
Shimmy on landing, boeing 737-3TO, November 6, 1998

Micro-summary: Shimmy on landing for this Boeing 737-300.

Event Date: 1998-11-06 at 1820 EST


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

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

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		NTSB ID: NYC99IA024		Aircraft Registration Number: N12318	
		Occurrence Date: 11/06/1998		Most Critical Injury: None	
		Occurrence Type: Incident		Investigated By: NTSB	
Location/Time					
Nearest City/Place NEWARK		State NJ	Zip Code 07114	Local Time 1820	Time Zone EST
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 737-3TO		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 November 6, 1998, about 1820 eastern standard time, a Boeing 737-3TO, N12318, operated by Continental Airlines as flight 1924, experienced a twisted right main landing gear while landing at Newark International Airport (EWR), Newark, New Jersey. The airplane received minor damage, and there were no injuries to the 2 certificated cockpit crewmembers, 4 flight attendants, or 104 passengers. Visual meteorological conditions prevailed for the scheduled passenger/cargo flight that originated from Sky Harbor International Airport (PHX), Phoenix, Arizona, about 1405. Flight 1924 was operated on an instrument flight rules (IFR) flight plan under 14 CFR Part 121.</p> <p>The airplane had landed on Runway 4R under the control of the first officer, and was on its landing roll when a vibration was felt. According to a written statement from the captain:</p> <p>"...Landing was on centerline with no crab or side forces. Autobrakes were selected at position #1. As the nose was apparently beginning to contact the runway normally, severe vibration was felt. Although selected immediately, thrust reversers delayed extension apparently until wheel spin-up and just prior to nose wheel contact RW. Vibration increased, and I assumed control of AC to utilize nose steering and differential thrust to maintain control of AC. AC required considerable left nose wheel steering and left reverse to maintain centerline. AC continued to vibrate severely and appeared to be 'skipping' on the right main gear, although at the time I was unable to identify the cause. The vibration continued until AC was stopped on the RW...."</p> <p>The airplane was stopped on the runway, about 8,300 feet from the approach end of Runway 4R, and was examined by emergency personnel. The lower portion of the right main landing gear was rotated about 45 degrees to the right, and further taxi was not possible. The engines were shut down, and after about 30 minutes, the passengers were deplaned using portable stairs, and were bussed to the terminal.</p> <p>Examination of the landing gear revealed that the inboard tire on the right main landing gear was punctured on the inboard sidewall, and had deflated. Small pieces of debris associated with the right main landing gear were found on the runway, up to 300 feet behind the airplane.</p> <p>The airplane was taken to a Continental Airlines maintenance hanger where the right main landing gear was replaced, and the airplane was returned to service. The removed landing gear was examined at the Continental Airlines maintenance hanger on November 24, 1998.</p> <p>The investigation revealed that wheels and brakes were attached to a hydraulically dampened piston that moved up and down, inside the main landing gear strut. Torsion links were attached to the lower portion of the main landing gear strut, and the hydraulically dampened piston, between the main landing gear wheels. An apex joint connected the two torsion links, and allowed the joint to flex and maintain proper alignment, as the piston moved up and down inside the main landing gear strut. The lower torsion link was fractured between the wheel strut, and the apex joint, through</p>					
FACTUAL REPORT - AVIATION					
Page 1					

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: NYC99IA024

Occurrence Date: 11/06/1998

Occurrence Type: Incident

Narrative (Continued)

the large lightening hole.

According to Boeing Service Letter 737-SL-32-057:

"...Since 1989, eight operators have reported thirteen main landing gear lower torsion link fractures. Fractures have occurred on 737-100/-200 airplanes as well as new model 737 airplanes. The fractures typically occur by ductile fracture across the larger lightening hole. There is an accompanying shimmy damper piston fracture in some instances...An investigation of the latest fractures...has determined that excessive play was present at the torsion link apex joint, rendering the shimmy dampers ineffective. Loss of proper dampening resulted in torsion link loads in excess of design, followed by ductile fracture of torsion links on both main gear...."


According to the report from the Safety Board Material Laboratory:


"...One of the fractures contained features typical of overstress separation. No preexisting crack features were noted on this fracture. The other fracture exhibited severe damage that obliterated the fracture features...."

