Aviation Investigation Final Report

Location:	Miami, Florida	**Accident Number:**	ATL02LA044
Date & Time:	February 11, 2002, 17:06 Local	**Registration:**	N103HA
Aircraft:	Hiller UH12E	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Minor
Flight Conducted Under:	Part 137: Agricultural		

Analysis

A Hiller UH-12E collided with the ground during a forced landing. According to the pilot, while executing aerial applications at 15 to 20 feet AGL, he heard a bang and the helicopter began shaking and yawing. The pilot realized he was losing altitude and attempted to slow the descent by using the collective. The helicopter impacted the ground, and caught fire. The pilot exited the helicopter through a hole in the bubble. Examination of the main rotor hub pieces revealed that the fracture at the hub had progressed through the inboard pin hole for the torsion/tension plate set. Six fracture faces were noted in the examination corresponding with the pin hole. Two fracture faces showed discoloration with a distinctive banding pattern and smoothly curved crack arrest marks consistent with fatigue propagation. Examination of the remaining two fractures revealed no evidence of fatigue cracking, but did show some corrosion on the exposed portion of the pin.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Fatigue cracking in the main rotor hub that resulted in the separation of the main rotor system. A factor was corrosive deposits on the exposed portion of the plate set pin.

Findings

Occurrence #1: ROTOR FAILURE/MALFUNCTION
Phase of Operation: MANEUVERING - AERIAL APPLICATION

Findings
1. (C) ROTOR SYSTEM,MAIN ROTOR HUB - FRACTURED
2. (F) ROTOR SYSTEM,MAIN ROTOR HUB - CORRODED
3. (C) ROTOR SYSTEM,MAIN ROTOR HUB - FATIGUE

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

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Findings
4. TERRAIN CONDITION - GROUND

Factual Information

On February 11, 2002, at 1706 eastern standard time, a Hiller UH12E, N103HA, registered to and operated by a private owner, under the provisions of Title 14 CFR part 137, collided with the ground during a forced landing in Miami, Florida. The aerial application flight operated under visual flight rules with no flight plan filed. Visual weather conditions prevailed at the time of the accident. The helicopter was substantially damaged, and the pilot was not injured. The flight initially departed Miami, Florida, on February 11, 2002 at 1700.

According to the commercial pilot, while executing aerial applications at 15 to 20 feet AGL, he heard a bang and the helicopter began shaking and yawing. The pilot realized he was losing altitude and attempted to slow the descent by using the collective. The helicopter impacted the ground, and caught fire. The pilot exited the helicopter through a hole in the plexiglass bubble.

Examination of the helicopter showed that the transmission, main rotor, and control rods were broken from the helicopter. The main rotor blades were found lying approximately 150 feet from the accident site, and were bent. The instrument panel, skids, tail rotor drive, main rotor hub, intake, and bubble were all broken, with the main rotor hub broken into two pieces.

The National Transportation Safety Board, Office of Research and Engineering, Materials Laboratory Division, performed metallurgical examination of the main rotor hub pieces. Examination of the main rotor hub pieces revealed that the fracture at the hub had progressed through the inboard pin hole for the torsion/tension plate set. Six fracture faces were noted in the examination corresponding with the pin hole. Two fracture faces showed discoloration with a distinctive banding pattern and smoothly curved crack arrest marks consistent with fatigue propagation. The mating faces of the two discolored fracture faces were found to match the aforementioned fractures. Examination of the remaining two fractures revealed no evidence of fatigue cracking, but did show some corrosion on the exposed portion of the pin.

Main rotor hub history and time in service were not available for review, however, the last reported annual inspection was completed on February 2, 2002, about 22 hours before the accident.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	39,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Center
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine; Helicopter; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	March 23, 2001
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	January 8, 2001
Flight Time:	2239 hours (Total, all aircraft), 650 hours (Total, this make and model), 2130 hours (Pilot In Command, all aircraft), 70 hours (Last 90 days, all aircraft), 39 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Hiller	**Registration:**	N103HA
Model/Series:	UH12E	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	HA3003
Landing Gear Type:	Skid	**Seats:**	3
Date/Type of Last Inspection:	February 2, 2002 Annual	**Certified Max Gross Wt.:**	3100 lbs
Time Since Last Inspection:	23 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5481 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Not installed	**Engine Model/Series:**	VO540C2A
Registered Owner:	Marvin Scripter	**Rated Power:**	305 Horsepower
Operator:		**Operating Certificate(s) Held:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TMB,10 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	17:45 Local	**Direction from Accident Site:**	315°
Lowest Cloud Condition:	Scattered / 40 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 90 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	23°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Miami, FL	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	17:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	private NONE	**Runway Surface Type:**	
Airport Elevation:	11 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	25.793056,-80.290275

Administrative Information

Investigator In Charge (IIC):	POWELL, PHILLIP
Additional Participating Persons:	Chuck Cunningham; FAA Miami FSDO; Maimi, FL
Original Publish Date:	November 25, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=54197