

WPR16LA125

Core Data:

Factual:

On June 14, 2016, about 1550 Pacific daylight time, a Bell 206L-1 helicopter, N1076Y, was substantially damaged during an autorotative landing attempt near Bishop, California, following a loss of engine power during cruise flight. The private pilot and two passengers were not injured. The helicopter was owned by a private company and operated by the pilot under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed, and no flight plan was filed for the cross-country flight that departed Corona Municipal Airport (AJO), Corona, California, at approximately 1320. The personal flight was destined for Mammoth Yosemite Airport (MMH), Mammoth, California.

According to the pilot, the flight departed AJO with 110 gallons of fuel on board and flew direct to General Wm. J. Fox (WJF), Lancaster, California to avoid restricted airspace. He planned the flight around a forecasted headwind of approximately 15 knots. Once he reached WJF, the pilot then flew a direct course to MMH, but after more than 2 hours of flight in 30 knot headwinds and turbulence the pilot decided to land at Bishop Airport to service the helicopter, which only had 110 lbs (about 16 gallons) of fuel remaining. He began a descent from his cruising altitude, 12,000 feet mean sea level (msl), but as he passed below 10,000 feet msl, the pilot heard a “violent explosion in the engine compartment” and immediately felt the helicopter vibrate. He then observed an engine out light indication and quickly initiated an autorotation. During the helicopter's descent to land, the pilot made two attempts to restart the engine, but was unsuccessful. The pilot reported that he observed that he was “too high” in the last 2,000 feet of his descent. He subsequently pulled the collective early to avoid landing in a crater; however, the helicopter impacted the ground hard, which resulted in substantial damage to the tail boom.

A review of photographs supplied by the Federal Aviation Administration (FAA) showed the accident was surrounded by flat terrain and terrain suitable for landing. Further, images from an online mapping tool showed flat topography near the accident site.

The pilot, age 42, held a private pilot certificate with ratings for single-engine land, multi-engine land, and rotorcraft-helicopter. The pilot's most recent third-class medical certificate was issued on August 16, 2014, which did not include any restrictions. According to the pilot, at the time of the accident he had accumulated a total of 1,500 flight hours; 240 hours of which were in rotorcraft, and 75 hours in the helicopter make and model.

The passengers were not interviewed as the pilot did not provide their contact information despite multiple requests from the NTSB investigator-in-charge.

According to FAA records, the helicopter was manufactured in 1980, and registered to Premiere Rotors, LLC on February 19, 2008. The helicopter was powered by a Rolls Royce M250 C30P, 650 shaft horsepower turboshaft engine, which was installed in 1992 in accordance with supplemental type certificate SH5695SW. A review of the aircraft logbooks revealed that the helicopter's most recent 100 hour inspection was completed on July 1, 2015 at which time the airframe had accumulated 34,947 total flight hours and the engine had accumulated 17,261 total flight hours. According to the registered owner, the accident pilot had entered into a lease-to-buy contract a few months prior to the accident with the intent of purchasing the helicopter.

According to a National Transportation Safety Board (NTSB) weather study, multiple weather forecasts that had been issued prior to the time of the pilot's departure, showed a probability of high winds throughout his route of flight. A National Weather Service Surface Analysis Chart depicted a thermal low--pressure system over southern Nevada with a trough of low pressure extending northward. The chart showed a 12-hectopascal pressure gradient across southern California and supported strong wind gusts over the mountainous regions of eastern California. The winds aloft forecast for the area that had been issued about 6 hours prior to the pilot's time of departure and was valid beginning at 1400 indicated winds from the west-southwest at approximately 17 to 30 knots. An area forecast issued at 1245 forecasted southwesterly winds at 20 knots gusting to 30 knots. Further, multiple Terminal Aerodrome Forecasts that were issued on the morning of the accident flight indicated up to 30 knot wind gusts along the pilot's route of flight.

The weather at Bishop Airport (BIH), Bishop, California near the time of the accident indicated winds from 280 degrees at 7 knots, clear skies, temperature 32 degrees C, dewpoint -2 degrees C, and a barometric altitude of 29.76 inches of Hg.

The helicopter came to rest in a slight nose up attitude approximately 4 nautical miles from Bishop Airport, Bishop, California. A first responder who arrived at the accident site moments after the impact reported that he was able to view the "fittings" at the bottom of the "fuel tank" and observed that the tank was void of fuel. An FAA inspector who arrived on-scene the day after the accident, reported that the fuel pump circuit breakers were extended indicating that the pumps were in the OFF position. The pilot subsequently reported that he flew with the fuel pump circuit breakers ON, and pulled them after the helicopter came to rest. He later added that he customarily disengages the fuel pumps by pulling the circuit breakers after each flight. Later that day, the pilot and the FAA inspector could hear the fuel pump motors run as they cycled the fuel pump circuit breakers several times. The helicopter was subsequently transported to a secure facility in Rancho Cordova, California where an airframe examination was completed by representatives of the airframe and engine manufacturers under the supervision of the NTSB and FAA.

