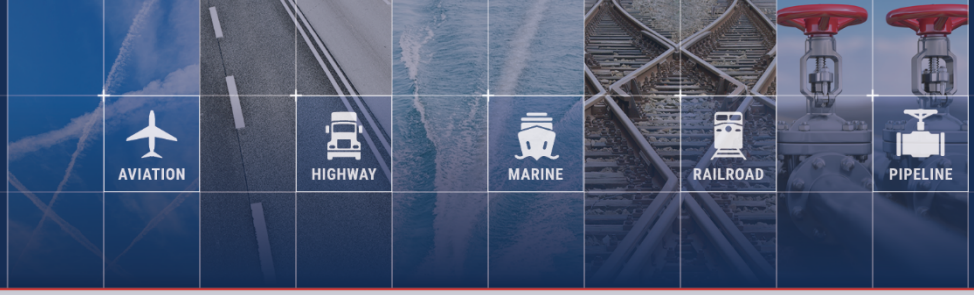

Aviation Investigation Final Report

Location:	GRAFTON, Ohio	**Accident Number:**	NYC99LA113
Date & Time:	May 15, 1999, 20:45 Local	**Registration:**	N812WC
Aircraft:	Hiller UH-12C	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

About 500 feet above ground level, and 10 minutes before landing, the pilot noticed a change in main rotor noise. The engine rpm increased, and rotor rpm decreased. The pilot reduced collective and increased throttle, but engine rpm continued to increase, and rotor rpm continued to decrease. The pilot entered an autorotation, the helicopter impacted a wire, and then came to rest upright. Inspection of the mercury clutch revealed a 'minor' leak from the transmission sun gear seal, but no oil was discovered on the clutch shoes. In addition, the intermediate drive shaft teeth were 'severely' worn, and three of the teeth had broken corners. The clutch shoes were worn beyond limits, and were glazed consistent with overheating. One clutch return spring was broken. The driver slots in the clutch side plates were 'severely' worn, and the driver lugs were also 'severely' worn. All the clutch attaching hardware were 'improperly' safetied, using .031 inch safety wire, and 'numerous' fasteners were safetied backwards. The clutch was a conditional item. Since the last 100 hour inspection on March 12, 1999, the helicopter flew 100 hours.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Inadequate maintenance which resulted in the failure of the mercury clutch assembly.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE

Findings
1. AUTOROTATION - PERFORMED - PILOT IN COMMAND
2. ROTOR DRIVE SYSTEM,CLUTCH ASSEMBLY - WORN
3. (C) MAINTENANCE - INADEQUATE - OTHER MAINTENANCE PERSONNEL

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - EMERGENCY

Findings
4. OBJECT - WIRE,TRANSMISSION

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. TERRAIN CONDITION - GRASS

Factual Information

On May 15, 1999, about 2045, eastern daylight time, a Hiller UH-12C helicopter, N812WC, was substantially damaged after contacting a wire while executing an autorotation to an open area near Grafton, Ohio. The certificated commercial pilot and passenger were not injured. Visual meteorological conditions prevailed. No flight plan was filed for the personal cross-country flight conducted under 14 CFR Part 91, that departed Findlay, Ohio, destined for the Columbia Airport, Columbia, Ohio.

The day before the accident, the pilot and passenger flew to Findlay, Ohio, and landed at the local fair grounds. After coordinating with fair organizers, and conducting a flight to the Findlay Airport to coordinate fuel, the pilot started giving helicopter rides. After several rides, he stopped because of weather. In addition, the pilot felt the weather was to sever to return to Columbia, so he and the passenger checked into a hotel.

The next day, the pilot and passenger arrived at the fair grounds, about 1000. The pilot started giving rides about 1300, and continued until about 1745. He then flew back to the Findlay Airport, paid his fuel bill, and returned to the fair grounds.

