BRISBANE VALLEY FLYER

November 2024

Watts Bridge Memorial Airfield, Cressbrook-Caboonbah Road, Toogoolawah, Q'ld 4313.
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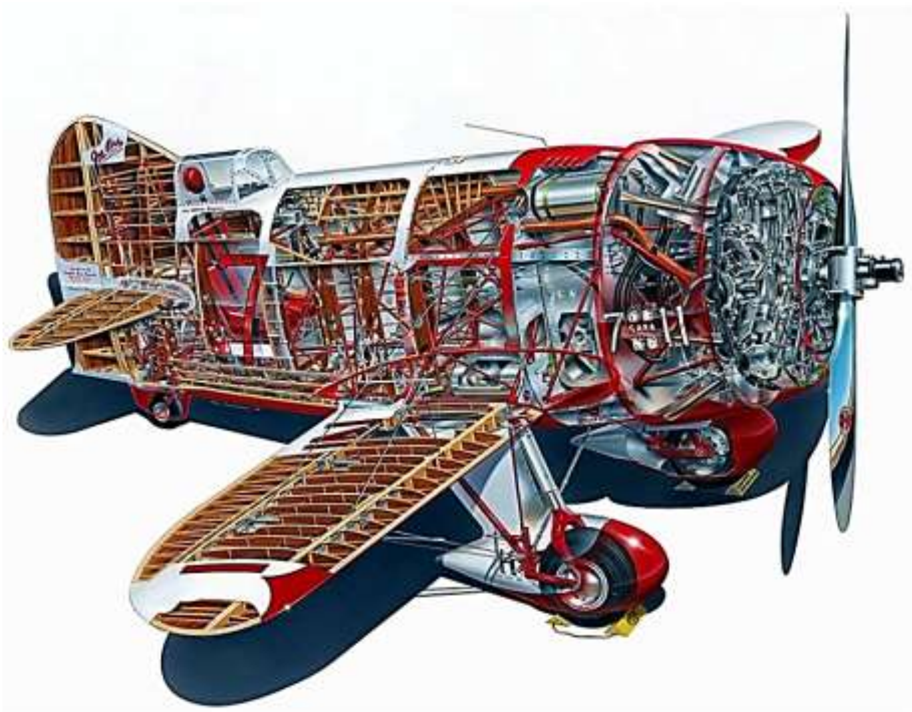

One of the World's Worst Aircraft – the Gee Bee Racers. **See page 20**

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Our website - **bvsac.com.au**

Greetings Members,

As we edge closer to the end of the year October is almost done and dusted with some good weather for flying now behind us.

Our last meeting was well attended with one new member signing up and that makes five new members this year.

Our next meeting will be held on the 2nd of November and it will be our AGM. Nomination and proxy forms will be sent out soon. If anyone would like to nominate for a position on the committee, please fill out a nomination form and send it back. If you would like to cast a vote, please complete a proxy form and return the completed proxy form to us.

We will also be discussing our upcoming 2024 Christmas party, so please come along to the meeting and share your ideas for this event with us

Best wishes

Peter Ratcliffe

President BVSAC

The Sneaky Stall – Part 2

By Rob Knight

In Part-1 of this trilogy we looked at the cause of the stall and demonstrated that it is purely a function of the angle of attack on the aerofoil. In this part, I'd like to look at the various responses of the aeroplane to a stalled condition and to perhaps provide an understanding of why these various responses occur.

Firstly, though, let's look at the factors that are producing the lift our aeroplane is experiencing. The formula for lift in level flight looks confusing in its normal form:

Lift = weight = CL 1/2 P V^2 S, - and, yes, this used to make my eyes water, too!

So, let's simplify it. It is saying that, in level flight, lift must equal weight which is surely understandable. Then we have the factors in designer talk. Let's see what they mean.

C_L	The co-efficient of lift. The angle-of-attack-factor which is the amount of lift being provided by the aerofoil. CLMAX is the maximum lift the aerofoil can produce and occurs at the stall.
1/2P	This factor is pronounced, "half Rho", where Rho represents the ambient air density. As far as we are concerned, on its own, it is a constant (K). See Note below.
V^2	V2 This is True Airspeed (TAS) the factor representing the effect of airspeed on the lift the aerofoil is developing. See Note below.
S	The "surface" or "plan" area of the wing.

Note that when the two factors **1/2P V^2** are taken together, their combined effect is indicated airspeed – IAS – the speed on the IAS dial (excluding instrument errors, of course).

The equation below represents the formula after this change.

$$\text{Lift} = \text{weight} = C_L \times \text{IAS} \times S$$

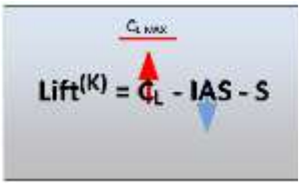
This means that, in its simplest form, a pilot can modify the lift being produced by an aeroplane's wing by changing just three factors:

- The angle of attack,
- The indicated airspeed, and
- The wing area (only by applying certain types of flaps (when fitted)).

An aeroplane wing can stall at any airspeed, BUT ONLY AT ONE ANGLE OF ATTACK

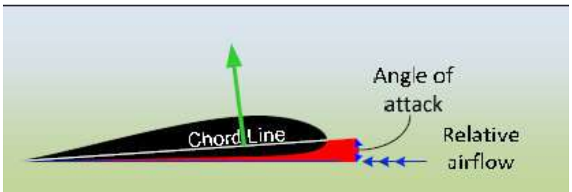
Let's begin with a basic stall – no power and no flap. We simply select a reference point on the horizon in front of us to keep straight on and apply full carburettor heat (if fitted) and gently close the throttle. With the closing of the throttle, the reducing slipstream will see the aeroplane yaw slightly - we must keep straight on the reference point using just sufficient rudder.

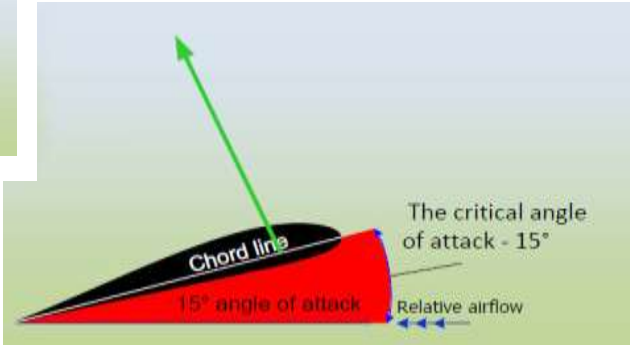
Our wings are level so no aileron input is required. Drag reduces the airspeed and thus the lift it produces so we will need to gently and progressively ease the stick (or yoke) back to increase the angle of attack just sufficient to keep the lift constant and thus maintain height.



As the sketch on the right indicates, as the lift from the airspeed diminishes, we are replacing it by increasing the lift from the CL by increasing angle of attack. That is, until we reach CL MAX, the stalling angle of attack.

However, as the speed is decaying and the angle of attack is rising, the symptoms of the level flight stall appear – a loss of noise, a rising nose attitude, the controls becoming lighter and less effective, and the stall warning if one is fitted. But with the rising angle of attack another occurrence is taking place that we cannot see, hear or feel - the centre of pressure, the point on the aerofoil chord through which all the lift may be considered to act – moving up the chord line.





The sketch above depicts the position of the centre of pressure in normal flight. Notice that, in the sketch on the right, the centre of pressure has advanced forward along the chord. It is this advancement with increasing angle of attack that makes flying with a Centre of Gravity aft of the aeroplane's limits so dangerous. If the angle of attack advances to a point forward of the Centre of Gravity, all the forces acting on the aeroplane will be pitching the nose up and there is no way a pilot can regain control.

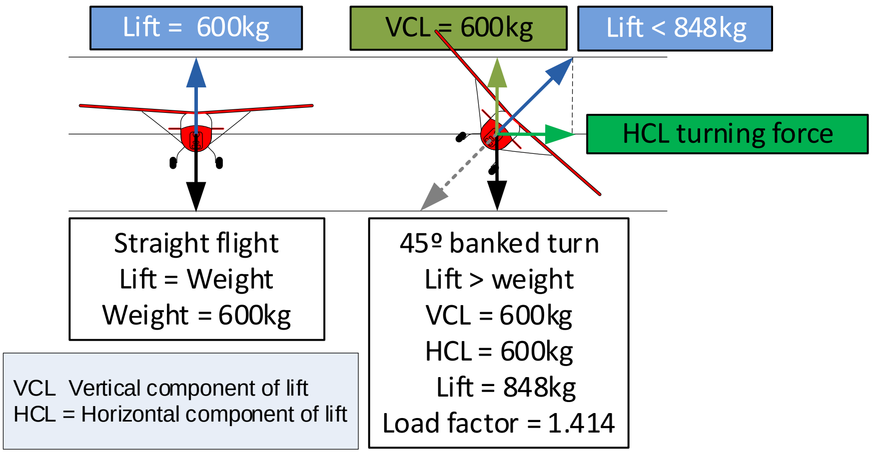
We now reach a very important point in our depiction of the aerofoil stall. If we can imagine for a moment that we are flying level with the aerofoil at 15 ° the aerofoil is providing all the lift that it can from its CL (current shape and angle of attack). Should the angle of attack be increased any further the airflow across the upper surface will break away into turbulent flow and the lift produced will diminish greatly and the drag will rise substantially. So, if we needed more lift, it could only come from either increasing the IAS or increasing the wing area. As the wing area is a fixed quantity in this part of the discussion, we have only indicated airspeed to play with. More weight would need more IAS at the stall: i.e., our aeroplane would have a higher stall speed.

