



# Interagency Aviation Lessons Learned



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**Subject: Fuel Planning and Management**

**Area of Concern: Flight Operations**

**Distribution: All Aviation Activities**

**Discussion:** According to the NTSB, there have been at least 19 fuel related accidents this year alone. 14 involved fuel exhaustion and 5 involved fuel starvation. In DOI, there was one accident in FY12 that involved fuel exhaustion. Fuel exhaustion means there is no fuel remaining. Fuel starvation means that fuel was available, but was unable to be used by the engine.



You're probably asking yourself – How could anyone run out of fuel? The answer: Improper fuel planning and in-flight fuel management. These vital functions always begins with: *what are the mission requirements, how much fuel do I need, and how much do I have?* If you don't know what your mission requirements are and how much fuel you have to start with, then it's impossible to know how long you can stay airborne over a fire or how far you can go on a survey or whether or not you can take your passengers where they need to go.

Next, what do the performance charts say about fuel required for:

Start / taxi / takeoff

Climb to altitude

Cruise - maximum range, fast cruise, or maximum endurance?

Mission profile – low, mid or high altitude operations

Descent

Approach – Instrument or VFR straight-in

Remember the FAA required fuel reserve? Instrument flight rules (IFR) or visual flight rules (VFR)? Day or night?

Heuristics. A heuristic (commonly referred to as a rule of thumb) is a mental shortcut that allows people to solve problems and make judgments quickly and efficiently. These rule-of-thumb strategies shorten decision-making time and allow people to function without constantly stopping to think about the next course of action. While heuristics are helpful in many situations, they can also lead to biases. For example: after running out of fuel, the pilot insisted that the aircraft could fly for 4 ½ hours. He didn't check the fuel tanks before flight to make sure they were full and the calibrated fuel gauge read empty (and had been for a while). His rule of thumb was that the aircraft could always fly for 4 ½ hours. Well, not that day.



Actual fuel gauge reading (with power on) after an accident due to fuel exhaustion.



Here are a few tips for managing fuel:

1. **PLAN!** Every flight requires homework which includes knowing the fuel required to perform your mission.
2. Stay with the aircraft during fueling to make sure you received the correct amount and type of fuel. Compare the quantity on the receipt with your fuel gauge prior to taxi.
3. In-flight fuel checks – Update your fuel status regularly to monitor fuel burn. Every 15 minutes is a best practice employed by many professional aviation organizations.
4. Set a bingo fuel state. Bingo fuel is that amount required to depart area of operations and be overhead the airport with the required amount of reserve fuel (VFR option, see #6 below).
5. Communicate the bingo fuel state to others (especially other crewmembers) and employ their capability to assist you in monitoring the fuel in order to ensure you don't accidentally fly beyond bingo fuel.
6. Divert fuel. Always have divert locations available throughout your route of flight and know the amount of fuel required to reach it. You never know when weather or a maintenance issue may require a different destination. Additionally, the runway you plan on using may be unavailable as a result of another crew's misfortune.
7. Reserve fuel. Remember the FARs 14 CFR 135.209, 14 CFR 91.167. This governs the amount of fuel that's required to be on board overhead your destination.
8. Minimum fuel. Remember, declaring minimum fuel does not give you special handling from air traffic control (ATC). It is advisory only.
9. Emergency fuel. It's so much better to declare an emergency for low fuel and land safely than to not declare an emergency and suffer potentially catastrophic results. You would be surprised at how helpful ATC can be when you're in a pinch and you wouldn't believe how much less paperwork is required. Most importantly, your loved ones will thank you.
10. Remember, if you're an aircrew member, it's your responsibility to know what the plan is . If nobody tells you, ASK!!!

Don't be the  
news story of  
the day.



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