Following recovery, the wreckage was examined at a storage facility and the engine and fuel control unit (FCU) were sent to their respective manufacturers for teardown examinations. Investigators accounted for all major airframe components with the exception of two doors, which were removed prior to the flight.

Picture 1: Wreckage

No pre impact anomalies were observed in the tail rotor drive system. Multiple tail rotor drive shaft fractures were observed and appeared to be consistent with overload. All tail rotor drive shaft pieces were accounted for and all fracture surfaces were positively matched.

Multiple main rotor control tube and pitch link fractures were observed, and all appeared to be consistent with overload. Both cyclic servos and the collective servo were observed in the cylinder support; the mounts for the servos were fractured. Manipulation of the swashplate inner ring (non-rotating swashplate) resulted in a corresponding movement of the cyclic control tubes and respective bellcranks. When the collective lever on the support assembly was manipulated, movement of the collective control tube and bellcrank were observed. The main rotor mast was fractured slightly below the main rotor hub assembly. One main rotor blade was fractured in two places; the other exhibited multiple fractures. The freewheeling unit was removed, and no anomalies were found.

Picture 2: Main Rotor Blades

Examination of the tail rotor drive system revealed that the drive shaft fractures were consistent with overload. The tail rotor gear box chip detector contained no visible particulate matter. The tail rotor rotated freely in both directions when spun by hand, and corresponding rotation of the tail rotor gear box input shaft was observed. Oil was visibly present in the tail rotor gear box and on the lower portion of the vertical fin. One of the tail rotor blades was bent about 45 degrees and fractured in a manner consistent with overload.

Picture 3: Tail Rotor

The three main transmission chip detectors were removed, and no visible particulate matter was observed. The transmission filter element was removed, and no visible particulate matter was observed. The engine-to-transmission drive shaft was intact, and the dots on the temperature dot strip appeared white.

The N2 drive train was free and continuous from the 4th stage turbine wheel to the power takeoff gear during manual rotation. The N1 drive train could be rotated by hand and was continuous to the starter generator.

The gas producer and power turbine were disassembled down to the rotors. The 1st stage turbine nozzle and nozzle shield displayed metallic spatter across the nozzle shield face and nozzle surfaces. The 1st stage nozzle was otherwise undamaged. Ingestion of small metallic debris was noted throughout the gas path consistent with the engine operating at the time of impact. All four turbine wheels were otherwise undamaged. The 4th stage turbine nozzle, which contains the blade tracks for the 3rd and 4th stage turbine wheels, revealed signs of heavy rub on both the 3rd and 4th stage blade tracks. The 4th stage nozzle also had a crack and was sent to the Rolls-Royce Metallurgy lab for examination and documentation. According to the lab's report, heavy oxidation on the surface of the fracture indicated that it was not related to or as a result of the impact.

The accessory gearbox was undamaged and normal in appearance. The upper and lower chip detectors were removed and visually examined. Both chip detectors contained a small amount of metallic debris, which according to a Rolls-Royce representative, was consistent with normal operation.

Investigators conducted examinations of the FCU and power turbine governor at Honeywell, the manufacturer. A functional test and complete disassembly of the FCU disclosed that there were no anomalies that would have prevented the unit from functioning normally. Disassembly of the impact-damaged power turbine governor revealed that there was no evidence of pre impact mechanical malfunctions.

