		NTSB ID: CHI05LA243		Aircraft Registration Number: N9094P	
		Occurrence Date: 08/28/2005		Most Critical Injury: Fatal	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place El Dara	State IL	Zip Code 62356	Local Time 0915	Time Zone CDT	
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:			
Aircraft Information Summary					
Aircraft Manufacturer Allensworth		Model/Series Baby Belle		Type of Aircraft Helicopter	
Revenue Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
HISTORY OF FLIGHT					
<p>On August 28, 2005, at 0915 central daylight time, an experimental amateur-built Allensworth Baby Belle helicopter, N9094P, collided with a tree and the terrain following an in-flight separation of a tail rotor blade in El Dara, Illinois. Witnesses reported hearing the engine running rough followed by a loss of engine power just prior to the impact. The pilot was fatally injured. The helicopter was destroyed by impact and post impact fire. The 14 Code of Federal Regulations Part 91 personal flight was operating in visual meteorological conditions without a flight plan. The local flight originated from a private farm field in New Canton, Illinois, at about 0900.</p> <p>The pilot kept the helicopter on his property in New Canton. His wife stated was going to fly to El Dara to check on the crops. She stated that he usually flew at an altitude of about 400 feet above ground level (agl).</p> <p>There were four known witnesses to the accident. One of the witnesses stated he saw the helicopter flying east-southeast. He stated he then heard what sounded like the engine sputtering and the helicopter made two or three 360 degree turns prior to nose-diving toward the ground. A second witness reported seeing the helicopter flying to the southeast. This witness reported hearing the "engine cut out" followed by the sound of an impact. The third witness reported seeing the helicopter flying low to the ground. This witness reported the engine suddenly quit running and the helicopter started spinning prior to contacting the ground. The fourth witness stated the helicopter was flying 150 to 200 feet agl. The helicopter then started "misfiring and tail spun to the ground."</p>					
PERSONNEL INFORMATION					
<p>The pilot held a private pilot certificate with a rotorcraft helicopter rating issued March 6, 2004. The pilot held a third class medical certificate, which was issued on January 27, 2005. His medical certificate did not contain any limitations. At the time of his last airman medical examination, the pilot reported having 246 hours of flight time of which 12 hours were flown in the previous 6 months. In addition, the pilot held a Repairman certificate with an Experimental Aircraft Builder rating. This certificate was limited to Baby-Belle Model B-B, serial number 2053. Pilot logbook records were not located during the course of this investigation.</p>					
AIRCRAFT INFORMATION					
<p>N9094P was an amateur-built, single-engine, two-seat helicopter that was equipped with skids. The kit was manufactured by Canadian Home Rotors (CHR), Inc., Ontario, Canada. The helicopter was powered by a 160 horsepower Lycoming O-320 engine.</p>					
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National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: CHI05LA243

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Occurrence Type: Accident

Narrative (Continued)

According to a friend of the pilot, who also owned a Baby Belle, the pilot purchased the kit second-hand from a previous owner in 2000. The friend stated the kit was still packed in the original boxes when the pilot purchased it and nothing had been assembled. He stated the pilot built the helicopter and the first flight was in 2001. This friend estimated that the helicopter had approximately 250 hours of flight time on it at the time of the accident.

According to CHR, the helicopter was involved in a hard landing in 2004. In 2005, the pilot purchased numerous replacement parts to repair the helicopter. An invoice provided by CHR shows that among the items purchased were main rotor blades and the tail rotor assembly including the spindle and blades. According to the pilot's friend, they balanced the new tail rotor blades after they were installed, but the blades continued to run "rough." A representative from CHR stated the pilot voiced his concerns to them and they sent out replacement tail rotor blades to the pilot. This representative stated he saw the pilot about a month before the accident and the pilot stated the helicopter was running fine since he installed the replacement tail rotor blades. The pilot's friend confirmed this information.

The pilot's friend and CHR both stated the pilot was required to hover for 20-hours following the replacement of major components. The friend stated the pilot finished the 20 hour hover requirement and had probably flown an additional 5 hours. The friend stated the pilot flew the helicopter on the day prior to the accident, and he was not aware of any recent problems with the operation of the helicopter.

Aircraft logbooks/records were not located during the course of this investigation.

METEOROLOGICAL INFORMATION

The closest weather reporting station was located at the Quincy Regional-Baldwin Airport (UIN) located approximately 22 miles north-northwest of the accident site. The UIN weather reported at 0854 was: Wind - 230 degrees at 4 knots; Visibility - 10 statute miles; Sky Condition - Few Clouds at 11,000 feet; Temperature - 21 degrees Celsius; Dew Point - 17 degrees Celsius; Altimeter Setting - 29.89 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The on-scene examination of the helicopter was conducted by inspectors from the Federal Aviation Administration (FAA) Flight Standards District Office in Springfield, Illinois. The inspectors reported the helicopter came to rest on its right side at the edge of a soybean field alongside a row of trees. The left fuel tank was ruptured and the cockpit area was consumed by the post impact fire. Both main rotor blades remained attached to the mast. One blade was intact with the outboard one-third of the blade bent upward. The inboard section of the other main rotor blade sustained fire/heat damage. All major components of the helicopter were located at the main wreckage site except for one of the tail rotor blades and the respective outboard 2 inches of the tail rotor spindle which, were not located.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was conducted on the pilot at the Memorial Medical Center, Springfield, Illinois, on August 29, 2005.

