



U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

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April 9, 2021

Timothy W. Monville
Sr. Air Safety Investigator
National Transportation Safety Board
45065 Bles Park Drive
Ashburn, VA 20147

Dear Monville,

Please review the attached report to this letter. This is my inspector statement about N1813Q accident that occurred on July 24, 2020, ref. NTSB ID ERA20LA261. This statement includes the FAA's data that was gather during the field investigation on behalf of the NTSB.

Please let me know if you have any questions or comments.

Sincerely,

Josue Marrero

Aviation Safety Inspector

TAIL NUMBER	AIRCRAFT SERIAL NO.	AIRFRAME TT	ACCIDENT DATE
N1813Q	177RG0213	3296hrs	07/24/20
ACCIDENT LOCATION	AIRCRAFT DAMAGE	NO. OCCUPANTS/INJURIES	
Salinas, PR 00751	Substantial	2/no injuries	

SYNOPSIS

On July 24, 2020, N1813Q was substantially damage during an emergency landing near Salinas Puerto Rico. The airplane was operating under Title 14 CFR Part 91 as instructional flight. The private pilot and flight instructor were uninjured. The flight departed westbound from Fernando Rivas Dominicci Airport (SIG) San Juan, PR at or about 0852. According to ATC radar and ADS-B data, N1813Q flew westbound from SIG to near Dorado then proceeded southbound to Mercedita Airport (PSE). At PSE, the pilot performed one touch-and-go landing followed by two full stop landings. After takeoff from PSE while on an easterly heading on route to Jose de la Torre Airport (RVR) Ceiba Puerto Rico and at an altitude of 1,100 feet MSL, the pilot felt what he described as a very mild vibration followed by a very smooth gradual loss of engine power. Soon afterward, the pilot turned on the auxiliary fuel pump, but that did not restore engine power. The pilot noted an open area to his left and informed his instructor to prepare for an emergency landing. The pilot landed on the intended area a soft field swamp. While the airplane was nearly in a stop, the airplane flipped over.

The pilot reported no fuel contamination or any abnormalities during his preflight. Fuel records confirmed that the aircraft was serviced with avgas the day before the accident. The pilot confirmed that the fuel tanks were full during his preflight.

FAA inspector Rafael Gonzalez investigated the accident scene on July 24, 2020.

AIRFRAME/IMPACT INFORMATION

The aircraft was relocated to a nearby private lot during the evening of July 24, 2020. On July 27, 2020, FAA inspectors met with the aircraft owner and mechanic at the private lot where the aircraft was relocated from the accident scene. A visual inspection to the aircraft fuselage and wings revealed both wings exhibited bulging damage inboard at the lower wing root to fuselage attachments. The fuselage wing root attachment structure exhibited also bulging damage at both sides thus suggesting that the damage was sustained when the upper forward wing structure and fuselage impacted the ground when the aircraft flipped over. Due to the damage sustained it was determined that the aircraft wing and fuselage structure suffered substantial damage.

With the assistance of the aircraft mechanic, a sample of each fuel tank was obtain with an aviation fuel tester cup. The test points where taken from the fuel drains of the fuel tanks, fuel selector drain and firewall gascolator. Small amounts of water presence was observed from each sample point, more notably at the firewall gascolator. The color and smell of fuel was consistent to aviation gasoline type. The fuel tanks were drained into a cleaned 50-gallon drum.

By measuring the amount extracted from the fuel tanks, the approximate amount of fuel was 29 gallons. A visual inspection inside the 50-gallon drum after emptying all the fuel contents of both wings did not reveal the presence of contaminants or foreign debris. Both wing fuel tanks flange cap assemblies were removed by the mechanic to gain access to the interior of the fuel tank. Both appeared to be sealed with an adhesive sealant similar to PRC/Proseal. The fuel tank fuel vents were examined and no noticeable obstruction was found by blowing air into the system. A visual inspection inside of the fuel tanks revealed no obstruction at the fuel inlet ports and fuel breather line port. At the conclusion of the inspection, the aircraft was relocated to Fernando Rivas Dominicci Airport (SIG) San Juan, PR Million Air FBO hangar for further evaluation.

On July 28, 2020, FAA inspectors continued with the inspection of the aircraft fuel system with the assistance of a mechanic. Fuel line continuity was confirmed from the fuel tanks to the gascolator. The fuel shutoff valve and auxiliary fuel pump were operational tested with no discrepancies noted. The firewall fuel gascolator revealed some foreign debris and traces of water contamination when opened for inspection. The engine driven fuel pump was removed from the engine to visually check the engine cam and pump arm assembly revealing no obvious damage. The fuel pump inner components revealed substantial corrosion damage to metal steel parts. The fuel control servo strainer element revealed corrosion and water presence. The inner strainer element was saturated with an apparent phosphorus material that was attracted to a magnetic field when in contact with a magnet. The fuel injection divider valve inner components had presence of foreign debris and corrosion. Fuel injectors were free from obstruction. Engine crankshaft continuity test from propeller to rear gearbox was confirmed. Engine timing was correct and cylinder compression was tested for each cylinder measuring; #1 78/80, #2 79/80, #3 76/80, #4 79/80.

