BRISBANE VALLEY FLYER

OCTOBER- 2020

BRISBANE VALLEY SPORT AVIATION CLUB INC

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Teaching formation flying across the ditch. With my flaps down to control my speed, I just slipped into position as formation leader.

Peter Ratcliffe (Pres.)	0418 159 429	Ian Ratcliffe(Treasurer)	0418 728 328
Vern Grayson (Vice Pres.)	0431 465 874	Jackie Daley (Secretary)	0438 783 740

From the Club

Hello everyone,

We have changed the key code to door anybody that needing it to access the Clubrooms will need to ring me so I can pass to them

The Convid-19 requirements have changed again and we are now permitted to have 30 people at meetings. However, those 30 people will need to maintain normal social distancing and keep at least 1.5 metres apart from each other.

All the best

Peter Ratcliffe
BVSAC President

Wheelbarrowing is a NO NO NO NO NO!

By Rob Knight

Scene 1: A fine day with a light wind blowing across the runway at about 5 knots. A light aircraft is on short finals, hot and high, with its airspeed a few knots fast and the aircraft too high to flare at the desired flare point. Ultimately the aircraft finally reaches the flare point further into the runway than the pilot likes so he decides to get the wheels onto the ground where he will have some braking.

Scene 2: Inside the cockpit the pilot hasn't allowed the aircraft to float as normal to wash the airspeed off. He flares just enough to let the aircraft touch down on the mains and nosewheel simultaneously.

Scene 3: From outside the aircraft the wheels rumble and the aircraft bounces gently. You can see the trailing edge of the elevator move down as the pilot pushes the stick forward to hold the aircraft on the ground. The nose is forced down onto the nosewheel wheel and the nosewheel suspension flexes as the leg shortens. The aircraft has begun to drift slightly across the runway with the crosswind

Scene 4: Inside the cockpit the pilot reaches for the brakes and applies them firmly. Too little of the runway remains in his windscreen so he firmly presses the stick full forward and applies even more pressure on the toe brakes.

Scene 5: The main wheel leg lengths extend as the tail rises and the nose pitches even further down. The main wheels stop rotating as the traction diminishes; the weight has come almost completely off the main wheels. Directional control is lost – falling airspeed has robbed the controls of their effectiveness and any chance of useful differential braking is gone- the braking wheels are virtually off the ground and, anyway, the pilot is too engaged to try to use them. The aircraft continues to drift further away from the runway centreline.

Final scene: The aircraft suddenly snaps and yaws violently, yawing into wind and pivoting around the point of contact of nosewheel with the runway. The nose leg fractures and collapses. The prop strikes the ground and bends backwards as the cowling crumples and tears away beneath engine. The tail and windward wing rise and the aircraft slowly topples tail over nose to lie upside down on the runway. There is silence except for the crackle of bending metal as the wreck settles. There is a strong smell of petrol in the air…….

Wheel-barrowing is a dangerous condition that occurs when the weight of an aircraft becomes concentrated on the nose wheel during a take-off or landing roll.

On take-off, the common cause is the pilot holding the airplane on the ground too long, particularly when a crosswind is present. When this flawed technique is used the forward stick that holds the airplane on the ground by pitching the nose down unloads the main-wheels, transferring the load to the nosewheel. This extra heavy nosewheel loading compresses the nose-wheel suspension and forces the nosewheel to remain in firm contact with the runway. This is *wheel-barrowing*.

In this condition, any yaw will set up a couple that will turn your airplane, and your very world, upside down. All directional control will be lost and the airplane will trip over its nose-wheel.

In reality, there is no cause to keep an airplane on the ground after it has reached its V_X (best angle of climb speed), indeed, there are very good reasons to be airborne before this figure is reached. If a pilot considers that he/she should hold their airplane down until attaining its V_X before lift-off, then the flight should be cancelled or postponed until better conditions exist.

Wheelbarrowing is more frequently an issue during the landing phase. Commonly, it results from approaching too fast and then touching-down too flat. As the rebound from the undercarriage tries to make it fly off again the pilot takes the stick forward to hold the aircraft on the ground. The applied forward stick will pitch the airplane nose down, unloading the main wheels and loading the nosewheel instead. With the aircraft main

wheels on tip-toe braking will be lost because the wheels have insufficient weight on the tyres to provide traction for brakes to function. The nose wheel, still in firm contact with the runway, will suffer substantial drag, and any lateral movement will create a powerful couple that yaws the airplane and it will pivot violently about its nosewheel.

To get a grip on this topic, it is necessary to be clear on what a 'couple' is in this sense.

> A Couple is a force acting about a point. The magnitude (power) of a couple varies with either a change in the power of the force applied, or a change in the arm of the force. A couple can ONLY be opposed by another couple.

In a 'normal' landing, when the main wheels (PW and SW) touch the runway with the nosewheel (NW) clear, two couples are generated by the contact the wheels have with the runway. The magnitude of each couple is determined by the drag force of the tire/wheel and the length of the couple arm - the distance between the point of application of the drag force and the aircraft Centre of Gravity.

Assuming the same drag applies to each wheel, when the aircraft is pointing in the same direction as it is travelling the couples are equal (red and blue couple arms are the same length) and no yaw will be caused by this interaction. This makes a nosewheel equipped aircraft easy

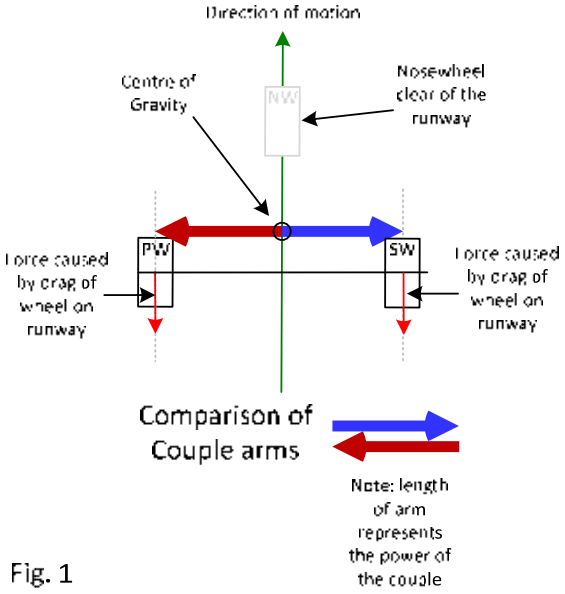

Fig. 1

Using the correct take-off and landing techniques provides a directionally stable aircraft. Drag from the wheels in contact with the runway provides a directionally corrective force.

