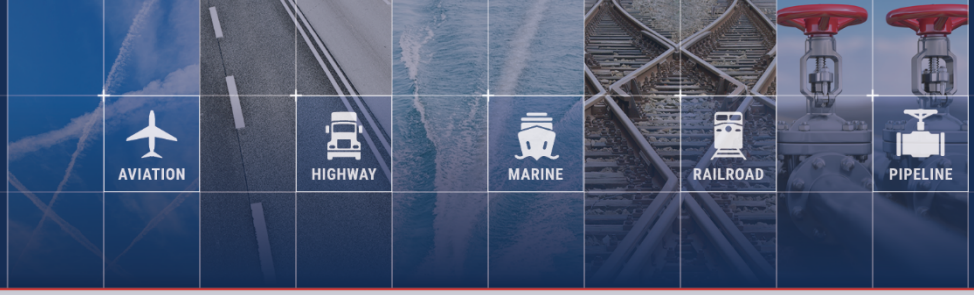

Aviation Investigation Final Report

Location:	Denver, Colorado	**Incident Number:**	DEN04IA026
Date & Time:	November 29, 2003, 08:40 Local	**Registration:**	N303FL
Aircraft:	Boeing 737-3M8	**Aircraft Damage:**	None
Defining Event:		**Injuries:**	135 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

While on final approach approximately 1/4 mile from the end of the runway, the captain applied right aileron to correct for a crosswind. He said the control yoke felt like it had "bound up." He used "excessive pressure" to get the control yoke to respond. An uneventful landing was made. During taxi, the captain cycled the control yoke left and right. After a few cycles, it seemed to move freely. He made an intentional sharp left turn and the tiller wheel seemed to "bind up." Mechanics performed a nose landing gear wheel steering test, and checked the cable tension to the nose wheel steering. A leak was discovered in the right hand nose steering accumulator, but the leak was "within limits." The case drain plugs and filters and the left and right hand aileron cables from the main wheel well outboard were inspected. Following flight control movement card 7-9002, mechanics performed an aileron PCU internal leak check. No discrepancies were noted. The airplane was then test flown and was returned to service. No data was recovered from the DFDR that would explain the event as described by the captain.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The restricted movement of the flight control yoke and tiller wheel steering for reasons undetermined.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: APPROACH

Findings
1. FLT CONTROL SYST,YOKE/CONTROL STICK - MOVEMENT RESTRICTED
2. LANDING GEAR,STEERING SYSTEM - MOVEMENT RESTRICTED
3. (C) REASON FOR OCCURRENCE UNDETERMINED

Factual Information

On November 29, 2003, at 0840 mountain standard time, a Boeing 737-3M8, N303FL, operating as Frontier Airlines flight 567, experienced a momentary lock up of the captain and first officer's aileron and flight spoiler controls, while on final approach into Denver International Airport (DEN), Denver, Colorado. The airline transport certificated captain and first officer, 3 cabin crewmembers, and 130 passengers were not injured. Visual meteorological conditions prevailed. The scheduled domestic passenger flight was being conducted under the provisions of Title 14 CFR Part 121. An instrument flight rules (IFR) flight plan had been filed for the flight that departed Milwaukee, Wisconsin, at 0637 central standard time.

The captain reported that they were on final approach approximately 1/4 mile from the end of the runway when he applied right aileron to correct for a crosswind. "The [control] yoke felt like it had 'bound up'." He had to use excessive pressure to get the control yoke to respond. An uneventful landing was made at DEN. After landing, he cycled the yoke left and right. After a few cycles, it seemed to free up. The captain said that while taxiing to parking with the number 2 engine shut down, he made a sharp left turn and the tiller [wheel] seemed to "bind up."

After the passengers had deplaned, the airplane was taken to Frontier's maintenance hangar where mechanics performed a "[nose landing gear] wheel steering test [in accordance with Maintenance Manual] 32-51-00. Checked good. Performed cable tension to nose wheel steering [in accordance with Maintenance Manual] 32-51-00. Tension good. Found [right hand] nose steering accumulator leaking. Leak limits good [in accordance with Maintenance Manual] 29-00-00, page 605. Inspected case drain filters. Found no discrepancies [reference Maintenance Manual 24-15-91]. Removed and reinstalled #2 engine case drain plug to inspect. Found no discrepancies [reference Maintenance Manual 29-15-00]. Inspected [left hand] and [right hand] aileron cables from main [wheel well] outboard visually. No discrepancies noted. Complied with flight control movement card 7-9002. No discrepancies noted. Performed aileron PCU internal leak check procedure [reference Maintenance Manual 84-00-00. No discrepancies noted. Aircraft is released for operational check flight. Performed post operational check flight, walk around inspection." During the test flight, no discrepancies were noted and the airplane was returned to service.

The digital flight data recorder (DFDR) was removed from the airplane and sent to NTSB's Vehicle Recorder Laboratory for readout. According to the DFDR engineer, no data was recovered that would explain the event as described by the captain.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	50,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	November 10, 2003
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	September 6, 2003
Flight Time:	144 hours (Last 90 days, all aircraft), 40 hours (Last 30 days, all aircraft)		

Co-pilot Information

Certificate:	Airline transport; Commercial	**Age:**	45,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	June 10, 2003
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 9, 2003
Flight Time:	5600 hours (Total, all aircraft), 1424 hours (Total, this make and model), 3321 hours (Pilot In Command, all aircraft), 176 hours (Last 90 days, all aircraft), 62 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Boeing	**Registration:**	N303FL
Model/Series:	737-3M8	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Transport	**Serial Number:**	25039
Landing Gear Type:	Retractable - Tricycle	**Seats:**	144
Date/Type of Last Inspection:	November 19, 2003 Continuous airworthiness	**Certified Max Gross Wt.:**	135000 lbs
Time Since Last Inspection:	88 Hrs	**Engines:**	2 Turbo fan
Airframe Total Time:	38084 Hrs at time of accident	**Engine Manufacturer:**	General Electric
ELT:	Installed, not activated	**Engine Model/Series:**	CFM-56-3B2
Registered Owner:	Wells Fargo Bank Northwest NA Trustee	**Rated Power:**	20000 Lbs thrust
Operator:	Frontier Airlines Inc	**Operating Certificate(s) Held:**	Flag carrier (121)
Operator Does Business As:		**Operator Designator Code:**	F3LA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	DEN,5431 ft msl	**Distance from Accident Site:**	
Observation Time:	08:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 12000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 250000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	13°C / -9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Milwaukee, WI (MKE)	**Type of Flight Plan Filed:**	IFR
Destination:	Denver, CO (DEN)	**Type of Clearance:**	IFR
Departure Time:	06:37 Local	**Type of Airspace:**	Class B

Airport Information

Airport:	Denver International DEN	**Runway Surface Type:**	
Airport Elevation:	5431 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	Visual
Runway Length/Width:		**VFR Approach/Landing:**	Straight-in

Wreckage and Impact Information

Crew Injuries:	5 None	**Aircraft Damage:**	None
Passenger Injuries:	130 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	135 None	**Latitude, Longitude:**	39.858333,-104.666946

Administrative Information

Investigator In Charge (IIC):	Scott, Arnold
Additional Participating Persons:	James B Hopkins; FAA Flight Standards District Office; Denver, CO
Original Publish Date:	June 2, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=58411

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.