



National Transportation Safety Board Aviation Accident Final Report

Location:	New Braunfels, TX	Accident Number:	FTW03LA034
Date & Time:	11/01/2002, 1550 CST	Registration:	N77UA
Aircraft:	Rockwell 690B	Aircraft Damage:	Substantial
Defining Event:		Injuries:	3 None

Flight Conducted Under: Part 91: General Aviation - Executive/Corporate

Analysis

The gear in transient light remained illuminated during the initial climb. After recycling the gear and observing the light was still on, the pilot visually checked to ensure that the gear was retracted. After leveling off at 16,000 feet the pilot noticed the ball was not centered and added rudder trim to compensate. Two minutes later the airplane began to yaw and shake violently, followed by an uncommanded roll to the left of about 70 degrees with about a 10 to 15 degree pitch down attitude. The pilot manually disconnected the autopilot and reduced power. After losing 1,000 feet, control of the airplane was regained. Power was added and the airplane climbed back to 16,000 feet. After leveling off the pilot tentatively put pressure on each flight control to assess the problem and stability of the airplane. No adverse reactions to control inputs were noted, with the exception of a slight buffet approaching 200 to 210 knots. Power was then reduced to maintain a cruise speed below 200 knots. During the descent the airplane was slipping badly and the ball was all the way to the right, but the pilot was able to compensate with roll input. After a normal landing the pilot noticed the rudder horn and approximately 18 inches of the trailing rudder had separated from the aircraft. The rear of the fuselage was wrinkled on both sides of the horizontal stabilizer, and the vertical stabilizer was wrinkled. The forward one-half of the left nose gear door was bent aft approximately 90 degrees. A subsequent search for the missing top 18 inches of the trailing rudder proved unsuccessful. The top 24 inches of the remaining rudder was sectioned and sent to the NTSB Materials Laboratory Division, Washington, D.C., for examination. The Senior Metallurgist noted that the fracture surfaces observed were consistent with overstress separations. No evidence of pre-existing damage such as corrosion or fatigue was found.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The in-flight separation of the top of the rudder assembly for undetermined reasons.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE - NORMAL

Findings

1. FLIGHT CONTROL, RUDDER - SEPARATION

Factual Information

On November 1, 2002, approximately 1550 central standard time, a Rockwell 690B twin-engine airplane, N77UA, sustained substantial damage after the top portion of the airplane's rudder separated during cruise flight approximately 7 nautical miles north-northwest of New Braunfels, Texas. The airplane was registered to and operated by the University of Arkansas, of Fayetteville, Arkansas. The two commercial pilots and their sole passenger were not injured. Instrument meteorological conditions prevailed, and a flight plan was filed for the 14 CFR Part 91 corporate flight. The cross-country flight originated from the Austin-Bergstrom International Airport, Austin, Texas, at 1530, and was destined for the Corpus Christi International Airport, Corpus Christi, Texas.

According to the Pilot/Operator Aircraft Accident Report (NTSB form 6120.1/2), the right seat pilot (pilot in command) reported the co-pilot was flying the airplane from the left seat. The pilot stated that after taking off he noticed the gear in transient light was still illuminated. He visually checked that the gear was retracted and then recycled it, but noticed the light was still on. He again visually checked to ensure the gear was retracted. The pilot stated that after leveling off at 16,000 feet "I noticed the ball [slip/skid indicator] was not centered and trimmed rudder to compensate." The pilot further stated that approximately two minutes later a violent yawing and shaking occurred, followed by an abrupt and uncommanded roll to the left of about 70 degrees with about a 10 to 15 degree pitch down. The pilot reported that he manually disconnected the autopilot due to excessive force, while simultaneously reducing power due to the nose down condition. The pilot further stated that after regaining control and adding power, he climbed back to 16,000 feet after having lost 1,000 feet. After leveling off and in straight and level flight, the pilot reported that he "tentatively" put pressure on each flight control to try and assess the problem and stability of the airplane. The pilot reported no adverse reaction to control inputs in level flight with the exception of a slight buffet approaching 200 to 210 knots. The pilot said he then decided to reduce power and maintain cruise below 200 knots. The pilot reported "during our descent the airplane was slipping badly, the ball was all the way to the right, but I was able to compensate with roll input." The pilot reported that the landing at Corpus Christi was normal, and that after parking he noticed the rudder horn and approximately 18 inches of the trailing rudder had separated from the airplane. He also reported wrinkling of the rear fuselage skin on both sides forward of the horizontal stabilizer and slight wrinkling of the vertical stabilizer. The pilot also stated the front left nose gear door was bent "with no idea of what might have happened to it."