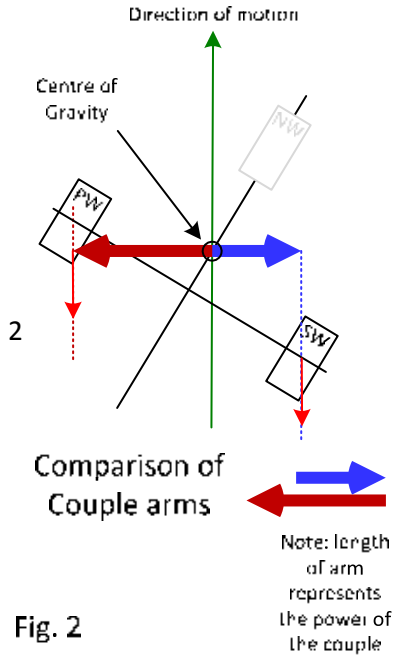

Fig. 2

to control on the runway because it is directionally stable and its forces try to keep its nose aligned with its direction of movement without pilot input. See Fig. 1.

As Fig. 2 illustrates, this is a STABLE action because it yaws the aircraft back towards its direction of motion and as it does so the couple arm shortens, diminishing the force as the alignment completes. In other words – the airplane WANTS to move in a straight line. The weight and drag forces tend to keep the airplane moving straight

However, this will ONLY be the case while the main wheels are on the runway and have traction with it. If the main wheels are not in contact with the runway and the load is on the nosewheel, an entirely different situation exists.

If, whilst the aircraft has weight on the main wheels, the nosewheel is clear BUT the aircraft nose is NOT pointing in the same direction as the aircraft is moving, then the couples will not be equal – the leading main wheel will have a greater arm and therefore more powerful couple. This, the red couple as

illustrated, is more powerful than the blue couple, and the imbalance provides a force to yaw the aircraft's nose and align it with the direction of motion.

However, when the nosewheel is on the runway and the main wheels aren't, the situation becomes critical.

Fig. 3. If, in this state, the drag generated by the nose-wheel is directly aligned with the centre of gravity and the direction of motion, no couple is formed and there is no yaw force generated.

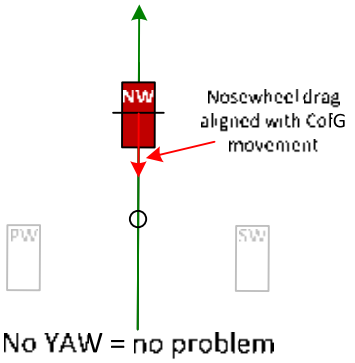

Fig. 3

However, immediately the nosewheel diverges from its alignment with the centre of gravity it will instantly create a couple that generates the unstable yawing moment. For example- See Fig's 4, 5, & 6.

Fig. 4. If the nosewheel has moved to the right, the drag force caused by nose wheel contact with the runway is now no longer aligned with the centre of gravity and direction of motion. A couple is formed.

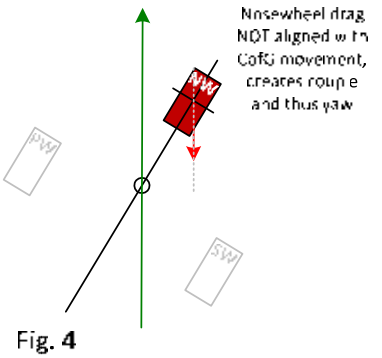

Fig. 4

Yaw creates an unstable condition that that can quickly became an out of control situation.

Fig. 5. The grey force of the aircraft's mass acting through the aircraft centre of gravity is moving forward while the red drag force created by the drag on the nose-wheel's contact with the runway acts rearwards. This will savagely yank the aircraft into a right yaw state and, as the yaw takes effect and the angle change increases, the arm gets longer and thus very quickly more powerful.

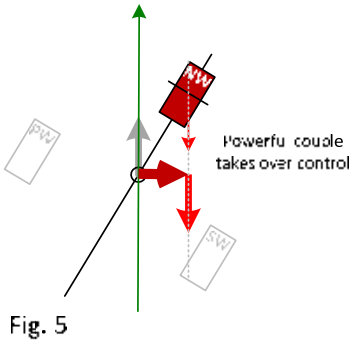

Fig. 5

Fig. 6. The magnitude of the couple has increased greatly with the changing angle. Not only is the arm longer, but the front wheel has less rolling ability and the now scuffing tire has greater drag than it initially had.

The situation is now serious. The aircraft still has just the nosewheel on the runway and the yaw forces are now beyond correction by the rudder. Removing forward pressure on the stick and then adding full power may allow the aircraft to fly off but as curative action it is doubtful at best. Effective control is lost and there are no remedial options available to the pilot at this late stage.

This is, in effect, a ground loop condition and the side loads on the nose wheel assembly will quickly exceed their design limits. The nose leg will fail. The prop may strike the ground and disintegrate. Parts of the propeller may enter the cockpit with fatal consequences. This can

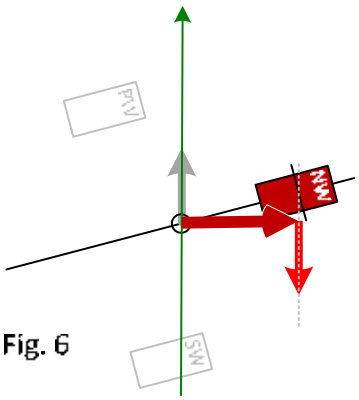

Fig. 6

ruin your WHOLE day. However, on the bright side, the landing will be short!

While the best correction is to never get into this condition in the first place, an immediate go-around before substantial yaw is experienced can resolve the problem – but early recognition of the pending problem is paramount. The correct landing technique has the main wheels touching first and the nose wheel settling only in such a manner that a positive load is retained on the main wheels as the speed washes off.

As you can now see, there are very good reasons for this.

> *I first published this article in early 2014, but now re-produced it at the request of a reader who didn't see it at that time and has recently experienced such an event, He was fortunate in that the aircraft was not damaged, but his ego needs panel beating and his adult daughter, who was with him, has refused to subsequently fly in a light aircraft because of the fright that she got. Note that my depiction in the article above is not what happened in this case, but what the potential and frequent result is likely to be.*

Happy Flying

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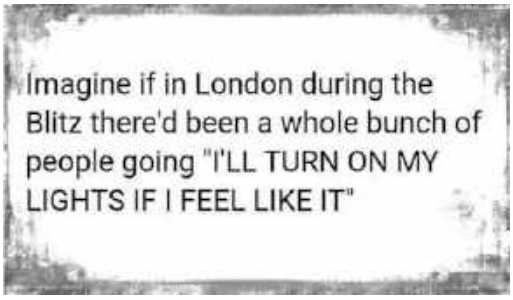


The PIO Trap

Or Pilot-induced oscillations: are you a sinner or a victim?

