

GA FEEDBACK

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EDITORIAL

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CARBON MONOXIDE

In Issue 2, we highlighted the insidious nature of some forms of pilot incapacitation. The following report amply underlines how rapidly a serious situation can arise.

On a previous day's flying in the circuit in my Piper Cherokee I had noticed a background smell similar to that of burning oil whilst using Cabin heat and Demist. Temperatures and Pressures revealed no obvious problem with fuel or oil and upon completion of several circuits I taxied the aircraft back to the nearby workshops to investigate. No visible signs of oil leaking etc were seen or indeed obvious wiring problems etc.

I purchased a new and more expensive CO detector as a precaution, despite the usual "Dead Stop" (black spot type) cardboard one showing no signs of discoloration during my flight. This purchase turned out to be LIFE-SAVING the very next day! I offered my daughter and her partner the opportunity of taking my aircraft for a local flight as the weather was perfect. My daughter had approximately 80 hrs as a PPL and she was to fly P1 whilst her partner would co-pilot (P2) with approx 200 hrs (most on type). She had recently converted with a club flying instructor to my aircraft and would carry out several circuits with her partner before landing and re-entering the circuit to do a solo. Although both young they are also meticulous with regards pre-flight planning/checks and safety. The aircraft, currently on public category rating, is also always maintained to the highest possible standards.

I was away from the field when they took off to climb out VFR, but listening enthusiastically on a hand held transceiver. Shortly after departure and about five

minutes into their flight my daughter made a PAN call to Tower requesting immediate return to the field, as the CO detector was showing "Caution". It was the last call she was able to make on that flight for even as ALL heating was shut off and ALL air vents opened etc the detector turned to "black" signalling danger - at which point my daughter fainted and her partner took control. He too began to feel queasy and with other traffic in the circuit asked to orbit, he was just able to safely land the plane. Fire crew attended as a precaution and an ambulance was called which took them both to local A&E for oxygen treatment. Blood gas analysis in both cases fortunately showed minimal exposure to CO.

Yet the "Dead Stop" detector so frequently used by GA had shown NO change of colour despite being positioned in exactly the same place in the aircraft! AND it had only been installed for about 10 days!

Both pilots are fine, the aircraft is fine but surely the moral here has to be NEVER fly without a CO detector AND buy the very best you can afford! As a father and aircraft owner I have dreamt badly about what "might have been" if I had simply replaced a cheap CO detector with another, or delayed in making that decision. Pilots beware please - spend those few extra pounds!

Finally I would make the following suggestion:-

As part of every pre-flight check, summer or winter, before taxiing, turn on heat to the cabin and keep an eye for a while on your CO detector. I have included this as a "VITAL" action on my checklist and will insist anyone about to fly my aircraft does indeed carry this out.

With most GA heating systems functioning via ducted air passing the engine and into the cabin surely this is a serious safety issue, rarely mentioned!

I am now seeking to install and employ an even more sensitive CO detector with an AUDIBLE alarm. What price safety and your life?

Individuals' tolerance to CO contamination may vary considerably. Also, the positioning of detectors can be an important factor in both their effectiveness in identifying a significant increase in CO and being capable of being easily monitored

GA FEEDBACK can also be accessed on the internet at www.chirp.dircon.co.uk

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from the Confidential Human Factors Incident Reporting Programme

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ALMOST A COMPLETE CHAIN

Age and experience do not, in themselves, provide immunity from an accident chain, as the following report describes.

We have all read how it is a series of errors that usually lead to an accident. This series is sometimes referred to as a chain of events or circumstances. All of us have at some time gone some way down a chain and happily there was an interruption of the chain, which saved us from an accident.

The following is my account of such a chain of events, which with one more link could have had a vastly different outcome.

I have for nearly 30 years flown from the same strip. During this time I have flown two aircraft of the same type, the present one for 19 years. I am therefore very familiar with both the strip and the aircraft.

On this occasion the aircraft required two minor pieces of work. The brakes needed a little adjustment - the right brake was not coming in synchronised with the left so braking was causing the aircraft to pull to the left, also number two engine cylinder was leaking oil at the rocker cover gasket.

