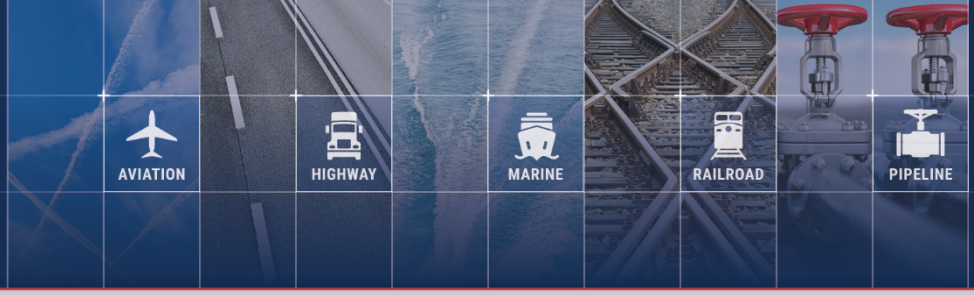

Aviation Investigation Final Report

Location:	WRANGELL, Alaska	**Accident Number:**	ANC99TA058
Date & Time:	May 5, 1999, 15:00 Local	**Registration:**	N97HM
Aircraft:	Bell UH-1B	**Aircraft Damage:**	None
Defining Event:		**Injuries:**	1 Fatal, 2 None
Flight Conducted Under:	Part 133: Rotorcraft ext. load		

Analysis

A restricted category Bell UH-1B helicopter was hovering near high voltage wires at a construction site, performing external load lift operations with a 110 feet long steel cable. The construction project was under the direction of the Alaska Energy Authority, a State of Alaska corporation. The State of Alaska construction project manager reported the electrical wires were energized, and the wires were configured to de-energize if shorted. The pilot had extensive external load experience, but had about 1 hour in the accident helicopter make and model. He said he was not aware the electrical wires were energized. The chief pilot was occupying the right seat, and said he was providing 'guidance' during the flight. The chief pilot said he was aware the wires were hot. Just after the long line was hooked to a load of steel beams on the ground, the cable touched the overhead electrical wire, and electrocuted one ground member standing on the load. The construction project operations manager said that the electrical short, caused when the cable touched the wire, was insufficient to trip the electrical power off. The helicopter company's external load manual includes the following: 'The chief pilot will brief all involved personnel concerning procedures for each operation; the flight crew consists (normally) of one pilot; the use of a hand signalman, separate from the ground crew, shall be assigned no other duties during the operation; the pilot may elect to use a continuous visual observation method, wherein he is directly observing the load by looking out the window, out the door, or by use of mirrors. In this case, release and/or signalmen need not be utilized.' The manual also includes: 'Radio contact between the pilot and the hook-up man is highly desirable, and the presence of a radioman in no way alleviates the need for the hand signalman. A signalman should be present at all times in the event of a radio failure. If the pilot is able to observe the hook-up operation by using a skid-mounted mirror, and VHF two-way radio communications are maintained between the pilot and the hook-up man, a signalman is not required.' During the accident, direct radio communication between the ground crew and the pilot was not maintained, and a signalman was not utilized.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot-in-command's failure to maintain sufficient distance from a transmission wire, arcing of the transmission wire, the failure of company personnel to utilize a nonconducting cable, and an inadequate procedure utilized by the construction project manager to ensure adequate fault protection on an energized transmission wire. Factors in the accident were a failure of the helicopter operator to maintain sufficient standards, including flight and ground crew coordination, and a failure to maintain radio communication between the pilot and ground crew.

