


| | | | | | |
|---|-------------|---------------------------------|----------------------------------|--------------------------------------|--------|
|  | | NTSB ID: DEN05LA056 | | Aircraft Registration Number: N9118F | |
| | | Occurrence Date: 02/03/2005 | | Most Critical Injury: None | |
| | | Occurrence Type: Accident | | Investigated By: NTSB | |
| Location/Time | | | | | |
| Nearest City/Place Provo | State UT | Zip Code 84601 | Local Time 0800 | Time Zone MST | |
| Airport Proximity: Off Airport/Airstrip | | Distance From Landing Facility: | | | |
| Aircraft Information Summary | | | | | |
| Aircraft Manufacturer Hughes | | Model/Series 369HS | | Type of Aircraft Helicopter | |
| Revenue Sightseeing Flight: No | | | Air Medical Transport Flight: No | | |
| Narrative | | | | | |
| <p>Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:</p> <p>On February 3, 2005, at approximately 0800 mountain standard time, a Hughes 369HS helicopter, N9118F, operated by W. Enterprises, Inc., was substantially damaged while landing on a ridge near Cascade Peak, northeast of Provo, Utah. Visual meteorological conditions prevailed at the time of the accident. The local charter flight was being conducted under the provisions of Title 14 CFR Part 135 without a flight plan. The commercial pilot and two passengers were not injured. The flight originated at Park City, Utah, at approximately 0700.</p> <p>According to the pilot, he was transporting two employees from the Utah Department of Transportation, to a ridge near Cascade Peak to assess the avalanche danger in Provo Canyon. As he applied power, just before touching down, he felt an "unusual" vibration in both tail rotor pedals and the helicopter's airframe. He stated that he was at approximately 4 feet above the ground. The pilot said that he increased the power and brought the helicopter up to a 10 foot hover to reposition approximately 20 feet away. While repositioning, the vibrations and noise became worse. As he attempted the second landing, he heard a "clanking" sound. He immediately lost all tail rotor authority and the helicopter began to spin to the right. He decreased the power and executed an autorotation. The helicopter continued the spin to the right, approximately 200 degrees, as it settled into a 1foot deep layer of snow. The pilot stated that, since the helicopter was still upright and stable, he decided to continue to run the engine at flight idle for 2 minutes before completing the engine shutdown.</p> <p>A visual examination revealed a 3 inch by 4 inch tear on the aft right side of the fuselage where a fractured piece of the tail rotor drive shaft had punctured through it. Further examination revealed that the tail rotor would spin freely and that the tail rotor drive shaft had fractured. No tail rotor blade damage was noted.</p> <p>A witness, who was one of the passengers, stated that they approached the landing zone heading in a southwest to northeast direction. He stated that they were also landing on a down slope. As they approached the landing zone, he noticed the nose of the helicopter "elevate slightly" and then he felt something in the rear of the helicopter "hit" the snow. He said that the pilot lifted the helicopter up about 10 to 15 feet as it began to spin. When they touched down, they were facing to the west. He stated that he noticed a mark in the snow where the pilot first attempted to land. The mark was approximately 30 feet away and was about 10 feet in length. He stated that he watched the pilot walk away from the helicopter, in the direction of the mark, and he watched him walk directly through the mark in the snow. The witness stated that he followed the pilot's tracks and took several photos looking to the northeast direction.</p> <p>On March 7, 2005, a manufacturer's representative from Boeing examined the helicopter. He stated that the aircraft's maintenance logs appeared to be in accordance with the applicable manufacturer service and maintenance manuals. The aircraft records indicated that the maintenance was in compliance with all applicable Manufacturer Service Notices/ Letters/Bulletins, and all applicable</p> | | | | | |
| FACTUAL REPORT - AVIATION | | | | | |
| | | | | | Page 1 |

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: DEN05LA056

Occurrence Date: 02/03/2005

Occurrence Type: Accident

Narrative (Continued)


FAA Airworthiness Directives, and "nothing exceptional was noted in the aircraft maintenance logs that would be considered causal to the accident." He stated that, the data at the time of the mishap, indicated that the aircraft had been operating within the weight and balance constraints, that there was sufficient power available for the conditions and configuration to perform the planned mission, and that the aircraft was being operated within published operational parameters.