So, what factors can modify the IAS at the stall, the Vs? There are six.

1. Changing the aeroplane's operating weight, or loading it by changing direction.
2. Flaps.
3. Slats/slots.
4. Power applied or otherwise.
5. Flying with slip or skid (crossed controls) and
6. Using aileron close to the critical angle.

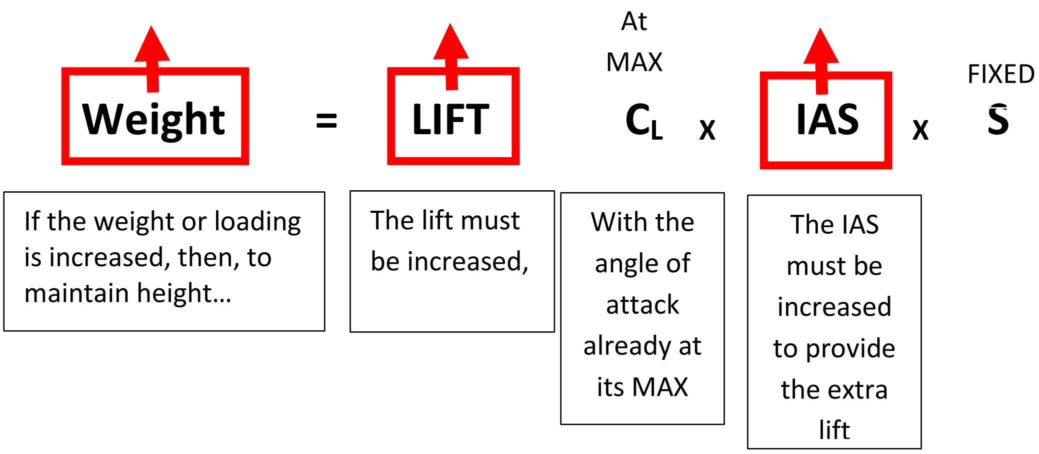
If we take off at a heavier weight, then the stalling speed will be greater than if we took off at a lower weight. Remember, if we are heavier, then for any given angle of attack we will have to be flying faster to maintain height. Over the period of a flight, fuel is burned and thus weight is reduced. It is a fact that, all other things being equal, the aeroplane will have a lower stalling speed at its destination than it did at departure. It may not be much, but, nevertheless, the principle applies.

Is there anything else that can change the weight of an aeroplane during a flight? The answer is both a yes and a no. Yes, weight can be reduced by dropping mass from it such as a crop duster spreading fertiliser or spraying liquid, or parachutists playing, "Race-you-down", and leaping from the opened doors. OR, and this is a BIG OR, we can increase the loading (apparent weight) by changing direction, either by turning, or pulling the nose up. And the faster the rate of change of direction the greater will be the apparent weight increase. The sketch below relates to turning.



The sketch left is a vector diagram displaying the increasing forces required to turn an aeroplane when it is in balance – i.e.–**NO SLIP OR SKID**.

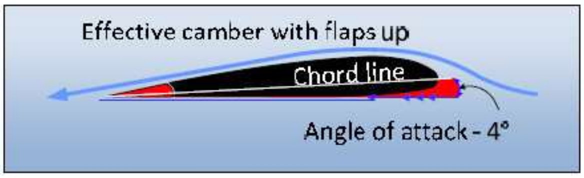
Of particular interest to us is the apparent increase in weight with angle of bank increase. The left image on the sketch shows no bank and here the wings just support the 600 kg aircraft weight. The right-side image shows an aeroplane in a 45° bank. For us, the importance lies in the last line of the details – the load factor of 1.41. From this we can calculate the stall speed of this aeroplane in this banked turn. The calculation is simple. The new stalling speed will be the level flight stall speed in this configuration, multiplied by the square root of the load factor. In other words, if the aeroplane has a stall speed of 45 knots, the new stall speed is 45 X √1.41 (or 45 X 1.187). This equals 54 knots, a 9-knot increase which is notable. As all aircraft in a 45° turn will have a load factor of 1.41, this is a calculation available to everyone. Following on, because the load factor for all aeroplanes in a 60° turn is 2, so, in a 60° banked LEVEL turn, it will stall at 45 X √2 (or 45 X 1.414.) The new stall speed during the turn will be 64 knots, an increase of 19 knots. Now THIS is worth knowing!

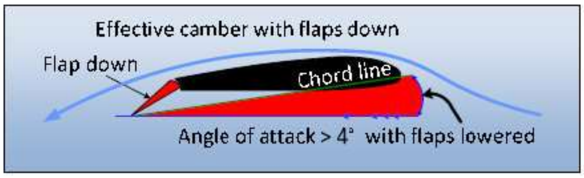


From the previous illustration, we can see that the combined effect of the angle of attack and the indicated airspeed is providing sufficient lift to counter the weight and, if one is diminished, the other must proportionally increase to maintain a constant value of lift. However, as we now can see, this mutual arrangement stops at the stall because we cannot get any more lift from the CL, the aerofoil has reached its CL MAX.

However, the CL is also influenced by two other devices which may be fitted to the aerofoil. These are the trailing edge flaps (when fitted and are lowered), and slats forming slots, (also when fitted). Let's see how these two devices can lower the stall speed. Note that heavy aeroplanes may also be fitted with leading edge flaps but these are outside this discussion.

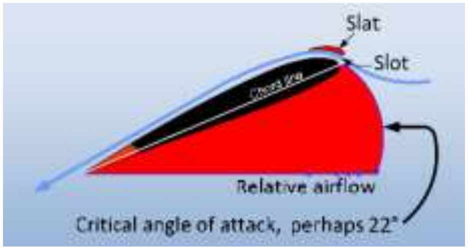
Trailing edge flaps are hinged surfaces that form part of the inboard trailing edge of a wing. They vary in design and effectiveness and, when lowered, change both the amount of lift (CL) and drag the aerofoil generates at any given air speed. The CL increase is due to the camber increase experienced by the aerofoil. Note, also, that lowering flaps increases the angle of attack at the time of lowering.





See the sketches above top explain the change in angle of attack when flaps are lowered

Slats, on the other hand, are fitted above and forward of the leading edge. Their function is simple – they are a mechanical/physical guide or fence that forces the air passing between the lower surface of the slat and the upper surface of the leading edge to change flow direction and pass over the upper surface of the Aerofoil instead of breaking away. The term slat is sometimes interchanged with slot. In truth, the slat is the added physical device, and the slot is the passage created between the device and the aerofoil surface. In other words, slats create slots. The upside of slats is that they delay the stall until a higher angle of attack is achieved, their downside - they almost inevitably cause a permanent and considerable drag inchalf isrease.

