WARNING! GET READY FOR THE BRITISH WINTER FLYING SEASON

Jon Cooke goes through the preparation required to continue flying through the winter – often the best time, with better viz and denser air

IT seems we have hardly had a summer and I am here writing about the perils of winter flying! Winter in the UK can bring some fantastically clear days, and new challenges to our flying. With these benefits comes the burden of additional factors that, as a pilot, you must consider.

WEATHER

Winter weather can be changeable, and is largely derived from the air mass that is affecting the UK at the time.

For example, Arctic Maritime air is driven in by a low-pressure area to the east of the UK, and a high-pressure area to the west. The air starts very cold and is driven south across a warmer surface heating the air from below, making it unstable.

This will bring either snow showers or clear skies depending on the amount of moisture collected en-route to the UK. A good source for reading about air masses and their characteristics is the Met Office website.

Ray Newall has previously written about the wisdom of wearing appropriate clothing when you aviate in winter.

I can only echo those comments by asking you to consider a "what if?". What if you successfully conduct a forced landing into a field, and have insufficient clothing, liquid and foods to keep you alive and warm until help arrives?

PERFORMANCE

The performance of your engine is enhanced by the cold and, therefore, denser air, but negatives elsewhere may far outweigh this benefit.

Take-off performance is affected by a number of factors. These are highlighted in LASORS, Safety Sense Leaflet 07 - Aircraft Performance, and Safety Sense Leaflet 03 - Winter Flying.

Wet grass, for example, adds 93% (tarmac x wet grass factor of 1.35 x safety factor of 1.43) to the Landing Distance Required figures quoted in an Aircraft Flight Manual for tarmac.

Similarly, take-off performance will be affected by the aircraft's ability to accelerate on wet or indeed contaminated runways.

Be conservative with your estimate, and ensure you add the recommended safety factors. If it's not safe, don't go!

PRE-FLIGHT INSPECTION

While conducting a thorough pre-flight in cold conditions may not be the most appealing option, it is vitally important.

First, follow your aircraft

manufacturer's recommendations, if there are any. A number of the following items naturally venture into the realms of engineering, but are also things that pilots must consider before taking flight.

Fuel contamination due to condensation forming inside the fuel tank can be caused by leaving your aircraft parked overnight with half-empty tanks. Fuel filters and sumps should be equipped with quick drains; all fuel sumps on the aircraft must be drained, including individual tank drains. Draw fuel off into a transparent container and check for contaminants.

It is possible to prevent condensation by leaving the aircraft with full tanks. If you are going to do this, take into consideration any effect this may have on take-off performance and mass and balance when the aircraft is next flown. And remember, you may not be the next person to fly the aircraft!

On your pre-flight inspection, ensure the following areas are checked for blockage due to snow, ice or frost: pitot tubes, static vents, carburettor intake, heater intake, elevator controls, main wheel and tailwheel wells, spats, and around aileron, rudder, and elevator controls.

There must be no contaminant on any of the flying surfaces, since any contaminant will seriously degrade the ability of the aerofoils to generate lift.

It is strongly recommended that all frost, snow or ice be removed before attempting flight. Do not rely on snow being blown off during the take-off roll.

Frost adds a roughness to the surface of the aerofoil, resulting in increased skin friction, and flow separation occurring at a lower angle of attack.

All of these will increase the stalling speed, and reduce performance. AIC 160/2004 (Pink 74) explains the hazards of frost, ice and snow on aircraft.

Ensure your windscreen is clean; even a fine layer of dust will greatly reduce your forward vision into a low or setting sun.

Expansion takes place as water freezes. This may cause considerable damage to the internal structures of wings, fuselage and control surfaces. Even small quantities of frozen water may provide a static imbalance within a control surface, leading to control difficulties.

'While conducting a thorough pre-flight in cold conditions may not be the most appealing option, it is vitally important'

Aircraft left outside in precipitation and freezing conditions will tend to accumulate water within the aircraft. Hangarage is the best protection; if this is not possible, engine and wing/tail covers will at least provide some protection from the British winter.

Check the drain holes in the wings, fuselage and flight controls to ensure that they are clear and not frozen and that all controls are unobstructed and function in full and free movement.

Mud and slush can be thrown into the wheel wells and spats during taxi, which adds considerable mass to the aircraft. Additionally, this may subsequently freeze during flight, preventing the wheels and brakes from functioning correctly.

Mud adding mass to the main airframe means that the airframe needs to be washed more frequently. Care should be taken not to wash away protective agents and lubricants from hinges and flying control mechanisms. Washing away these agents could allow water to enter, which may later re-freeze, resulting in control difficulties. If required, after cleaning your aircraft re-apply lubricants and protective agents.

Starting your engine when cold will use more energy from your battery, and cold weather will also reduce the capacity of your battery. Leaving a battery stored flat after unsuccessful start cycles will damage it internally. This means that attention to the condition of the battery during winter is important.

If you're not going to use your aircraft for several weeks, I recommend that you remove the battery, and charge and store it at room temperature if possible. This will ultimately prolong its life.

GOING FLYING

Pre-flight done, your passengers are anxious to go. Is there anything else you should think about?

Consider your comfort and that of your passengers in cold weather. If your aircraft

is not fitted with a cabin heater, it may be difficult to demist the windscreen, and it will be somewhat uncomfortable.

Even if it has a cabin heater, it may not be effective – the J3 Cub we used to own did a good job of warming your big toe, but that was about it! Cold weather is known to impair your judgement and co-ordination as your concentration turns to your cold extremities.

