Winter Flying

Winter Flying has unique rewards and challenges. It can be a spectacular experience, especially in the snow-covered Southern Alps. In order to keep it safe, think ahead and be fully prepared before venturing out into the winter weather.

Preflight Inspection

A preflight inspection in winter is very different to a summer preflight inspection. There are a number of additional things to do – particularly if your aircraft has been picketed outside. It will take you longer to complete, so allow additional time for your preflight routine, and dress appropriately. Don't allow your preflight check to be less thorough, just because you are cold.

Check the drain holes in the wings, stabiliser, flight control surfaces, fuselage, tailplanes, and air scoops, to make sure they are unobstructed and capable of working. Aircraft that are left outside for any length of time in rain and frost conditions will tend to accumulate water in all of these places. It is easy for drain holes to freeze over, keeping the water and ice in. The expansion of water when it freezes can cause damage to the internal structures of wings, control surfaces, or fuselage bulkheads.

Aircraft fuel systems should be checked for water. A small amount of ice can prevent the proper operation of fuel pumps, selector valves and carburettors.

Pitot-static systems should also be checked, as water freezing in these could make the altimeter, airspeed indicator and vertical speed indicator unserviceable.

In winter there is a greater risk of water condensing in fuel tanks – completely full tanks will help minimise this. After refueling, allow fuel to settle before taking a sample to check for contamination. Check that all fuel vents are unblocked. A blockage could cause an engine to stop or a tank to collapse.

Wheel spats and fairings pick up mud and slush. If mud is allowed to accumulate in the spats, it can compact and add considerable weight. It can also create a braking effect on the wheels, and may eventually break the spats if they are not cleaned out regularly.

Ice buildup inside wheel spats tends to break up into blocks. These blocks could become jammed between the wheel and the spat. Check spats, fairings and undercarriage bays for ice accumulation and mud.

Snow or ice on the upper wing surface substantially increases drag and weight, thereby decreasing lift. The shape of the aerofoil is altered, it becomes much less efficient, and your stall speed is increased. Frost can be unpredictable in its effect. Even a small amount of ice on a helicopter's rotor blades could set up a vibration that leads to loss of control.

Snow, ice, or frost, must be entirely removed before flight. It is especially important to remove snow before it turns into ice. Check for ice by moving a bare hand or a thinly gloved hand over critical surfaces.

Hand brushing will clear what is not stuck to the surface. Patches of solid ice can then be removed by 'sawing' with a length of material or hemp rope backwards and forwards over the surface. Hard-edged tools must not be used.

If you choose to use a hot air blower, take care that the run-off is not allowed to pool and freeze unseen over drain holes or around hinges. Warm water mixed with de-icing fluid can also be used.

Preflight Planning

When planning a winter flight, here are some additional things to think about.

Snow, slush, mud, and wet grass will lengthen the takeoff roll. Make sure you factor this into your performance calculations, and pick a 'decision point' which will allow sufficient runway to stop if you have not reached your nominated airspeed.

Obtain a comprehensive weather briefing before flight. Fog is much more common in winter and can be very widespread, potentially covering the whole of either coast of the South Island. Don't assume the weather will be clear and fine when an anticyclone is present – this is when fog is most likely to form.

Other things to consider in winter are the surface condition of your destination aerodrome, and the amount of daylight remaining when you arrive. Daylight becomes even shorter when bad weather sets in. For VFR operations, plan to arrive at least 30 minutes before Evening Civil Twilight. This will give a safety margin for unexpected delays en route.

Plan your fuel requirements conservatively. Possible diversions around weather can add to flight time and increase your fuel needs. The use of carburettor heat will also increase your fuel consumption.

Anywhere snow is falling should be avoided. Snow will transform reasonable visibility in rain to virtually zero visibility in heavy snow.

Always carry warm clothing in case a diversion or emergency landing is necessary. The risk of carbon monoxide (CO) poisoning increases with the use of cabin heat. Ensure you have a valid CO detector, and mix cabin heat with outside fresh air.