Findings

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

Factual Information

History of the Flight

On May 5, 1999, about 1500 Alaska daylight time, an employee of an electrical engineering company was electrocuted while working on the ground beneath a hovering Bell UH-1B helicopter, about 15 miles east-southeast of Wrangell, Alaska, about latitude 56 degrees, 19 minutes north, and longitude 132 degrees, 02 minutes west. The restricted category helicopter, N97HM, was hovering near high voltage wires with a 110 feet long cable attached to the helicopter, and to a load of steel beams on the ground. The helicopter was being operated as a visual flight rules (VFR) public use flight under Title 14 CFR, Part 133, when the accident occurred. The helicopter, registered to and operated by Whitewater Transport Company, Bellingham, Washington, was not damaged. The operator is a subsidiary of Whitewater Engineering, Bellingham. The company was performing external load operations in support of an electrical engineering contract with the Alaska Energy Authority, a State of Alaska Corporation. The flight crew, both certificated commercial helicopter pilots, were not injured. Visual meteorological conditions prevailed.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), on May 6, 1999, the chief pilot for the company, who was the second pilot in the helicopter, reported the following: He was occupying the right seat, and was providing "guidance" to the first pilot. The first pilot was flying from the left seat, and was maintaining a hover over the ground load by viewing the operation through a bubble window in the left door of the helicopter. The first pilot had not flown the accident helicopter from the left seat before the accident date. A two-man ground crew, employees of Whitewater Engineering, secured the lifting cable to the load of beams. The helicopter had not begun to actually lift the load, and a slight amount of slack was in the lifting cable. The helicopter's lifting cable touched an electrical wire about 50 feet above the ground, and one of the ground crew was electrocuted. The second pilot took the flight controls, jettisoned the lifting cable, and landed the helicopter nearby the scene. The first pilot began to assist the ground crew. The second pilot utilized a second company helicopter to transport a emergency medical team to the accident site. The victim was then transported to the Wrangell Hospital.

The Wrangell Police Department, the Alaska State Troopers, and the State of Alaska, Occupational Safety and Health, conducted an investigation of the accident. The second ground crew member reported to the Wrangell Police Department that he picked up the helicopter long line from the ground as the helicopter hovered overhead. He carried the cable to the first ground crew member who was waiting to hook it to the load straps. The load of steel beams were positioned on the ground between 15 to 20 feet away from the overhead electrical wires. He walked away from the load as the helicopter lifting cable was attached to straps by the first ground crew member who was standing on the load. He heard a growling

noise, and turned around to see sparks arcing around the steel beams, and around the first ground crew member.

CREW INFORMATION

The first pilot holds a commercial pilot certificate with a rotorcraft helicopter rating. His helicopter experience consists of over 15,000 hours, in McDonnell/Douglas 500, Bell 206, Aerospatiale SA-315, and Bell 205 helicopters. The pilot's total Bell 205 experience consists of about 170 hours. The pilot had been the chief pilot for the operator in the past.

During a telephone conversation with the NTSB IIC, on September 24, 1999, the first pilot said he had began work at the construction site on Monday, May 3, 1999, two days before the accident flight. On May 3, and May 4, 1999, the pilot flew a McDonnell/Douglas 500. On May 4, 1999, he was the second pilot (right seat) in the accident helicopter for about 1 hour, during external load operations. On the accident date, he flew about 1 hour as the pilot (left seat) in the accident helicopter, and had conducted about 9 lifts before the accident. His most recent external load experience in a helicopter similar to the accident helicopter, was on February 27, 1999, using a Bell 205 (UH1H). On that date, the pilot logged 6.1 hours of CFR, Part 133 experience. The first pilot said he was under the impression the electrical wires were energized until May 1, 1999. He said he was not aware the electrical wires at the construction site were hot.

The second pilot holds an airline transport pilot certificate, with an airplane multiengine land rating. He holds commercial pilot privileges with airplane single-engine land, single-engine sea, multiengine sea, and rotorcraft helicopter ratings. He also holds a flight instructor certificate with airplane single-engine, and rotorcraft helicopter ratings. According to the NTSB Pilot/Operator report (NTSB Form 6120.1/2) submitted by the second pilot, his total helicopter experience consists of about 11,000 hours, of which 500 hours were accrued in the accident helicopter make and model.

During a telephone conversation with the NTSB IIC, on September 27, 1999, the second pilot said he was aware the electrical wires at the construction site were energized.

AIRCRAFT INFORMATION

The helicopter crew was utilizing a plastic-coated steel wire cable as the long line lift cable. According to a Wrangell Police Department report, a postaccident inspection of the cable revealed four burn spots on the cable between 38 to 40 feet from the bottom of the cable.

METEOROLOGICAL INFORMATION

The chief pilot said the weather conditions at the work site consisted of overcast clouds about 3,000 feet agl, visibility 10 miles with a mix of light rain and snow, and gusty winds from 090 degrees at six to twelve knots.

COMMUNICATIONS

The crew of the helicopter did not have direct radio communications with the ground crew while they were working under the helicopter. A radio for the ground crew was located in a nearby vehicle. A signalman, separate from the ground crew attaching the load to the long line cable, was not utilized.

ADDITIONAL INFORMATION

Whitewater Transport holds a CFR, Part 133, rotorcraft external load operating certificate. The certificate was issued on March 10, 1999, by the Federal Aviation Administration (FAA) Flight Standards District Office (FSDO), Juneau, Alaska.

