



Aviation Investigation Final Report

Location:	DARRINGTON, Washington	Accident Number:	SEA99LA020
Date & Time:	December 14, 1998, 11:00 Local	Registration:	N94NW
Aircraft:	GARLICK UH-1H	Aircraft Damage:	Substantial
Defining Event:		Injuries:	1 Serious
Flight Conducted Under:	Part 133: Rotorcraft ext. load		

Analysis

While in a hover during heavy-lift aero-logging operations, the vertical fin separated from the tail boom, resulting in an uncontrolled descent into the terrain. During the investigation, the NTSB Materials Laboratory determined that the separation was due to the propagation of a number of fatigue cracks which had initiated within the fourth rivet hole above where the left side of the spar fin cap protruded from the tail boom. Although the FAA had previously issued Airworthiness Directive (AD) 97-20-09 to address the separation of vertical fins from UH-1 helicopters used in repeated heavy-lift operations, the Rotorcraft Directorate determined that the AD was not adequate. As a result, the Directorate initiated the formulation of a Priority Letter Airworthiness Directive requiring the replacement of the original fin spar with one that '...has been shown to account for the effects of repeated heavy-lift operations.'

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The total separation of the vertical fin (stabilizer), as the result of fatigue cracks which initiated in the fourth rivet hole above where the fin extends from the tailboom.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: HOVER

Findings

1. (C) VERTICAL STABILIZER - FATIGUE
2. (C) VERTICAL STABILIZER - FRACTURED
3. (C) VERTICAL STABILIZER - SEPARATION

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

On December 14, 1998, approximately 1100 Pacific standard time, a Garlick UH-1H helicopter, N94NW, owned by Northwest Helicopters, and operated as a 14 CFR Part 133 aero-logging operation, impacted the terrain after experiencing a separation of the vertical fin in flight. Visual meteorological conditions prevailed, and no flight plan was filed. The aircraft sustained substantial damage, and the commercial pilot received serious injuries. The flight originated at a nearby helicopter service pad.

According to the pilot, he was in a hover at the end of a 150 foot long-line that had just been attached to a set of logs. He reported that he had not yet began to lift the logs, but had taken the slack out of the line when he heard a loud bang. The aircraft immediately began spinning to the right and settled into the terrain.

The aft portion of the tail boom was sent to the NTSB materials laboratory for examination. That examination revealed the presence of fatigue cracking in all five layers of the left side of the vertical fin spar cap. According to the laboratory, the cracks initiated from the hole for the fourth rivet above where the fin protrudes from the tail boom, and propagated through most of the left side of the spar cap prior to final separation.

During the investigation, it was determined that the vertical fins of at least two other UH-1 helicopters had previously separated in flight, although not through the fourth hole. The FAA had previously issued Airworthiness Directive (AD) number 97-20-09 to address the problem of fin separation from UH-1 helicopters used in repeated heavy-lift operation, but the FAA Rotorcraft Directorate subsequently determined that the AD was not adequate. As a result, the Directorate initiated the formulation of a Priority Letter Airworthiness Directive calling for the replacement of the original equipment manufacturer's (OEM) fin spar with one that "...has been proven to account for the effects of repeated heavy-lift operations."

Pilot Information

Certificate:	Commercial	Age:	50, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
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:	April 29, 1998
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	6336 hours (Total, all aircraft), 800 hours (Total, this make and model), 6336 hours (Pilot In Command, all aircraft), 210 hours (Last 90 days, all aircraft), 66 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	GARLICK	Registration:	N94NW
Model/Series:	UH-1H UH-1H	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Restricted (Special)	Serial Number:	66-1101
Landing Gear Type:	Skid	Seats:	2
Date/Type of Last Inspection:	December 10, 1998 Continuous airworthiness	Certified Max Gross Wt.:	9500 lbs
Time Since Last Inspection:	10 Hrs	Engines:	1 Turbo shaft
Airframe Total Time:	7240 Hrs	Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	T53-L13B
Registered Owner:	NORTHWEST HELICOPTERS INC.	Rated Power:	1400 Horsepower
Operator:		Operating Certificate(s) Held:	
Operator Does Business As:		Operator Designator Code:	

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:	Unknown	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	/
Wind Direction:	0°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:		Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	10:30 Local	Type of Airspace:	Class G

Airport Information

Airport:		Runway Surface Type:	
Airport Elevation:		Runway Surface Condition:	
Runway Used:	0	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Serious	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Serious	Latitude, Longitude:	48.189357,-121.210533(est)

Administrative Information

Investigator In Charge (IIC):	Anderson, Orrin
Additional Participating Persons:	BRENT MARROW; SEATTLE , WA JACK SUTTLE; FORT WORTH , TX
Original Publish Date:	January 11, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=45496

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