

CALLBACK

From NASA's Aviation Safety Reporting System



Issue 416

September 2014

General
Aviation



Fuel Management Errors



Fuel management errors continue to account for a significant percentage of the General Aviation forced landing incidents reported to ASRS. However, since fuel exhaustion and fuel starvation events often result in significant aircraft damage and personal injury, an even greater number of fuel management errors result in NTSB accident reports.

The following ASRS reports offer sobering lessons from pilots who have “been there, done that” and, fortunately, survived to share their experiences. Top off your fuel management wisdom by learning from these fuel management mishaps.

In a Position to Fail

This Twin Piper pilot learned that “close” is not good enough when it comes to positioning fuel tank selector switches.

■ *While flying solo on an IFR flight plan in a rental Twin Piper approximately 20 nautical miles to the east of my destination, I was cleared to descend from 8,000 feet to 6,000 feet. At this time I was in IMC with light rain. As part of routine pre-landing checks, I switched both left and right tanks from Auxiliary to Main. As I was reaching 6,000 feet, the right engine started to run rough for a few seconds and subsequently failed.*

Since I was in the landing phase of the flight, there was no time to complete the “cause check” procedure. When ATC asked me to maintain altitude, I responded, “Unable” and explained that I was on one engine only. At this time I was in VMC. I squawked 7700, declared an emergency, and requested vectors to the nearest airport. ATC vectored me to a nearby field, advised that I could land on any runway, and switched me to Tower frequency. Tower immediately cleared me to land. I maintained a safe airspeed, lowered the landing gear and flaps, and landed...uneventfully.

Next day, I found that although the fuel selector had been set to the Main position, the engine was still drawing fuel from the auxiliary tank which had eventually emptied and led the engine to fail due to fuel starvation. Apparently the fuel selector valve had not been positioned completely in its detent position (close, but had not “clicked”). This incident was a good lesson learned and I have become more alert

and diligent to ensure the fuel selector valves are properly positioned when using them to switch between tanks.

An Inconvenient Truth

A faulty recollection of the last flight influenced this C180 pilot's optimistic interpretation of the aircraft's fuel gauges. Although somewhat inconvenient, visually checking the fuel tanks could have prevented an even more “inconvenient” forced landing.

■ *The engine quit for (at the time) unknown reasons. I turned toward lower terrain while slowing to best glide speed. The area was mountainous with thick timber and mixed clear cuts, none suitable for landing. About five miles west, I chose a pasture and made a forced landing with no aircraft damage or personal injury.*

After my nerves settled down, I investigated the cause and found it to be fuel exhaustion. I thought I had preflighted the aircraft carefully. I had checked both right and left fuel gauges and believed them to be reading FULL. The gauges are original equipment for a Cessna 180 and were working properly. The problem is the gauges are built with EMPTY and FULL both on the bottom of the gauge, very close together. I also think the needles can go below EMPTY in certain attitudes which would put them closer to the FULL marks. When [the tanks are] full, the gauges can go above the FULL mark which would put them closer to the EMPTY mark.

My last flight was almost three months prior and was a long one, landing not too much above FAA minimum fuel remaining. I mistakenly thought my last flight had been from my local fuel stop after filling up, which is the normal way I park the airplane. I was airborne around 30 minutes, which would fit with the fuel to be expected after the actual last flight.

What I learned was to do a better preflight and watch out for the fuel gauge problem. The fuel gauges bounce around starting at about 1/4 tank and go to “0” when parked in the normal ground attitude. I did not check the tanks visually which I will try to do anytime the fuel gauges are not in the middle. The Cessna 180 tanks are hard to check (high wings made worse by large tires and the lack of any steps to climb up on in case a ladder is not available).

My wish list includes better aftermarket fuel gauges for the aircraft and a better brain for me.

A Self-Induced Surprise

After inadvertently switching both tanks “OFF,” a Light Sport Aircraft pilot was fortunate to have plenty of runway remaining when the engine quit less than 200 feet in the air.

