GASIL

General Aviation Safety Information Leaflet

Civil Aviation Authority

www.caa.co.uk/gasil

Issue no. 3 of 2012

Moist air

The AAIB's Bulletin 1 of 2012 contains a report into an accident to a Cessna 172 which experienced an engine failure shortly after take-off. The aircraft was damaged during the subsequent forced landing.

The pilot reported that the aerodrome surface was wet grass, visibility was 4,000 metres in drizzle, with broken cloud at 700 feet and overcast at 800 feet. Drizzle generally indicates a very high humidity level, as does wet grass, with the consequent high risk of carburettor icing. As the AAIB report states, SafetySense leaflet 14, available like all such leaflets free for download from www.caa.co.uk/safetysense, contains essential information about the formation of carburettor icing and ways of minimising its effect, including the need to allow carburettor hot air time to melt any ice present during the pre-take-off engine check. AIC P077/2009 (Induction system icing on piston engines as fitted to aeroplanes, helicopters and airships) contains additional information.

GPS displays

The AAIB investigation into the Agusta accident mentioned in the last issue noted two facts concerning the GPS display presented to the pilot. The first was that the aeronautical database was out of date, and incorrect information about restricted airspace was displayed to the pilot. However, the investigation also identified that the published information about the equipment's map display layer tinting suggested that there would be an obvious change in colour at a ground elevation of 2,000 feet amsl, from dark green below 2,000 feet to light brown above. However, according to the report, for capacity reasons the terrain over 2,000 feet is not modelled in the database for that particular equipment.

The investigation highlighted the fact that the manufacturer's Pilot Guide and Operating Manual emphasises that the equipment is a **supplementary navigation system,** intended as an **aid to VFR navigation only.** That is also emphasised by SafetySense leaflet 25 "Use of GPS", like all such leaflets free for download from the CAA's website www.caa.co.uk/safetysense. However, human factors suggest that a pilot may come to rely on a GPS display more than the manufacturer intended.

As the leaflet also suggests, pilots must understand what their own equipment can and cannot do, and how to operate it to best advantage. The Royal Institute of Navigation (RIN) has produced a training syllabus for instructors to guide pilots through the learning process about their GPS equipment, and this is available from the RIN at www.rin.org.uk or 1 Kensington Gore, London SW7 2AT.

Emergency ADs

EASA produces bi-weekly summaries of the ADs they have issued or approved, which are available through their website www.easa.eu. Foreign-issued (non-EU) Airworthiness Directives are also available through the same site, as are details of all recent EASA approved Airworthiness Directives. CAA ADs for UK manufactured aircraft which have not yet been incorporated in CAP 747 can be found on the CAA website http://www.caa.co.uk/ads.

We are aware that the following Emergency Airworthiness Directives have been issued recently by EASA; however, this list is not exhaustive and must not be relied on.

Number	Applicability	Description
EASA 2012-0041-E	Eurocopter EC 135, 635	Main rotor hub
EASA 2012-0046-E	Eurocopter AS 332	Fuselage longitudinal beams
EASA 2012-0059-E	Eurocopter SA330, AS332, EC225LP	Flight Manual

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Partial engine failure

The AAIB have published a report on a fatal accident to a Jodel D117 in their Bulletin 12 of 2011. It seems the aircraft experienced a partial engine failure, and the commander decided to carry out a forced landing into a field. The aircraft overshot the selected field and contacted some trees and cables before striking the ground, causing serious injuries to the occupants from which the commander died.

Although the terrain does not always allow it, we have in the past reminded pilots of the importance of making a forced landing approach into wind whenever possible, to minimise damage and injury. However, the investigation concludes that the engine had not completely failed, but was producing some residual power during the approach. This additional power could be expected to increase the available landing field options. However, additional power would also increase any float experienced during the landing flare, which is a reason why instructors recommend that the engine is 'secured' (shut down) on or before the final approach to a forced landing (another reason is to minimise the risk of fire).

