

Inspector Observations concerning N34BJ

On Aug 11, 2014, Inspectors Dennis Tremblay, Sean Adams, and I traveled to Cobb Motors in Cumberland, ME to examine N34BJ following an engine failure accident and removal from the accident site to a car dealership per the Cumberland County Sheriff's Department.

We were unable to determine much, however the main fuel tank appeared to be empty and there was an undetermined quantity of fuel in the wing tank. Inspector Tremblay had been to the scene of the accident and stated the fuel level in the wing tank was lower than it had been the day before. He also stated that fuel was running out of the aircraft while the towing company was loading it on their truck, and that they plugged the leak and continued with the removal. When Inspector Tremblay examined the fuel tank once the aircraft was loaded for transport, the main fuel tank was found to be empty. We were unable to perform detailed examination of the aircraft at this time as it was in an unsecured location, sitting on its belly and we had few tools and no equipment available to us.

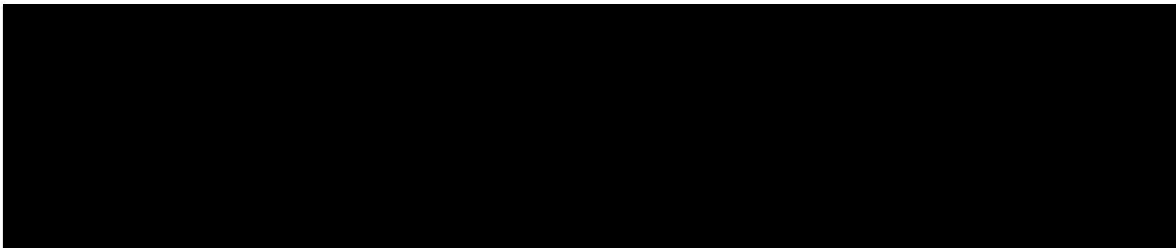
On Sep 3, 2014, Inspector Sean Adams accompanied me to Ryan Insurance Services, which was the location of the aircraft at that time. We were joined by Wayne Whitten, a highly experienced and respected IA in the area. We first examined the aircraft for anything obvious, with nothing to report other than the absorbent material placed on vent / overflow line for the upper wing tank (the tank that had fuel remaining while at Cobb Motors) . That line had been folded over with pliers and crimped. The material in which it was wrapped did not show fuel staining.

We examined the fuel lines for leaks, and found none. We pressurized the main fuel tank, and still found no leaks. Due to the volume of the fuel system and limited volume of available compressed air, we were unable to verify air flow for the entire length of the system as a whole. We disconnected fittings at accessible locations throughout the system and tested for restrictions to flow as well as leakage. No problems were noted. The wobble pump and selector valve are one unit, and were tested for flow and the valve was tested for position selected. All test with no problems noted. Flow was tested in this manner from the fuel tank to the fuel servo, and all checked out as operational.

The Pilot had commented that he had difficulties with the transfer of fuel from the wing tank into the main tank. This is a gravity flow system in which fuel flows from the upper tank to a selector in the cockpit, then runs back forward to the main tank outlet. The upper wing had been removed, so we tested the system with shop air once again. No restrictions or leaks were found. We tested the vent by installing the cap and running air pressure into the fuel line toward the tank. Air could be heard exiting the tank from the vent fitting.

The main tank had two methods of venting. One we could check and was clear. The other was a surgical tubing type material and was crumbled up in accident damage on the aircraft's belly. We were unable to verify there was no plugging pre-accident. The wing tank vent appears to have been the line that was leaking while the aircraft was being loaded. The vent in this tank is located in the upper forward section of the tank. If this tank was relatively full during removal from the site, fuel would have flowed to the vent as the wrecker crew hoisted the aircraft tail first up out of the ditch in which it was resting and up onto the ramp truck. This explains the sudden fuel leak as well as the reduced fuel level the next day.

The fuel pickup in the main tank has a flop tube, which is a long hose with a heavy weight on the end for the purposes of providing fuel flow while performing aerobatic maneuvers. There have been concerns about the flexible hose becoming stiff due to age. If the hose became stiff and did not return to the bottom of the tank, the unusable fuel number would have increased significantly. The aircraft is approximately 7 years old, and this has been known to happen to hoses more than 8 years old, at least when exposed to heat. It is unknown how old the hose was when the aircraft was certificated. We fabricated a hook and lifted the tube off of the bottom of the tank. There were no flexibility issues with this tube, and the weight had no trouble returning the tube to the bottom of the tank.



gapped and clean. The engine gave appearances of being well maintained and properly operated. We hoisted the engine and slightly moved the aircraft off of the cart on which it was resting and pulled the propeller through. We chose this method of testing the magnetos as the engine mount was pushed back slightly and the firewall was deformed forward. There is very little room between the accessories and firewall. We were able to see spark on #1 top spark plug (the only one we checked). This would indicate at least one magneto was operational and the camshaft drive was still intact. This engine had recently been exposed to another prop strike, but was properly inspected before returning it to service.

When we first examined the aircraft at Ryan Insurance, we noted the upper tank selector was in the on position as well as the main tank was in the on position. We asked if Ryan Insurance Services drained any fuel from the main tank. They stated they did not drain any from the aircraft. All three tanks were empty. The reserve tank was stated empty by the pilot and was not considered significant to the investigation.

Items still undetermined: We were unable to check the fuel injection system due to a lack of equipment. Mr. Whitten is to return in the near future to remove the fuel pump, fuel servo, and flow divider so they can be sent out for bench tests. Also, given the structural damage to the aircraft, and the fact that I had to stand on the hoist while we lifted the aircraft partway off the cart to gain propeller clearance in order to spark the mags, we did not feel it was safe to examine under the aircraft for fuel stains. None were noted while looking from the sides of the aircraft. I am relatively confident no fuel leaked from any lines from this aircraft.

Please contact me if there are additional questions I might answer.

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