



# National Transportation Safety Board Aviation Accident Factual Report

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<b>Location:</b>	NASHVILLE, TN	<b>Accident Number:</b>	ATL96FA043
<b>Date &amp; Time:</b>	02/01/1996, 1505 CST	<b>Registration:</b>	N903VJ
<b>Aircraft:</b>	DOUGLAS DC-9-32	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	80 None

**Flight Conducted Under:** Part 121: Air Carrier - Scheduled

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## HISTORY OF THE FLIGHT

On February 1, 1996, at 1505 central standard time, a Douglas DC-9-32, N903VJ, registered to and operated by ValuJet Airlines, Inc., as a Title 14 CFR Part 121 scheduled domestic passenger flight, had the right main landing gear fail during landing at Nashville International Airport, Nashville, Tennessee. Visual meteorological conditions prevailed at the time and an instrument flight rules flight plan was filed. The aircraft received substantial damage. The airline transport-rated captain, first officer, 3 flight attendants, and 75 passengers were not injured. The flight originated from Atlanta, Georgia, the same day, about 1430.

The flightcrew stated this was their third flight leg of the day, all of which were flown in this aircraft. The flight from Atlanta to Nashville was uneventful. The first officer was performing flying duties. On approach to Nashville they decided the captain would deploy the ground spoilers after landing because the automatic ground spoiler system was inoperative. The touchdown was normal in the touchdown area of the runway. As the captain deployed the ground spoilers they began to feel vibration and what appeared to be gyration and skipping of the right main gear as if the brakes were on. The vibration got worse as they slowed and the aircraft veered to the right. The first officer used aileron to keep the right wing up and rudder and brakes to maintain directional control. The aircraft came to a stop with the right wing down and the captain directed that all passengers exit via the left front door slide. Rescue personnel arrived and requested that the over wing exits be opened and that passengers exit over the wing.

## PERSONNEL INFORMATION

Information on the captain and first officer is contained in this report in first pilot information and supplement E to this report.

## AIRCRAFT INFORMATION

On December 24, 1995, 312 flight hours before the accident, the right main landing gear torque links on N903VJ failed during landing roll at Raleigh, North Carolina. The gear strut piston and axle rotated within the shock strut cylinder. The flightcrew was able to taxi off the runway, and the aircraft was towed to the gate. The right torque links, shimmy damper, and wheel assemblies were changed and the aircraft was ferried to Miami, Florida for further repairs. In Miami, the right gear strut piston was replaced and all lines and wires, including the anti-skid brake system wiring, were repaired. The gear strut cylinder was not changed. The aircraft was returned to service.

Metallurgical examination of the failed torque link and the removed shimmy damper was performed by McDonnell Douglas Aircraft, Materials Process and Engineering Laboratory. The lower torque link arm had failed at the apex bolt/shimmy damper as a result of fatigue cracking. The shimmy damper was found sealed, but almost empty of fluid. (See the attached McDonnell Douglas report)

Flight log discrepancy records obtained from ValuJet Airlines showed that from July 1, 1995 until the Raleigh incident there were numerous occurrences of the right main gear tires being changed and discrepancies with the anti-skid brake system. These occurrences stopped after the repairs following the Raleigh incident. (See the attached records)

Additional aircraft information is contained in this report under aircraft information and in attachments to this report.

## METEOROLOGICAL INFORMATION

Visual meteorological conditions prevailed at the time of the accident. Additional meteorological information is contained in this report under weather information.

## FLIGHT RECORDERS

The cockpit voice recorder and the digital flight data recorder were removed from the aircraft and forwarded to the NTSB Flight Recorder Laboratory, Washington, D. C., for readout. The cockpit voice recorder was not readout.

The readout indicated that at the moment of apparent touchdown the maximum recorded vertical acceleration value was 1.448 G's, at an airspeed of 134.43 knots. The vertical acceleration data from the twelve previous landings showed that the highest recorded value during the landing sequences was 1.448 G's. (See the attached Factual Report-Digital Flight Data Recorder)

## WRECKAGE AND IMPACT INFORMATION

Examination of the runway by FAA, ValuJet, and McDonnell Douglas personnel showed the aircraft touched down at about the 1,500 foot point on the runway. The aircraft traveled

about 500 to 1,000 feet before debris separated from the failed right main landing gear. The aircraft stopped on the runway center line at about the 6,500 foot point.