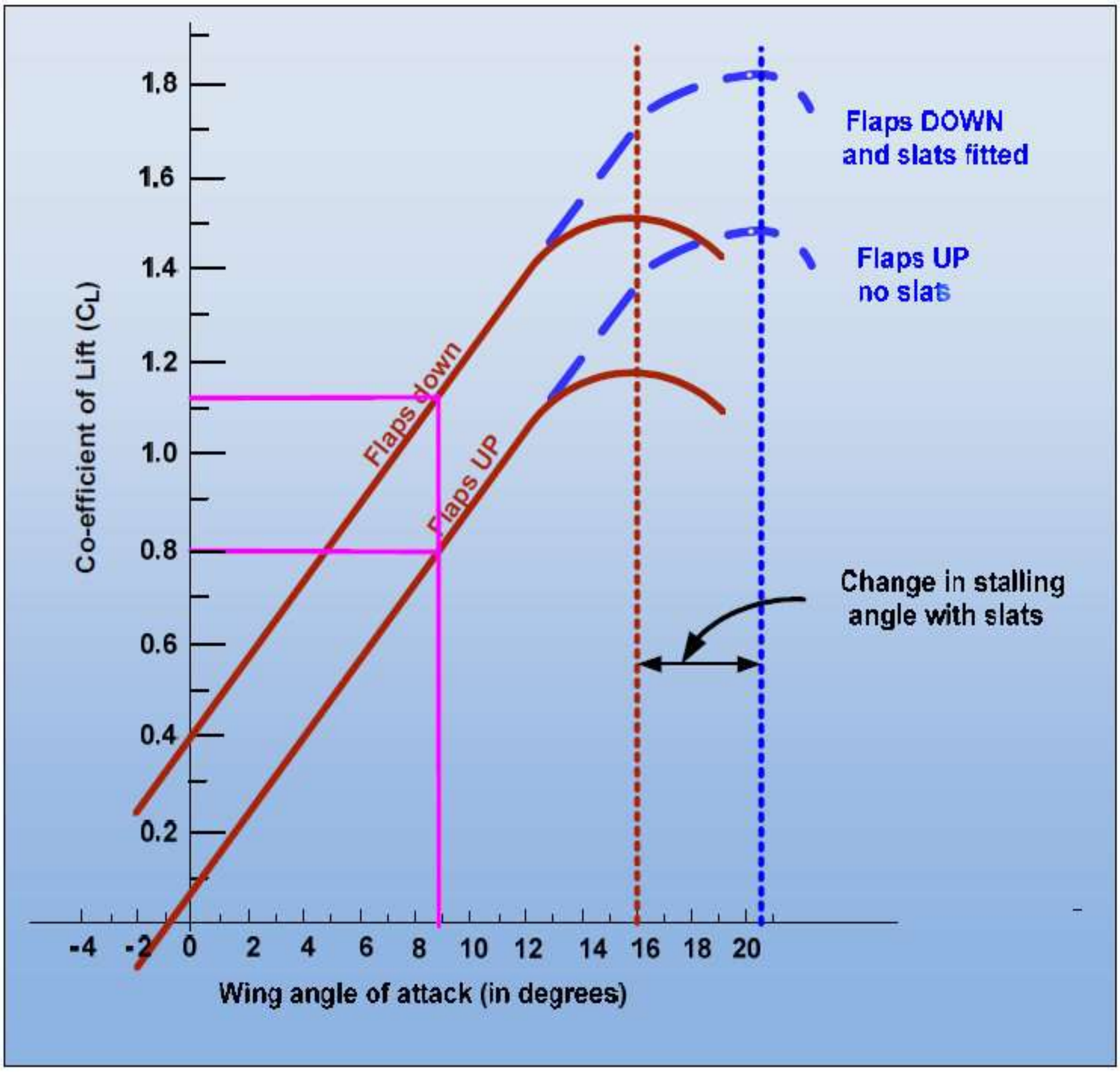


Benefits of these Device (Effects Result(s))

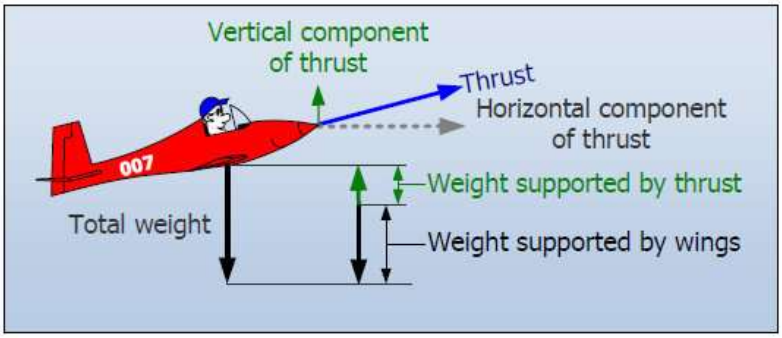
Device	Effects (Pros & Cons)	Result(s)
Simple flap	· Same stalling angle · Increased camber · Increased drag	Stalling angle unchanged, lowers stall speed a little and increases drag.
Fowler flap*	· Same stalling angle, · Increased camber, and · increases wing area · Increased drag	Stalling angle unchanged, Lowers stall speed considerably, & substantially increases drag.
Slats	· Increased stalling angle, · Reduces stall speed substantially, · Substantial increase in drag through all stages of flight	Substantial lowering of stall speed but causes serious rise in drag values throughout all stages of flight.

**Note that fowler flaps move to two directions – they lower and increase the camber and the angle of attack, as well as move rearwards, increasing the wing area.*

The comparative effects of flaps and slats can best be realised in a graphic comparison



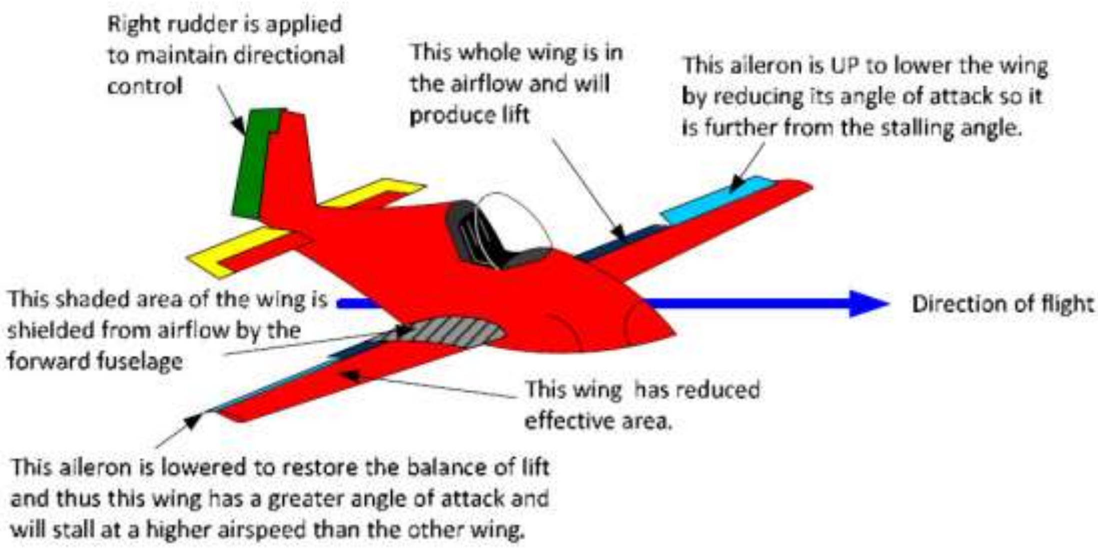
The graph shows that our CL value is 0.8 at 8.8° angle of attack with the flaps UP, but notice that this improves to CL 1.12 at this same angle of attack with the flaps DOWN.

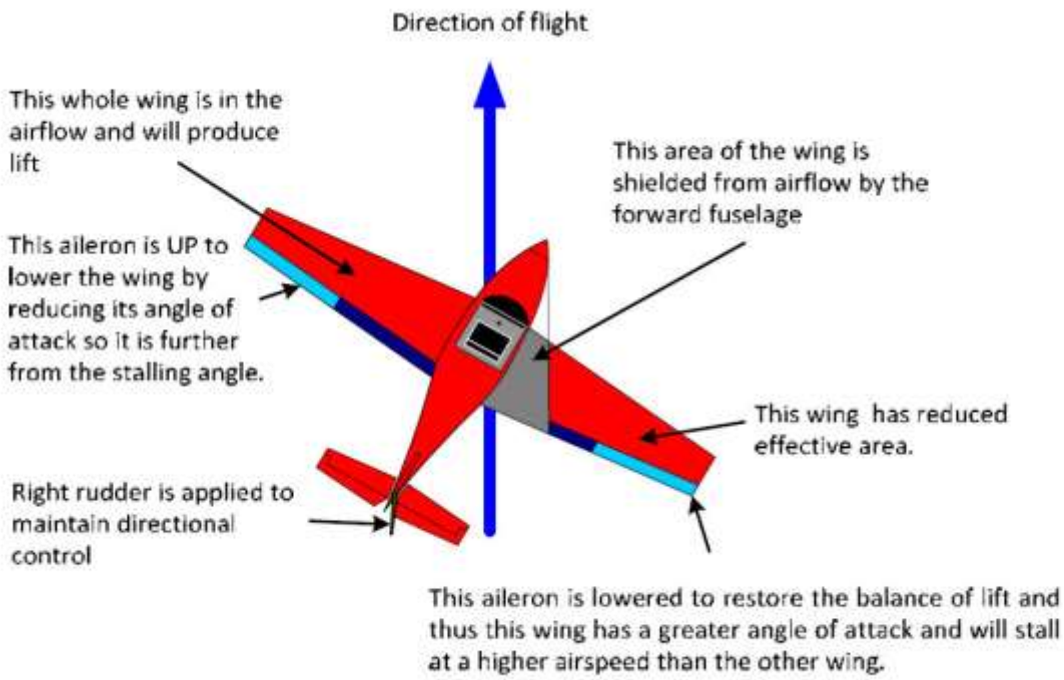


Adding power decreases the stall speed. As the illustration to the right depicts, power will support some of the weight. In our last few paragraphs, we have determined that adding weight (or loading) raises the stall speed so if something decreases the weight the wings have to support the stalling speed will decrease. The reason that the wings sense a decrease in weight lies in the inclination of the aeroplane's longitudinal axis causing the propeller's thrust to pull both forwards and upwards. The forward thrust opposes drag, and the upwards thrust supports some of the weight. With the weight reduction comes a stall speed reduction. In theory, with enough power an aeroplane could hang vertically, its thrust supporting all its weight. However, the power is coming from the rotating propeller and the torque from the prop is trying to roll the aeroplane away from the propeller's direction of rotation. To stop the roll, aileron must be applied so one wing will have a higher angle of attack just to stop the roll from prop torque.

