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## Engine fire, Boeing 747-256, EC-DNP, August 11, 2002

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**Micro-summary:** This Boeing 747 experienced a #2 engine fire during climb, and diverted back to the origin.

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**Event Date:** 2002-08-11 at 1920 EDT


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

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

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1. Accident reports can be and sometimes are revised. Be sure to consult the investigative agency for the latest version before basing anything significant on content (e.g., thesis, research, etc).
  2. Readers are advised that each report is a glimpse of events at specific points in time. While broad themes permeate the causal events leading up to crashes, and we can learn from those, the specific regulatory and technological environments can and do change. ***Your company's flight operations manual is the final authority as to the safe operation of your aircraft!***
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		NTSB ID: NYC02FA160		Aircraft Registration Number: EC-DNP	
		Occurrence Date: 08/11/2002		Most Critical Injury: Serious	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Jamaica	State NY	Zip Code 11401	Local Time 1920	Time Zone EDT	
Airport Proximity: On Airport		Distance From Landing Facility: 0		Direction From Airport: 0	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 747-256		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><b>HISTORY OF FLIGHT</b></p> <p>On August 11, 2002, about 1920 eastern daylight time, a Boeing 747-256, Spanish registration EC-DNP, operated by Iberia Airlines as flight 6250, sustained a number 2 engine fire during the initial climb after takeoff and performed an emergency landing, with a subsequent evacuation, at the John F. Kennedy International Airport (JFK), Jamaica, New York. Four flight crewmembers, 12 flight attendants and 333 passengers were not injured. One flight attendant and 34 passengers sustained minor injuries and 2 passengers were seriously injured. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed for the flight destined for Madrid, Spain. The scheduled international passenger flight was conducted under 14 CFR Part 129.</p> <p>The flight crew reported that shortly after takeoff, when the airplane was climbing between 1,300 and 1,500 feet, the number 2 engine fire warning light illuminated. The crew discharged both number 2 engine fire extinguisher bottles; however, the light remained illuminated. The flight crew declared an emergency, and performed an emergency landing on runway 13R. After landing, the flight crew initiated an emergency evacuation and intended to utilize the five evacuation slides on the airplane's right side.</p> <p>During the evacuation, the slide/rafts at doors 4R and 5R did not operate as intended. The 4R slide/raft partially deployed and did not reach the ground. The 5R slide/raft partially deployed and reached the ground. Neither exit was used during the evacuation and all 369 passengers and 17 crewmembers evacuated through doors 1R, 2R, and 3R.</p> <p>On site examination of the airplane revealed that the number 2 engine sustained an under cowl fire in the area of the accessory gearbox. The majority of the accessory gearbox case was consumed, while the underside of the engine exhibited signs of damage due to the fire. Examination of the engine fan, compressors, turbines and cowlings did not reveal evidence of any uncontained failures.</p> <p>The majority of the rear accessory gearbox housing was missing, from the constant speed drive and main oil pump, to the outboard hydraulic pump. The front gearbox housing was missing from the alternator to the outboard hydraulic pump. The gearbox housing was missing in the area of the fuel pump/fuel control pad and all that remained were the attachment bolts.</p> <p>The number 2 engine, the 4R and 5R slide/rafts, the cockpit voice recorder, and the flight data recorder were retained for further examination.</p> <p>The accident occurred during the hours of daylight approximately 40 degrees, 38 minutes north latitude, and 73 degrees, 46 minutes west longitude.</p> <p><b>INJURIES TO PERSONS</b></p>					
<p align="center">FACTUAL REPORT - AVIATION</p> <p align="right">Page 1</p>					

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**Narrative (Continued)**

Ten passengers were transported to local medical facilities for treatment. One flight attendant was treated at the scene and released. A male passenger was admitted with respiratory failure after he became non-responsive to medical personnel in the triage area of the terminal. A female passenger sustained a fractured ankle.

**PERSONNEL INFORMATION**

The pilot-in-command was a check airman, who was originally seated in a jumpseat to observe the captain in training, seated in the left seat. Prior to the landing, the check airman switched seats with the co-pilot, who was seated in the right seat, and assumed control of the airplane. All pilots held a Spanish first class medical certificate, and an airline transport pilot certificate. The cockpit crew also included a flight engineer who occupied his normal position.

**AIRCRAFT INFORMATION**

The accident airplane, serial number 22764, line number 554, was delivered directly to Iberia Airlines on February 26, 1982.

