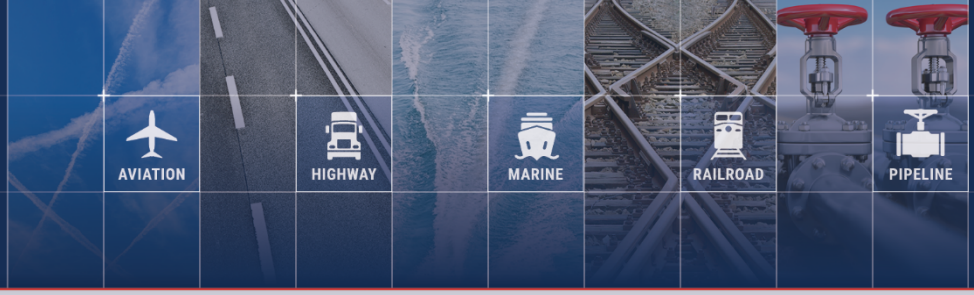

Aviation Investigation Final Report

Location:	Leavenworth, Washington	**Accident Number:**	SEA04TA158
Date & Time:	August 11, 2004, 10:25 Local	**Registration:**	N205XP
Aircraft:	Bell 205A1	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 133: Rotorcraft ext. load		

Analysis

The helicopter was operating under contract to the United States Forest Service (USFS). The purpose of the external load flight was to deliver equipment to a crew of smoke jumpers fighting a fire in heavily wooded, mountainous terrain. The jumpers estimated the trees in the area were a maximum of 120 feet tall, and therefore, they requested a 150 foot long line be used for the equipment drop. The helicopter was dispatched with a tandem load on a 160 foot long line. The smoke jumpers placed a marker on a sand bar in a stream bed. There was a tall dead tree (snag) located on a cut bank overlooking the sand bar. As the helicopter approached the area, one of the smoke jumpers communicated by radio with the pilot that if he did not like the marked site, he could choose his own spot. The pilot replied that he would give the marked spot a try. The radio operator did not mention the snag to the pilot. The pilot successfully placed both loads on the marker. Another smoke jumper disconnected both loads and then reconnected one of the loads meant to be dropped at another location. As the helicopter began its departure, the pilot who was sitting in the left seat, slowly turned the helicopter's nose to the left and its tail to the right. This maneuver allowed the helicopter's tail rotor to contact the snag. The helicopter began to spin and then fell to the ground. Investigation revealed that the snag was located 36 feet from the marker and was about 173 feet tall. The rotor diameter of the helicopter was 48 feet. Following the accident, the USFS issued an Aviation Safety Alert on the subject of "Clearance From Obstacles During External Load Operations." One of the recommendations in the alert stated the following: "In areas of sloping terrain or with obstacles rising to one or more sides of the cargo pickup/delivery area, or dip site, pilot should maintain aircraft clearance from all obstacles in accordance with the landing area safety circle requirements for the type aircraft. The safety circle is generally recognized as 1 1/2 times the rotor diameter."

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain clearance from the snag while hovering out of ground effect during an external load operation. Factors were the smoke jumper's misjudgment of the tree heights in the area, which resulted in the use of too short a long line, and their failure to communicate with the pilot about the tall snag.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: HOVER - OUT OF GROUND EFFECT

Findings
1. OBJECT - TREE(S)
2. (C) CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND
3. ROTOR SYSTEM,TAIL ROTOR - BLADE STRIKE
4. (F) COMMUNICATIONS - INADEQUATE - GROUND PERSONNEL
5. (F) INFORMATION - INCORRECT - GROUND PERSONNEL

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: HOVER - OUT OF GROUND EFFECT

Findings
6. AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
7. TERRAIN CONDITION - GROUND

Factual Information

On August 11, 2004, approximately 1025 Pacific daylight time, a Bell 205A1 helicopter, N205XP, was destroyed when it impacted heavily wooded, mountainous terrain approximately 20 miles northwest of Leavenworth, Washington. Prior to the impact, the helicopter's tail rotor struck a tree and aircraft control was lost while hovering out of ground effect with an external load. The commercial pilot, the sole occupant, was fatally injured. The helicopter was operated by Shasta Aviation Corporation dba Crescent Helicopters under contract to the United States Forest Service (USFS). The purpose of the public use flight conducted under Title 14 CFR Part 133 was to ferry supplies to a firefighting crew in the Alpine Lakes Wilderness Area located in the Cascade Mountain Range. Visual meteorological conditions prevailed, and a company flight plan was filed. The flight departed from the USFS Leavenworth helibase (Fromme Field) approximately 0955.

Personnel with the USFS conducted witness interviews, examined the accident site, and prepared a summary report of their observations. According to the USFS report, on the afternoon of August 10, 2004, eight smoke jumpers parachuted into a drainage approximately 1/2 mile down stream of a small lightning fire called INC.698. Some of the jumpers were assigned to INC.698 and some were assigned to INC.697, another small lightning fire in the area. In the evening, the smoke jumpers requested that equipment be longlined into a drop zone (DZ) they selected near INC.698 along the stream bed. The jumpers estimated the trees in the drainage were an average of 80 feet tall with some 120 foot tall trees near the DZ. Therefore, they requested a 150-foot long-line be used for the equipment drop.