Adapted from an article by Enderson Rafael

You have probably seen this before: a GoPro video showing a pilot struggling with large inputs on the yoke, giving the throttle a hard time with either high thrust or idle power, and after a fair amount of time focused on that demanding approach, a smooth touchdown followed by a reassuring smile. On the title of the video, something mentioning a high crosswind component, and below, the comments saying that the pilot nailed it like a boss. Did he or she?

It is no secret that pilots like to hand fly—after all, that is what make them aviators. No one watched *Top Gun* during their childhood and started dreaming about monitoring an autopilot-flight director system for seven hours straight. So, although the industry has slowly but surely turned airline pilots into managers, to the extent that it is itself now concerned about their hand flying capabilities, we, on the other hand, kind of pardon the boring hours of paperwork and flight path monitoring for the sake of those couple minutes taming the beast.

Wrestling the airplane onto the runway – why?

Yet apparently some colleagues are taking it too seriously, and their thrilling performances are a great reminder to ourselves. After all, it requires a high level of self consciousness for one to know exactly how he or she is dealing with the flight controls. Recording yourself flying in video, instead, is a very useful tool for this matter, and although understandable, it is sad that most airlines do not allow their pilots to do so. Since you are very focused on flying, looking out the window and to the instruments, and your hands are responding almost automatically, to notice what movements you are actually doing is not that simple. Nevertheless, some people have recorded it, and after posting themselves on the internet, is time for us to look at them and try to figure out if we are doing the same unintentionally.

Imagine yourself flying, and while you are preparing for an approach, you encounter a challenging, windy condition ahead. The good side of it is that you are going to be more focused on the safe outcome of that approach, so the chances of you ruining your touchdown, for example, are greatly diminished. It is not uncommon to see basic mistakes being made in good weather with calm winds, since complacency tends to kick in and get us relaxed. But how do high winds affect our aircraft?

First of all, there are limitations we have to observe. Some are imposed by your airline policy, others by the insurance company policy, and besides those, for those pilots who are fortunate enough to fly their own aircraft; it is always advisable for them to have their own personal limits. When it comes to the manufacturers, usually the word used is “demonstrated” crosswind component. That is not exactly a limitation: anyone who has flown a Cessna 152 long enough knows it handles crosswinds perfectly well above twelve knots, if properly dealt with.

But having hard limits on your operations, either from your experience or from the operator that pays your bills is healthy. In the airlines we are talking about crosswinds up to forty knots, and although such conditions would keep most light GA airplanes on the ramp, in major airports around the world it is just another day at the office—probably followed by a beer and some goods stories shared far from home.

Having said that, pilots from all types of aviation and all levels of experience fall into the pilot-induced oscillation (PIO) trap. From an F-22 Raptor test pilot to a Boeing 737 captain, not excluding

several single engine piston students and instructors, the over control is just like the controls themselves: all over the place. But why does that happen, especially in high wind conditions?

Let's start from the basics.

Every action has a corresponding reaction of same intensity but opposite direction: this is one of Newton's laws. So this is pretty much the way an airplane, an inherently stable flying machine, goes up, down, and to whatever side it has to: by changing the control surface positions, leading to a reaction of the whole airframe in the air.

Now during a final approach, the objective is exactly the opposite: to remain on a constant flight path that will eventually take the airplane to a touchdown on a predetermined portion of the pavement ahead, no matter how dynamic is the atmosphere around it. But then there's the wind. It can come from either direction, so a tailwind tends to make you float, to approach too fast, and pilots usually have fairly low limitations in order to keep us in the space available for us to stop upon landing.

Headwinds, on the other hand, are usually welcome, and since it is unlikely you'll find any headwind capable of making your aircraft to fly backwards, there are no real limitations regarding them (other than for autoland systems). But, since high winds, even headwinds, normally change in intensity the closer you get to the ground and are often associated with turbulence, some kind of work on the power is going to be required for sure. As usual, the gold rule, "pitch for speed, power for altitude," goes without saying.

Even Airline pilots can stiff-up crosswinds

But it is with crosswinds that our bull riders are more prone to shine. And I say that from experience: I was one of them for a fair amount of flight hours, and it took an instructor's advice to make me realize what I was doing wrong. Just like pilots in movies who do sharp hand movements and make confident statements using sunglasses to look cool, the same coming from a real pilot on a real flight had no use other than for dramatization. And we will get to that in a minute. First let's review the three main crosswind landing techniques. Crab, decrab, and sideslip.

Landing in a crab means you are not correcting for the wind with the wings. Instead, you are flying wings level all the way to the ground, while your nose is pointing into the wind, relying on the natural reaction the airplane has when affected by any sort of crosswind. Although it might be easier, since all you need to do is keep flying in the direction of the runway and its aiming point without messing with the rudder while flying, this technique is not practical for all types of airplane. Narrow body aircraft can usually do it on wet runways with ease, and even on dry ones with very high crosswinds (if coupled with a sideslip). But the widebody jetliners are the ones that take more advantage of it, because its robust bogie-mounted main gear can withstand some serious crab upon touchdown, tilting the whole machine back to the runway orientation almost by magic, especially with the modern, fly-by-wire systems behind the scenes.

The decrab method consists of turning the crab approach into a sideslip during the flare, which is so quick and precise that it leaves no room for funny inputs by the pilot and works well with pretty much any airplane. This is true especially when ground clearance by the engines or wings might be a factor, even at small bank angles.

But then we have the pure sideslip—although not necessarily suited to light airplanes, the method of excellence for airplanes like narrow body jetliners (which would end up in the grass if crabbing into a

dry runway) or single engine pistons (which, without this technique, would ruin their tires painfully as they touched down in a decent crosswind).

The sideslip method has a beauty all its own. It might not be as elegant as the crab when seen from outside, but it requires a decent amount of coordination on the flight controls by both human and machines—yes, automated landing systems use the sideslip, and this is the main reason why they have relatively low crosswind limits. The Boeing 787, for example, can handle up to 25 knot crosswinds, down to the roll-out, even on one engine. How amazing is that?

