Electrical smoke, McDonnell Douglas MD-11, April 28, 2005

Micro-summary: **This McDonnell Douglas MD-11 reported smoke in the cockpit and diverted.**

Event Date: **2005-04-28 at 0530 ADT**

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

Investigative Body's Web Site: **http://www.ntsb.gov/**

Cautions:

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!***

3. Reports may or may not represent reality. Many many non-scientific factors go into an investigation, including the magnitude of the event, the experience of the investigator, the political climate, relationship with the regulatory authority, technological and recovery capabilities, etc. It is recommended that the reader review all reports analytically. Even a "bad" report can be a very useful launching point for learning.

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National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB ID: ANC05IA064	Aircraft Registration Number: N277WA
Occurrence Date: 04/28/2005	Most Critical Injury: None
Occurrence Type: Incident	Investigated By: NTSB

Location/Time

Nearest City/Place	State	Zip Code	Local Time	Time Zone	
Anchorage	AK	99502	0530	ADT	

Airport Proximity: Off Airport/Airstrip	Distance From Landing Facility:	Direction From Airport:

Aircraft Information Summary

Aircraft Manufacturer	Model/Series	Type of Aircraft
McDonnell Douglas	MD-11	Airplane

Sightseeing Flight: No

Air Medical Transport Flight: No

Narrative

Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:

On April 28, 2005, about 0530 Alaska daylight time, a Mc Donnell Douglas MD-11 airplane, N277WA, sustained minor damage resulting from an electrical anomaly on the flight deck during normal cruise, about 950 miles southwest of Anchorage, Alaska. The airplane was being operated as Flight 8278, by World Airways, Inc., of Peachtree City, Georgia, as an instrument flight rules (IFR) non-scheduled international passenger flight under Title 14, CFR Part 121, when the incident occurred. The three flight crew members, three reserve flight crew members, 6 cabin crew members, and 189 passengers were not injured. Visual meteorological conditions prevailed, and an instrument flight plan was filed. The flight originated at Osan Air Base, South Korea, and was bound for the Seattle International Airport, Seattle, Washington. The flight departed Osan Air Base April 27, about 2355.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on April 28, the Anchorage FAA Regional Operations Center specialist said the flight crew reported smoke in the cockpit, declared an emergency, and diverted to the Ted Stevens Anchorage International Airport, Anchorage. There were no other system anomalies reported by the flight crew, and the airplane landed without incident.

During an examination of the airplane's flight deck by maintenance personnel and the IIC on April 28, heat damaged wiring was discovered in the doorframe above the locking solenoid of the cockpit security door. According to members of the flight crew, just prior to the smell and visible smoke in the cockpit, there was a crew change that required the cockpit door to be opened and closed.

The inspection of the cockpit security door by the NTSB IIC revealed that an excess length of wiring, which provides power to the electrically locking security door, was laying atop the metal-encased, unshielded, solenoid inside the doorframe. Several of the wires were encased in a plastic anti-chafe mesh. A portion of the mesh was melted, and had the smell of burnt plastic. During a discussion with the IIC, a mechanic said he had seen similar doors overheat when the door and frame were misaligned, and the bolt could not fully extend.

The cockpit door had been modified from its original configuration in accordance with Supplemental Type Certificate (STC) ST01391LA, which was issued to C & D Interiors, a division of C & D Aerospace, Huntington Beach, California. The installation meets the FAA's requirements for a reinforced cockpit door. The door uses a "demand access" electrically operated door latching solenoid. Criteria for the construction and operation of cockpit security doors is found in FAA Advisory Circular (AC) 25.783-1A. The conversion of the door was completed on March 21, 2003. Prior to the incident, the new security door had been in service about 16,416 flight hours, and 1170 cycles/flights.

C & D Aerospace issued an addendum to the Boeing MD-11 maintenance manual titled: Cockpit Security Door Striker/Solenoid Assembly - Maintenance Practices. The addendum includes removal,

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Narrative (Continued)

installation, and system tests of the striker/solenoid unit. The installation section does not specifically address the issue of securing excess wiring located above the striker/solenoid within the doorframe. The installation instructions do contain a "caution," referencing the need for the security bolt to engage fully. Failure of the bolt to fully engage will cause the solenoid to remain energized, and overheat. Construction of the striker/solenoid assembly is such that the metal-encased, unshielded electrical coil of the solenoid is the upper most portion of the assembly within the doorframe. The installation does include a warning light that illuminates in the event the solenoid does not shut off. The crew did not report seeing the warning light in-flight. The light and locking mechanism functioned properly during subsequent tests on the ground; it was not tested in-flight.

