



National Transportation Safety Board Aviation Incident Final Report

Location:	Toledo, OH	Incident Number:	CEN11IA087
Date & Time:	12/01/2010, 1336 EST	Registration:	N607QS
Aircraft:	CESSNA 560XL	Aircraft Damage:	None
Defining Event:	Flight control sys malf/fail	Injuries:	3 None
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

The Cessna 560XL airplane encountered ground and/or in-flight moisture/rain, that collected in the tailcone stinger and subsequently froze around the rudder cables during flight at an altitude above the freezing level. When the pilot attempted to use the rudder to initiate a crosswind correction during the landing flare, he was unable to move the rudder pedals, but was able to land the airplane uneventfully. In the days and weeks that followed, several other 560XL airplanes encountered the same problem. As a result, the airplane manufacturer issued a service bulletin recommending that drain holes be added in the tailcone stinger. The manufacturer had already added the drain holes in production airplanes, yet some production airplanes had drain holes that were not the indicated size. The manufacturer then issued an alert service letter to modify the stinger drain. However, the alert service letter still did not remedy the problem; another 560XL airplane, modified in accordance with the alert service letter, sustained ice-bound rudder cables. The manufacturer subsequently issued a mandatory service bulletin that required the installation of a seal and drain to improve water drainage from the stinger. The misdrilled holes on production airplanes were not detected by the Federal Aviation Administration (FAA) district office assigned to oversee the incident airplane. The manufacturer has subsequently instituted a specific inspection criteria to verify the drain hole installation on production airplanes, and the FAA has verified engineering requirements, planning changes for technicians to follow, and actual holes, including their dimensions.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The manufacturer's inadequate initial design and subsequent modifications of the tailcone, which allowed moisture to collect and freeze around rudder cables during flight levels above the freezing level and resulted in a loss of rudder authority. Contributing to the accident was the lack of oversight of the manufacturer's design and production by the Federal Aviation Administration.

Findings

Aircraft	Rudder misc structure - Design (Cause)
Environmental issues	Rain - Contributed to outcome
Organizational issues	Equip certification/testing - FAA/Regulator (Factor)

Factual Information

On December 1, 2010, about 1336 eastern standard time, a Cessna 560XL, N607QS, operated by NetJets Aviation, Inc., sustained a loss of rudder authority when the airplane's rudder bound during landing at the Toledo Express Airport (TOL), near Toledo, Ohio. The airplane landed without incident and was undamaged. The two pilots and one passenger were not injured. Visual meteorological conditions prevailed. The flight was operating on an activated instrument flight rules flight plan. The non-scheduled domestic passenger flight was conducted under 14 Code of Federal Regulations Part 135. The flight departed from the Monmouth Executive Airport (BLM), near Belmar, New Jersey, about 1159, and was destined for TOL.

On November 29, 2010, according to the operator, the airplane had landed at the Philadelphia International Airport (PHL), Philadelphia, Pennsylvania, and was parked on the ramp for 30 hours. Light rain was reported during the time the airplane was parked at PHL. On November 30, 2010, the flightcrew repositioned the airplane from PHL to BLM where the airplane was parked under an open canopy.

On the morning of December 1, 2011, the flightcrew performed a preflight inspection of the airplane at BLM and they noted that it was raining moderately during the preflight with a temperature of 15C. The flightcrew reportedly conducted a normal preflight inspection, which included an inspection of the control cables visible in the aft equipment bay where no discrepancies were noted. The aircraft was repositioned under the canopy facing into the wind for the engine start. The startup and taxi procedures, including a flight control check and rudder bias check were conducted. All checks were normal.

The flight departed through light to moderate rain until west of the PHL airspace and the flight was subsequently cleared to climb to a cruising altitude of flight level 400. The cruise portion of the flight was at an altitude above the freezing level. The flight broke out on top of the cloud layer into clear skies during the climb about 14,000 feet above mean sea level (MSL). The remainder of the flight was in clear conditions until its descent through 8,000 feet MSL on approach to TOL.

During the approach, the autopilot was disconnected while descending through 2,500 feet MSL. The flight broke out of the clouds about 1,600 feet MSL. The yaw damper was disconnected while descending through 600 feet above ground level. The recorded temperature at TOL was -2 degrees C at 1252. No problems were noted until the pilot flying attempted to use the rudder to initiate a crosswind correction during the landing flare. At that time, the flying pilot noted he was unable to move the rudder pedals. Other than the lack of rudder authority, the landing was uneventful. The airplane taxied to the ramp using differential thrust and braking.