But humans can land in much more severe crosswinds, simply because we can add some crab into it and, of course, we have the capacity to react in a satisfactory way to quick changes that the computer would probably find too puzzling. So this is the perfect—although not only—scenario. You are approaching in a crosswind and choose to do it with a sideslip. Since, as mentioned before, turbulence is often associated with high winds, now you find yourself having to adjust to the changing movements of the airplane every tenth of a second, and that requires from you all your hard-earned skills. Suddenly, you are fighting the universe like there was no tomorrow, and either you are doing it thinking it is quite the right way to do it, or you are not even noticing the hard time you are giving to the airplane. Where does that come from?

The Portuguese have a very ironic expression to define it: “vento de cabine,” or in a direct translation, “cockpit wind.” Yes, you got it right: most of your corrections on the control were not even necessary in the first place, and could even be only a response to some overcorrection you did just before. That is why it is technically classified as pilot-induced oscillation. Most of the movements the airplane is making are a direct result of the pilot’s inputs. And if those inputs are not needed for any practical reason, then they are nothing but the pilot fighting himself, using the airplane as the battlefield.

How silly can it get? Well, a bit more. You see, even highly experienced, fly-by-wire aircraft pilots do it here and there, and many of these airplane types are able to distinguish the pilot’s inputs from the wind effect, thus correcting the latter to make our life easier. So, if you start correcting something that three flight computers already did, well, then it gets really embarrassing.

Some people got the bad habit during basic and even advanced training, from instructors who used to do it and made it look right. Others had this tendency naturally, increased by self confidence, and were never properly addressed by anyone they’ve flown with. The fact is, that is an obviously wrong thing to do. As you make large and quick inputs in a small airplane, you are exposing the airframe to loads it might not have been designed for. And if you are flying a big jet, then the whole inertia involved in airplanes that can have the area of an Olympic pool or even a city block, makes these quick opposite direction control inputs ineffective altogether—not to mention what your passengers are going to experience in the back.

So, if you have the chance to record yourself flying during a gusty approach, do it. Then analyze honestly your performance and come up with ways of improving it, if needed. If you can’t place a GoPro on your operator’s $250 million airplane, that’s also fine: the next time you fly into a windy destination, pay attention to the way you are acting on the controls. Do it gently, with small amplitude inputs, and wait for the airplane to react before you make your next move. Most of the adverse airplane displacement imposed by the wind is momentary, and it is not uncommon to end up where you were half a second before without doing anything—especially if you have a fly-by-wire system in normal mode assisting you.

One thing is for sure: there is absolutely no need to deal with the stick and rudder as if you were playing the drums.

Editor's note: The Ongoing Debate Regarding Crosswind Approach and Landing Methods.

10,000 hours instructing and 15 years as a flight examiner has illustrated to me that the best means by which a pilot can carry out a non-stressful crosswind approach and landing is whichever method the pilot feels best doing. I have flown both types of approaches and been required to assess others performance in carrying them out as well as being examined myself on both types. The result of this is that I don't see any hard and fast rule. We are essentially discussing whether to use a track (or crab) approach down finals followed by a kick-it-straight-as-we-touch method, or fly the finals with crossed controls and slip to the flare and through the float until we touch. There is a nauseating amount of propaganda about which is the safest/best/easiest method but I can't see a resolution to it. The best is what the PinC feels easiest with.

A crosswind landing on the windward wheel at Coominya. The crosswind was from port.

For me, I was taught in the 1960s to track in and "just before the wheels touch" to "kick the rudder and align the nose with the runway". This is like buying a lottery ticket, the chances of winning are in the hands of fate and most people are losers. My judgement then (and now) was/is hard-pressed to know exactly the right instant to "kick straight" because of the mechanical turbulence just above the runway. Now I use a combination. I track down finals (just as I fly cross-country and allow for drift) until I reach the flare. Then, as I flare, I lower the windward wheel onto the runway which provides the slip to off-set the drift from the crosswind. This, in my opinion, requires less concentration on controls as I don't have to fly consciously with the ball out one side (a forbidden act in all other sectors of flying). It has another benefit, too. When I lower the windward wing at the flare, the adverse yaw automatically pulls my nose to align it with the runway with but little assistance from me. Because the control movement is definite, and the results are easily seen and able to be assessed, there is little opportunity for any PIO to cloud the issue, and precise control is relatively easy. However, let me reiterate, it is merely my choice to use this technique because I find it is easier to achieve a smooth, controllable landing in adverse crosswind condition compared to other techniques.

Windward wheel crosswind landing in my Colby. It works for either undercarriage configurations.

This situation in crosswind approaches, to crab or to slip might be a question to which an absolute answer is just not available. It's quite rightly argued that that crossed controls are a prelude to many stall/spin accidents but this is hardly relevant to this subject assuming normal pilot competence as the degree of the out-of-balance state is not high if the max demonstrated cross-wind component figures are adhered to.

It's your choice as the pilot in command to follow the technique you decide you are most comfortable with. This will give you the best chance of making an approach and landing you'll be satisfied with. Also remember, if it's not working out as you want, you can go around at any time and turn that attempt into a practice run.

Breakfast at Murgon

From Mal McKenzie

This was the first brekkie fly in at Angelfield since the start of Covid-19 restrictions. Strict requirements were in force at the airfield and eating areas. On Saturday, cloud with some drizzle in the morning didn't stop some of the Savannah folk from arriving. More aircraft arrived from different airfields as the afternoon wore on.

Saturday became a Savannah event as the invitation had gone out to owners to visit. The Australian agent in Victoria was unable to attend due to the state travel restrictions but special discount pricing was being offered to any new buyers of a Savannah kit sold over the weekend.

Pilots and visitors gathered to discuss relevant aviation matters and drink coffee or tea. Later, a dinner of spaghetti goulash was served by Deb and Ralph at the fire pit. Dennis and crew had set up the projection in the hangar to show a relevant movie later in the evening.

Sunday morning dawned CAVOK with little wind - perfect for the many aircraft still flying. The hot breakfasts were served as quickly the arrivals could consume them. Later the Savannah group ran some raffles of some goodies.

By mid morning a wide variety of aircraft had arrived safely. A good mix of Cessna's, Piper's, RV's of various models plus different recreational and ultralight aircraft including BVSAC member Peter Freedom with a few passengers from Watts Bridge. Overall estimates were of attendance were forty five to fifty aircraft and crew flying in over the weekend. Other folk drove in to attend. Some chose to camp nearby overnight or try out the bunk house beside the hangar or a local motel.