An initial inspection of the airframe revealed that the empennage had separated from the aft tailboom. The aft section of the tail rotor drive shaft at the tailboom displayed rotational scoring consistent with rotation at impact. The top half of the left end plate on the horizontal stabilizer was separated. One tail rotor blade was bent, but remained

attached to the tail rotor hub and its opposing blade was separated at the blade root. Both tail rotor blades displayed paint transfer markings at the leading edges and the separated blade exhibited a gouge mark near the outboard tip of the blade. Paint transfer markings similar in color to the color scheme of the accident helicopter were found on the outboard leading edges of one of the main rotor blades, which displayed bending opposite the direction of rotation.

According to the Bell 206L-1 flight manual, the helicopter's total fuel system capacity was 99.4 gallons. According to the owner, the helicopter was equipped with a fuel range extender that expanded the fuel tank size to accommodate a total of 110 gallons of usable fuel. The helicopter fuel system included two interconnected forward fuel tanks with a capacity of 11 gallons each. The aft fuel tank, located below the aft cabin, has a total capacity of approximately 88 gallons.

A fuel system diagram furnished by the helicopter manufacturer shows that fuel is transferred from the forward tanks to the main fuel tank using right and left boost pumps located in the main tank and an ejector pump located between the two forward tanks. Fuel is then pumped from the aft tank to the engine through an airframe mounted fuel filter. After the helicopter is started, the fuel boost pumps engage to begin directing fuel from the forward tanks to the aft tank. The fuel boost pumps can only be deactivated through two circuit breakers that control each pump.

Fuel line continuity was observed from the forward fuel tank to the inlet port of the engine driven fuel pump. Both the right and left fuel boost pumps operated normally and continuously when tested using the cockpit circuit breakers; the left fuel boost pump measured 8 psi and the right boost pump measured 5 psi. A representative of the FAA stated that he noted the fuel boost pump circuit breakers were extended, indicating that the pumps were OFF when he arrived at the accident site. The pilot reported that he flew with the fuel boost pumps ON, but subsequently pulled the fuel boost pump circuit breakers after the accident when the helicopter came to rest. An inspection of fuel recovered from the fuel pump inlet line appeared free of contaminants.

The fuel gauge, which monitors the fuel quantity from the left forward tank and the main fuel tank, indicated approximately 40-50 lbs. of fuel (5.88 – 7.35 gallons) during the postaccident examination. Subsequently, a representative of the FAA drained approximately 20 gallons of fuel from the helicopter's fuel sump. A sample submitted to a laboratory for analysis revealed that it displayed the same specifications as JET A fuel.

A fuel consumption of approximately 35 gallons per hour, furnished by the helicopter manufacturer, was used to compute the approximate fuel burn during the accident flight. Based on the pilot's reported fuel quantity of 110 gallons at the time of his departure, the helicopter would have burned about 88 total gallons of fuel during the 2 hour and 30 minute long flight.

Approximately 1 teaspoon of fuel was drained from the fuel feed line that was connected to the fuel spray nozzle and considered normal by the engine manufacturer. The fuel was

clear in appearance and free of contamination. The fuel spray nozzle tip displayed a black soot pattern with no indications of carbon deposits, blockage or streaking.

Collective and cyclic control continuity was verified from the cockpit to the main rotor assembly. Tail rotor pedal continuity was traced from the tail rotor pedals to the tailboom.

A subsequent engine examination/test run was performed at the engine manufacturer's facility with oversight from the NTSB.

An initial engine examination revealed that the N1 and N2 tach-generator drive gears rotated freely by hand using a speed handle.

Both the upper and lower magnetic chip detectors were free of ferrous debris.

The compressor inlet was free of debris, but exhibited a build-up of black residue around the back edge of the compressor front support.

A leak test was performed after a soap solution was applied to all fittings, connections and air lines. Approximately 50 PSI of pressurized air was directed through the Pc pneumatic line, which revealed no presence of leaks as the soap solution was not excreted.

During the three test runs, the engine functioned normally at ground-idle, flight-idle, max-continuous power and take-off power. Additionally, during subsequent transient tests, when the power was reduced to flight-idle and rapidly advanced to take-off power, the engine responded normally and produced maximum power without hesitation. Further, the vibration measurements were within the prescribed limitations of the manufacturer.

According to the manufacturer, the engine performance was 4.8% below new engine production standards at maximum take-off power, which was attributed to a faulty anti-ice solenoid valve that had failed in the open position, as designed.