
Massive tire failure following gear retract cylinder support frame failure, McDonnell Douglas DC-10-10, August 10, 2002

Micro-summary: This McDonnell Douglas DC-10-10 blew eight tires on landing.


Event Date: 2002-08-10 at 0540 EDT

Investigative Body: National Transportation Safety Board (NTSB), USA

Investigative Body's Web Site: <http://www.nts.gov/>

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		NTSB ID: ATL02IA155		Aircraft Registration Number: N388FE	
		Occurrence Date: 08/10/2002		Most Critical Injury: None	
		Occurrence Type: Incident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Tampa		State FL	Zip Code 33609	Local Time 0540	Time Zone EDT
Airport Proximity: On Airport		Distance From Landing Facility: 0		Direction From Airport: 0	
Aircraft Information Summary					
Aircraft Manufacturer McDonnell Douglas		Model/Series DC-10-10		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
<p>On August 10, 2002, at 0540 eastern daylight time, a McDonnell Douglas DC-10-10, N388FE, Flight 2410, registered to and operated by Federal Express Corporation as a Title 14 CFR Part 121 supplemental scheduled domestic cargo flight, blew eight tires during landing following an in-flight failure of the No. 3 hydraulic system and an unsafe left main landing gear light on approach to the Tampa International Airport, Tampa, Florida. Visual meteorological conditions prevailed, and an IFR flight plan was filed. The airplane sustained minor damage. The airline transport-rated pilot in command, the airline transport-rated first officer, the airline transport-rated second officer, and the airline transport-rated jump seat rider reported no injuries. The flight originated from Memphis, Tennessee, at 0317 central daylight time.</p> <p>The captain stated the flight was normal until approximately base leg when the gear was extended. " We heard a loud bang and the airplane shuttered seriously. The number 3 hydraulic system quantity decreased to zero and left main landing gear red unsafe lights illuminated on both pilot's and engineer's panel. An emergency was declared and we accomplished the HYDRAULIC QUANTITY LEAK OR LOSS OR HYD SYS 3 ELEV OFF LIGHT ON checklist and SINGLE HYDRAULIC FAILURE SYSTEM#3 INOP checklist. Then accomplished RED GEAR LIGHT (S) ILLUMINATED (BOTH PANELS) W/HANDLE DOWN checklist. During RED GEAR LIGHT (S) ILLUMINATED checklist, the two red lights remained red. We attempted to determine gear position using main gear indicators (buttons). Because of window condition, SO was unable to visually check. Next we accomplished the LANDING PREPARATION WITH GEAR UP OR PARTIAL GEAR DOWN checklist. Next we accomplished LANDING WITH ONE GEAR UP OR UNSAFE checklist. The left gear touched down with a loud crunch and I thought the gear was collapsing. I shut down the engines in accordance with the checklists. We then accomplished the EMERGENCY QUICK EVACUATION checklist and evacuated the aircraft through R1 using the slide."</p> <p>The FedEx Manager of Aircraft Maintenance stated, examination of the landing gear system by maintenance personnel revealed a failure of the left hand main landing gear retract cylinder support frame P/N ARB0642-501, at the point it attaches to the main gear retract cylinder. Upon landing gear extension at TPA the gear extended when the landing gear door, that was supporting the gear, opened breaking the hydraulic lines attached to the retract cylinder dumping #3 hydraulic system fluid overboard. The proximity switch target that activates both the pilots and S/O's displays broke off due to the inertia of the unrestricted extension of the left main landing gear. Thus both red / unsafe lights would not extinguish. When the flight crew followed procedure 2-6-10, LANDING WITH ONE GEAR UP OR UNSAFE, the anti skid became inactive when electrical power was lost due the engines being shut down and the fire handles pulled. Thus he only had brake accumulator pressure to activate the brakes with no skid protection. The P/N of the failed part was: ARB0642-501, This part had no serial number, it had a total of 67,913 hours and 27,081 cycles since installed when the aircraft was manufactured. FedEx Express has operated the aircraft for 5,845 hours and 2,814 cycles since purchased."</p> <p>Service Bulletin No. DC10-57-105, dated May 19, 1998, states, "four operators have reported seven</p>					
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National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: ATLO2IA155

Occurrence Date: 08/10/2002


Occurrence Type: Incident


Narrative (Continued)

instances of main landing gear (MLG) retract cylinder support frame assembly failures which resulted in free fall of the MLG and loss of the number 3 hydraulic system. A design engineer determined that the frames failed due to fatigue, and determined that detectable cracks may initiate after the accumulation of 4,000 landings. If not corrected failure of the support frame could cause damage to MLG adjacent structure, and/or unscheduled maintenance. Inspection of the affected frames will determine the frame condition." The Service Bulletin further states in a Note: "Replacement of the existing titanium MLG retract cylinder support frames with new like frames will require reinstatement of the repetitive inspections after the accumulation of 5,000 landings until new steel frame is installed."