A few pilots took their aircraft for local flights, too. As people were departing the increasing crosswind made some takeoffs a little more interesting for some. It was good to see the aircraft climb away safely as their pilots set the course for home destinations. The Burnett Flyers worked hard to make this a great event once again and need to be congratulated for the warm hospitality given to all.

The next fly in is being planned again for October. Once again all interested folk are welcome to attend and share in a great time with other aviators.

Catering was well organized and all Covid-19 considerations were observed without protest.

Peter Freeman and his 182

Panthera, by Pipistrel

The Pipistrel Panthera achieves unprecedented efficiency through careful aerodynamic shaping, retractable titanium undercarriage, lightweight advanced composite structure; a tailor-made propeller and a dedicated performance exhaust system. Efficiency is translated directly into more speed for the same power. No other four-seat aircraft exists that flies this fast on the same engine! For the owner/operator this represents significantly lower operating costs and simplified maintenance.

The Panthera

Panthera Panel

The maximal range is available with any payload, something which pilots of four-seat airplanes have been wishing for. The robust design of the undercarriage and low overall weight allows for operations from short grass strips, taking you as close as possible to your desired destination. The engine is ready for the future, able to accept unleaded fuels and meeting the future environmental requirements. Hybrid and electric models further reduce the take-off noise footprint by taking advantage of the pure-electric take-off.

Young Aerial Topdressing Pilot Learns Lessons

Adapted from AgAirUpdate, Posted Jul 25, 2016 (Pilot's name not given)

During the period from November 1960, I began working with Rural Aviation as an aerial topdressing pilot flying the Cessna 180. It was my first flying job and I had just passed the New Zealand CPL.

My parents were very concerned about me entering the NZ aerial topdressing industry due to the number of accidents that were receiving much publicity in the newspapers and radio news.

After telling my parents about my new job and that I would be leaving home to be an ag-pilot in Taranaki and Wanganui, I went to James Aviation at the Rukuhia aerodrome and bought a new crash-helmet, or "bone-dome" as we called them. This new silver helmet eased my mother's mind somewhat. I felt sort of sensible and "grown-up" to own it and use it. Many pilots found them heavy and restrictive; but I liked it when working at low-level.

A Cessna 180 topdresser, similar to ZK-BUI, being refuelled by a similar Nuffied tractor Loader with front-end bucket.

Many pilots that are not from my aviation decades will find it hard to believe what was happening when I flew my first year as an ag. pilot. Ten were killed in 1961. Many others were involved in non-fatal accidents and I was one of them. I came close to being Number 11 during that terrible year.

Thirty-three New Zealand ag-pilots had been killed since 1950 until 1961 that raised that number by year's end to 43. Of the 10 killed in 1961, seven had started in either 1960 or 1961 and the other three were only two with three years experience and one with six years experience.

Location: Jim Hurley's airstrip; north of Waverly, Taranaki, New Zealand.
Time: About 12.00. February 9th, 1961.
Met. conditions: Temp: 18 deg. C, wind NW at 5-10 knots.
Airstrip: 3% downslope for take-off. Firm grass. 400 metres long (level equivalent 430 m). Some undulations toward take-off end. Low boxthorn hedge at end with gate (closed).
Product: Superphosphate dumped on grass. No bin or pad. Bottom few inches wet.
Loading vehicle: Nuffield tractor with front-end bucket.

Loader driver: My Waikato Aero Club chum Peter Baker from near Morrinsville. Pete was training for his Commercial Pilot Licence. Killed in 1963 whilst topdressing in a C-185 a few miles from where I was working in a Beaver near Dannevirke. His replacement was also killed in a C-185 a few weeks later; also near where I was working.

Payload: 1,008 lbs.(9 cwt.) Fuel remaining, about 1.3 hours.
Take-off weight: Approx. 3,000 lbs. (Normal category max. 2,650 lbs)
Aircraft: ZK-BUI. 1957 Cessna 180. 230 bhp Continental 0-470.
Windsock location: Halfway down strip on right side.

Pilot: Six foot male. Age 20.2 years. Experience: Dual: 43 hrs. In-command: 512 hrs. In Cessna 180: 320 hrs.

Sequence of events: Had been safely 'lofting' off an undulation and clearing gate and hedge using 20 degrees of flap. Had experienced some fertiliser flow disruption due to clods of grass and soil mixed with wet product, but was clearing these despite the small hopper outlet size on the Cessna 180. I expected matters to improve as Pete worked the heap. I had noticed him using bucket to clear grass away and mix wet fertiliser with dry during the three minutes I was away on each sortie.

During previous take-off, I noted the windsock "flicking" as I went past and thought of reducing load for next trip to eight cwt. When landing, I noted the windsock hanging limply, but still signalled Pete to reduce by one cwt. for next load; but accepted the nine cwt load he had in bucket. As I opened throttle, I noted the windsock "twitching" a little. Just as tail was rising, I felt a gust hit from right side which tried to weathercock aircraft to right. Tail also sank back nearly to ground and airspeed stagnated. With 300 metres gone, I yanked the hopper lever back to jettison load. It moved about an inch, then jammed solid. Aircraft became just airborne, but squashing/mushing at very high angle-of-attack. It was far too late to abort take-off as just past the hedge there was a very steep and deep gulley.

Whilst nearly tearing the hopper lever from its mounting brackets, I steered directly toward the gateway in an attempt to at least get the main-wheels through it. At about three feet off ground, I nearly managed it, but the left tyre struck the top of the heavy strainer-post on which the wooden gate was hanging. I felt and heard a "deep" resounding "thud" as the undercarriage leg separated from the fuselage. Still unable to jettison any of the load, the 180 pitched nose down, recovered from the impact yaw and fell into the gulley. I held the nose down, retracted the flap to 10 deg., rolled to the right to avoid hitting the rapidly approaching hill face and flinched as power and telephone wires flashed overhead. I then reduced power somewhat and climbed clear of the winding gully.

When I looked out of the open left side window I noted the gear leg was gone. I could not look out the right side due my shoulder harness and the reduced cockpit size due to the hopper configuration intrusion into the right side.

However, as I flew back to the strip I sighted a Cessna undercarriage leg lying near the bottom of the gully and cleverly deducted that it could well be from my aircraft. Then, as I approached the strip, I saw Pete running down and performing some form of very energetic dance. He was jumping up and down, pointing vigorously at his left arm then turning and pointing in the direction of New Plymouth, our main maintenance and repair base. It was then, as I turned over top of Pete, that I saw the shadow of my aircraft…the remaining right leg was still attached but whether it was damaged and the wheel and tyre serviceable, I could not determine.

