
Tailstrike on landing, McDonnell Douglas MD-11, HL-737, May 25, 1996

Micro-summary: This MD-11 encountered a tail strike while landing.

Event Date: 1996-05-25 at 1513 PDT


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

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

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		NTSB ID: LAX96FA206		Aircraft Registration Number: HL737	
		Occurrence Date: 05/25/1996		Most Critical Injury: None	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place LOS ANGELES		State CA	Zip Code 90009	Local Time 1513	Time Zone PDT
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer McDonnell Douglas		Model/Series MD-11		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
HISTORY OF FLIGHT					
<p>On May 25, 1996, about 1513 hours Pacific daylight time, Korean Airlines Flight 090, a McDonnell Douglas MD-11 freighter, Korean registry HL7373, sustained major structural damage during a tail strike while landing at Los Angeles International Airport, Los Angeles, California. The crew of two were uninjured. The aircraft was being operated by Korean Airlines as a scheduled cargo operation under 14 CFR Part 129 when the accident occurred. The flight originated at Anchorage, Alaska, at 0945 hours Alaska daylight time.</p>					
<p>During the approach into Los Angeles the air traffic controller advised the pilot to plan for a runway 25R approach. After passing the Santa Monica VOR eastbound (downwind), the controller advised a change to runway 25L. The pilot was given radar vectors for runway 25L, the final approach course. The Santa Monica VOR is located about 5 nautical miles north of runway 25L.</p>					
<p>The crew of a commuter aircraft was holding for departure and witnessed the landing and tail strike.</p>					
<p>The Digital Flight Data Recorder (DFDR) data indicated the autopilot was disconnected with the aircraft on a magnetic heading of 250 degrees and a wing flap configuration of 35 degrees. Ten seconds before the first touchdown, at FDR Subframe Reference Number (SRN) 1771, the aircraft was in a wings level attitude, the spoilers were not armed, and engine N1 settings were approximately 32 percent. (The FDR SRN is a measure of relative time on the DFDR; one subframe is equivalent to 1 second). At SRN 1778, the elevators trailing edge surface start deflecting up to about 12 degrees. The pitch attitude also begins to increase at that time. At SRN 1781, a 2.13 (g) spike in the vertical acceleration occurs. The aircraft reaches a maximum pitch attitude of 12 degrees and at SRN 1787, the nose gear compresses.</p>					
PILOT INFORMATION					
<p>According to the operator's report, the captain accumulated 10,785 total flight hours with 3,072 in the make and model of the accident aircraft.</p>					
<p>The first officer was flying the approach. According to the report, he accumulated 5,398 total flight hours with 2,800 hours listed in the make and model of the accident aircraft.</p>					
AIRCRAFT INFORMATION					
<p>The McDonnell Douglas MD-11F was manufactured February 16, 1992. According to the operator, the aircraft had accumulated 15,896 flight hours.</p>					
<p>Preliminary review of the flight release and load manifest revealed that the landing weight was</p>					

National Transportation Safety Board

FACTUAL REPORT

AVIATION

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Occurrence Type: Accident

Narrative (Continued)

about 419,700 pounds with a CG about 24.0 percent of the MAC.

Both the flight data recorder and the cockpit voice recorder were removed and sent to the Safety Boards Engineering and Computer Services Division for data retrieval. Copies of these reports are attached to this report.

METEOROLOGICAL INFORMATION

At 1452, the Los Angeles Airport Terminal Information Service (ATIS) was reporting: 4,300 feet scattered; 15 miles visibility; temperature 66 degrees Fahrenheit; dew point 54 degrees Fahrenheit; wind 250 degrees at 15 knots; and the altimeter was 29.92 inHg. There were no windshear conditions reported, nor forecasted.

On final approach to runway 25L, the air traffic controller advised the pilots that the winds were 220 degrees at 11 knots.

DAMAGE INFORMATION

An examination revealed that substantial damage occurred between airframe stations 1801 and 2033. There was damage to the auxiliary power access door aft of station 2033. The major damage extended from the exterior skin inward to the stringers, bellframes, and the lower portion of the aft pressure bulkhead.

RESEARCH INFORMATION

According to McDonnell Douglas representatives, this accident was the 13th tail strike incident/accident involving the MD-11 aircraft resulting in minor or substantial damage. There were five tail strikes during takeoffs and eight during landings. All takeoff tail strikes resulted in minor damage.


The factors affecting tail strikes during landing were: flap setting; center of gravity; gross weight; air speed; improper strut servicing (single chamber vs. Dual chamber); sink rate; pitch rate; attitude and ground spoilers.


According to the DFDR approach information, the descent rate was between 1,470 feet per minute (fpm) and 300 fpm. The horizontal stabilizer moved over 3 degrees aircraft nose up between 700 feet above ground level (agl) to 200 feet agl with a corresponding increase in pitch. At 200 feet agl, an additional 3 degrees aircraft nose up were commanded which raised the pitch attitude to 8 degrees aircraft nose up. According to the data, the auto throttles were held back and the speed dropped below landing approach speed (Vref). At 50 feet agl the speed was 10 knots below Vref and raised the pitch to 12 degrees aircraft nose up. The touchdown occurred at 12 degrees pitch, 16 knots low at a sink rate of 9 feet per second. The tail touched the runway coincident with the main gear. According to the DFDR, the spoilers were not armed and the aircraft responded to all pilot inputs.

