National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB ID: LAX06FA069	Aircraft Registration Number: N530MD
Occurrence Date: 12/25/2005	Most Critical Injury: Fatal
Occurrence Type: Accident	Investigated By: NTSB

Location/Time

Nearest City/Place	State	Zip Code	Local Time	Time Zone	
Lihue	HI	96766	1740	HST	

Airport Proximity: Off Airport/Airstrip	Distance From Landing Facility:

Aircraft Information Summary

Aircraft Manufacturer	Model/Series	Type of Aircraft
McDonnell Douglas	369FF	Helicopter

Revenue Sightseeing Flight: No

Air Medical Transport Flight: No

Narrative

Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:

*** Note: NTSB investigators either traveled in support of this investigation or conducted a significant amount of investigative work without any travel, and used data obtained from various sources to prepare this aircraft accident report. ***

HISTORY OF FLIGHT

On December 25, 2005, at 1740 Hawaiian standard time, a McDonnell Douglas 369FF (also known as a 530FF) helicopter, N530MD, impacted small trees and water at the De Mello reservoir following an in-flight loss of control while hovering out of ground effect near Lihue, Hawaii. The helicopter was operated by Smoky Mountain Helicopters, Hanapepe, Hawaii, doing business as Inter-Island Helicopters (Air-1) as a fire suppression asset for the Kauai Fire Department (KFD) under the provisions of 14 CFR Part 133, Rotorcraft External Load Operations. The private pilot, who was the sole occupant, was fatally injured, and the helicopter was substantially damaged. Visual meteorological conditions prevailed at the time of the accident, and a flight plan had not been filed. The local flight departed a parking lot located in the vicinity of a brush fire near Lihue, about 10 minutes prior to the accident.

According to Inter-Island Helicopters personnel, they received a call from KFD requesting their assistance in suppressing a brush fire that was nearing an apartment complex. The company's chief pilot dispatched the accident pilot and the ground supervisor to the fire to assist KFD personnel. According to the ground supervisor, the pilot flew him to the apartment parking lot where he then proceeded to hook up the 25-foot line and 140-gallon Bambi Bucket to the helicopter. The pilot then departed the parking lot and headed to the De Mello reservoir to fill the bucket with water.

A witness located near the accident site reported that the helicopter dropped down over the reservoir and he lost sight of the helicopter behind the tree line. He then observed the helicopter rise up in a "vertical" manner from the reservoir with the bucket still attached. He indicated that the nose of the helicopter was pointed down some. The helicopter then began to rotate in a counterclockwise direction. The rotation became "very violent, very fast." At this point in the event, the witness heard the engine "rev up really loud." Others located at the park then noticed the helicopter due to the loud engine noise. The helicopter was spinning violently, and then he heard the engine "shutdown or stall." The rotation of the helicopter began to slow and the nose began to level as the helicopter descended back down toward the reservoir. The witness then lost sight of the helicopter as it descended behind the tree line, and commented that the descent seemed more controlled. He also indicated that the bucket remained attached to the helicopter throughout the entire event, and he was not sure if the pilot disconnected the bucket line as it descended below the tree line. He added that the tail rotor system remained attached to the helicopter throughout his view of the event. When asked how high the helicopter was during the event, he could not say for sure but estimated that it was below 100 feet above the ground.

A second witness, who was at the same location as the first witness, reported that when he observed the helicopter it was spinning in a clockwise direction.

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Narrative (Continued)

He stated that the helicopter was "level, but spinning pretty fast." He added that the bucket remained attached to the helicopter and was following the helicopter as it spun around. The helicopter stopped rotating and then began a slow descent, which the witness described as a "controlled drop." The witness continued to observe the helicopter until it descended below the tree line. He did not recall hearing the helicopter's engine. When questioned by the NTSB investigator-in-charge (IIC) about the helicopter's direction of rotation, the witness stated that other witnesses told him that they observed the helicopter rotate in a counterclockwise direction, but he was confident it rotated clockwise. The witness stated that if he had been sitting in the pilot's seat, the helicopter would have been spinning to the pilot's right.

