Clearance:** | IFR |
| **Departure Time:** | 11:59 UTC | **Type of Airspace:** | Class A |

## Wreckage and Impact Information

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| **Crew Injuries:** | 12 None | **Aircraft Damage:** | None |
| **Passenger Injuries:** | 221 None | **Aircraft Fire:** | None |
| **Ground Injuries:** | | **Aircraft Explosion:** | None |
| **Total Injuries:** | 233 None | **Latitude, Longitude:** | 56.112671,-46.145325 |

## Administrative Information

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| **Investigator In Charge (IIC):** | Hauf, Michael |
| **Additional Participating Persons:** | Jacob Zeiger; Boeing Air Safety Investigation; WA<br>Shannon Masters; Delta Air Lines, Inc.<br>Jon Sheehan; DALPA - Accident Analysis and Prevention |
| **Original Publish Date:** | April 20, 2023 |
| **Last Revision Date:** | |
| **Investigation Class:** | Class 4 |
| **Note:** | The NTSB did not travel to the scene of this incident. |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=105738 |

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties … and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.