In conclusion, note that that the reverse also applies and decreasing power will INCREASE the stall speed from what it was before the power was decreased. How does flying out of balance (with slip, or skid, or the ball not in the middle) change the speed at the stall? This is of primary concern by its very insidiousness. An aeroplane that is flying out of balance will have a higher stalling speed than if that aeroplane was being flown without slip or skid.

The reasons are twofold. To fly out of balance but without roll, one aileron must be raised to hold a wing down whilst the other lowered to hold that wing up. This means that one wing has a higher angle of attack than the other so will stall first, before the wing with the up aileron. Also, the wing with the down aileron is shielded to some extent by the fuselage and so has less effective area to carry its share of the weight so it will require further down aileron.



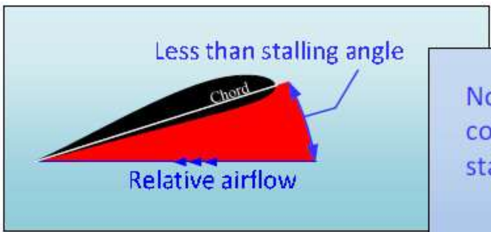


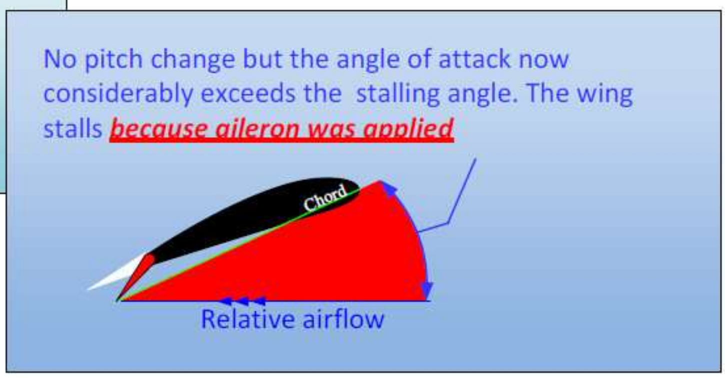
In this situation, the pilot is holding right rudder and left stick and, if the angle of attack is raised because the speed decays, the right wing will stall before the left, at a higher speed than the left wing. The reasons for the right wing stalling first are that the wing area around the right aileron has a higher angle of attack because of the lowered aileron.

Flying out of balance, may be the result of several things including deliberate control inputs as when doing a slipping turn to lose height on approach, poor flying skills resulting in a lack of coordination entering and exiting turns, failing to correct yaw with rudder when changing power or airspeed, or failing to stop yaw when one wings stalls before the other.

The primary use of aileron is for roll control and we develop the natural response of rolling level whenever our wings are not level. HOWEVER….. this is NOT an ideal response when our aeroplane is stalled or even close to the stall. Let's see again how ailerons work.

When we want to raise a wing, we put the aileron down. This increases our camber and angle of attack, thus providing us with more aerodynamic lift, and the wing rises. However, moving the aileron down, also increases our angle of attack because it changes the line of the chord – the chord line. Thus, applying aileron close to the critical angle can induce a stall in one wing whilst moving the other wing further from the stall. Obviously, in this event, we have induced a complete reversal of stick/aileron control and left stick no longer provides left roll.



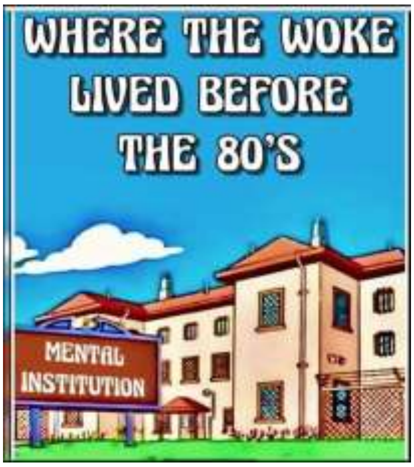


We can induce a stall by applying aileron at a high angles of attack such as when flying slowly in level flight. So, the slower one flies, the

the more-gentle on the controls one needs to be.

Next month we will be looking at what the aeroplane does when the stall occurs and how they can influence the best technique for restoring the aeroplane to unstalled flight, If you have questions relating to this piece on stalling, please don't hesitate to email me on kni.rob@bigpond.com.

Happy Flying



The Aeronca L series

By Rob Knight

The Aeronca L was a 1930s cabin type monoplane designed and built, in small numbers, by Aeronca Aircraft in the USA. It differed immensely from other Aeronca planes by the use of radial engines, streamlining, and strut-less low wings.

Aeronnca LB

The L series featured side-by-side seating in a completely enclosed cabin, which, in 1936, was by no means universal in light aircraft. This aspect was a beneficial side effect of the design work presented by engineers paying greater attention to streamlined aerodynamics. This topic included providing wheel covers (spats) to reduce drag created by the fixed undercarriage and a ringed cowl, called a Townsend ring, around the circular pattern of cylinders of the radial engine.

Materials in the construction of the aircraft was mixed, with the fuselage framed by welded steel and wings manufactured with spruce spars and ribs. The aircraft was fabric covered.

Initial attempts to use Aeronca's own engines proved inadequate, and the company turned to small radial engines from other suppliers, particularly those produced by the Le Blond company in neighbouring Cincinnati. This arrangement was particularly successful and, of the close to 60 aircraft built, 29 were fitted with the 90 hp Le Blond radial.

The Model L design was mainly aimed towards private pilot owners. The plane was not a big seller. Difficulty with engine sources, and a disastrous flood, in 1937, at Aeronca's factory at Cincinnati's Lunken Airport, took the life out of the program, and Aeronca ceased producing the L design and returned to producing solely high-wing light aircraft.

Aeronca L series. Note the clean lines, no struts, wheel and undercarriage pants, and the townsend ring around the cylinders on the engine,all drag reducing elements.

With sales to Aeronca closed, LeBlond sold their engine-manufacturing operation to an Aeronca-rival plane-maker, Kansas City-based Rearwin Aircraft, who resumed production of the engines under the brand name "Ken-Royce," largely for use in Rearwin planes.

General Characteristics of the Aeronca Series LB

Seats:	2.
Wing span:	11.00 m.
Height:	2.1 m.
Empty Weight:	469 kg.

Engine:	5 cylinder, 90hp, Warner Scarab radial.
Length:	6.86 m.
Prop:	2 blades, fixed pitch.
MTOW:	840 kg.

Performance Characteristics of the Aeronca Series LB

Max (level flight) speed:	107 kias
Stall speed (Vs)	39 kias

Cruise speed:	90 kias
Range:	465 nm

Aeronca Series LB – out of the history books and back into the air.

Tiny Faults can have Massive Consequences

By Rob Knight

While the incident depicted occurred whilst in IMC, the issue is relevant for all flight operations.

March, 1988, I was airborne, flying off the balance of time I required to maintain my instrument rating. I was Pilot Flying[1], and on my right was a close friend, fellow instructor, fellow flight examiner, and retired RAF Avro Vulcan pilot, Dmitri Zotov. Dmitri was also maintaining his own required recent experience for his Instrument rating. The aircraft we were flying was an IFR certified PA28-151 – ZK-DSK, the basic instrument trainer for the Wellington Aero Club in New Zealand.

Dmitri had completed his required time flying from Wellington (NZWN) to Nelson (NZNS) and returned to Wellington via an NDB approach into Omaka (NZOM) at the top of the South Island. Conditions were IFR OK for us (we could operate below the freezing level) – BKN Cu, base 4500, tops to 10000 +, with the freezing level above 11000. As we have no airframe or prop de-icing capability, we preferred to remain below the freezing level.

Back at Wellington, Dmitry and I had a cuppa whilst I planned my flight. It was a simple IFR milk run from Wellington to RNZAF Ohakea (NZOH) for a (PRA) precision radar approach, followed by a missed approach and a diversion to Palmerston North (NZPM). After another missed approach procedure, I planned for an NDB approach into Paraparaumu (NZPP) followed by a touch and go and an ILS approach into Wellington to end the flight.

