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## Fire near aft stairwell, Boeing 727-233, May 25, 2001

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**Micro-summary: Fire near the aft stair well for this Boeing 727-233.**

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**Event Date: 2001-05-25 at 624 EDT**


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


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

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		NTSB ID: NYC01IA134		Aircraft Registration Number: N277FE	
		Occurrence Date: 05/25/2001		Most Critical Injury: None	
		Occurrence Type: Incident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Harrisburg		State PA	Zip Code 17101	Local Time 0624	Time Zone EDT
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 727-233		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 25, 2001, about 0624 eastern daylight time, a Boeing 727-233, N277FE, operated by Federal Express Corp., as flight 1503, sustained minor damage after a fire ensued near the aft stairwell door while the airplane was standing on the ramp at the Harrisburg International Airport, Harrisburg, Pennsylvania. The certificated airline transport flight crew was not injured. Visual meteorological conditions prevailed and an instrument rules flight plan was filed for the scheduled cargo flight conducted under 14 CFR Part 121.</p> <p>According to a representative of the operator, the airplane landed, was taxied to the ramp area, parked, and the engines were shut down. A mechanic installed the tail jack, the cargo was off loaded, and the flightcrew disembarked. Neither the mechanic nor the flightcrew recalled observing any fire or smoke.</p> <p>The mechanic then proceeded to the cockpit to perform a "Predispatch Ops Check" on the airplane for a pending flight. During the check, other ground personnel notified the mechanic that smoke was observed coming from the aft stairwell. Fire extinguishing agents were applied to the area from where the smoke was emitting, and the fire was contained.</p> <p>One of the items to be completed during the "Predispatch Ops Check" performed by the mechanic, was to place the system "A" rudder switches in the "OFF" position, resulting in the operation of the hydraulic standby pump.</p> <p>Examination of the airplane after the incident revealed that the insulation on a wire to the standby hydraulic system electric motor pump had chafed through, allowing the wire conductor to contact a hydraulic system "A" case drain return line. Approximately 4 feet above the hydraulic line, a 1-inch by 3/16 inch hole was observed in the backside of a reservoir pressurization line, which was fed by a 13th stage bleed-air line.</p> <p>Inspection of the airplane also revealed that fire damage was concentrated outboard and above the hydraulic standby reservoir. Heat damage was observed in the following locations: lower surface of the upper torque box, frame webs (BS 1203 and 1223), stringer S8L-S9L, aluminum skin panels, and associated wiring located in the area. Burned paint was also observed on a titanium panel inside the number one engine pylon. Additionally, the external surface of the number one engine high stage bleed regulator was coated with "coked" hydraulic fluid.</p> <p>Following the incident, the operator initiated a fleet wide inspection program after a second Boeing 727 airplane in their fleet was found with similar chafing to the hydraulic system "A" case drain return line.</p> <p>The damaged portion of the hydraulic system "A" case drain return line, the wire harness, and the damaged portion of the reservoir pressurization line, were forwarded to the Boeing Company,</p>					
FACTUAL REPORT - AVIATION					
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 <p>National Transportation Safety Board <b>FACTUAL REPORT</b> AVIATION</p>	NTSB ID: NYC011A134
	Occurrence Date: 05/25/2001
	Occurrence Type: Incident

## Narrative (Continued)

Seattle, Washington, and examined under the presence of Safety Board personnel on August 20, 2001.

According to the Equipment Quality Analysis Reports submitted by Boeing, there was evidence of chafing and arcing from the wire harness rubbing against the hydraulic system "A" case drain return line, P/N 65-17844-146, as indicated by localized melting of the line and copper deposits around the periphery of the hole in the line.

No evidence of preexisting external damage to the reservoir pressurization line was observed.

The wire harness, which chafed against the hydraulic system "A" case drain return line, was identified as W344. The harness contained six wires, which were held together by plastic tie-wraps. The specific wire that arced was identified as W344-002-12, a 12-gauge wire, was connected to Pin B of connector D308 at the standby hydraulic system electric motor pump. The wire exhibited arcing damage in two locations, about 3/4 inches apart. Two tie-wraps were observed approximately 2-3 inches from the arcing damage. The maximum continuous current carried by the wire did not exceed 26 Amps; however, the "inrush current," reached a maximum current of 167 Amps during the initial 2-seconds of startup of the standby hydraulic system electric motor pump. Chemical analysis confirmed that the wire met specifications even though its physical appearance was different than the other wires in the harness. The reason for the difference was not determined during the examination; however, "possible explanations for this can be that different vendor wire was used during the manufacture of this harness or the wire may have been replaced in service at some time."

Two other wires in the wire harness displayed damaged insulation. The damage was such that the copper conductor was exposed; however, no evidence of arcing was noted.


Boeing concluded that the chafing between the standby hydraulic pump electrical power wire, and the hydraulic system "A" case drain return line, exposed the standby pump conductor wire and resulted in electrical arcing/puncture to the system "A" return line, followed by ignition to the mist of hydraulic oil leaking from the hole in the line.


