Aviation Investigation Final Report

Location:	Long Beach, California	**Incident Number:**	LAX02IA013
Date & Time:	October 22, 2001, 17:00 Local	**Registration:**	N959SD
Aircraft:	McDonnell Douglas 600N	**Aircraft Damage:**	None
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Public aircraft		

Analysis

A MDHI 600N helicopter, operated by the Los Angeles County Sheriff's Department, was found to have a fractured tail boom attach bolt during a routine ground examination of the helicopter for evening ground standby duty. The pilot stated that as he pushed sideways on the tail boom it seemed loose. Subsequent examination by maintenance personnel found that the head half of the upper right 5/16-inch tail boom attach bolt was hanging loose by the safety wire. Examination of the bolt revealed that it had failed about three threads from the bolt shank. The remainder of the threaded portion of the bolt remained in the plate nut affixed to the fuselage. Fretting was observed on the fuselage and tail boom mating points in proximity to the fractured bolt. Areas of the bolt shank exhibited polishing. Subsequent examination for collateral damage revealed cracks were present at the aluminum attach fitting and associated angles. The operator examined two of their other 600N helicopters and found those with cracks at the same location. Two other local area law enforcement operators also found cracks in the same location. The tail boom is attached to the fuselage with four special OEM produced bolts. The helicopter tail boom is required to be removed every 300 flight hours for inspection, and, in addition is occasionally removed for other servicing procedures. Examination of the maintenance records disclosed that the bolts may have been through about 10 torque cycles. The bolts have no life limit. The failed 5/16-inch bolt, p/n HS5482-5-18, is torqued to 150-inch/pounds during installation. On November 2, 2001, MDHI issued service bulletin SB600N-036, which prescribes procedures for inspecting the upper right tail boom, attach bolt, and attach fitting assembly. "The Part 1 inspection requirements of this bulletin shall be accomplished within the next five (5) hours of helicopter operation after the receipt of this bulletin or within thirty (30) days of the issue date of this bulletin, whichever occurs first." "The Part 2 inspection and repair requirements of this bulletin shall be accomplished within the next twenty-five (25) hours of helicopter operation after the receipt of this bulletin or within ninety (90) days of the issue date of this bulletin, whichever occurs first." On November 28, 2001, the FAA issued Priority Letter Airworthiness Directive (Emergency AD) 2001-24-51, mandating compliance with the service bulletin 600N-036.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The fatigue failure of a 5/16-inch boom attach bolt was most probably caused by the angular misalignment between the tail boom bolt hole and the fuselage mounted nutplate.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: STANDING - ENGINE(S) NOT OPERATING

Findings
1. (C) MISC ROTORCRAFT,TAIL BOOM - FATIGUE

Factual Information

On October 22, 2001, about 1700 hours Pacific daylight time, a MDHI 600N helicopter, N959SD, operated by the Los Angeles County Sheriff's Department, was found to have a fractured tail boom attach bolt during a preflight examination by a pilot. A routine ground examination of the helicopter was being performed prior to evening ground standby duty from the Sheriff's Aerobureau in Long Beach, California. The pilot stated that as he pushed sideways on the tail boom it seemed loose. Subsequent examination by maintenance personnel found that the head half of the upper right 5/16-inch tail boom attach bolt was hanging loose by the safety wire. Examination of the bolt revealed that it had failed about three threads from the bolt shank. The remainder of the threaded portion of the bolt remained in the plate nut affixed to the fuselage. Fretting was observed on the fuselage and tail boom mating points in proximity to the fractured bolt. Areas of the bolt shank exhibited polishing.

Subsequent examination for collateral damage revealed cracks were present at the aluminum attach fitting and associated angles. The operator examined two of their other 600N helicopters and found those with cracks at the same location. Two other local area law enforcement operators also found cracks in the same location. According to the Federal Aviation Administration (FAA) Aircraft Certification Offices responsible for certifying the 600N, a service bulletin and a priority letter airworthiness directive are in process.

The tail boom is attached to the fuselage with four special OEM produced bolts. The helicopter tail boom is required to be removed every 300 flight hours for inspection, and, in addition, is occasionally removed for other servicing procedures. Examination of the maintenance records disclosed that the bolts may have been through about 10 torque cycles. The bolts have no life limit. The failed 5/16-inch bolt, p/n HS5482-5-18, is torqued to 150-inch/pounds during installation.

On November 2, 2001, MDHI issued service bulletin SB600N-036, which prescribes procedures for inspecting the upper right tail boom, attach bolt, and attach fitting assembly.

"The Part 1 inspection requirements of this bulletin shall be accomplished within the next five (5) hours of helicopter operation after the receipt of this bulletin or within thirty (30) days of the issue date of this bulletin, whichever occurs first."

"The Part 2 inspection and repair requirements of this bulletin shall be accomplished within the next twenty-five (25) hours of helicopter operation after the receipt of this bulletin or within ninety (90) days of the issue date of this bulletin, whichever occurs first."

On November 28, 2001, the FAA issued Priority Letter Airworthiness Directive (Emergency AD) 2001-24-51, mandating compliance with the service bulletin 600N-036.

Information

Certificate:		**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	McDonnell Douglas	**Registration:**	N959SD
Model/Series:	600N	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	RN-019
Landing Gear Type:	Skid	**Seats:**	5
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	4100 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:		**Engine Manufacturer:**	Allison
ELT:	Not installed	**Engine Model/Series:**	250-C20
Registered Owner:	Los Angeles County Sheriff's Dept.	**Rated Power:**	530 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Long Beach, CA (LGB)	**Type of Flight Plan Filed:**	Company VFR
Destination:	(LGB)	**Type of Clearance:**	Unknown
Departure Time:	17:00 Local	**Type of Airspace:**	Unknown

Airport Information

Airport:	Long Beach LGB	**Runway Surface Type:**	Asphalt
Airport Elevation:		**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	Unknown
Runway Length/Width:		**VFR Approach/Landing:**	Unknown

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	None
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	33.819541,-118.110122(est)

Administrative Information

Investigator In Charge (IIC):	Petterson, George
Additional Participating Persons:	James F Wildey II; NTSB; Washington, DC
Original Publish Date:	April 18, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=53678