
Spurious Engine fire warning on approach, Boeing 737-222, November 18, 1996

Micro-summary: This Boeing 737-222 experienced an engine fire warning on approach, followed by an emergency evacuation.

Event Date: 1996-11-18 at 2049 EST


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

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

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		NTSB ID: CHI97FA030		Aircraft Registration Number: N9038U	
		Occurrence Date: 11/18/1996		Most Critical Injury: Serious	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place GRAND RAPIDS		State MI	Zip Code 49501	Local Time 2049	Time Zone EST
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 737-222		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 November 18, 1996, at 2049 eastern standard time (est), a Boeing 737-222, N9038U, registered to United Air Lines, Inc., operated as flight 422, sustained no damage after the captain reported a fire warning on the number two engine and gave the order to evacuate the airplane at the Kent County International Airport, Grand Rapids, Michigan. There were no injuries to four crewmembers. One flight attendant (F/A) received a minor injury. A 79 year old passenger received a fractured ankle and another passenger twisted a knee. The remaining 80 passengers reported no injuries. Visual meteorological conditions prevailed at the time and an IFR flight plan was filed. The flight was a domestic passenger flight, operating under 14 CFR Part 121, from Chicago, Illinois, to Grand Rapids, Michigan.</p> <p>The glareshield fire-warning light illuminated intermittently with an intermittent aural warning during descent into the Kent County International Airport. The Captain directed the First Officer to troubleshoot the fire warning system. The First Officer was able to stop the warning by pulling the number two fire-warning circuit breaker. The circuit breaker was then reset. The Captain subsequently requested priority handling by air traffic control and was assigned number two for the visual approach. While turning onto final approach, at approximately 1,500 feet, the number two engine fire warning illuminated. The Captain reported that all engine parameters appeared normal, and he directed the First Officer to accomplish the engine fire emergency procedure which included firing both fire bottles. The fire warning light remained illuminated throughout the approach and landing.</p> <p>The Captain used the interphone to advise the F/A's that they would be making a single engine landing, that there was a possible fire in the number two engine, and they should standby for further instructions. Following the landing, the Captain cleared the runway, stopped the airplane on taxiway A4, and selected 40 degrees of flaps. The Captain contacted the air traffic control tower and asked if they could see smoke or flames coming from the number two engine. He was informed that they could not see anything unusual with the engine. The Captain then used the public address (PA) system and told everyone to "remain seated." Shortly thereafter, the Captain was advised that fire/rescue personnel reported smoke coming from the number two engine cowling. The Captain then used the PA system to issued the command to evacuate the airplane.</p> <p>Upon hearing the command to "release seatbelts and get out", the F/A's initiated their evacuation procedures. F/A No.1 who was stationed in the front of the airplane opened the 1L door (front left side) and observed that the slide failed to inflate. She reported she then grabbed the manual inflation handle, but was unable to pull it hard enough for the slide to inflate. F/A No.1 stated she then went to the 1R door (front right side) and checked to make sure there was no fire on the right side of the airplane. Not seeing any fire, she opened the 1R door. The slide deployed normally and passengers proceeded to evacuate the airplane through the 1R door. After the First Officer completed the evacuation checklist and proceeded into the cabin, he observed the slide at door 1L was not deployed. He pulled the manual inflation handle twice in order to get the slide to</p>					
FACTUAL REPORT - AVIATION					

National Transportation Safety Board

FACTUAL REPORT

AVIATION

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Narrative (Continued)

deploy. He stated it felt as if it required approximately 80 pounds of force to activate the slide. F/A No.1 then began directing passengers out of both the 1L and 1R doors. She stated that the passenger who fractured her ankle exited the airplane out of the 1L door. She stated this passenger did not jump out the exit as directed, but rather sat down and slid out.

F/A No.2 was stationed near the 2L (left side rear) door. She stated that during the approach she picked up the interphone and heard the Captain state, "Prepare to evacuate, fire in engine number 2." She stated that both she and F/A No.3 jumped up from their seats and looked out their respective sides of the airplane for fire. They did not see any fire so they strapped back in their seats. She reported hearing the command to stay seated followed by the command to evacuate. F/A No.2 stated that upon hearing the evacuation command she turned on the emergency lights, and looked out her door (2L) to see if it was safe to evacuate out that door. She stated she was unable to move the door handle. She enlisted the assistance of a male passenger and with his help she was able to "crack" the door. She stated the door was opened approximately 45 degrees when she heard a "hissing" noise at which time she saw the slide inflating toward her. She instructed the assisting passenger to move forward and she stood behind the last row of seats as the slide inflated into the galley/cabin. She stated that with the slide inflated in the airplane, access to door 2R was blocked. She then instructed the passengers who were remaining in the airplane to go forward to evacuate. F/A No.2 stated she then went out the left overwing exit and not having anyone there to help her down, she went back into the airplane and exited through the 1R door.

F/A No.3 was located in the back of the airplane near door 2R (right side rear). She reported that during the approach, after they received the interphone call, both she and F/A No.2 both looked out their respective sides of the airplane because they were unsure which engine was the number two. She stated that after receiving the command to evacuate she rotated the handle on the 2R door and had to push hard about seven times on the door to get it to fully open. She said the slide did not automatically inflate after a couple of seconds so she pulled the manual inflation handle and the slide immediately inflated. She stated that about 5 to 8 passengers exited through the 2R door when she heard F/A No.2 shout "Slide! Slide!." She stated she turned around and saw the 2L slide coming at her at which time she exited out the 2R door. F/A No. 3 then went around to the left side of the airplane where she helped passengers off the left wing.

