Aviation Investigation Final Report

Location:	MI 700,	**Accident Number:**	FTW03FA097
Date & Time:	February 16, 2003, 12:25 Local	**Registration:**	N407HH
Aircraft:	Bell 407	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal, 3 Serious
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

The helicopter, flown by 19,000-hour pilot and transporting 4 passengers to an offshore oil platform, experienced a catastrophic engine failure and autorotated into open ocean water in the Gulf Of Mexico. Within a few seconds after landing on the water, the helicopter rolled inverted, the pilot and passengers exited, inflated their personal life vests, and waited for rescue. The pilot and one of the passengers drowned prior to rescue personnel arriving about 2 hours after the accident. Surviving passenger statements indicated that they were not aware of an emergency lift raft on-board the helicopter, and that the skid-mounted emergency float system was not inflated prior to landing. Rescue personnel reported high wind and rough seas in the area of the accident. Examination of the wreckage revealed that the float "ARM" switch was found in the disarmed position and its cover closed. The skid-mounted emergency floats were found inside their protective bags. The float system tested functional, and no anomalies were found during airframe component examinations. Download data from the ECU showed that engine performance prior to the loss of power was normal and the engine was operating in a steady state condition prior to the initial deterioration of NG. Detailed inspection of the engine revealed progressive turbine wheel damage throughout the power turbine. The damage varied from approximately 95% of the airfoil material missing on the 1st stage wheel to approximately 10% of the material missing on the 4th stage wheel. The damage observed in the gas producer turbine section was consistent with the separation of one or more of the first stage wheel airfoils. Mostly all of the fracture surfaces were obscured, typical of elevated turbine temperatures (according to the manufacturer, in excess of turbine and material limits). All 4 turbine wheels had evidence of solutioning and incipient melting was observed at the tips of the airfoil remnants. Fracture surfaces of the 1st stage wheel airfoils did not reveal the presence of fatigue. Detailed metallurgical examination revealed the presence of sulfides on the 1st and 2nd stage turbine wheel surfaces. According to the manufacturer, the presence of sulfides is evidence that sulfidation has occurred. Damage on the concave surface adjacent to the fractures near the leading edges of the airfoils was found consistent with type 1 hot corrosion (sulfidation) damage. Examination of radial cracks at the trailing edges of the

airfoils revealed heavy oxidation consistent with thermal fatigue. According to Rolls Royce, that "thermal fatigue cracking at the airfoil base is not uncommon." Evidence of EPS 10649 (S1 Aluminide, which is a protective coating applied to the turbine wheel during manufacturing), was confirmed adjacent to the corrosive damage found on the wheels.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The catastrophic failure of the engine resulting from 1st stage turbine wheel blade failure due to type 1 hot corrosion (sulfidation). Contributing factors were the pilot's failure to brief the passengers on emergency safety equipment (life raft), the pilot's failure to deploy the skid-mounted emergency float system during the autorotation, the high wind conditions, and rough sea state.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: CRUISE

Findings
1. (C) TURBOSHAFT ENGINE,FREE(POWER) TURBINE - FAILURE,TOTAL
2. (C) TURBINE ASSEMBLY,TURBINE BLADE - FAILURE,TOTAL
3. (C) TURBINE ASSEMBLY,TURBINE WHEEL - CORRODED
4. (F) PASSENGER BRIEFING - NOT PERFORMED - PILOT IN COMMAND

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Findings
5. AUTOROTATION - PERFORMED - PILOT IN COMMAND

Occurrence #3: DITCHING
Phase of Operation: EMERGENCY LANDING

Occurrence #4: ROLL OVER
Phase of Operation: STANDING

Findings

6. (F) EMERGENCY FLOATS - NOT DEPLOYED - PILOT IN COMMAND
7. (F) EMERGENCY EQUIPMENT - NOT DEPLOYED
8. (F) TERRAIN CONDITION - WATER,ROUGH
9. (F) WEATHER CONDITION - HIGH WIND

Factual Information

HISTORY OF FLIGHT

On February 16, 2003, approximately 1225 central standard time, a Bell 407 single-engine helicopter, N407HH, registered to and operated by Houston Helicopters, Inc., of Pearland, Texas, executed an emergency landing into open ocean water in the Gulf of Mexico following a loss of engine power. The pilot and his four passengers survived the initial landing, however, the pilot and one passenger later drowned after egress from the helicopter. The remaining three passengers received serious injuries. Visual meteorological conditions prevailed, and a company visual flight rules (VFR) flight plan was filed for the Title 14 Code of federal Regulations Part 135 on-demand air taxi flight. Approximately 1210, the helicopter departed Harbor Island (TeSoro Heliport), Ingleside, Texas, for a 26.1 nautical mile flight to offshore platform, Ensco Rig 84 (Matagorda 700 block offshore), with an estimated time of arrival of 1230.

