

		NTSB ID: SEA98FA077		Aircraft Registration Number: N98NW	
		Occurrence Date: 05/19/1998		Most Critical Injury: None	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place HOPE		State ID	Zip Code 83836	Local Time 1015	Time Zone PDT
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:			
Aircraft Information Summary					
Aircraft Manufacturer Garlick		Model/Series UH-1H /UH-1H		Type of Aircraft Helicopter	
Revenue Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
<p>HISTORY OF FLIGHT</p> <p>On May 19, 1998, approximately 1015 Pacific daylight time, a Garlick UH-1H, N98NW, was substantially damaged during an emergency landing in a clearing during a logging operation near Hope, Idaho. The commercial pilot-in-command, who was the helicopter's sole occupant, was not injured. The 14 CFR Part 133 commercial flight operation was operating in visual meteorological conditions at the time of the accident, and no flight plan had been filed for the local flight which originated at a point near the accident scene.</p> <p>The pilot reported that he had dropped off a load of chokers and was maneuvering to hook up to a load of logs when the engine began to make "a weird squealing noise, followed by a constant series of compressor stalls, occurring about twice per second." The pilot also reported that at the time that the compressor stalls began, the master caution light illuminated. The ground crew reported that smoke and flames were emitted from the tailpipe and the pilot turned towards a clearing approximately 100 yards away. The pilot then lost all engine power, but managed to land in the clearing. Examination of the engine revealed no obvious problems. There was evidence of oil in the engine inlet.</p> <p>In a written statement, the pilot noted that he heard a loud noise from the engine, followed by an engine chip light. At that time, the engine was having a series of compressor stalls and it was losing engine RPM. He stated he then jettisoned the long line and headed for a clear landing area. Before reaching the clear-cut, the engine quit totally. He pushed the nose forward to gain airspeed and to attempt an autorotation. Finding a flat place to land the aircraft, he impacted approximately 100 feet from the timberline, causing substantial damage to the aircraft.</p> <p>AIRCRAFT INFORMATION</p> <p>The engine, an AlliedSignal (formerly Lycoming) T53-L-13B, serial number LE-18249B, was given a hot-section inspection by Northwest Helicopters on April 13, 1998, at 5,678 hours since new, according to records provided by the operator. The engine was then installed in N98NW. Total time since new at the time of the accident was 5,820.2 hours.</p> <p>Military records from Army Aviation Support Facility, Boone, Iowa, which were available to the operator included an Unserviceable Tag, dated March 18, 1994. Total time since new on that date was 5,678 hours, with time since overhaul recorded as 4,026 hours. The removal tag cites failure code SF1 (part removed for safety of flight analysis). No evidence was found of specifics related to that failure code, nor was evidence found recording related corrective maintenance action. A Northwest Helicopters work order with an April 10, 1998 entry noted that the engine time since overhaul was calculated in accordance with U.S. Army Technical Manual (TM) 55-1520-210-23 as 1,561 hours.</p>					
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FACTUAL REPORT

AVIATION

NTSB ID: SEA98FA077

Occurrence Date: 05/19/1998

Occurrence Type: Accident

Narrative (Continued)

WRECKAGE AND IMPACT INFORMATION

On scene investigation was conducted by FAA inspectors. A diagram provided by FAA on-scene inspectors is attached.

TESTS AND RESEARCH

Disassembly and inspection of the engine were performed at AlliedSignal facilities in Phoenix, Arizona. During the course of disassembly, it was found that the front nut, which clamps the bevel gear, No. 1 bearing, and the face seal, was loose on the shaft. The nut could be easily turned by hand. The locking cup was still attached and engaged with the nut. The No. 1 bearing (P/N:1-300-015-04; S/N:127AC) was found to be heavily damaged. This bearing was evaluated by metallurgists at AlliedSignal (excerpts of the complete report are attached).

From observations of damage on the bearing raceways and the inner ring split faces, evidence indicated that both thrust and non-thrust sides of the inner ring had been misaligned, based upon ball path indications. The cage was broken in pieces; the outer ring raceway was heavily damaged and covered with bronze material transferred from the cage. The lower part of the face seal runner was melted into the bearing thrust-side inner ring. Both the thrust inner ring and the seal runner were completely discolored. The non-thrust side of the bearing inner ring did not turn blue, indicating (according to AlliedSignal) that the bearing was still receiving cooling from the oil. All ball surfaces were heavily deformed and discolored dark blue.

