

Winter Happens

But it Can be Managed

Winter means different things to different people – some embrace it and can't get enough winter activity; for others, it's a dark, gloomy, unpleasant period to be endured stoically until the days lengthen and summer returns. For the aviation community, it presents a known set of challenges, which will vary with the type and scale of operation. With preparation and planning, however, these challenges can be managed to minimise risk and discomfort.

What Winter Brings

Shorter Days

Daylight hours are in short supply at midwinter, as compared to midsummer – for example, at Christchurch on 21 June, there are just 9 hours 51 minutes of daylight, and on 21 December, 16 hours and 36 minutes. The implications of the shorter days include less flexibility for the day VFR pilot, and generally more night flying for the IFR pilot. Particularly noticeable is the rapid onset of darkness after sunset, and this is exacerbated by overcast conditions – on a bad day it can be quite dark at sunset, making the AIP daylight table times seem a little academic.

Not only is the sun late to rise and early to set in winter, it is lower in the sky throughout the day and thus has the potential to be 'in your face' more of the time. The midwinter sun at Christchurch is only 23 degrees above the horizon at local noon, quite a difference from 70 degrees at midsummer.

Weather

Winter can bring some glorious, crystal-clear, calm weather, in which it is an absolute pleasure to fly. Even when the winter weather is good though, we still pay the price in the form of frosts, ice, and sometimes morning fog.

On the Ground

On an aircraft that has been parked out overnight, frost can be an insidious hazard. It takes only a light frosting on wings or rotor blades to degrade the boundary layer airflow, which is critical to lift development. Frost with the texture of medium-grade sandpaper can be enough to result in a stall after takeoff at what would be normal speed for a clean wing. Similarly, a heavy dew or rain that has subsequently frozen on the aircraft will affect the lifting ability of the wing or rotor, and may add significantly to the aircraft weight if not removed.

A hard frost will turn a normally resilient grass surface into a solid unyielding surface, on which you will feel every tiny bump and corrugation while taxiing. Sometimes it will be difficult to convince yourself that the aeroplane isn't going to shake itself to pieces.

Fog can be a frequent occurrence at some aerodromes, and usually the drive to the field will give you some idea of what to expect. Carry on with flight preparation by all means, but wait until the fog has dissipated and you have good visibility before attempting to take off. Also, it's a good idea to check that your destination isn't similarly affected.

If carrying out night flying training on a cool clear night, keep a weather eye out for fog. Each time round, check the runway lights for a milky halo effect, usually a reliable indicator that fog is forming, and that it's time to call it quits.

In the Air

Lower freezing levels, greater likelihood of encountering icing conditions, rain, and snow can all add to your workload and stress levels. Sometimes there is no choice but to brave the elements if you are operating to a schedule, but generally this will be in a suitably-equipped IFR aircraft. For the VFR pilot, encountering bad winter weather isn't a pleasant experience, and good advice is to turn back early instead of pressing on. Flying in snow conditions especially, not only means reduced visibility and a lower altitude necessary to maintain sight of the ground, but also the risk of encountering whiteout conditions. This could lead to unwitting flight into terrain, or spatial disorientation and subsequent loss of control.

For comprehensive information on operating in icing conditions, see the CAA's *Icing Handbook*.

Being Prepared for Winter

The best defence for your aircraft against winter woes is to keep it in a hangar, but not every owner has that option. For an aircraft that is normally kept outdoors, you might consider using covers, not only for the windshield, but also for the entire airframe. Also, engine intake bungs, pitot head covers and external control locks should be on the list of possibilities.

If the aircraft isn't utilised all that often, it may be necessary to top up the battery charge from time to time, to ensure that it will be ready for that difficult cranking on a cold

morning. Depending on location and how cold it gets, you may wish to change your engine oil to a lighter, less viscous grade to reduce starter motor loads. Always refer to manufacturers' recommendations before doing so, however.

Prior cleaning of the windshield and applying rain repellent will not only help immensely when flying in rain, but it will also make it a lot easier to get rid of dew – all you need is a 'slosh' from a water bottle and the dew is gone, as well as being less likely to re-form.

Pre-winter checks should pay particular attention to winter-critical items such as heaters, anti-icing and/or de-icing equipment, interior and exterior lights, and where applicable, the currency and condition of any carbon monoxide (CO) detectors fitted. The CO detector is important because many light aircraft heaters utilise exhaust system heat, and even a small crack or defect in the exhaust system can result in carbon monoxide entering the cabin. A classic case of this is described in CAA fatal accident report 03/1675, on the CAA web site under "Accidents and Incidents".

Personal checks should include appropriate clothing and footwear, especially for doing preflights on cold, wet or icy mornings. In a busy apron environment, high-visibility clothing is essential; preferably types with reflective panels.