Paraparaumu airport is only a few hundred meters from the beach, and an elevation of 20 feet AMSL. It has issues for IFR operations as the Tararua Ranges lie only about a mile to the east and these include Mt Hector rising to over 5000 feet. To the west, at less than 3 nm, sits Kapiti Island rising to 1710 feet while 10 nm to the south Pukerua Bay cliffs rise sharply to nearly 1000 feet, and its adjacent hills chase 1500 feet. To the north west is clear air for 100 miles until you experience Mt Egmont. I include these details to ensure it is clearly understood that terrain proximity adds to the hazards when making instrument approaches into NZPP.

My flight had all gone to plan and I was cleared by Wellington to enter the hold for runway 16 and maintain 5000 until IFR traffic ahead either declared *"Visual"*, or commenced a missed approach. I acknowledged and reported crossing the beacon (NDB) and commenced my right turn onto the prescribed timed outbound leg. There was little conversation in the cockpit – IFR ops require considerable concentration and I asked Dmitri to call Wellington for an update on the position of the traffic ahead. Wellington reported that the Twin Comanche ahead had reported descending through 3000, still in IMC. We were in developed cumulus cloud and it was quite bumpy, not severe but requiring constant effort to keep straight and maintain height and wings level. I crossed the beacon again and turned right. On completing the turn for the second time around the pattern, established tracking 348° outbound, the Cherokee cockpit suddenly began to fill with eye-watering, pungent grey smoke. After the normal human-style expletives questioning what was happening, Dmitri cracked the aircraft door and I opened all the cabin vents and the port side tiny pilot's window. This cleared most of the smoke from the front of the cockpit and through steaming eyes we scanned the

[1] Pilot flying (or PF) – recognised aviation vernacular for the pilot flying an aircraft in a two-pilot situation. The other pilot is the pilot monitoring (PM).

instruments. There was no indication of a fault from the instruments except for the ammeter which seemed locked on its maximum readout and the continuing thick flow of grey smoke from every vent and orifice above and around the instrument panel and facia.

I turned the ammeter Master switch OFF and asked Dmitri to call Wellington to alert them to our predicament. We were now on the inbound leg of the pattern and the reply to his call instructed us to remain in the hold and report our next crossing of the beacon, and did we want to report an emergency. Shaking my head, Dmitry reported in the negative and said that we'd advise.

By the time of our crossing the beacon the smoke had diminished as we were no longer pouring electricity at the fault, wherever it lay. However, to expedite the initiating of our descent, we declared an emergency. Now on battery power only, we had shut down all the electrical devices we considered we safely could. I reported "outbound" in the hold, and requested an emergency descent. After a brief pause Wellington replied, clearing my commencement of an immediate descent on returning to overhead the NDB and advising me that they had instructed the aircraft ahead to either break-off their approach and commence a missed approach immediately or, if they were now in VMC, to declare "visual", and allow us to commence our approach. Remember, the hills are close, we are being thumped around in thick cloud, and we had a cockpit filled with stinking, choking, electrical wiring smoke, and still had 5000 feet to descend before our wheels could be on the ground.

With relief I heard Wellington further repot that the Twin Comanche had declared "visual", and that they had broken cloud at 1900 feet QNH. Now we only had 3100 feet to descend before we could at least see outside the aircraft.

Those 3000 odd feet seemed to take 100 years in time. Through my mind was running the text from Ernest K Gann's book, "Fate is the Hunter" where his Captain Ross was holding a match under his chin whilst he made an instrument approach to force him to ignore the smell of smoke and the heat, and to solely concentrate on flying the instrument approach. It helped me to push the distractions aside and keep the instrument readouts and needles where they were supposed to be.

We descended through 1800 feet – where does this bloody cloud end? Then, at close to 1700 feet, the cloud fell away and light filled the cockpit. Dimitri called "visual", and I raised my eyes and was relieved to see a clear path down to the white paint bars across the end of the runway in the distance.

A PA28 Warrior panel. The circuit breakers are on the right, below the control yoke.

We landed and taxied to the Kapiti Aero Club to be met on the maneuvering area by the instructor and student from the Twin Comanche that had been ahead of us. After we evacuated (the cockpit), they expressed their congrats and we looked under the instrument panel but could see no cause, just a black, melted, twisted, and distorted mess of wires: DSK's IFR ops, at least, were over for a while. The Aero Club gave us each a coffee and a biscuit while I called our maintenance base who, in light of my description of the incident, asked us to fly it home if we could. It would be much cheaper to fly it home for maintenance than either pull the wings off and truck it back, or get it inspected and its VHF radio jury rigged to fly it over the ridge and back to Wellington within the law. I called Wellington tower to see if we could get an emergency clearance to fly the aircraft home.

The controller, whom I knew personally, was rather amused and said that Wellington tower had never used its light signaling system so it would be a good test. He gave us a last-time-to-leave Paraparaumu, an instruction to maintain an altitude not in excess of 1900 feet QNH, and to carry out a 360° orbit at Whitby and more at Newlands. We should continue to orbit Newlands until we saw a green light from the tower before we continued. Receipt of the green light was to be clearance to land.

The return flight was quiet without the radio (Wellington is an International Airport) and without further event, the tower's green light lit up during our second orbit at Newlands, and the approach onto 16 was otherwise perfectly normal.

The fire was caused by a double failure: a short circuit in the starboard pitot head de-icing heater AND a second failure in the "pop-out" circuit breaker that was supposed to protect the electrical system from just such a problem. The electrical engineer that repaired the aircraft stated that, in his estimation, we would have had 45 amps DC pouring through the system which was why the busbar had semi-melted and drooped at nearly 90° to its original alignment. The episode was incredibly expensive, the re-wiring job cost close to 40% of the aircraft's value at that time.

After DSK had a month in intensive care, I flew her to Omaka (VFR) to collect an instructor who was stuck there. I took the kids.

The message from this – Some things cannot be seen or assessed at the pre-flight inspection stage of a flight, but can fail after the flight commences.

In my case, there had been no early warning of the impending failure; the first indication was the sudden out-pouring of eye-burning, acrid, choking smoke. When we later looked in the Flight Manual, there were no relevant instructions for such an event OR an appropriate checklist pertinent to the situation.

This tale serves to highlight the adage that pilots should always expect the unexpected, and, in the event of a failure, they should……..

- first - keep the aeroplane flying, and
- second – regain and retain the attitude for flight, and direction for flight, that you desire.

Only after these have been achieved and can be maintained THEN…….

- thirdly, tell someone about it (if you can).

AVIATE – NAVIGATE - COMMUNICATE

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

Aeronca 11AC Chief – Pilot Report

By Rob Knight

Don't take feisty old ladies lightly, they can still bite. My grandmother's words still ring in my ears after an altercation by me with one of her friends when I was little more than a toddler. This philosophical outburst is still relevant, not only in life, but also when interacting with little old lady aeroplanes.

25-8804 in formation

In the week previous, the late Dave Briffa, the then CFI at AirsportQLD Flying School in Boonah, and I went out to tea and, as pilots do, we talked just a little bit about aeroplanes. In our general conversation, Dave mentioned the tailwheel conversions that he was doing in the school's 1948 Aeronca 11AC Chief. I had long wondered what these classic aeroplanes were like to fly; they were still new when I first started looking at metal birds, and every magazine I picked up in those days seemed to have an advertisement telling me that I wasn't living unless I owned one. I didn't, and I haven't, but here was Dave suggesting I try one out – what could I say?

We met by arrangement in the late afternoon on a beautiful autumn day. The surface wind was light and variable and visibility was unlimited except to the south where the climbing peaks of the Great Dividing Range rose loftily, jagged and blue, towards the sky. Recent rain had left the air very clear, the sort of day that makes everyone glad to be alive. We climbed aboard with surprising ease for a light tail-dragger, and strapped ourselves in. I looked around.

My first impressions were nostalgic as, in the instant, I was transported back 70 years by the appearance of the interior. The soft seat, the old-style instrument panel, the automobile type doors whose latches closed with a loud snap, their automobile handles and slide opening windows, and the central cluster of engine controls, it was exactly what the magazine sketches and photographs had displayed in my youth. I felt that I was in for a reminiscence renaissance.

Start-up was simple and after a load, Clear prop", called through the open window, the little 85 HP continental flicked the metal prop into a soft blur. The oil pressure rose immediately and a quick radio call advised traffic that Aeronca 8804 was taxiing for 22. Releasing the park brake using the cleverly hidden brake release up under the central panel saw us gently rolling across the soft grass.

I was surprised by the low engine noise. Alright – an 85 HP engine isn't spectacular in the audio arena but this was a whole lot less that what I had experienced in Cubs and Austers and the like. The rudder on the ground was very powerful and turns were easy to commence: overcontrol for a clumsy-footed oaf would quickly lead to embarrassment. The toe brakes helped with tight taxi turns as we checked the circuit before entering the runway to back-track. This is a classic tail-dragger - her nose sat so high that I cursed my mother for not giving me another couple of feet in elevation. The only way to taxi safely was to forget a straight line and do clearing turns so the way ahead can be checked. Our only audience was a pair or three kangaroos resting in the shade by the runway, but they quickly departed when they realised that I wasn't following a straight line. Run-up was simple, 1700 rpm, check carb heat for function and the mags left and right. Oil pressure was green.

