



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	Pomeroy, Washington	<b>Accident Number:</b>	WPR18FA074
<b>Date &amp; Time:</b>	January 27, 2018, 15:34 Local	<b>Registration:</b>	N369TH
<b>Aircraft:</b>	Hughes 369D	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	1 Fatal, 2 Serious
<b>Flight Conducted Under:</b>	Part 91: General aviation - Other work use		

## Analysis

The purpose of the wildlife capture flight was to catch and collar mule deer for tracking. The flight was operated with three crewmembers: a pilot, a gunner, and a mugger. The pilot sits in the front left seat, the gunner sits in the rear left seat and shoots nets from a net gun in order to capture deer, and the mugger sits in the front right seat and exits the helicopter to handle the tagging and release of the deer.

During a refueling stop after about 2 hours of flight, the pilot mentioned to the biologist that it was quite windy. The helicopter then departed; data from an onboard GPS unit showed the helicopter flying northeast through the ravine before reversing course and proceeding southwest through the ravine when the flight track ended in the vicinity of the accident site.

Examination of the site revealed two nets slightly northeast of the main wreckage. One net was mostly closed at the bottom of the ravine, with one weight extended farther than the others. This weight exhibited damage inconsistent with the other weights and was missing its rubber ring. Metallurgical examination of the weight revealed aluminum transfer marks. Another net that was partially open was located about 6 ft north of the first net and slightly up the western ravine wall. A piece of tail rotor skin was found about 5 ft farther north.

At the time of the accident, nearby airports were reporting wind gusts between 23 and 35 knots. A High Resolution Rapid Refresh model over the accident site identified strong low-level winds, with a maximum wind 1,000 ft above the surface from 230° at 48 knots. AIRMET Tango for low-level wind shear and turbulence due to strong winds was current for the area of the accident site at the time of the accident.

Postaccident examination did not reveal any anomalies with the engine that would have precluded normal operation. The tail rotor hub and stop exhibited contact marks and dents consistent with excessive tail rotor blade flapping. The tail rotor blades remained attached at the hub. One blade appeared undamaged, and the outboard 2 inches of the second blade had a dent with gouge marks with

evidence of metal transfer consistent with stainless steel, similar to that of the net weight; the remaining section of the blade was bent and curled. One side of the tail rotor skin was fracture-separated.

Based on the marks on the tail rotor blade and on the net weight, it is likely that the net weight struck the leading edge of the tail rotor, which resulted in a fracture of the tail rotor tip and subsequent imbalance of the tail rotor blades. This imbalance resulted in excessive tail rotor blade flapping and subsequent loss of control. Despite two net guns being present in the helicopter, the angle the net weight impacted the tail rotor is consistent with the net originating from the left side of the helicopter. In addition, since there are several accounts of windy conditions it is potential that the wind affected the nets ability to open and possibly the net trajectory.

## Probable Cause and Findings

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

A loss of control following the gunner's failure to ensure that the net maintained clearance from the tail rotor.

Findings	
Aircraft	(general) - Attain/maintain not possible
Personnel issues	(general) - Passenger
Personnel issues	Incorrect action performance - Passenger
Environmental issues	Gusts - Effect on operation
Environmental issues	Gusts - Effect on equipment

# Factual Information

## History of Flight

Maneuvering-low-alt flying	Low altitude operation/event
Maneuvering-low-alt flying	Loss of control in flight (Defining event)
Maneuvering-low-alt flying	Collision with terr/obj (non-CFIT)

On January 27, 2018, about 1534 Pacific Standard time, a Hughes 369D helicopter, N369TH, was substantially damaged when it impacted terrain about 10 miles northwest of Pomeroy, Washington. The commercial pilot and one crewmember were seriously injured, and the second crewmember was fatally injured. The helicopter was registered to McCall Helicopters Inc, and was being operated by Kiwi Air, doing business as Hells Canyon Helicopters, as a Title 14 *Code of Federal Regulations* Part 91 flight. Visual meteorological conditions prevailed, and no flight plan was filed for the wildlife capture flight that originated from a nearby staging area.