According to the USFS report, on the morning of August 11, 2004, the helicopter was dispatched with a tandem sling load to deliver firefighting supplies as requested by the smoke jumpers first to INC.698 and then to take the remainder of the supplies to INC.697. The helicopter's approach into the DZ was from the southwest perpendicular to the drainage. The smoke jumpers had marked the drop sight by placing a large X made of pink flagging near the stream on a sand bar at the southern end of the DZ. To the right of the helicopter on its approach was a tall dead tree (snag) located on a cut bank overlooking the sand bar.

The radio operator, one of the smoke jumpers, told the pilot that if he did not like the drop sight marked by the X, he could choose his own spot and that would be okay with the smoke jumpers. The pilot acknowledged the radio operator's statement and indicated he would give it a try. The radio operator did not mention the snag to the pilot. The pilot successfully placed both loads on the drop sight marker. The ground crewman, another one of the smoke jumpers, removed the first load and reattached the second load meant to be dropped at INC.697.

Eyewitnesses (smoke jumpers) interviewed by USFS personnel reported that as the helicopter began its departure, the pilot, who was sitting in the left seat, slowly turned the helicopter's

nose to the left and its tail to the right. This maneuver allowed the helicopter's tail rotor to contact the snag located near the drop sight marker. The helicopter than began to spin and move up stream from the drop zone before falling to the ground. As the helicopter fell, the main rotor system separated, and a fire erupted.

On scene examination by USFS personnel revealed that the tail rotor and a portion of the 90-degree gearbox separated from the helicopter and came to rest 44 feet 6 inches from the base of the snag on a magnetic heading of 169 degrees. The helicopter came to rest on a magnetic heading of about 270 degrees, partially inverted on its left side, in trees approximately 200 feet west of the drop sight marker. The main rotor system separated from the aircraft at the mast near the static stops and came to rest approximately 40 feet north of the fuselage. The fuselage from the nose to the tail boom was destroyed by fire.

The cargo hook on the belly of the helicopter was found in the open position. The remote hook at the end of the long-line was still attached to the second load. The cargo long-line was stretched out from the drop zone towards the helicopter with the last 40 feet coiled up in a ball. The long-line measured 160 feet in length. The snag was cut down, measured, and found to be 169 feet 5 inches tall. There were three separate strike marks found 15 feet 4 inches from the top of the snag. The cut bank that the snag was located on was 3 feet 6 inches above the sandbar. Adding the height of the cut bank to the height of the snag, the top of the snag was determined to be 172 feet 11 inches above the drop zone surface.

The base of the snag was 36 feet 2 inches from the drop sight marker. The rotor diameter of the helicopter was 48 feet. Following the accident, on August 24, 2004, the USFS issued an Aviation Safety Alert on the subject of "Clearance From Obstacles During External Load Operations." One of the recommendations in the alert stated the following: "In areas of sloping terrain or with obstacles rising to one or more sides of the cargo pickup/delivery area, or dip site, pilot should maintain aircraft clearance from all obstacles in accordance with the landing area safety circle requirements for the type aircraft. The safety circle is generally recognized as 1 1/2 times the rotor diameter."

An autopsy of the pilot was performed by the Chelan County Coroner in Wenatchee, Washington. Toxicological tests performed by the FAA's Toxicology and Accident Research Laboratory were negative for carbon monoxide, cyanide, ethanol and drugs.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	55,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine; Helicopter; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	April 1, 2004
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	January 11, 2004
Flight Time:	22650 hours (Total, all aircraft), 110 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N205XP
Model/Series:	205A1	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	30017
Landing Gear Type:	Skid	**Seats:**	10
Date/Type of Last Inspection:	100 hour	**Certified Max Gross Wt.:**	10200 lbs
Time Since Last Inspection:	89 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	28600 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	T-53-L-17A
Registered Owner:	Copter Lease LLC Trustee	**Rated Power:**	1800 Horsepower
Operator:	USDA Forest Service, Fire and Aviation Management	**Operating Certificate(s) Held:**	None

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:		**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	32°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Leavenworth, WA	**Type of Flight Plan Filed:**	Company VFR
Destination:	Leavenworth, WA	**Type of Clearance:**	None
Departure Time:	09:55 Local	**Type of Airspace:**	Class G

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:**	47.650001,-121.041664

Administrative Information

Investigator In Charge (IIC):	Struhsaker, Georgia
Additional Participating Persons:	Donald N Bird; FAA, FSDO; Spokane, WA Boyce J Bingham; USDA Forest Service, Alaska Region; Juneau, AK
Original Publish Date:	April 28, 2005
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=59889