National Transportation Safety Board
Aviation Incident Final Report

Location:	Newark, NJ	**Incident Number:**	NYC06IA207
Date & Time:	08/21/2006, 0630 EDT	**Registration:**	N14655
Aircraft:	Boeing 737-524	**Aircraft Damage:**	Minor
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 121: Air Carrier - Scheduled		

Analysis

The Boeing 737 was being towed for repositioning by maintenance personnel, when the nose landing gear collapsed forward into the wheel well. The nose landing gear remained attached to the airplane by its primary trunnion support and upper drag brace. Metallurgical examination of the nose landing gear lower and upper drag braces, and lock brace, revealed no evidence of preexisting cracking, and that they failed due to overstress. Examination and testing of the nose landing gear steering components did not reveal any pre-incident malfunctions. The maintenance technician in the cockpit reported that he was "riding the brakes" at the time of the incident. The airplane maintenance manual stated that at a minimum, applying airplane brakes while towing the airplane could shear the towbar shear pins; however, there was no visible evidence on the ground that the airplane's brakes had been applied during the tow. After the incident, Boeing issued a service letter that discussed six previous reports of 737 nose landing gear collapse that occurred between 2004 to 2006 during pushback or towing. It also addressed current towbar design, and provided recommendations for operators intended to minimize the likelihood of nose gear damage or collapse during towing\pushback operations.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: An overload failure of the airplane's nose landing gear while being towed for repositioning.

Findings

Occurrence #1: NOSE GEAR COLLAPSED
Phase of Operation: TAXI - PUSHBACK/TOW

Findings
1. LANDING GEAR,NOSE GEAR ASSEMBLY - COLLAPSED
2. (C) LANDING GEAR,NOSE GEAR ASSEMBLY - OVERLOAD

Factual Information

On August 21, 2006, about 0630 eastern daylight time, a Boeing 737-524, N14655, operated by Continental Airlines Inc., experienced a nose landing gear collapse while being towed by maintenance personnel at the Newark Liberty International Airport (EWR), Newark, New Jersey. The airplane sustained minor damage. The maintenance technician seated in the cockpit, and two ground crew members were not injured. Visual meteorological conditions prevailed for the ground repositioning operation conducted by the 14 Code of Federal Regulations Part 121 certificated airline.

According to the maintenance technician seated in the cockpit, he was "riding the brakes" while the airplane was being towed at walking speed, when he felt a bump, which was followed by the collapse of the nose landing gear.

According to Continental Airlines representatives, the nose landing gear collapsed forward into the wheel well. The nose landing gear remained attached to the airplane by its primary trunnion support and upper drag brace. The lock brace assembly fractured in close proximity to the lock link. The lower drag brace was fractured near the center of its length. The tow bar shear pin was also fractured during the incident.

The nose landing gear lock actuator, upper drag brace, lower drag brace, lock brace, and retract actuator were forwarded to the National Transportation Safety Board's Materials Laboratory, Washington, D.C., for further examination. All fractures were consistent with overstress separation and no evidence of fatigue cracking or any other preexisting conditions were found. The fracture on the lower drag brace exhibited deformation consistent with the fracture location moving downward relative to the ends. The bending deformation was consistent with the collapse of the gear following buckling of the lower drag brace.

Examination and testing of the nose landing gear actuator assembly, lock actuator, left hand nose gear steering actuator, depressurization steering valve, and steering metering valve, which was supervised by a Safety Board investigator, did not reveal any pre-incident discrepancies.

The 737-300/-400/-500 airplane maintenance manual, page 213, alerted operators, that at a minimum, applying airplane brakes while towing the airplane could shear the towbar shear pins. Examination of the ground surrounding the airplane after the incident did not reveal any main landing gear tire skid marks.

After the incident, Boeing issued Service Letter 737-SL-09-003. The service letter discussed six previous reports of 737 nose landing gear collapse that occurred between 2004 to 2006 during pushback or towing. It also addressed current towbar design, and provided recommendations for operators intended to minimize the likelihood of nose gear damage or collapse during towing and pushback operations.

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Boeing	**Registration:**	N14655
Model/Series:	737-524	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Transport	**Serial Number:**	28916
Landing Gear Type:	Retractable - Tricycle	**Seats:**	114
Date/Type of Last Inspection:	07/01/2006, Continuous Airworthiness	**Certified Max Gross Wt.:**	124500 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo Fan
Airframe Total Time:	22644 Hours at time of accident	**Engine Manufacturer:**	CFM International
ELT:	Not installed	**Engine Model/Series:**	CFM56-3
Registered Owner:	CONTINENTAL AIRLINES INC	**Rated Power:**	20100 lbs
Operator:	CONTINENTAL AIRLINES INC	**Operating Certificate(s) Held:**	Flag carrier (121)
Operator Does Business As:		**Operator Designator Code:**	CALA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	EWR, 18 ft msl	**Observation Time:**	0551 EDT
Distance from Accident Site:	0 Nautical Miles	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Few / 5000 ft agl	**Temperature/Dew Point:**	21°C / 14°C
Lowest Ceiling:	None	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	7 knots, 330°	**Visibility (RVR):**	
Altimeter Setting:	29.94 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:		**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

Airport Information

Airport:	Newark Liberty (EWR)	**Runway Surface Type:**	
Airport Elevation:	18 ft	**Runway Surface Condition:**	
Runway Used:	NA	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Minor
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	40.692500, -74.168611

Administrative Information

Investigator In Charge (IIC):	Luke Schiada	**Adopted Date:**	03/31/2008
Additional Participating Persons:	TR Proven; FAA AAI-100; Washington, DC Richard Anderson; Boeing; Seattle, WA Toby Carroll; Continental Airlines; Houston, TX		
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.ntsb.gov/pubdms/.		

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