The Boeing representative stated that, during an interview with operator, several references to a "history of events concerning tail rotor system and tail empennage vibrations" were noted, although there was little documentation that reflected maintenance being accomplished on those systems. Furthermore, the documentation did not clarify or substantiate the operator's claims. He stated that there was an entry in the maintenance log dated January 14, 2005, which reflected the replacement of the upper vertical stabilizer due to cracks in the skin on the leading edge and for a fractured strut bracket, but there was no reason provided for the cause of the damage to the vertical stabilizer. It was noted that the lower vertical stabilizer had an "arc shaped" contact mark approximately 6 inches up from the bottom of the fin. However, this damage was reportedly from a previous incident.

The Boeing representative stated that there was no visible indication of a sudden stoppage of the main rotor system. A visual inspection of the main rotor blades showed that they were intact and undamaged. The tail rotor drive shaft (PN: 369A5518, SN: 6917) was fractured into several sections. The tail rotor blades (p/n: 500P33000-501, s/n: P262, and P263) appeared undamaged and the full-length abrasion strips on each blade were in place and secure. Although, tail rotor blade s/n: P262 had a "blemish" on the abrasion strip on its exterior side at approximately 5 inches from the blade tip, the cause of the blemish was not determined.

According to the Boeing representative, the tail rotor drive shaft had a "rotational/torsion fracture" near fuselage station 170.0, and exhibited a degree of "shaft wind-up" normally associated with a "sudden stoppage to the tail rotor system." There was no "characteristic damage" to the tail rotor blades that would normally be present with a tail strike event. However, he added that there "have been instances where blades have struck water or soft snow and [did] not exhibit physical damage." No further faults or malfunctions of any other helicopter system or component was noted that could have contributed to this accident.

On April 4, 2005, four sections of the fractured tail rotor drive shaft were examined at the NTSB Materials Laboratory in Washington D. C. According to the metallurgist, the fractured surfaces exhibited "extensive torsional deformation on both sides of the aft fracture." The indicated direction of torsion, as viewed looking aft, was "as if the forward portion of the shaft rotated clockwise," relative to the aft portion of the shaft. This fracture was largely circumferential and was at a location where the exterior surface of the shaft contained mechanical rubbing and rotational contact damage. Several other areas of rotational damage were noted on the shaft surface between the forward and aft fractures. A detailed examination of the fracture surfaces in the shaft revealed clean fractures on a 45-degree slant plane, "typical of recent overstress fracture under tension or tearing loads." No evidence of preexisting fracture such as fatigue cracking was noted.

| | | | | | |
|--|-------------------------------------|--|-------------------------------------|--------------------------|--------------|
|  National Transportation Safety Board FACTUAL REPORT AVIATION | | NTSB ID: DEN05LA056 | | | |
| | | Occurrence Date: 02/03/2005 | | | |
| | | Occurrence Type: Accident | | | |
| Landing Facility/Approach Information | | | | | |
| Airport Name | Airport ID: | Airport Elevation Ft. MSL | Runway Used | Runway Length | Runway Width |
| Runway Surface Type: | | | | | |
| Runway Surface Condition: | | | | | |
| Approach/Arrival Flown: NONE | | | | | |
| VFR Approach/Landing: Full Stop | | | | | |
| Aircraft Information | | | | | |
| Aircraft Manufacturer Hughes | | Model/Series 369HS | | Serial Number 720397S | |
| Airworthiness Certificate(s): Normal | | | | | |
| Landing Gear Type: Skid | | | | | |
| Amateur Built Acft? No | Number of Seats: 5 | Certified Max Gross Wt. | 3200 LBS | Number of Engines: 1 | |
| Engine Type: Turbo Shaft | Engine Manufacturer: Rolls-Royce | Model/Series: 250-C20 | Rated Power: 400 HP | | |
| - Aircraft Inspection Information | | | | | |
| Type of Last Inspection 100 Hour | Date of Last Inspection 09/2004 | Time Since Last Inspection 2913.5 Hours | Airframe Total Time 2970.4 Hours | | |
| - Emergency Locator Transmitter (ELT) Information | | | | | |
| ELT Installed?/Type Yes / | ELT Operated? No | ELT Aided in Locating Accident Site? No | | | |
| Owner/Operator Information | | | | | |
| Registered Aircraft Owner W. Enterprises, Inc. | | Street Address | | | |
| | | City Park City | State UT | Zip Code 84060 | |
| Operator of Aircraft W. Enterprises, Inc. | | Street Address | | | |
| | | City Park City | State UT | Zip Code 84060 | |
| Operator Does Business As: | | | Operator Designator Code: W9EA | | |
| - Type of U.S. Certificate(s) Held: None | | | | | |
| Air Carrier Operating Certificate(s): | | | | | |
| Operating Certificate: | | | Operator Certificate: | | |
| Regulation Flight Conducted Under: Part 135: Air Taxi & Commuter | | | | | |
| Type of Flight Operation Conducted: Non-scheduled; Domestic; Passenger Only | | | | | |

| | |
|--|-----------------------------|
|  <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p> | NTSB ID: DEN05LA056 |
| | Occurrence Date: 02/03/2005 |
| | Occurrence Type: Accident |