According to recorded communication records provided by the operator, the pilot of N407HH had transmitted a "Mayday" call, approximately 1225, citing an engine failure, and that he was going to land the helicopter on the water. Sounds similar to an "engine-out" audio tone were heard in the background of the Mayday call. Upon reception of the Mayday call, the Coast Guard stationed at Aransas Pass, Texas, and Corpus Christi, Texas, were notified, and an immediate search and rescue was initiated by the operator, the Coast Guard, private water vessels, and other helicopter operators.

Two of the surviving passengers reported that they heard a loud "bang" at the time of the loss of engine power. The survivors also reported that the helicopter rolled inverted within a few seconds after the landing and began to submerge. They stated that the skid-mounted emergency float system were not inflated at the time of the landing. The pilot and passengers exited the helicopter, inflated their life vests, and awaited their rescue. Approximately 1425, the pilot and passengers were recovered by the Coast Guard. (See 'Survival Aspects' section for additional details). The operator, Coast Guard helicopter pilots, pilot's of other search helicopters, and two of the passengers reported the winds were from the north at 25-40 mph with 5-9 foot sea swells.

PERSONNEL INFORMATION

The 19,000-hour pilot-in-command, held a valid commercial pilot certificate, issued on May 25, 1964, with a rotorcraft-helicopter rating. The pilot also held a valid mechanic certificate, issued December 8, 1965, with airframe and power plant ratings. His most recent second class medical certificate was issued on June 12, 2002, with the limitation that he must have available glasses for near vision. On the Pilot/Operator Aircraft Accident Report (NTSB Form

6120.1/2) the operator reported the pilot's total flight time in all aircraft was 19,339 hours, of which, 19,299 hours were in rotorcraft. The pilot's total accumulated flight time in the Bell 407 was151 hours. A review of company flight and duty records revealed the pilot flew 168.9 hours, 263.9 hours (27.9 Bell 407), and 232.8 hours (89.9 Bell 407) in years 2000, 2001, and 2002, respectively. His most recent flight experience was 57 hours, 21 hours, and 3.5 hours in the past 90 days, 30 days, and 24 hours, respectively. The pilot was off duty from February 6-10, 2003. Flight and duty records for February 11-16 were not recovered from the helicopter and are presumed destroyed. According to the aircraft's (N407HH) maintenance log for February 11-14, 2003, the pilot flew 1.2 hours on February 11, 1.2 hours on February 12, and 2.5 hours on February 14.

A review of company records revealed that the pilot satisfactory completed company training and the airman competency/proficiency testing requirements (FAA CFR Part 135.293 (a) (b) Part 299) to act as pilot-in-command (PIC) of Bell 407 helicopters on May 8, 2001. The pilot's most recent recurrent ground training records, dated March 20, 2002, certified the pilot-in-command had received ground training on life rafts, survival vests, ditching procedures, and water survival techniques. Underwater egress training for the pilot could not be verified. The pilot's most recent competency/proficiency check, conducted by the company check airman, for the Bell 407 helicopter was satisfactorily performed on May 31, 2002.

AIRCRAFT INFORMATION

The Bell 407 helicopter, serial number (SIN) 53460, helicopter was manufactured in 2000, and issued an airworthiness certificate on December 9, 2000, and was registered to Houston Helicopters, Inc., on February 1, 2001. Total airframe time at the time of the accident was approximately 612.7 hours since manufactured. The helicopter was equipped with a Full Authority Digital Electronic Control system (FADEC) and Electronic Control Unit (ECU) with version 7102 software, which includes incident recording capability. On December 12, 2002, the last annual inspection of N407HH, which was accomplished at a total time of 546.8 hours by the Houston Helicopter, Inc., FAA certificated repair station, encompassed the 50 hour, 100 hour and 300 hour airframe inspection and the 150 hour engine inspection. During the inspection, the electrical system functional test, inflation test, and float pneumatic system checks and bottle servicing were satisfactorily performed for the emergency float system. The helicopter was not equipped with a cockpit voice recorder (CVR) or a digital flight data recorder (DFDR).

