
Galley elevator injury, Lockheed L-1011-385-1, June 26, 1997

Micro-summary: A failure of the galley elevator on this Lockheed L-1011-385-1 resulted in serious injury to a flight attendant.


Event Date: 1997-06-26 at 2350 EDT

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

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

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		NTSB ID: NYC97LA129		Aircraft Registration Number: N723DA	
		Occurrence Date: 06/26/1997		Most Critical Injury: Serious	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place COVINGTON		State KY	Zip Code 41011	Local Time 2350	Time Zone EDT
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Lockheed		Model/Series L-1011-385-1		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:					
<p>On June 26, 1997, at 2350 eastern daylight time, a flight attendant was seriously injured in a galley elevator while the Lockheed L-1011-385-1, N723DA, operated by Delta Air Lines as flight 1885, was being pushed back from the gate at Covington, Kentucky. There were no injuries to the cockpit crew of 3, the remaining 7 flight attendants, or the 85 passengers onboard the airplane, which was not damaged. Visual meteorological conditions prevailed for the flight destined for Atlanta, Georgia. An instrument flight rules flight plan had been filed for the flight that was conducted under 14 CFR Part 121.</p> <p>According to the Captain's statement:</p> <p>"...As we began pushback, a Flight Attendant called the cockpit and advised that a Flight Attendant had been injured in the right (First Officer's) galley elevator. I stopped the pushback so that I could get more information...[the flight attendant] advised that she had been bruised and that her ankle was swollen. The lift had fallen from passenger level down to galley level...We called the local emergency medical team for assistance...The EMT's transported her to a local hospital..."</p> <p>The investigation revealed that the elevator was operated by an electric motor driving two shafts that were co-located. The primary shaft lay inside of the secondary shaft. The primary shaft carried the load until it failed, at which time two dogs on the secondary shaft engaged the lift sprocket, to raise/lower the galley elevator. A failure of the primary shaft could be detected by visual inspection of a washer at the end of the shaft.</p> <p>According to Engineering Report 7-72422-20, from Delta Air Lines, Inc., dated July 18, 1997:</p> <p>"...In the flight, DAL flight # 1074 from Los Angeles (LAX to CVG) which was immediately prior to the accident flight, the flight attendants had noticed that the galley lifts were not flush with the service center floor. However, this was not considered unusual by the flight attendants and not reported to maintenance. Consequently no special attention was paid to the galley lift system and it was not inspected at the end of flight 1704...."</p> <p>"...The failure mechanism of the primary shaft from the macroscopic appearance of the fracture surfaces...appears to be by rotating-bending fatigue..."</p> <p>The report also stated:</p> <p>"The failure mechanism of the secondary shaft was by fatigue crack growth at the base of the dog teeth. The cracks started out of the sharp corner at the junction of the teeth and the shaft body. There were three regions on the fracture surfaces: an thumbnail shaped fatigue crack initiation area, followed by indistinct but continuous striations, and a final fast fracture region showing ductile overload failure. Corrosion was evident in some areas of the surface indicating that the</p>					
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National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: NYC97LA129

Occurrence Date: 06/26/1997

Occurrence Type: Accident


Narrative (Continued)


fatigue crack had been propagating form some time...."

The report further stated:

"...The free-fall of the lift was caused by failure of the primary shaft and the two dog teeth on the secondary shaft which are parts of the sprocket assembly. The failure of the secondary shaft dog teeth was unexpected as the design of the sprocket assembly included a 'fail-safe' mechanism that would indicate primary shaft failure after which the secondary shaft dog is supposed to carry the torque load for a duration of at least 300 hours, which is the interval between inspections of the fail-safe mechanism...."

According to the Delta Air Lines maintenance program, the area was last inspected on a service check, on June 23, 1997, 33 hours prior to the accident.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: NYC97LA129			
		Occurrence Date: 06/26/1997			
		Occurrence Type: Accident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
CINCINNATI REGIONAL	CVG	Ft. MSL	0		
Runway Surface Type:					
Runway Surface Condition:					
Type Instrument Approach: NONE					
VFR Approach/Landing: None					
Aircraft Information					
Aircraft Manufacturer		Model/Series		Serial Number	
Lockheed		L-1011-385-1		193C-1150	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 0	Certified Max Gross Wt.	442000 LBS	Number of Engines: 3	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Fan	Rolls-Royce	RB211-22B	41000 LBS		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
Continuous Airworthiness	06/1997	33 Hours	60686 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			
DELTA AIR LINES, INC.		HARTSFIELD INTL AIRPORT			
		City	State	Zip Code	
		ATLANTA	GA	30320	
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: DELTA AIR LINES			Operator Designator Code: DALA		
- 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					
FACTUAL REPORT - AVIATION					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: NYC97LA129
	Occurrence Date: 06/26/1997
	Occurrence Type: Accident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 57
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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--w/ waivers/lim.	Date of Last Medical Exam: 05/1997
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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	20300	2109								
Pilot In Command(PIC)										
Instructor										
Last 90 Days	152	152								
Last 30 Days										
Last 24 Hours										

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 CVG	Departure Time 0000	Time Zone
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Destination ATLANTA	State GA	Airport Identifier ATL	
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Type of Clearance: None

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
CVG	2354	EDT	897 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Scattered			25000 Ft. AGL	Condition of Light: Night/Bright	
Lowest Ceiling: None		0 Ft. AGL	Visibility: 10	SM	Altimeter: 30.00 "Hg
Temperature: 21 °C	Dew Point: 15 °C	Wind Direction: 360		Density Altitude: Ft.	
Wind Speed: 6	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				1	1
Cabin Attendants		1		7	8
Other Crew					
Passengers				85	85
- TOTAL ABOARD -		1		95	96
Other Ground	0	0	0		0
- GRAND TOTAL -	0	1	0	95	96

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National Transportation Safety Board

FACTUAL REPORT

AVIATION



NTSB ID: NYC97LA129

Occurrence Date: 06/26/1997

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

ROBERT L. HANCOCK

Additional Persons Participating in This Accident/Incident Investigation:

KEITH DEBERRY
FAA FSDO
LOUISVILLE, KY

RALPH E HICKS
DELTA AIR LINES
ATLANTA, GA