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General Aviation Safety Information Leaflet

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A load of hot air?

File photo

According to a report by the BFU (German AAIB), a Robin DR315 was flying below cloud at low altitude when the engine started losing power. The power continued to reduce and the aircraft was destroyed when it collided with a wood during the ensuing forced landing on a road.

The report notes that the German Met Office reported that the temperature and dew point were close together, indicating high humidity, so conditions were favourable for carburettor icing. It seems the pilot had selected carburettor hot air after he noticed the loss of power, but the selection seemed to make the power loss worse, so he selected COLD again. According to the report, the pilot had once been told by a mechanic that selecting carburettor hot air in his aircraft was "completely useless".

SafetySense leaflet 14, 'Piston Engine Icing', available like all such leaflets free for download from the CAA's website www.caa.co.uk/safetysense gives advice on the subject. It notes that if carburettor icing is present, selection of hot air is likely to cause an apparent increase in rough running as the ice melts and passes through the engine. If this happens the temptation to return to cold air must be resisted so that the hot air has time to clear the ice.

The leaflet also notes that air humidity is likely to be high close to cloud base. If we find ourselves cruising close to cloud base, we should not only check carburettor heating frequently, but should consider keeping carburettor hot air selected in the cruise until we need a high power setting.

Know your aircraft

Many aerobatic aeroplanes are fitted with relatively simple carburettors, which limits the time the engine can operate during inverted or negative 'g' flight, and their pilots tend to be familiar with their engine stopping during some manoeuvres. Usually the engine will restart again either automatically or after carrying out a simple restart procedure.

A report in the AAIB's Bulletin 9 of 2011 concerns a Jungmann whose pilot was carrying out aerobatics when the engine stopped, and all his restart attempts failed. The nearest airfield was apparently beyond gliding range, and the aeroplane was damaged in the subsequent forced landing. The aircraft was not fitted with a starter, and the pilot assessed the cause of the failure to restart as being the coarse pitch of the propeller.

It is often difficult for pilots to find clear airspace to practise aerobatics, and few aerodromes allow such practices in their overhead. Nevertheless, in similar aeroplane types, this accident suggests we ought to consider the likelihood of an engine failing to restart when selecting an area for practice.

Visiting events

It's interesting what a few words on a radio can tell a listener about the person who is transmitting. For example, a pilot may be on his way to an event, perhaps the Superbike Championships at Cadwell Park. He may receive information from the LARS unit that the NOTAMmed parachute display is about to start and a suggestion that he should remain clear of the area. If the pilot then expressed concern about the delay and asked "What display?", everyone listening would know that he had not carried out the pre-flight planning required for safe flight. Of course, his passengers probably wouldn't understand the significance of the exchange, in which case they would be unaware how much regard their pilot had for their safety.

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 Directive has been issued recently by EASA; however, this list is not exhaustive and must not be relied on.

Number	Applicability	Description
EASA 2011-0210-E	MDM-1 Fox sailplanes	Control stick

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Hose sorry now?

As we have done in the past, in the last issue we highlighted the importance of using approved parts for maintenance. Unfortunately to illustrate the problem a report was included referring to an occurrence on which the post incident investigation had not been completed. The manufacturer has concluded that the hose in question was indeed the correct part and was suitable for its intended purpose.

The investigation concluded that the incident most likely occurred as a result of the hose being mishandled, bent, kinked or twisted, causing damage to the hose structure and leading to the subsequent failure. It is essential that maintenance procedures take proper account of all the manufacturer's recommendations and it is important that, when removing or installing components, care is taken to avoid any damage by careless or improper handling.

Doors

In last month's Occurrence Digest readers may have seen a report on a KingAir which rejected its take-off when the crew discovered one of the baggage locker doors was open. It transpired later that some engine covers and blanks had fallen out unnoticed.

Doors and inspection panels require particular care during pre-flight inspections; in many cases they may appear closed and even locked to a casual observer, but appearances can be deceptive. In some cases the drag from the open door can cause control difficulties, and in others the noise or vibration from airflow passing even a partially open door can be very distracting.

Gusts and turbulence

A feature of this summer has been the number of accidents reported to the AAIB which refer to 'sudden gusts' or 'unexpected turbulence'. Glider pilots know all about convective turbulence, which to them is a thermal which will give them energy. However, to many other aviators the horizontal and vertical air currents caused by those thermals are a hazard, and so are the effects of wind blowing around, and through gaps in, obstacles. It is possible with experience to anticipate such effects, but by their nature they are unpredictable.