FedEx acquired twenty aircraft after Service Bulletin No. DC10-57-105 was issued. A Fleet Campaign Directive was issued by FedEx on August 12, 2002, to inspect all DC10/MD10 Main Landing Gear Retract Cylinder Support Assemblies, and Landing Gear Eddy Current inspection was initiated as a result of N388FE landing incident. In addition, two other support frames were found cracked during subsequent fleet inspection. The failures occurred on aircraft having logged between 15,904 and 39,559 flight-hours (14,306 thru 19,485 cycles.)

FedEx provided the NTSB with a CD that contained the data recovered from the incident aircraft's flight data recorder. The NTSB Specialist's Factual Report of Investigation Solid State Flight Data Recorder Report contains information relative to this investigation.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: ATL02IA155				
		Occurrence Date: 08/10/2002				
		Occurrence Type: Incident				
Landing Facility/Approach Information						
Airport Name Tampa International Airport		Airport ID: TPA	Airport Elevation 26 Ft. MSL	Runway Used 36L	Runway Length 11022	Runway Width 150
Runway Surface Type: Concrete						
Runway Surface Condition: Dry						
Type Instrument Approach: NONE						
VFR Approach/Landing: Traffic Pattern						
Aircraft Information						
Aircraft Manufacturer McDonnell Douglas		Model/Series DC-10-10		Serial Number 46622		
Airworthiness Certificate(s): Transport						
Landing Gear Type: Retractable - Tricycle						
Homebuilt Aircraft? No		Number of Seats: 9	Certified Max Gross Wt. 443000 LBS	Number of Engines: 3		
Engine Type: Turbo Jet		Engine Manufacturer: General Electric	Model/Series: CF6-6D	Rated Power: 40000 LBS		
- Aircraft Inspection Information						
Type of Last Inspection Continuous Airworthiness		Date of Last Inspection 06/2002	Time Since Last Inspection 115 Hours	Airframe Total Time 67915 Hours		
- Emergency Locator Transmitter (ELT) Information						
ELT Installed? No		ELT Operated? No	ELT Aided in Locating Accident Site? No			
Owner/Operator Information						
Registered Aircraft Owner Federal Express Corporation		Street Address 3101 Tchulahoma Road				
		City Memphis	State TN	Zip Code 38118		
Operator of Aircraft Same as Reg'd Aircraft Owner		Street Address Same as Reg'd Aircraft Owner				
		City	State	Zip Code		
Operator Does Business As: FedEx			Operator Designator Code: FDEA			
- Type of U.S. Certificate(s) Held:						
Air Carrier Operating Certificate(s): Supplemental						
Operating Certificate:			Operator Certificate:			
Regulation Flight Conducted Under: Part 121: Air Carrier						
Type of Flight Operation Conducted: Scheduled; Domestic; Cargo						
FACTUAL REPORT - AVIATION						

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: ATL02IA155
	Occurrence Date: 08/10/2002
	Occurrence Type: Incident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 47
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Sex: M	Seat Occupied: Left	Principal Profession: Civilian Pilot	Certificate Number: On File
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Certificate(s): Airline Transport

Airplane Rating(s): Multi-engine Land; Single-engine Land

Rotorcraft/Glider/LTA: None

Instrument Rating(s): None

Instructor Rating(s): Airplane Single-engine

Type Rating/Endorsement for Accident/Incident Aircraft? Yes	Current Biennial Flight Review? 07/2002
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Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--no waivers/lim.	Date of Last Medical Exam: 04/2002
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- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time		3109								
Pilot In Command(PIC)		1098								
Instructor										
Last 90 Days		62								
Last 30 Days		41								
Last 24 Hours										

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? No	Second Pilot? Yes
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Flight Plan/Itinerary

Type of Flight Plan Filed: IFR

Departure Point Memphis	State TN	Airport Identifier MEM	Departure Time 0317	Time Zone CDT
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Destination Same as Accident/Incident Location	State	Airport Identifier TPA	
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Type of Clearance: IFR

Type of Airspace: Class B

Weather Information

Source of Briefing: Company

Method of Briefing: Telephone

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Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
TPA	0553	EDT	26 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Clear			Ft. AGL	Condition of Light: Dawn	
Lowest Ceiling: Broken		12000 Ft. AGL		Visibility: 10 SM	Altimeter: 30.04 "Hg
Temperature: 24 °C	Dew Point: 22 °C	Wind Direction:		Density Altitude: 897 Ft.	
Wind Speed:	Gusts:	Weather Conditions at Accident Site: Visual Conditions			
Visibility (RVR): Ft.	Visibility (RVV) SM	Intensity of Precipitation:			
Restrictions to Visibility: None					
Type of Precipitation: None					

Accident Information		
Aircraft Damage: Minor	Aircraft Fire: None	Aircraft Explosion: None

Classification: U.S. Registered/U.S. Soil					
- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot				1	1
Second Pilot				1	1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer				1	1
Cabin Attendants					
Other Crew					
Passengers				1	1
- TOTAL ABOARD -				4	4
Other Ground					
- GRAND TOTAL -				4	4

National Transportation Safety Board

FACTUAL REPORT

AVIATION



NTSB ID: ATL02IA155

Occurrence Date: 08/10/2002

Occurrence Type: Incident

Administrative Information

Investigator-In-Charge (IIC)

Carrol A. Smith

Additional Persons Participating in This Accident/Incident Investigation:

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