AlliedSignal metallurgists noted that:

1) The exact cause of damage could not be determined. 2) It appeared that the No. 1 bearing was misassembled, allowing inner ring misalignment, which resulted in severe ball excursion and ultimate cage fracture. 3) The engine continued to operate, resulting in bearing overheating and melting of the aft inner ring into the seal runner. 4) The loss of nut clamping load appeared to be due to the reduction in length of the clamp stack members resulting from the melting of the bearing inner race into the seal runner.

ADDITIONAL DATA/INFORMATION

The wreckage was released to the owner's representative, on February 5, 1999. The wreckage remained in storage at Northwest Helicopters' facility in Olympia, Washington.

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		Occurrence Type: Accident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation Ft. MSL	Runway Used 0	Runway Length	Runway Width
Runway Surface Type:					
Runway Surface Condition:					
Approach/Arrival Flown:					
VFR Approach/Landing: Forced Landing					
Aircraft Information					
Aircraft Manufacturer Garlick		Model/Series UH-1H /UH-1H		Serial Number 64-13822	
Airworthiness Certificate(s): Restricted (Special)					
Landing Gear Type: Skid					
Amateur Built Acft? No	Number of Seats: 2	Certified Max Gross Wt. 9500 LBS	Number of Engines: 1		
Engine Type: Turbo Shaft	Engine Manufacturer: Lycoming	Model/Series: T53-L-13B	Rated Power: 1400 HP		
- Aircraft Inspection Information					
Type of Last Inspection Annual	Date of Last Inspection 05/1998	Time Since Last Inspection 3 Hours	Airframe Total Time 13590 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed?/Type Yes /	ELT Operated? Yes	ELT Aided in Locating Accident Site? No			
Owner/Operator Information					
Registered Aircraft Owner REYNOLDS AVIATION INC.		Street Address 7822 OLD HWY 99 SE			
		City OLYMPIA	State WA	Zip Code 98501	
Operator of Aircraft REYNOLDS AVIATION INC.		Street Address 7822 OLD HWY 99 SE			
		City OLYMPIA	State WA	Zip Code 98501	
Operator Does Business As: NORTHWEST HELICOPTERS INC.			Operator Designator Code: WYFL		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s):					
Operating Certificate:			Operator Certificate: Aircraft External Load		
Regulation Flight Conducted Under: Part 133: Rotorcraft Ext. Load					
Type of Flight Operation Conducted: Unknown;Unknown; Unknown; Unknown					
FACTUAL REPORT - AVIATION					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: SEA98FA077
	Occurrence Date: 05/19/1998
	Occurrence Type: Accident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 40
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Sex: M	Seat Occupied: Left	Occupational Pilot? Civilian Pilot	Certificate Number: On File
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Certificate(s): Commercial

Airplane Rating(s): None

Rotorcraft/Glider/LTA: Helicopter

Instrument Rating(s): None

Instructor Rating(s): None

Current Biennial Flight Review?

Medical Cert.: Class 2	Medical Cert. Status: Valid Medical--no waivers/lim.	Date of Last Medical Exam: 06/1997
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- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	11700	6700						11700		
Pilot In Command(PIC)	11250	6700						11700		
Instructor										
Instruction Received										
Last 90 Days	160	160						160		
Last 30 Days	90	90						90		
Last 24 Hours	3	3						3		

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? No	Second Pilot? No
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Flight Plan/Itinerary

Type of Flight Plan Filed: None

Departure Point Same as Accident/Incident Location	State	Airport Identifier	Departure Time 0935	Time Zone PDT
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Destination Local Flight	State	Airport Identifier	
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Type of Clearance: None

Type of Airspace:

Weather Information

Source of Wx Information:

No record of briefing

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Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
	0000		0 Ft. MSL	0 NM	0 Deg. Mag.
Sky/Lowest Cloud Condition: Clear			0 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: None		0 Ft. AGL	Visibility: 5 SM	Altimeter: "Hg	
Temperature: 21 °C	Dew Point: °C	Weather Conditions at Accident Site: Visual Conditions			
Wind Direction:	Wind Speed: Calm		Wind Gusts:		
Visibility (RVR): 0 Ft.	Visibility (RVV) 0 SM				
Precip and/or Obscuration:					

Accident Information		
Aircraft Damage: Substantial	Aircraft Fire: None	Aircraft Explosion: None

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot				1	1
Second Pilot					
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers					
- TOTAL ABOARD -				1	1
Other Ground	0	0	0		0
- GRAND TOTAL -	0	0	0	1	1

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FACTUAL REPORT

AVIATION



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Occurrence Date: 05/19/1998

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

GREGG NESEMEIER

Additional Persons Participating in This Accident/Incident Investigation:

DON BIRD
SPOKANE, WA

PHILLIP HENSLEY
PHOENIX, AZ

MICHAEL L STOCKHILL
SEATTLE, WA