After arrival with the engines shut down, the flightcrew noted that the rudder pedals would still not move. They attempted to manually move the rudder and found that it would not move.

Postflight examination of the airplane by maintenance personnel revealed that ice had accumulated in the tail cone stinger and it interfered with the rudder control cables and pulleys in the tail cone, which rendered the rudder immovable.

On April 1, 2005, Cessna issued service letter (SL)560XL-53-05, which listed procedures including drilling a 0.201-inch hole that provided a drain path for moisture that accumulated within the stinger. SL560XL-53-05 applied to 560XL airplanes with serial numbers between

560-5002 and 560-5544. Airplanes with serial numbers higher than 560-5544 had their SL560XL-53-05 drain holes incorporated in the tailcone stinger during factory production. This incident airplane, serial number 560-5340, stinger's tailcone assembly, part number 6612119-60, had a drain hole incorporated in it. However, a Federal Aviation Administration (FAA) inspector examined the airplane and found that its tailcone stinger had a 0.182-inch drain hole, which was smaller than the 0.201-inch drain hole dimension indicated in SL560XL-53-05.

The FAA inspector was asked to examine other Cessna 560XL airplanes' drain holes that were present in the maintenance hangar that housed N607QS in TOL. Three other Cessna 560XLs, with serial numbers 560-5305, 560-5548, and 560-5661, drain holes were smaller than the drain hole dimension indicated in SL560XL-53-05. The serial number 560-5548 and 560-5661 airplanes should have had correct dimensioned drain holes incorporated in their tailcone stingers during factory production.

According to preliminary information supplied to the National Transportation Safety Board (NTSB), on December 13, 2010, a Cessna 560XL, N498AB, sustained no damage when the airplane's rudder bound during landing at the Birmingham-Shuttlesworth International Airport, near Birmingham, Alabama. This incident investigation's report number is CEN11IA111.

According to notification information supplied to the NTSB, on December 20, 2010, a Cessna 560XL, N626QS, sustained no damage when this airplane's rudder also bound during landing at the Idaho Falls Regional Airport (IDA), near Idaho Falls, Idaho.

Cessna issued alert service letter (ASL)560XL-53-08 on January 21, 2011. The ASL, in part, stated:

REASON

The stinger may not drain water which may allow ice to form around the rudder bias cable pulleys.

DESCRIPTION

This alert service letter provides instructions to inspect for drain holes in frames immediately forward and aft of access panel 321ABC, and drill them if necessary. Instructions are also provided to seal an existing drain hole in the tailcone stinger and add a drain hole in the aft canted bulkhead.

COMPLIANCE

MANDATORY. This alert service letter must be accomplished within 90 flight

hours or 90 days from the date of receipt, whichever occurs first.

On March 15, 2011, the NTSB issued Safety Recommendation A-11-16 to the FAA. A-11-16 recommended that the FAA issue an airworthiness directive to require that all Cessna 560XL operators comply with Cessna ASL560XL-53-08.

According to preliminary information supplied to the NTSB, on March 10, 2011, while climbing through approximately 28,000 feet in the vicinity of Haynesville, Maryland, a Cessna 560XL, N588QS, operated by NetJets Aviation, Inc., experienced stuck rudder controls. N588QS was modified to comply with ASL560XL-53-08. This incident investigation's report number is ERA11IA184.

Cessna subsequently issued service bulletin (SB)560XL-53-16 titled Fuselage – Stringer Drain Installation on October 4, 2011. SB560XL-53-16, in part, stated:

EFFECTIVITY

MODEL

SERIAL NUMBERS

560XL (Citation Excel)	-5002 thru -5372
560XL (Citation XLS)	-5501 thru -5830
560XL (Citation XLS+)	-6002 thru -6080, -6082 thru -6086

The equivalent of this service bulletin has been incorporated on production airplanes -6081 and -6087 and On.

NOTE: For airplanes affected by ASL560XL-53-08, Fuselage - Aft Canted Bulkhead Drain Installation, that alert service letter must be complied prior to or in conjunction with this service bulletin.

REASON

To install a seal and drain to improve water drainage from the stinger.

DESCRIPTION

This service bulletin provides parts and instructions to install a drain and seal that will reduce the amount of water entering the stinger and improve drainage.

