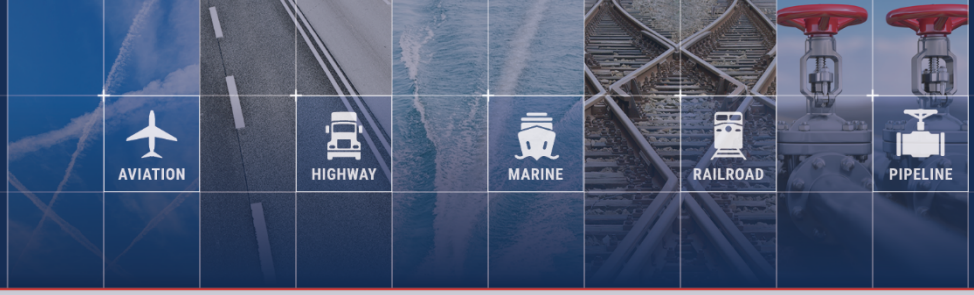

Aviation Investigation Final Report

Location:	LAS VEGAS, Nevada	**Incident Number:**	LAX95IA246
Date & Time:	July 4, 1995, 11:03 Local	**Registration:**	N712RC
Aircraft:	BOEING 727-257	**Aircraft Damage:**	Minor
Defining Event:		**Injuries:**	53 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

AFTER TOUCHDOWN THE CREW FELT THE AIRCRAFT LURCH TO THE RIGHT. AN INSPECTION REVEALED THAT THE RIGHT MAIN LANDING GEAR OUTER CYLINDER TRUNNION HAD SHEARED AT THE MAIN LANDING GEAR BEAM TRUNNION SUPPORT. THE OPERATOR REPORTED TWO SIMILAR PRIOR INCIDENTS. THE FAILED TRUNNION AND THE TWO FROM THE PRIOR OCCURRENCES WERE SENT TO BOEING FOR DETAILED METALLURGICAL ANALYSIS. ACCORDING TO THE LAB REPORT, ALL THREE TRUNNIONS FAILED AS A RESULT OF A FATIGUE FRACTURE AND STRESS CORROSION WHICH INITIATED IN THE BLENDOUT TRANSITION RADIUS BETWEEN THE MACHINED DOWN TRUNNION JOURNAL AND THE CYLINDER. THE RADIUS WAS FOUND TO BE BELOW THE SPECIFIED MINIMUM AND NICKEL PLATING EXTENDED INTO THE AREA IN EXCESS OF THE LENGTH PERMITTED BY THE OVERHAUL MANUAL. SEVERE THROUGH-THICKNESS CRACKING IN THE CHROME PLATING WAS ALSO FOUND IN ALL THREE TRUNNIONS. ACCORDING TO THE OPERATOR, BOEING 727 LANDING GEAR OVERHAUL REWORK IS PERFORMED IN-HOUSE.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: A shear failure of the right main landing gear outer cylinder trunnion due to fatigue and stress corrosion, and the operator's inadequate and improper overhaul procedures.

Findings

Occurrence #1: GEAR COLLAPSED
Phase of Operation: LANDING - ROLL

Findings
1. (C) LANDING GEAR,MAIN GEAR ATTACHMENT - FATIGUE
2. (C) LANDING GEAR,MAIN GEAR ATTACHMENT - STRESS CORROSION
3. (C) MAINTENANCE,OVERHAUL - INADEQUATE - COMPANY MAINTENANCE PERSONNEL

Factual Information

On July 4, 1995, at 1103 Pacific daylight time, a Boeing 727- 257, N712RC, right main landing gear collapsed while landing at Las Vegas, Nevada. The aircraft was operated by Northwest Airlines as flight 1191 under 14 CFR Part 121 of Federal Aviation Regulations. Visual meteorological conditions prevailed and an IFR flight plan had been filed. None of the three crew members, four cabin attendants or 46 passengers were injured; however, the aircraft sustained minor damage. The flight originated from Detroit Metropolitan Wayne County Airport at 0930 central daylight time on the day of the incident.

