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## Wing gear collapse, Boeing 747-228F, F-GCBG, January 3, 2002

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**Micro-summary:** This Boeing 747 experienced a wing landing gear collapse.

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**Event Date:** 2002-01-03 at 0446 CST

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


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

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		NTSB ID: FTW02IA061		Aircraft Registration Number: F-GCBG	
		Occurrence Date: 01/03/2002		Most Critical Injury: None	
		Occurrence Type: Incident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Houston		State TX	Zip Code 77001	Local Time 0446	Time Zone CST
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 747-228F		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 January 3, 2002, about 0446 central standard time, a Boeing 747-228F airplane, French registration F-GCBG, experienced a wing landing gear collapse after landing on runway 15L at the Houston Intercontinental Airport, Houston, Texas. The cargo configured airplane was registered to and operated by Air France. The flight crew (Captain, First Officer, and Flight Engineer) were not injured. Dark night visual meteorological conditions prevailed and an Instrument Flight Rules (IFR) flight plan was filed for the 14 Code of Federal Regulations Part 129 international cargo flight that originated from Mexico City, Mexico, at 0245.</p> <p>After touchdown and rollout, the airplane exited the runway onto a high-speed taxiway. The captain, noticed that the airplane was "dragging," to the right. The need for additional power for taxi seemed too great, so the crew stopped taxi and applied the parking brake. Two warning lights on the landing gear panel indicated that there was a problem with the right main wing gear. Additionally, the flight engineer's instrument panel confirmed an open hydraulic circuit (wheel brakes) on the right main wing gear. The airplane's engines were stopped, the APU was started, and ground personnel performed a visual inspection which revealed that the right wing landing gear assembly was partially collapsed and tilted inward toward the fuselage. The top of the right wing gear aft trunnion was found fractured and protruding upward through the top of the right wing surface. There was minor damage to surrounding wing structure and lines to the #4 hydraulic system (wheel brakes) were found ruptured.</p> <p>On-site examination of the airplane by the NTSB investigator-in-charge, FAA air safety inspectors, Air France maintenance personnel, and a Boeing engineer confirmed that the right outboard main landing gear trunnion was completely fractured and separated several inches inboard of the aft trunnion bearing. Further visual inspection of the fractured area showed evidence of corrosion and what appeared to be a pre-existing crack on the upper portion of the outer cylinder of the trunnion. The lower portion of the outer cylinder was cut away to facilitate shipment of the parts to the NTSB Materials Laboratory, Washington, D.C., for detailed examination.</p> <p>Examination of the parts was conducted at the Safety Board's Materials Laboratory on January 17-18, 2002. During the examination, the aft trunnion on the upper portion of the outer cylinder was found fractured through the outboard cross bolt hole. Very dark, thick deposits were noted on a portion of the fracture that intersected the cross bolt hole on a flat, 45-degree spiral plane. Evidence of pre-existing corrosion was found in the fractured surface of the outer cylinder. The predominate features of the fractures showed evidence of stress corrosion cracking (SCC). Typically, stress corrosion cracking propagates under sustained loading (not cyclic loading) which is the predominate loading that the outer cylinder is subjected to while resting on its landing gear. A detailed report of the materials examination is included as a supporting document to this report.</p> <p>Historical information on the airplane and the landing gear assembly were provided by the operator.</p>					
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National Transportation Safety Board

## FACTUAL REPORT

AVIATION

NTSB ID: FTW02IA061

Occurrence Date: 01/03/2002

Occurrence Type: Incident


## Narrative (Continued)


A review of the information provided revealed the following. The airplane's total time since new was 81,124 hours, and 15,988 cycles since new. The right wing landing gear assembly, P/N: 65B01464-34, S/N: CP001482, was installed on December 27, 1994 during a heavy "D" check. The assembly had accumulated 11,599 cycles since new, and 5,496 cycles since overhaul. The outer cylinder P/N: 65B01430-18, S/N: 3701, was installed together with the wing landing gear assembly on December 27, 1994. The cylinder had accumulated 5,496 cycles since overhaul.

Mandatory inspections of the wing landing gear assembly were outlined in Boeing Service Bulletin (SB) 747-32-2190 revision 7, and Alert Service Bulletin (ASB) 747-32A2465 revision 1. These service bulletins were respectively mandated by FAA Airworthiness Directives (AD) 90-06-18 R1, and AD 2001-17-25. AD 2001-17-25, issued on October 3, 2001, superceded AD 90-06-18 R1. Entries in the operators maintenance records showed that SB 747-32-2190 revision 7 was complied with during the wing landing gear replacement performed on December 27, 1994. Entries in the records also showed visual and eddy current inspections at 18-month intervals since December, 1994. According to the records, the last visual and eddy current inspection was performed on July 21, 2001, and did not reveal any defects.

The inspection criteria outlined in AD 90-06-18 R1 required the operator to perform a visual inspection, or a visual plus eddy current inspection of the wing landing gear at the trunnion, for cracks and corrosion. The inspection criteria outlined in AD 2001-17-25 required the operator to perform a detailed visual inspection using a bore scope to find cracking and corrosion of the aft trunnion outer cylinders of the wing landing gear, within 180 days from October 3, 2001. According to the operator's records, the bore scope inspection had not been performed, as per the AD, it was not due until April 3, 2002.