A Forensic Toxicology Fatal Accident Report was prepared by the FAA Civil Aeromedical Institute, Oklahoma City, Oklahoma. The toxicology results for the pilot were negative for all tests performed.

TEST AND RESEARCH

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: CHI05LA243

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Occurrence Type: Accident

Narrative (Continued)


The tail rotor assembly was sent to the National Transportation Safety Board's Materials Laboratory for examination.


The examination revealed the tail rotor spindle contained two integral rods, which extended out in opposite directions. The length of each rod was manufactured with sections of consecutively reduced diameter. The examination revealed a fatigue failure was present which, initiated at the relief radius between the sections where the rod steps down from 0.812-inch diameter to 0.750-inch diameter. The relief radius in this area was rough and irregular and was measured to be approximately 0.0073-inch.

CHR provided the engineering drawings for the tail rotor spindle to the NTSB. Drawing #15 did not specify a relief radius for the transition area between the 0.812-inch and 0.750-inch diameter sections. CHR subsequently provided a revised drawing #15, dated September 14, 2005. This drawing required a 0.0156-inch relief radius between the .812-inch and .750-inch diameter sections. CHR stated they did not manufacture the spindles. The manufacturing of the spindles were contracted out to an individual who owned a machine shop.

ADDITIONAL INFORMATION

Parties to the investigation were the Federal Aviation Administration and Lycoming Engines.

 National Transportation Safety Board FACTUAL REPORT AVIATION		NTSB ID: CHI05LA243			
		Occurrence Date: 08/28/2005			
		Occurrence Type: Accident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation Ft. MSL	Runway Used NA	Runway Length	Runway Width
Runway Surface Type:					
Runway Surface Condition:					
Approach/Arrival Flown: NONE					
VFR Approach/Landing: None					
Aircraft Information					
Aircraft Manufacturer Allensworth		Model/Series Baby Belle		Serial Number 2053	
Airworthiness Certificate(s): Experimental (Special)					
Landing Gear Type: Skid					
Amateur Built Acft? Yes	Number of Seats: 2	Certified Max Gross Wt.	1450 LBS	Number of Engines: 1	
Engine Type: Reciprocating	Engine Manufacturer: Lycoming	Model/Series: O-320	Rated Power: 160 HP		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection Hours	Airframe Total Time Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed?/Type No	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner David D. Allensworth		Street Address			
		City New Canton	State IL	Zip Code 62356	
Operator of Aircraft David D. Allensworth		Street Address			
		City New Canton	State IL	Zip Code 62356	
Operator Does Business As:			Operator Designator Code:		
- Type of U.S. Certificate(s) Held: None					
Air Carrier Operating Certificate(s):					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 91: General Aviation					
Type of Flight Operation Conducted: Personal					

 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: CHI05LA243
	Occurrence Date: 08/28/2005
	Occurrence Type: Accident

First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 53
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Sex: M	Seat Occupied: Right	Occupational Pilot?	Certificate Number: On File
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Certificate(s): Private

Airplane Rating(s): None

Rotorcraft/Glider/LTA: Helicopter

Instrument Rating(s): None

Instructor Rating(s): None

Current Biennial Flight Review? 03/2004

Medical Cert.: Class 3	Medical Cert. Status: Without Waivers/Limitations	Date of Last Medical Exam: 01/2005
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- 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	246									
Pilot In Command(PIC)										
Instructor										
Instruction Received										
Last 90 Days										
Last 30 Days										
Last 24 Hours										

Seatbelt Used?	Shoulder Harness Used?	Toxicology Performed? Yes	Second Pilot? No
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Flight Plan/Itinerary

Type of Flight Plan Filed: None

Departure Point New Canton	State IL	Airport Identifier	Departure Time 0900	Time Zone CDT
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Destination Local Flight	State IL	Airport Identifier	
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Type of Clearance: None

Type of Airspace:

Weather Information

Source of Wx Information:

Unknown

 National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: CHI05LA243
	Occurrence Date: 08/28/2005
	Occurrence Type: Accident

Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
UIN	0854	CDT	769 Ft. MSL	22 NM	340 Deg. Mag.
Sky/Lowest Cloud Condition: Few			11000 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: None		Ft. AGL	Visibility: 10	SM	Altimeter: 29.89 "Hg
Temperature: 21 °C	Dew Point: 17 °C	Weather Conditions at Accident Site: Visual Conditions			
Wind Direction: 230	Wind Speed: 4	Wind Gusts:			
Visibility (RVR): Ft.	Visibility (RVV): SM				
Precip and/or Obscuration: No Obscuration; No Precipitation					

Accident Information		
Aircraft Damage: Destroyed	Aircraft Fire: Ground	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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National Transportation Safety Board

FACTUAL REPORT

AVIATION



NTSB ID: CHI05LA243

Occurrence Date: 08/28/2005

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

Pamela S. Sullivan

Additional Persons Participating in This Accident/Incident Investigation:

Frank Crawford
FAA
Springfield, IL

Gregory Erikson
Lysoming
Williamsport, PA