The helicopter's power plant, installed new on October 28, 2000, was an 650-horsepower Allison/Rolls Royce 250-C47B turbo shaft engine, part number (PIN) 23063392, SIN CAE 847499. The last annual inspection engine inspection coincided with the last airframe inspection on December 12, 2002, at a total time of 546.8 hours. The turbine engine maintenance inspection was performed in accordance with the Rolls Royce/Allison Operations and Maintenance Manual. Total engine time at the time of the accident was 612.7 hours (power cycles:1,679, start cycles:1,116).

In May 2001, the operator found (during an inspection) that the internal engine oil filter was not installed. The time on the engine was 97.0 hours. On September 7, 2001, two bearings (258.6 hours) PIN 407-340-339-103, SIN C00-2514 and D00-0027 were removed and replaced. The starter generator (164.7 hours) was removed and replaced on July 3, 2002. Maintenance records for January 4, 2003, stated the "floats circuit breaker pops when float switch armed/repaired wire." Time on the aircraft was 562.4 hours.

The last refueling of N407HH prior to the accident occurred on February 14, 2003, with a total of 90.2 gallons.

WRECKAGE AND IMPACT INFORMATION

Recovery

On February 26, 2003, search for the submerged helicopter was initiated by the insurance company. Side scan sonar located the helicopter on February 27, 2003, at North 27 degrees 51 minutes 23.617 seconds; West 096 degrees 41 minutes 36.493 seconds (approximately 1,400 feet northeast of the last known position). According to divers, the helicopter was found inverted at a depth of 96 feet with 2 of the 4 main rotor blades embedded in sand and silt. The helicopter was raised on March 16, 2003. According to an FAA inspector, who was aboard the recovery vessel, the boat stabilizing pylon was inadvertently jacked down onto the wreckage, resulting crushing damage to the airframe and cabin. After the wreckage was raised, it was rinsed with fresh water on board the recovery vessel. The ECU and three instrument panel-mounted engine instruments (MGT, Torque, and Ng) were removed and placed in fresh water for preservation. The helicopter was brought to shore and transported via ground vehicle by Air Salvage of Dallas (ASOD), Lancaster, Texas, to the ASOD facility where is was secured for further examination by the Board.

Initial Wreckage Examination

Under the supervision of the NTSB IIC, the helicopter was examined from March 17 to March 19, 2003, at ASOD. Static position of cockpit instruments, switches, and circuit breakers were recorded. The float "ARM" switch was found in the disarmed position and its cover closed. The skid-mounted emergency floats were found inside their protective bags, and both float bottles were found fully charged. Electrical continuity on the float system in the cockpit was confirmed, including the arm switch, the activation button, and the circuit breaker. As a test of the system, the float bottles were armed by the float arm switch and fired by pressing the float pneumatic system activation button. During the test, both float bottles discharged. Additionally, it was demonstrated that the float bags would deploy when air was introduced into the float inflation air lines. No pre-impact anomalies were found with the float system.

The FADEC Mode Switch was found in "AUTO" position.

The collective was found in the full up position, the throttle was between "95" % setting and

"max", and the cyclic was centered. Flight control continuity was confirmed throughout the cyclic and collective control systems. Salt water corrosion buildup precluded a determination of movement for the main rotor rotating control system. Additionally, the red pitch change link was found separated with the fracture surfaces exhibiting physical evidence consistent with overload. Several fractured components in the tail rotor controls exhibited physical evidence consistent with overload. The oil cooler short shaft hanger bearings were not recovered.

Salt water corrosion precluded rotation of the main transmission and freewheeling unit. The transmission chip detector was found to be free of particulate. The steel tail rotor drive shaft exhibited torsional overload consistent with a sudden stoppage. No anomalies were found that would have precluded operation of the main rotor and tail rotor systems prior to impact.

