



National Transportation Safety Board Aviation Accident Final Report

Location:	DOS PALOS, CA	Accident Number:	LAX95LA318
Date & Time:	09/01/1995, 0830 PDT	Registration:	N4027D
Aircraft:	HILLER UH-12E	Aircraft Damage:	Substantial
Defining Event:		Injuries:	1 None
Flight Conducted Under:	Part 137: Agricultural		

Analysis

THE PILOT WAS SPRAYING A TOMATO FIELD WHEN A STRONG VIBRATION STARTED THROUGH THE AIRFRAME, FOLLOWED IMMEDIATELY BY A SEVERE YAW. PEDAL INPUT HAD NO EFFECT ON THE YAW AND THE HELICOPTER BEGAN TO SPIN. THE PILOT REDUCED POWER AND LOWERED THE COLLECTIVE TO STOP THE YAW AND THE HELICOPTER LANDED HARD. AN FAA AIRWORTHINESS INSPECTOR EXAMINED THE WRECKAGE AT THE ACCIDENT SITE. ONE TAIL ROTOR BLADE WAS MISSING AND SUBSEQUENTLY FOUND ABOUT 100 FEET AWAY. THE INSPECTOR REPORTED THAT THE TENSION TORSION (TT) PLATES OF THE SEPARATED BLADE WERE BROKEN AT THE HUB ATTACH BOLTS. NO LEADING EDGE DAMAGE WAS OBSERVED ON THE BLADE. THE FRACTURED TT PLATES WERE SENT TO THE NTSB LAB WHERE REPRESENTATIVE PLATE FRACTURES WERE SELECTED FOR DETAILED EXAMINATION. FEATURES TYPICAL OF PROGRESSIVE FATIGUE CRACKING WERE OBSERVED. A MATERIAL ANALYSIS REVEALED THAT THE STRAPS WERE MADE FROM THE MANUFACTURER'S SPECIFIED MATERIAL. NO EVIDENCE OF FOREIGN ELEMENT CONTAMINATION WAS FOUND ON THE FRACTURE FACES. THE TAIL ROTOR TT BAR HAS A 12,500-HOUR LIFE LIMIT AND THE FRACTURED TT BAR HAD ACCUMULATED A TOTAL TIME IN SERVICE OF 3,710 HOURS. NO PRIOR INCIDENTS WERE FOUND IN THE FAA SERVICE DIFFICULTY REPORT DATA BASE.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the fatigue failure of the tail rotor tension torsion bar plates.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: MANEUVERING - AERIAL APPLICATION

Findings

1. (C) ROTOR SYSTEM, TAIL ROTOR BLADE - FATIGUE
 2. (C) ROTOR SYSTEM, TAIL ROTOR BLADE - SEPARATION
 3. DIRECTIONAL CONTROL - NOT POSSIBLE - PILOT IN COMMAND
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Occurrence #2: HARD LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

4. AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND

Factual Information

On September 1, 1995, at 0830 hours Pacific daylight time, a Hiller UH-12E, N4027D, made a hard landing following the loss of a tail rotor blade while applying chemicals to a field near Dos Palos, California. The helicopter was owned and operated by Bettencourt Flying Service, Inc., of Delhi, California, and was on a local area aerial application flight under 14 CFR Part 137. Visual meteorological conditions prevailed at the time and no flight plan was filed. The helicopter sustained substantial damage. The certificated airline transport pilot, the sole occupant, was not injured. The flight originated at Delhi, California, on the day of the accident at 0600 hours.

The pilot reported that he was spraying pesticides on a tomato field when a strong vibration started through the airframe, followed immediately by a severe yaw. The pilot was unable to control the yaw with pedal input and the helicopter began to spin. He reduced power and lowered the collective to stop the yaw and the helicopter landed hard. The pilot stated that examination of the helicopter after the accident revealed one tail rotor blade was missing.

An FAA airworthiness inspector from the Fresno, California, Flight Standards District Office, examined the helicopter wreckage at the accident site. The missing tail rotor blade was found about 100 feet from the helicopter wreckage. The inspector reported that the tension torsion (TT) plates of the separated blade were broken at the hub attach bolts. No leading edge damage was observed on the blade.

The fractured TT plates were sent to the Safety Board's metallurgical laboratory in Washington, D. C., for examination. A copy of the report is attached. According to the report, representative fractures were selected for detailed examination. Features typical of progressive fatigue cracking were observed. A material analysis revealed that the straps were made from the manufacturer's specified material. No evidence of foreign element contamination was found on the fracture faces.

Review of the Hiller component replacement/overhaul schedule revealed that the tail rotor TT bar has a 12,500-hour life limit. The helicopter maintenance records denote that the fractured TT bar had accumulated a total time in service of 3,710 hours.

The FAA Service Difficulty Report data base was examined for records of prior TT bar failures. No prior incidents were found. Several helicopter repair stations were queried and they reported no knowledge of prior TT bar failures.

Pilot Information

Certificate:	Commercial	Age:	32, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land; Single-engine Sea	Seat Occupied:	Center
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	11/29/1994
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	8500 hours (Total, all aircraft), 3003 hours (Total, this make and model), 8390 hours (Pilot In Command, all aircraft), 300 hours (Last 90 days, all aircraft), 70 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	HILLER	Registration:	N4027D
Model/Series:	UH-12E UH-12E	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Restricted	Serial Number:	5072
Landing Gear Type:	Skid	Seats:	3
Date/Type of Last Inspection:	08/22/1995, 100 Hour	Certified Max Gross Wt.:	3100 lbs
Time Since Last Inspection:	24 Hours	Engines:	1 Reciprocating
Airframe Total Time:	2749 Hours	Engine Manufacturer:	LYCOMING
ELT:	Not installed	Engine Model/Series:	VO-540-C2A
Registered Owner:	BETTENCOURT FLYING SERVICE, IN	Rated Power:	305 hp
Operator:	BETTENCOURT FLYING SERVICE, IN	Operating Certificate(s) Held:	
Operator Does Business As:		Operator Designator Code:	DWFG

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	, 0 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	0000	Direction from Accident Site:	0°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	30 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	20° C
Precipitation and Obscuration:			
Departure Point:	DELHI, CA (0M9)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	0600 PDT	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	JEFF RICH	Report Date:	01/29/1996
Additional Participating Persons:	JOE ROMANO; FRESNO, CA DAVID LEHMAN; FRESNO, CA		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).