In addition to the door, both overwing exits were opened and utilized by passengers without Flight Attendant direction. The right hatch was found inside the airplane on the cabin floor in the exit aisle and the left hatch was found out on the left wing.

AIRCRAFT INFORMATION

The airplane was a Boeing 737-222, serial number 19076, N9038U. The airplane had accumulated 54,614 hours time in service at the time of the accident. The left engine had 53,613 hours total with 5,164 hours since its last overhaul. The right engine had 52,078 hours total with 318 hours since its last overhaul. The most recent inspection was conducted on May 24, 1996, 1,053 hours prior to the accident.


FLIGHT RECORDERS

United Airlines did not remove the cockpit voice recorder nor the flight data recorder after the accident. The slides were removed and replaced and the airplane was returned to service.

TESTS AND RESEARCH

Inspection of the number 2 engine after the accident revealed a failed element in the lower fire warning detection loop. There was no evidence of a fire in the engine.

Inspection of the evacuation slides was accomplished on December 12th and 13th, 1997, at the United

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Airlines maintenance facility in San Francisco, California. The results of this inspection were as follows:

1L Evacuation Slide

The slide was equipped with the original style girt which contained stitched nylon webbing reinforcements. The force required to pull the uncharged regulator was about 25 pounds. The bottle cable (firing line) part number was marked on yellow heat shrink tape which was able to slide along the firing line. The tape was found against the cable ball at the regulator valve end.

The tape appeared as if it had been scrunched up and a portion of the tape was torn.

1R Evacuation Slide

The slide was equipped with the new style girt which was constructed with folded edge reinforcements. This slide deployed normally during the evacuation.

2L Evacuation Slide

The slide was equipped with the original style girt which contained stitched nylon webbing reinforcements. The girt was measured and it was approximately 1 inch shorter than the original design requirements. The slide compartment hinge was deformed, both restraint cables were broken, the pan latch clip was broken at the rivet line, and the lower edge of the pan was dented and bent.

This indicated the slide began to inflate inside the compartment while the compartment was still closed and latched. The firing line was found with the handle detached from the girt and the cable was still routed through the girt grommet.

2R Evacuation Slide

The slide was equipped with the original style girt which contained stitched nylon webbing reinforcements. The girt was measured and it was approximately 1 inch shorter than the original design requirements.


ADDITIONAL DATA


All four of the escape evacuation slides on this airplane had been modified by United Air Lines for automatic Inflation versus manual inflation.

Boeing issued Boeing Service Bulletin No. 737-25A1182 on September 18, 1985, which addressed girt shrinkage, slide compartment bracket and latch assemblies, trim compartment covers, and latch and cable block assemblies on Boeing Model 737- 100, 200, and 300 escape slides. On September 23, 1985, the Federal Aviation Administration (FAA) issued AD 85-25-04, Amendment 39-5141. This AD was superseded by AD 85-25-04, Amendment 39-5179 effective December 20, 1985, which required operators to accomplish inspections, escape slide modifications, and functional tests in accordance with Boeing Service Bulletin No. 737-25A1182. Amendment 39-5179 stated an Alternate Means of Compliance (AMOC) was an acceptable method of compliance with the AD.

In a letter dated October 17, 1985, United Air Lines stated to the FAA, "UAL did not receive or place into service any evac. assemblies equipped with girts having nylon webbing nor is aware of girts that are shorter than the nominal 16.00 for UAL assemblies." In this letter, United Air Lines requested an AMOC for AD 85-25-04, based on previous modifications to its evacuation slide assemblies. On January 6, 1986, following evacuation slide tests and proposed further modifications the FAA accepted United Air Lines AMOC.

Parties to the investigation were the Federal Aviation Administration, United Air Lines, BF Goodrich, Boeing, and the Association of Flight Attendants.

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Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
KENT COUNTY INTERNATIONAL	GRR	794 Ft. MSL	26L	10000	150
Runway Surface Type: Asphalt					
Runway Surface Condition: Dry					
Type Instrument Approach: ILS-complete					
VFR Approach/Landing: Full Stop					
Aircraft Information					
Aircraft Manufacturer		Model/Series		Serial Number	
Boeing		737-222		19076	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 109	Certified Max Gross Wt.	109000 LBS	Number of Engines: 2	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Jet	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		05/1996	1053 Hours	54614 Hours	
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? Yes	ELT Operated? No	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner		Street Address			
UNITED AIR LINES, INC.		OHARE INTL ARPT 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: UNITED AIR LINES			Operator Designator Code: UALA		
- 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/Cargo					

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First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 43
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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; 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: 07/1996
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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	7473									
Pilot In Command(PIC)										
Instructor										
Last 90 Days		196								
Last 30 Days		64								
Last 24 Hours		7								

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 CHICAGO	State IL	Airport Identifier ORD	Departure Time 1906	Time Zone CST
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Destination Same as Accident/Incident Location	State	Airport Identifier GRR	
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Type of Clearance: IFR

Type of Airspace: Class C

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
GRR	1756	EST	794 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Scattered			2100 Ft. AGL	Condition of Light: Night/Dark	
Lowest Ceiling: None		0 Ft. AGL	Visibility: 10	SM	Altimeter: 30.00 "Hg
Temperature: 0 °C	Dew Point: -3 °C	Wind Direction: Variable		Density Altitude: 1013 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: None	Aircraft Fire: None	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			1	2	3
Other Crew					
Passengers		1	1	80	82
- TOTAL ABOARD -		1	2	84	87
Other Ground	0	0	0		0
- GRAND TOTAL -	0	1	2	84	87

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Administrative Information

Investigator-In-Charge (IIC)
TODD J. CARLSON

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