



National Transportation Safety Board Aviation Accident Data Summary

Location:	Avalon, CA	Accident Number:	SEA08MA136
Date & Time:	05/24/2008, 0920 PDT	Registration:	N67GE
Aircraft:	AEROSPATIALE AS-350-D	Injuries:	3 Fatal, 3 Serious
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

The helicopter was descending to the planned destination during the on-demand air taxi flight when witnesses reported hearing a loud pop, followed by flames emitting from the back of the engine. The helicopter subsequently collided with the ground.

A surviving passenger reported that just after the loud pop, the pilot told passengers that he was going to autorotate. The helicopter entered a descent at an altitude witnesses on the ground estimated at 200 to 400 feet above ground level. During the descent, the pilot had to clear numerous obstacles, including buildings and power lines, to reach an open field located beyond the obstacles but short of the normal landing area. The ground witnesses stated that the helicopter was in an area near the shoreline when they witnessed the flames and heard the loud pop; however, the exact location in reference to the shoreline could not be determined.

Since the pilot stated to passengers that he was going to autorotate, it is likely that the helicopter experienced a loss of power after the loud pop. In the event of a loss of engine power, the pilot must enter an autorotation by immediately reducing the collective pitch to maintain main rotor speed to avoid a main rotor stall. The collective pitch must be reduced to the point required to maintain, or regain a safe main rotor speed. This would allow the pilot to maintain sufficient rotor speed while maneuvering to a suitable landing area, and to arrest the descent when needed. If the main rotor blades stall, this will ultimately result in a loss of control and uncontrolled descent.

Because of the relatively low altitude at which the loss of power occurred, it is likely that the accident pilot had to trade rotor rpm to maintain the altitude needed to clear the obstacles and reach the open field. This would have resulted in a lack of sufficient rotor rpm to arrest the helicopter's descent rate as it approached the ground. Further, examination of the main rotor blades at the accident scene did not show evidence of high rotational energy at impact.

Postaccident inspection of the turbine engine revealed localized damage to four consecutive power turbine blades. Two of the blades were fractured transversely across the airfoil above the blade root platform and two were fractured higher up their respective airfoils near the blade tips. Generalized damage was observed to the remaining power turbine blades; however, all blades were in place and remained secured to the power turbine wheel. A Safety Board materials engineer's examination of the fractured blades revealed striation features typical of fatigue cracking on the pressure (concave) side of the airfoil. The fatigue crack features emanated from the boundary area between the base material and a casting pin. Further analysis disclosed that the fracture was the result of fatigue cracking that emanated from two platinum casting pins on the pressure side of the blade adjacent to the platform. The fracture face of the blade contained isolated regions of fatigue cracking that were separated by fracture regions and showed oxidation damage consistent with fatigue. Additional testing of the fractured blade(s) indicated that the microstructure in the airfoil portions showed no evidence of operation above a temperature profile expected for this stage of the engine. The fracture features of the remaining turbine blades were consistent with overstress separation.

Review of maintenance records indicated that, the engine's cycle counting process, inspection requirements, and compliance with airworthiness directives and service bulletins were all satisfactory.

More specifically, due to the power turbine blade failures, the life and maintenance history of the power turbine rotor, including the power turbine blades, were assessed. The information contained in the maintenance records, as well as the information provided by the manufacturer on the history and inspection requirements of the power turbine blades showed that they were operated in accordance with the requirements set forth by the manufacturer.\

Following the accident, Honeywell Aerospace issued Service Bulletins; LT 101-71-00-0252 and LTS101-71-00-0253. The Service Bulletins require the removal and inspection of the turbine assemblies, "To address a service related difficulty with Power Turbine Rotor Blade Part No. 4-141-084-06 cracking at the mid span of the airfoil that can lead to a blade separation and subsequent inability to maintain powered flight resulting in potential injuries and damage to the aircraft." Additionally, two FAA Airworthiness Directives pertaining to this issue are pending.

Flight Events

Approach - Loss of engine power (total)
Emergency descent - Off-field or emergency landing
Autorotation - Collision with terr/obj (non-CFIT)

Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
Loss of engine power during approach for landing due to a fatigue fracture of a power turbine blade.

Findings

Aircraft-Aircraft power plant-Engine (turbine/turboprop)-Turbine section-Failure - C
Aircraft-Aircraft power plant-Engine (turbine/turboprop)-Turbine section-Fatigue/wear/corrosion - C

Pilot Information

Certificate:	Commercial	Age:	33
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	Helicopter
Other Aircraft Rating(s):	Helicopter	Instructor Rating(s):	Helicopter
Flight Time:	5692 hours (Total, all aircraft), 3942 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	AEROSPATIALE	Registration:	N67GE
Model/Series:	AS-350-D	Engines:	1 Turbo Shaft
Operator:	Island Express Helicopters	Engine Manufacturer:	Lycoming
Operating Certificate(s) Held:	On-demand Air Taxi (135)	Engine Model/Series:	LTS - 101
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	AVX, 1597 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	Broken / 1500 ft agl	Wind Speed/Gusts, Direction:	3 knots / , 80°
Temperature:	9°C	Visibility	10 Miles
Precipitation and Obscuration:	Light - In the Vicinity - Showers - No Obscuration		
Departure Point:	Long Beach, CA	Destination:	Avalon, CA

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	2 Fatal, 3 Serious	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	On-Ground
Latitude, Longitude:	33.438333, -118.499722		

Administrative Information

Investigator In Charge (IIC):	Dennis J Hogenson	Adopted Date:	05/11/2010
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.nts.gov/pubdms/ .		

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