Communications failure?

Incidents continue to occur of pilots being reportedly unable to make R/T contact with an Air Traffic Service Unit when they make their initial call after engine start, or after changing frequency. Sometimes, the pilot has believed incorrectly that a lack of response means that the ATSU is closed.

The reason for the lack of response may be that the selected frequency is incorrect. Pilots have misread published information, and on occasion have omitted to check published updates in NOTAMs and chart updates on the AIS web site www.ais.org.uk. Others have just made an error when selecting, and transmitting on 'box2' when the correct frequency is set only on 'box1' has also been known.

However, another possibility, especially when a pilot is making the initial call on a radio which has not been successfully used during recent communications on other frequencies, is a volume control set too low. Most pilots' headsets have volume controls. There is a variety of VHF radio selectors available for GA use, and many of these are integrated into communications integration devices which have their own volume and squelch controls. There are many possibilities for a volume or squelch selector being turned too far and the pilot unable to hear.

Setting up the radios correctly is an important part of pre-flight preparation, and should avoid such a situation. Most instructors recommend setting all volume controls to the 1 o'clock position until established communications allow refinement. However, mistakes can easily be made, especially where communications pass through more than one communications device, so when we hear nothing after our initial call on a frequency we should seek out possible causes before assuming we can continue safely.

If we can hear other transmissions, it could be our transmitter at fault, but if we hear nothing we should check the frequency set, then check all volume controls. If all is correctly set, after another attempt at an initial call we also ought to consider the possibility that our transmitter is stuck ON, and try listening on another frequency. These checks take time which we should be prepared to take. Initiate calls early, and remain in a safe place until the problem is resolved, or if it cannot be resolved, follow the communications failure procedure as published for the airspace or aerodrome, making blind calls in the correct places. CAA Safety Notice 2012/002 reminds us of where to finds these published procedures, and reminds us of some possible problems if the radio fails on the approach to land.

Gyroplane take-off performance

A report in the AAIB's Bulletin 2 of 2012 concerns an accident to a Rotorsport gyroplane which struck a wall when it failed to get airborne in the distance available. The report highlights the need for all pilots, no matter what they fly, to be aware of the performance characteristics of their aircraft and make decisions about the suitability of the aerodromes they use accordingly. Among other things, Article 87 of the Air Navigation Order 2009 requires the commander of a flying machine (which includes aeroplanes, helicopters and gyroplanes) to take all reasonable steps to be satisfied that it is capable of safely taking off and reaching and maintaining a safe height.

The distance required for a gyroplane to accelerate after lift-off to a safe climbing speed is very much greater than that for a light aeroplane. The "take-off distance required" is very much longer than the "take-off run required". We also need to remember that gyroplanes can land in much shorter distances than they can take-off; just because we can land safely doesn't mean we can take-off again.

A gyroplane does have an advantage over an aeroplane in that once the pilot decides to abandon the take-off, the aircraft can be made to stop quite quickly if the correct techniques are used. However, whatever he is flying, the pilot does have to make, and act on, that abandonment decision before it is too late.

The basic information for all performance calculations is the manufacturer's Flight Manual or Pilot's Operating Handbook. All factors affecting the performance including the actual wind, air density (temperature and pressure), weight, and runway slope as well as runway surface and condition, must be taken into account to produce a figure for the take-off distance required, and any further safety factors then added. Then it is important to accurately measure the clear distance available, as described in SafetySense leaflet 12 "Strip sense". If the take-off distance required is greater than the take-off distance available, then perhaps towing the aircraft on a trailer is the best way to get out of the field!

Wind

We have in the past reminded pilots of the problems that strong and gusty winds can produce on the approach to land. However, it was noticeable last winter that several occurrence reports related to pilots' flight paths being affected by strong winds to such an extent that they infringed Controlled Airspace. These pilots included flight instructors conducting training.