No witnesses observed the helicopter impact the reservoir. According to local authorities, the helicopter was found approximately 10 feet from the shore of the eastern bank of the reservoir completely submerged with the exception of the right skid, which protruded from the water. Small trees, with limb diameters ranging between 1 and 2 inches, were freshly cut along the bank in the vicinity of the helicopter.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with airplane single engine land and rotorcraft helicopter ratings. Additionally, he held a mechanic certificate with airframe and powerplant ratings. He held a second class medical certificate dated October 10, 2005, with no limitations. On the application for this medical certificate, the pilot reported that he had accumulated 365 hours of flight time with 60 hours flown in the previous 6 months.

The pilot completed MD 530FF Pilot Transition Training at MDHI in Mesa, Arizona, on December 2, 2005. On the application form for this training, dated October 17, 2005, the pilot reported that he had accumulated 62 hours airplane flight time and 430 hours helicopter flight time of which 70 hours were in the accident make and model helicopter. He was issued a Statement of Competency for external load operations by the operator's chief pilot on December 10, 2005, which authorized him to operate "Aircraft and Load Combinations: UH-1 and MD 530FF, Class B & C." Operator personnel reported to the NTSB IIC that the accident flight was the pilot's first solo external load flight.

AIRCRAFT INFORMATION

The McDonnell Douglas 530FF helicopter, S/N 0081F, was powered by one 650-horsepower Rolls-Royce 250-C30 turboshaft engine, S/N CAE 900108. It was operated and maintained by Inter-Island Helicopters at their facility on the Port Allen Airport, Hanapepe, Kauai, Hawaii. Prior to the accident flight, the airframe had accumulated 1,991.1 hours total time and the engine had accumulated 2,176.2 hours. A 25-hour inspection was performed on the helicopter on the day of the accident. The most recent 100 hour inspection was performed on December 7, 2005, at an airframe total time of 1,914.0 hours. Review of the daily maintenance report sheets for the helicopter from December 5, 2005, to the date of the accident revealed no listings of any uncorrected maintenance discrepancies.

METEOROLOGICAL INFORMATION

At 1753, the reported weather conditions at Lihue Airport, located approximately 3 miles southeast of the accident site, were wind from 150 degrees at 3 knots, visibility 10 statute miles, few clouds at 2,700 feet agl, temperature 23 degrees C, dew point 17 degrees C, and altimeter setting 30.05 inches.

WRECKAGE AND IMPACT INFORMATION

The helicopter was recovered from the reservoir on December 26, 2005, with the NTSB IIC present.

The bucket and line were not attached to the external load hook located on the belly of the helicopter. The helicopter's fuselage remained intact, but sustained impact deformation to its undercarriage in the up direction. The left side of the helicopter, in front of the pilot's seat, sustained the most impact damage in the up and aft direction.

Narrative (Continued)

The tail boom sustained deformation damage to its left side consistent with the shape of the main rotor blade's leading edge. Yellow paint transfers were noted in the tail boom damage, and were consistent with the yellow color found on the main rotor blades.

The horizontal and vertical stabilizer section, with the tail rotor gearbox and tail rotor blades intact and attached, separated from the tail boom about 8 inches forward of the vertical stabilizer's leading edge. The tail rotor gearbox rotated freely when the blades were manually manipulated. The drive shaft was fractured at the tail boom separation point, and the section of drive shaft that stayed with the gearbox displayed a corresponding rotation when the tail rotor blades were manually rotated. The pitch change links for the tail rotor blades remained intact and attached to the blades. Manual variances of the blade angles resulted in a corresponding movement in the pitch change collar, pitch change elbow, and pitch change control rod.

The main rotor hub remained attached to the mast and the five main rotor blades were deformed and wrapped around the mast opposite the direction of rotation.

The wreckage was transported to the Lihue Airport where it was examined under the supervision of the NTSB IIC by representatives from the FAA, MD Helicopters, Boeing, and Rolls-Royce from January 5 to 7, 2006. There was major damage to the underside of the left forward fuselage section with dented, torn and deformed structure and skin panels. The underside skin panels across the entire surface of the fuselage from FS 44.65 to FS 124.0 were depressed inward in a manner consistent with water impact. The most extensive damage was located forward of FS 84.49 with the extent of the damage decreasing aft. According to the airframe manufacturer's representatives, this damage pattern indicated the fuselage impacted the water in a level roll attitude with a nose down pitch attitude.