The engine was removed and transported to Dallas Airmotive, Dallas, Texas. On March 20, 2003, under the supervision of the NTSB IIC, the engine was examined at Dallas Airmotive, Dallas, Texas. The fuel nozzle flow patterns were within specifications. No evidence of metal was found on the engine oil chip detector. Teardown examination of the turbine assembly revealed thermal deformation a fragmentation to all 4 turbine wheels and nozzles. Further engine disassembly showed that all internal bearings and shafts were intact and were severely corroded due to salt water immersion. Engine components related to the power turbine section were shipped to the NTSB Materials Laboratory, Washington, D.C., for further metallurgical examination.

The main driveshaft and steel tail rotor drive shaft were examined, under the supervision of the NTSB 11C, at Bell helicopter's Field Investigation Laboratory, Euless, Texas. Visual examination of the fracture features on the main driveshaft were consistent with overload. Examination of the steel tail rotor driveshaft revealed that the fracture features were consistent with bending and torsion buckling followed by overload. The steel tail rotor driveshaft fracture was consistent with tail rotor sudden stoppage.

For further examinations: The ECU/HMU wiring harness was sent to Unison industries, Jacksonville, Florida. Combustion and compressor engine components were sent to Rolls Royce, Indianapolis, Indiana. The HMU and ECU was sent to Goodrich Power and Electronic Control Systems (GPECS), West Hartford, Connecticut. Engine cockpit gauges (MGT, Torque, and Ng) were sent to Northrop Grumman Poly Science, Springfield, Pennsylvania, for download. (See Test and Research section for details of the aforementioned components)

MEDICAL AND PATHOLOGICAL INFORMATION

The pilot's autopsy was conducted by the Nueces County, Texas, Medical Examiner and determined that the cause of death was drowning.

The FAA Civil Aeromedical Institute's (CAMI) Forensic Toxicological and Accident Research Center examined the specimens taken by the medial examiner. According to CAMI, the specimens of blood and urine were positive for non quantified amounts of Metoprolol. The

toxicology was positive for 97 (mg/dl) glucose detected in vitreous, and 435 (mg/dl) glucose detected in urine. According to CAMI, elevated postmortem vitreous glucose levels are considered hyperglycemic conditions which may or may not have been a factor in the accident.

SURVIVAL ASPECTS

On written statements and during interviews conducted by the NTSB IIC, the surviving passengers reported that, prior to the flight, they each donned life jackets (which they found in the seats), boarded the helicopter, and secured their seat belt and shoulder harness. According to their statements, the pilot did not brief the passengers, and the passengers did not know if there was a lift raft aboard the helicopter. The operator's Part 135 General Operations Manual Section 11 Passenger Briefing Paragraph 11.1 (A) states in part: "The pilot-in-command is responsible for ensuring that the passengers receive and understand the following information prior to each flight. "The pilot-in-command shall designate a responsible person to remove the lift raft in the event of an emergency water landing. He shall show the passenger how to remove the raft from the aircraft, and proper inflation procedures."

The passenger, who occupied the left front seat, heard a noise which was described as a "mechanical clunk and engine swooshing down to no sound". The pilot called, "Mayday, Mayday, engine failure, going in the water." The passenger, who occupied the right aft forward facing seat recalled hearing a "loud bang." The passenger, who occupied the left aft forward facing seat, recalled hearing a loud bang, and it "felt like the backend shifted, the engine shutdown, and the helicopter started descending."

According to the passengers statements, the pilot turned the helicopter to the left as the helicopter descended toward the water. As the pilot landed the helicopter on the water, the helicopter rolled to the right upon contact with the water. Within seconds, the helicopter rolled inverted and within the next few seconds was full of water. The pilot and left front seat passenger exited the helicopter and the other passengers assisted each other in exiting the helicopter. As far as the surviving passengers recall, all life jackets were inflated. The helicopter floated inverted under about 2-3 feet below the surface of the water, and the pilot floated away from the helicopter. The passengers remained at the helicopter, and when the waves would pull the helicopter down, the passengers would swim, and when the helicopter floated back up, the passengers would hold onto the skids. The helicopter stayed afloat about 2 hours.

Three of the four passengers had water survival training during May 2002, September 2002, June 2001. Underwater egress training for the pilot could not be verified, and water survival training for the fourth passenger was not verified.