FAA Advisory Circular (AC) 65-15A, chapter 11, covers generally accepted practices and procedures for the installation and maintenance of aircraft electrical wiring. The AC does note however, that practices and procedures outlined in this section are general recommendations and are not intended to replace the manufacturer's instructions and approved practices. Chapter 11, page 441, Slack in Wiring Bundles, states: "Single wires or wire bundles should not be installed with excessive slack." Page 442, Routing and Installations, states: "All wires and wire groups should be routed and installed to protect them from: (2) high temperature."

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FACTUAL REPORT AVIATION

NTSB ID: ANC05IA064

Occurrence Date: 04/28/2005

Occurrence Type: Incident

Landing Facility/Approach Information

Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
		Ft. MSL	NA		

Runway Surface Type:

Runway Surface Condition:

Type Instrument Approach: Unknown

VFR Approach/Landing: Full Stop; Precautionary Landing

Aircraft Information

Aircraft Manufacturer	Model/Series	Serial Number
McDonnell Douglas	MD-11	48743

Airworthiness Certificate(s): Normal

Landing Gear Type: Retractable - Tricycle

Homebuilt Aircraft?	Number of Seats:	Certified Max Gross Wt.	Number of Engines:
No	298	602000 LBS	3

Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:
Turbo Fan	Pratt & Whitney	PW4460	62000 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?	ELT Operated?	ELT Aided in Locating Accident Site?
Yes	No	No

Owner/Operator Information

Registered Aircraft Owner	Street Address	City	State	Zip Code
MDFC-Knoxville Company	500 Naches Avenue	Renton	WA	98055

Operator of Aircraft	Street Address	City	State	Zip Code
WORLD AIRWAYS INC	101 World Drive	Peachtree City	GA	30269

Operator Does Business As: World Airways

Operator Designator Code: WRLA

- 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: Non-scheduled; International; Passenger Only

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB ID: ANC05IA064

Occurrence Date: 04/28/2005

Occurrence Type: Incident

First Pilot Information

Name	City	State	Date of Birth	Age
On File	On File	On File	On File	54

Sex: M | Seat Occupied: Left | Principal Profession: Occupational Pilot | Certificate Number: On File

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?

Medical Cert.: Class 1 | Medical Cert. Status: Without Waivers/Limitations | Date of Last Medical Exam: 05/2005

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Mult-Engine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time										
Pilot In Command(PIC)										
Instructor										
Last 90 Days										
Last 30 Days										
Last 24 Hours										

Seatbelt Used? Yes | Shoulder Harness Used? Yes | Toxicology Performed? No | Second Pilot? Yes

Flight Plan/Itinerary

Type of Flight Plan Filed: IFR

Departure Point	State	Airport Identifier	Departure Time	Time Zone
Osan Air Base	UN		0755	UTC

Destination	State	Airport Identifier
Seattle	WA	KSEA

Type of Clearance: IFR

Type of Airspace:

Weather Information

Source of Briefing: Company

Method of Briefing:

National Transportation Safety Board

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Occurrence Date: 04/28/2005

Occurrence Type: Incident

Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
			Ft. MSL	NM	Deg. Mag.

Sky/Lowest Cloud Condition: Ft. AGL | Condition of Light: Day

Lowest Ceiling: Ft. AGL | Visibility: SM | Altimeter: "Hg

Temperature: °C | Dew Point: °C | Wind Direction: | Density Altitude: Ft.

Wind Speed: | Gusts: | Weather Condtions at Accident Site: Visual Conditions

Visibility (RVR): Ft. | Visibility (RVV) SM | Intensity of Precipitation:

Restrictions to Visibility: No Obscuration; No Precipitation

Type of Precipitation:

Accident Information

Aircraft Damage: Minor | Aircraft Fire: None | Aircraft Explosion None

Classification:

- 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				6	6
Other Crew				3	3
Passengers				189	189
- TOTAL ABOARD -				201	201
Other Ground					
- GRAND TOTAL -				201	201

National Transportation Safety Board **FACTUAL REPORT** **AVIATION**	NTSB ID: ANC05IA064	
	Occurrence Date: 04/28/2005	
	Occurrence Type: Incident	

Administrative Information

Investigator-In-Charge (IIC)

Lawrence R. Lewis

Additional Persons Participating in This Accident/Incident Investigation:

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