Aviation Investigation Final Report

Location:	Lorida, Florida	**Accident Number:**	MIA02LA133
Date & Time:	July 16, 2002, 09:30 Local	**Registration:**	N91281
Aircraft:	Bell UH-1B	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Serious
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The pilot stated he was making a spray turn at the south end of a grove and when he started to initiate the turn and pull a little power, he heard a noise, not a real loud boom, just a noise. The helicopter yawed a little bit and lost all lift. It just fell straight down. He didn't have time to look at instruments or anything, it just came straight down like a rock. The ground crew for the spray operation stated they had just refueled the helicopter and put chemical in the tank prior to the pilot departing. A short time later they heard the pilot call on the radio that he had crashed. They went searching and found the helicopter and pilot at the south end of the grove. As they approached the helicopter, the main rotor was still turning and the engine was still running. The pilot was still in the cockpit. They attempted to shut down the engine with the cockpit controls but they were jammed. They then went to the engine compartment and shut the engine off with the fuel control lever. The pilot reported to them that he was attempting to come out of a turn and the engine lost power and the helicopter went down. One of the ground crewmembers reported that the pilot stated during the previous servicing stop that the engine was running hot and losing power. Post accident examination of the engine fuel control showed the pump drive clutch assembly was fractured into two pieces. According to the technician performing the disassembly this resulted in disengagement from the N1 flyweight assembly. The N1 flyweight assembly drives the N1 servo system during normal fuel control operation. The N1 servo assembly determines the amount of fuel supplied to the engine based on the speed at which it is driven. With the N1 servo system effectively disengaged from the fuel control, the system would remain in the start position and the amount of fuel supplied would not be enough to sustain normal engine operation. The technician further stated the pump drive clutch, the mating surface on the flyweight assembly and the bearing located below the drive clutch exhibit excessive wear. The failure of the pump drive clutch can be attributed to this wear. This type of wear occurs over an extended period of operation and is not usually caused by one incident or a sudden impact.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's continued operation with known engine anomalies resulting in loss of engine power due to failure of the engine fuel control pump drive clutch assembly due to wear and collision with the terrain during the resultant descent.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - MECH FAILURE/MALF
Phase of Operation: MANEUVERING - AERIAL APPLICATION

Findings
1. FUEL SYSTEM,FUEL CONTROL - WORN
2. FUEL SYSTEM,FUEL CONTROL - FAILURE,PARTIAL
3. (C) OPERATION WITH KNOWN DEFICIENCIES IN EQUIPMENT - CONTINUED - PILOT IN COMMAND

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

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

Findings
4. TERRAIN CONDITION - GROUND

Factual Information

On July 16, 2002, about 0930 eastern daylight time, a Bell UH-1B, N91281, registered to Colony Helicopters, Inc., operating as a Title 14 CFR Part 137 aerial application flight, crashed in the vicinity of Lorida, Florida. Visual meteorological conditions prevailed and no flight plan was filed. The aircraft received substantial damage, and the commercial-rated pilot, the sole occupant, received serious injuries. The flight departed a field near the spray grove about 5 minutes before the accident.

The pilot stated he was spraying an orange grove and was heading south. He started to make a turn to the west and his airspeed was 22 mph. He was making a spray turn at the end, slow, and when he started to initiate the turn and pull a little power, he heard a noise, not a real loud boom, just a noise. The helicopter yawed a little bit and lost all lift. It just fell straight down. He didn't have time to look at instruments or anything, it just came straight down like a rock.

The ground crew for the spray operation stated they had just refueled the helicopter and put chemical in the tank prior to the pilot departing. A short time later, they heard the pilot call on the radio that he had crashed. They went searching and found the helicopter and pilot at the south end of the grove. As they approached the helicopter, the main rotor was still turning and the engine was still running. The pilot was still in the cockpit. They attempted to shut down the engine with the cockpit controls but they were jammed. They then went to the engine compartment and shut the engine off with the fuel control lever. About 7-12 minutes passed from the time they arrived on the scene to the time the engine was shut down. The pilot reported to them that he was attempting to come out of a turn and the engine lost power and the helicopter went down. One of the ground crewmembers reported that the pilot stated during the previous servicing stop that the engine was running hot and losing power. The ground crewmember reported this to a company mechanic and the mechanic wanted the pilot to call him. Before the pilot could be told to call the mechanic the helicopter had already crashed.

A postaccident test run of the engine was attempted at an engine overhaul facility in September 2003. The engine rotated normally and ignition occurred. The engine stopped accelerating after reaching 30 percent speed. Fuel flow was observed to increase during the start attempt to 250 lb/hr and then drop to 125 lb/hr. Three attempts to start the engine were made with the same results. The engine was then removed from the test cell and the fuel control was removed for testing and disassembly inspection.

The fuel control was placed on test bench at the engine overhaul facility and a functional test was attempted. The fuel control would produce no more than 90 lb/hr fuel flow regardless of the test position. The fuel control was then removed from the test bench for disassembly examination. Disassembly showed the pump drive clutch assembly was fractured into two

pieces. According to the technician performing the disassembly this resulted in disengagement from the N1 flyweight assembly. The N1 flyweight assembly drives the N1 servo system during normal fuel control operation. The N1 servo assembly determines the amount of fuel supplied to the engine based on the speed at which it is driven. With the N1 servo system effectively disengaged from the fuel control, the system would remain in the start position and the amount of fuel supplied would not be enough to sustain normal engine operation resulting in the hang starts experienced during the post accident engine test attempts.

The technician further stated the pump drive clutch, the mating surface on the flyweight assembly and the bearing located below the drive clutch exhibit excessive wear. The failure of the pump drive clutch can be attributed to this wear. This type of wear occurs over an extended period of operation and is not usually caused by one incident or a sudden impact.

Maintenance records showed the engine assembly, which included the fuel control, was installed on the helicopter on June 29, 2002, about 40 flight hours before the accident. The helicopter operator had purchased the engine assembly from another company. No records concerning the history of the fuel control were located after the accident.

Pilot Information

Certificate:	Commercial	**Age:**	58,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
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:**	April 25, 2002
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 8, 2001
Flight Time:	8000 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N91281
Model/Series:	UH-1B	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	63-8535
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	July 14, 2002 100 hour	**Certified Max Gross Wt.:**	8500 lbs
Time Since Last Inspection:	6 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	3025 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Not installed	**Engine Model/Series:**	T53-L-11D
Registered Owner:	Colony Services, Inc.	**Rated Power:**	1100 Horsepower
Operator:		**Operating Certificate(s) Held:**	
Operator Does Business As:	Colony Helicopters	**Operator Designator Code:**	COOG

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	VRB,25 ft msl	**Distance from Accident Site:**	40 Nautical Miles
Observation Time:	09:53 Local	**Direction from Accident Site:**	60°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	250°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	29°C / 25°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lorida, FL	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	09:25 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	27.309999,-81.111663

Administrative Information

Investigator In Charge (IIC):	Stone, Alan
Additional Participating Persons:	Mark L Laughridge; FAA FSDO; Orlando, FL Harald Reichel; Honeywell; Phoenix, AZ
Original Publish Date:	March 30, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=55222