So armed with my tool kit and a rocker cover gasket I went to remedy these matters. I would not need my nav bag, headsets or other accoutrements.

The jobs did not take as long as I expected and there was a substantial part of the afternoon remaining when I was ready to push the airplane back into the hangar. This is where I picked up the first link in the chain.

It has always been my guiding principle to make a test flight after even the smallest mechanical adjustment and if appropriate to make a ground run before taking off on such a test flight. It would also be an economy of time to do it now.

The weather conditions at this time were good visibility but a boisterous wind was blowing from 90 deg across. I did not need a weather forecast as I could clearly see the weather that I would be flying in, especially as I only intended to fly a single circuit. However, there was a squall coming up at about 3-4 miles range, which clearly could make a difference if I lingered too long.

I made the best use of my time carrying out a brisk daily inspection and taxiing out to the take-off run. By this time the squall was definitely nearer, but I could get around once if I pulled my finger out. Mistake number two.

The take off was good if a bit lumpy. The Crosswind Leg was towards the squall and downwind was bumpy. Final was hectic and I got it wrong. I would have to go around and that was not any fun at all. Final the second time was extremely uncomfortable with a real crosswind at the

leading edge of the squall and that now was almost at mine and the aircraft's limit, I HAD to land off this one or I was in trouble. However, fortune smiled on me and I made an arrival, if not a landing. Somewhat subdued I commenced to taxi back to the hangar muttering that I would not do that again. That was when we came to another link, for I had barely taxied the length of a cricket pitch when one of the lenses dropped out of my specs on to the floor of the cabin. With one eye closed I taxied to the hangar feeling even more subdued and knowing what an impossible situation I would have been in if that had happened a mere 30 seconds earlier.

The chain had not finished with me. After stopping in front of the hangar and by now being under a fully developed squall I recovered my lens and attempted to replace it in the frame. This I found I could not do without specs, so I reached into the glove locker for my mandatory second pair, guess what!! They weren't there!! I had recently been on holiday and taken them with me in case of accidents. Where were they? Yes, you have guessed, in my nav bag waiting to be taken back to their usual home in the aircraft.

This collection of poor decisions and seemingly unconnected circumstances had gathered into a chain which very nearly caught me....and I had almost convinced myself that by now I was one of the 'old pilots'.

IF IT ISN'T RIGHT ... DON'T PRESS ON

After hiring an aircraft and completing a flight check on type, I planned to fly with my wife to BBB airfield, a distance of over 150 miles, involving a sea crossing. Prior to take off, the power checks showed rough running and 500 RPM drop on left magneto. A second attempt leaning the mixture to burn off any deposits showed no improvement, so I aborted and taxied back. The CFI checked - perfect - I taxied again and the power check was OK this time.

We made a precautionary landing due to weather at CCC airfield en route and, when the weather cleared, I had the same power check problem. CCC had no servicing, so I rang base who located an engineer at DDD airfield - 80/90nm away.

Reluctantly I agreed to fly there. Power checks better but still not good. A short field take-off on 900 metres was close to an abort and only 20/30 feet over the hedge. Flight was fine, plenty of fields, but engineer found one plug failing under pressure and three with over-large gaps. On reflection, I should have waited at CCC for an engineer to come over, even if I should have had to wait over the weekend.

DRIED OUT?

After landing my Condor on a grass airfield following a 20-min flight, I applied power to taxi clear of the runway and noticed that the engine had developed an unusual rattle. On shutting down, an observer commented that the engine sounded 'a bit rough'. The cowlings were removed and a check for insecure engine components revealed nothing untoward. The engine was re-started but I was unhappy with a mechanical rattle accompanying the engine note. Following a second shut down for further investigation, the propeller was found to be insecure; each of the eight propeller mounting bolts could be turned with just a finger and thumb. However, the Nylock nuts were still in place, indicating that the wood had shrunk away from the nut and bolt heads.