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For more winter flying tips, see the *Winter Flying* GAP booklet on the CAA web site, www.caa.govt.nz, or email info@caa.govt.nz for a copy.

Night Flying

Most night flying is carried out in winter. If you are considering flying at night, make sure you do some practice with an instructor, and read the *Night VFR* GAP booklet. See the CAA web site, or email info@caa.govt.nz for a copy.

Flying With a Cold

Winter is cold and flu season, and most of us will succumb at some point. Don't be tempted to fly with a cold. Here's why.

A cold will affect your decision-making ability and your reaction time, making you less able to deal with emergency situations. It will also cause congestion in the nose, sinuses and ears.

The eustachian tubes link the inside of each ear drum to the back of the throat. Their main function is to keep the air pressure in the ear the same as that outside the body.

When you have a cold the tissues inside your nose and throat swell, and the tiny opening to the eustachian tube narrows, or closes over completely. This makes pressure equalisation difficult or impossible during climb and descent, and can lead to anything from slight discomfort and hearing loss, to intense and incapacitating pain, and even perforation of the ear drum – leaving you unfit to fly for many months.

Sinus cavities are also linked to the outside world via small tubes. Sinus pain occurs when these tubes are blocked by swelling tissue. Intense sinus pain is more likely during a climb.

A cold also increases your fatigue, and decreases your hypoxia tolerance, and G tolerance.

Colds are a viral illness, with no proven cure. Just be patient, and don't fly while suffering from cold and flu symptoms.

Aquaplaning

Aquaplaning is where standing water on the runway causes the wheel of an aircraft to lose contact with the runway surface. Both braking and directional control can then be lost.

As a tyre rolls on a wet runway, it displaces the water it comes into contact with. At high speeds, this displacement creates hydrodynamic pressure that reacts on both the runway and the tyre. This pressure causes the wheel to rotate more slowly, although the aircraft groundspeed has not decreased.

As groundspeed increases, so does the hydrodynamic pressure, and a wedge of water starts to lift the tyre from the runway.

A water depth of only 3 mm is needed for aquaplaning to start. Once it has begun, it can be sustained over water depths that would not have led to its initiation, and at speeds lower than the speed at which it began.

A simple equation can be used to predict the minimum groundspeed at which aquaplaning will begin.

$V = 9 \times \sqrt{P}$, where V is the groundspeed in knots and P is the tyre pressure in pounds per square inch (psi).

Practical tips to prevent aquaplaning:

- Make sure your aircraft has the correct tyre pressure.
- Make sure it has sufficient tread.
- Know your aquaplaning speed (using the formula above).
- Ensure you achieve the target threshold speed during touchdown. This figure is normally found in your Aircraft Flight Manual.
- Ensure you make a positive touchdown – don't bounce and don't try to do a greaser. A positive touchdown helps break through the water and make effective contact with the runway surface.
- Depending on your aircraft type, application of gentle forward control column pressure can be useful after touchdown as this increases the weight on the wheels.
- If you have anti-skid, make sure it is on.
- If you have reverse thrust, use this in preference to wheel braking.
- Don't disable your anti-skid (except if there is a gross malfunction) since hard braking on a wet runway without this protection may lead to reverted rubber aquaplaning, and a decrease in deceleration due to locked wheels. Reverted rubber aquaplaning is where a skidding tyre generates enough heat to change the water film into a cushion of steam, keeping the tyre off the runway, and causing the tyre rubber to revert to its original uncured state.
- If you do not have anti-skid braking or reverse thrust, choose the longest into-wind runway available, and limit the use of wheel braking. Let the aircraft roll to a stop as much as possible.
- Avoid landing on a wet or contaminated runway when there is a cross wind.
- Check that sufficient 'wet runway' landing distance is available. This should be at least 115 percent of the landing distance required on dry runways (see rules 121.223, 125.225 and 135.225).
- Apply even brake pressure to maintain directional control.
- If you don't have anti-skid, use the 'apply and release' technique to reduce the chance of locking up the wheels. ■