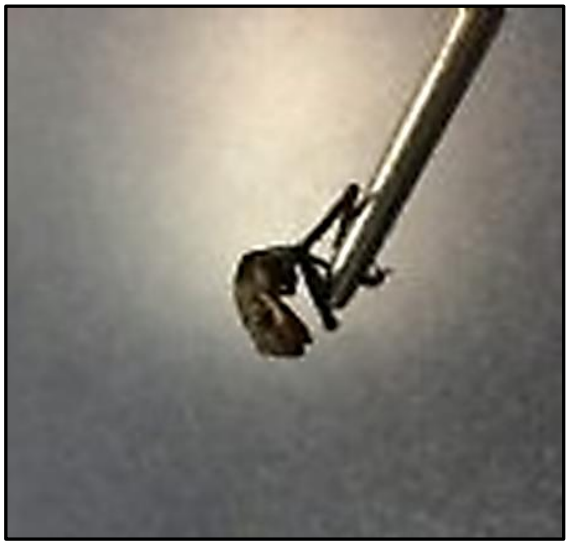
OAS-43A
(4/18)

Interagency Aviation Accident Prevention Bulletin

Subject: Fuel Contamination and Aircraft Refueling

Area of Concern: Flight Safety

Distribution: All Aviation Activities



Discussion: Two years ago, we discussed aircraft fuel nozzle screens and how they are a critical fuel system component to ensure fuel delivered is contaminate free (DOI APB 16-01). Problem solved, right? Not so fast. As incredible as it may seem, a frog, albeit a very small frog, was discovered INSIDE a helicopter fuel tank (Safecom 18-0305) when maintenance personnel were troubleshooting a fuel indication problem. Unfortunately, the frog did not survive. "How did a frog get into the helicopter fuel tank?" That's a very good question. Here's the story.

A helicopter operating in the Florida Everglades was experiencing a fuel indication problem. When maintenance personnel started troubleshooting the problem, they found grass, mud, and a small frog in the fuel system. The helicopter had not been fueled in the field for over a year and has only been fueled in two places; a general aviation airport in southeast Florida and an airfield in south central Florida.

As a result, all fuel lines of the helicopter were inspected and cleaned. Both fuel tanks were pulled and cleaned and the fuel system was re-calibrated. New O-rings and gaskets were ordered for the fuel system. Fuel samples from the aircraft were sent to an aviation laboratory in Louisiana for analysis. The only item noted in the analysis was a high concentration of water in the fuel.

While we are on the subject, water occurs in aviation fuels in two forms: dissolved and free. All aviation fuels dissolve water in varying amounts depending upon the fuel composition and temperature. Dissolved water in fuel is similar to humidity in air. Lowering fuel temperatures will cause dissolved water to come out of solution similarly as free water forms fog in air. The creation of free water occurs at a rate of about one part per million per degree fahrenheit (1 ppm/deg. F). Dissolved water is not a problem for aircraft operation as long as it remains in solution. Dissolved water cannot be removed by filtration but can become free water with temperature change. Once free, it can cause operating problems. Free water is any water in excess of that which will dissolve.

Operating in areas where there is a lot of rainfall can affect the quality of the fuel. It's important to ensure filters are replaced often and containers are properly sealed. For additional information see AC 20-125 Water in Aviation Fuels.

Additional fuel samples from fuel storage tanks were sent to the Defense Logistics Agency (DLA) Energy - AK Petroleum Laboratory in Anchorage, AK. No issues were found with the samples.

The OAS Fuel Specialist conducted an audit of the fuel sources used for the helicopter. No contaminates were found in the fuel truck, tank, or nozzle. It was recommended however, that a nozzle dust cap be used for the nozzle barrel end.

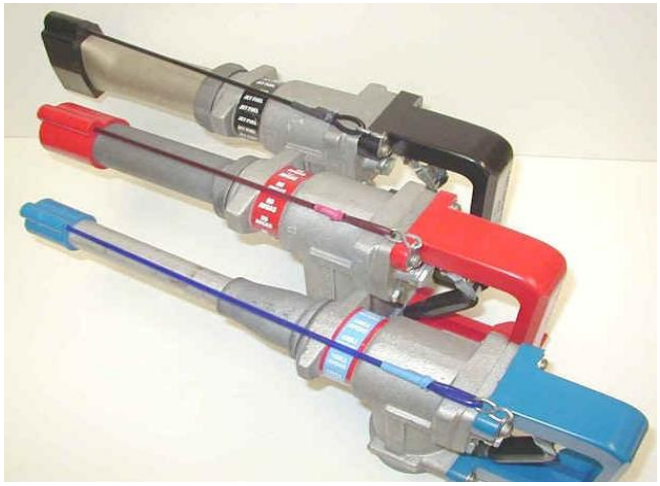
So, how did the frog get in the fuel tank? No one knows for sure but there are a few theories. They range from getting in through the vent system to being in the refueling nozzle to being left over from the second plague of Egypt. According to the OAS Fuels Specialist, the contamination could not have been upstream of the nozzle. The only way the fuel distribution system could have been the source was if the nozzle dustcover was not in position when not used. A frog could have found it's way into the barrell leading to it's injection into the helicopter.

A trend observed during aviation fuel service equipment (mobile/fixed) inspections during 2017 involved components related to open port aviation fuel servicing nozzles. Many of the open port aviation servicing nozzles were missing static bonding wire with clip and dust caps. The missing static bonding wire with clip hardware increases the potential for a static electricity caused fire during aircraft refueling. The missing dustcover increases the potential for fuel contamination from insects, windblown debris, and weather exposure.

The nozzle dustcover should be positioned on the nozzle barrel at all times except when fuel servicing is being accomplished. If the pilot sees that it is not, a small amount of fuel should be discharged into a white bucket to flush the nozzle prior to refueling the aircraft. The photograph demonstrates a product for dustcover replacement (lanyard & dust cap).

For additional information, contact Charles Mathwig, OAS Fuels Specialist at 907-271-6022.

FJORD AVIATION PRODUCTS



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