It is assumed that the significant shrinkage was caused by a recent relocation, from an unheated external building to a warm, dry purpose-built hangar. Interestingly, engine noise at the start-up, taxi and take-off from an asphalt runway was normal. The propeller was checked for security on the initial walk round but I do (did) not habitually check to see if I can turn the propeller bolts by hand.

NOTAMS - A QUESTION OF TIMING

I examined the day's NOTAMS, via the NATS web page. I noticed that a parachute site, close to my planned route, would be active from 12:20 to 12:40 and a 4 nm radius clearance was required. I telephoned the NOTAM office, and confirmed that the parachuting would be complete by 12:40. I asked if there was a contact frequency that I could use to check once airborne. They said no.

We set off at about 12:30 BST, and flew above cloud. My plan was to descend to 1,500ft when clear of high ground and follow the coastline. En route I changed to London Information, but they could not hear me, so I was out of radio contact at the time of the incident. As we approached the parachuting site, I checked my watch, and decided it was well after the parachuting had finished. I nearly decided to fly directly over the site, rather than to follow the coastline. Had I done this, it may have proved disastrous. Instead, as we turned towards the parachuting site, a passenger saw the parachute formation. The parachutists were less than 1 nm away, at our altitude of 1500'. I immediately turned back out to sea, not knowing how many formations to expect.

Lessons I have learned:

NOTAM times are in UTC! (I don't think I'll ever forget this one.)

NOTAMs are well worth reading and understanding. (I was given no training in understanding NOTAMs, they are not explained in textbooks, and were not tested in my PPL exams.

NATS Aeronautical Information is available at www.ais.org.uk

We have received several reports detailing instances of alleged poor aircraft maintenance standards in the GA sector. Three are published in this issue.

(1) A LACK OF CONTROL

On entering the Heathrow zone for transit at 1,500ft following a period of cruise at 2,400ft, I noticed that the elevator was substantially stuck.

A very small amount of movement remained and I judged that a landing at my planned destination was feasible. This was carried out. Subsequent investigation revealed no fault but some slight staining on the port elevator bracket indicating the possible presence of water in the bearing; it is surmised that this froze, jamming the elevator. The elevator restriction disappeared shortly after landing.

The aircraft maintenance company (who inspected the plane after the incident) re-greased and lubricated the bearing.

The aircraft was only just out of a 150-hour inspection, some 15 hours had been flown since the inspection.

Some primary/secondary control systems can be adversely affected by freezing of moisture. Regular lubrication in accordance with the maintenance schedule should be effective in preventing this type of occurrence. If the problem is encountered, descent below the freezing level should restore full/free movement.

(2) A BITTER EXPERIENCE

I purchased an aircraft several years ago, the first I have owned, since which time I have encountered an alarming number of situations regarding maintenance. The most recent has resulted in the aircraft being unusable.

Although I am a professional engineer with over 35 years experience, I have always deferred to the Aviation qualifications of the engineers who have maintained my aircraft. However, it has become obvious that on many occasions it is not simply a question of good engineering practice and workmanlike procedures being ignored, but certain basic, almost criminal, occurrences that have given me great cause for concern regarding the safety of my aircraft and perhaps those of others.

At the time I was interested in learning to fly and saw the aircraft advertised in a flying publication. I went to look at the aircraft and I took an aviation engineer with me to inspect the aircraft. The aircraft was pronounced fit and I duly purchased it.

During the first few weeks of my ownership many faults became evident in the aircraft. It transpired that the maintenance organisation responsible for the aircraft had been in a business relationship with the aircraft's previous owner. Thus it would seem that although the aircraft was, according to the logbook, regularly inspected and signed off over a period of more than ten years, the reality of the situation was that the aircraft had many faults. These faults included instruments that did not function properly, including the ADF, VOR, DI and RPM gauge, and were mostly due to faulty, very old and dangerous wiring.