The take-off checks were equally basic, the trim on the roof to central, throttle friction nut tight, mixture rich, carb heat cold. Fuel was on (checked by the push/pull on/off knob on the central panel being "in"). There being no flaps to set, and the instruments and switches were all good, I checked the controls to their stops, and our straps. A look out showed no other aircraft, tentatively supported by our silent radio, so I advise the local traffic of my intentions, lined up and taxied forward to straighten the tailwheel.

Dave had warned me that the push/pull throttle only went in a little more than half its reach to get full power and he was right - somehow, the low engine noise and slow acceleration had me sub-conscientiously feeling there was more to come - but there wasn't. However, the airspeed did rise and I found that I had an aeroplane on my hands (and feet) with her own unique personality.

1948 Aeronca 11AC Chief – 25-8804 at YBOA.

With the stick initially central, the tail was a slower to rise than I anticipated and I took the stick forward a bit to assist. When the tail did come up it was quick, and it would be easy to over-rotate with over control. The end of the runway appeared in front of the windscreen as she rose onto her main wheels. The nose snapped to the left with the combination of slipstream and "P" factor, but a quick bit of right rudder put the nose back down the centreline. This display of characteristics was right out of my textbook briefings from when I was training students.

The grassed Boonah runway has gentle humps and, as we approached 50 knots the aircraft began to gently bounce. Easing the stick back a tad stopped the slight porpoising but also resulted in an immediate yaw left indicating the need for additional right rudder to keep straight. This little old lady was making me work for my money.

Climbing at 55 knots bought us 500 fpm - exactly what she would have given 70 years ago when she was a young lady. Noticeable right rudder needed to be retained to counter the slipstream effect in the climb, and gentle clearing turns were needed to clear the way ahead. We levelled off at 3000 ft QNH and set the power at 2300. She trimmed out OK but I needed some further small adjustments as the speed rose to a quiet cruise of about 70 knots. The visibility was great as long as I was looking down. Sitting almost at mid chord, the wings blotted out the sky laterally and I could only see clearly pretty much straight ahead. This was very reminiscent of the Piper PA18s and PA22s that have flown in the past and very typical of aircraft design in the Aeronca's birth period.

With a good lookout being demanded by the restricted visibility, I did several clearing turns to make sure no-one could be sneaking around that I didn't know about. In the turns it was obvious that this little girl wrote the book on adverse yaw and plenty of co-ordinating rudder was needed to tame the ball and keep it in its cage. However, the rudder was powerful, and so long as I was positive about using it, I had little difficulty in keeping my world centred. I took her into a 45° banked turn each way and she was totally responsive in every way that I could wish. Controls pressures were light but powerful, and provided that I used them appropriately, she would faithfully follow. There was some tendency to overbank in level and descending turns, but nothing extra ordinary. As long as I applied rudder with the input aileron, she responded admirably.

Stalls were – what stalls? The basic stall saw her nose-high and just sagging away, still nose-high, as we exceeded the critical angle. The sink accelerated quickly but, with her large wing area, would never be excessive as long as her wings were level. There was no need to pedal her, there was no tendency to drop a wing. Power on stalls were identical in characteristics, they just displayed a slower deceleration and a higher nose attitude at the stall break. Recovery, and return to normal flight was instantaneous in both cases.

I eased the throttle back and we descended at 80 knots back towards the airfield. It was gorgeous to be flying. The sun was sinking to the west and the still brightly lit earth was intersected by dark shadows. In the clear air everything stood out sharp and clear. All too soon we were back and joining, this time for runway 04, the light wind had moved and now favoured this direction. Lifting the wings as necessary to see around, I entered the downwind leg and called my position, The downwind checks were simplicity in themselves- brakes off, mixture rich/carb heat cold, fuel quantities, and harnesses tight. Late downwind, with the carb heat pulled out and thus " ON", I eased the power back and turned onto left base. The speed settled to 55 knots and, with a trickle of power remaining, I trimmed for that attitude. The runway threshold drifted towards us and I turned onto finals with my flare point sitting exactly on the position on the windscreen where I wanted it. In the near still air we slid gently and quietly down the approach into the gathering dusk and the runway rose accommodatingly towards us. A small addition of power to counter the sink as we crossed the hedge with its dark shadow, and we were at the flare.

A classic 1940s cockpit layout.

Dave had warned me the controls leant towards heavier and I subscribe to that wholeheartedly. The stick felt solid as I dragged to nose up when arresting sink, but we settled quite gently onto the main wheels as a wheeler. After a couple of skips on the runway undulations we were down for good as long as I didn't do something silly, and we rolled out with the tail up. Dave was also right, it would be very easy to lift the tail too high and runway-strike the propeller in this stage of the landing. Full power accelerated us into the next circuit, the landing on which I started a skip/bounce and elected to go around so I didn't have to fix it.

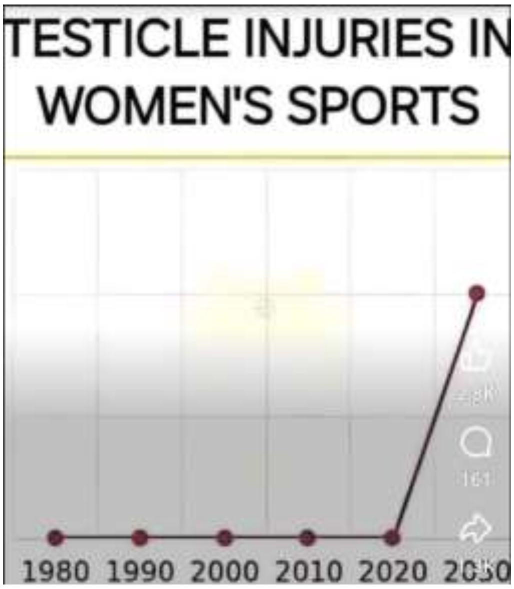
The last final approach was no different, the conditions making the flight a beautiful experience. The same sink was still there at the hedge but this time I settled into a three-pointer and rolled out to a full stop. After a U-turn and a back track to the hangar, we quietly checked the mags before shutting her down and putting her to bed.

This is one memorable aeroplane. Highly typical of other types manufactured in her birth period, she displays the complete set of challenges that her ilk will require the pilot to meet. Not overburdened with power, every aileron application must have an appropriate rudder application co-ordinated with it. Her aileron and elevator controls were both a little heavier than more modern light aircraft, but also decidedly more powerful and give a surprisingly good response. This could lead to over control very easily in a pilot's initial transition to this type. My grandmother's words still fit, there are some old ladies who bite, and must always be taken seriously. They will be taken lightly only at the risk of considerable loss of ego. But when you do meet their challenge, you will realize that they weren't so bad after all. They just need taming.

This venerable old lady would be a great challenge for a tail-wheel converting trainee: an ideal platform to acquire a tailwheel endorsement. The traits she displays are precisely those needed to operate aeroplanes with the third wheel at the back end.

FLY-INS Looming

WHERE	EVENT	WHEN
Murgon (Angelfield) (YMRG)	Burnett Flyers Breakfast Fly-in	**Find Next Planned EVENT AT** **http://www.burnettflyers.org/?p=508**



The Days of Our Lives (From a Flying Instructor's perspective).

By Rob Knight

As a CFI of an Aero Club or Flying School, you are responsible for the actions of your members insofar as ensuring that their training and aircraft operations are all above reproach. This extends the gamut from more junior instructors down through CPLS, PPLs and students.

When I worked for Waitemata Aero Club I followed one club trip down the North Island on a social visit to the New Plymouth Aero Club. I arrived at New Plymouth about an hour behind our aircraft and was pleased to see them all tied down in an orderly fashion, neatly in a line with their picket ropes with no slack. I decided to compliment the junior instructor who had been the organiser for the group. Although the early evening weather was pleasant, a 15 to 20 knot northerly was forecast to come through at around 0400 so the pickets were a necessary precaution.

As I walked away, aircraft from another organisation were still landing and their first arrivals were shutting down at their allotted parking spaces. One of these was their PA32 Cherokee 6, and I watched as it taxied in and parked. The door opened and 7 people streamed out. The last out was a junior instructor, John, with whom I had had words at a recent RNZAC flying competition when his candidate for a competition was marked fourth so was out of the race. His over-loud protests of parochialism had been unpleasant and just plainly rude until an ajudicator silenced him. I stopped to watch as I knew there was difficulty with picket pins being driven where he had parked, there were stones under the surface. I also knew that he had a short fuse. One of his passengers retrieved a rolled-up pack from the front locker, opened the roll and shook out a pile of picket pins, short chains, a hammer and some coils of cord. They crawled under the wing and, beneath the tie-down loop they began hammering in a steel pin. After several hits with the hammer, it stopped moving and began to bend. The hammer-holder selected another pin, a slightly different place, and bent that one too.