The lower torsion link was found to be loose on the shaft of the shimmy damper connected to the upper torsion link. The apex nut was loose, and the shimmy damper shaft was bent rearward about 20 degrees. The damage from the occurrence precluded a check of the apex nut for proper torque.

The shimmy damper piston was found to be intact and operative.

Following the incident, Continental Airlines conducted a fleetwide examination of the Boeing 737 fleet for proper torque on the torsion link apex nut. None have been reported as loose.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: NYC99IA024			
		Occurrence Date: 11/06/1998			
		Occurrence Type: Incident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
NEWARK INTL	EWR	18 Ft. MSL	4R	9300	150
Runway Surface Type: Asphalt					
Runway Surface Condition: Dry					
Type Instrument Approach: ILS-complete					
VFR Approach/Landing: None					
Aircraft Information					
Aircraft Manufacturer		Model/Series		Serial Number	
Boeing		737-3TO		23369	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 132	Certified Max Gross Wt.	135000 LBS	Number of Engines: 2	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Fan	Cfm	CFM 56-3B	20100 LBS		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
Continuous Airworthiness	11/1998	21 Hours	40059 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? No	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner		Street Address			
		1211 AVENUE OF THE AMERICAS			
CIT LEASING CORPORATION		City	State	Zip Code	
		NEW YORK	NY	10036	
Operator of Aircraft		Street Address			
		P.O. BOX 4607			
CONTINENTAL AIR LINES		City	State	Zip Code	
		HOUSTON	TX	77210	
Operator Does Business As:			Operator Designator Code: CALA		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s): Flag Carrier/Domestic					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 121: Air Carrier					
Type of Flight Operation Conducted: Scheduled; Domestic; Passenger/Cargo					
FACTUAL REPORT - AVIATION					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: NYC991A024
	Occurrence Date: 11/06/1998
	Occurrence Type: Incident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 48
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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; Commercial; Flight Engineer

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

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): None

Type Rating/Endorsement for Accident/Incident Aircraft? Yes	Current Biennial Flight Review?
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Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--w/ waivers/lim.	Date of Last Medical Exam: 09/1998
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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	18000	8800								
Pilot In Command(PIC)	14000	8800								
Instructor										
Last 90 Days	274	274								
Last 30 Days	83	83								
Last 24 Hours	8	8								

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	
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Departure Point PHOENIX	State AZ	Airport Identifier PHX	Departure Time 1205	Time Zone MST
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Destination Same as Accident/Incident Location	State	Airport Identifier EWR	
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Type of Clearance: IFR

Type of Airspace:

Weather Information

Source of Briefing:
Company

Method of Briefing:

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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
EWR	1751	EST	18 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Scattered			6000 Ft. AGL	Condition of Light: Night/Bright	
Lowest Ceiling: None			0 Ft. AGL	Visibility: 10 SM	Altimeter: 30.00 "Hg
Temperature: 6 °C	Dew Point: -5 °C	Wind Direction: 350		Density Altitude: Ft.	
Wind Speed: 11	Gusts:	Weather Conditions at Accident Site: Visual Conditions			
Visibility (RVR): 0 Ft.	Visibility (RVV) 0 SM	Intensity of Precipitation: Unknown			
Restrictions to Visibility: None					
Type of Precipitation: None					

Accident Information

Aircraft Damage: Minor	Aircraft Fire: None	Aircraft Explosion: None
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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					
Cabin Attendants				4	4
Other Crew					
Passengers				104	104
- TOTAL ABOARD -				110	110
Other Ground	0	0	0		0
- GRAND TOTAL -	0	0	0	110	110

National Transportation Safety Board

FACTUAL REPORT

AVIATION



NTSB ID: NYC99IA024

Occurrence Date: 11/06/1998

Occurrence Type: Incident

Administrative Information

Investigator-In-Charge (IIC)

ROBERT L. HANCOCK

Additional Persons Participating in This Accident/Incident Investigation:

NATE GLINBIZZI
FAA FSDO
TETERBORO, NJ

WILLIAM MOORE
CONTINENTAL AIRLINES
HOUSTON, TX

RICHARD ANDERSON
BOEING COMM. AIRPLANE GROUP
SEATTLE, WA