Manufacturers' flight tests produce recommended airspeeds for many phases of flight. These may include rotate speed, initial climb speed, and speeds for best rate of climb and best angle of climb. They also produce 'threshold' or 'reference' speeds (which are effectively the same although calculated slightly differently), using which the manufacturer can calculate whatever landing distances are published. These speeds are intended to allow a pilot a reasonable level of control in normal weather conditions, which include a certain level of turbulence.

If no speeds are published, we advise pilots to maintain a minimum approach speed of 1.3 times the stalling speed in the approach configuration. However, as we have said before, that simple calculation takes no account of the aircraft's controllability. If the manufacturer advises a speed higher than that simple calculation, it is to allow the pilot to retain full control of the aircraft down to touchdown. Flying at a lower speed than that recommended is likely to reduce the controllability such that 'moderate' turbulence may overcome the pilot's input.

Flying at a speed much higher than that recommended will of course result in a longer landing distance than the manufacturer expects. An aeroplane with too much energy can be expected to float before touching down, or bounce, both of which can present the pilot with problems, so maintaining a steady and correct speed on the final approach down to round-out gives the pilot the best chance of making a good landing. If the speed is fluctuating or wrong, go around early and set yourself up again.

Winter time

With winter approaching (or possibly already here by the time this is published), we should consider its probable effects. SafetySense leaflet 3, available for free download from the CAA web site www.caa.co.uk/safetysense should be our main reference, but this should serve as a short reminder of the main factors.

The air is cold, the ground is cold, and so is any moisture. Resist the temptation to rush the external checks in order to get inside with the doors shut at the earliest opportunity. Think about the possibility of a diversion or a forced landing, and wear or at least carry suitable clothes for that eventuality. Remember that a ditching in winter (and spring) will be into very cold water; if you want to be rescued afterwards, seriously consider wearing an immersion suit. Cold metal can damage skin – consider wearing gloves at least for the external checks. Cold air also affects engine warm up time, ease of starting, and cowl flap requirements.

Cold water on a hard runway takes longer to clear – braking will be reduced with an increased risk of skidding. Ice on a runway makes it almost impossible to stop or steer. Grass runways and taxiways may become boggy, if only in patches, which will reduce acceleration on take-off. Mud tends to collect in spats, and if not cleared may also reduce acceleration. Snow on any surface may prevent take-off altogether, and if compacted in UK conditions may turn to ice.

Photo courtesy Michal Orlita

Winds tend to be stronger in winter, although perhaps with fewer gusts. Crosswinds on wet or icy runways are likely to have a lot more effect than on a dry runway. Strong headwinds give better climb angles, but may need an increase in threshold speeds to cope with the turbulence. Controls can be snatched by the wind while parked or taxiing, and aircraft must be properly secured.

Visibility in winter may be excellent in an Arctic air mass. However, in other air masses it may be very poor indeed. Radiation fog, formed overnight in light winds, can be cleared by heating, but there may be little of that. Even if it clears, it may return rapidly once radiation cooling overcomes the weak sun in late afternoon. An increase in wind will only lift fog into low stratus. If advection fog forms over the sea or a snow covered landscape, it will only clear when the air mass changes. Smoke and dust particles stay low because there is not enough energy from the sun to spread them by convection – flying above a haze layer is to be recommended for lookout reasons, but beware when you descend again, especially into a low sun! Remember that METARS and SPECIs will report 'prevailing visibility', your approach may be into a lot worse.

Cold air holds less water vapour; cloud is more likely and the base tends to be lower. Radiation stratus has been mentioned, but in moderate winds stratocumulus forms in conditions which in summer would probably give clear skies. Cloud droplets at temperatures below freezing will form ice on any aircraft which flies through them, and severe ice is often encountered at the top of a stratocumulus layer.

If your aircraft is cleared for flight in light icing conditions, check the system and ensure you stay away from any more serious icing.

Alternates as well as destinations may find their runway unusable because of weather or surface water. Navigation may be made more difficult by snow (or flood water) hiding previously obvious features. Snow may produce dangerous “white out” conditions, especially when blown by a helicopter’s rotors during take-off or landing. When lying on hills, snow may merge into cloud.

Winter clothing will add weight to occupants and baggage, as will extra fuel, so ensure the weight and balance calculations are correct. Also check take-off and landing performance. Any ice on the airframe will affect the centre of gravity position, as well as its primary effect on the aircraft handling characteristics, and the weight of snow on a parked aircraft has been known to tip it over. If you are unfortunate enough to be affected by ice in flight, do not change configuration at low heights – selection of flap has been known to lead to loss of control which could only be regained by raising the flap again.

Water on a windscreen affects vision, and may lead to difficulties in judging runway aspect on approach and landing. Water on clothing may evaporate in a warm cockpit, condensing again on a cold windscreen to reduce visibility. Any water finding its way onto electrical connections may result in short-circuiting and possible fire, and care should also be taken during refuelling and fuel contents checking not to allow water to enter the fuel system. Water on wings can affect the performance of certain aeroplane types (for example SF 25 motor gliders) by altering the airflow.