On August 4, 2020, FAA inspectors with the assistance of a mechanic, conducted an inspection to the wing fuel tanks and fuel flange cap assembly. The wings were separated from the aircraft when it was relocated to SIG. The wings were placed on stands and leveled similar as installed on the airplane. A detail inspection was conducted to each fuel cap assemblies manufactured by Monarch Aircraft Components and installed on N1813Q under STC no. 2458CE. During the inspection of both fuel cap flange assemblies, both caps o-ring seals and flange seal lip were found in good condition. Both caps were operational tested with no discrepancies noted. Both assemblies are interchangeable to either wing tank location. The right tank fuel cap flange assembly, presented signs of corrosion marks at the lower portion of the fuel inlet neck-assembly and the inner inlet spring loaded plate. Further analysis of the right fuel cap assembly found that the inner measuring plate that is attached by a nut and screw to the flange and neck assembly, presented signs of galvanic corrosion suggesting that water was present at some point in time. The measuring plate was dismantle and inspected further, during the inspection the aluminum measuring plate that comes in contact with the stainless steel fuel inlet neck showed evidence of corrosion thus suggesting that water may have leaked to the inside of the assembly and to the right fuel tank. The left fuel tank fuel cap flange assembly did not show evidence of corrosion marks within the same areas as of the right fuel cap flange assembly. A detail and operational inspection of both fuel tank drains was conducted with no obvious discrepancy noted. A test to determined drainable water was conducted using the left fuel tank. The fuel tank was filled with

a limited amount of water to conduct the test. The waster was drained by using an aviation drain cup until no further water was drained. A visual inspection inside the tank revealed that undrainable water was present within the fuel tank ribs and stringers structure. The fuel tank drain was removed and the wing was raised therefore the water can be drained and measured. The total amount of undrainable water was 1/3 of a cup or 2.6 ounces.

Both fuel cap flange-assemblies were individually tested by installing each one on a 5 gallon bucket lids to test any leaks by leaving both assemblies exposed to rain water and for the water to be collected inside the bucket. The results were that the right assembly leaked small amounts of water thru the inner fuel level plate retaining screw and nut. No leaks were detected for the left fuel cap flange assembly.

AIRCRAFT MAINTENANCE HISTORY AND RECORDS

N1813Q last annual inspection was recorded on November 8, 2020. The aircraft had accumulated 3296.8 hours since new. The engine had accumulated 166.3 hours since rebuilt by the OEM. Following the annual inspection, the aircraft was flown for the first time on February 19, 2020 for about 2.38hrs.

After the February 19, 2020 flight, the owner reported to the mechanic that the fuel quantity instrument reading was erratic and the fuel not being consumed equally within both tanks. It was determined by the mechanic that the problem with the fuel not being consumed equally was a clothed fuel tank vent. For the fuel quantity erratic instrument indication, the owner operator purchased a replacement fuel quantity senders for both tanks to be installed by his mechanic. From the month of February to June 2020, the owner reported on several occasions the presence of water in the fuel tanks and the engine running rough. Maintenance work invoices provided by the aircraft owner as evidence, showed several maintenance actions to correct the reported discrepancies. The aircraft fuel tanks were drained, the fuel drain valves were replaced, the fuel senders were installed and the engine fuel system was decontaminated. Those maintenance actions were not recorded in the aircraft maintenance records.

CONFLICTING EVIDENCE

Based on a phone interview on August 26, 2020 with the NTSB investigator and FAA inspector. The mechanic stated that the fuel senders purchased by the owner were not installed because the electrical harness was repaired. The owner of the aircraft stated that he purchased the senders to correct the fuel quantity erratic instrument readings and that he was billed for the installation.

ENGINE MONITOR DATA EXTRACTION BY THE NTSB

The aircraft was equipped with a J.P. Instruments EDM 900 primary engine instrument. The instrument is designed to replace the aircraft original engine instruments into a LCD display with

data recording capability. The instrument installed on N1813Q was operational and recorded the flights of February 19, 2020 and the accident flight on July 24, 2020. The instrument was capable of recording 30 data parameters on intervals of 6 seconds. The data was extracted by the NTSB for review and analysis and a copy was provided to the FAA. Based on the data from the flight of February 19, 2020, the engine Exhaust Gas Temperature (EGT) parameters for cylinder number 3 was on average of 100 degrees Fahrenheit above the rest of the cylinders EGT readings, Cylinder Head Temperatures (CHT) of cylinder number 3 was 70 degrees Fahrenheit above the rest of the cylinders. Data recorded from July 24, 2020 flight, showed that the engine Exhaust Gas Temperature (EGT) parameters for cylinder number 1 was on average of 40 degrees Fahrenheit below of the rest of the cylinders EGT readings, Cylinder Head Temperatures (CHT) of cylinder number 3 was 50 degrees Fahrenheit above the rest of the cylinders. At approximately one hour and fifteen minutes into the data recording, a sudden rise on EGT temperature of cylinder number 1 was recorded of 1500 degrees Fahrenheit with an average of 300 degrees Fahrenheit above temperature of the rest of the cylinders that lasted around eight minutes. At the same data time point were cylinder number 1 sudden temperature rise was recorded, the cylinder number 3 EGT and CHT readings were declining proportionally. At about one hour and eighteen minutes of the recording, all engine performance data parameters were declining until the recording ended.

INSPECTOR OPINION