Planning Winter Flights

When planning a VFR flight of reasonable length during winter, keep an eye on the developing weather in the days leading up to the flight, so that you have an idea what to expect on the actual day. The weather will affect, among other things, the duration of the flight, the route to fly, and the likely altitude band available to you.

Consider the concept of a 'departure window' – the interval between the earliest available and the latest acceptable departure times. To obtain the latter, calculate the end of daylight at your destination and work backwards by applying the estimated flight duration, including stops, and your personal safety margins. For example, you may wish to arrive one hour before last light so that you will have daylight left for post-flight activity such as securing the aircraft for the

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night. If the weather is less than perfect, it's a good idea to add in extra time to allow for diversions or waiting at intermediate stops for the weather to improve.

Should your 'window' close before you manage to depart, have a Plan B, such as abandoning the attempt until the next day, or terminating the flight at what would otherwise have been an intermediate stop – and for which you will now have a Plan C.

Depending on the route you plan to take, you may need to think about carrying survival gear. At least ensure that everyone on board has warm clothing and sturdy footwear in case of an unplanned landing somewhere remote. Refer to the CAA GAP booklet *Survival* for more detail on equipment and survival in various situations.

Check out the surface conditions of any aerodromes you are likely to use, especially those with a grass surface. These may have become rutted, muddy or waterlogged, all of which will affect landing and takeoff performance. A simple phone call or email to the aerodrome operator should keep you in the picture if NOTAMs are not available for that location.

Before Flight

Preparing for an early start usually means having to do the preflight inspection in the dark. Allow plenty of time, because it's going to take longer than in daylight. A good torch is essential, and supplementing this with a headlamp can be useful as well. It's easy to miss things in the dark, so double check that tiedowns, covers, external control locks, chocks and bungs are removed and stowed.

A very effective preventative action in this case is going home.

If you feel the need to pull the propeller through to make the subsequent start easier on the starter motor, make sure the mags are off, mixture in cut-off, throttle closed and at the very least, the brakes are applied. Always pull the prop in its normal direction of rotation, and treat it as live at all times. If you haven't been trained in how to pull a propeller through safely, don't try it.

If weight considerations permit, fuelling the aircraft to capacity the day before will minimise condensation, which, in an overnight frost, could freeze in drain sumps or filters. If you can't get a fuel sample from a drain point during your preflight, this could be the reason.

Frost or ice on the aircraft must be removed before flight. Water, lots of it, is very effective, but ensure that any runoff isn't going to refreeze and lock up flaps or control surfaces. Chipping or scraping ice has the potential to damage the aircraft paint job, skin, or transparencies. Try to avoid scraping a windshield in particular, as even one decent scratch in the wrong place could render it unserviceable.

Snow piled up on the aircraft means that it's a fairly safe bet that the ground is similarly covered. Snow can hide all manner of hazards: potholes, frozen puddles, runway or taxiway edges and the like. If the runway is snow-covered, your takeoff performance is compromised, as well as directional controllability on the ground. A very effective preventative action in this case is going home.

If it was raining while you were preparing the aircraft, you might be faced with the interior window surfaces misting up as water evaporates from your wet clothing. If the cabin heating or demisting system isn't up to the task, a clean rag or moist chamois cloth should help, but make sure that's all it's ever used for. If a passenger offers to help, check that they don't have on any rings or other bling that could scratch the windows.

Starting a piston engine on a cold morning can present a fire hazard. If possible, post a suitably briefed fire guard with an extinguisher. Excessive priming, be it from an electric boost pump, a manual primer, or the accelerator pump in the carburettor, can result in fuel draining out of either the exhaust or the air inlet and pooling on the ground or inside the engine cowling. A backfire and a lick of flame from the exhaust will ignite the pooled fuel, and in some cases this has resulted in the total destruction of an aircraft.

Once the engine is running, pay close attention to carburettor heat operation during the run-up – you may need it in flight. If flight in any form of visible moisture is anticipated, include switching on the pitot heat in your line-up checks.

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After Flight

As indicated earlier, refuelling ready for the next day can reduce the chances of water accumulating in the fuel tanks. Arriving at your destination in daylight gives a good opportunity to perform a thorough after-flight inspection and secure the aircraft if it is to be parked outdoors. Any defects detected in flight should be written up and reported, especially if they involve systems critical to winter flying.

Further Reading

The GAP booklets *Winter Flying*, *Secure Your Aircraft*, and the *Icing Handbook* all contain useful information on aspects mentioned in this article, and are all available on the CAA web site, www.caa.govt.nz. Hard copies of the GAP booklets are available free of charge on request from info@caa.govt.nz, and the *Icing Handbook* at cost from Vertia (formerly The Colour Guy), on 0800 GET RULES, or via their web site, www.vertia.co.nz. ■



Spectacular frost patterns on a PA-38 Tomahawk wing
Photos courtesy of Paul Neame.