Historical review of Service Difficulty Reports (SDR's) revealed 19 occurrences of SCC associated with corrosion of the aft trunnion outer cylinder stressed areas. Due to these SDR data, the manufacturer issued ASB 747-32A2465 revision 1, which was mandated by a new FAA AD 2001-17-25. AD 2001-17-25 included a bore scope inspection of the affected area of the trunnion due to the fact that the propagation of SCC cracking was internal on the cylinder and not readily detected by visual or eddy current methods as per the original AD 90-06-18 R1.

 <b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b>		NTSB ID: FTW02IA061				
		Occurrence Date: 01/03/2002				
		Occurrence Type: Incident				
<b>Landing Facility/Approach Information</b>						
Airport Name Bush Intercontinental Airport		Airport ID: IAH	Airport Elevation Ft. MSL	Runway Used 15L	Runway Length 12001	Runway Width 150
Runway Surface Type: Concrete						
Runway Surface Condition: Dry						
Type Instrument Approach: ILS-complete						
VFR Approach/Landing: None						
<b>Aircraft Information</b>						
Aircraft Manufacturer Boeing		Model/Series 747-228F		Serial Number 22939		
Airworthiness Certificate(s): Transport						
Landing Gear Type: Retractable - Tricycle						
Homebuilt Aircraft? No		Number of Seats: 3	Certified Max Gross Wt. 285762 LBS		Number of Engines: 4	
Engine Type: Turbo Fan		Engine Manufacturer: General Electric		Model/Series: CF6-50E2	Rated Power: 52500 LBS	
- Aircraft Inspection Information						
Type of Last Inspection AAIP		Date of Last Inspection 11/2001	Time Since Last Inspection 377 Hours		Airframe Total Time 81124 Hours	
- Emergency Locator Transmitter (ELT) Information						
ELT Installed? Yes		ELT Operated? No		ELT Aided in Locating Accident Site? No		
<b>Owner/Operator Information</b>						
Registered Aircraft Owner  AIR FRANCE		Street Address Siege Sociale 45 rue de				
		City Paris		State	Zip Code 95747	
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: Air France				Operator Designator Code: UTA3		
- Type of U.S. Certificate(s) Held:						
Air Carrier Operating Certificate(s): Foreign Operation						
Operating Certificate:			Operator Certificate:			
Regulation Flight Conducted Under: Part 129: Foreign						
Type of Flight Operation Conducted: Scheduled; International; Cargo						
FACTUAL REPORT - AVIATION						

 <p><b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b></p>	NTSB ID: FTW02IA061
	Occurrence Date: 01/03/2002
	Occurrence Type: Incident

**First Pilot Information**

Name On File	City	State	Date of Birth On File	Age 57
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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

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): None

Type Rating/Endorsement for Accident/Incident Aircraft?	Current Biennial Flight Review?
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Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--no waivers/lim.	Date of Last Medical Exam: 07/2001
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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	16031									
Pilot In Command(PIC)	8004	6458								
Instructor										
Last 90 Days	136									
Last 30 Days	72									
Last 24 Hours	8									

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? No	Second Pilot?
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**Flight Plan/Itinerary**

Type of Flight Plan Filed: IFR	
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Departure Point Mexico City	State	Airport Identifier MMEX	Departure Time 0245	Time Zone CST
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Destination Houston	State TX	Airport Identifier KIAH	
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Type of Clearance: IFR

Type of Airspace: Class A

**Weather Information**

Source of Briefing:  
Company

Method of Briefing: Telephone

 <p><b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b></p>	NTSB ID: FTW02IA061
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**Weather Information**

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
IAH	0353	CST	97 Ft. MSL	NM	Deg. Mag.
Sky/Lowest Cloud Condition: Clear				Ft. AGL	Condition of Light: Night
Lowest Ceiling: None			Ft. AGL	Visibility: 10 SM	Altimeter: 30.45 "Hg
Temperature: -3 °C	Dew Point: -7 °C	Wind Direction:		Density Altitude: Ft.	
Wind Speed:	Gusts:	Weather Conditions at Accident Site: Visual Conditions			
Visibility (RVR): Ft.	Visibility (RVV) SM	Intensity of Precipitation:			
Restrictions to Visibility:					
Type of Precipitation: None					

**Accident Information**

Aircraft Damage: Minor	Aircraft Fire: None	Aircraft Explosion: None
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Classification: Foreign 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					
- GRAND TOTAL -				3	3

National Transportation Safety Board

**FACTUAL REPORT**

**AVIATION**



NTSB ID: FTW021A061

Occurrence Date: 01/03/2002

Occurrence Type: Incident

Administrative Information

Investigator-In-Charge (IIC)

Alexander Lemishko

Additional Persons Participating in This Accident/Incident Investigation:

John Loomis  
Air Safety Inspector  
FAA  
FSDO  
Houston, TX

Dennis Rodriguez  
Air Safety Coordinator  
Boeing  
Seattle, WA

Gerald Gaubert  
Air Safety Investigator  
BEA  
France,