Water may freeze in clear air above the freezing level – check the pitot heat system and use it. Be particularly aware of the possibility of rain ice. The effects of carburettor icing may be generally less severe in winter, but the normally high relative humidity increases its likelihood. Frost may form overnight on the airframe, and must be cleared **completely**, as must any ice or snow. De-icing before flight requires care – refer to AIC 118/2006 (pink 106), and ensure you know how long any fluid you are using is effective for.

Days are shorter, and the time taken for early morning problems such as mist or cloud to clear reduces the available time even more. Unless you have a night qualification and are in practice, do not risk landing in the dark. Even then, beware of fog or low stratus forming when you cannot see it. Make sure your (and your aerodrome) lights are serviceable before flight, and carry a working (and easily found) torch. However, if you think you are becoming short of time to complete the flight, do not rush into it. The pre-flight checks are more vital than ever, so if time is running out, wait for another day, and do not let others pressurise you into doing something about which you are not happy.

Fire on start-up

A recent occurrence report refers to an engine fire on start-up. While there is no indication that it was the cause in this particular case, over-priming is a frequent cause of such engine fires, and correct priming is a skill which should be learnt and practised. However, perhaps the most important thing to stress is that it can happen to you, and you should be prepared to deal with the situation. Know the drill for your aircraft without having to refer to the Flight Manual or check-list; usually the initial actions include continuing to turn the engine over to draw the flames inwards while turning off the fuel.

An important point mentioned by the pilot in one report some years ago was that he was unfamiliar with the operation of the fire extinguisher which he had available. Are the rest of us sure we all know how to use the one we have (and where to find it)?

A final point to consider is whether the fire extinguisher on the aircraft is serviceable. Most have a pressure gauge which is colour coded to give a simple indication of its condition. An unserviceable extinguisher is of little use on the ground and even less so in the air where the options are more limited.

Don’t rely on the automatics

A recent incident concerned a Beech Bonanza which suffered control difficulties caused by the autopilot. We frequently remind pilots to be aware of all means by which their autopilot can be disconnected, and to be prepared to use any of them.

In a recent Airworthiness Directive, Transport Canada report that there have been multiple incidents where the automatic de-icing system fitted to DHC-8 aeroplanes has failed. Few of our readers will operate aircraft fitted with such equipment. However, the incidents may serve to remind us once again that automatic systems do fail, and that we need to monitor them constantly, just as we need to monitor the indications of systems without automatic controls.

Human factors suggest that, if a system has been operating as intended for some time, we may relax our attention and at least unconsciously rely on the automatics to carry out their intended function. Even looking at a gauge, unless we look carefully we may not ‘see’ the indication as being abnormal. Monitoring checks, as of the propeller rpm we mentioned in Issue 8, need to be positive. Look carefully, and expect to see the indication in the wrong place!

Pitot covers

Elsewhere in this issue we refer to incorrectly secured doors. Another failure of the pre-flight checks which causes relatively frequent incidents is the pitot cover. Even large red flags saying “remove before flight” can be missed, possibly because the pilot has decided to delay the flight after carrying out the checks, but wishes to protect his pitot system against insects while waiting.

While careful pre-flight checks should prevent taxiing with a cover in place, a check of the airspeed indicator during the take-off run (we all do that, don’t we?) should provide an indication that something is wrong before it becomes too late to stop.

Runway clear for landing?

Bus drivers do not normally have to concern themselves about aircraft, even those landing at aerodromes with warning signs on the roadside. Most people assume that these signs indicate a sudden noise, not a collision risk. So it must have been quite a shock for the driver of the bus mentioned in last month’s Occurrence Digest, when an aeroplane appeared in his field of vision so close that he decided to make an emergency stop in an attempt to avoid it. Fortunately no-one was injured.

Public roads and paths are often found near to, and in a few cases run across, runways at aerodromes. The collision last year between a tractor and an aeroplane on the approach should have reminded us all to check that not only is the runway clear for landing, but that there are no obstacles moving into the aircraft’s path. If there are, we must not only avoid them by a safe distance, but we also need to give consideration to others.

The landing's not over . . .

Distraction is a frequent causal factor in aircraft accidents. We humans are easily distracted, and it is very difficult to maintain concentration on the job in hand when something unexpected occurs or appears in our field of view. After all, that unexpected apparition may be a hazard which needs immediate attention.