The airplane was maintained under an approved continuous airworthiness inspection program. The airplane had accumulated about 81,955 total hours, and approximately 593 hours since an "A-check" was performed, on June 29, 2002.

The airplane was equipped with four Pratt & Whitney JT9D-7Q, two-spool, high-bypass ratio, turbofan engines. Each engine consisted of a fan and four-stage low-pressure compressor (LPC), and an eleven-stage high-pressure compressor (HPC) driven by a four-stage low-pressure and two-stage high-pressure turbine, respectively.

The number 2 engine had accumulated 71,293 hours and 11,030 cycles, since new. The engine had accumulated 2,474 hours, and 326 cycles, since overhaul.

**METEOROLOGICAL INFORMATION**

The weather reported at JFK, at 1851, included: winds 180 at 14 knots, visibility 10 statute miles, clear skies, temperature 77 degrees F, dew point 66 degrees F, altimeter 30.06 inches-hg.

**FLIGHT RECORDERS**

The airplane was equipped with a Sundstrand digital flight data recorder (DFDR) and cockpit voice recorder (CVR). The DFDR was downloaded and captured the accident flight; however, the CVR exhibited sounds consistent with "bulk erasure" of the recording, and did not contain any useful information.

**TESTS AND RESEARCH****Slide/Raft Examination**

The 4R and 5R slide/rafts were shipped to their manufacturer, Goodrich, in Phoenix, Arizona, where they were examined on September 17 and 18, 2002, under the NTSB Survival Factors Group.

The 4R slide/raft was manufactured in 1979, and most recently overhauled on October 5, 2001. The inflation bottle was also overhauled and hydrostatically tested during the slide/raft overhaul. Teardown examination of the 4R slide/raft revealed a fractured inflation hose in the area of the regulator end swivel wire groove. The fractured hose was submitted to the Safety Board's Materials Laboratory for examination. The Materials Laboratory Factual Report stated, "all features

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**Narrative** (Continued)

associated with the hose fracture were indicative of a recent overstress separation. No evidence of fatigue cracking or other type of preexisting defect was noted."

The investigation revealed Goodrich had issued service bulletin 25-241, on September 30, 1991, which recommended that operator's "replace any hoses with Manufacturing/Test dates prior to May 30, 1983...at the next scheduled maintenance action." The replacement hoses were modified to increase their side loading capabilities and had demonstrated an improved side load capability of more than a factor of two.

Iberia Airlines personnel reported that they chose not to implement the service bulletin because compliance was not mandatory, and their fleet had not experienced any problems with the hoses. Within 48 hours of the accident, Iberia tested all inflation hoses installed on their Boeing 747 fleet with the same or equivalent part number. All hoses tested meet the appropriate slide/raft maintenance manual requirements. Iberia airlines subsequently elected to comply with SB 25-241, which was performed on all applicable airplanes.

Teardown, and "flat fire" testing of the 5R slide/raft did not disclose any abnormalities, which would have precluded normal operation.

**Number 2 Engine Teardown**


The number 2 engine was shipped to Iberia's Madrid Maintenance Center, Madrid Spain, where it was examined on September 10, 2002, under the supervision of the NTSB Powerplants Group.


The examination revealed in part, that the High-Pressure Compressor (HPC) forward air seal stack had become disengaged from the hub. The key washer and retaining nut were found disengaged from the threads on the HPC rear shaft. There was evidence of light, grooved scoring on the HPC shaft in the area where the retaining nut was found loose on the shaft. The key washer anti-rotation slots in the HPC hub, exhibited signs of contact marks. Dimensional measurements of the HPC rear hub were within specification; however, the HPC hub snap diameter for the front air seal revealed it was worn out-of-limits.


The threads for the air seal stack retaining nut on the HPC shaft, were intact and did not exhibit any evidence of the nut being "pulled" off of the threads. There was a thread-like wear pattern in the HPC shaft that extended approximately 0.5 inches aft of the retaining nut threads. An area of thermal distress that was approximately 0.070 inches deep also accompanied this wear pattern.

**ADDITIONAL INFORMATION****Airplane Release**

The airplane was released on August 14, 2002, to a representative of Iberia Airlines.

