
Wing panel separation, Boeing 747-273C, May 19, 1996

Micro-summary: This Boeing 747-273C experienced a wing panel separation during climb.

Event Date: 1996-05-19 at 440 PDT


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

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

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		NTSB ID: LAX96IA199		Aircraft Registration Number: N470EV	
		Occurrence Date: 05/19/1996		Most Critical Injury: None	
		Occurrence Type: Incident		Investigated By: NTSB	
Location/Time					
Nearest City/Place LOS ANGELES		State CA	Zip Code 90009	Local Time 0440	Time Zone PDT
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 747-273C		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
<p>Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:</p> <p>On May 19, 1996, about 0440 hours Pacific daylight time, Qantas Flight 7554, a Boeing 747-273C freighter, N470EV, with a crew of three, experienced an in-flight composite skin disbonding of the right inboard wing fixed trailing edge upper panel while over the Pacific ocean. The aircraft sustained minor damage and the flight crew were uninjured. The aircraft was operated by Evergreen International Airlines, Inc., as a scheduled cargo flight under contractual agreement with Qantas Airlines, under 14 CFR Part 121 when the incident occurred. The flight originated from Los Angeles, California, at 0429.</p> <p>During departure, the crew felt a rumble as the aircraft was accelerating through 330 knots. The flight engineer checked his panel and was unable to identify the source of the rumble. After level off, the rumble decreased. The flight engineer attempted to locate the source of the rumble, which he localized behind the R3 door on the main cargo deck.</p> <p>When the sun was rising an hour later, the captain walked back to see if he could find the source of the problem. As he looked at the right wing through the aircraft window, he saw that the composite inboard wing panel had been partially torn away. The captain elected to return to Los Angeles International Airport where a successful heavy weight landing was made at 0916 with the inboard flaps retracted.</p> <p>An on-scene examination of the aircraft by the Safety Board revealed that trailing edge portions of the composite right inboard wing panel, part number 65B11623, had separated. The panel separation further damaged the retracted fore and mid right inboard flaps. The inboard rod assembly and outboard rod assembly fitting fractured and separated. Two of the four bolts attaching the fitting to the landing air support beam had separated. The web of the number 3 adjustable rib exhibited horizontal and vertical tears.</p> <p>A review of the aircraft maintenance records revealed that the wing panel had been inspected during the fifth phase of a 6 phase C check at a British Airways maintenance facility. At the time of the inspection, cracking was detected in the forward outboard corner. On May 7, 1995, the crack was repaired, the required inspection items were carried out, and the panel was repainted. The C check was completed on July 30, 1995. The previous C check was conducted by HAECO, and during the fourth phase of that check on August 4, 1993, disbonding and delamination were found in the right wing panel. The panel was repaired on December 8, 1993. (The work cards for both repairs are appended to this report.)</p> <p>The records also showed a B check was completed on May 8, 1996, with no non-routine entries for the wing panel.</p> <p>A review of the structural history of the 747 fixed trailing edge upper wing panel was conducted. According to Boeing, 245 operator reports have been received involving disbonding of the panel from</p>					
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National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: LAX96IA199

Occurrence Date: 05/19/1996

Occurrence Type: Incident

Narrative (Continued)

June 6, 1970, through the date of this incident. In 95 of those reports a section of the panel separated from the aircraft in flight. The data also shows that wing flaps are susceptible to secondary damage as a result of in-flight panel separations. During this period Boeing made a series of improvements consisting of core changes, increased plies and ply orientation, revised rigging instructions, and improvements to eliminate water ingress. These production revision records (PRR) applied to panel part number 65B11623.

In 1977, the panel was redesigned as part number 65B22845 starting with aircraft production line number 353. In 1993, the panel was redesigned a second time as part number 113U1011. The incident aircraft, aircraft production line number 131, was equipped with the original design panel, part number 65B11623. Boeing stated that there have been no reports of disbonding involving part number 113U1011 in the 40 sets of panels that have been installed since mid 1994 to date. (A chronological history of the panel is appended to this report.)


Boeing published service bulletin (SB) 747-57-2261 on March 7, 1991, which is still in effect and now contains five subsequent revisions. In revision 3, issued on April 15, 1993, the SB directed the operator, in part, to replace the coin tap sound inspection with an ultrasound inspection of the panels. The SB does not apply to aircraft equipped with panel part number 113U1011, or to aircraft production line numbers 1036, 1037, 1040 and later. (The summary page from the SB and each subsequent revision is appended to this report.)


