CALLBACK
From NASA's Aviation Safety Reporting System
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GENERAL AVIATION FUEL MANAGEMENT INCIDENTS

While the ASRS receives an average of 35 General Aviation fuel starvation and fuel exhaustion incident reports per year, the NTSB investigates a significantly higher number of accidents related to fuel management. The voluntary nature of ASRS reports accounts for some of the difference in the number of reports, but the higher NTSB numbers also highlight another point— the fact that fuel management errors often lead to significant aircraft damage and/or personal injury. By taking heed of the lessons in the following ASRS reports, Pilots can help reduce fuel management errors and avoid the often costly results.

"I Aimed for a Thicket of Trees"

After a Student Pilot in a PA-44 set the fuel tank selector in the wrong position, only the quick action of the Instructor changed the event from a certain accident to an ASRS incident.

Lesson 1: ***Know how to operate the aircraft's fuel tank selection panel.***

■ *The student…preflighted before the start of the lesson. While running the Start checklist, I observed some mishandling of switches such as engaging the starter when he meant to press the prime button and forgetting to turn the magnetos on prior to cranking the engine. During the run up, he demonstrated satisfactory procedures while checking the systems and briefing the takeoff and emergency procedures…. We taxied to the runway for the start of pattern work and were cleared for takeoff. While the student taxied onto the runway, I performed my own personal checks by visually confirming that all mags were on and both fuel selectors were in the ON position.*

After takeoff, the Student turned a left crosswind then downwind and started his Pre-Landing checks after the gear had been extended…. Abeam the runway, I requested a touch-and-go and read back the landing clearance…. The student reduced the throttles to 15 inches MAP (Manifold Absolute Pressure), added the first notch of flaps, and pitched for a 100 knot descent…. It was at that point that I noticed irregular left engine noise. Since we were flying on a fairly humid day, I promptly turned on the carb heat of the left engine and then the right. The left engine quit immediately following the application of the carb heat. I announced, "My controls," took control of the aircraft and proceeded to adjust mixtures, props, and throttles full forward. At that point the right engine quit as well. I pitched for 88 knots and looked right and left in search of a place to land while declaring an emergency on Tower frequency.

At this point we were approximately 1,000 feet AGL and somewhere just north of the…highway merger. I checked the mag switches to verify that they were on. Tower asked if we required equipment and I replied, "Yes, we can't make the airport." After ruling out any surrounding roads due to the amount of bank required to get to them, I aimed for a thicket of trees straight ahead. Reaching between the seats to verify that the fuel selectors were in the ON position, I found them both resting at the midpoint in the OFF position. I quickly pushed both fuel selectors full forward to ON and continued the glide. In the midst of preparing for a nose-high flare into the trees, both engines fired and started developing full power, pulling the aircraft up and away from the terrain.

After reaching a safe altitude, I updated the Tower to let them know that we had regained power and would be landing on the runway. On final approach to land, the Student started reaching for the fuel selectors and yoke to which I responded, "Don't touch anything. I am flying and will be taking this landing."

After parking and shutting down the aircraft, I questioned the Student on his actions. He stated, "I looked at the fuel selectors while on downwind; they looked wrong, so I moved them."

"The Airport Was Beyond Glide Distance"

This PA-28 Instructor Pilot also encountered a Student Pilot whose fuel tank selection procedure was "off" the mark. Normally, switching to the tank with more fuel is a prudent step in preparing for landing. In this incident, however, selection of either tank would have been preferable to the OFF selection.

Lesson 2: ***Know and follow Lesson 1.***

■ *On the downwind, I instructed the Student to switch to the fullest tank. He switched from the left tank and went past the right tank position to OFF. The fuel selector valve had no detent to prevent being inadvertently switched to OFF. Engine power was lost and a decision to execute an off-airport landing was made as the airport was beyond glide distance for the aircraft. We executed an uneventful*

off-airport landing. I noted the fuel selector valve was in the OFF position after securing the aircraft. There was no attempt to restart on my part because of the lack of altitude.

The Student Pilot was accustomed to a different Cherokee that had a detent feature on the fuel selector that wasn't found in this model. I was complacent in believing that the student knew the fuel selector positions and should have verified that the selector valve was in the correct position.