The purpose of the flight was to capture and collar mule deer for tracking. The operator reported that a wildlife capture flight requires three crewmembers: a pilot, a "mugger," and a "gunner." The pilot sits in the front left seat and flies the helicopter, the gunner sits in the left rear seat and shoots nets out of a net gun in order to capture the deer, and the mugger sits in the front right seat and exits the helicopter to handle the tagging and release of the deer. The guns usually have an empty cartridge inside; live ammunition is only put into the cartridge when the crew is in pursuit of a deer. The pilot always indicates when it is safe for the gunner to shoot. On the day of the accident, the mugger was training as a gunner; therefore, the helicopter was equipped with two net guns rather than the typical one.

A biologist from the Washington Department of Fish and Wildlife reported that, after the helicopter was flying for about 2 hours, he met it during its refueling stop, when the crew dropped off samples from previously captured deer and took on additional collars. During the stop, the pilot mentioned that it was quite windy.

Data retrieved from an onboard Garmin 496 GPS unit indicated that, after refueling, the helicopter proceeded generally southwest then turned west. The helicopter flew south of the ravine, turned northeast through the ravine, then reversed its course southwest before the flight track ended in the vicinity of the accident site.

The pilot did not recall the accident flight. The gunner only recalled portions of the flight. He remembered that it was windy that day; however, the nets were still opening. He recalled the pilot hovering, which was challenging due to the wind. He also remembered catching between 5 and 7 deer, and he vaguely remembered the mugger working on a deer after the refueling stop. He reported that the mugger had gunned in the past, but he did not recall him gunning on the accident flight. He also remembered the helicopter spinning shortly before impact.

## Pilot Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	33, Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Helicopter	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	August 12, 2017
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	8000 hours (Total, all aircraft), 6000 hours (Total, this make and model)		

The pilot had about 8 years of experience flying wildlife capture flights and had owned Kiwi Air for about three years at the time of the accident.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Hughes	<b>Registration:</b>	N369TH
<b>Model/Series:</b>	369D	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	1980	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal; Restricted (Special)	<b>Serial Number:</b>	1000830D
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	
<b>Date/Type of Last Inspection:</b>	January 17, 2018 100 hour	<b>Certified Max Gross Wt.:</b>	3000 lbs
<b>Time Since Last Inspection:</b>	45 Hrs	<b>Engines:</b>	Turbo shaft
<b>Airframe Total Time:</b>	11793 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Rolls-Royce
<b>ELT:</b>	Installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	250-C20B
<b>Registered Owner:</b>	MCCALL HELICOPTERS LLC	<b>Rated Power:</b>	420 Horsepower
<b>Operator:</b>	Kiwi Air	<b>Operating Certificate(s) Held:</b>	None
<b>Operator Does Business As:</b>	Hells Canyon Helicopters	<b>Operator Designator Code:</b>	

According to the maintenance logbooks, the most recent maintenance on the helicopter was a 100-hour inspection of the airframe and a 150-hour inspection of the engine, which occurred on January 17, 2018, at an airframe total time of 11,793 hours and an engine total time of 4,760 hours.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	PUW, 2555 ft msl	<b>Distance from Accident Site:</b>	25 Nautical Miles
<b>Observation Time:</b>	15:53 Local	<b>Direction from Accident Site:</b>	71°
<b>Lowest Cloud Condition:</b>	Few / 3500 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	23 knots / 35 knots	<b>Turbulence Type Forecast/Actual:</b>	/ None
<b>Wind Direction:</b>	250°	<b>Turbulence Severity Forecast/Actual:</b>	/ N/A
<b>Altimeter Setting:</b>	30.1 inches Hg	<b>Temperature/Dew Point:</b>	7°C / 2°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Gould City, WA	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Gould City, WA	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	15:15 Local	<b>Type of Airspace:</b>	

The station models surrounding the accident site depicted west-southwest winds of 25 knots with higher gusts, scattered clouds, temperatures around 40°F, and dew points around 30°F. At the time of the accident, nearby airports were reporting wind gusts between 23 and 35 knots. A High Resolution Rapid Refresh model over the accident site identified strong low-level winds with a wind maximum at 1,000 ft above the surface from 230° at 48 knots. Inflight weather advisories current for the region at the time of the accident included an AIRMET Tango for low-level wind shear and turbulence due to strong winds.