Approximately two years later, after a landing accident, the aircraft was placed for repair with an engineering organisation. The engine was sent for shock load testing and rebuilding. The aircraft was rebuilt and the engine re-installed. However, the engineer was not able to make the engine work properly and as a result of his diagnosis I purchased replacement parts at a cost of over £500. However, the problem remained and during one of the engine run-ups one cylinder was noticed to be glowing red-hot! I looked at the engine and noticed apart from the fact that the baffles were incorrectly fitted he had omitted to fit one of the exhaust manifold gaskets when the engine was re-installed. I pointed this out, it was rectified and immediately cured the rough running problems (no need for the replacement parts!).

In the course of this repair, a major certified item was also replaced. About a year later, after losing confidence in the organisation involved, I changed maintenance providers. During a subsequent service inspection, it transpired that there was no paperwork for the item that had been replaced. It seems that the item fitted by the previous engineer had not been new in what would seem to be an attempt to save money, notwithstanding that I had paid a bill for about £1000 for a new item. This was brought to the previous individual's attention; he was extremely apologetic and he immediately purchased and supplied a new item, with all the necessary paperwork. The part that had been fitted to my aircraft for a year was never seen again.

Other problems were; a loose exhaust manifold causing fumes in the cockpit after an engine service; a persistent fuel leak from the carburettor, still evident after four attempts at rectification (bill over £1000); maintenance work paid for in advance but not subsequently honoured; brake unions not tightened on newly fitted pipes causing a brake failure on the subsequent landing.

More recently, a major assembly, fitted as a result of a separate landing incident involving a colleague and signed out at the time as airworthy, was subsequently

assessed as non-airworthy during a major annual inspection. A CAA/SRG representative confirmed the assessment due to "an unapproved repair with a poor standard of workmanship." When confronted with the proposition that the aircraft could not have been airworthy at the time the assembly had been fitted, or subsequently, when the aircraft had undergone a preliminary inspection, the engineer involved was disinterested, saying that it was the case now and anything that had gone on before was irrelevant.

In conclusion I would like to state that I am disgusted with the service problems I have encountered, also the extra time, trouble and money that the maintenance organisations concerned have caused me over several years. It has left a bitter taste and has taken away any enjoyment of flying.

I am keen to pass on my experiences with these so-called "Approved" maintenance organisations and individuals, in the hope of assisting other innocent owners/pilots.

(3) CHECKED FOR CORROSION?

A local flight in the syndicate Rans was planned to give a new syndicate member experience on type. All pre-flight checks were undertaken. Full power was applied for take-off. After 2-3 seconds engine died. Smoke appeared from cowling and aircraft was exited along with on-board fire extinguisher. Fire had broken out by this stage and was immediately put out by pointing the extinguisher through nose cowl.

Subsequent investigation by the repairer revealed that a corroded hole through the exhaust pipe near to the manifold had blown directly on to one carburettor and caused the engine fire. Although the Permit renewal had only just been carried out, the exhaust pipe had not been thoroughly checked and taken out as recommended.

GA FEEDBACK COMMENT

Following publication of the item "Too Close for Comfort" (GAFB 3-Page 1) the staff of an Air Traffic Services Unit commented that the report contained serious inaccuracies in relation to the nature of the air traffic service that was available to the pilot.

The report starts "The instruction from the Tower (clearly implying an ATC service was being provided) was - "G#### with a helicopter crossing from left to right take-off at your discretion" (phraseology only used by Flight Information Service Officers (FISOs). It concludes with "I now treat helicopters with some trepidation and some Air/Ground controllers warily" (surely this should be A/G operators if it was a "Radio" service). From these remarks it would appear that the reporter was unaware of the actual service being provided, and therefore his

responsibilities, or the danger of vortex wake from large helicopters.

As to the wake turbulence encountered from the departing helicopter, pilots do need to be much more aware of such phenomenon, the AIP entry for this airfield, for example, contains several warnings to alert pilots not familiar with operating in to aerodromes that operate large helicopters to the potential dangers.