During a subsequent interview with Federal Aviation Administration (FAA) inspectors, the pilot advised them that the rudder had sustained previous damage caused by striking the top of a hangar door opening. Aircraft maintenance records indicate that the top of the rudder was repaired on February 13, 2001.

A team of FAA inspectors, accompanied by two representatives from Twin Commander of Arlington, Washington, inspected the entire airplane in Corpus Christi on November 25, 2002. The team conducted a detailed inspection of the rudder, which had been previously removed from the aircraft. The inspection team concluded that without the missing portion of the rudder, it would be very difficult to evaluate the cause of the failure. The team also agreed that the damage to the nose gear door was not likely related to the cause of the accident.

On February 22, 2003, a search was conducted by volunteers from the San Marcos, Texas, Civil

Air Patrol to aid in locating the separated rudder. The search was conducted in a thick, dense, heavily wooded area. The result of the search effort proved unsuccessful.

The top 24 inches of the remaining rudder was sectioned and sent to the NTSB Materials Laboratory Division, Washington, D.C., for examination. Results of the examination indicated that all of the fracture surfaces observed were clean and oriented on slant planes with a slightly rough texture, consistent with overstress separations. No evidence of pre-existing damage such as corrosion or fatigue was found.

Pilot Information

Certificate:	Commercial	Age:	52, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Seatbelt
Instrument Rating(s):	Airplane; Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	08/01/2002
Occupational Pilot:		Last Flight Review or Equivalent:	08/10/2002
Flight Time:	10485 hours (Total, all aircraft), 4425 hours (Total, this make and model), 10300 hours (Pilot In Command, all aircraft)		

Co-Pilot Information

Certificate:	Commercial	Age:	43, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):		Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	05/10/2002
Occupational Pilot:		Last Flight Review or Equivalent:	08/10/2002
Flight Time:	6315 hours (Total, all aircraft), 246 hours (Total, this make and model), 5500 hours (Pilot In Command, all aircraft), 50 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Rockwell	Registration:	N77UA
Model/Series:	690B	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	11422
Landing Gear Type:	Retractable - Tricycle	Seats:	8
Date/Type of Last Inspection:	09/30/2002, 100 Hour	Certified Max Gross Wt.:	10375 lbs
Time Since Last Inspection:	30 Hours	Engines:	2 Turbo Prop
Airframe Total Time:	10000 Hours as of last inspection	Engine Manufacturer:	Garrett
ELT:	Installed, not activated	Engine Model/Series:	TPE 331-251K
Registered Owner:	University of Arkansas	Rated Power:	717 hp
Operator:	University of Arkansas	Operating Certificate(s) Held:	None
Operator Does Business As:		Operator Designator Code:	U0AM

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	BAZ, 651 ft msl	Distance from Accident Site:	7 Nautical Miles
Observation Time:	1551 CST	Direction from Accident Site:	170°
Lowest Cloud Condition:	Unknown	Visibility	8 Miles
Lowest Ceiling:	Broken / 1850 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	14 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	50°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.17 inches Hg	Temperature/Dew Point:	-8° C / 12° C
Precipitation and Obscuration:			
Departure Point:	Austin, TX (AUS)	Type of Flight Plan Filed:	IFR
Destination:	Corpus Christi, TX (CRP)	Type of Clearance:	IFR
Departure Time:	1530 CST	Type of Airspace:	Class E

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	1 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 None	Latitude, Longitude:	29.790000, -98.605000

Administrative Information

Investigator In Charge (IIC):	Thomas M Little	Report Date:	11/25/2003
Additional Participating Persons:	Edward J Trayhan; Federal Aviation Administration; San Antonio, TX Geoffery Pence; Twin Commander; Arlington, WA		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).