The main rotor hub assembly and components were extensively damaged. Several blades exhibited contact marks and paint transference from tailboom/fuselage contact. The No. 1-Red blade separated from the rotor head due to a blade fracture at the doubler. The No. 3-Yellow and No. 5-White blades were entangled and wrapped around the static mast and upper flight controls. The No. 2-Green and No. 4-Blue blades were bent and twisted at several locations. All blades exhibited overload damage with fractured and bent spars, skin delamination, trailing edge separation, cuts and gouges. According to the airframe manufacturer's representatives, the damage to the blades indicated that the rotors were in an operational RPM state at the time of contact with the water and/or the fuselage or tailboom.

The main transmission rotated when the main rotor system was turned by hand, although the movement was limited due to the main rotor blades being wrapped around the static mast and upper flight controls. Drive from the transmission to both the tail rotor output pinion and the engine input quill was present when the transmission was rotated.

The forward section of the tailboom remained attached to the fuselage and exhibited multiple main rotor blade strikes and was bent downward approximately 2 feet aft of the tailboom mounting point. The tail rotor driveshaft was fractured into multiple segments corresponding to damage and breaks in the tailboom structure. The tail rotor drive shaft pieces, the tail rotor pitch change links and the tail rotor pitch change pushrods were removed from the helicopter and sent to the NTSB Materials Laboratory in Washington, DC, for further examination.

The helicopter was configured for single pilot operation with the right side cyclic and collective control sticks and anti-torque pedals removed. The flight controls exhibited various breaks, displacements and binding. All observed damage to the flight controls was attributed to impact damage and/or main rotor blade strikes.

Examination of the engine revealed no evidence of external engine damage. Engine oil, fuel, and pressure air lines were intact and undamaged. The engine mounts were in place and undamaged. The fuel control and power turbine governor linkages were intact and attached to their respective controls. The fuel control quadrant pointer indicated full open. The power turbine governor pointer indicated a mid-range setting. The N1 section rotated free and smooth and was continuous through the gear train to the starter/generator. The N2 section rotated free and smooth and was continuous to the main rotor.

Narrative (Continued)

There was no evidence of damage to the 4th stage turbine wheel. The engine was removed from the helicopter and sent to the facilities of Rolls-Royce in Indianapolis, Indiana, for further examination.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was conducted on December 29, 2005, at the Wilcox Memorial Hospital in Lihue, Hawaii. Toxicology tests conducted by the FAA's Toxicology and Accident Research Laboratory were negative for carbon monoxide and cyanide. Acetominophen was detected at 4.093 ug/ml in blood. Ethanol was detected in the samples; however, the report noted that the ethanol was from sources other than ingestion.

TESTS AND RESEARCH

The tail rotor drive shaft pieces, the tail rotor pitch change links and the tail rotor pitch change pushrods were examined at the NTSB Materials Laboratory in Washington, DC. All fractures and damage were determined to be a result of overstress. No evidence of any pre-existing fractures, such as fatigue, was found.

On March 29, 2006, under the supervision of an NTSB investigator, the engine was disassembled at the facilities of Rolls-Royce in Indianapolis, Indiana. No evidence was found of any preimpact mechanical malfunction with any of the engine components. The compressor impeller exhibited foreign object damage to several blades with the blade tips torn and bent opposite the direction of rotation. According to the engine manufacturer representative, this damage to the compressor impeller indicated that the compressor was rotating when the damage occurred.

On March 30, 2006, under the supervision of an NTSB investigator, the fuel control and power turbine governor were disassembled at the facilities of Honeywell in South Bend, Indiana. No evidence of any preimpact mechanical malfunction was found during the examination of either component.

ADDITIONAL INFORMATION

The helicopter, with the exception of the retained tail rotor drive shaft pieces, the tail rotor pitch change components, and the engine, was released to a representative of the owner on February 27, 2006. The retained components were returned to the operator following their examination.

