



Aviation Investigation Final Report

Location:	ANATONE, Washington	Accident Number:	SEA93LA105
Date & Time:	May 12, 1993, 07:15 Local	Registration:	N846D
Aircraft:	KAMAN HH-43F	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal
Flight Conducted Under:	Part 133: Rotorcraft ext. load		

Analysis

THE CONVERTED MILITARY HELICOPTER WAS IN A HOVER LIFTING AN EXTERNAL LOAD OF LOGS WHEN THE MAIN ROTOR PYLONS SEPARATED IN FLIGHT, RESULTING IN AN UNCONTROLLED INVERTED DESCENT INTO THE GROUND. ON-SCENE EXAMINATION REVEALED THAT THE TRANSMISSION ROTOR INPUT GEAR SHAFT, P/N K774515-5F, HAD FRACTURED. SAFETY BOARD METALLURGICAL EXAMINATION SHOWED THAT THE FRACTURE WAS CHARACTERISTIC OF FATIGUE FAILURE, AND INDICATED REPETITIVE HIGH LOADS. THE FAA TYPE-CERTIFICATE, BASED ON MILITARY CONFIGURATION, LISTS THE APPROVED ENGINE AS 1100 SHP, AND THE EXTERNAL LOAD LIMIT AS 2,300 LBS. THE FAA HAD APPROVED INSTALLATION OF A 1400 SHP ENGINE, AND OPERATIONS WITH AN INCREASED EXTERNAL LOAD LIMIT OF 4,000 LBS.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: FATIGUE FAILURE OF THE ROTOR TRANSMISSION DRIVE SYSTEM, RESULTING FROM THE IMPROPER CERTIFICATION/APPROVAL OF THE AIRCRAFT MODIFICATION BY THE FEDERAL AVIATION ADMINISTRATION.

Findings

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

Findings

1. (C) ROTOR DRIVE SYSTEM,MAIN GEARBOX/TRANSMISSION - FATIGUE
2. (C) INADEQUATE CERTIFICATION/APPROVAL - FAA(ORGANIZATION)

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

Factual Information

Pilot Information

Certificate:	Commercial; Flight instructor	Age:	45, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
Instrument Rating(s):	Helicopter	Second Pilot Present:	No
Instructor Rating(s):	Helicopter	Toxicology Performed:	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	January 4, 1993
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	18970 hours (Total, all aircraft), 3051 hours (Total, this make and model), 18051 hours (Pilot In Command, all aircraft), 344 hours (Last 90 days, all aircraft), 113 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	KAMAN	Registration:	N846D
Model/Series:	HH-43F HH-43F	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Restricted (Special)	Serial Number:	58-1846
Landing Gear Type:		Seats:	6
Date/Type of Last Inspection:	April 27, 1993 100 hour	Certified Max Gross Wt.:	9150 lbs
Time Since Last Inspection:	42 Hrs	Engines:	1 Turbo shaft
Airframe Total Time:	7266 Hrs	Engine Manufacturer:	LYCOMING
ELT:	Not installed	Engine Model/Series:	T53-L-13B
Registered Owner:	ROBERT & SHARON WOODY	Rated Power:	1400 Horsepower
Operator:	WOODY CONTRACTING, INC	Operating Certificate(s) Held:	
Operator Does Business As:		Operator Designator Code:	OWVL

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	LWS ,1438 ft msl	Distance from Accident Site:	26 Nautical Miles
Observation Time:	07:48 Local	Direction from Accident Site:	10°
Lowest Cloud Condition:	Clear	Visibility	30 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	8 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	130°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	18°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:		Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	07:00 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:	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	46.079105,-117.26947(est)

Administrative Information

Investigator In Charge (IIC):	Mangum, Prentiss
Additional Participating Persons:	JEAN BERNSTEIN; WASHINGTON , DC KEN ZIEMER; RENTON , WA SAM BRODIE; FORT WORTH , TX
Original Publish Date:	June 22, 1994
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=43019

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).