The Apache Corporation Shorebase Dispatch Log stated that the United States Coast Guard (USCG) received a distress call, "MAYDAY ENGINE FAILURE," at 1220. USCG records indicated approximately 1235, the USCG received notification of the downed helicopter en route on a magnetic heading of 077 degrees for approximate 27 nautical miles (27 degrees 54 minutes

North; 096 degrees 34 minutes West) from Port Aransas, Texas. Approximately 1251, USCG search and rescue launched helicopters. Also, at 1310, the USS Gladiator (a Navy vessel) commenced to search. Approximately 1405, search helicopters reported on site and commenced a search pattern at the notification latitude/longitude. Search and rescue efforts were hampered by high winds and rough seas. Approximately 1415, Air Logistics, Inc., helicopter pilot reported 2 people sighted in the water (27 degrees 51.19 minutes North; 096 degrees 41.68 minutes West). At 1420, a USCG helicopter diverted to the location where the pilot and one passenger were recovered and brought on board the helicopter. Resuscitation efforts were not successful. Approximately 1427, a USCG helicopter arrived and commenced the recovery of the three surviving passengers, who were then transported to Spohn Hospital, Corpus Christi, Texas.

TEST AND RESEARCH

Power Turbine Components

Engine components submitted for evaluation at the NTSB Materials Laboratory included the following: Power turbine assembly (PIN 230633354, SIN CAT44722); Gas turbine rotor assembly (PIN 23064610, SIN 33924); 1st stage wheel (PIN 23053299, SIN X146690); 2nd stage wheel (PIN 23032280, SIN HX129197); 3rd stage wheel (PIN 6898663, SIN HX93426); 4th stage wheel (PIN 23066744, SIN HX76645).

Visual examination of the turbine wheels revealed that their respective airfoils were heavily damaged. The damage varied from approximately 95% of the airfoil material missing on the 1st stage wheel to approximately 10% of the material missing on the 4th stage wheel. The damage observed in the gas producer turbine section was consistent with the separation of one or more of the first stage wheel airfoils. Mostly all of the fracture surfaces were obscured, typical of elevated turbine temperatures (according to the manufacturer, in excess of turbine and material limits). All 4 turbine wheels had evidence of solutioning and incipient melting was observed at the tips of the airfoil remnants.

Fracture surfaces of the 1st stage wheel airfoils did not reveal the presence of fatigue. Detailed metallurgical examination revealed the presence of sulfides on the 1st and 2nd stage turbine wheel surfaces. According to the manufacturer, the presence of sulfides is evidence that sulfidation has occurred. Damage on the concave surface adjacent to the fractures near the leading edges of the airfoils was found consistent with type 1 hot corrosion (sulfidation) damage. Examination of radial cracks at the trailing edges of the airfoils revealed heavy oxidation consistent with thermal fatigue. According to Rolls Royce, that "thermal fatigue cracking at the airfoil base is not uncommon." Evidence of EPS 10649 (S1 Aluminide, which is a protective coating applied to the turbine wheel during manufacturing), was confirmed adjacent to the corrosive damage found on the wheels.

ECU

The ECU was examined and downloaded under the supervision of the NTSB at Goodrich Pump & Engine Control Systems, Inc., West Hartford, CT. According to the manufacturer, the incident recorder function in the ECU software was designed to record up to three minutes of data. These data are stored in EEPROM memory in the ECU. One minute of data are acquired each time an incident is detected. The data is broken up into 12 seconds of data pre-incident, and 48 seconds of post incident data. The data is then recorded in 1.2 second intervals called records. Upon arrival at the GEPEC facility, the ECU was flushed twice with de-ionized water and placed in a 105 degree Celsius oven for approximately 2 hours to dry out the materials. The CPU board was then removed and the EEPROM de-soldered from the CPU board. The EEPROM was then placed in a test ECU for downloading using the Windows Maintenance Terminal and Incident Recorder software. The downloaded data showed that engine performance prior to the loss of power was normal and the engine was operating in a steady state condition prior to the initial deterioration of NG. Record #10 of the downloaded ECU data showed a sharp decrease of NG which corresponds to the engine's initial loss of power. NG continued to decay until the speed fell below the run limit and the incident recorder shut down after record #53.