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<b>Landing Facility/Approach Information</b>					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
JOHN F KENNEDY INTL	JFK	13 Ft. MSL	13R	14572	150
Runway Surface Type: Asphalt					
Runway Surface Condition: Dry					
Type Instrument Approach: Visual					
VFR Approach/Landing: Full Stop					
<b>Aircraft Information</b>					
Aircraft Manufacturer		Model/Series		Serial Number	
Boeing		747-256		22764	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 428	Certified Max Gross Wt.	818280 LBS	Number of Engines: 4	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Fan	Pratt & Whitney	JT9D-7Q3	53000 LBS		
<b>- Aircraft Inspection Information</b>					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
Continuous Airworthiness	06/2002	593 Hours	81954 Hours		
<b>- Emergency Locator Transmitter (ELT) Information</b>					
ELT Installed? Yes	ELT Operated? No	ELT Aided in Locating Accident Site? No			
<b>Owner/Operator Information</b>					
Registered Aircraft Owner  IBERIA Airlines		Street Address C/Velazquez 130 28006			
		City Madrid	State	Zip Code	
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: Iberia Airlines			Operator Designator Code: ILAF		
<b>- Type of U.S. Certificate(s) Held: None</b>					
Air Carrier Operating Certificate(s):					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 129: Foreign					
Type of Flight Operation Conducted: Scheduled; International; Passenger/Cargo					
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<b>First Pilot Information</b>																																																																																				
Name		City		State	Date of Birth																																																																															
On File		On File			Age																																																																															
					56																																																																															
Sex: M	Seat Occupied: Right	Principal Profession: Civilian Pilot		Certificate Number: On File																																																																																
Certificate(s): Airline Transport; Flight Instructor																																																																																				
Airplane Rating(s): Multi-engine Land																																																																																				
Rotorcraft/Glider/LTA: None																																																																																				
Instrument Rating(s): Airplane																																																																																				
Instructor Rating(s): Airplane Multi-engine																																																																																				
Type Rating/Endorsement for Accident/Incident Aircraft? Yes				Current Biennial Flight Review? 06/2002																																																																																
Medical Cert.: Class 1		Medical Cert. Status: Valid Medical--w/ waivers/lim.		Date of Last Medical Exam: 04/2002																																																																																
<table border="1"> <thead> <tr> <th rowspan="2">- Flight Time Matrix</th> <th rowspan="2">All A/C</th> <th rowspan="2">This Make and Model</th> <th rowspan="2">Airplane Single Engine</th> <th rowspan="2">Airplane Multi-Engine</th> <th rowspan="2">Night</th> <th colspan="2">Instrument</th> <th rowspan="2">Rotorcraft</th> <th rowspan="2">Glider</th> <th rowspan="2">Lighter Than Air</th> </tr> <tr> <th>Actual</th> <th>Simulated</th> </tr> </thead> <tbody> <tr> <td>Total Time</td> <td>20872</td> <td>4034</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pilot In Command(PIC)</td> <td>15724</td> <td>4001</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Instructor</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Last 90 Days</td> <td>207</td> <td>207</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Last 30 Days</td> <td>82</td> <td>82</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Last 24 Hours</td> <td>8</td> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						- 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	20872	4034									Pilot In Command(PIC)	15724	4001									Instructor											Last 90 Days	207	207									Last 30 Days	82	82									Last 24 Hours	8	8								
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Method of Briefing: Unknown																																																																																				

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<b>Weather Information</b>					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
JFK	1851	EDT	13 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Clear				Ft. AGL	Condition of Light: Day
Lowest Ceiling: None			Ft. AGL	Visibility: 10 SM	Altimeter: 30.06 "Hg
Temperature: 25 °C	Dew Point: 19 °C		Wind Direction: 180		Density Altitude: Ft.
Wind Speed: 14	Gusts:		Weather Conditions at Accident Site: Visual Conditions		
Visibility (RVR): Ft.	Visibility (RVV) SM		Intensity of Precipitation:		
Restrictions to Visibility: None					
Type of Precipitation: None					

<b>Accident Information</b>					
Aircraft Damage: Minor		Aircraft Fire: Ground and In-flight		Aircraft Explosion: None	
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				1	1
Flight Engineer				1	1
Cabin Attendants			1	12	13
Other Crew					
Passengers		2	34	333	369
- TOTAL ABOARD -		2	35	349	386
Other Ground					
- GRAND TOTAL -		2	35	349	386

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<b>Administrative Information</b>		
<b>Investigator-In-Charge (IIC)</b> Luke Schiada		
<b>Additional Persons Participating in This Accident/Incident Investigation:</b>  Peter A Marotte FAA IFO Jamaica, NY  Dennis Rodrigues Boeing Seattle, WA  James J Babitt Goodrich Corporation Phoenix, AZ  Inocencio Recio Perez Iberia Airlines Madrid, Spain,  Stephen K Sheely Pratt & Whitney East Hartford, CT		
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