



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

Log 2183

Date: December 20, 1989

In reply refer to: A-89-136 and -137

Admiral James B. Busey  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

On August 10, 1989, the flightcrew of a Boeing 727-254, N915TS, owned and operated by the Trump Shuttle of New York, New York, was unable to lower the nose landing gear during approach to Logan Airport, Boston, Massachusetts. The landing was made with the nose landing gear retracted, and the aircraft received minor damage. Passengers were evacuated using the forward emergency slides; 2 passengers reported minor injuries, while the 3 flight crewmembers, 4 flight attendants, and remaining 47 passengers were not injured.

During the Safety Board's investigation of the incident, which is continuing, the flightcrew reported that they had not experienced any problems with the hydraulic system that might have affected their ability to lower the nose landing gear. They also reported that they tried to lower the nose wheel using the alternate hand crank, by applying negative "G" loads, and by bouncing the main wheels on the runway. Because all attempts to lower the nose gear were unsuccessful, the landing was made with the nose gear retracted.

Examination of the nose landing gear after the incident revealed fractures in both of the link assemblies between the locking pin and the drag brace assembly. Each link assembly, part number (P/N) 69-66127-X (left and right link assemblies have different dash numbers), is required to have a bearing through the upper lug that attaches to the drag brace and a bushing, P/N 66-25805-X, in the lower lug that attaches to the lock pin assembly, P/N 69-66133-3. The bushings on the lower lug of the links can be removed and installed only during overhaul.

The drag brace assembly of the nose landing gear was removed from the airplane, disassembled, and examined at the facilities of The Boeing Company (Boeing), in Seattle, Washington. The examination revealed severe damage on the lock pin assembly where it engages the lower lugs of the links. A corresponding damage pattern was noted on the separated lugs of the links. The lower lug bushings were not found.

The nose landing gear has external alignment marks that are used to visually verify that the gear is in the locked position. These alignment marks consist of a piece of tape on the unlocking arm aligned with a piece of tape on one arm of the drag brace. After the drag brace is assembled (either following overhaul or when new), the tape is put on these components while the drag brace is in the locked position. The flightcrew can view this tape to ensure that the gear is locked (either up or down) by looking through a view port in the floor of the cockpit.

The drag brace and locking components from N915TS were reassembled at Boeing using links that had the proper bushings installed. When the locking pin was moved to the locked position, the pieces of alignment mark tape showed a major mismatch, overlapping approximately 50 percent. However, when the bushings were removed from the lower lugs of the links and the test repeated, the external alignment marks were very close to matching, overlapping less than 10 percent. The above evidence suggests that the lower lug bushings were not installed at the last overhaul.

The airplane involved in the incident had been recently purchased from Eastern Airlines who had purchased it from Pacific Southwest Airlines (PSA). The nose landing gear had last been overhauled in 1980 by PSA. Since this overhaul, the airplane had accumulated 11,272 hours and 14,804 cycles. Boeing recommends overhaul of the landing gear every 16,000 hours. Trump's maintenance schedule also specifies overhaul of the gear every 16,000 hours.

There are two known earlier incidents similar to that in Boston: one at Chicago, Illinois, in February 1986, involved a United Airlines Boeing 727;<sup>1/</sup> and the other at Anchorage, Alaska, in October 1986.<sup>2/</sup> In both incidents, the flight crews were forced to land the airplanes without the use of the nose landing gear, and the Safety Board determined that the required bushings had been left out of the lower lug of the P/N 69-66127-X links between the drag brace and the locking pin. The nose landing gear from the United Boeing 727 had been overhauled by United, and the nose landing gear from the Anchorage incident had been overhauled by Trans World Airlines.

As a result of these two earlier incidents, Boeing issued service letter 727-SL-32-52, dated May 11, 1987, which called for a one-time inspection of the landing gear drag brace assemblies to determine whether the bushings were missing. Eastern Airlines and Trump Shuttle had not incorporated the suggestions of this service letter into their maintenance program for their model Boeing 727 airplanes, including the airplane involved in the August 1989 incident.

<sup>1/</sup> NTSB Field Incident Report CHI86-I-A083, Brief No. 5064 (attached).

<sup>2/</sup> NTSB Field Incident Report ANC87-I-A003, Brief No. 5049 (attached).

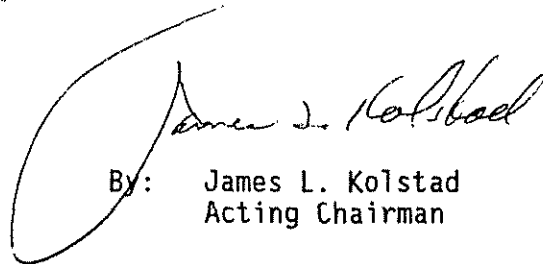
The Safety Board is concerned that additional Boeing 727 airplanes may be flying without the required P/N 66-25805-X bushings in the drag brace links. The Safety Board is also concerned that the overhaul procedure currently described in the Boeing overhaul manual may not call sufficient attention to the importance of installation of these bushings. The Safety Board believes that these conditions create the potential for a serious or catastrophic accident.