Jumping into your cold aircraft, your warm bodies will soon mist the windscreen. It may take a significant amount of time to demist the windscreen before flight. Make sure you have a suitable cloth to use which won't scratch your windscreen, and allow time for the screen to clear fully before taking off.

Starting your engine may require more priming than in the summer: beware of over priming, and make sure you know what to do in the event of a fire during engine starting. Starting may also be more difficult due to the engine oil being thicker, and your engine will also take longer to warm up, so allow adequate time for temperatures to reach their operating range prior to take-off.

Braking action on mud, ice or snow can be poor. When taxying, consideration should be given to what is going to be different – for example, small radius turns and quick stops should be avoided. There may be solid ice under snow, so do not taxy through small snowdrifts or snow banks along the edge of the runway.

Taxying downwind or downhill with a strong wind may result in extreme control difficulty due to lack of control and braking action. Snow, ice or mud may additionally require you to reduce the crosswind you might usually accept for taxy, take-off and landing, since control of the aircraft may be somewhat degraded.

Before you take off, make a mental note of a point along the runway from which you will be able to safely stop your aircraft. This 'take-off decision point' is the point at which you should have reached a pre-determined speed. If not, it is better to stop the aircraft on the ground than to try and get airborne with an aircraft that is significantly under performing.

Weather at departure, destination and en-route should be considered carefully against the minima to which you operate. With winter flying, the weather may change quicker than in the summer months.

Look at the forecast with a critical eye, and if in doubt ask a coach or instructor for advice, bearing in mind that the final decision is yours.

During the winter, daylight hours are somewhat reduced, and the sun sits much lower in the sky. This can mean that taking off and landing towards the east in the morning, and the west in late evening can all but sun-blind you, taking away the peripheral vision required for landing. A crazed or dusty windscreen greatly exacerbates this problem.

Assuming you are Day VFR, make sure you allow yourself plenty of time to return home before dark. If you do happen to arrive back with the sun sitting on the end of the runway, consider delaying landing until the sun has moved around or sinks below the horizon – or even diverting.

Fog is more common in winter, and can take longer to clear than in summer. Make sure visibility is well above your minima since fog can be very patchy if near coastal areas, undulating terrain or high ground.

No item about winter would be complete without mentioning induction icing. If your aircraft is fitted with carburettor heat or alternate air, make sure that this is functioning correctly before take-off. There is an excellent section in LASORS, Safety Sense Leaflet 14 containing some good explanations and advice.

Don't let any of this put you off flying in winter, however! It can be some of the best flying possible all year and it's important to stay current. Just follow the advice here and available at the recommended sources.

PILOT COACHING SCHEME

The PCS currently offers a number of courses to LAA members, including:

- **Tailwheel Conversion**
- **Type Conversion**
- **Differences Training**
- **Gold/Silver/Bronze General Flying Diploma**
- **Strip Flying Diploma**
- **'Hour Flight with an Instructor'**
- **Licence Revalidation**

Contact us by email or call with your training enquiry. Jon Cooke or Peter Davies will be happy to discuss your training requirement and advise you of your nearest coach. Contact details are available on the LAA website under training.
coaching@laa.uk.com

CAA SAFETY EVENING

All pilots and those involved in General Aviation operations in the area are strongly encouraged to attend. The evenings start at 7:30pm unless otherwise indicated, and last about two hours.

- **20/10/2008** Durham, Tees Valley Cleveland Flying Club, Fiona Erol, 01325 337572
- **21/10/2008** Dundee, Tayside Aviation, Linda Kircaldy, 01382 644372
- **23/10/2008** Kirknewton, tbc, Chris Wilson, tbc
- **17/11/2008** Enstone, Enstone Flying Club, Paul Fowler, 01608 678204
- **18/11/2008** Dunkeswell, Dunkeswell Aerocentre Brendon Proctor tbc Restaurant
- **19/11/2008** Lands End Airport Terminal, Emily Bliss, 01736 785227
- **24/11/2008** Tibenham, Norfolk Gliding Club, Tim Davies, 01379 677207
- **08/12/2008** Nottingham, Tollerton Trueman Clubhouse, Jim Marren, tbc
- **09/12/2008** Gloustershire, Airport Terminal, Harry Hopkins, tbc
- **10/12/2008** Wycombe, tbc, Caroline Herd, tbc
- **22/01/2009** Rochester, tbc, Kelvin Carr, 01634 869969
- **23/02/2009** Halfpenny Green, Bobbington Village Hall, Tony Dring, 01384 221106

W: www.caa.co.uk/ga

RESOURCES FOR PILOTS

LASORS: www.caa.co.uk/docs/33/
LASORS is available as a free download from the CAA website, and contains a number of Safety Sense leaflets. Those applicable to Winter Flying are:
LASORS, SSL 03 Winter Flying
LASORS, SSL 07 Aircraft Performance
LASORS, SSL 14 Induction Icing

Aeronautical Information Circulars
www.nats-uk.ead-it.com
The CAA-produced AICs are available as a free download on the NATS website:
AIC 98/1999 (Pink 200)
Icing Induced Stalls
AIC 160/2004 (Pink 74)
Hazards of Frost, Ice and Snow
AIC 127/2006 (Pink 110)

Performance of Light Aeroplanes
GASIL: www.caa.co.uk/gasil
The General Aviation Safety Information Leaflet contains comments on recent incidents and accidents, with appropriate advice to pilots. If you are an aircraft owner, you should already receive a free copy. If not, it is available for free download.

Met Office: www.metoffice.gov.uk
As well as obtaining general weather information, METARs and TAFs, there are some good education sections. Information about Air Masses is available at the following web address: www.metoffice.gov.uk/education/secondary/teachers/air.html