

CALLBACK

From NASA's Aviation Safety Reporting System



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CAPitalizing on Fuel Management Lessons

Previous issues of *CALLBACK*¹ have targeted the very serious matter of General Aviation (GA) fuel exhaustion and fuel starvation incidents. However, the problem of missing or improperly fastened fuel caps was not discussed previously and it has shown up in a significant number of recent ASRS fuel incident reports.

While there are several lessons offered in the following fuel cap incidents, the one that would ultimately have prevented each of these events from occurring is perhaps the most obvious—check the fuel caps after fueling. By topping off your fuel management wisdom with this lesson and the others mentioned below, you can help reduce preventable fuel related incidents.

Out in the Cold Without a Cap

A C182 Pilot was lucky to have an airport within gliding distance after the engine ran out of fuel. A post-fueling pre-flight could have prevented this embarrassing bladder-emptying event.

■ *On an IFR flight in VFR conditions at 4,000 feet, the engine lost power. I immediately switched the [GPS NAV] to Nearest Airport. The temperature was -4C so I had already pulled the carb heat and noticed that the fuel gauge on the left tank was empty and the right tank read a bit over half full. I switched to the right tank, but still no power. All the while I continued my glide toward the airport. At about 2,500 feet I saw the airport and set up for a power-off landing which was uneventful.... I cancelled my IFR clearance and notified the briefer that...the flight had terminated uneventfully.*

My first thought was that the fuel line from the right tank had frozen and fuel was exhausted from the left tank with plenty in the right tank. The temp on the ground was +2C so I expected that this might be OK once the plane warmed above freezing. When I left the FBO office and walked back to the plane I noticed that there was something different about the right wing gas cap. Sure enough, upon closer inspection, it was hanging by its chain well clear of the filler port.

Prior to the flight I had purchased 40 gallons of fuel (top off) and while the lineman fueled the plane I did my walk-around preflight. I thought I had done a very good job of this, but if I had done the walk-around after the refueling I

would have seen the fuel cap condition.... I could say that this was caused by the lineman not replacing the fuel cap, but in the end it is my responsibility to manage all aspects of the flight and checking the oil filler cap and the fuel caps fall under that as well. I also had a second chance to discover the missing cap since I flew to an intermediate stop in this condition and departed with the cap off and still unnoticed.

With the cap off, fuel is gushing out over the top of the wing and trailing off past the flaps. The weather was cloudy and visibility was limited, but still VFR during takeoff and initial climb out. This white background would perhaps make the fuel loss less apparent, but I'll bet if I would have looked, I would have seen it.

During flight the plane appeared to me to be heavy on the left side. I noticed this and continually examined the ball and rudder trim, but never understood what was making me think something was abnormal. I scanned the gauges but was always satisfied that the fuel was OK because the gauges were never real good at showing the fuel level when it had over 3.5 hours of fuel remaining anyway.

I dipped the tanks after the incident and found that both tanks were completely empty. I then called my A&P/IA who was familiar with this. He explained to me that the erroneous high fuel level indication of the tank with the cap missing was caused by the empty fuel bladder bottom surface buckling. The bladder was being sucked up by the low pressure over the wing which also propped up the fuel float sensor bar and resulted in the gauge indicating a high fuel level.

A Most Fortunate Find

Apparently the rate of fuel loss from the uncapped tanks was not sufficient to catch the attention of this Cirrus SR22 Pilot. It took a timely message from ATC to prevent what could have become a serious fuel incident.

■ *[The field] only offered self-serve fuel, something I am trained to do, but don't do very often. I taxied the airplane to the self-serve station and followed the procedures for refueling my airplane. I added a total of 12.5 gallons of fuel; 6 gallons in the right wing and 6.5 gallons in the left. After fueling, I purposely left the fuel caps on top of the wings with the intention to come back and visually check the fuel level before departure. After I was done fueling I forgot*

to do my final check of the airplane where I would have checked the fuel caps.