"I Flared and Landed in Rows of Soybeans"

A Pilot conducting skydiving operations in a light twin aircraft learned that a questionable visual inspection of the fuel tanks may not be the best way to confirm fuel gauge readings and could result in an unplanned arrival in the produce aisles.

Lesson 3: ***Err on the side of caution. When it comes to fuel management, err much further on the side of caution.***

■ *The incident occurred while supporting skydiving operations. The flight was conducted in VFR conditions within a four mile radius of the airport. The flight to altitude was uneventful and I released all the jumpers at an altitude of 13,000 feet. On the way down, I noticed a fluctuation in engine power from the right engine. Moments later, the power returned. I contacted [my base] and requested the Mechanic to meet me when I got down.*

I turned onto a four mile final with the landing gear down and locked, but flaps still up. At that point I saw the right engine FUEL PUMP annunciator light come on. Moments later I felt the plane surge heavily and begin to slow. I powered up both throttle levers to arrest the loss of airspeed. The airplane immediately began to bank right and continued to do so despite counter control input. I determined the right engine was not producing power.

At that point I was well short of the runway at about 500 feet AGL (or less), with the airspeed decreasing to around 80 knots. I immediately brought both throttles back to idle. This stopped the uncommanded turn and I was able to nose over a bit and select an open field east of the runway. I pushed the nose down to maintain my airspeed (still at 80 knots) and seconds later was able to clear some trees and head for a soybean field. As I cleared the trees, I selected the flap lever down, flared, and landed in the rows of soybeans. The roll out was short and surprisingly smooth. While still rolling, I feathered both engines and moved the condition levers to cut off….

I shut everything off, got out, and determined that the airplane had suffered no damage. I also determined that there were only trace amounts of fuel in each tank.

On pre-flight I was told by the pilot operating the plane the day before, that 40 gallons were flown off of the full nacelle tanks which contain 120 gallons total usable fuel. I visually confirmed that the tanks were approximately half-full, although this is very difficult to judge accurately. The fuel gauges in the cockpit also indicated ¾-full tanks on each side. After the off-field landing, I went back into the cockpit to check the fuel gauges again and they both still indicated ¼-full.

In retrospect I can see my efforts to determine the fuel on board before the flight were inadequate, which lead to a fuel starvation event which nearly produced a low altitude VMC roll which would undoubtedly have ended me. I am still uncertain as to the exact discrepancy between perceived fuel and actual fuel onboard and I may never reconcile this. What is certain is that in the future I will err much further on the side of caution, especially when it comes to fuel management.

"All Was Normal Until Five Minutes After Takeoff"

The Pilot of an Experimental Homebuilt aircraft miscalculated the amount of fuel onboard and didn't believe the tank that looked empty was actually empty. Unfortunately, he ran out of fuel while enroute to another airport… to get fuel. Fortunately, he shared a lesson in common (fuel) sense.

Lesson 4: ***When a fuel tank shows no visible fuel, put fuel in, regardless of what you think is in the tank.***

■ *When I flew to the airport four days previously, I noted that I had about one hour of fuel remaining, i.e., a quarter of a tank. On the morning of the incident, I went to the airport to fly 20 miles south for fuel. In this airplane, no fuel will show up on inspection when there is less than a quarter tank. The tank gauges showed enough fuel and the previous trip should have allowed enough fuel. All was normal until five minutes after takeoff when the engine quit. [I] switched to the other tank and turned back to the airport. The engine restarted and ran for a minute and then quit. I attempted to return to the airport, but was unable. I elected to land alongside the highway….*

Now I know that I should have added enough fuel to be sure there was no possibility of running out. I am not sure why my previous experience led me to believe that there was enough fuel…. When a fuel tank shows no visible fuel, put fuel in regardless of what previous experience tells one about how much should still be in the tank. No fuel visible means no fuel and not the four gallons that I "think" is still there.

ASRS Alerts Issued in August 2013

Subject of Alert	No. of Alerts
Aircraft or Aircraft Equipment	3
Airport Facility or Procedure	5
ATC Equipment or Procedure	1
Company Policy	1
TOTAL	**10**

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http://asrs.arc.nasa.gov

August 2013 Report Intake

Air Carrier/Air Taxi Pilots	4,052
General Aviation Pilots	1,234
Controllers	720
Flight Attendants	361
Mechanics	149
Military/Other	142
Dispatchers	139
TOTAL	**6,797**