National Transportation Safety Board
Washington, DC 20594

Brief of Incident

Adopted 02/28/2006

ANC05IA016

File No. 19618 | 12/05/2004 | Anchorage, AK | Aircraft Reg No. JA8158 | Time (Local): 14:00 AST

Make/Model:	Boeing / 747SR-146B SF
Engine Make/Model:	General Electric / CF6-50E2
Aircraft Damage:	Minor
Number of Engines:	4
Operating Certificate(s):	Foreign Operation
Name of Carrier:	NIPPON CARGO AIRLINES
Type of Flight Operation:	Non-scheduled; International; Cargo
Reg. Flight Conducted Under:	Part 129: Foreign

	Fatal	Serious	Minor/None
Crew	0	0	3
Pass	0	0	0

Last Depart. Point:	Same as Accident/Incident Location
Destination:	Tokyo-Narita
Airport Proximity:	Off Airport/Airstrip

Condition of Light:	Day
Weather Info Src:	Weather Observation Facility
Basic Weather:	Visual Conditions
Lowest Ceiling:	1100 Ft. AGL, Broken
Visibility:	7.00 SM
Wind Dir/Speed:	030 / 005 Kts
Temperature (°C):	-11
Precip/Obscuration:	No Obscuration; No Precipitation

Pilot-in-Command Age: 57

Certificate(s)/Rating(s)
Foreign; Multi-engine Land; Single-engine Land

Instrument Ratings
Airplane

Flight Time (Hours)

Total All Aircraft:	17678
Last 90 Days:	133
Total Make/Model:	4370
Total Instrument Time:	UnK/Nr

HISTORY OF FLIGHT

On December 5, 2004, about 1400 Alaska standard time, a Boeing 747SR-146B SF airplane, Japanese registration JA8158, sustained minor damage during a rapid decompression event while in normal cruise flight, about 137 miles west of Anchorage, Alaska. The airplane was being operated as Flight KZ103, by Nippon Cargo Airlines of Tokyo, Japan, as an instrument flight rules (IFR) non-scheduled international cargo flight under Title 14, CFR Part 129, when the incident occurred. The three flight crew members were not injured. Visual meteorological conditions prevailed, and an instrument flight plan was filed. The flight originated at the Ted Stevens International Airport, Anchorage, about 1338, and was bound for the Narita International Airport, Tokyo, Japan.

Upon reaching an altitude of 30,000 feet the airplane had a rapid decompression, and returned to the Ted Stevens International Airport.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on December 5, the FAA aviation safety

inspector who examined the airplane said he saw a 12-inch elliptical tear in the right side of the pressure bulkhead web separating the electronics service bay from the nose wheel well.

During an examination of the airplane by the IIC on December 7, a rupture of the right side pressure bulkhead web inside the nose wheel well was seen. The tear extended about 12-inches along a horizontal rivet line. Both ends of the torn skin turned downward approximately 80-90 degrees, and the skin was bent outward 90 degrees to the bulkhead. No other damage resulting from the rupture was seen.

The damaged area (STA 260-280, WL 160-170) was excised from the structure by a team from Boeing, and delivered to the IIC.

AIRPLANE INFORMATION

The accident airplane is a Boeing 747-100SR (cargo configuration), serial number 22711. At the time of the incident the airplane had logged 58,185 flight hours, and 27,243 cycles/landings.

TEST AND RESEARCH

On January 19, the excised material was hand-delivered to the Boeing Material and Process Technology Fracture Analysis Group, Seattle, Washington. Under the supervision of the NTSB, a detailed examination of the fracture mechanism was conducted. The fracture exam concluded that the web fracture was initiated by fatigue from multiple origins on the outboard surface within the pressure vessel. A total of 10 separate fatigue cracks, ranging from 0.48 to 0.94 inch in width, propagated through the full web thickness, before the onset of rapid ductile tearing. Each fatigue crack formed adjacent to a fastener hole common with the WL 170 beam. The cracking was in line with the edge of the bonded strip doublers on the inboard surface (wheel well side). Metallurgical analysis showed the material met all the engineering drawing requirements. A copy of the fracture examination is attached to the docket for this case.

OTHER INFORMATION

Inspection criteria for the affected area is contained in Boeing Service Bulletin 747-53A24645 (April 5, 2001), and Alert Revisions 1 thru 4. Information gathered during the material analysis of this incident investigation was instrumental in the creation/adoption of Alert Revision 4 (February 24, 2005). Alert Revision 4 adds the requirement for repeated inspections of areas 1 and 2, at 500 flight-cycle intervals once the airplane has reached 20,000 flight cycles. It also decreased the inspection intervals of area 3 from 6,000 flight-cycles to 1,500 flight-cycles.

PROBABLE CAUSE(S)

The National Transportation Safety Board determines the probable cause(s) of this incident as follows.

The fatigue and subsequent fracture of a portion of the airplane's pressure bulkhead, which resulted in a rapid decompression during cruise flight.