After refueling I started the engine, did my normal Before Takeoff check and run-up, and got an IFR clearance.... All indications were normal, but I failed to notice that I was missing my fuel caps. I flew for about an hour before I checked in with Approach at [destination]. They advised me that an SR22 fuel cap was found at [departure airport] and they suspected it could be mine. Approach advised me that my company wanted me to land as soon as possible to see if I was missing some fuel caps. Approach suggested that I go to [an alternate airport] and I agreed since this was a good option for me at the time. I had the airport in sight and got cleared for a visual approach. I made sure I stayed high on my approach in case of any issues with the engine.

Landing was normal and on the ground I noticed that I was missing both of my fuel caps. I parked the airplane and followed our procedures to cover the fuel tanks until the next day when our mechanic came with replacement fuel caps.

An Uneasy Feeling Precedes an Unplanned Landing

This Pilot got rushed and forgot to check the fuel caps after refueling a borrowed C182. An hour from the destination airport, the Pilot also failed to pay attention to a feeling that something wasn't right. When that something is corroborated by a fuel gauge on EMPTY, do as the Pilot suggested— pay attention to the feeling.

■ I pulled up to the fuel pump and dipped both tanks. There were 10 gallons in the right tank and 25 gallons in the left. I decided to put 25 gallons in the right for a total of 60 gallons. However, the pump stopped at 20 gallons due to my error in operating the self-serve pump. Another aircraft had pulled up behind me, waiting to fuel up, so I felt a little rushed and decided not to re-engage the pump for the extra five gallons I had originally planned.... I quickly re-calculated the difference the five gallons would make in my planning (55 gals vs. 60 gals). Having never flown this aircraft before, I wasn't completely sure what the normal fuel burn would be, so I calculated a 15 gallons-per-hour burn. I flight planned for a 2 hour trip, so with 55 gallons on board I figured I had about a 3.6 hour endurance, with the required fuel reserve.

We took off...and eventually got handed off to Center. I was having trouble communicating with Center, so I canceled

Flight Following and continued on my way. It was also about this time I noticed the left fuel gauge showing empty. Not having flown this airplane before, I didn't know whether this was normal or not. I started feeling a little uneasy and I did consider stopping...to investigate and refuel if necessary, but decided to keep going as we were only about an hour away from home. When we got about four miles past [another airfield], the engine stopped. I immediately turned back toward the field. I relayed my intentions (the field was closed this day so no one was in the Tower). I set up for a glide to the runway but as I got closer I saw X's on the runway numerals. I then decided to set up for a landing on the other runway. During this time I had asked my passenger to get the CTAF frequency (which wasted precious time and altitude) and by the time he found it on the sectional, my altitude had depleted to about 600 feet above the surface. I was still on downwind so I immediately turned to lineup on the runway, about midfield. I overshot the runway so I banked sharply to get back on centerline. The aircraft was about 15-20 feet above the runway and just ran out of energy. We impacted the runway fairly hard but there was no damage and no one was hurt.

While we were sitting on the taxiway awaiting the tug, I got out of the aircraft and the first thing I saw was the left fuel cap was not securely fastened to the fuel port. I also dipped both tanks and they were completely empty. I surmised that all the fuel had been siphoned or vented out of the open fuel port.

Lessons learned/suggestions: 1) Never allow yourself to get rushed for any reason. Had I not been rushed, I would have double checked to ensure all caps were securely fastened. 2) When you get that feeling that something isn't right, pay attention; it probably isn't. If I had listened to myself about the uneasiness I felt about the fuel gauge and landed, I would have noticed the fuel cap being off, refueled, and avoided this situation altogether. Finally I would like to say that I have been flying for [many] years and have always been very safety conscious. I never thought that one day I would run out of fuel, but it happened. If you don't practice emergency procedures, especially dead-stick landings, you're doing yourself a great injustice. I do every time I go up and it paid off this time. Let your training take over and remember— fly the airplane, no matter what happens.

¹#416, September 2014 and #405, October 2013

ASRS Alerts Issued in August 2015	
Subject of Alert	No. of Alerts
Aircraft or Aircraft Equipment	4
Hazard to Flight	1
TOTAL	5

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 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>

August 2015 Report Intake	
Air Carrier/Air Taxi Pilots	5,027
General Aviation Pilots	1,199
Controllers	572
Flight Attendants	544
Military/Other	523
Dispatchers	172
Mechanics	168
TOTAL	8,205