



Aviation Investigation Final Report

Location:	Kettle Falls, Washington	Accident Number:	WPR15LA159
Date & Time:	May 7, 2015, 17:50 Local	Registration:	N46969
Aircraft:	Garlick UH-1B	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	1 Minor
Flight Conducted Under:	Part 133: Rotorcraft ext. load		

Analysis

The commercial pilot was conducting an external load logging flight in the helicopter. A review of maintenance records revealed that, on the day of the accident, the engine had been replaced with an overhauled engine. Following the maintenance, the pilot completed one logging cycle without incident. The pilot reported that, about 50 minutes into the second cycle, she heard a loud screeching/grinding noise followed by a muffled "bang." The low rotor rpm horn sounded, and she initiated an autorotation. The helicopter touched down, impacted trees, rolled down sloped terrain, and then came to rest.

A postaccident examination of the engine's particle separator assembly revealed that it was intact and installed properly on the air inlet section; however, the inlet guide vanes exhibited signatures consistent with foreign object damage, and a material consistent with a towel was found within the vanes. Given the damage signatures and the found material, it is likely that maintenance personnel did not adequately inspect the engine area after installing the overhauled engine and left a towel in its compressor section, which the engine subsequently ingested and resulted in a total loss of power.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A total loss of engine power due to foreign object (towel) ingestion. Contributing to the accident was maintenance personnel's inadequate postmaintenance inspection of the engine.

Findings

Aircraft	Air inlet section (core eng) - Failure
Environmental issues	Debris/dirt/foreign object - Effect on equipment
Aircraft	(general) - Inadequate inspection
Personnel issues	Post maintenance inspection - Maintenance personnel
Environmental issues	Tree(s) - Contributed to outcome
Environmental issues	Sloped/uneven terrain - Contributed to outcome

Factual Information

History of Flight

Maneuvering	Loss of engine power (total) (Defining event)
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On May 07, 2015, about 1750 Pacific daylight time, a Garlick UH-1B, N46969, experienced a total loss of engine power near Kettle Falls, Washington. R & R Conner Aviation, the registered owner, was operating the helicopter under the provisions of 14 Code of Federal Regulations Part 133 as an external load logging flight. The commercial pilot, the sole occupant, sustained minor injuries; the helicopter sustained substantial damage. The flight departed from the landing zone in the area at about 1700. Visual meteorological conditions prevailed, and no flight plan was filed.

During a telephone conversation with a Safety Board investigator, the pilot stated that she had been performing logging operations for the past four days. The engine had been replaced the day of the accident. Following the maintenance, the operator's chief pilot conducted a short test flight. Thereafter, the long-line was attached to the helicopter and the pilot conducted a 50-minute logging cycle. She returned to the landing zone and refueled, planning on another 1 hour 20-minute logging cycle. The operation was configured with the log landing was located at the base of a steep hill, and the hookers were located at the top.

After about 50 minutes into the cycle, equating to about 22 picks, the pilot was maneuvering the helicopter up the mountain toward the hookers. When the helicopter was about three quarters of the way up the mountain, about 200 to 300 feet above the tree line, she heard a loud screeching/grinding noise followed by a muffled "bang." The low rotor rpm horn sounded and she initiated an autorotation, maneuvering the nose of the helicopter to touch down upslope. The helicopter impacted trees and after touching down, began to roll down the slope. She braced herself through several rolls until the helicopter came to a stop. Upon exiting out the bubble window, she noticed the engine was smoking.

A post accident examination was conducted of the engine and airframe. The complete examination report with embedded pictures is contained in the public docket for this accident.

Drive train continuity was verified from the tail rotor drive shaft to the transmission. Rotation of the tail rotor drive shaft in the direction of rotation (free wheel via sprag clutch) produced a corresponding rotation of the main rotor. There were no evidence of airframe mechanical malfunctions or failures.

The helicopter is equipped with a Lycoming T53-L-13B engine, serial number LE-17588. The T53 series engines are shaft turbine engines with a two stage, free type power turbine and a two stage gas producer turbine that drives a combination axial centrifugal compressor.

The external areas of the engine appeared intact with no visible damage. The interior of the engine exhaust tail pipe showed signs consistent with internal overheating. The power turbine section could not be rotated manually and various power turbine blades were damaged. The particle separator assembly appeared intact and installed properly on the air inlet section. Examination of the inlet guide vanes

(IGV) revealed material appearing to be consistent with a towel within the various IGVs. The trailing edges of the IGVs appeared to be displaced forward and distorted, and displayed signs consistent with foreign object damage. Material consistent with a towel was also observed in the compressor section.

The helicopter records indicated that the newly-overhauled engine was installed on the day of the accident.

Pilot Information

Certificate:	Commercial	Age:	30, Female
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Lap only
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	June 20, 2014
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	March 24, 2015
Flight Time:	(Estimated) 2450 hours (Total, all aircraft), 1700 hours (Total, this make and model), 2250 hours (Pilot In Command, all aircraft), 200 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft), 9 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Garlick	Registration:	N46969
Model/Series:	UH-1B	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Restricted (Special)	Serial Number:	63-8548
Landing Gear Type:	N/A; High skid	Seats:	2
Date/Type of Last Inspection:	May 7, 2015 Condition	Certified Max Gross Wt.:	
Time Since Last Inspection:	1 Hrs	Engines:	1 Turbo shaft
Airframe Total Time:	24111 Hrs	Engine Manufacturer:	Lycoming
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	T53
Registered Owner:	R & R CONNER AVIATION LLC	Rated Power:	
Operator:	R & R CONNER AVIATION LLC	Operating Certificate(s) Held:	Rotorcraft external load (133), Agricultural aircraft (137)

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:	/ None
Wind Direction:		Turbulence Severity Forecast/Actual:	/ N/A
Altimeter Setting:	29.92 inches Hg	Temperature/Dew Point:	24°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Kettle Falls, WA	Type of Flight Plan Filed:	None
Destination:	Kettle Falls, WA	Type of Clearance:	None
Departure Time:	17:00 Local	Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Minor	Latitude, Longitude:	48.875831,-118.132225(est)

Administrative Information

Investigator In Charge (IIC):	Keliher, Zoe
Additional Participating Persons:	Chris Cowgill; Federal Aviation Administration; Spokane, WA David Studtmann; Honeywell ; Phoenix , AZ
Original Publish Date:	June 29, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=91154

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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](#).