The aircraft seemed to be handling OK, given that it was in an overloaded state. The stabiliser trim screw-jack tested OK, but I could not run it too far back due to the extreme aft centre-of-gravity position. Jim Hurley's strip was far too short to land back on when grossly over Normal Category max. weight. As I circled overhead, I considered the Waverly golf course, Wanganui aerodrome and, if fuel and weather permitted, Rural Aviation's main base at New Plymouth; the optimum choice as it would greatly assist the engineers to have the damaged aircraft delivered right to their 'doorstep', so to speak.

I quickly calculated that I had enough fuel to fly to New Plymouth; even into a headwind and could always divert into Hawera or Stratford should the weather pack in.

So, I radioed Charlie on the H.F. radio, informed him of the mishap and said I would be coming to New Plymouth and asked where they would prefer me to land. As I set off, I flew past my mate Pete

and dipped a wing to say goodbye. I noticed that it was becoming gusty and turbulent and the windsock was standing out.

As I flew carefully along at reduced airspeed, my mind was wandering over such things as how Pete would get home to Wanganui and whether the right tyre was still inflated, which I doubted as it had struck the top rail of the gate and shattered it into matchwood.

With a near-full hopper load behind my back, I pondered what would happen if the right wheel dug in and flipped me inverted on touch-down. Such was my preoccupation with such dismal thoughts, that it was not until about five minutes later that I noticed that I still had 10 degrees of flap extended.

About halfway back, the boss himself, Miles King, came up on the radio and said they had told the tower about my ETA and situation (we had no VHF in those days). Miles told me to orbit south of the field so he could come up in a Cessna 150 to take a look at the undercarriage and rear end of my machine.

I was somewhat nervous when the aerodrome came in sight; but mainly because I anticipated getting a right bollicking and probably the sack. On our company frequency, which was shared by some other operators, Miles asked me to try the hopper lever again. Nothing came out. He then went lower and said the right wheel appeared to be OK and the tailplane looked undamaged which was a relief as I was somewhat concerned that it might do something strange at lower airspeed. I had never landed a C-180 at such a high weight. He suggested I do a long approach onto the lengthy grass strip which ran past the hangar.

I noted quite a crowd out in front of the hangar which made me cringe a little. Anyway, Miles just said something like “Don’t get too slow on final…I’ll see you on the ground young fellow!” and he peeled away leaving me to face the growing audience of engineers and office staff. What I did not know was that a NAC DC-3 was due in and the onlookers included quite a number of passengers and their friends. I was also not aware that some person, who listened in on our HF frequency, had phoned the local newspaper who dispatched a reporter out to the Bell Block aerodrome to capture the “drama”. Hence, the photo you see below (very tattered and faded after all this time). It became even more ‘overblown’ because the NZ broadcasting people picked up on it which meant that my mother heard about it on the evening news.

Anyway, to make a short story longer, I flew miles downwind before turning onto a long final approach with some gusty cross-wind from the left. The nor-westerly was really kicking in by now. I set the flap to 30 degrees and trimmed well forward as the 180 was tending to pitch up a little. The approach was flat with substantial power on. Prop to full increase, cowl flaps full open, carb heat to cold as the threshold fence approached, flap to 40 and I began to feel more confident. I gently flared with power still on, then gingerly touched the right wheel onto the soft grass to see what would happen. It felt good. The tyre was still inflated and the undercarriage leg felt normal. Rolled the right wing down which brought the hopper load and centre-of-gravity more over the right gear and the machine felt quite happy like that. As the hangar was getting nearer on my left side, I pulled the mixture control back to idle-cutoff and the left wing ever so gently lowered to the grass. Then, even with the yoke full back, the nose pitched down, dug in, and I was looking at the grass as the 180 stopped in a very short distance. And that is all there was to it. The left wing was virtually undamaged with just some grass stains on the tip. The engineers jacked up the left side and trundled BUI away straight into the repair shop.

Senior Ops. Manager, Frank Ferrier (and possibly one of the Rural Aviation founders, Phil Lightband) took me into the office and listened to my explanation. Frank said almost nothing until he opened a cupboard and asked me if I felt like a whiskey? I accepted happily, even though I had rarely tasted

Scotch. He then told me to book into our usual hotel and I could fly back to Wanganui the following day in my own aircraft, ZK-BUX, which was in for a check. BUI was a spare machine which I had never flown before the incident.

Later, over a beer in the pub, Don Erceg, a senior pilot, informed me that BUI, for reasons which nobody could quite determine, was a bit of a "dog" performance-wise. I had noticed that its cruise speed was some eight MPH slower than my favourite BUX.

When we tried to empty the hopper, we found the outlets hopelessly blocked with a mix of thick grass clods, wet soil and wet superphosphate. It had packed down so firmly that a jemmy bar and spade had to be used. I am fairly sure that when I completed Jim Hurley's topdressing a few days later, I made a deduction for his load of fertiliser which ended up in New Plymouth. I certainly recall asking him if he wanted me to pay for his demolished gate. He just smiled and said that he had intended replacing it anyway.

Lessons learned

It would be difficult to conceive of a more potentially hazardous situation than that described above. Consider the following:

A) An inexperienced pilot and loader driver. Both just 20 years of age.
B) Highly hygroscopic fertiliser dumped onto soft wet grass some days prior to spreading.
C) An undulating airstrip with, not only a fence at the take-off end, but a hedge as well.
D) A hopper outlet design which was well streamlined, but considerably smaller than later higher drag configurations.
E) An upper wind pattern from the nor-west which are known, to the locals and more experienced pilots, to suddenly affect the surface winds with pronounced gustiness.

On later reflection, I was most fortunate that the wheel struck the post and pitched the aircraft nose-down. Had it not, I believe that the tailplane would have struck the gate and suffered damage; probably rendering the heavy aircraft uncontrollable. The Cessna 180 and 185 did not have a good survival rate in aerial topdressing accidents.

If you feel pressured enough to accept product just dumped on the ground, you must load the higher material first. Clear some ground of grass, preferably adjacent to a bank and move the fertilizer onto it before loading. Trying to mix the wet stuff at an early stage is bound to lead to trouble with poor flow and distribution. If you must carry it, reduce your weights and be absolutely certain that you do not have hung-up material in your hopper; even if it means your loader driver taking a look into the hopper. One day, we are going to have electronic weighing equipment fitted to NZ ag aircraft. (I have been saying that for nearly 30 years!).