On September 28, 2001, Boeing sent a message to all 727 Field Service Bases advising them of the fire that occurred to N277FE, and to recommend corrective action. The recommended corrective action included the following statements:

"As noted, the wire bundle/tube chafing condition is believed to have occurred from inadvertent mis-routing of the wire bundle during maintenance activity. Boeing therefore encourages operators to check their airplanes at the next convenient maintenance opportunity for a similar chafing/tube damage condition, take the action necessary to correct any damage found and record results."

"During investigation of this subject, it is believed that one or more of the support clamps were likely missing, resulting in additional 'slack' in the wire bundle and allowing it to chafe against the hydraulic tube."

"Verify that a minimum clearance of 0.25 inch is present between wire bundle W344 and adjacent tubing/structure."

 <b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b>		NTSB ID: NYC011A134				
		Occurrence Date: 05/25/2001				
		Occurrence Type: Incident				
<b>Landing Facility/Approach Information</b>						
Airport Name Harrisburg International		Airport ID: MDT	Airport Elevation 347 Ft. MSL	Runway Used	Runway Length	Runway Width
Runway Surface Type: Unknown						
Runway Surface Condition: Unknown						
Type Instrument Approach: Unknown						
VFR Approach/Landing: Unknown						
<b>Aircraft Information</b>						
Aircraft Manufacturer Boeing		Model/Series 727-233		Serial Number 22042		
Airworthiness Certificate(s): Transport						
Landing Gear Type: Retractable - Tricycle						
Homebuilt Aircraft? No		Number of Seats: 4	Certified Max Gross Wt. 209500 LBS		Number of Engines: 3	
Engine Type: Turbo Jet		Engine Manufacturer: P&W		Model/Series: JT8D-15	Rated Power: 14500 LBS	
- Aircraft Inspection Information						
Type of Last Inspection Continuous Airworthiness		Date of Last Inspection 05/2001	Time Since Last Inspection 78 Hours		Airframe Total Time 33964 Hours	
- Emergency Locator Transmitter (ELT) Information						
ELT Installed? No		ELT Operated? No		ELT Aided in Locating Accident Site? No		
<b>Owner/Operator Information</b>						
Registered Aircraft Owner FEDERAL EXPRESS CORP		Street Address 3101 Tchulahoma				
		City Memphis		State TN	Zip Code 38118	
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: Federal Express Corp.				Operator Designator Code: FDEA		
- Type of U.S. Certificate(s) Held:						
Air Carrier Operating Certificate(s): Cargo; Flag Carrier/Domestic						
Operating Certificate:			Operator Certificate:			
Regulation Flight Conducted Under: Part 121: Air Carrier						
Type of Flight Operation Conducted: Scheduled; Domestic; Cargo						
FACTUAL REPORT - AVIATION						

 <p><b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b></p>	NTSB ID: NYC011A134
	Occurrence Date: 05/25/2001
	Occurrence Type: Incident

**First Pilot Information**

Name	City	State	Date of Birth	Age
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Sex: M	Seat Occupied:	Principal Profession:	Certificate Number:
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Certificate(s):

Airplane Rating(s):

Rotorcraft/Glider/LTA:

Instrument Rating(s):

Instructor Rating(s):

Type Rating/Endorsement for Accident/Incident Aircraft?	Current Biennial Flight Review?
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Medical Cert.:	Medical Cert. Status:	Date of Last Medical Exam:
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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										
Pilot In Command(PIC)										
Instructor										
Last 90 Days										
Last 30 Days										
Last 24 Hours										

Seatbelt Used?	Shoulder Harness Used?	Toxicology Performed?	Second Pilot? Yes
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**Flight Plan/Itinerary**

Type of Flight Plan Filed: IFR

Departure Point	State	Airport Identifier	Departure Time	Time Zone
Memphis	TN	MEM	1300	EDT

Destination	State	Airport Identifier	
Same as Accident/Incident Location		MDT	


Type of Clearance: Unknown

Type of Airspace: Class C

**Weather Information**

Source of Briefing: Unknown

Method of Briefing: Unknown

 <p><b>National Transportation Safety Board</b> <b>FACTUAL REPORT</b> <b>AVIATION</b></p>	NTSB ID: NYC011A134
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**Weather Information**

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
MDT	2156	EDT	310 Ft. MSL	NM	Deg. Mag.
Sky/Lowest Cloud Condition:				Ft. AGL	Condition of Light: Dawn
Lowest Ceiling: Broken		12000 Ft. AGL		Visibility: 7 SM	Altimeter: 30.03 "Hg
Temperature: 17 °C	Dew Point: 16 °C	Wind Direction: 150		Density Altitude: Ft.	
Wind Speed: 11	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					

**Accident Information**

Aircraft Damage: Minor	Aircraft Fire: Ground	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					
- GRAND TOTAL -				3	3

National Transportation Safety Board

**FACTUAL REPORT**

**AVIATION**



NTSB ID: NYC01IA134

Occurrence Date: 05/25/2001

Occurrence Type: Incident

Administrative Information

Investigator-In-Charge (IIC)

Stephen M. Demko

Additional Persons Participating in This Accident/Incident Investigation:

Joseph Green  
Inspector  
FAA  
Harrisburg, PA