
 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: ERA09IA499		Aircraft Registration Number: N801SB	
		Occurrence Date: 09/29/2008		Most Critical Injury: None	
		Occurrence Type: Incident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Allentown	State PA	Zip Code 18109	Local Time 1125	Time Zone EDT	
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility: 13			
Aircraft Information Summary					
Aircraft Manufacturer MCDONNELL DOUGLAS HELICOPTER		Model/Series 369E		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>*** Note: NTSB investigators used data provided by various sources and may not have traveled in support of this investigation to prepare this aircraft incident report. ***</p> <p>On September 29, 2008, about 1125 eastern daylight time, a McDonnell-Douglas 369E helicopter, N801SB, was undamaged during a forced landing in a hay field near Allentown, Pennsylvania, following an engine failure. The helicopter departed Queen City Airport (XLL), Allentown, Pennsylvania, about 1115, and was enroute to Stewart International Airport (SWF), Newburgh, New York. The commercial pilot was the sole occupant, and was uninjured. The positioning flight was operated under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed at the time, and no flight plan was filed for the flight.</p> <p>According to the pilot's written statement, he had performed a preflight of the helicopter and fuel was added prior to the 0915 departure from Battlefield Heliport (PA14), Gettysburg, Pennsylvania. The pilot planned an intermediate stop at SWF, and then planned to continue to the final destination of Laurence G Hanscom Field Airport (BED), Bedford, Massachusetts. While enroute, the left rear door of the helicopter become unlatched, and the flight diverted to XLL, where the pilot secured the door, and refueled the helicopter. After departure from XLL, and while in cruise flight at 1,000 feet above ground level (agl) and at a ground speed of 115 knots, the pilot heard a loud bang. This was followed by a left yawing of the helicopter, alerts by the "engine out" horn and light, and illumination of an engine chip detector light. The pilot noticed a decline in the rotor rpm, felt moderate vibration through the cyclic and the anti-torque pedals, and conducted a forced landing in the field. The helicopter touched down in a level attitude, and ground scars indicated that it slid for about 65 feet prior to coming to a stop.</p> <p>After he shut off the start pump, generator, and battery switches, the pilot exited the helicopter, saw the engine smoking, and heard sounds similar to an engine cooling down. Other anomalies noted by the pilot included thermal damage to the paint on the clam shell doors, engine oil throughout the engine compartment and tail section, unseating of the left exhaust stack, an approximate 10 inch crack around the mounting flange of the right side exhaust, unseating of the right side discharge tube snap rings, loose igniters and fuel spray nozzles, and broken safety wiring.</p> <p>The helicopter was equipped with a Rolls-Royce 250-C2B gas turbine engine. The helicopter and engine were transported to the operator's maintenance facility at PA14 and examined by a Federal Aviation Administration (FAA) inspector, representatives of Rolls-Royce, and representatives from the operator. According to the engine manufacturer representative, the exhaust stacks had minor internal impact damage which was consistent with high velocity objects exiting the engine. The exhaust collector had a 2 inch crack along its forward face. The fourth stage turbine wheel outer ring was missing material along an approximate 30 degree arc, and could not be rotated by hand.</p>					
FACTUAL REPORT - AVIATION					
Page 1					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: ERA09IA499
	Occurrence Date: 09/29/2008
	Occurrence Type: Incident

Narrative (Continued)

According to FAA records, the incident helicopter was issued an airworthiness certificate on October 28, 1986 and was added to the owner's Federal Aviation Regulations Part 133 certificate on September 19, 2008. In August 2008 the incident engine was installed on the helicopter. At the time of installation, the engine had 2,158.8 hours of time in service. Maintenance records indicated that the engine had most recently been overhauled at a facility in Canada, and was installed on the incident helicopter by the operator approximately 6 flight hours prior to the event.

On October 21, 2008 the engine was examined at the overhaul facility in Canada with representatives of the Transportation Safety Board of Canada, Rolls-Royce, a representative of the owner of the helicopter, and representatives from the overhaul facility. The compressor section was removed and rotated freely. However, the turbine section was unable to be rotated, and had indications of thermal damage.

Internal examination of the turbine section revealed bearing and labyrinth seal damage, as well as large carbon deposits. The second stage turbine wheel was missing one blade, but there were no indications of tip rub. The No. 6 bearing and associated stage exhibited signs of thermal damage. The No. 8 bearing was examined; oil was present, and no heat damage indicative of oil starvation was observed. Testing of the fuel nozzle spray pattern was found to be within the manufacturer's specifications, and there was no indication of flame streaking throughout the turbine components.


The National Transportation Safety Board's Material Laboratory examined several parts of the engine on November 27, 2009 and on April 28, 2010. Examination of the exterior of the combustion liner revealed dark gray regions with localized wrinkling around the two largest holes, which was consistent with localized hot spots. The interior of the liner had no indication of local hot spots or streaking.


Examination of the second stage turbine wheel revealed a fatigue fracture through an airfoil blade that initiated on the convex side of the blade. The fracture progressed through approximately half of the blade. Further examination of the blade revealed that the fracture origin was located in the transition radius, between the wheel rim outer diameter and the blade, near the junction of a fore to aft mold line that was created during original manufacture. No metallurgical or mechanical discontinuities were noted at the surface.