Of course, my serious error was in not asking Pete to reduce the load. The half minute needed to do that simple action would have saved my company much expense and trouble. I did not follow my own unease about the wind conditions and consequently experienced a tailwind gust at just the wrong stage of take-off. I urge you new chaps to, if uncertain, to sit and watch the windsock for a while to note trends.

Permanent fences at the end of aerial topdressing airstrips are absolutely insane. If they are not droppable or temporary, they must be located so as to be below strip level. Otherwise, as per the CAA "Guideline" document, they should be about 180 metres further out from the defined airstrip end. The CAA declined to make this mandatory; however, in the event of a fatal or serious injury occurring as a result of a fence impact, I feel quite certain that officials such as coroners, OSH and ACC officers and, perhaps, District Court judges and various lawyers are going to have the CAA

"Guideline" booklet very close to hand! Airstrip owners and aerial agricultural operators would be well advised to heed my words.
If you remember nothing else from this memoir piece; note well this:

"With overloaded ag. aircraft, a standard height fence at the end of an airstrip reduces the effective operational length by at least 100 metres!"

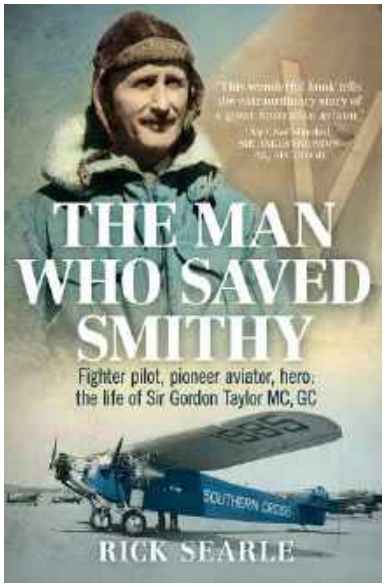
------ ooOOoo ------

Book Review

The Man who Saved Smithy

by Rick Searle

In 2015, Searle published his exemplary work on the life of Sir Gordon Taylor, MC, GC. Published by Allen and Unwin in Sydney, the book covers in particular the exploits of Sir Gordon whilst undergoing flight training in the UK and subsequent fighting in WW1. His seemingly casual yet highly successful training indicates a higher than usual aptitude for piloting and his ultimate success as one of Australia's highest skilled pilots and navigators becomes a seemingly simple progression.



Having a "no bullshit attitude to everything in his life, Sir Gordon became a pioneer of early Australian air routes and his abilities were so world-class many were followed by other nations.

As a contemporary to Charles Kingsford Smith, it was inevitable that he and Sir Gordon would find themselves in joint pioneering ventures with each supplying their personal skills and courage in support of their joint venture. It was Sir Gordon (but not **Sir** Gordon, then) that saved the Southern Cross on a Tasman flight in which oil had to be transferred from one motor to another to keep it running, an act of bravery for climbing out of the Fokker in flight, with no real safety harness, to harvest oil form the non-functioning engine and climbing out on the other side to make the manual transfer into the running engine oil tank.

I found it very enjoyable and a good story depicting a golden era in aviation that can never come again

Rob Knight

Half Price Parts

I found this business purely by chance when I was looking for a replacement scissor jack for my Genesis. In my dealings with them, I found the company most helpful, and I was surprised at the magnitude of the range of items and materials they had on offer.

Rob Knight (Editor)

Half Price Parts is a privately owned business that has been operating for nearly the past decade. Primarily a supplier of car parts, the company aims to provide the opportunity for customers to purchase brand new genuine parts very attractively at half the retail price or less.

Their current parts listing contains in excess of 18,500 parts, ranging from spark plugs to full body panels and accessories for all makes and models of cars from 1933 to current. Obviously, the parts listings also provide for brake, cooling system, fuel system and electrical system parts and components.

Clearly, such a business can be of great advantage when seeking parts, components, and/or materials for building your aircraft or subsequent servicing of appropriate aircraft.

Contact them at website ***www.halfpriceparts.com.au***,
Email ***halfpriceparts@outlook.com*** or
give them a call on ***0412 760 479***.

FLY-INS Looming

13 Dec 2020	Murgon (Angelfield)	Burnett Flyers Breakfast Fly-in

Harry's Joke:

Who says today's schools are not teaching anything?

My young nephew caught me a beaut last weekend when he asked me how many times you can take 10 from a hundred. I told him that I could take ten from a hundred ten times, and he looked at me, shook his head, and then grinned suspiciously. Being old and slow, I interrupted him, and said again that ten times ten equaled a hundred so I could take ten away from a hundred ten times.

By now his grin split his face and he said, with total conviction, that I was wrong.

After taking ten from a hundred once, then you are taking the next ten from ninety. You can only take ten from a hundred one single time.

Smart little bugger is going to be a bank manager I reckon.

Harry

What the Hell is THAT – A PZL 106A Crop Duster

PZL-106A in flight

The PZL-106 was developed as a modern agricultural aircraft for Poland and Comecon countries, to replace the less capable PZL-101 Gawron and aging PZL Antonov An-2. (According to Comecon decisions, Polish industry was responsible for developing agricultural aircraft). There were several agricultural plane designs proposed in the early 1960s by a group of young designers from WSK PZL Warszawa-Okęcie, led by Andrzej Frydrychewicz. These proposals were made on their own initiative, but never realized because the USSR was content with the An-2 and was planning to replace it with a jet aircraft (later PZL M-15 Belphegor). The first was the PZL-101M Kruk 63 of 1963. That remained a paper aeroplane, but did give its name to later designs. Next were the PZL-106 Kruk 65 (1965), PZL-110 Kruk-2T (1969) and PZL M-14 Kruk (1970, it was planned to produce this variant in PZL-Mielec). Only in 1971 did the authorities decide to start development of the new agricultural design as the PZL-106 Kruk 71. Despite this decision, its development was quite protracted, due to both economic and political reasons. The work, led by Andrzej Frydrychewicz, started in 1972, and was based on earlier designs. The first prototype was flown on April 17, 1973. The designers chose a safe layout of a braced low-wing monoplane with a container for chemicals in front of the pilot, and was inspired by planes like Piper PA-25 Pawnee (in case of an emergency landing, the container would not crush the higher sitting pilot).