About 1930, the pilot preformed a second preflight for the return flight to Columbia. The pilot and passenger boarded, and the pilot started the helicopter's engine. Once the engine oil temperature went above 40 degrees Celsius, and the main rotor rpm and engine rpm matched, the pilot increased engine rpm to 2,700. He checked both the left and right magnetos, and noted no change in engine rpm. He then stabilized the engine rpm at 3,100, "cut" the throttle, and checked the sprag clutch. No anomalies were noted. After reestablishing 3,100 engine rpm, the pilot increased collective, and executed a crosswind takeoff to the northeast. He stopped the climb at 500 feet agl, and established the helicopter on course for Columbia.

Ten minutes before landing at Columbia, the pilot noticed a change in main rotor noise. He also noticed the engine rpm increasing and rotor rpm decreasing. He reduced collective and increased throttle, but engine rpm continued to increase, and rotor rpm continued to decrease. At this point, the helicopter started to shake, and the pilot felt he was loosing control. He estimated that main rotor rpm decreased to 250.

The pilot entered an autorotation, and started a right turn to regain main rotor rpm. The main rotor rpm increased, and the helicopter stop shaking. While in the turn the pilot located an open area, and maneuvered to land. On final for the open area, and about 75 feet agl, the pilot identified a wire below his descent path running parallel to a road. Prior to passing over the wire the pilot identified a second wire above the first. The helicopter contacted the second wire, and the pilot heard a loud noise, and saw several intense flashes of light. The helicopter then rotated to the left several times while traveling backwards. The helicopter impacted the

ground in a level attitude. The tail rotor made contact with rising terrain destroying the tailrotor blades, and shearing the tailrotor drive shaft. With the main rotor blades still rotating, the pilot secured the ignition system, electrical master, and fuel, before he and the passenger exited the helicopter without injury.

The pilot added that the helicopter consumed 1 quart of oil for every 2 to 2 1/2 hours of flight time. In addition, the pilot had 5,400 hours of total flight experience, 5,100 hours in helicopters, and 80 hours in helicopters in the last 90 days.

On May 26, 1999, the mercury clutch was examined at a maintenance facility under the supervision of a Federal Aviation Administration Inspector. During the examination, the Inspector discovered a "minor" leak from the transmission sun gear seal, but no oil was discovered on the clutch shoes. In addition, the intermediate drive shaft teeth were "severely" worn, and three of the teeth had broken corners. The clutch shoes were worn to the bottom of the wear groves, and were glazed consistent with overheating. One clutch return spring was broken. The driver slots in the clutch side plates were "severely" worn, and the driver lugs were also "severely" worn. All the clutch attaching hardware were "improperly" safetied, using .031 inch safety wire, and "numerous" fasteners were safetied backwards. The Inspector added that the clutch shoes were worn beyond limits.

According to the FAA Inspector, the clutch was a conditional item, and the last 100 hour inspection was completed on March 12, 1999. Since the inspection, the helicopter flew 100 hours.

Pilot Information

Certificate:	Commercial	**Age:**	49,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	March 26, 1999
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	5410 hours (Total, all aircraft), 5347 hours (Pilot In Command, all aircraft), 80 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Hiller	**Registration:**	N812WC
Model/Series:	UH-12C UH-12C	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1038
Landing Gear Type:	Skid	**Seats:**	3
Date/Type of Last Inspection:	November 9, 1998 100 hour	**Certified Max Gross Wt.:**	2500 lbs
Time Since Last Inspection:	100 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	7860 Hrs	**Engine Manufacturer:**	Franklin
ELT:	Not installed	**Engine Model/Series:**	6V-335-B
Registered Owner:	WILLIAM ASAD	**Rated Power:**	210 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	CLE ,790 ft msl	**Distance from Accident Site:**	24 Nautical Miles
Observation Time:	16:54 Local	**Direction from Accident Site:**	50°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	130°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	24°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	FINDLAY , OH (NONE)	**Type of Flight Plan Filed:**	None
Destination:	COLUMBIA , OH (4G8)	**Type of Clearance:**	None
Departure Time:	00:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	Vegetation
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	41.280063,-82.029197(est)

Administrative Information

Investigator In Charge (IIC):	Muzio, David
Additional Participating Persons:	RON BARONE; CLEVELAND , OH
Original Publish Date:	October 13, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=46375