After many attempts they gave up and John sent the passenger in to register their arrival. He walked around the aircraft looking at the ground and, after several more probes with a straightened pin, climbed into the aircraft, released the brakes, and pulled the aircraft forward about a foot (300mm). He tied a cord to each tie-down loop and pulled the loose ends in under the aircraft, each length of cord lying just behind each mainwheel tire. He then pushed the aircraft backwards until the tires sat over the ropes, climbed back into the cockpit and parked the brakes.

He gathered up the picket pins, chains and the rest of the cord and put them back into the bag and stowed the roll in the forward locker. He walked away into the Clubrooms. His aircraft was now solely and securely tied down by its mass.

The wind did pick-up for a while in the early morning, but not enough to move anything around so the Cherokee remained tied to the ground by its weight.

Several years later John applied for a position that I was advertising and complained because I didn't offer him an interview. He didn't know what I knew!

They do walk among us ……… and I didn't want him walking around my scene.

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

WTF - The World's Worst Aircraft –
The Gee Bee Racers, 1929 to 1933

By Rob Knight

In 1929, the Granville Brothers (hence Gee Bee) built their first aircraft, a two-seat biplane named the Model A, which they dubbed the "Sportsters," and advertised it as "the fastest and most manoeuvrable licensed airplane for its horsepower in the United States." Their main business goal, as they entered the 1930s, was to produce a series of Sportsters for sale to aviation enthusiasts.

The Sportsters were essentially the most powerful engine available, attached to the front of an airframe with the smallest frontal area possible. The results suffered almost zero forward views for the pilot and, looking like beer barrels, acquired the nickname of “The flying sewer pipes”. Their flying characteristics were no more delightful. With around a 25 foot wing span and a take-off weight of some 1034 kg, their wing loading exceeded even that of some military fighter aircraft. To illustrate the issue regarding the wing loading, a Piper PA24 151 has a wing loading of 65 kg/m^2, The Gee Bee Model Z had the equivalent loading of 147 kg/m^2. The wing design was not conducive to good stalling characteristics and the onset of the stall was severely abrupt, developing across the wing very quickly which made all stalling hazardous below several thousand feet AGL. With the tremendous torque developed as power was adjusted, even a sudden application of power could induce a wing-drop stall resulting in a spin. Approach speeds in some cases exceeded those of military fighters and the runways they required to operate from were all very long to cater for the exaggerated length of their landing rolls. Only extremely experienced pilots were contracted to fly them.

A Gee Bee, one of the Model-Rs.

The Model R series had several crashes and the R-2 killed its pilot during one such event. The aircraft was rebuilt and crashed again, twice. On its last rebuild, the R-2 was combined with parts salvaged from the R-1, but this aircraft crashed again on its next flight and killed its pilot. The centre of gravity of the hybrid aircraft had its centre of gravity too far aft to be flown – caused by the fitting of a long-range fuel tank.

Gee Bee, the one and only Model-Z.

However, the aircraft were designed to race, and race they did - very well indeed when flown by the right pilots. Designed solely to enter in the Thompson Trophy Air races by Robert Hall, they had a public reputation of being dangerous and mysterious and people flocked to the races where they were entered. Unfortunately, the spectacles they presented sometimes gave the crowd what it came for. The Model Z aircraft, whilst attempting to upgrade its speed record, suddenly pitched up and the right wing folded, the pilot dying in the subsequent crash. However, this accident was later determined to have been caused by the fuel cap from the tank in front of the pilot’s seat coming through the windscreen and smashing into the pilot’s face. Unconscious, he pulled the stick back pitching violently up whilst in excess of the aircraft manoeuvring speed. The resulting rise in G loading exceeded the maximum loading and the right wing folded up and back. Alas, the pilot died instantly on impact.

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The Sopwith Pup

By Rob Knight

Not only was it good looking, the Pup was also nice to fly.

The Sopwith Pup was a British single-seater biplane fighter aircraft built by the Sopwith Aviation Company. It began service with the Royal Naval Air Service and the Royal Flying Corps in late 1916. With pleasant flying characteristics and good manoeuvrability, the aircraft proved very successful. The Pup was eventually outclassed by newer German fighters, but it was not completely replaced on the Western Front until the end of 1917. The remaining Pups were relegated to Home Defence and training units. The Pup's docile flying characteristics also made it ideal for use in aircraft carrier deck landing and take-off experiments and training.

In 1915, Sopwith produced a personal aircraft for the company's test pilot, Harry Hawker, a single-seat, tractor biplane powered by a seven-cylinder 50 hp , Gnome rotary engine which was known as "Hawker's Runabout". Finding it had surprisingly good performance and flying characteristics Sopwith used the basic concept and developed a larger and more powerful aircraft for use as a fighter. One of the major influences that carried through from the Runabout, was the implementation of ailerons for roll control instead of wing warping that was the primary method of the time.

Tom Sopwith's "Pup" with its 80 hp L Rhone engine. Much loved by RNAC and RFC pilots alike.

The result of this major make-over was a single-bay, fabric-covered, single-seat biplane. It utilised wooden framework and had staggered equal-span wings. The cross-axle type main landing gear was supported by V-struts attached to the lower fuselage longerons. The prototype and most production Pups were powered by an 80 hp Le Rhône 9C rotary engine. It carried a single 0.303 in Vickers machine gun in its nose, firing through the propeller arc via a synchronized Sopwith-Kauper synchronizer.

Original Sopwith Pup N5195 is now displayed at the Museum of Army Flying. The cowl, with a lower cutaway vent, indicates this aircraft powered by an 80 hp Le Rhone engine.

The prototype, completed in February 1916, was delivered to Upavon for testing in late March. The Royal Naval Air Service (RNAS) quickly ordered two more prototypes, then placed a production order. Sopwith, very heavily occupied with the production of the Sopwith 1½ Strutter, was only able to produce a small number of Pups for the RNAS. Deliveries commenced in August 1916.

The Royal Flying Corps (RFC) also placed large orders for Pups. The RFC orders were undertaken by sub-contractors Standard Motor Co. and Whitehead Aircraft. Deliveries from these sources did not commence until the beginning of 1917.

In all, 1,796 Pups were built, including 96 by Sopwith, 850 by Standard Motor Co., 820 by Whitehead Aircraft, and 30 by William Beardmore & Co.

The RNAS received its first Pups for operational trials with "A" Naval Squadron in May 1916: the first Pups reaching the Western Front in October of that year and proved highly successful, with the squadron's Pups claiming 20 enemy machines destroyed in operations over the Somme battlefield by the end of that year. The first RFC Squadron to re-equip with the Pup was No. 54 Squadron, which arrived in France in December. The Pup quickly proved its superiority over the early Fokker, Halberstadt and Albatross biplanes. After encountering the Pup in combat, Manfred von Richthofen reportedly said, "We saw at once that the enemy aeroplane was superior to ours."

The Pup's light weight and 80 hp engine gave it a good rate of climb and its manoeuvring agility was enhanced by having ailerons on both upper and lower wings. While the Pup had only half the horsepower and armament of the German Albatross D.III, it was much more manoeuvrable, especially at altitudes in exceeding 15,000 ft due to its low wing loading. Ace, James McCudden, stated that "When it came to manoeuvring, the Sopwith Pup would turn twice to an Albatross's once". He added that it was a remarkably fine machine for general all-round flying. It was so extremely light and well surfaced that after a little practice one could almost land it on a tennis court. However, the Pup was also longitudinally unstable.

At the peak of its operational deployment, the Pup equipped only four RNAS squadrons (Nos. 3, 4, 8 and 9), and three RFC squadrons (Nos. 54, 46 and 66). By the spring of 1917, the Pup had been outclassed by the newest German fighters. The RNAS replaced their Pups, first with Sopwith Triplanes, and then with Sopwith Camels. The RFC soldiered on with Pups, despite increasing casualties, until it was possible to replace them with Camels in December 1917.

But the raids at home, on London, by Gotha bombers in mid-1917 caused far more damage and casualties than the earlier airship raids. The ineffective results achieved against them by British interceptor units had serious political repercussions. In response, No. 66 Squadron was withdrawn to Calais for a short period, and No. 46 was transferred for several weeks to Sutton's Farm airfield, near London. Two new Pup squadrons were formed specifically for Home Defence duties, No. 112 in July, and No. 61 in August.

Squadron Commander E.H. Dunning brings a Pup aboard HMS Furious in August 1917.

The first Pups delivered to Home Defence units still utilised the 80 hp Le Rhône, but subsequent Home Defence Pups were fitted with more powerful 100 hp Gnome Monosoupape engines, which provided an improved rate of climb. These aircraft were distinguishable by the addition of vents in the cowling face. In 1917, the Admiralty acquired the Sopwith Pup.