Picture 4: Skids

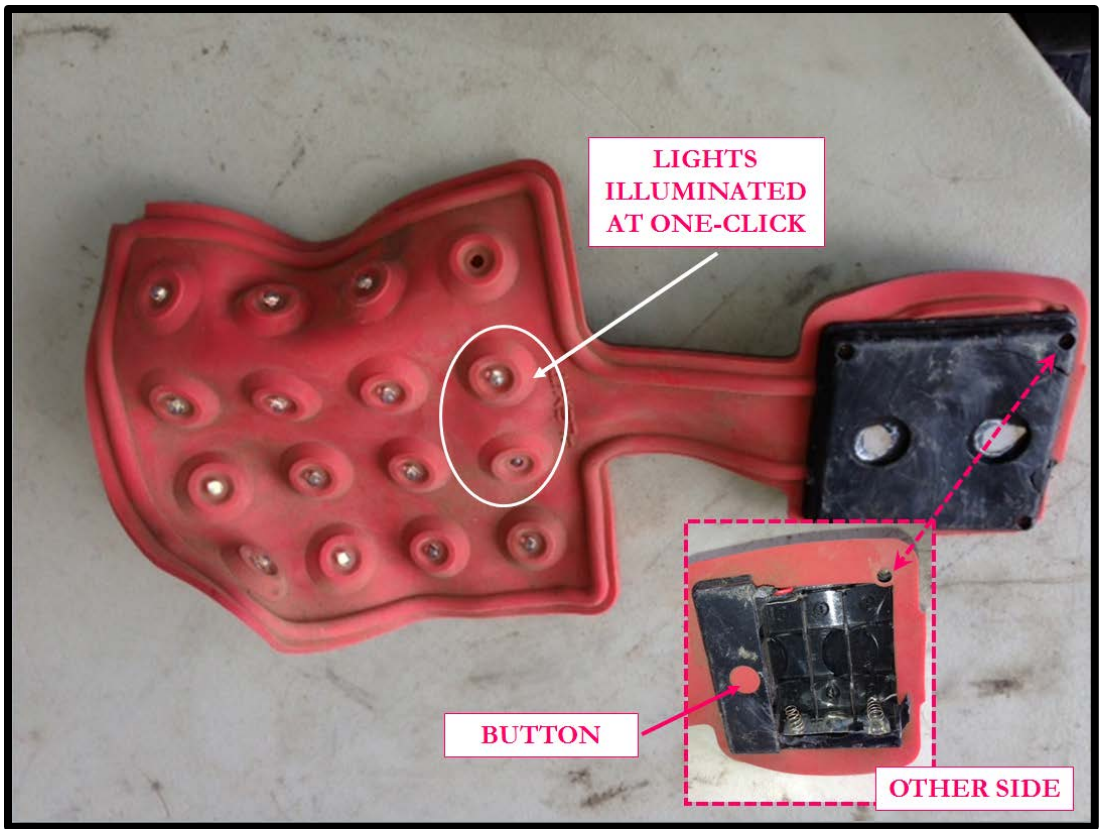
Honeywell has conducted a functional test of the fuel control on August 14, 2013. In addition to the functional test a complete disassembly was conducted. Testing and disassembly did not disclose any condition that would prevent the unit from functioning normally.

The Power Turbine Governor was disassembled on August 14, 2013. Discounting obvious impact damage disassembly did not disclose any condition that would prevent the unit from functioning normally.