When the wind at cruising, or training, altitudes is strong, it has a considerable effect at light aircraft cruising airspeeds. For example, when cruising at 100 knots, a gradient wind of 40 knots will produce a downwind groundspeed of 140 knots, so any airspace or terrain in that direction will be approached rapidly. The maximum drift experienced will be 24 degrees, requiring that heading change to maintain track, and making it possible for an error in drift application to take the aircraft a very long way from its intended route. When flying into the wind, groundspeed will reduce to 60 knots, increasing the time and fuel required to make headway (and the maximum drift). Indeed, during a stalling exercise, the into-wind groundspeed may reduce to almost nil.

Many instructors attempt to minimise the effect of a strong wind on their training exercises by operating upwind of their base aerodrome, which has the added advantage of allowing them to see any approaching poor weather before it arrives at that aerodrome. Unfortunately, airspace restrictions do not always allow that luxury, and even if we start upwind we must take care to remain there. If pilots decide to fly in strong winds, they need to plan carefully to compensate for the effects.

Weather getting worse?

Just occasionally, the forecast, or the pilot's interpretation of it, proves optimistic. We may then be presented with a dilemma when in-flight weather deterioration approaches safe limits. Of course, turning along a clearer route is the preferred option, and we should have turned back into the better weather behind us as soon as we noticed the deterioration starting. However, distractions and terrain may mean we notice the deterioration late, and the weather may be closing in behind us as well.

Rather than continue into worsening weather, we need to make a positive decision to make a landing in a field before that becomes impossible. Aeroplane pilots need to make that decision early enough to select and check a suitable field then fly a circuit and land; helicopter pilots are in the fortunate situation of being able to land almost anywhere with the minimum of preparation, although we do still need to be able to control the aircraft visually.

Unfortunately, human beings are not perfect. Despite all good advice, we might have been pushing our luck by flying over terrain which does not provide a safe landing area. Even over terrain which is suitable for landing, a little hesitation may take the safe areas out of our reach. Having flown ourselves into an extremely hazardous situation, and with no safe options remaining, we have little time to make a risk assessment and judge which of the available unsafe options is the least dangerous. Rather than hit the ground, a climb under control through a gap may be the relatively safer option if it can bring us into clear air above cloud. It is not unknown for pilots to climb above some low cloud in the belief that was just a patch and in the expectation that a clear area is in front of them.

Once, hopefully, above cloud we are faced with the problem of returning to the surface again safely. While PPL holders are expected to be able to use radio-navigation aids, the stress of recent events is almost certainly going to affect our flying. Rather than run out of fuel searching in vain for a hole through which to descend, if you have not already done so, call for help on 121.5 MHz as soon as you have the spare capacity.

More on fuel

In the last issue, in addition to providing some guidance on the storage of fuel for aviation purposes, we referred readers to formal petroleum industry guidance material. A reader has written to remind us that in addition to these guidelines, there are regulations which affect the handling of all petroleum products, including aviation fuel. He informs us that the Petroleum (Consolidation) Act 1928 applies to AVGAS and MOGAS. For those working with Jet fuels, the Dangerous Substances and Explosive Atmospheres (DSEAR) Regulations 2002 applies, and the Petroleum Spirit (Motor Vehicles etc) Regulations 1929 and Petroleum Spirit Plastic Containers Regulations 1982 concern fuel handling outside the workplace.

Amongst the points he covers are the need for a licence issued by the Local Petroleum Licensing Authority (normally part of the Trading Standards department) to dispense petrol by mechanical or electrical means. There is also a prohibition of storing more than 20 litres of petroleum fuel outside the immediate-use fuel tank of the aircraft or vehicle concerned, or of storing it in portable containers greater than 10 litres (metal) or 5 litres (approved plastic type) capacity. He also draws attention to the fact that some commercially advertised fuel handling products do not necessarily comply with the applicable regulations for use with aviation fuel products. Anyone storing, transporting, or handling petroleum products, whether for aviation purposes or not, is required to comply with all the applicable regulations.