Examination of the other 23 blades on the same wheel revealed small cracks in the same general location as the fatigue origin on the fractured blade. A small amount of rub was noted on several blades. The blades most affected were the blades adjacent to the fractured blade, and those 180 degrees opposed to the fractured blade. The second stage turbine wheel was sectioned, and then transversely cut at the location of the fatigue origin. The section intersected a visible crack in one of the adjacent blades. The origin of the fracture was about 0.008 inches above the wheel's outer surface, and propagated normally to about 40 degrees to the wheel radial. Cracks were found both in the blade radius and in the wheel rim between blades. The cracks had similar transgranular propagation, and oxidized surfaces consistent with thermal fatigue. All 38 blades on the first stage turbine wheel were fractured near the blade tips. Six blades on the third stage turbine wheel were fractured outboard of the mid-span, consistent with overstress separation, and no indications of preexisting cracking were found.

The 1051 recorded weather observation at Lehigh Valley International Airport (ABE), Allentown, Pennsylvania approximately 10 miles south-southwest of the unscheduled landing site, reported winds from 290 degrees at 9 knots, a broken cloud layer at 2,900 feet agl, 10 miles visibility, temperature 20 degrees C, dew point 14 degrees C, and an altimeter setting of 29.99 inches of mercury.

Updated on Mar 16 2011 10:54AM

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: ERA09IA499			
		Occurrence Date: 09/29/2008			
		Occurrence Type: Incident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
Queen City Airport	XLL	399 Ft. MSL	N/A		
Runway Surface Type:					
Runway Surface Condition:					
Approach/Arrival Flown: NONE					
VFR Approach/Landing: Forced Landing					
Aircraft Information					
Aircraft Manufacturer		Model/Series		Serial Number	
MCDONNELL DOUGLAS HELICOPTER		369E		0209E	
Airworthiness Certificate(s): Normal					
Landing Gear Type: Skid					
Amateur Built Acft? No	Number of Seats: 4	Certified Max Gross Wt. LBS		Number of Engines: 1	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Shaft	Rolls Royce	250-C2B	420 HP		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
100 Hour	08/2008	Hours	1673 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed?/Type Yes / C91-A		ELT Operated? No	ELT Aided in Locating Accident Site? No		
Owner/Operator Information					
Registered Aircraft Owner		Street Address			
HAVERFIELD INTERNATIONAL INC		City	State	Zip Code	
		GETTYSBURG	PA	17325-7109	
Operator of Aircraft		Street Address			
HAVERFIELD INTERNATIONAL INC		City	State	Zip Code	
		GETTYSBURG	PA	17325-7109	
Operator Does Business As:			Operator Designator Code: HXFL		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s):					
Operating Certificate:			Operator Certificate: Aircraft External Load		
Regulation Flight Conducted Under: Part 91: General Aviation					
Type of Flight Operation Conducted: Positioning					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: ERA091A499
	Occurrence Date: 09/29/2008
	Occurrence Type: Incident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 37
-----------------	-----------------	------------------	--------------------------	-----------

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

Certificate(s): Commercial

Airplane Rating(s): None

Rotorcraft/Glider/LTA: Helicopter

Instrument Rating(s): None

Instructor Rating(s): None

Current Biennial Flight Review? 01/2008

Medical Cert.: Class 2	Medical Cert. Status: With Waivers/Limitations	Date of Last Medical Exam: 12/2007
------------------------	--	------------------------------------

- 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	6831	5962								
Pilot In Command(PIC)										
Instructor										
Instruction Received										
Last 90 Days										
Last 30 Days										
Last 24 Hours										

Seatbelt Used? Unknown	Shoulder Harness Used? Unknown	Toxicology Performed? No	Second Pilot? No
------------------------	--------------------------------	--------------------------	------------------

Flight Plan/Itinerary

Type of Flight Plan Filed: None

Departure Point Allentown	State PA	Airport Identifier XLL	Departure Time 1115	Time Zone EDT
------------------------------	-------------	---------------------------	------------------------	------------------

Destination Newburg	State NY	Airport Identifier SWF	
------------------------	-------------	---------------------------	--


Type of Clearance: VFR

Type of Airspace:

Weather Information

UAT C/S Source of Wx Information:

Unknown

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: ERA091A499
	Occurrence Date: 09/29/2008
	Occurrence Type: Incident

Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
ABE	1051	EDT	393 Ft. MSL	6 NM	224 Deg. Mag.

Sky/Lowest Cloud Condition: Thin Broken 2900 Ft. AGL Condition of Light: Day

Lowest Ceiling: Broken 2900 Ft. AGL Visibility: 10 SM Altimeter: 29.99 "Hg

Temperature: 20 °C Dew Point: 14 °C Weather Conditions at Accident Site: Visual Conditions

Wind Direction: 290 Wind Speed: 9 Wind Gusts:


Visibility (RVR): Ft. Visibility (RVV) SM

Precip and/or Obscuration:
No Obscuration; No Precipitation

Accident Information

Aircraft Damage: Minor 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

 National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: ERA09IA499	
	Occurrence Date: 09/29/2008	
	Occurrence Type: Incident	

Administrative Information

Investigator-In-Charge (IIC)

Shawn Etcher

Additional Persons Participating in This Accident/Incident Investigation: