National Transportation Safety Board
Aviation Accident Final Report

Location:	Yuba City, CA	**Accident Number:**	LAX06LA134
Date & Time:	04/01/2006, 1303 PST	**Registration:**	N710WD
Aircraft:	Bell UH-1H	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The helicopter collided with trees and the ground following an in-flight loss of control while conducting an aerial spraying operation. The pilot reported that the purpose of the flight was to spray a fungicide on several tree orchards in the area. After about 3 miles in flight he reached the orchard to be treated and slowed the helicopter. He initiated a descending left turn. During the turn the flight controls locked and the pilot thought the helicopter was experiencing a hydraulic failure. He maneuvered the helicopter to avoid power lines and attempted to regain control. He turned the hydraulic system off and manipulated the cyclic in an effort to obtain level flight. The helicopter impacted trees. A follow-up examination of the helicopter by Federal Aviation Administration inspectors and a technical representative from the helicopter's manufacturer revealed no mechanical malfunctions or failures that would have precluded normal operation of the helicopter in general and the hydraulic control system in particular.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's in-flight loss of control of the helicopter for undetermined reasons. A factor was the trees.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING - AERIAL APPLICATION

Findings
1. (C) REASON FOR OCCURRENCE UNDETERMINED

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
2. (F) OBJECT - TREE(S)

Factual Information

HISTORY OF FLIGHT

On April 1, 2006, at 1303 Pacific standard time, a Bell UH-1H helicopter, N710WD, collided with the ground following the pilot's in-flight loss of control while conducting an aerial spraying operation near Yuba City, California. The commercial pilot, the sole occupant, was not injured. The helicopter, owned and operated by Avag, Inc., sustained substantial damage during the crash sequence. The helicopter was operating under the provisions of 14 CFR Part 137 when the accident occurred. The helicopter departed about 1215 from a location near the field the helicopter was spraying. Visual meteorological conditions prevailed for the local area aerial application flight, and a flight plan had not been filed.

In both telephone conversations and a written statement, the pilot reported that the purpose of the flight was to spray a fungicide on several tree orchards in the area. The pilot departed with an estimated 330 gallons of chemical on board and about 600 pounds of fuel. After about 3 miles in flight, he approached the orchard to be treated from a southerly direction. The pilot slowed the helicopter while on the east side of the orchard and initiated a descending left turn. During the turn the control forces needed to maintain the turn increased and the pilot thought the helicopter was experiencing a hydraulic failure. He maneuvered the helicopter back to a southerly heading to avoid power lines and attempted to regain control. The cyclic began to move to the left, akin to a mild hardover. He temporarily turned the hydraulic system off (cycled switch) and manipulated the cyclic in an effort to obtain level flight. The helicopter impacted the trees.

PERSONNEL INFORMATION

The pilot's self-reported total flight time was 10,500 hours, with about 3,500 hours accrued in various make and models of helicopters; he reported to have amassed 2,000 hours in the accident make and model helicopter.

A review of Federal Aviation Administration (FAA) airman records disclosed that he held a commercial pilot certificate with a rotorcraft helicopter rating, and commercial pilot privileges in single and multiengine land airplanes. The pilot's most recent medical certificate was issued as a second-class on February 27, 2006, and contained no limitations or restrictions.

METEOROLOGICAL INFORMATION

The closest weather observation station was Marysville, California, located 2 nautical miles southeast of Yuba City. A routine aviation weather report (METAR) for the airport was issued at 1253. It stated: few clouds at 3,500 feet above ground level (agl); broken cloud layers at 6,000 and 7,500 agl; wind 150 degrees at 13 knots; temperature 14 degrees Celsius; dew point 07 degrees Celsius; altimeter 30.15 inches of mercury.

WRECKAGE AND IMPACT

On April 16, 2006, at the request of a Safety Board investigator, a technical representative from the Flight Safety Department of Bell Helicopter Textron (BHT) traveled to Yuba City to examine the helicopter wreckage under the supervision of an inspector from the FAA Sacramento Flight Standards District Office.

According to the BHT representative, examination of the wreckage revealed that all of the

external visual damage to the aircraft was consistent with that of impact forces; there was no evidence of preimpact damage.

The mast was fractured, which was consistent to the damage incurred from the main rotor blade striking trees and the ground. As a result of the forces of the blade strike the main transmission lower case had additionally fractured. The internal gears were inspected and no anomalies were identified. The hard landing additionally resulted in the tail boom being bent downward just aft of the horizontal stabilizer. The BHT representative stated that all of the observed damage was consistent with expected damage following a hard landing, and impact with trees and the ground.

The accessory drive of the transmission did not display any visible damage and turned as the mast was turned. Investigators removed the transmission and further examined the gears. They confirmed that the transmission chip detectors were clean and that the rotating components of the transmission moved freely. The hydraulic pump was removed along with the cyclic and collective actuators. A visual examination of the input-shaft of the hydraulic pump confirmed that there was no visual damage to the shaft. Investigators tested the pump via the utilization of a drill motor. The input-shaft of the pump was connected to the drill, which was subsequently energized. As the drill motor turned the input-shaft of the hydraulic pump, a fluid, red in color sprayed from the output port of the hydraulic pump.

All three actuators were connected to a charged nitrogen bottle and a pressure of greater than 600 pounds per square inch (psi) of nitrogen was applied to the respective input port. As the pressure was applied, the actuator pistons extended normally.

The BHT representative stated that during the examination he found no preimpact airframe anomalies. All damage examined was consistent with what he would expect from an accident involving a hard landing with power.

A FAA inspector who was present at the examination stated that he noted no mechanical malfunctions that would have precluded normal operation.

Pilot Information

Certificate:	Commercial	**Age:**	42, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land; Single-engine Sea	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2	**Last FAA Medical Exam:**	02/01/2006
Occupational Pilot:		**Last Flight Review or Equivalent:**	11/01/2004
Flight Time:	10500 hours (Total, all aircraft), 2000 hours (Total, this make and model), 10300 hours (Pilot In Command, all aircraft), 300 hours (Last 90 days, all aircraft), 100 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N710WD
Model/Series:	UH-1H	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Restricted	**Serial Number:**	65-09716
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	03/01/2006, Continuous Airworthiness	**Certified Max Gross Wt.:**	9500 lbs
Time Since Last Inspection:	4.6 Hours	**Engines:**	1 Turbo Shaft
Airframe Total Time:	7987.5 Hours as of last inspection	**Engine Manufacturer:**	Honeywell
ELT:	Installed, not activated	**Engine Model/Series:**	T-53-LBB
Registered Owner:	Avag, Inc.	**Rated Power:**	1400 hp
Operator:	Avag, Inc.	**Operating Certificate(s) Held:**	
Operator Does Business As:		**Operator Designator Code:**	NIEG

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	MYV, 62 ft msl	**Distance from Accident Site:**	
Observation Time:	1253 PST	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 3500 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	Broken / 6000 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.15 inches Hg	**Temperature/Dew Point:**	14°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Yuba City, CA	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	1215 PST	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	39.116667, -121.600000

Administrative Information

Investigator In Charge (IIC):	Zoë Keliher	**Report Date:**	04/25/2007
Additional Participating Persons:	Tom Weeks; Federal Aviation Administration; Sacramento, CA Harold Barrentine; Bell Helicopter Textron; Arlington, TX		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		