Aviation Investigation Final Report

Location:	Kahoolawe, Hawaii	**Accident Number:**	LAX03LA160
Date & Time:	May 22, 2003, 11:50 Local	**Registration:**	N3280U
Aircraft:	Bell UH-1H	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 133: Rotorcraft ext. load		

Analysis

The commercial helicopter had delivered an external load, and was returning to another site with a 41-foot, unweighted external load cable still attached under the helicopter. A witness saw the helicopter overhead, and watched as the cable slapped the fuselage, and became entangled with the tail rotor. The tail rotor subsequently separated from the tail boom, and the helicopter rolled nearly inverted and crashed. Examination of the wreckage revealed cable witness marks on the tail boom and tail rotor blades. The commercial pilot had extensive flying experience conducting external load operations. The operator indicated it was not their standard procedure to have an unweighted cable attached to the helicopter for transition flights.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to remove the external load cable before the repositioning flight, which resulted in the cable striking the tail rotor in cruise flight.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: CRUISE

Findings
1. OBJECT - OTHER

2. (C) EXTERNAL LOAD CABLE/HOOK - NOT REMOVED
3. (C) EQUIPMENT,OTHER - NOT REMOVED - PILOT IN COMMAND

Occurrence #2: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE

Findings
4. ROTOR SYSTEM,TAIL ROTOR - SEPARATION
5. ROTOR SYSTEM,MAIN ROTOR - SEPARATION

Occurrence #3: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

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

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
7. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On May 22, 2003, at 1150 Hawaiian standard time, a Bell UH-1H single-engine helicopter, N3280U, was destroyed following an in-flight breakup after its 41-foot external load cable became entangled with its tail rotor over the island of Kahoolawe, Hawaii. The helicopter was registered to Pacific Helicopter Services LLC, of Kahului, Hawaii, and operated by Pacific Helicopter Tours, Inc., of Kahului. The commercial helicopter pilot, who was the sole occupant, was fatally injured. The flight was operated under the provisions of CFR Part 133 Rotorcraft - External Loads. The flight departed a landing zone (LZ) on Kahoolawe approximately 5 minutes prior to the accident, and was destined for Puunene, on the island of Maui, Hawaii. Visual meteorological conditions prevailed at the time of the accident and a flight plan was not filed.

According to the operator, the pilot had conducted three external load transports earlier that day between Puunene and Kahoolawe, with the last one being a 3,000-pound fuel pod via its 41-foot external load line. The pilot dropped off the fuel pod at LZ Squid and departed with the 41-foot line still attached.

One witness, located on the island of Kahoolawe, indicated he heard the helicopter fly overhead and looked up. He observed the helicopter with an "unweighted cable swinging free under the aircraft." The witness saw the cable "slap the undercarriage one time before the cable impacted the tail rotor." He then observed the tail rotor coming apart. The witnessed looked away from the helicopter shortly (due to unstable footing) and when he looked back, the helicopter had "rotated and spun nearly upside down," and he watched it descend until impact. He added he could tell the cable was unweighted "due to the way it moved freely under the aircraft...because of the aircraft speed and the cable being unweighted, it [the cable] was able to slap the underside of the aircraft."

Additional witnesses heard three loud bangs or pops described as a gunshot, explosion, or metal hitting metal. As they looked up to see the helicopter they noticed the tail rotor coming apart. One witness heard another pop and then noticed the main rotor separate from the helicopter. Another witness indicated she observed the main rotor blade rotation slow after the tail rotor debris fell from the helicopter, then the main rotor system separated. A few witnesses observed the helicopter rolling to the right.

The helicopter impacted the ground inverted. By the time the witnesses reached the accident site the helicopter's cockpit/cabin section was engulfed in flames. The witnesses, who first responded to the accident site, indicated the helicopter was severely damaged and they did not receive any response from their calls to the pilot.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with airplane single-engine land, airplane multi-engine land, instrument airplane, and helicopter ratings. He also held a helicopter flight instructor certificate. According to the operator, the pilot accumulated a total of 12,766 flight hours, of which 11,758 hours were accumulated in helicopters, and 1,565 hours were logged in the accident airplane make and model. Approximately ¼ of the pilot's total flight experience was accumulated while conducting long-line, external lift operations. His last FAR 135 Airmen Competency/Proficiency Check was conducted on March 21, 2003, in a Bell 206B helicopter. The pilot obtained a second-class medical certificate on May 12, 2003, with a limitation to wear "corrective lenses for near vision."

A review of the operator's daily flight logs revealed the pilot worked a 14-hour duty day (3.2 hours of which were logged flying) on the 19th, an 11.50-hour day (6.6 hours of flight) on the 20th, and a 14-hour day (2.7 hours of flight) on the 21st. On the morning of the accident, the pilot logged in for work at 0530.