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Landing Facility/Approach Information

Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
		Ft. MSL	NA		

Runway Surface Type:

Runway Surface Condition:

Approach/Arrival Flown: NONE

VFR Approach/Landing: None

Aircraft Information

Aircraft Manufacturer	Model/Series	Serial Number
McDonnell Douglas	369FF	0081FF

Airworthiness Certificate(s): Normal

Landing Gear Type: High Skid

Amateur Built Acft?	Number of Seats:	Certified Max Gross Wt.	Number of Engines:
No	4	3100 LBS	1

Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:
Turbo Shaft	Allison	250-C30	650 HP

- Aircraft Inspection Information

Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time
100 Hour	12/2005	77 Hours	1991 Hours

- Emergency Locator Transmitter (ELT) Information

ELT Installed?/Type	ELT Operated?	ELT Aided in Locating Accident Site?
No	No	No

Owner/Operator Information

Registered Aircraft Owner	Street Address	City	State	Zip Code
Smoky Mountain Helicopters Inc.	Port Allen Airport	Hanapepe	HI	96716

Operator of Aircraft	Street Address	City	State	Zip Code
Smoky Mountain Helicopters Inc.	Port Allen Airport	Hanapepe	HI	96716

Operator Does Business As: Inter-Island Helicopters

Operator Designator Code: FNHL

- Type of U.S. Certificate(s) Held:

Air Carrier Operating Certificate(s): On-demand Air Taxi

Operating Certificate:

Operator Certificate: Aircraft External Load

Regulation Flight Conducted Under: Part 133: Rotorcraft Ext. Load

Type of Flight Operation Conducted: External Load

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First Pilot Information

Name	City	State	Date of Birth	Age
On File	On File	On File	On File	20

Sex: M | Seat Occupied: Left | Occupational Pilot? | Certificate Number: On File

Certificate(s): Private

Airplane Rating(s): Single-engine Land

Rotorcraft/Glider/LTA: Helicopter

Instrument Rating(s): None

Instructor Rating(s): None

Current Biennial Flight Review? 11/2005

Medical Cert.: Class 2 | Medical Cert. Status: Without Waivers/Limitations | Date of Last Medical Exam: 10/2005

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Mult-Engine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time	492	70	62					430		
Pilot In Command(PIC)										
Instructor										
Instruction Received										
Last 90 Days										
Last 30 Days										
Last 24 Hours										

Seatbelt Used? Yes | Shoulder Harness Used? Yes | Toxicology Performed? Yes | Second Pilot? No

Flight Plan/Itinerary

Type of Flight Plan Filed: None

Departure Point	State	Airport Identifier	Departure Time	Time Zone
Same as Accident/Incident Location			1730	HST

Destination	State	Airport Identifier
Local Flight		

Type of Clearance: None

Type of Airspace:

Weather Information

Pilot's Source of Wx Information:

Unknown

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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
LIH	1753	HST	153 Ft. MSL	3 NM	135 Deg. Mag.

Sky/Lowest Cloud Condition: Few 2700 Ft. AGL

Condition of Light: Day

Lowest Ceiling: None Ft. AGL

Visibility: 10 SM

Altimeter: 30.05 "Hg

Temperature: 23 °C

Dew Point: 17 °C

Weather Conditions at Accident Site: Visual Conditions

Wind Direction: 150

Wind Speed: 3

Wind Gusts:

Visibility (RVR): Ft.

Visibility (RVV) SM

Precip and/or Obscuration:

No Obscuration; No Precipitation

Accident Information

Aircraft Damage: Substantial

Aircraft Fire: None

Aircraft Explosion None

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot	1				1
Second Pilot					
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers					
- TOTAL ABOARD -	1				1
Other Ground					
- GRAND TOTAL -	1				1

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Administrative Information

Investigator-In-Charge (IIC)

Nicole L. Charnon

Additional Persons Participating in This Accident/Incident Investigation:

David B Lusk
FAA FSDO
Honolulu, HI

Adrian Booth
The Boeing Company
Mesa, AZ

John Swift
Rolls Royce
Indianapolis, IN

John Hobby
MDHI
Mesa, AZ

Wayne Pollack
NTSB
Los Angeles, CA