The comments are correct. Generally, a FISO is not permitted to issue instructions or advice to pilots of his own volition, except as permitted in relation to aircraft, vehicles and personnel operating on the specified parts of the manoeuvring area. Some airfields provide both an ATC service and an FIS at specified times. An FIS is easily identified by the callsign suffix INFORMATION. More details on the types of service are contained in CAP 413 Radio Telephony Manual.

Regarding wake vortex advice, the CAA (SRG) GA Safety Sense Leaflet 15B also contains important information on the subject, including helicopter downwash.

WOULD YOU HAVE COPED?

I was due to fly a twin-engine aircraft from my base to a nearby airfield, pick up a number of passengers and take them to another UK destination. I was due to make the return journey two days later.

The weather on the day of departure was appalling with winds at base gusting in excess of 55 knots. A phone call to the final destination resulted in the first positive decision of the day. The runway was icy and the lights covered in snow. Clearly a no go situation. However, the forecast for a major airport relatively close to the final destination was reasonable and so I filed IFR flight plans for both sectors.

On the positioning flight I encountered a reasonable amount of ice at Flight Level 050. The short journey was otherwise uneventful. The passengers boarded and I departed shortly after nightfall and commenced the climb to Flight Level 120. After approximately ten minutes in the cruise the starboard alternator warning light came on indicating the alternator had failed. At the same time the Low Volt light on the annunciator panel glowed red. The instrument lights and cabin lights were also dimming. Clearly I had a problem. Due to the conditions - IMC with ice on the windshield - virtually everything electrical that could be switched on was: windshield de-ice, pitot heat, stall warning heat, propeller de-ice, cabin heating, cabin lights, etc: I immediately began load shedding in accordance with the emergency procedures. Almost immediately the instrument lights became brighter and I thought that I have solved the problem. The starboard alternator came back on line

but the Low Volt light remained on. The battery voltmeter was reading 24 volts and so I decided to continue.

After a few minutes Area Control cleared me for my requested route. They were now unable to hear my acknowledgement transmission although I could hear them clearly. "G####, if you can read this transmission, squawk IDENT". I kept transmitting and squawking IDENT when requested. What I didn't really appreciate was the fact that transmitting on the radio draws a lot of power from the electrical system. I should have instead squawked 7600 for radio failure. Very quickly the previous problems returned. First the starboard alternator went off line again followed soon after by the port alternator. The instrument lights and cabin lights faded and we were left in total darkness.

As you can imagine this was not the best situation that I had been in. 12,000 feet, in airways, in IMC, icing conditions with ice on the aircraft. No radios and no navigation equipment. What do I do now? My first priority was to fly the aircraft. Out came the trusty Maglight and I attempted to maintain the course and heading last received from Area Control using the magnetic compass. Next I tried the emergency power switches - nothing. Clearly I could not continue to my planned destination. I reached for my hand held radio and switched it on - nothing. (Subsequently, this proved to be faulty.)

I turned approximately 90° left and began to descend out of controlled airspace and reduced to endurance power settings. I knew that Air Traffic would have put a primary radar trace on me and I wanted to make it clear to them that I was leaving controlled airspace. The theory was that if I headed west I would soon be away from high ground and over the coast where I could descend to VMC and make my way home. I noted the time and my approximate position. The wind was from the northwest at approximately 50 knots, ground speed would therefore be 150 knots. But how could I be sure? When should I start to come down?

I was still in IMC and the only instruments that were remaining were the pitot static instruments and the magnetic compass. I decided that my best course of action was to attempt to get back to my base, which was not in controlled airspace and where the weather was reasonably clear. I estimated base to be approximately South of my current position. I descended to 7,500ft in a circling descent and set course to base. The sector safe altitude in this area is around 5,000ft amsl at night. The next item of equipment I was expecting to fail was the pitot static system, as I was still in IMC and icing conditions. I was contemplating switching over to the alternative static source but didn't. Holding the heading on the magnetic compass with a strong wind from 310° was fairly difficult. This is the situation when you really appreciate the quality of training involved when doing

your instrument rating. I doubt whether an IMC rating would have been sufficient in the conditions.

