

Believe Your Fuel Gauges

Recently the pilot of a light commercial twin-engine aircraft experienced a surging of the aircraft's righthand engine shortly after takeoff. The pilot changed fuel tanks as part of the engine trouble checks, but then decided to feather the engine to obtain maximum climb performance due to the nature of the terrain in the takeoff path. The engine was secured before it could be established that the surging was due to a fuel starvation problem. The aircraft was then re-circuited to land without further incident.

AERO CLUB FLIGHT LOG						<i>Consumption rate 35 l/hr</i>	
				TIME		FUEL	
				Flight Time	2:30	87.5 l	
				Taxi	0:15	8.75 l	
				Reserve	0:45	26.25 l	
				Fuel Required	3:30	122.5 l	
				Usable Fuel Carried	4:00	140.0 l	
Time	L	R	Total	Tank	Remarks		
09:06	70	70	140	L	Startup		
09:36	57.5	70	127.5	R	TOC		
10:06	57.5	57.5	115	L			
10:56	28.5	57.5	86	R	Changed tanks 20 mins late		



Subsequent investigation by the operator revealed that the aircraft had been incorrectly refuelled and that the righthand fuel tank selected at the time had been run dry.

The pilot had requested the company's fuel provider to supply a specified quantity of fuel to the aircraft outer tanks prior to its previous flight. The pilot observed the refueller fuelling the aircraft and later verified the quantity by checking the relevant fuel uplift documentation.

On this occasion the refueller did not refuel the outer tanks as requested, but instead placed the fuel in the inboard tanks. The refueller was new to the job and did not follow the appropriate refuelling procedures. Previously it had been operator company policy that, as long as the pilot observed the aircraft being refuelled and sighted the refuelling documentation to verify the quantity uplifted, fuel tank dipping was not required. The pilot did not dip the aircraft fuel tanks in this instance. (The company has since revised this policy so that pilots are now required to dip the tanks after refuelling to verify the fuel quantity on board.)

The operator's investigation suggests that pilot training up to the light commercial twin-engine level of the industry places little reliance on the aircraft fuel gauges. The reason for this may be that most gauges are not annotated in litres and that basic training from instructors focuses on fuel usage in terms of airborne time remaining, without reference to the fuel gauges.

Vector Comment

There are a number of lessons to be learned from what could have been a more serious incident or accident:

- Do not rely on someone else to correctly refuel your aircraft. Murphy's Law says that they will eventually get it wrong – as was the case in this incident.
- Always dip your aircraft fuel tanks (assuming that it is possible to do so) before every flight to verify that you have the fuel on board you think you have.
- Ensure that your fuel gauges are maintained in accordance with the aircraft maintenance program.
- Aircraft fuel gauges, when maintained correctly, do not usually lie. Although keeping a fuel log using the time-remaining method should always be the primary means of calculating fuel endurance, fuel gauges should **not** be ignored – especially when they are indicating a low fuel quantity. A fuel gauge reading that indicates less fuel on board than your fuel log shows may be a sign that an engine is burning more fuel than you think, or that the aircraft was under-fuelled in the first place. Where there is a noticeable discrepancy between the two, all available options should be reviewed and action taken that will allow positive verification of the fuel quantity remaining. Better to be a little late than not to arrive at all.

Fuel management is one aspect of aviation safety that you cannot afford to take short cuts with. Even if you are under time pressure to get airborne, it is still worth spending a few extra minutes dipping the tanks and verifying the amount of usable fuel on board. If the pressure is on to get to a destination, and you are unsure of the fuel remaining, then **land** (preferably at an enroute airfield) and positively verify the fuel tank contents. Good decisions and habits such as these save lives. ■