First Pilot Information

| | | | | |
|-----------------|-----------------|------------------|--------------------------|-----------|
| Name On File | City On File | State On File | Date of Birth On File | Age 55 |
|-----------------|-----------------|------------------|--------------------------|-----------|

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

Certificate(s): Flight Instructor; Commercial; Private

Airplane Rating(s): Multi-engine Land; Single-engine Land

Rotorcraft/Glider/LTA: Helicopter

Instrument Rating(s): Airplane; Helicopter

Instructor Rating(s): Airplane Single-engine

Current Biennial Flight Review? 12/2004

| | | |
|------------------------|---|------------------------------------|
| Medical Cert.: Class 2 | Medical Cert. Status: Without Waivers/Limitations | Date of Last Medical Exam: 10/2004 |
|------------------------|---|------------------------------------|

| - Flight Time Matrix | All A/C | This Make and Model | Airplane Single Engine | Airplane Multi-Engine | Night | Instrument | | Rotorcraft | Glider | Lighter Than Air |
|-----------------------|---------|---------------------|------------------------|-----------------------|-------|------------|-----------|------------|--------|------------------|
| | | | | | | Actual | Simulated | | | |
| Total Time | 4680 | 11 | 1011 | 38 | 582 | 65 | 253 | 3631 | | |
| Pilot In Command(PIC) | 3728 | 11 | 902 | 38 | 542 | 60 | 218 | 2783 | | |
| Instructor | 518 | | 518 | | 26 | | 82 | | | |
| Instruction Received | | | | | | | | | | |
| Last 90 Days | 91 | 3 | | | 2 | | | 91 | | |
| Last 30 Days | 25 | 1 | | | 1 | | | 25 | | |
| Last 24 Hours | | | | | | | | | | |

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

Flight Plan/Itinerary

Type of Flight Plan Filed: None

| | | | | |
|------------------------------|-------------|--------------------|------------------------|------------------|
| Departure Point Park City | State UT | Airport Identifier | Departure Time 0730 | Time Zone MST |
|------------------------------|-------------|--------------------|------------------------|------------------|

| | | | |
|---|-------|--------------------|--|
| Destination Same as Accident/Incident Location | State | Airport Identifier | |
|---|-------|--------------------|--|


Type of Clearance: VFR

Type of Airspace:

Weather Information

Source of Wx Information:

Unknown

| | |
|--|-----------------------------|
|  <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p> | NTSB ID: DEN05LA056 |
| | Occurrence Date: 02/03/2005 |
| | Occurrence Type: Accident |

| | | | | | |
|-----------------------------------|------------------|--|----------------|---------------------------------|------------------------------|
| Weather Information | | | | | |
| WOF ID | Observation Time | Time Zone | WOF Elevation | WOF Distance From Accident Site | Direction From Accident Site |
| KPVU | 0815 | MST | 4494 Ft. MSL | 9 NM | 225 Deg. Mag. |
| Sky/Lowest Cloud Condition: Clear | | | Ft. AGL | Condition of Light: Day | |
| Lowest Ceiling: None | | Ft. AGL | Visibility: 10 | SM | Altimeter: 30.47 "Hg |
| Temperature: -7 °C | Dew Point: -5 °C | Weather Conditions at Accident Site: Visual Conditions | | | |
| Wind Direction: | | Wind Speed: | Wind Gusts: | | |
| Visibility (RVR): | Ft. | Visibility (RVV) | SM | | |
| Precip and/or Obscuration: | | | | | |

| | | |
|------------------------------|----------------|--------------------|
| Accident Information | | |
| Aircraft Damage: Substantial | Aircraft Fire: | Aircraft Explosion |

| - 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 | | | | 2 | 2 |
| - TOTAL ABOARD - | | | | 3 | 3 |
| Other Ground | | | | | |
| - GRAND TOTAL - | | | | 3 | 3 |

| |
|--|
| |
|--|

National Transportation Safety Board

FACTUAL REPORT

AVIATION



NTSB ID: DEN05LA056

Occurrence Date: 02/03/2005

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

Arnold W. Scott

Additional Persons Participating in This Accident/Incident Investigation:

Lewis Olsen
Federal Aviation Administration
Salt Lake City, UT

Adrian Booth
Boeing
Mesa, AZ