Therefore, as a result of the investigations, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive to require that the drag braces on the nose landing gear of all Boeing 727 airplanes be inspected to verify that the P/N 66-25805-X bushings are installed in the P/N 69-66127-X link assemblies; this inspection should apply to any Boeing 727 airplane with an overhauled nose landing gear, including those overhauled in the future. Drag braces that do not pass the inspection should be immediately removed from service. (Class II, Priority Action)(A-89-136)

Review, with the assistance of The Boeing Company, the overhaul manual for the nose landing gear of the Boeing 727 airplane to determine if the overhaul procedures, as currently written, direct sufficient attention to the importance of installing the P/N 66-25805-X bushings in the P/N 69-66127-X link assemblies in the drag brace of the nose landing gear. (Class III, Long-Term Action)(A-89-137)

KOLSTAD, Acting Chairman, BURNETT, LAUBER, and DICKINSON, Members, concurred in these recommendations.



By: James L. Kolstad  
Acting Chairman

Brief of Incident

File No. - 5064      2/06/86      CHICAGO, IL      NCT Rep. No. N705201      Time (Local) - 1717 (GMT)

---Basic Information---

Type Operating Certificate-AIR CARRIER - FLAG/DOMESTIC  
Name of Carrier - UNITED AIRLINES  
Type of Operation - SCHEDULED, DOMESTIC, PASSENGER  
Flight Conducted Under - 14 CFR 121  
Incident Occurred During - LANDING

Fatal      0  
Serious      0  
Minor      0  
Injured      0  
Crew      0  
Pass      0

---Aircraft Information---

Make/Model - BOEING 727-22  
Landing Gear - TRICYCLE-RETRACTABLE  
Max Gross Wt - 142000  
No. of Seats - 172

Eng Make/Model - P3W J18-D-7  
Number Engines - 3  
Engine Type - TURBOJET  
Rated Power - 14000 LBS THRUST

ELT Installed/Activated - NO -N/A  
Stall Warning System - YES

---Environment/Operations Information---

Weather Data  
W: Briefing - COMPANY  
Method - IN PERSON  
Completeness - FULL  
Basic Weather - VMC  
Wind Dir/Speed- 040/020 KTS  
Visibility - 7.0 SM  
Lowest Sky/Clouds - 1500 FT THIN RKN  
Obstructions to Vision- NONE  
Precipitation - SNOW  
Condition of Light - NIGHT(BRIGHT)

Itinerary  
Last Departure Point  
OKLAHOMA CITY,OK  
Destination  
CHICAGO,IL

Airport Proximity  
ON AIRPORT  
Airport Data  
O'HARE  
Runway Ident - 04R  
Runway Lth/Wid - 8071/ 150  
Runway Surface - CONCRETE  
Runway Status - DRY

---Personnel Information---

Pilot-In-Command  
Certificate(s)/Rating(s)  
ATP,FLT ENG  
SE LAND,ME LAND

Age - 52  
Biennial Flight Review  
Current - YES  
Months Since - UNK/NR  
Aircraft Type - UNK/NR

Medical Certificate - UNK/NR  
Flight Time (Hours)  
Total - UNK/NR  
Make/Model - UNK/NR  
Instrument - UNK/NR  
Multi-Eng - UNK/NR  
Last 24 Hrs - UNK/NR  
Last 30 Days - UNK/NR  
Last 90 Days - UNK/NR  
Rotorcraft - UNK/NR

Instrument Rating(s) - AIRPLANE

---Narrative---

THE FLIGHT CREW WAS UNABLE TO LOWER THE NOSE WHEEL LANDING GEAR THROUGH EITHER THE NORMAL OR BACKUP SYSTEMS. THE AIRPLANE SUBSEQUENTLY MADE A NOSE GEAR UP LANDING RESULTING IN MINOR DAMAGE TO THE AIRPLANE. AN EXAMINATION OF THE NOSE GEAR DRAG BRACE ASSEMBLY REVEALED A BROKEN DRAG BRACE PAWL BLOCK LINK WHICH LEFT THE NOSE GEAR IN AN UP AND LOCKED POSITION AND PRECLUDED IT FROM BEING LOWERED IN FLIGHT.