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 Fatal, 1 Serious	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Fatal, 2 Serious	<b>Latitude, Longitude:</b>	46.604999,-117.669723

The accident site was located in a small northeast-to-southwest-oriented ravine about 6 miles west of the refueling location. The helicopter came to rest on its right side at the bottom of the ravine with its nose oriented on a northeast heading. Immediately adjacent to the main wreckage were impact marks along the lower portion of the western ravine wall consistent with the helicopter's two skids; the right skid was fracture-separated in this area. The cabin was mostly intact, although the right side and floor sustained crush damage. The main rotor head was intact and one main rotor blade was wrapped around it. The four remaining main rotor blades were fracture-separated and were found near the main wreckage; the blade

tips were scattered to the south. The tailboom was fracture-separated about 2 1/2 ft forward of the empennage, and the empennage came to rest just north of the cabin area. The tail rotor assembly and tail rotor transmission were found just north of the main wreckage slightly up the western ravine wall. Continuing further north at the bottom of the ravine was a net that was mostly closed, with one weight extended farther than the others. This weight exhibited damage inconsistent with the other weights and was missing its rubber ring. A second, half-opened net was located about 6 ft north of the first net and slightly up the western ravine wall. About 5 ft farther north was a piece of tail rotor skin, and about 15 ft up the eastern ravine wall was a main rotor blade tip cap.

During a postaccident examination of the engine, a borescope examination of the gas generator turbine revealed no evidence of operational damage, thermal discoloration, or damage consistent with abnormal combustion. Metal splatter was observed on the first stage turbine nozzle shield. Examination of the compressor revealed damage consistent with foreign debris; however, the compressor moved freely when rotated by hand. Control continuity could not be established from the cockpit to the engine due to deformation of the fuselage and cabin area. All pneumatic engine control lines were intact and the fittings were secure.

The helicopter's forward fuselage exhibited substantial impact damage, with the right side crushed inward. The lower fuselage exhibited upward and inward crushing on the right side; the canted frame and lower bulkhead behind the front seats were bent and distorted. Control continuity could not be established from the cyclic, collective, and anti-torque pedal controls due to broken and seized flight controls and control tube assemblies. The main rotor hub exhibited multiple fractures and deformation, as did the pitch housing assemblies, swashplates, strap packs, main rotor dampers, and main rotor blades. Continuity was established from the engine through the main drive shaft to the main transmission. From the main transmission, continuity was established up to the main rotor hub and back to a fracture in the tail rotor drive shaft. The main drive shaft was rotated by hand, but rotation was limited due to the damage of the main rotor hub. The tail rotor drive shaft was fracture-separated into three pieces and exhibited extensive rotational scoring, particularly toward the aft end of the drive shaft.

The empennage was fracture separated but was mostly intact. Light-colored diagonal marks were observed on the side of the tailboom immediately adjacent to the tail rotor. The tail rotor assembly and transmission were mostly intact and fracture-separated from the end of the tailboom. The four bolts that connect the tail rotor transmission to the tailboom sustained damage; two of the bolts were sheared, one was missing, and one was bent downward. The tail rotor transmission rotated freely when manipulated by hand. The tail rotor stop and tail rotor hub exhibited contact marks and dents consistent with excessive tail rotor blade flapping. The tail rotor blades remained attached at the hub. One blade appeared undamaged, and the second blade sustained damage to the outboard two inches. One side of the tail rotor skin was fracture-separated, and the remaining section of the blade was dented, bent, and curled. The blade tip weight and endcap were fracture-separated and not located.

Tailboom fragments and tail rotor skin components were sent to the National Transportation Safety Board (NTSB) Materials Laboratory for further examination. The leading edge of the tail rotor blade exhibited a dent with gouge marks. The gouge marks displayed evidence of metal transfer (iron, nickel, chromium) consistent with stainless steel material similar to that of the net weight. In addition, the round surface of the net weight exhibited metal transfer consistent with contact with aluminum.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Link, Samantha
<b>Additional Participating Persons:</b>	Phillip Griffis; Federal Aviation Administration; Spokane, WA Joan Gregoire; MD Helicopters; Mesa, AZ Jack Johnson; Rolls-Royce Corporation; Indianapolis, IN
<b>Original Publish Date:</b>	July 8, 2019
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=96661">https://data.nts.gov/Docket?ProjectID=96661</a>

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