According to the cockpit voice recorder information, no formal checklist was used during the approach.

ADDITIONAL INFORMATION

The FDR was previously released, and the CVR was released to a Korean Airlines representative on 10/25/96.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: LAX96FA206			
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		Occurrence Type: Accident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
LOS ANGELES INTERNATIONAL	LAX	126 Ft. MSL	25L	11098	200
Runway Surface Type: Concrete					
Runway Surface Condition: Dry					
Type Instrument Approach: ILS-complete					
VFR Approach/Landing: Full Stop					
Aircraft Information					
Aircraft Manufacturer		Model/Series		Serial Number	
McDonnell Douglas		MD-11		48409	
Airworthiness Certificate(s): Normal					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 4	Certified Max Gross Wt.	618000 LBS	Number of Engines: 3	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Fan	P&W	4460	60000 LBS		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
Continuous Airworthiness	03/1996	Hours	15896 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			
KOREAN AIRLINES CO, LTD.		City		State	Zip Code
		SEOUL		OF	
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: None					
Air Carrier Operating Certificate(s):					
Operating Certificate:					
			Operator Certificate:		
Regulation Flight Conducted Under: Part 129: Foreign					
Type of Flight Operation Conducted: Scheduled; International; Cargo					
FACTUAL REPORT - AVIATION					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: LAX96FA206
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	Occurrence Type: Accident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 48
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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

Airplane Rating(s): Multi-engine Land; Single-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?
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Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--no waivers/lim.	Date of Last Medical Exam: 02/1996
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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	10785	3072	1593	9192	3072					
Pilot In Command(PIC)	4871	2851	1593	3218						
Instructor	1115		910	205						
Last 90 Days	150	150		150						
Last 30 Days	49	49		49						
Last 24 Hours	4	4		4						

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 ANCHORAGE	State AK	Airport Identifier ANC	Departure Time 0945	Time Zone ADT
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Destination Same as Accident/Incident Location	State	Airport Identifier LAX	
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Type of Clearance: IFR

Type of Airspace: Class B

Weather Information

Source of Briefing:
National Weather Service

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
LAX	1452	PDT	126 Ft. MSL	0 NM	0 Deg. Mag.

Sky/Lowest Cloud Condition: Scattered 4300 Ft. AGL Condition of Light: Day

Lowest Ceiling: None 0 Ft. AGL Visibility: 15 SM Altimeter: 29.00 "Hg

Temperature: 19 °C Dew Point: 12 °C Wind Direction: 250 Density Altitude: Ft.

Wind Speed: 15 Gusts: Weather Conditions at Accident Site: Visual Conditions

Visibility (RVR): 0 Ft. Visibility (RVV) 0 SM Intensity of Precipitation: Unknown

Restrictions to Visibility: None

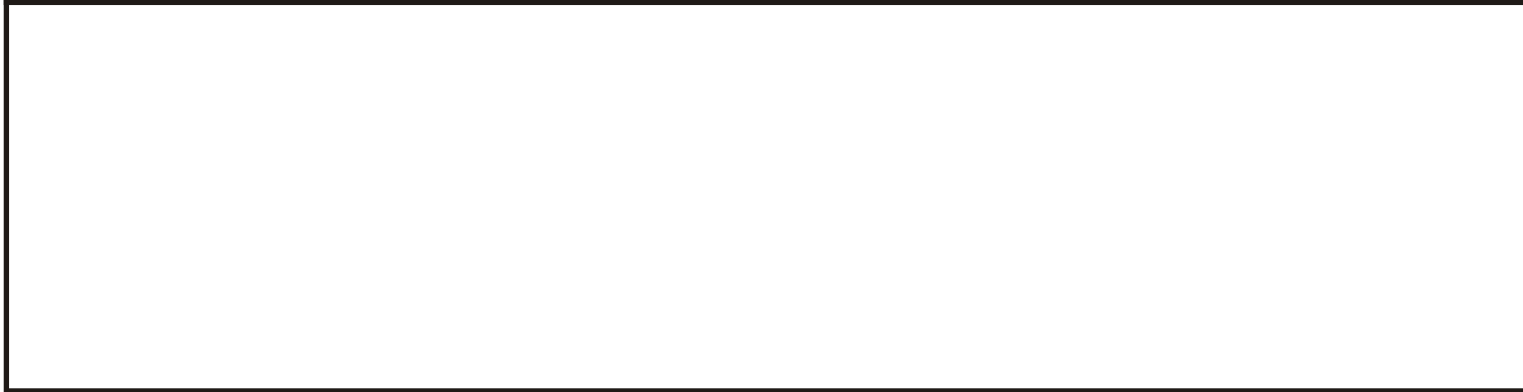
Type of Precipitation: None

Accident Information

Aircraft Damage: Substantial Aircraft Fire: None Aircraft Explosion: None

Classification: Foreign 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					
Other Crew					
Passengers					
- TOTAL ABOARD -				2	2
Other Ground	0	0	0		0
- GRAND TOTAL -	0	0	0	2	2



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AVIATION



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Occurrence Date: 05/25/1996

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

GEORGE E. PETTERSON

Additional Persons Participating in This Accident/Incident Investigation:

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