Collision on final

The BFU (German AAIB) have published a report on a collision between a Cessna 152 and a glider on the final approach to an aerodrome. It seems the glider descended on top of the Cessna during their approach to the same runway, and neither pilot had the other in sight. For some time before the collision, each seems to have been in the other's "blind spot", where airframe structure blocked the pilot's view in the direction of the other aircraft. The glider seems to have been turning above and inside the Cessna, which was on a shallow approach slope from a base leg outside the glider's turn.

It is possible to be hidden from view from another aircraft while you are unable to see that other aircraft, and in certain circumstances, that situation may continue for some time. However, we must be aware that the most likely place for a mid-air collision is in the traffic pattern, and make a positive effort to look in our "blind spots" at regular intervals. And a casual glance is not enough - that look must also be in the expectation that another aircraft will be in a position to collide with us.

In the freely translated words of the BFU investigation: "The damage to the two aircraft indicates that the outcome of the collision without injuries was only thanks to good fortune!"

Weight and balance – check the figures!

A report in the AAIB's Bulletin 3 of 2012 concerns a Piper Lance which crashed on take-off with 4 passengers on board. The aircraft was seen to adopt a high nose attitude on lift-off and "wallow" before sinking back to the ground and striking a hedge.

It seems the pilot had used assumed weights in his weight and balance and performance calculations, and although placing the aircraft close to the limits of both maximum weight and aft Centre of Gravity these figures indicated the take-off could safely be made. SafetySense leaflet 9 "Weight and balance" is available like all such leaflets from the CAA's website www.caa.co.uk/safetysense, and explains the possible consequences of exceeding the limits and stresses the need to use actual weights for calculations.

The investigation re-calculated the figures using the actual weights of the passengers and their baggage, which indicated that the aircraft was 260 lbs above its maximum authorised take-off weight. That additional weight would have increased the take-off distance, which it seems was very close to the distance available without any allowance for error or engine wear.

However, the corrected figures also showed that the actual Centre of Gravity was 3.34 inches to the rear of the aircraft's design aft limit. The aircraft's Pilot Operating Handbook apparently backs up the information in the SafetySense leaflet by stating that "if the CG is too far aft, the airplane may rotate prematurely on take-off or tend to pitch up during climb. Longitudinal stability will be reduced."

An aircraft flying overweight or with the Centre of Gravity outside permitted limits would be by definition not airworthy, and the consequences of a person being injured or killed in such an aircraft may be a lot more serious than the pilot may have considered, if not for themselves then perhaps for their next of kin.

It is not always possible to obtain accurate figures when requesting passengers' weights, and in any case, people unfamiliar with the reasons for the question are likely to not only understate their own weight, but to forget to include their clothing and the contents of their pockets. They are also very unlikely to be correct when stating the weights of their bags. Unless the aircraft is obviously well within the permitted limits for safe flight, use an accurate set of scales and weigh everyone and everything!

Medication

Over the counter medication can be obtained from the chemist without a prescription. A wide range of drugs is available for the treatment of conditions such as coughs, colds, flu and diarrhoea. When purchased, there is no accompanying warning advice that would be normally be given by your doctor when he prescribes medication for a patient. However, all drugs have adverse side effects and some individuals are affected more than others. Even individuals who believed they had not suffered any adverse effects showed a worrying deterioration in essential flying skills, such as reaction times and judgment, during scientific tests.

If you feel unwell, you should ground yourself and wait until you have fully recovered before returning to flying. Treatment with over the counter medication will not 'cure' the condition and may only mask the symptoms of the underlying illness for a short period of time.

An individual's response to medication cannot be reliably predicted. If trying a new medication for the first time, you should always wait at least 24 hours before flying. Even if you are familiar with the medication, carefully read the information leaflet that comes with it. If the medication carries any warning of possible drowsiness or dizziness, you must not fly during the treatment. You must also allow a suitable period to elapse after the last dose for such effects to resolve before you plan to fly after completing the course of treatment. As a guide, if the dosage regime is 'every 4-6 hours', you should not fly for at least 12 hours after the last dose. If the dosage is 'every 10-12 hours' then you should wait at least 24 hours after the last dose.

