
Uncontained engine failure, Boeing 737-200, April 28, 1997

Micro-summary: This Boeing 737-200 experienced an uncontained engine failure of the #2 engine on takeoff.


Event Date: 1997-04-28 at 1300 CDT

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

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

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		NTSB ID: CHI97IA117		Aircraft Registration Number: N9063U	
		Occurrence Date: 04/28/1997		Most Critical Injury: Minor	
		Occurrence Type: Incident		Investigated By: NTSB	
Location/Time					
Nearest City/Place CHICAGO		State IL	Zip Code 60666	Local Time 1300	Time Zone CDT
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 737-200		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 April 28, 1997 at 1300 central daylight time (cdt), a Boeing 737, N9063U, operating as United flight 1210, sustained an uncontained engine failure on the right engine during takeoff from runway 32L, at the O'Hare International Airport, Chicago, Illinois. An emergency evacuation was ordered by the captain of the airplane, after reports of smoke and flames coming from the right engine. The 2 flight crewmembers, 2 cabin crewmembers, and 54 passengers evacuated the aircraft using the emergency slides. Two passengers sustained minor injuries in the evacuation, the remaining passengers and flight crew members were uninjured. The 14 CFR Part 121 flight was operating on an IFR flight plan, and visual meteorological conditions prevailed at the time of the incident.</p> <p>The captain reported that the engine start and taxi were normal. He stated that after taxiing into position and hold no runway 32L he set the parking brake and the first officer took control of the airplane. He continued to report that upon reaching approximately 80% N1 and 20 knots of ground speed during the takeoff roll they heard a loud bang and the airplane yawed to the right. According to the captain, the first officer controlled the yaw and aborted the takeoff exiting the runway on the T-8 high speed taxiway. The captain notified the tower of the aborted takeoff. He reported that the only indication that the flightcrew had of a problem was the loss of rpm on the #2 engine. According to the captain the air traffic control tower reported seeing smoke and another airplane reported seeing fire. The captain then initiated engine fire and emergency evacuation procedures.</p> <p>Following the incident the airplane was taken to the operator's maintenance facility where the right engine was removed from the airplane, and shipped to the operator's overhaul facility in San Francisco, California. During the removal of the engine a small piece of compressor disk was removed from the right side of the engine cowling. The runway area near where the uncontained engine failure occurred was searched and one additional piece of compressor disk was located that same evening. The two pieces of compressor disk were examined and a boroscope was used in an attempt to verify that all compressor disk portions had been found.</p> <p>On May 5, 1997, disassembly of the engine, a Pratt & Whitney JT8D-7B s/n 655900, began at the operator's facility. Disassembly of the engine was unremarkable except for the tenth stage compressor disk. When the tenth stage compressor disk was removed the two pieces of compressor disk found at the incident site were matched with the remaining disk portion. This indicated that all significant portions of the tenth stage disk had been located. After the tenth stage disk was removed from the engine, all portions of the disk were sent to the National Transportation Safety Board's laboratory in Washington D.C. for further analysis.</p> <p>The metallurgical analysis of the disk revealed that the disk was the correct hardness. The analysis also found that the disk was lacking nickel plating which is used during the rework process of the disk. The disk was found to have tool marks near the snap area which appeared to be a result of a machining operation.</p>					
FACTUAL REPORT - AVIATION					
Page 1					

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: CHI97IA117

Occurrence Date: 04/28/1997


Occurrence Type: Incident


Narrative (Continued)

Nickel is applied to the disk during normal rework operations followed by cadmium plating. The nickel is used to protect the steel from embrittlement by the cadmium plating.

The aircraft operator is certified to performs rework operations on this type of compressor disk at their overhaul facility in San Francisco. The failed disk had been overhauled at the operator's San Francisco facility in February 1997, 38 hours and 33 cycles prior to the failure. The disk had a total of 25,060 hours and 16,195 cycles since new. As part of this investigation the aircraft operator located additional disks which had been reworked at their facility during February 1997. Some of the disks were found to have little or no nickel plating on them similar to the incident airplane's disk. Further investigation by the operator determined that during the period from February 5, 1997 until February 20, 1997 a discrepancy had occurred on the nickel cadmium line.

It was determined during the investigation that there were no written procedures to determine the process parameters and rectifier set-up procedures. In addition, personnel on the working on the NiCad plating line had no means with which to measure and record the thickness of the nickel plating prior to application of the cadmium. The operator has taken corrective action on these findings.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: CHI97IA117			
		Occurrence Date: 04/28/1997			
		Occurrence Type: Incident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
CHICAGO OHARE	ORD	667 Ft. MSL	32L	13000	200
Runway Surface Type: Concrete					
Runway Surface Condition: Dry					
Type Instrument Approach: NONE					
VFR Approach/Landing: None					
Aircraft Information					
Aircraft Manufacturer		Model/Series		Serial Number	
Boeing		737-200		19944	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 116	Certified Max Gross Wt.	109000 LBS	Number of Engines: 2	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Fan	P&W	JT8D-7B	14000 LBS		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
Continuous Airworthiness		Hours	Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? No	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner		Street Address			
UNITED AIRLINES		O'HARE AIRPORT PO BOX 66100			
		City	State	Zip Code	
		CHICAGO	IL	60666	
Operator of Aircraft		Street Address			
Same as Reg'd Aircraft Owner		Same as Reg'd Aircraft Owner			
		City	State	Zip Code	
Operator Does Business As:			Operator Designator Code:		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s): Flag Carrier/Domestic					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 121: Air Carrier					
Type of Flight Operation Conducted: Scheduled; Domestic; Passenger Only					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: CHI97IA117
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First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 46
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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; Commercial; Flight Engineer

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--no waivers/lim.	Date of Last Medical Exam: 11/1996
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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	9537	3128								
Pilot In Command(PIC)		3128								
Instructor										
Last 90 Days		166								
Last 30 Days		33								
Last 24 Hours		2								

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 ORD	Departure Time 1300	Time Zone CDT
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Destination PHILADELPHIA	State PA	Airport Identifier PHL	
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Type of Clearance: IFR

Type of Airspace: Class B

Weather Information

Source of Briefing:
Company

Method of Briefing:

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Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
ORD	1250	CDT	667 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Scattered			4000 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: None		0 Ft. AGL	Visibility: 10	SM	Altimeter: 29.00 "Hg
Temperature: 16 °C	Dew Point: 7 °C	Wind Direction:		Density Altitude: Ft.	
Wind Speed: Calm	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: Ground	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					
Flight Engineer					
Cabin Attendants				2	2
Other Crew					
Passengers			2	52	54
- TOTAL ABOARD -			2	56	58
Other Ground	0	0	0		0
- GRAND TOTAL -	0	0	2	56	58

National Transportation Safety Board

FACTUAL REPORT

AVIATION



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Occurrence Date: 04/28/1997

Occurrence Type: Incident

Administrative Information

Investigator-In-Charge (IIC)

DAVID A. BOLDENOW

Additional Persons Participating in This Accident/Incident Investigation:

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