■ Having very recently completed my CFI renewal, BFR and Light-Sport Aircraft checkout at an FBO, this was to be my first solo flight in about a decade. Because of these circumstances, I was being very deliberate and careful in everything I did. The aircraft was the same one that I had flown for my BFR the week before. I had noted that the aircraft had a rather complex fuel system for a simple high-wing aircraft. It featured both engine-driven and electric fuel boost pumps and an independent fuel shutoff valve for each wing tank located on the respective windshield pillars. According to the checklist, the valves (small “batwing” types) are “OFF” at engine stop and, obviously, “ON” for flight operations. Additionally, the engine back-feeds surplus fuel to the right tank only, which introduces fuel management issues.... I had noted to friends that this seemed a bit complex for an LSA-class pilot and aircraft, but obviously (I thought to myself), not for ME.

On preflight I noted by visual check that the left tank was full and the right, brim-full. Since I knew that any excess returned to the full right tank would simply spill out the overflow tube, I started to think about “managing” that environmental issue. So after startup, I positioned the selector valves to draw off the right tank only during taxi and run-up. Because I had noted that there were no fuel tank items on the Before Takeoff checklist, I would have to remember to recheck/reconfigure the fuel selectors. After more than 50 years in aviation I thought I could remember to do this, and I did, just before taking the runway. With that mentally checked off, I rechecked the other items (flaps and trim, engine gauges) as I lined up.

The [aircraft] leapt off the ground in a few hundred feet. Somewhere between 100 and 200 feet, the engine sputtered and quit. After a fraction of a second of disbelief, having never had a complete power failure before (let alone on takeoff), I dumped the nose and landed uneventfully well before the first turnoff.

As I rolled out I wondered, “Why?” There was no mixture control or carb heat on this engine, the Aux Fuel pump was on, and I knew I had checked and reset the fuel selectors. I looked at each windshield pillar and noted with satisfaction they were both similarly positioned. Then to my astonishment

I processed what I was seeing; they were both “OFF”! I turned them back on, turned the key and the engine was running again....

It was obvious “what” had happened, but it took about two hours after the flight for me to suddenly realize “how.” As I ran back through my thought processes at run-up, I realized that because all my thinking about the fuel situation was focused on the right tank, when the time came to reconfigure, I moved the “RIGHT” (wrong!) fuel selector, which of course had been “ON” to burn some excess fuel while the left was “OFF.” I turned the right tank “OFF” because my brain had become fixated on changing the right tank, rather than on both tanks “ON.” While I’m hardly surprised that I could make a mistake, I was astonished that I could make THIS one.

I fully understood the fuel system and its selectors. While it is a bit complex for a simple aircraft, and in some respects the system design helped me make this mistake, I’ve logged substantial flight time in...many other aircraft with more complex fuel systems than this one, and never had a single self-induced fuel system surprise. Nor was I rushed or over-confident on this occasion. I wish I could remember whether I physically LOOKED at the fuel valves as I took the runway or whether I just mentally checked off “good to go” for that system. I hope it was the latter. I can’t imagine that actually “seeing” both valves horizontal wouldn’t have rung my bells.

My take-away from the affair is not a new one for me or for any airman. Look AND think about each checklist item, especially the potential killers.

Nine Gallons Short of a Stetson

Two C172 pilots did not receive the ten gallons of fuel they paid for and subsequently learned a lesson about the need to verify the amount of fuel on board. But, given the fuel required for the one hour reserve, perhaps their calculation of the fuel needed for the flight was also a bit short.

■ During an instrument flight lesson we decided to add 10 gallons of fuel to meet the club requirements of one hour reserve. We requested 10 gallons of fuel with ramp personnel and the FBO front desk. We went in and flight planned and in approximately a half hour we paid our fuel bill for 10 gallons and departed. We thought we had the fuel, but we experienced an engine out on short final followed by an emergency landing.

We received a phone call from the FBO the next day stating that the fuel uplift was in error and that we received only one gallon, as opposed to the ten gallons we paid for.

ASRS Alerts Issued in July 2014	
Subject of Alert	No. of Alerts
Aircraft or Aircraft Equipment	9
Airport Facility or Procedure	3
ATC Equipment or Procedure	4
TOTAL	16

416

A Monthly Safety Newsletter from

The NASA Aviation Safety Reporting System

P.O. Box 189
Moffett Field, CA
94035-0189

<http://asrs.arc.nasa.gov>

July 2014 Report Intake	
Air Carrier/Air Taxi Pilots	4,973
General Aviation Pilots	1,239
Controllers	740
Flight Attendants	577
Mechanics	199
Military/Other	142
Dispatchers	108
TOTAL	7,978