

March '09 Safety Newsletter

Dear fellow pilots,

Welcome to the March Safety Newsletter. We are rapidly approaching the wet season here in Hong Kong, where we get troughs of low pressure hanging around the South China Coast area. These in turn will be bringing lots of rain and thunderstorms. So I thought this month we would look at some of the considerations for aircraft operations during this wet weather.

Firstly, pre-flight planning. Nowadays, with modern technology, we have access to a multitude of weather information. As well as the usual VHHH forecast and METAR and the 100nm Area forecast, we have a very useful Radar Imagery display available on the HKO website. During the rainy season this imagery gives a very useful and almost real time picture of the rainfall and thunderstorm activity in Hong Kong, particularly when the animation feature is used. The animation shows very clearly the track of the weather and can be very useful in anticipating the weather for the next few hours. I would recommend you always look at this picture when there is any hint of rainfall or thunderstorm activity.

Secondly, the pre-flight check of your aircraft. One of the biggest concerns here is fuel contamination, water in the fuel. The effect of this on the engine can be anything from a misfire or two to a partial engine failure (unable to achieve perhaps more than 1500 RPM), to a complete engine failure. This will depend on how much water contamination there is in the fuel.

The other thing to bear in mind is that nothing will happen to the engine until the water reaches the carburetor (or fuel injectors in the case of PL or SB). This may be during take-off or perhaps 30 minutes or more into the flight.

How does water get into the fuel tank?

It can be from contaminated fuel in the bowser. The engineers carry out a daily check of the bowser for water contamination before the start of flying. It can be water getting past the fuel caps. If the cap is loose fitting and/or the rubber seal has any brown staining then water will probably get past the cap. Bring this to the attention of an engineer or Instructor immediately.

So what can we do during our pre-flight to minimize the risk of water contamination? Well, I would suggest you consider the following.....

Check when the aircraft last flew. If it has not flown today and there has been rain since its last flight, suspect water contamination.

If it has been refueled remember, it takes about 20 minutes for any water in the fuel to settle to the bottom of the tank. You will have to wait 20 minutes before you can carry out a water drain check.

Drain off a good amount of fuel from each drain. I recommend at least two inches of fuel from each drain and more if you suspect contamination. You can always pour it back into the tank if there is no water. Check the colour. Make sure it is fuel and not 100% water. Hold it up against the white paint of the aircraft to check it is BLUE colour.

If you find any water get an Instructor to help. He will go through the procedure of rocking the aircraft wings and then lowering the tail. The idea of this is to coax the water to the lowest point of the tank so it can be taken out with the fuel drain. Keep draining until the fuel is absolutely clear. It may take several litres from each tank.

Know how many fuel drains there are. Why does PL have more fuel drains than the other 172's? The answer is because it is more modern than the other 172's. Cessna realised that the bottom of their fuel tanks would become uneven with time and hence would trap water in pockets rather than allowing the water to drain to the lowest point where the drain valve is. This is why we rock the wings of the older 172's and why Cessna fitted more fuel drains to its modern aircraft. Have a look at this web site, which shows the difficulty in getting the fuel drain valve in the right place, in the lowest point of the tank

<http://www.sumpthis.com/cessna150andcessna152tanktest/cessna152tanktestimages1024x768page1.htm>

PL has 13 fuel drains, HN has 4, PA has 3, the other 172's have 3, the Slingsby has 3 but you can only access the two fuel tank drains with the nose cowling on.

Know where the fuel drains are. Two of our aircraft have fuel drains underneath the fuselage, PL and HN. It will take two people to take a fuel sample from the filter drain inside the engine cowling, unless you have extremely long arms! This sample must also be inspected for water contamination.

So now we are happily flying along when the engine starts misbehaving for no apparent reason. As mentioned earlier, water contamination can produce symptoms from a misfire to a complete engine failure depending on the amount of water present.

Discussion on engine failures is another whole new newsletter, but consider the following:

If you suspect water contamination is giving you the engine problem consider delaying the securing of the engine. The engine may recover if the water is allowed to travel through the system.

What if you are unfortunate enough to be caught out and flying in heavy rain? What considerations should you have for operation of the engine?

The Cessna POH states you should select full carb heat. This is because with carb heat set to cold, rainwater could block the airway or enter the carburetor and cause engine problems. We can avoid this by selecting carb air hot, so air is now being taken from the protected area inside the engine cowling.

The runway is very wet. What considerations should we have for take-off and landing?

Have you ever noticed how you get a smooth landing on a wet runway? This is because of the film of water between the tyre and the runway acting as a cushion. But this thin film of water can give you big problems if you want to use the brakes. Above a certain speed the tyre will lock and ride on the film of water thus rendering the brakes useless. This phenomenon is called “aquaplaning” and the aquaplaning speed is calculated as follows:

Aquaplaning speed = $8.6 \sqrt{P}$, where P = tyre pressure in PSI

For the 152, where P = 21 psi, the aquaplaning speed is 40 kts. If you apply the brakes above this speed on a wet runway there is every chance that the wheels will lock and the aircraft will slide gracefully out of control! Any cross wind will then take you just as gracefully off the side of the runway!

So, if you are faced with landing on a very wet runway, do not land in any significant crosswind and try not to use the brakes until low speed.

By the way, aquaplaning can occur with water depths of just 1mm and at speeds less than the calculated.

To avoid turning this newsletter into a newsbook I will close now, but remember, there are many, many considerations for operating during the rainy season. I have just touched on some of them. When it comes to the decision on whether to fly or not there is an old adage that springs to mind immediately:

It is better to be down here wishing you were up there, rather than the other way round!

Happy and safe flying

Bob