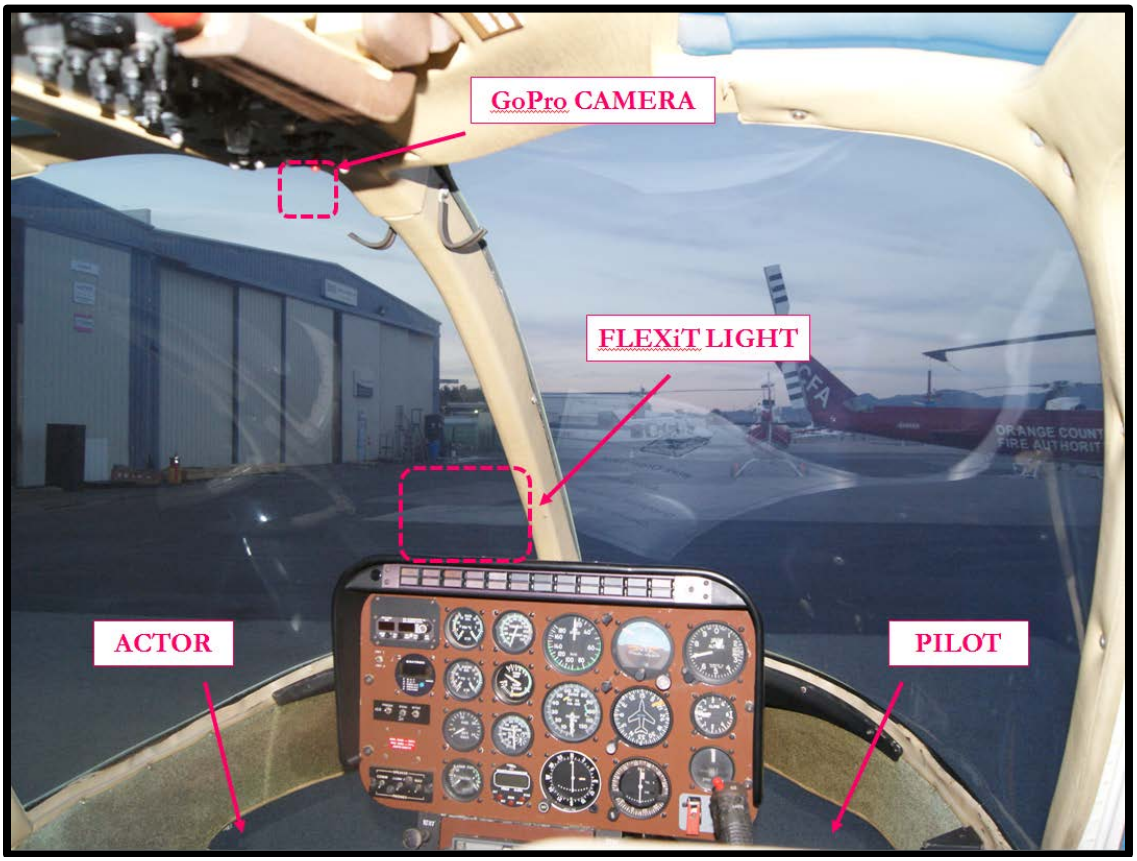
Light

The light placed in the cockpit for the purpose of illuminating the actor for the mounted GoPro camera was found with in the wreckage. The Stiker FLEXiT Light was a flat red flexible silicone panel measuring 13 in by 7 in that contained 16 white 5mm LED lights. The light was equipped with 2 magnets for mounting and powered by AA batteries. The light was operated by depressing a 3-mode electronic switch (button) that would activate a low (2 lights illuminated), medium (4 lights illuminated), high setting (16 lights illuminated), of which the highest setting would emit 128 lumens. Osteopathic 503-224-8399

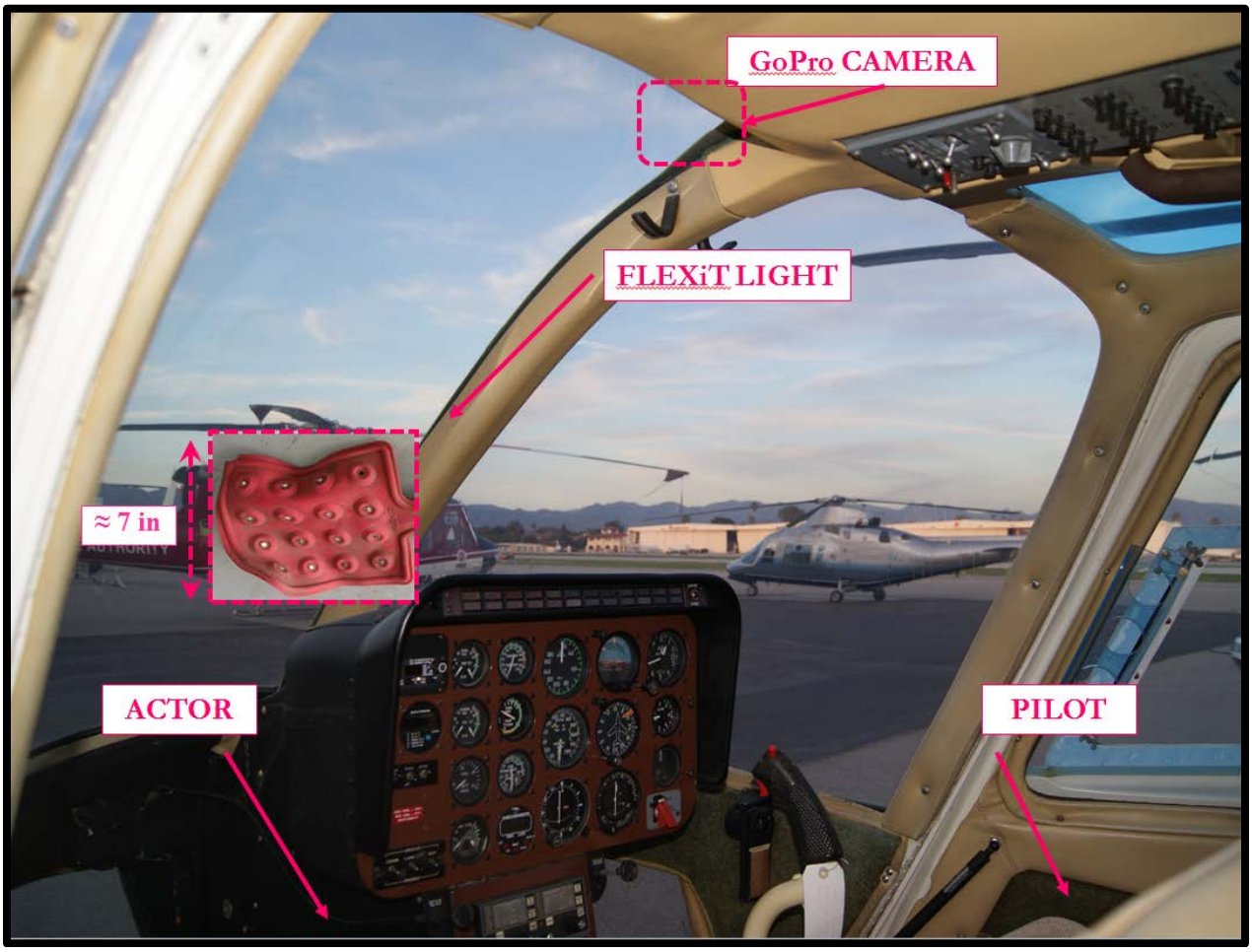
Picture 5: FLEXiT Light in Wreckage



Picture 6: FLEXiT Light



Picture 7: Exemplar Helicopter Showing Light and Camera Position



Picture 8: Exemplar Helicopter Showing Light and Camera Position

Records

The Bell Helicopter 206B2 JetRanger, serial number (s/n) 1322, was manufactured in 1974. A review of the logbooks revealed that the most recent 100-hour inspection of the airframe and engine was performed on January 24, 2013, at an airframe total time of 7,435.9 hours, equating to 6.3 hours prior to the accident.