The first prototype was powered by an imported 298 kW (400 hp) Lycoming IO-720 flat-eight-cylinder engine and had a T-tail with wings of wooden construction. There were several prototypes built, and the plane was finally fitted with a 441 kW (600 hp) PZL-3S radial engine, a conventional tail and metal wings. The prototype with the final engine first flew on 25 October 1974.

Production started in 1976 under the designation PZL-106A. Successive variants were the PZL-106AR, with PZL-3SR engine and the PZL-106AS with a stronger 736 kW ASz-62IR radial engine. By 1982, 144 PZL-106As had been built. Several aircraft were modified in Africa to PZL-106AS standard.

On May 15, 1981 the prototype of an improved variant PZL-106B was flown with redesigned wings using shorter struts. It was powered by the same PZL-3SR engine and was produced from 1984. In 1982 the prototype of the PZL-106BS flew powered by the ASz-62IR engine. By 1988, 60 PZL-106Bs had been built.

The next step was fitting the Kruk with a turboprop engine. The first was the PZL-106AT Turbo Kruk prototype, with a 566 kW (770 hp) Pratt & Whitney PT6A-34AG engine in 1981. The next version, based upon the PZL-106B, was the PZL-106BT Turbo Kruk with a 544 kW Walter M601D-1 engine. The PZL-106BT first flew in 1985 and was only produced in limited numbers (10 in 1986–1988). The last variant, in 1998, was the PZL-106BTU-34 Turbo Kruk with a Pratt & Whitney PT6A-34AG engine. Both turboprop variants have a taller tailfin, and the BTU-34 differs again with a restyled nose, a bigger fuel tank (780 l), revised cockpit layout and improved performance.

In total, 266 PZL-106s were produced. Production was restarted in 1995 and as of 2007, the PZL-106BT (renamed PZL-106BT-601) with the Walter M601-D1, and the PZL-106BTU-34 with the PT6A-34AG engine are currently being offered by the manufacturer EADS-PZL. Limited numbers of turbo-Kruks have been produced so far.

------ ooOOoo ------

I was recently advised that the RA-Aus portal for pilots wishing to do their L1 examination had been removed. I checked it for myself and found the complaint appeared to be upheld. I called RA-Aus and spoke to Leanne who kindly replied with the email below.

Hi Rob,

The L1 online training is accessible by first logging into your member's portal by accessing Member login from the home page. Then, when logged in, you will find the L1 training link under the members training tab in the banner on the top portion of the page. Click on L1 Maintenance, and then follow the directions for logging in from this point.

Regards

Leanne Cabrera

Airworthiness and Maintenance Coordinator

RAAus: A Pilot in Every Home

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Keeping up with the Play (Test yourself – how good are you, really?)

1. Which of the following options best depicts Frise ailerons?
   A. Ailerons that carry a mass balance weight
   B. Ailerons that are designed to have an aerodynamic balance.
   C. Ailerons that go up a greater amount than they go down.
   D. Ailerons that go down a greater amount than they go up.

2. When an altimeter subcale is set so the altimeter hands indicate the airfield elevation AMSL on the ground at that airfield, the altimeter is said to be set to which of the following?
   A. QNH
   B. QLD.
   C. QFE.
   D. QML.

3. At a constant glide speed, lowering fowler flaps during a glide will cause the descent angle to steepen. Why does the glide angle change?
   A. Because all flaps increase lift and the only way to maintain speed is to lower the nose and glide more steeply.
   B. Because flaps increase both lift and drag, but drag by a greater proportion than lift.
   C. Flaps increase lift and the aeroplane doesn't have to glide as fast to maintain lift.
   D. To reduce adverse yaw.

4. Rising air will cool at a rate considered to be constant throughout the troposphere. Considering dry (unsaturated) air, and saturated air, which of the following lists the accepted temperature lapse rates?
   A. Unsaturated air cools at 1.5°C and saturated air cools at 1.0°C /1000 ft.
   B. Unsaturated air cools at 3°C and saturated air cools at 1.5°C /1000 ft
   C. Unsaturated air cools at 1.98°C and saturated air cools at 1.5°C /1000 ft.
   D. Unsaturated and saturated air both cool at 1.98°C /1000 ft.

5. Many aeroplane designs have their wing tips raised higher than their wing roots creating an angle of dihedral. What purpose does the dihedral angle serve?
   A. It provides lateral stability about the longitudinal axis.
   B. It provides longitudinal stability about the lateral axis.
   C. It provides directional stability about the normal axis.
   D. It improves inherent stability about all axes.

See answers and explanations overleaf

Answers: 1, C, 2, A, 3, B, 4, B, 5, A.

If you have any problems with these questions, See Notes below or call me (in the evening) and let's discuss them. Rob Knight: 0400 89 3632.

1. C is correct. Frise ailerons are an aileron system designed to reduce aileron drag and thus adverse yaw when ailerons are applied. In a frise aileron system, the up-going aileron travels a greater arc and extends further into the low pressure above the wing, than the down aileron. Thus increases drag on the up-going aileron which pulls the nose into the turn this minimises adverse yaw.
   Googling "frise ailerons" will provide a wealth of information and illustrations on this topic

2. A is correct, An altimeter set via its subscale so its hands will read zero at sea level is said to be set to QNH.

3. B is correct. Lowering and flaps will diminish the lift/drag ratio so the aeroplane cannot glide as far with flaps lowered as it will clean. The reason the L/D ratio diminishes lies in the fact that lowering flaps will increase the drag in greater proportion than it will the lift so an overall reduction in efficiency must result.

4. B is correct. The change in air temperature with a change in height is called a lapse rate. If the state of saturation of the air in a temperature calculation is unknown, we use 1.98°C for each 1000 feet of height change. If the air is saturated (inside cloud), the latent heat of vaporisation reduces the figure to 1.5°C/1000 feet of height change. Where the air saturation status is known, we use 3°C/1000 feet.
   https://www.skybrary.aero/index.php/Lapse_Rate

5. A is correct. The dihedral angle is incorporated in wing design by the aircraft designer to increase the level of lateral stability. The aircraft moves laterally (rolls) about the longitudinal axis.
   https://en.wikipedia.org/wiki/Dihedral_(aeronautics)

------ ooOOoo ------

Did you know that:

A LASER is a shaving instrument used by Japanese men.

Aircraft Parts and Tools

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Contact Rob Knight at either kni.rob@bigpond.com, or call **0400 89 3632**.

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The Swamp

Many thanks to SWAMP's author, Gary Clarke