

CLEAN & DRY: Aviation Fuel Handling

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After having spent the better part of 20 years involved in aviation firefighting, both as astronaut rescue leader for our nation's space program and most recently as fire chief and safety manager of the Orlando (FL) Sanford International Airport, I realized that what I knew on the subject of aircraft fueling operations was minimal.

Being a helicopter pilot with a meager 425 hours as pilot in command, every time I flew, I trusted the FBO personnel to make sure the fuel they put in my machine was clean and dry. But many fuel handlers at even large commercial airports are young, inexperienced people that receive only the bare minimum of training on the dos and don'ts of aviation fuel handling. In many cases, very little training and mentoring are done. The employees know the basics, involving specific gravity, vapor density and the hazards of static potentials, but are they able to perform vehicle, tank and fuel quality inspections that would hold up to scrutiny if a fatal accident were to occur with an aircraft, vehicle or tank farm in their charge?

After a personal quest to completely understand the intricacies of the hazardous world of aviation fuel, I realized that if these workers were unaware of the complexities of the mission, then my safety was at risk. Should just one person of an otherwise conscientious organization not completely observe and follow the standard, dirty or wet fuel could get into my gas bag.

The issue of homeland security complicates the issue. Although the chances may be slim, what might the probability be that some marijuana cultivator or organized crime operation infiltrates your local FBO or fuel delivery company and deliberately contaminates fuel in an effort to stop interdiction efforts and discredit your operation in the eyes of the public, not to mention put your life and aircraft in danger?

After teaching a class at ALEA's recent Eastern Region Safety Seminar in Kansas City, MO, and at the Western Regional in California, I realized by a show of hands that only a few law enforcement operators were performing fuel testing on their own. Almost all were relying on their local FBO or receiving dedicated loads. However, even those who received dedicated loads did not require integrity seals.

Each of us must take the issue of fuel quality control seriously and develop procedures and testing methods that verify a quality product is received, stored and dispensed. Every time I pull pitch, I want to know without a doubt that my fuel is top notch.

The Letter Of The Law

From August 1982 until June 2004, the Federal Aviation Administration used Advisory Circular 150/5230-4, "Aircraft Fuel Storage, Handling and Dispensing on Airports," as its sole method of communicating with our nation's fuel handlers. This 34-page document was simply a thumbnail sketch of the whole picture. It included the basics but failed to adequately provide complete guidance to operators who were unaware of the National Fire Protection Association, the National Air Transportation Association and the American Petroleum Institute documents on the subject. Although referenced in the appendix, these documents were not made mandatory reading for those in the industry. I believe that this lack of information led the

nation's aircraft operators to mandate that fuel handlers adopt and utilize the Air Transport Association SPEC 103 Standards for Jet Fuel Quality Control.

From what I've gleaned from my students while teaching on this subject nationwide for the past four years, ATA 103 was the document of choice because airlines required its following. The FAA made good in June 2004 when it adopted Advisory Circular 150/5230-4A, which specified the use of NFPA 407 and the NATA publication Refueling and Quality Control Procedures for Airport Service and Support Operations. Those documents in turn required adherence to the API Standards and alluded to numerous other NFPA documents, thus completing the regulatory issue.

However, there was still one void left: making certain that all fuel handling personnel at our nation's airports have the knowledge, skill and ability to properly receive, store and dispense aviation fuel, protect the public and themselves from the inherent hazards of petroleum fuel and provide clean, dry fuel to the aircraft in our skies around the world.

The guidance provided by the FAA is better than before; however, it still lacks the initiative to verify that the required training is done in a professional manner and that companies authorized by them to provide the training are actually teaching the required subjects. At the time of this writing, 14 CFR 139.321 (e) (1) & (2), stated, "(1) At least one supervisor with each fueling agent must have completed an aviation fuel training course in fire safety that is authorized by the administrator. Such an individual must be trained prior to initial performance of duties or enrolled in an authorized aviation fuel training course that will be completed within 90 days of initiating duties and receive recurrent instruction at least every 24 consecutive calendar months. (2) All other employees who fuel aircraft, accept fuel shipments or otherwise handle fuel must receive at least initial on-the-job training and recurrent instruction every 24 consecutive calendar months in fire safety from the supervisor trained in accordance with paragraph (e)(1) of this section."