<u>Key points to remember:</u>

Do not fly if you do not feel fully fit.

If you require medication, ask yourself if the underlying medical condition itself makes you unfit to fly.

Do not fly within 24 hours of using any medicine for the first time.

If you take any medication before intending to fly, first check the side effects in the information leaflet.

If in any doubt, ask the advice of your Authorised Medical Examiner (AME) or, in the case of NPPL holders, your Association medical advisor.

Flying in France

As summer approaches, we are reminded that it is some time since we informed pilots who intend flying across the Channel about the French SIA (their AIS) website, www.sia.aviation-civile.gouv.fr, and the information available there in French and English. The site provides access to the French AIP, including aerodrome and approach charts, and AICs. It offers an Integrated Flight Planning service which provides NOTAMs in a similar fashion to the UK AIS web site, and also AIP Supplements and weather information. It also gives access to charts and activity times of military low flying restricted area activity under "AZBA".

Electronic instrumentation

The New Zealand CAA in their magazine 'Vector' notes that electronic displays of flight instrument information are becoming increasingly popular in general aviation and are being found in all types of aircraft, including microlights. An article notes the versatility which such displays can provide, the clarity of coloured indicators, and the relatively low cost of upgrading the systems.

File Photo

However, the article also highlights the hazards the NZ CAA has identified in these electronic flight information systems (EFIS), and emphasises the need to verify the input data, perform comparison checks, and detect failures in the display monitoring. It draws attention to the need to include the latest software updates, not only to update the mapping data but also to correct identified defects which may not be readily apparent to a pilot. It also notes the danger that VFR pilots can be tempted to divert a lot of their attention inside the cockpit and not maintain a good lookout.

The NZ CAA highlights a recent fatal accident to a MCR 01 whose pilot was found dead on the slopes of a mountain. It seems testing revealed that the terrain database for the aircraft's moving map display contained some serious spot height and terrain display inaccuracies. The investigation apparently suggests that because of the high level of sophistication of the EFIS information displayed (albeit inaccurately) to the pilot, that he probably placed too much reliance on that information, instead of using basic VFR navigation skills and applying the proper VFR meteorological minima for the flight. It believes that because the database errors were unknown to the pilot, he probably wrongly thought, in the poor weather and reduced visibility, that he was sufficiently clear of the terrain ahead.

The European GA Safety Team EGAST (see below) is also concerned about the potential problems of electronic displays, and a draft guidance leaflet on the subject has been published on their website for consultation. In addition, the CAA's GA SafetySense leaflet 25 "Use of GPS", which is available like all such leaflets for download from www.caa.co.uk/safetysense, contains useful guidance to anyone who uses or intends to use GPS equipment in an aircraft, and much of its content is relevant to any form of electronic cockpit display.

European safety information

In addition to the CAA's SafetySense leaflets and posters, available free for download from www.caa.co.uk/safetysense, other organisations produce documents which give useful and valuable safety advice. Amongst these are the Safety teams forming the European Strategic Safety Initiative ESSI, under the auspices of EASA and including several national regulators, but composed mainly of industry representatives.

The European General Aviation Safety Team **EGAST** makes a considerable amount of material available, in English and other languages, on its web site www.easa.europa.eu/essi/egast, amongst which are a recently published leaflet on Weather Anticipation and a multi-media guide to ICAO standard radio telephony for GA similar to the CAA's CAP413 supplement 3 but intended for European operations.

The European Helicopter Safety Team **EHEST** produces training and safety material specifically for helicopters on their web site www.easa.europa.eu/essi/ehest, including a recently published guide for helicopter off-airfield landing site operations.

In addition to guidance produced by the teams themselves, both websites include links to material from other sources.