Sopwith Pups were also used in many early pioneering aircraft carrier experiments. On 2 August 1917, a Pup flown by Sqn Cdr Edwin Harris Dunning, became the first aircraft to land aboard a moving ship, HMS *Furious*. Alas, Sqn Cdr Dunning was killed on his third landing when the Pup left the prepared runway and fell over the side of the ship.

The Pup began operations on the carriers in early 1917; the first aircraft being fitted with skid undercarriages in place of the standard landing gear. Landings utilised a system of deck wires to "trap" the aircraft. Later versions reverted to the normal undercarriage. Pups were used as ship-based fighters on three carriers: HMS *Campania*, *Furious* and *Manxman*. Some other Pups were deployed to cruisers and battleships where they were launched from platforms attached to gun turrets. A Pup flown from a platform on the cruiser HMS *Yarmouth* shot down the German Zeppelin L*23* off the Danish coast on 21 August 1917.

The U.S. Navy also employed the Sopwith Pup with Australian pilot, Edgar Percival, testing the use of carrier-borne fighters. In 1926, Percival flew a Pup from a platform on turret "B" on the battleship USS *Idaho* at Guantánamo Bay, Cuba, prior to the ship undergoing a major refit that added catapults on the stern.

During its service life, the Pup saw extensive use as a trainer. Student pilots completing basic flight training in the Avro 504k often graduated to the Pup as advanced trainers. The Pup was also used in Fighting School units for instruction in combat training. Many training Pups were reserved by senior officers and instructors as their runabouts while a few survived in France as personal or squadron 'hacks' long after the type had been withdrawn from combat.

The Sopwith Pup

General Characteristics of the Sopwith Pup

Crew:	1.
Wing span:	8.98 m.
Wing area:	23.6 $m^{2.}$
Powerplant:	1 X 80 hp Le Rhome rotary piston engine.

Length:	5.88 m.
Height:	2.87 m.
Empty Weight:	357 kg.
MTOW:	556 kg

Performance with 80 hp Le Rhone engine

Max level flight Speed	97 kias
Endurance:	3 hours
Time to Altitude	14 minutes to 10.000 feet
	35 minutes to 16,100 feet

Range:	293 nm
Service Ceiling:	17,500 feet

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

1. Which of the following will most likely cause an aeroplane to suffer a longer take-off run?
   A. High QNH.
   B. Low QNH.
   C. High OAT[2].
   D. Low OAT.
   E. B and C are correct

2. Whilst banked at a constant angle in a level turn, does rudder continue to need to be applied
   A. Always.
   B. Yes, but only in a maximum rate turn.
   C. No.
   D. Only if aileron is required to be held.

3. Which of the following provides a wind velocity in degrees magnetic?
   A. GAF.
   B. METAR.
   C. GPW&T.
   D. TAF.
   E. None of the above

4. Which of the following will cause a rise in the stall speed?
   A. Pulling out of a dive.
   B. When in a banked turn.
   C. When in a steady climb.
   D. When in a steady glide.
   F. A and B are both correct.

5. Flying in Australia, a pilot notices that his track to his destination will take the aircraft from a low-pressure area into an area of high pressure (anticyclone)?
   A. He could therefore expect port drift so the heading will be greater than the track.
   B. He could therefore expect starboard drift so the heading will be less than the track.
   C. QNH cannot influence drift.

See answers and explanations overleaf.

[2] OAT – outside air temperature.

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 (International +61 4 0089 3632), or email me at kni.rob@bigpond.com.

1. E is correct.

   Low air pressures (QNH) and high OAT both lower the air density and therefore diminish take-off (and landing) performance.

2. D is correct.

   Rudder is required when turning solely to balance adverse yaw caused by aileron drag. If no aileron is applied, then no rudder need be held. If aileron is used (perhaps to prevent overbanking) then appropriate rudder must be held to balance the aileron drag generated by the applied aileron to remain in balanced flight with the ball in the middle.

3. E is correct.

   No written/printed aviation forecast or report provides a magnetic wind direction. Magnetic winds are only given verbally over the radio by a ground station.

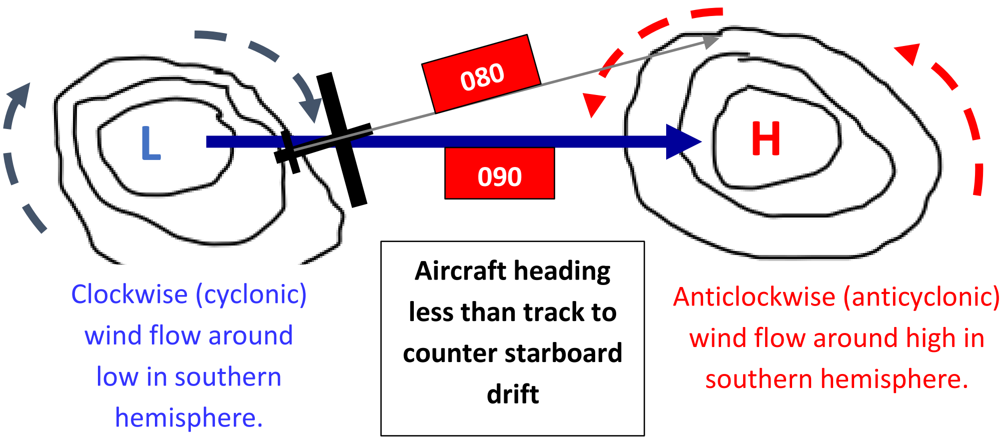
4. F is correct.

   Loading increases the force the wings are required to provide and loading increases when the aeroplane changes direction in any way. Therefore, as pulling out of a dive, or being in a banked level turn, will increaser the loading, these will also increase the speed at which the aircraft will reach its critical, or stalling, angle of attack.

   As neither options C or D modify the loading value, they cannot influence the stall speed.

5. B is correct.

   Winds around an anticyclone rotate anticlockwise so the pilot will experience a wind from port. Therefore, his heading must be to port of track so his heading value will be lower than his track value on a compass or other directional indicator.



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Aircraft Books, Parts, and Tools etc.

Contact Rob on mobile – 0400 89 3632

Torque wrench

Item	Condition	Price
Used for Rotax spark plugs, sump plugs, and torquing of other Rotax engine parts.	As new	**$50.00**

Aircraft Magnetic Compass (Selling on behalf)

Item		Price
Magnetic compass: Top panel mount, needs topping up with baby oil.		**$45.00**

Propeller Parts

Item	Condition	Price
Propeller spacers, Assorted depths, all to fit Rotax 912 UL/ULS propeller flanges.	Excellent	**$100.00 each**
Spinner and propeller backing plate to suit a Kiev, 3 blade propeller, on a Rotax 912 engine flange.	Excellent	**100.00**

For all items, Contact me - on mobile – 0400 89 3632

Or email me at:

kni.rob@bigpond.com

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AN3, AN4 & AN5 bolts, all bagged
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Today's cost – approximately **$5,500**

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ITEM	Condition	Price
E6B Navigation slide rule (engraved metal)	Excellent	$25.00

Contact Rob Knight, Tel: 0400 89 3632, - Email: kni.rob@bigpond.com.

Sky Dart Single Seat Ultralight for Sale.

$4,500.00 NEG

A single seat, ultralight, Taildragger. Built in 1987, this aircraft has had a single owner for the past 18 years, and is only now I am regretfully releasing it again for sale. I also have a Teenie II and am building another ultralight so I need the space.

The landed Sky Dart III rolling through at YFRH Forest Hill

TTIS airframe is 311 hours, and the engine, TTIS 312 – is just 1 hour more. Up-to-date logbooks available. 2 X 20 litres tank capacity. To be sold with new annuals completed.

It is easy to fly (for a taildragger), and a great way to accumulate cheap flying hours.

Call me to view, Bob Hyam, Telephone mobile 0418 786 496 or Landline – 07 5426 8983, or Email: bobhyam@gmail.com

Landed at McMaster Field after my flight back from Cooma just West of Canberra. In the cockpit with me is GeeBee, my dog

Single Seat T84 Thruster, disassembled and ready for rebuild.

I have a T84 single seat Thruster project in my hanger at Watts bridge.

The fuselage is on its undercarriage, the wing assemblies are folded up and the skins are with them.

Included is a fully rebuilt Rotax 503 dual ignition engine and propeller.

And, most importantly – the aircraft logbook!

Asking price $5000.00

Contact John Innes on **0417 643 610**

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- Leather seats.
- 100 Knots cruise.
- TTIS – 32.0 hours engine & airframe.

$38,000

Contact Colin Thorpe
Ph. 0419 758 125

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Aircraft Engines for Sale

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"The time of year when I complain about Christmas coming too early gets earlier every year."