SB560XL-53-16 listed a drain tube assembly as part of its required materials.

The FAA's Wichita Aircraft Certification Office (ACO) approved Cessna's issuance of ASL560XL-53-08 and SB560XL-53-16. On May 11 through May 19, 2011, the FAA's Wichita Manufacturing District Office (MIDO) and ACO conducted a district office audit to evaluate Cessna's quality control data for compliance with FAA regulations. That audit did not detect any misdrilled tailcone stinger drain holes on production 560XL airplanes. Cessna subsequently instituted a specific inspection characteristic to verify the drain hole installation. A MIDO inspector conducted a follow-up inspection on August 16, 2011, verifying engineering requirements, planning changes for technicians to follow, and actual holes to include their dimensions. The inspector also verified the drain scupper installation on the first airplane in production to receive it. The drain scupper is listed as a "tube weld assembly" with part number 6612060-1 in SB560XL-53-16.

History of Flight

Landing	Flight control sys malf/fail (Defining event)
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Pilot Information

Certificate:	Airline Transport; Commercial	Age:	51, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	No
Medical Certification:	Class 1 With Waivers/Limitations	Last Medical Exam:	08/09/2010
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	09/26/2010
Flight Time:	9889 hours (Total, all aircraft), 4152 hours (Total, this make and model), 7662 hours (Pilot In Command, all aircraft), 102 hours (Last 90 days, all aircraft), 31 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Co-Pilot Information

Certificate:	Airline Transport; Flight Instructor	Age:	50, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Single-engine	Toxicology Performed:	No
Medical Certification:	Class 1 With Waivers/Limitations	Last Medical Exam:	10/12/2010
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	07/12/2010
Flight Time:	8998 hours (Total, all aircraft), 712 hours (Total, this make and model), 7200 hours (Pilot In Command, all aircraft), 71 hours (Last 90 days, all aircraft), 27 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	CESSNA	Registration:	N607QS
Model/Series:	560XL	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	560-5340
Landing Gear Type:	Retractable - Tricycle	Seats:	9
Date/Type of Last Inspection:	05/17/2010, AAIP	Certified Max Gross Wt.:	20200 lbs
Time Since Last Inspection:	435 Hours	Engines:	2 Turbo Fan
Airframe Total Time:	6738 Hours	Engine Manufacturer:	P&W CANADA
ELT:	C126 installed, not activated	Engine Model/Series:	PW545A
Registered Owner:	NETJETS SALES INC et al	Rated Power:	3804 lbs
Operator:	NETJETS AVIATION INC	Air Carrier Operating Certificate:	On-demand Air Taxi (135)
Operator Does Business As:		Operator Designator Code:	DXTA

Meteorological Information and Flight Plan

Observation Facility, Elevation:	TOL, 683 ft msl	Observation Time:	1252 EST
Distance from Accident Site:	0 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	0°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:		Temperature/Dew Point:	-2° C / -6° C
Lowest Ceiling:	Broken / 1800 ft agl	Visibility	6 Miles
Wind Speed/Gusts, Direction:	18 knots/ 25 knots, 240°	Visibility (RVR):	
Altimeter Setting:	29.84 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	Light - Snow; No Obscuration		
Departure Point:	Belmar, NJ (BLM)	Type of Flight Plan Filed:	IFR
Destination:	Toledo, OH (TOL)	Type of Clearance:	IFR
Departure Time:	1207 EST	Type of Airspace:	

Airport Information

Airport:	Toledo Express Airport (TOL)	Runway Surface Type:	Asphalt
Airport Elevation:	683 ft	Runway Surface Condition:	Wet
Runway Used:	25	IFR Approach:	ILS
Runway Length/Width:	10599 ft / 150 ft	VFR Approach/Landing:	Full Stop

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	None
Passenger Injuries:	1 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 None		

Administrative Information

Investigator In Charge (IIC):	Edward F Malinowski	Adopted Date:	12/27/2011
Additional Participating Persons:	Michael A Rutherford; Federal Aviation Administration; Cleveland, OH Paul McClaskey; NetJets Aviation Inc.; Columbus, OH Andrew Hall; Cessna Aircraft Company; Wichita, KS Suzy Danielson; NetJets Assoc of Shared Aircraft Pilots Union; Gahanna, OH		
Publish Date:	12/27/2011		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=77918		

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