At one point I found myself considering what it will feel like when we hit a mountain. At the speed we were travelling [about 250 knots] I decided that it wouldn't hurt too much. I quickly put aside these negative thoughts and considered that we still had a lot going for us. We had altitude, over three hours of fuel endurance, Air Traffic would have alerted D & D and if necessary I could fly a triangle and hopefully someone would come up and assist us in getting down.

We then hit a CB and although it wasn't the worst one I have been in it was by far the worst situation in which I had been in one. Suddenly we were descending rapidly and I was glad that I had not descended any lower than 7,500ft. We lost about five hundred feet before I could arrest the descent without over-stressing the airframe. I reduced power to manoeuvring speed and held the new altitude of 7,000ft. I was convinced that the pitot would soon freeze up. It didn't.

My estimates now led me to believe that we would soon be at the coast close to my base. But how could I be sure? I risked descending to 5,000ft, still above sector safe altitude in my estimated position, but could I trust what the altimeter was telling me? Both the altimeter and the VSI showed a descent, I had to trust them. A few minutes later there was a break in the clouds and I saw that we were only about fifteen miles from base. I virtually dived through the gap in the clouds and followed the coast home. During the descent I had to clear the ice on the windshield with the heat from my hand. I instructed one of my passengers to attempt to contact ATC on the mobile phone. This was not successful.

Believing that ATC would have me on radar I joined downwind left hand for the active runway. One more hurdle to go - would the emergency blow down system work. I tentatively pulled the lever and the landing gear sounded and felt as if it had successfully gone down. There was only one way to find out - land. Apart from being a little low on the approach it was otherwise uneventful despite flying with the Maglight now in my mouth, one hand on the control column and the other hand alternating between keeping a small area of the windshield clear of ice and melting ice and operating the throttle. Landing without lights is more difficult than you may imagine. The runway only had edge lights and my peripheral vision was restricted. The landing was good, the taxiing to the apron less elegant. We were down and alive. That was a good feeling. The fat lady was singing.

What have I learnt?

1. Never fly at night without a torch. I always keep two in the cockpit.

2. Always check your emergency equipment before every flight and don't assume that because it was all right last time, it will be ok this time.
3. My emergency kit comprised the hand held radio, an emergency locator beacon, a personal strobe light, life jackets, life raft and oxygen masks. I have since added a portable GPS. This will go with me whenever I fly from now on.
4. As soon as you see a warning light come on react and make a positive decision. Don't think that it will get better as it probably won't. I should have returned immediately to the departure airfield or to base while I still had radio contact.
5. Be aware of the amount of current each item of equipment draws from the electrical system. Switching off avionics has a minimal effect. I may have not reduced the load quickly enough.
6. Remain calm. I did and we are alive.
7. If you haven't got an instrument rating, get one. If you are going to fly in this country in anything but clear skies it could save your life.
8. At all times when flying, be aware of your geographical position. When you are being radar vectored it is easy to lose track of your exact position.
9. Whenever possible take along a co-pilot who at least can fly straight and level in IMC would have relieved some of the heavy workload.

Some time later I visited the Area Radar and saw the radar trace of my evening's entertainment. I am very appreciative of the helpful attitude of the individuals involved. I was pleased to see that I was indeed in the position I thought I was when the problem occurred and to note the accuracy of my flying, when at the time I thought I was going all over the place. This enabled radar to make assumptions as to what I was doing.

I had always intended to visit air traffic and would recommend all pilots to do so, whether you are a newly qualified PPL or an aged ATPL. Apart from being extremely interesting, it is reassuring to know that you are being looked after by a very professional team.

For those of you with an engineering bent the problems encountered were very rare indeed. First the starboard alternator went off-line. What should happen is that when an alternator fails the voltage regulator should regulate the voltage output from the remaining alternator. As the remaining alternator cannot cope with all the load from the aircraft systems, items that are not essential to the flight, are switched off. In this case the aircraft also had a problem with the voltage regulator. The diodes were faulty and failed to do their job. As a result the alternator attempted to provide the voltage demanded of it, couldn't cope, and failed.