After touching down on runway 25L at McCarran International Airport, the aircraft slowed to about 70 knots. At that time, the flight crew felt the aircraft lurch to the right. The captain thought the right main tires had blown and as a precaution brought the aircraft to a halt on the runway 15 feet to the right of the runway centerline. He declared an emergency and emergency equipment was dispatched to the aircraft. After the aircraft was inspected by crash-rescue and Northwest maintenance personnel, all the passengers were disembarked through the main cabin door. The aircraft was later towed off the runway.

A subsequent inspection of the aircraft revealed that the right main landing gear outer cylinder trunnion had sheared at the main landing gear beam trunnion support. The outer cylinder translated upward, damaging the main landing gear beam upper chord. The flight data recorder was recovered and forwarded to Northwest Airlines maintenance facilities.

The average time in service for the effected component is 10 years. The time since the overhaul for this trunnion assembly was approximately 3 years. A review of the aircraft logbook pages onboard the aircraft failed to identify any discrepancies related to the landing gear.

The failed main landing gear outer cylinder trunnion was sent to Boeing for detailed metallurgical analysis. In addition, two other failed trunnions were submitted for examination. According to the laboratory report (attached), all three trunnions failed as a result of a fatigue fracture and stress corrosion which initiated in the blendout transition radius between the machined down trunnion journal and the cylinder. The blendout transition radius was found to be below the specified 1.00-inch minimum and nickel plating extended into the blendout transition radius in excess of the length permitted by the overhaul manual. Severe through-thickness chicken wire cracking in the chrome plating was also found in all three trunnions.

Northwest Airlines reported a similar incident on May 24, 1995, during takeoff roll at San Francisco International airport. The Las Vegas Federal Aviation Administration (FAA) Flight Standards District Office (FSDO) airworthiness inspector reported that the service history of the 727 includes about 20 occurrences of a trunnion shearing.

According to Northwest Airlines, Boeing 727 landing gear overhaul rework is performed in-house.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	33,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	February 9, 1995
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	6856 hours (Total, all aircraft), 2626 hours (Total, this make and model), 234 hours (Last 90 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BOEING	**Registration:**	N712RC
Model/Series:	727-257 727-257	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Transport	**Serial Number:**	22020
Landing Gear Type:	Retractable - Tricycle	**Seats:**	155
Date/Type of Last Inspection:	Continuous airworthiness	**Certified Max Gross Wt.:**	197000 lbs
Time Since Last Inspection:		**Engines:**	3 Turbo fan
Airframe Total Time:		**Engine Manufacturer:**	P&W
ELT:		**Engine Model/Series:**	JT-8-17R
Registered Owner:	FIRST SECURITY BANK OF UTAH	**Rated Power:**	17000 Lbs thrust
Operator:	NORTHWEST AIRLINES, INC.	**Operating Certificate(s) Held:**	Flag carrier (121)
Operator Does Business As:	NORTHWEST AIRLINES, INC.	**Operator Designator Code:**	NWAA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LAS ,2175 ft msl	**Distance from Accident Site:**	
Observation Time:	11:50 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	50 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	35°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	DETROIT , MI (DTW)	**Type of Flight Plan Filed:**	IFR
Destination:	(LAS)	**Type of Clearance:**	IFR
Departure Time:	09:30 Local	**Type of Airspace:**	Class B

Airport Information

Airport:	MCCARRAN INTERNATIONAL LAS	**Runway Surface Type:**	Asphalt
Airport Elevation:	2175 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	25L	**IFR Approach:**	ILS
Runway Length/Width:	8900 ft / 150 ft	**VFR Approach/Landing:**	Full stop

Wreckage and Impact Information

Crew Injuries:	7 None	**Aircraft Damage:**	Minor
Passenger Injuries:	46 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	53 None	**Latitude, Longitude:**	36.250873,-115.040954(est)

Administrative Information

Investigator In Charge (IIC):	Crispin, Robert
Additional Participating Persons:	RANDY JONES; LAS VEGAS , NV
Original Publish Date:	February 14, 1996
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=28955