HMU

The Hydro mechanical (HMU) was examined, under the supervision of the FAA and/or NTSB, at Goodrich Pump & Engine Control Systems, Inc. During the examination, a fractured surface at the end of the HMU's drive shaft that inserts into the fuel pump, was examined under the binocular microscope. According to the manufacturer, the "driveshaft sheared in bending, and the shaft was likely not rotating at the time of fracture." Metallurgical examination of the HMU drive shaft showed intergranular regions at the fracture, the grain boundaries were free of foreign deposits and no significant corrosion byproducts were found. Corrosion and mineral accumulation was evident on most internal surfaces of the HMU as well as on the surfaces of components housed within the electromechanical component cavity. Further, according to the manufacturer, during tests performed on the HMU "all values were typical with the exception of the potentiometers whose values fluctuated significantly". However, the HMU was found to be significantly contaminated and corroded as a result of salt water immersion, therefore, valid functional testing was not feasible.

Wire Harness

Electronic testing was conducted per acceptance test guidelines for Unison's harness part number 421304 (accessory harness for the engine). Conductor continuity, insulation resistance (IR), dielectric strength, shield resistance, and a visual examination were conducted at Unison Industries, Jacksonville, Florida, on April 16, 2003. No anomalies were discovered that could would have contributed to the loss of engine power.

Engine Instruments

Torque (S/N 0566), Measured Gas Temperature (S/N 0040), Gas Produced Turbine (S/N 0530)

On March 20-21, 2003, the torque (TRQ), measured gas temperature (MGT), and gas produced turbine, N1 (Ng) instruments were examined, under the supervision of the FAA, at Northrop Grumman Poly-Scientific at Springfield, Pennsylvania. Corrosion throughout the internal mechanisms was found in all three engine instruments. Resistance measurements taken on each of the instruments revealed there was either open ends and/or shorts in all of the instruments. According to the manufacturer, these open and/or shorts are the results of the instrumentals being submerged in salt water. These corrosive conditions precluded any attempt to energizer the instruments for download. The memory chips were removed and installed into functioning surrogate instruments for download of data. There were no exceedances recorded in the memory chips of any of the three instruments (MGT, TRQ, Ng). Subsequently, each instrument's memory chip was tested functional by inserting an exceedance and then printing out the data.

Fuel

Fuel samples from the helicopter's fuel filter, and the last fuel source were tested by Aviation Laboratories, Kenner, Louisiana. Both samples met the required Jet A conformity specifications. Testing of both fuel samples for zinc reveled a zinc concentration less than 1 PPM. Testing of the fuel filter sample for sulphur revealed a sulphur concentration of 0.07 PPM.

ADDITIONAL INFORMATION

The helicopter wreckage was released to the owner's representative on March 15, 2004.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	65,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	June 12, 2002
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 31, 2004
Flight Time:	19339 hours (Total, all aircraft), 151 hours (Total, this make and model), 57 hours (Last 90 days, all aircraft), 21 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N407HH
Model/Series:	407	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	53460
Landing Gear Type:	Float	**Seats:**	7
Date/Type of Last Inspection:	December 10, 2002 AAIP	**Certified Max Gross Wt.:**	6000 lbs
Time Since Last Inspection:	62.2 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	546.8 Hrs as of last inspection	**Engine Manufacturer:**	Allison
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	250-C47B
Registered Owner:	Houston Helicopters, Inc.	**Rated Power:**	600 Horsepower
Operator:		**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:		**Operator Designator Code:**	YHHA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	20 knots / 30 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	10°C
Precipitation and Obscuration:			
Departure Point:	Ingleside , TX	**Type of Flight Plan Filed:**	Company VFR
Destination:	MI 700, GM	**Type of Clearance:**	Unknown
Departure Time:	12:10 Local	**Type of Airspace:**	Unknown

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal, 3 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal, 3 Serious	**Latitude, Longitude:**	27.853055,-96.694725

Administrative Information

Investigator In Charge (IIC):	Roach, Joyce
Additional Participating Persons:	James D Moore; FAA; Houston, TX John Swift; Rolls Royce; Indianapolis, IN Mark C Stuntzner; Bell Helicopter; Hurst, TX William L Thornton; Houston Helicopters; Pearland, TX
Original Publish Date:	April 28, 2005
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=56497