Ideally, like an instrument pilot checking a performance instrument while concentrating on the attitude indicator, we can steel ourselves to return our gaze to the work in hand after a quick glance at the distraction. After all, as human factors training tells us, an image will remain in our visual memory for a second or so, and we can consider its importance while actually looking ahead. Unfortunately, such self-discipline is difficult to achieve for most of us, but it is a skill which pays off in the end.

Landing an aircraft requires intense concentration, and a distraction then can be a serious hazard. Even slowing down during the rollout requires considerable concentration, especially in a crosswind. This concentration is vital in an aeroplane with a tailwheel. Relaxing concentration during the rollout in a taildragger has caught out many a pilot who was initially trained on tricycle undercarriage aircraft, and ground looping safely can be a useful part of the necessary differences training. Don't let distractions cause you to lose control!

. . . till the engine has stopped on the apron

Tie-downs

As stated elsewhere in this issue, high winds frequently affect our aerodromes during the autumn. We need to ensure that our parked aircraft are not moved by these winds, and if there is no hangar, we must use the tie-down points. However, while tying the aircraft down to a 'heavy weight' such as a full barrel or a concrete block, these weigh less than a passenger, and are not ideal. A ground anchor is much more efficient.

We are also unlikely to be able to taxi while still attached to a ground anchor (although we have had a report of a chain snapping while a pilot attempted to do exactly that!). If we leave a barrel or block attached, these provide virtually no hindrance to the aircraft's progress, and there may be no audible indication through our headsets either. Unless someone sees the dangling object and warns us, it is possible to take-off with one or more barrels or blocks still attached, and these can work themselves loose and fall onto a third party, or their property as occurred to the pictured lump of concrete five years ago.

Low-wing aircraft are the most likely to get airborne with an attached object, but recently it was a Cessna 172. Do the pre-flight checks carefully, and if you see an aircraft taxiing with an object attached, try to warn the pilot!

GPS Jamming

AIC P093/2011 provides details of an exercise during which GPS jamming will take place from RAF Spadeadam in Cumbria between 28 November and 9 December. The area affected may include a considerable part of the airspace between the Newcastle CTA and the Scottish TMA.

Propeller bolts

In their Bulletin 9 of 2011, the AAIB include a report of an accident to a Tipsy Nipper. It seems that four of the six bolts which held the propeller to the engine had worked loose, causing all the bolts to fail and the propeller to detach from the aircraft in flight. The aircraft landed safely in a field.

The report assesses that the standard of the wire locking of the bolts was inadequate to prevent the bolts from coming loose. Wire locking may not be in such general use as it was, but it needs to be done properly. As with everything else, refer to the manual for correct procedures.

The investigation also notes that although the bolts had been re-torqued within the required hourly maintenance interval, the low usage of the aircraft meant that the torque had not been checked in almost 2 years. For aircraft with a low usage, the investigation suggests it might be more appropriate to base the re-torque of the propeller securing bolts on a calendar basis. It would seem logical to consider doing the same with other safety-critical tasks.

Fuel planning

SafetySense leaflet 1, available like all such leaflets free for download from www.caa.co.uk/safetysense, advises pilots to always plan to land by the time the tank(s) are down to the greater of ¼ tank or 45 minutes cruise flight, but not to rely solely on gauge(s) which may be unreliable. It points out that headwinds may be stronger than forecast and frequent use of carb hot air will reduce range. It concludes by advising us to expect to use 20% more fuel than the 'book' figures.

It is therefore disconcerting when we read of a pilot running out of fuel on the taxiway after landing. Nevertheless, we know that circumstances may place us in undesirable situations, so a fuel shortage is not impossible. If we do find ourselves short of fuel, it is important that we harness all possible assistance. The only way to obtain priority in a landing queue is to declare an emergency (Mayday) or a state of urgency (PAN PAN).

GA Safety Evenings 2011-12

GASCo, the GA Safety Council to which the CAA is a major contributor, is organising this winter's series of Safety Evenings. The evenings are of value to everyone involved in general aviation, whatever they fly, operate or maintain, and logbooks will be signed when requested as proof of attendance. The programme of currently confirmed events is shown below.

For updated information, see the CAA website www.caa.co.uk/safetyevenings or the GASCo site at www.gasco.org.uk. Organisations wishing to host a future safety evening should contact GASCo on 01380 830584 or by e-mail to ce@gasco.org.uk.

Date	Area	Venue
14 November	Biggin Hill	Passenger Terminal
15 November	Lashenden Headcorn	Staplehurst Village Hall
16 November	Manston	TG Aviation
17 November	Panshangar	North London Flying School
21 November	Dorking	The Punchbowl Inn, Oakwood Hill, Ockley
24 November	Sleap	Shropshire Aero Club
21 January	Talgarth	Black Mountains Gliding Club
13 March	RNAS Yeovilton	tbc