The company's external load operations manual, Section IV, Crew member Duties, Person in Charge, states: "The chief pilot, or his representative at each operation has overall charge of that operation, including any other pilots, and all ground personnel. He shall brief all personnel on procedures to be followed for each operation, such as approaches to the pick-up spot, approaches to the release sites, flight paths for any wind direction, a review of all pertinent safety procedures, etc. The chief pilot may also act as pilot-in-command of the aircraft conducting the external load operation."

Under Flight Crew, the company external load manual states: "A flight crew for Class-B rotorcraft-load combinations will normally consist of only the pilot, but in some cases where various instruments, etc., must be carried as part of the necessary load, and operated in-flight, an additional pilot may be assigned to the flight crew."

Under Ground Crew, the external load manual states: "The ground crew for Class-B rotorcraft-load combinations shall consist of a least the minimum number required to conduct a safe operation. These operations require a ground man for hand signals, and if the load is hooked to the helicopter while in a hover, at least one additional man to make this hook-up. If the pilot is able to observe the hook-up operation by using a skid-mounted mirror, and VHF two-way radio communications are maintained between the pilot and the hook-up man, a signalman is not required."

Under Signalman, the external load manual states: "In all operations consisting of Class B rotorcraft-load combinations, a signalman shall be present. This signalman shall position himself forward of, and to the left of the pilot in such a way as to be visible to the pilot at all times that the helicopter is to be under hand signal control at the loading or drop site. The signalman shall give the pilot all hand signals necessary for the safe pick-up and release of the load. In operations where sling loads are being staged for a pick-up and drop-off spot, a hand signalman shall be present at each pick-up and drop-off area. Hand signalman shall be assigned no other duties during the operation."

Under Radioman, the external load manual states: "It is highly desirable in all Class B operations that VHF radio communications be established between the ground crew and the pilot of the helicopter. A radioman should be giving directions to the pilot on both pick-up and drop, and may also give him information during the flight. The presence of this radioman in no way alleviates the need for the hand signalman. A hand signalman should be present at all times in the event of a radio failure. A radioman at each site is desirable. This will not (language reflected in the manual) facilitate communications with the pilot at each end of the flight, but will also permit communications between ground crews. The VHF communications channel to be used for these operations is 122.9 MHz."

The company manual further states: "Note: In some operations, the pilot may elect to use the continuous visual observation method, wherein he is directly observing the load by looking out the window, out the door, or by use of mirrors. In this case, release and/or signalman need not be utilized."

During a telephone conversation on September 17, 1999, the operations manager for the Alaska Energy Authority reported the electrical power along the construction area was subject to a "Hot Line Order." The order, accomplished by switching and tagging of circuits, specified the condition of the electrical power lines over the accident scene. The electrical lines were energized, but were configured so that any ground fault should trip various breakers to de-energize the power line. The power would stay off until reset. A ground fault needed to be of a large enough magnitude to trip the circuit off line. The operations manager said that when the helicopter long line contacted the electrical wire, the ground fault was not sufficient to de-energize the line.

A review of "Powerline Construction and Maintenance Guidelines," included as a portion of the Helicopter Association International (HAI) Safety Manual, Page 700-69, Suspended Loads (Jettisonable), states, in part: "1. ...Is non-conductive material required?"

Pilot Information

Certificate:	Commercial	**Age:**	66,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	September 22, 1998
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	18000 hours (Total, all aircraft), 2 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N97HM
Model/Series:	UH-1B UH-1B	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	62-2034
Landing Gear Type:	Skid	**Seats:**	7
Date/Type of Last Inspection:	December 31, 1998 100 hour	**Certified Max Gross Wt.:**	8500 lbs
Time Since Last Inspection:	64 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	6942 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	T53L-13
Registered Owner:	WHITEWATER TRANPORT CO.	**Rated Power:**	1300 Horsepower
Operator:		**Operating Certificate(s) Held:**	
Operator Does Business As:		**Operator Designator Code:**	W94L

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	,0 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:		**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Unknown / 0 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Overcast / 3000 ft AGL	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	6 knots / 12 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	1°C
Precipitation and Obscuration:	Moderate - None - Snow		
Departure Point:	, AK (WRG)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	14:30 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:**	None

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	None
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	1 Fatal	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 2 None	**Latitude, Longitude:**	56.410415,-131.610534(est)

Administrative Information

Investigator In Charge (IIC):	Erickson, Scott
Additional Participating Persons:	ROBERT KOLVIG (FAA); JUNEAU , AK
Original Publish Date:	November 30, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=46275