Examination of the separated portion of the right main landing gear showed the gear strut cylinder and piston had failed causing the separation of the axle, wheels, and tires.

## METALLURGICAL EXAMINATION

Metallurgical examination of the failed right main landing gear cylinder and piston was performed by James F. Wildey II, National Resource Specialist, Metallurgy, NTSB, Washington, D.C. The landing gear cylinder fracture surface had a large majority of the fracture at a 45 degree shear plane, indicative of an overstress separation. No evidence of preexisting fracture areas was found on either of the mating fracture faces. However, two areas of the fracture, located on diametrically opposite sides of the cylinder, were not entirely on a 45 degree plane. The fracture faces had sustained damage as a result of the accident and contained ratchet marks that usually separate initiation sites on slightly offset planes. The landing gear piston fracture faces showed no evidence of preexisting fracture areas. The fracture around the entire circumference of the break was on a 45 degree plane typical of an overstress separation. (See the attached Metallurgist's Factual Report)

## ADDITIONAL INFORMATION

The aircraft was released to David L. Gentry, Vice President Maintenance, ValuJet Airlines, on February 6, 1996. Components retained by NTSB for further examination were released to Mr. Gentry on December 18, 1996.

### Pilot Information

<b>Certificate:</b>	Airline Transport; Flight Engineer	<b>Age:</b>	39, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	01/22/1996
<b>Occupational Pilot:</b>	<b>Last Flight Review or Equivalent:</b>		
<b>Flight Time:</b>	6000 hours (Total, all aircraft), 1500 hours (Total, this make and model), 2500 hours (Pilot In Command, all aircraft), 258 hours (Last 90 days, all aircraft), 79 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Make:	DOUGLAS	Registration:	N903VJ
Model/Series:	DC-9-32 DC9-32	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	47261
Landing Gear Type:	Retractable - Tricycle	Seats:	118
Date/Type of Last Inspection:	02/01/1996, Continuous Airworthiness	Certified Max Gross Wt.:	108000 lbs
Time Since Last Inspection:	6 Hours	Engines:	2 Turbo Fan
Airframe Total Time:	3078 Hours	Engine Manufacturer:	P&W
ELT:	Not installed	Engine Model/Series:	JT8D-7B
Registered Owner:	VALUJET INC.	Rated Power:	14500 lbs
Operator:	VALUJET INC.	Operating Certificate(s) Held:	Flag carrier (121)
Operator Does Business As:		Operator Designator Code:	VJ6A

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	BNA, 599 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	1450 CST	Direction from Accident Site:	13°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	15 Miles
Lowest Ceiling:	Overcast / 3700 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	10 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	360°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	-2° C / -11° C
Precipitation and Obscuration:			
Departure Point:	ATLANTA, GA (ATL)	Type of Flight Plan Filed:	IFR
Destination:	, TN (BNA)	Type of Clearance:	IFR
Departure Time:	1420 CST	Type of Airspace:	Class D

## Airport Information

Airport:	NASHVILLE INTERNATIONAL (BNA)	Runway Surface Type:	Asphalt
Airport Elevation:	599 ft	Runway Surface Condition:	Dry
Runway Used:	31	IFR Approach:	ILS
Runway Length/Width:	11029 ft / 150 ft	VFR Approach/Landing:	Straight-in

## Wreckage and Impact Information

<b>Crew Injuries:</b>	5 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	75 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	80 None	<b>Latitude, Longitude:</b>	

## Administrative Information

<b>Investigator In Charge (IIC):</b>	ROFF H SASSER
<b>Additional Participating Persons:</b>	LEIGHTON E WRIGHT; NASHVILLE, TN DAVID L GENTRY; ATLANTA, GA KURT GOELLNER; ATLANTA, GA
<b>Investigation Docket:</b>	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 <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .