GA FEEDBACK

No: 9 **September 2001**

The assumption that an aircraft will get airborne in the take off distance available on the basis that it has never been a problem before remains a serious trap for the unwary, as this excellent, honest report details.

A LESSON TO BE AVOIDED

A colleague (100hrs TT) and I (150hrs TT) took off from our local airfield, in a PA-28. My friend was operating as P1, and there were only the two of us on board with tanks filled to the tabs only. The majority of our flying has been in lighter aircraft types from grass, with our recent flying in a PA-28 flying mainly from tarmac. On the day in question, the ground was soft, and there was a reasonable crosswind, which had an amount of tailwind during the varying direction, rather than a headwind. We lined up, checks complete, but then made the following errors:

1. Did not even think of doing a performance calculation (too much tarmac flying..!)
2. Did not question the runway in use, let alone insist on changing
3. Did not think 'short field take-off'
4. Brakes were not applied during power run-up
5. The yoke was not held back for minimum ground drag during the ground run
6. Did not move our 'abort point' back to compensate for the conditions

Consequently, by the time we had passed the obvious abort point, it was too late to stop safely, and an instant decision had to be made to commit to a take off or a crash through the boundary. The yoke was pulled back at about 45 knots to unstick the wheels when realisation dawned that all was not going well. The aircraft just took off with the stall warning sounding, and the nose was lowered to accelerate the aircraft. We used all of the 800m runway available, and passed over the boundary hedge far lower than ever before at about 60 knots. The aircraft was accelerated to 75 knots and safely climbed away.

Conclusion is that we did not consider the extent of the conditions and appreciate the difference between tarmac and soft grass and appreciate fully the amount of force required to rotate the PA-28 (when on grass) compared to a Robin. We both learnt on grass but had recently been on tarmac only.

We have now included the basic aircraft performance data and condition factors at the bottom of our load and balance sheets that we have for each aircraft that we fly, to act as an aide-memoire. Whilst my friend was P1, the above is written in the plural because there were two of us in the aircraft and either of us should have been capable of addressing any one of the factors in this incident.

If this helps in making anyone avoid the same (potentially fatal) mistake then it's been worth the writing.

The lessons learned by the reporter and his colleague are most important and, if heeded, could prevent a future accident.

ALL of the factors to consider are detailed in CAA GA Safety Sense leaflet 7B - 'Aeroplane Performance'.

Have you read it recently?

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In addition to physical factors, such as grass condition, wind and Outside Air Temperature, human factors such as distraction can also lead to a significant error:

CAUGHT OUT BY CARBURETTOR HEAT

On a humid summers day, +18°C, I was delayed at holding point of the runway due to a string of arrivals, so selected Carburettor Heat ON. There was no positive ATC, only air/ground information. A brief gap in the landing traffic appeared, so I taxied promptly onto the runway and performed an expeditious takeoff. With 2 passengers + half fuel, the acceleration over long-ish grass was "leisurely" and an early rotation killed the acceleration completely.

A General Aviation Safety Newsletter

from the **C**onfidential **H**uman **F**actors **I**ncident **R**eporting **P**rogramme

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Then I spotted the problem. The Carb. Heat was still selected out (i.e. ON). I selected Carb. Heat back to COLD and the takeoff performance returned to normal. Fortunately the airfield in use has long runways!

I have since added Carb. Heat - COLD - to my take off check list and would suggest this for all aircraft fitted with carburettor heat.

Plus your recommendation ***(In GA FB Issue 8)*** - **always use a checklist to back-up memory!!**

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In the last issue, we highlighted how easily important checks can be missed, particularly when using mental checklists. We subsequently received this report:

ANOTHER ALMOST PERFECT TOUCHDOWN

'A Perfect Touchdown - Almost' in GA FEEDBACK No. 8 has similar factors to my incident.

My aircraft has its main gear retracted manually by moving a lever forward in a slot with securing gates at the top for UP and the bottom for DOWN. When DOWN a catch rotates under gravity preventing the lever re-entering the slot.

This particular type is a difficult aircraft to land in strong cross-winds, so I was in the circuit extending my capability in a 12-14 kt component which was taking considerable concentration. The approach was good, flare and touchdown good but on roll out the gear retracted. The aircraft slid on the retracted wheel for a further 25-30m. The VP propeller blades were damaged beyond repair but otherwise damage was superficial.

Clearly I had failed to carry out the final check that the locking catch was correctly deployed. Probably due to the extra concentration applied to the cross-wind conditions. The aircraft was fitted with a GEAR NOT DOWN warning system but the micro-switches were linked to the position of the landing gear and not the locking system. I have since modified this so that the locking catch has to be in place when the throttle is closed, otherwise a warning light and klaxon operate.

The incident has reinforced my experience to ensure ALL checks are properly carried out. Unfortunately it was a somewhat expensive lesson.

Many pilots routinely check on every final approach that the landing gear is down and locked.

This report references modification action taken by the reporter, as do the two that follow. It is most important that the appropriate modification approval process is complied with. In this report the aircraft was a home-built, consequently the PFA procedures would apply. In the following report, the appropriate Type Authority's approval would be required

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RUDDER DRAIN

During pre-flight External Checks, a quantity of water was found to have collected in the rudder bottom closing fairing. This is a composite (plastic) closing member open at the top at its forward end below the lower rudder hinge. The fairing contains the electrical supply harness for the rear navigation light, which is mounted in the aft extremity of the fairing. A drain hole would solve the problem.

Arrangements were made for the fairing to be removed to drain water and to be refitted before flight. Approximately a teacupful of water was drained from the fairing.

Always check for the possibility of water ingress, particularly if the aircraft has been parked outside or exposed to adverse weather for a period of time.

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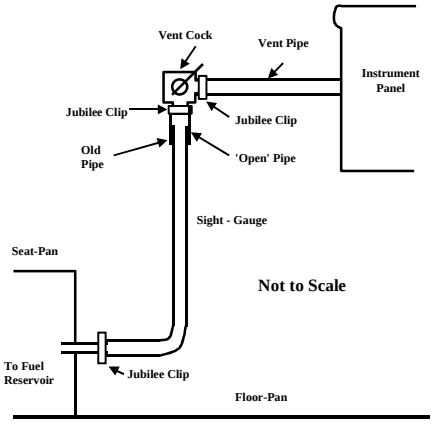
And finally, a modification that was obviously not approved:

FUEL SYSTEM FOLLY

The aircraft was purchased last year. It was noted shortly after purchase that if the two wing tanks were filled to maximum capacity then fuel was seen to be running down the outside of the fuel sight gauge (located on left wall of the cockpit) onto the cockpit floor. Until this could be fully investigated the tanks were not filled to the top.

When the side panel was removed to investigate the fuel leakage, it was discovered that the sight-gauge tubing had been replaced with smaller bore pipe-work than the original. Because this smaller pipe could not be expanded to fit over the air-vent cock connection, it had simply been stuffed into the short length of old tube still remaining.



In effect the fuel tanks were connected to the cockpit by an open pipe! The main fuel cock does not isolate the sight-gauge.

Don't wait - investigate!!

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PAY ATTENTION - OR PAY THE PRICE!

My aircraft is fitted with a two-axis autopilot. I was crossing the English Channel at 2,500ft. An adjustment to the altimeter setting put the aircraft at 2,600ft. I adjusted the autopilot to descend at 100fpm intending to level at 2,500ft. Chatting to my passenger I forgot I was descending. There was no horizon due to haze over the sea. The audible altitude alert warning was selected OFF. When I next looked at the altimeter I was at 1,800ft! With no horizon I would have continued my descent into the sea if I hadn't looked at the altimeter when I did. I will now always switch altitude alert ON, if the autopilot is in use. For a small height correction, however, I will fly manually.

Great technology but dangerous if not used properly!

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FUEL STARVATION

During my second flight of the day I experienced what I considered to be either 'carburettor icing' or 'vapour lock' and immediately returned to the airfield from which I had just departed to check the fuel and carburettor filters.

Although I found a minute amount of water in the wing tanks everything else seemed in order. After conducting two ground engine runs with 15 minutes between each run, I decided to complete a circuit of the airfield as a test flight. There was no further occurrence of the problem in flight and I decided to return to my original home airfield some 50nm away.

On descending for my rejoin, the engine suddenly spluttered and quit at 1500ft and would not restart. Following a 'May-Day' call I landed in a field without damage. I pressed the starter button and the engine fired and started immediately.

The aircraft was trailered back to my home workshop and I spent the following three days stripping down, flushing and cleaning the entire fuel system. During this process I noticed that over a period of time the fuel in the fuselage tank slowly drained into the wing tanks, which led me to believe that there was a problem with the fuel valve.

On further investigation, I found that the fuel valve was not seating properly in the WING TANK position due to the handle catching slightly on the armrest. I increased the clearance around the handle by grinding an indent into the armrest and the fuel valve seated perfectly.

It appears that if the fuel valve is positioned only slightly between the FUSELAGE and WING TANK positions the fuselage tank will run dry and air will flow into the system and eventually cause vapour lock.

I have now completed extensive ground runs, taxi and circuit tests, and a 220nm cross-country covering five different airfields and no further problems have been experienced.

The lessons I have learned from this incident are:

a) Always make sure that the fuel valve is seated properly before flight and periodically check the position during flight.

b) Never fly the aircraft without fuel in the fuselage tank.

c) Keep a cool head when the engine cuts.

d) Always be ready for an emergency and practice in-flight engine failure procedure.

Taking heed of lesson (d) in particular could save your life and possibly other's.

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CAUGHT IN THE ACT

Since going solo I thought it would be nice to have a camcorder fitted to my microlight aircraft. I bought a very small camcorder, which fits nicely on top of my fuel tank behind my left shoulder. The sound system is connected to my radio/intercom interface so I can give myself a commentary and record my radio transmissions. I show the results to an instructor and I have a very effective means to self-criticise.

On the day in question I was flying the circuit at AAA at 800'. There were two other aircraft also flying circuits. One of them was crewed by a student with an instructor colleague.

I turned off the downwind leg onto base and I heard my instructor colleague call "G-## doing one low level right-hand circuit". I thought that will put him in my 2o'clock high when I do my touch and go. I turned onto final and called "final", at the same time became aware of an aircraft very close behind me. I knew he hadn't arrived on a long final, and being as I had called final, I assumed that he would move onto the dead-side and go around. I then called "G-XX, short final, touch and go". Then I heard my instructor colleague call "Cherokee on final go around now, go around!" This was followed by the radio operator in the Tower calling " go around!"

The Cherokee passed over the top of my aircraft very close. I recall seeing the rivets on his underside. I slammed open my throttle and turned away from the

aircraft's wake turbulence to the right. I felt my aircraft being pulled left and I hung on! I heard the Tower attempt to contact the aircraft. There is no reply. Someone in the Tower then said "I think the other aircraft is not on radio". I regained my composure and flew a further circuit.

After landing, the pilot of the other aircraft came and spoke to me. He apologised and said his radio wasn't operating correctly, and he wasn't aware of this? He had heard nothing so I think he assumed nothing was there!

I enclose a copy of the video. The camera is fitted with a wide-angle lens, so the separation between the two aircraft looks greater than it was in reality.

This was a classic example of each aircraft being positioned on the final approach in the other's blind spot as a result of the High wing configuration microlight and the Low wing overtaking aircraft.

To avoid this type of situation, in the absence of a published arrival procedure, a standard overhead join should be flown, particularly if no radio contact has been established. CAA Safety Sense leaflet 6B - 'Aerodrome Sense' refers.

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RT DISCIPLINE

The following report was received from an Air Traffic Control Officer at a UK Regional Airport within Class D Airspace:

An incident with a light aircraft recently left me astonished at the standard of RT. It made what would have been a quiet period into a nightmare.

The aircraft was a light single engine aircraft from AAA, which is in Class G airspace and has only air/ground facilities. It was in the ### hold (which is overhead the field) carrying out instrument training.

I instructed the a/c "Next time over the ### you are cleared for the alternate NDB procedure R/W ##. Report Beacon Outbound". In keeping with most previous replies the pilot only said "Roger". I managed to get a sort of readback of "NDB Roger".

I then observed him on radar leaving the beacon at about 1 mile but with no beacon outbound call. I then said "Confirm Beacon Outbound". He replied " Roger we are on the outbound track" which I mistakenly assumed that he was Beacon Outbound for the procedure. I replied " G-XX you are cleared to descend with the procedure and report Base Turn complete. " To which he replied " Roger" but sounded distracted.

At about 2 miles out instead of continuing and descending on the outbound track he turned back towards the hold maintaining his level. I queried this and he said " we were on the outbound track for the hold". He had intended to remain in the hold and was not on the outbound track for the NDB procedure. I was glad that I hadn't released a departure thinking that he was beacon outbound- it could have been very nasty.

This was just the worst confusion in a whole catalogue of mis-readbacks. Other examples included:

ATC "G-XX Fly heading one eight zero, climb flight level four zero"

Readback " One eighty, forty"

ATC "G-XX Turn left heading zero three zero"

Pilot "Thirty, Roger"

On one occasion there was no reply to four transmissions that I made. The pilot said about 3 minutes later "G-XX is going to AAA Radio on 123.45"

I discovered subsequently that the pilot was a PPL and had a qualified instructor with him!

I appreciate that training a/c have a high workload and that pilots are busy flying the a/c, however to arrive at an airfield in Controlled airspace with such a standard of RT is not only aggravating but also potentially dangerous. I had a moderate workload but this was turned into a very high workload because of this one aircraft.

Not only does incorrect RTF phraseology increase the ATCO's workload, it can easily lead to a loss of separation incident or worse in Controlled Airspace. The inherent dangers in the situation reported are obvious.

Whilst it is accepted that student pilots will make occasional mistakes, it is unacceptable for any pilot to fly in Controlled Airspace and operate the radio without ensuring that he understands the importance of using correct RTF phraseology.

The Radiotelephony Manual (CAP 413) contains full information on the correct phraseology to be used.

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