



Aviation Investigation Final Report

Location:	DFW AIRPORT, Texas	Incident Number:	FTW92IA055
Date & Time:	January 7, 1992, 13:32 Local	Registration:	N322DL
Aircraft:	BOEING 737-232	Aircraft Damage:	Minor
Defining Event:		Injuries:	49 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

THE RIGHT ENGINE SEPARATED FROM THE WING AS THE AIRPLANE WAS CLIMBING THROUGH 200 FEET AFTER TAKEOFF. FOLLOWING THE ENGINE SEPARATION, THE CREW CONTINUED THE CLIMB AND WERE VECTORED FOR AN UNEVENTFUL LANDING WITHOUT FURTHER INCIDENT. ENGINE SEPARATION WAS THE RESULT OF THE FAILURE OF THE AFT CONE BOLT AND THE ENGINE SECONDARY SUPPORT ASSEMBLY. THE AFT CONE BOLT FAILED AS RESULT OF A PREEXISTING FATIGUE CRACK, WHILE THE ENGINE SECONDARY SUPPORT ASSEMBLY FAILED AS RESULT OF THE DYNAMIC LOADS THAT EXCEEDED THE DESIGNED CAPACITY OF THE MOUNTING BOLTS. THE TWO FORWARD CONE BOLTS FAILED IN OVERLOAD AS THE ENGINE SWUNG FORWARD DURING THE SEPARATION SEQUENCE. METALLURGICAL TESTING REVEALED THAT THE FATIGUE OF THE AFT CONE BOLT WAS A RESULT OF LUBRICANT INADVERTENTLY INTRODUCED INTO THE CONICAL SURFACE OF THE CONE BOLT.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: THE FAILURE OF THE AFT CONE BOLT AS RESULT OF PREEXISTING FATIGUE CRACKING DUE TO IMPROPER MAINTENANCE, AND THE FAILURE OF THE SECONDARY SUPPORT STRUCTURE AS A RESULT OF LOADS THAT EXCEEDED THE CAPACITY OF THE ATTACHING HARDWARE AND THE CRUSHABLE HONEYCOMB CORE.

Findings

Occurrence #1: ENGINE TEARAWAY

Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (C) ENGINE INSTALLATION, MOUNTING BOLT - FATIGUE
2. (C) INSTALLATION - IMPROPER - COMPANY MAINTENANCE PERSONNEL
3. (C) ENGINE INSTALLATION, MOUNTING BOLT - FAILURE, TOTAL
4. (C) ENGINE INSTALLATION, SUSPENSION MOUNTS - DISCONNECTED
5. POWERPLANT - SEPARATION
6. ENGINE INSTALLATION, SUSPENSION MOUNTS - OVERLOAD

Factual Information

Pilot Information

Certificate:	Airline transport	Age:	49, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	December 15, 1991
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	12000 hours (Total, all aircraft), 8200 hours (Pilot In Command, all aircraft), 209 hours (Last 90 days, all aircraft), 55 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BOEING	Registration:	N322DL
Model/Series:	737-232 737-232	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Transport	Serial Number:	23094
Landing Gear Type:	Retractable - Tricycle	Seats:	130
Date/Type of Last Inspection:	December 23, 1991 Continuous airworthiness	Certified Max Gross Wt.:	115000 lbs
Time Since Last Inspection:	82 Hrs	Engines:	2 Turbo fan
Airframe Total Time:	20468 Hrs	Engine Manufacturer:	P&W
ELT:	Installed, not activated	Engine Model/Series:	JT-8D-15
Registered Owner:	DELTA AIR LINES, INC.	Rated Power:	15500 Lbs thrust
Operator:	DELTA AIR LINES, INC.	Operating Certificate(s) Held:	Flag carrier (121)
Operator Does Business As:		Operator Designator Code:	DAL

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	DFW ,603 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	13:00 Local	Direction from Accident Site:	360°
Lowest Cloud Condition:	Scattered / 1600 ft AGL	Visibility	15 miles
Lowest Ceiling:	Overcast / 7500 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	8 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	180°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	16°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(DFW)	Type of Flight Plan Filed:	IFR
Destination:	HOUSTON , TX (IAH)	Type of Clearance:	IFR
Departure Time:	13:31 Local	Type of Airspace:	Class B;Class D;Class E

Airport Information

Airport:	DFW AIRPORT DFW	Runway Surface Type:	Concrete
Airport Elevation:	603 ft msl	Runway Surface Condition:	Dry
Runway Used:	18	IFR Approach:	
Runway Length/Width:	11387 ft / 200 ft	VFR Approach/Landing:	Precautionary landing

Wreckage and Impact Information

Crew Injuries:	5 None	Aircraft Damage:	Minor
Passenger Injuries:	44 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	49 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	Casanova, Hector
Additional Participating Persons:	VINCENT L COLLAMORE; DFW AIRPORT , TX
Original Publish Date:	June 30, 1993
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=18386

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