AIRCRAFT INFORMATION

The helicopter (serial number 66-16904) was a military surplus aircraft. It was established on a military phase inspection program and had undergone a phase 2 inspection on February 6, 2003, approximately 144 hours prior to the accident. The airframe accumulated a total time of 11,368.4 hours on the morning of the accident.

The helicopter incorporated two external load release systems; one being an electrically operated system, which is activated by a switch located on the cyclic, and the other being a manual release system, which can be activated by stepping on a release pedal located between the anti-torque pedals. In either case, not only is the external load released, but the cable is also freed.

The 41-foot line was a steel cable with a load hook positioned at the load end. The cable was not weighted for the return flight to Puunene. The distance between the cable attach point on the belly of the helicopter and the center of the tail rotor system was approximately 28.8 feet.

METEOROLOGICAL INFORMATION

At 1154, the weather observation facility located at the Kahului Airport (27 statute miles north-northeast of the accident site) reported the wind from 030 degrees at 18 knots, 9 statute miles visibility in light rain, a few clouds of 2,200 feet, scattered clouds at 2,900 feet, and broken clouds at 3,800 feet, a temperature of 26 degrees Celsius, and a dew point of 21 degrees Celsius, and an altimeter setting of 30.05 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

Two Federal Aviation Administration (FAA) inspectors, who responded to the accident site, indicated the tail rotor hub separated from the helicopter and came to rest in some scrub brush. The tail rotor blades remained attached to the hub; however, the outboard section of one of the blades had separated. At the blade separation area, cable witness marks were noted. In addition, cable witness marks were visible on the bottom side of the tail boom.

The main rotor blades remained intact and attached to their hub. The main rotor was located at 20 degrees 32 minutes north latitude and 156 degrees 38 minutes west longitude.

The main wreckage, which included everything except the main rotor blades, the tail rotor blades, and a section of separated sheet metal, came to rest at 20 degrees 34 minutes north latitude and 156 degrees 38 minutes west longitude. The cable came to rest adjacent to the main wreckage, but was not attached to the helicopter.

The wreckage was recovered to a hangar at the Kahului Airport on the island of Maui. The wreckage was examined by the FAA and NTSB again on Wednesday, May 28, 2003. The main rotor mast separated at the blade flapping stops, and displayed indentations consistent with the flapping stop locations. The mast fracture surfaces displayed 45-degree sheer lips. The engine turbine case displayed punctures from the inside out, and the turbine blades were fractured and displayed heat damage. The engine's compressor section was completely destroyed with its entire rotor and stator blades found separated and/or burned.

PATHOLOGICAL INFORMATION

An autopsy on the pilot was performed by the Maui County Medical Examiner's Office. According to the autopsy report, the pilot died as a result of multiple traumatic injuries.

Toxicological tests for volatiles and drugs were conducted on the pilot. According to the toxicological report, 11 mg/dL of ethanol and 12 mg/dL of acetaldehyde were detected in the pilot's heart; however, the ethanol was cited as being formed from "postmortem ethanol formation and not from the ingestion of ethanol."

ADDITIONAL INFORMATION

According to the operator, it is not normal procedure to fly between Kahoolawe and Maui with the cable attached without a load. Review of the operator's flight and operations manuals revealed there were no policies established for flights with the cable attached, without a load. No airspeed limitations or cable length restrictions were established.

The wreckage was released to the owner's representative on May 29, 2003.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	55,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	May 12, 2003
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 21, 2003
Flight Time:	12766 hours (Total, all aircraft), 1565 hours (Total, this make and model), 136 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N3280U
Model/Series:	UH-1H	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	66-16904
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	February 6, 2003 Continuous airworthiness	**Certified Max Gross Wt.:**	9500 lbs
Time Since Last Inspection:	144 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	11368.4 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	T53L-13BA
Registered Owner:	Pacific Helicopter Tours, Inc.	**Rated Power:**	21400 Horsepower
Operator:		**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:	Pacific Helicopters	**Operator Designator Code:**	DBZL

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	OGG,54 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	11:54 Local	**Direction from Accident Site:**	20°
Lowest Cloud Condition:	Few / 2200 ft AGL	**Visibility**	9 miles
Lowest Ceiling:	Broken / 3800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	18 knots / 23 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	30°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.04 inches Hg	**Temperature/Dew Point:**	26°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Kahoolawe, HI	**Type of Flight Plan Filed:**	None
Destination:	Puunene, HI	**Type of Clearance:**	None
Departure Time:		**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:**	On-ground
Total Injuries:	1 Fatal	**Latitude, Longitude:**	20.569999,-156.633331

Administrative Information

Investigator In Charge (IIC):	Charnon, Nicole
Additional Participating Persons:	Curtis Whaley; HNL FAA-FSDO; Honolulu, HI
Original Publish Date:	December 28, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=57053