The powerplant, an Allison 250-C20B, s/n CAE831376, was last overhauled in March 1990, equating to 833.9 operational hours before the accident. The helicopter's flight log was located in the wreckage. Those records indicated that the last time the helicopter was flown was 6 days prior to the accident where another pilot flew for 3.4 hours and did not report any squawks. On the log, the pilot had marked down the Hobbs meter time when departing from Van Nuys, indicating that he had flown the helicopter for 1.5 hours prior to the accident.

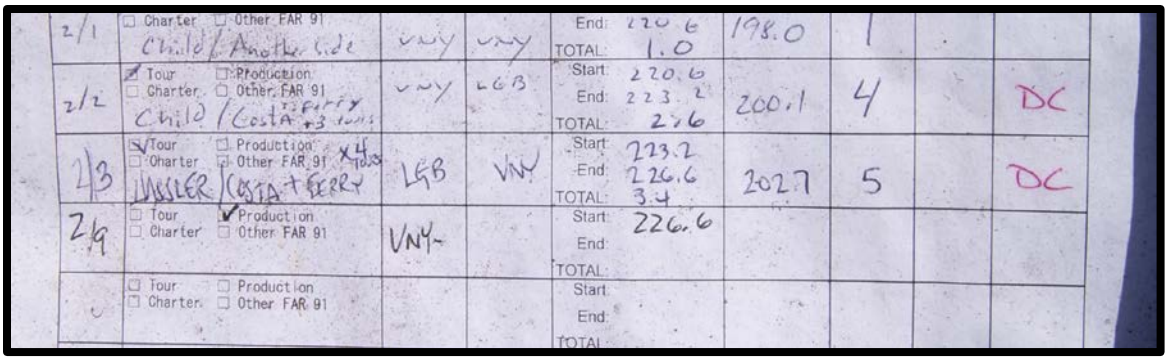
N59518 AC Total Time: 6282.0 HT: 197.3 01/24/2013
Engine TT: 7458.6 Starts 10318

I certify that this helicopter has been inspected per BHT-206B-MM 100 hour inspection and found to be in an airworthy condition.
Complied with AD 2007-25-07 / ASB 206-06-107, 100 hour inspection of vertical fin support for cracks, none noted. Next inspection is due 6382.0 TT.
Complied with 94-19-02, 50 hour inspection of swashplate support assembly for cracks, none noted. Next inspection is due 6332.0 TT.
Complied with AD 85-26-06, 100 hour inspection of tail rotor blades tips for condition, found serviceable. Next inspection is due at 6382.0 TT.
Complied with ASB 206-82-19, verify hardware and torque check on TR Gearbox. Next inspection due 6382.0 TT.
Complied with 50 / 100 hour aircraft lubrication.
Complied with ELT self test operational check.
Cleaned, inspected, and serviced FDC inlet barrier filter.
Complied with 12 month transmission, tail rotor gearbox, engine oil change, re-service with Mobil Jet II.
Ground run and leak check, and test flight good.

[redacted]
Reynaldo V. Garcia
[redacted]

Picture 9: Last 100-hour Inspection Record

Picture 10: Hobbs and Tachometer



2/1	☐ Charter ☐ Other FAR 91 Child / Another ride	VNY	VNY	End: 220.6 TOTAL: 1.0	198.0	1			
2/2	☑ Tour ☐ Production ☐ Charter ☐ Other FAR 91 Child / Costa +3 Family Tours	VNY	LGB	Start: 220.6 End: 223.2 TOTAL: 2.6	200.1	4		DC	
2/3	☑ Tour ☐ Production ☐ Charter ☐ Other FAR 91 X4 Tours Ussler / Costa + Ferry	LGB	VNY	Start: 223.2 End: 226.6 TOTAL: 3.4	202.7	5		DC	
2/9	☐ Tour ☑ Production ☐ Charter ☐ Other FAR 91	VNY-		Start: 226.6 End: TOTAL:					
	☐ Tour ☐ Production ☐ Charter ☐ Other FAR 91			Start: End: TOTAL:					

Picture 11: Helicopter's Trip Log