The problem as I see it is that the supervisor alluded to in the law is most probably not a professional instructor, with the exception of large fuel handling operators that employ Health Safety and Environment educators. And as with the majority of the business in America, the bulk of the work in aviation is performed by small businesses, not major conglomerates.

Side Bar

Secure & Sustainable Fuel Sources

The Commercial Aviation Alternative Fuels Initiative (CAAFI) was established to enhance energy security and environmental sustainability for aviation by exploring the potential use of alternative fuels. CAAFI's participants are drawn from all areas of the international commercial aviation industry, fuel suppliers, universities and U.S. government agencies, including the Departments of Transportation, Defense, Energy and NASA. The initiative's sponsors are the FAA, Office of Environment and Energy, Airports Council International-North America (representing airports), Aerospace Industries Association (representing manufacturers), and the Air Transport Association (representing U.S. airlines).

U.S. commercial aviation consumes less than 3 percent of total domestic energy use but drives about 6 percent of the U.S. gross economic output and just under 9 percent of national employment. Secure and sustainable fuel sources are essential for its continued prosperity. Meanwhile, concerns

have risen internationally about the environmental impacts of aviation growth.

CAAFI participants are evaluating alternative fuels in four areas. To ensure the safety of any alternative fuels given the demanding environment posed by aviation operations, they will certify and qualify all products. CAAFI will perform research and develop a broad range of potential sources and technologies in developing alternative fuels. They will assess the environmental impacts of any alternative fuel options developed and evaluate the market and business case for use of alternative fuels compared with conventional ones. The CAAFI meets annually to update the state of alternative fuel developments in these areas, identify gaps and hurdles, and decide on next steps required in the research, development and deployment process.

Having recently participated in the Gammon Technical Products Fuel Safety Seminar in New Jersey, attended by members of the U.S. Air Force Petroleum Agency, Canadian Defense Ministry, Petroleum Managers Association and manufacturers from many disciplines, I found the topic of alternative fuels intently debated. At the seminar, we learned that there are no easy solutions to our problems. But our military is very interested in synthetic fuels, because they need an uninterrupted supply and are well on the road toward success.

Synthetics are manufactured from two basic resources, coal and natural gas. Synthetic fuels from biological sources are not practical at this juncture. The processes are not efficient. Either way, FT (Fischer-Tropsch) process fuels have a problem. They create copious quantities of carbon dioxide in the process, more than any other fuel. This is not when the fuel is burned (it actually burns quite well with zero sulphur content), but when it is manufactured. Coal to liquid fuel is a better idea and can be cost effective. However, it requires not only a conversion plant (a special refinery), but mining and transportation of the coal. So, gas to liquid is the better looking solution today. However, it has been said that America possesses enough coal to provide our country with energy for the next 250 years. There is a large (10 square miles) Sasso plant in South Africa that produces fuels at a cost of \$25 per barrel today.

There are two significant problems aside from plant construction. The first is that gas is in demand for other uses (heating, plastics, hydrogen production, etc.), so cost is a question down the road. The second is eliminating excess carbon dioxide from the refining process. Pumping it into existing oil wells to help push more oil out does this. These wells are so deep, the CO₂ will not get back to the atmosphere.

It makes much better publicity than sense to use bio jet fuel in a jet aircraft. Biofuels that will perform in the temperatures and atmospheres that jets must endure are difficult to make. The better solution is to blend the bio component into crude before refining, thereby making better use of biofuels.

From purely a military standpoint, the aviation fueling industry is gauging the effects of eliminating the JP series of fuels and opting for a Jet A fuel with a freeze point of -45 degrees Fahrenheit. The decisions to proceed with this venture could be reality by mid-2009, as flight-testing temperature evaluations are currently ongoing. Much has been done, yet we are still a long way from daily use of alternative fuels.

Learn More About Fuel Safety

For those of you desiring additional information on the subject of fuel safety, Aviation Continuing Education offers all ALEA members a substantial discount to attend classes. Additionally, if you host a class for fuel handlers at your location, you will have free slots to our program. Our

mission is to drive the information required of fuel handling from supervisors down to the person fueling the aircraft of even the smallest agency supporting the law enforcement missions of our great nation. For further information, call (877) 322-7139 or visit www.aviationcontinuinged.com.