

We recently had a loss of engine power incident on a dual flight. The crew had shot the RNAV 31 at 1K4 and were executing the missed approach procedure. When executing the climb check list, upon turning off the electric fuel pump the engine started to balk, losing power, briefly regaining power and losing power again. Upon switching fuel tanks from left to right and turning on the electric fuel pump engine power was restored. The crew declared an emergency on 121.5 and landed the aircraft without further incident at 1K4. Post flight inspection revealed ample fuel in both tanks. Following a maintenance inspection\* the next day and a thorough preflight inspection (no contaminants detected in the fuel sample), and a thorough engine runup the aircraft was uneventfully flown back to OUN and returned to flight status.

So, what happened? In his incident report the instructor noted that when directing the student to switch tanks during the power loss that the fuel selector pointed a bit left of the left tank position, toward the "Off" position.\* Without going into a lot of system testing and analysis I'm assuming that the location of the fuel selector being to the left of the left tank position, combined with turning off the electric fuel pump and the high fuel demand of full throttle the engine became fuel starved. The instructor also acknowledged that they did not execute the in-range checklist until after departing HAKAR and approaching GOLGY, the FAF. Executing this checklist along with configuring the airplane for approach (and executing the before landing checklist) probably caused the in-range checklist to be hurried which caused the student to incorrectly operate the fuel selector while switching tanks.

\*We all know that in the warriors there is a "locking tab" that has to be depressed in order to switch the fuel selector to the "off" position. If not depressed the locking tab will not allow the selector to move any amount of distance from "L" toward the "off" position. We tried several times, using a reasonable amount of pressure to see if we could "force" the selector toward the off position without pressing the tab. The conclusion was that the tab functioned correctly in preventing the fuel selector from moving toward the "off" position. As unlikely as it may seem, the student also managed to depress this tab when switching tanks. I know of two instances in the distant past when the student managed to turn the selector all the way to "off" when switching tanks. The details of those incidents are for another time.

When should we have the in-range checklist completed?

- In the local practice area: Prior to leaving the practice area and prior to contacting ATC.
  - Cross country's: Prior to reaching the top of descent
  - Doing multiple instrument approaches: Prior to reaching the Initial approach fix or when being vectored prior to receiving the final vector to intercept the inbound approach course.
- What if I'm beyond that point and realize I'm behind the airplane and haven't done the in-range check? Do I try to salvage the approach, or do I simply tell ATC I need to come back around for another try? Note there are more items in the in-range check than "fuel on the fullest tank." If you are hurrying this check, did you check the weather – determine whether ceilings/vis is above minimums; determined whether a straight in or circling approach is required based on the winds? In a severe clear training environment, you usually won't get burned if you don't properly consider the weather. Remember, we're training for instrument conditions down to minimums. To be a bit more on the pragmatic side, trying to salvage an approach in this situation will lead to a bust on a stage check. Telling ATC, you need to come around for another try and you may live to fight on – both for your stage check and in the real world.

A word about switching fuel tanks when conducting the in-range check. We all set the countdown timer for thirty minutes and switch tanks when the counter hits zero and then reset the timer for thirty minutes, repeat. This is great for ensuring balanced tanks during cross country flights. However, the in-range check doesn't say "switch tanks when the timer counts down to 0." It says, "fuel on the fullest tank." I have seen instances where the pilot did not switch to the fullest tank when conducting the in-range check. Then, in a critical phase of flight the timer hits zero and they switch tanks. In many, if not most,

situations when conducting the in-range check the fullest tank is probably the tank not being used. Simply switch tanks and reset the timer. In those situations where the tank you are currently operating on is the fullest tank, no problem. But, from that point on, and especially if I'm in a high workload situation, if the timer hits zero I'm not going to interrupt what I'm doing to switch tanks. If I'm trying to keep the needles centered on an approach down to minimums in bumpy conditions, am I going to break scan, even temporarily, to switch tanks – and also risk vertigo with the sudden head movement? Is the airplane going to become uncontrollable due to fuel balance issues if I don't switch tanks exactly when the timer goes off?

OK, I've seen situations on stage checks when the timer goes off in the middle of the maneuver or an approach and the pilot makes a mental note to switch tanks at the completion of their maneuver. Then at the completion of the maneuver they forget to switch tanks. If, when heading into an airport they properly execute the in-range check, switch to the fullest tank and restart the timer, we're good. Unless we're really flying the tanks down to less than a total of one hour duration or less, nothing bad is going to happen if you fly the airplane even a half hour beyond the expiration of the timer. Note: Prior to the advent of convenient timers on our transponders we did have a student on the Stage III, Lesson 1 long XC who executed a good, forced landing (good in the sense that the student survived without injury) after running a tank dry on the final leg into OUN after executing landings at two airports. Again, the issue wasn't "did the student switch tanks every thirty minutes?" The issue was "did the student properly execute the in-range checklist prior to descending into the two previous airports?" The answer was no.

Final note: Kudos to the crew for declaring an emergency and landing at the nearest suitable airport. In retrospect one might think, "gee, I could have just switched tanks, and flown home – nobody would have been the wiser." But what if there had been deeper issues regarding the fuel system? Better to declare the emergency and let people know you may need help. Better to be safely on the ground then sweating it out trying to make it back to OUN. And better to provide us all an opportunity to learn from the error\*\* and do better in the future.