On July 13, 1994, Boeing issued a service letter to all operators with aircraft production line numbers 1 through 1035, 1038, and 1039. In the letter Boeing summarized the redesign of the wing panel and informed operators of a program that offers operators a 50 percent reimbursement for the new panel. (A copy of the service letter is appended to this report.)

Boeing noted that the SB coin tap sound inspection, and now the ultrasonic inspections with revision 3, are intended to detect disbonding that has occurred below the panel surface. Boeing developed the following background information regarding this problem in 1995. They said that: "the presence of water inside the panel honeycomb core has proven to be a factor in panel losses. The expansion and contraction of waters freeze and thaw cycle breaks the bond between the skin and core, causing disbonds. Water typically enters at the fasteners common to the internal titanium doublers and support ribs. Water can also enter through a damage site."

Boeing also stated that "the number 1 and 2 adjustable ribs are designed to flex, allowing the panel to deflect upward for the following conditions: The inboard trailing edge flaps impart an upload to the panel in the ground static mode, deflecting the panel upward at the side of body approximately 2 inches." Continuing, they stated "when the inboard trailing edge flaps are extended or retracted they push up on the panel."

Prior to this incident, the operator chose to retain the coin tap sound inspection method rather than adopt the ultrasonic inspection prescribed in revision 3 to the SB.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: LAX961A199			
		Occurrence Date: 05/19/1996			
		Occurrence Type: Incident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation Ft. MSL	Runway Used 0	Runway Length	Runway Width
Runway Surface Type:					
Runway Surface Condition:					
Type Instrument Approach:					
VFR Approach/Landing:					
Aircraft Information					
Aircraft Manufacturer Boeing		Model/Series 747-273C		Serial Number 20653	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 8	Certified Max Gross Wt.	800000 LBS	Number of Engines: 4	
Engine Type: Turbo Fan	Engine Manufacturer: P&W	Model/Series: JT9D-7J	Rated Power: 48650 LBS		
- Aircraft Inspection Information					
Type of Last Inspection Continuous Airworthiness	Date of Last Inspection 05/1996	Time Since Last Inspection 93 Hours	Airframe Total Time 2174 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? Yes	ELT Operated? No	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner EVERGREEN AVIATION		Street Address 3850 THREE MILE LANE			
		City MCMINNVILLE	State OR	Zip Code 97128	
Operator of Aircraft Same as Reg'd Aircraft Owner		Street Address Same as Reg'd Aircraft Owner			
		City	State	Zip Code	
Operator Does Business As: EVERGREEN INT'L AIRLINES, INC.			Operator Designator Code: EIAA		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s): Supplemental					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 121: Air Carrier					
Type of Flight Operation Conducted: Scheduled; International; Cargo					
FACTUAL REPORT - AVIATION					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: LAX96IA199
	Occurrence Date: 05/19/1996
	Occurrence Type: Incident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 52
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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

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: 12/1995
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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	600	7000	11000						
Pilot In Command(PIC)	17000	600								
Instructor										
Last 90 Days	34	34								
Last 30 Days										
Last 24 Hours										

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

Departure Point Same as Accident/Incident Location	State	Airport Identifier LAX	Departure Time 0429	Time Zone PDT
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Destination HONOLULU	State HI	Airport Identifier HNL	
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Type of Clearance: IFR

Type of Airspace: Class E

Weather Information

Source of Briefing: Company

Method of Briefing:

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: LAX96IA199
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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
LAX	0350	PDT	126 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Clear			0 Ft. AGL	Condition of Light: Night/Dark	
Lowest Ceiling: None		0 Ft. AGL	Visibility: 7 SM	Altimeter: 29.00	"Hg
Temperature: 16 °C	Dew Point: 13 °C	Wind Direction: 20		Density Altitude: Ft.	
Wind Speed: 4	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				1	1
Cabin Attendants					
Other Crew					
Passengers					
- TOTAL ABOARD -				3	3
Other Ground	0	0	0		0
- GRAND TOTAL -	0	0	0	3	3

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: LAX96IA199

Occurrence Date: 05/19/1996

Occurrence Type: Incident

Administrative Information

Investigator-In-Charge (IIC)

ROBERT R. CRISPIN

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