Brief of Incident (Continued)

File No. - 5064                      2/06/86                      CHICAGO, IL                      NTSB Report No. N70550                      Time (Lcl) - 1710 (P)

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

Findings(s)

1. LANDING GEAR, NOSE GEAR ASSEMBLY - FAILURE, PARTIAL
2. MAINTENANCE, INSTALLATION - IMPROPER - COMPANY MAINTENANCE PWD
3. LANDING GEAR, NOSE GEAR ASSEMBLY - JAMMED
4. LANDING GEAR, NOSE GEAR ASSEMBLY - IMPROPER

Occurrence #3                      ON GROUND COLLISION WITH TERRAIN  
Phase of Operation                      LANDING - ROLL  
5. GEAR EXTENSION - NOT POSSIBLE - PILOT IN COMMAND

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this incident is/are finding(s) 1,2,3,4,5

National Transportation Safety Board  
Washington, D.C. 20548

Brief of Incident

File No. - 5049      10/15/86      ANCHORAGE, AK      Aircraft Reg. No. N753AS      Time (Local) - 13:05 ADT

Basic Information

Type Operating Certificate-NONE (GENERAL AVIATION)

Aircraft Damage  
Aircraft      Fatal      Serious      Minor      Damaged  
Type      Count      Count      Count      Count  
None      0      0      0      199

Type of Operation - BUSINESS  
Flight Conducted Under - 14 CFR 91  
Incident Occurred During - LANDING

Aircraft Information

Make/Model - BOEING 727-22C      Eng Make/Model - P1W J19-D-7      ELT Installed/Activated - UNK/NR  
Landing Gear - TRICYCLE-RETRACTABLE      Number Engines - 3      Stall Warning System - YES  
Max Gross Wt - 142000      Engine Type - TURBOJET  
No. of Seats - 143      Rated Power - 14000 LBS THRUST

Environment/Operations Information

Weather Data  
W: Briefing - COMPANY  
Method - IN PERSON  
Completeness - WEATHER NOT PERTINENT  
Basic Weather - VMC  
Wind Dir/Speed - 330/005 KTS  
Visibility - 60.0 SM  
Lowest Sky/Clouds - 4000 FT SCATTERED  
Lowest Ceiling - NONE  
Obstructions to Vision - NONE  
Precipitation - NONE  
Condition of Light - DAYLIGHT

Itinerary

Last Departure Point  
KUPARUK, AK  
Destination  
ANCHORAGE, AK  
Type of Flight Plan - IFR  
Type of Clearance - IFR  
Type Apch/Lnds - TRAFFIC PATTERN  
FULL STOP

Airport Proximity  
ON AIRPORT

Airport Data  
ANCHORAGE INT'L  
Runway Ident - 06L  
Runway Lth/Wid - 10300/ 150  
Runway Surface - ASPHALT  
Runway Status - DRY

Personnel Information

Pilot-In-Command  
Certificate(s)/Ratings(s)  
ATP  
SE LAND, ME LAND, SE SEA

Asse - 43      Medical Certificate - VALID MEDICAL-NO WAIVERS/LIMIT  
Biennial Flight Review      Flight Time (Hours)  
Current - YES      Total - 9000      Last 24 Hrs - UNK/NR  
Months Since - 1      Make/Model - 2000      Last 30 Days - UNK/NR  
Aircraft Type - UNK/NR      Instrument - UNK/NR      Last 90 Days - 120  
Multi-Eng - UNK/NR      Rotorcraft - UNK/NR

Instrument Ratings(s) - AIRPLANE

Narrative

AFTER DEPARTURE, THE FLIGHT CREW RETRACTED THE LANDING GEAR AND NOTICED A NOSE GEAR DISAGREEMENT LIGHT. UPON ARRIVING AT ANCHORAGE, THE FLIGHT CREW COULD NOT LOWER THE NOSE GEAR THROUGH NORMAL OR MANUAL MEANS. THE AIRPLANE LANDED WITH MAIN GEAR EXTENDED AND THE NOSE GEAR RETRACTED. EXAMINATION OF THE NOSE GEAR MECHANISMS REVEALED THAT THE TWO LINKS WHICH EXERCISE THE PAWL BLOCK LOCKS HAD FAILED ALLOWING THE NOSE GEAR TO REMAIN IN THE FULLY RETRACTED AND LOCKED POSITION.

Brief of Incident (Continued)

File No. - 5049

10/15/86

ANCHORAGE, AK

A/C Reg. No. N753AS

Time (GMT) - 1330 GMT

Occurrence #1 GEAR NOT EXTENDED  
Phase of Operation LANDING - ROLL

Findings(s)

1. LANDING GEAR, NOSE GEAR ASSEMBLY - DISABLED
2. MAINTENANCE, MAJOR REPAIR - IMPROPER - OTHER MAINTENANCE PSM.

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this incident is/are finding(s) 2