BRISBANE VALLEY FLYER

October – 2024

BRISBANE VALLEY SPORT AVIATION CLUB INC

www.bvsac.com.au

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

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Steve Newing's Great Lakes 2T-A1, at YBCM for the Fly-In – see page 14.

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Contents

From the Club

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

Welcome to October!

At our latest meeting, we had a productive working bee focused on starting the new utility room project. We were thrilled with the turnout of 15 members who came out to help. Your hard work was invaluable, and we managed to get all the walls up in a single day, in addition to clearing out the junk from the clubhouse.

A special thank you to Peter Freeman for his dedication to trimming the bushes around the clubhouse. Peter spent two days on this task, and we truly appreciate his efforts.

Our next meeting will return to our regular format, starting at 10:30 am. We look forward to seeing you there for a great time together!

Best regards,

Your committee.

Images of the progress towards the clubrooms' improvements are overleaf

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The Sneaky Stall – Part 1

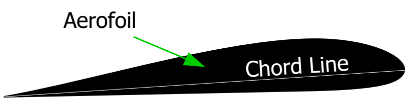
By Rob Knight

Some say that stalls are caused by flying at too low an airspeed. Others claim stalls happen when pilots try to climb too steeply. Yet others are simply so scared by the propaganda put out about stalling and its dangers they cannot overcome their trepidation and become conversant with them. What's the issue here? The actual cause of a stall is simple and should be well known and stalls are predictable. Deliberate stalls are not dangerous. Pilot entered stalls are corrected/recovered from with simplistic ease and in complete safety. BUT….herein lies the qualifying phrase – *deliberately entered stalls*. I cannot ever recall hearing or reading about any serious accident, or even an incident, involving a deliberately entered stall.

But stalls are sneaky. Stalls can appear at any time, at any speed; indeed, a major 21st century mystery some would say. Obviously, stalls are no fairy-tale so let's take a realistic look at their simplicity and safety.

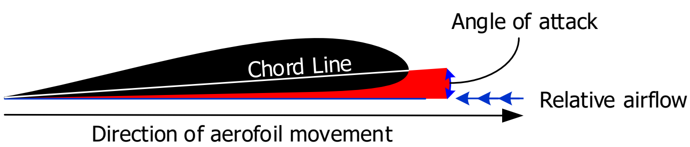
Let's start by dispelling some myths. Stalls really can occur at any airspeed, anywhere from an aeroplane's VNE down to a zero reading on the ASI. Stalls can also be experienced at any nose attitude, from vertical climb to vertical dive and anywhere in between. They can occur when an aeroplane is inverted straight and level right-side-up. So, is there any time when an aeroplane is safe from a stall? When can a pilot relax their vigilance? The answer is a resounding YES! An aeroplane is safe from a stall at any point in time when its angle of attack is less than the aerofoil's stalling angle. Generally, aerofoils (airfoils in the USA) stall at about 15° angle of attack so as long as the aeroplane's angle of attack is less than the 15°limit, the aeroplane simply cannot stall

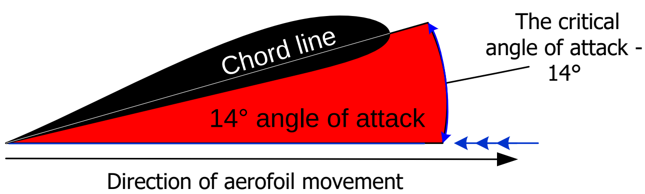
To better understand this we need to look at a couple of definitions. We said that the stall occurred because the angle of attack was too high i.e., greater than 15°. The angle of attack is the angle between the chord line of the aerofoil and the relative airflow (relative wind in the USA). So, what's an aerofoil? An aerofoil is the cross section of a wing. A cross section that displays the shapes and the curves of the upper and lower surfaces as shown above.



The "chord line" is a straight line joining the leading and trailing edges of an aerofoil as shown below left

The angle of attack is the angle made between the chord line and the relative airflow as shown on the right. If the angle of the chord line changes, OR the relative airflow changes direction, the angle of attack will change. In the illustration on the right, the angle of attack is about 4°, the angle of attack where the best lift/drag ratio occurs and where the aerofoil is most efficient.

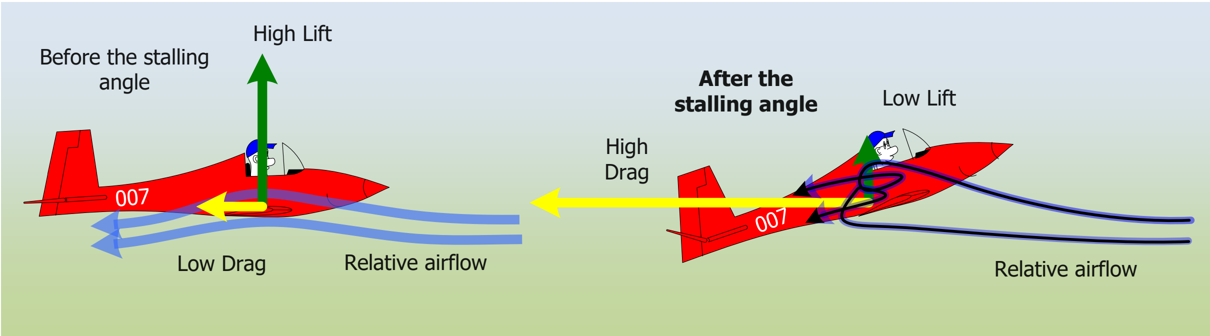




If the aeroplane stalls at 15° angle of attack, then we could call 14° the critical angle because, if we increase the angle any further, we will induce the aerofoil to stall. *(See note 1 at the end of this article.)*

Now the cause is ascertained, what actually happens when a stall physically occurs? The word stall is usually associated with something that stops and, in this sense, the same applies. However, what has stopped is not the aeroplane or its engine, but the smooth flow of air that passes over the upper surface of the aerofoil in normal flight. At the stall, the relatively smooth airflow over the aerofoil breaks away from the surface and tumbles in a series of eddies and swirling currents across that curved surface of the wing. As the previously relatively smooth airflow provided about 80% of the lift produced, so, at the stall, we will lose a large proportion of lift.

So, the next obvious question is why does this air break away? You are driving on a motorway and proceed around a bend. Doing 100 KPH, the time to drive around the bend is comfortable and there is no adverse effect caused by the vehicle mass to force you away from the curve. But what if you tried to drive around the curve at 200 KPH? It is quite possible that the vehicle will not be able to take the curve and will slide/skid/roll towards the outside of the curve and into the barrier positioned for that very purpose. The cause is that the inertia of the vehicle prevents it following the change in direction around the curve. The air behaves in the same fashion – the inertia of the air precludes it following the change in direction over the upper surface of the aerofoil aft of the point of maximum camber. And the air will behave in exactly the same manner as the vehicle. It, too, will not be able to take the bend and will "spin out", breaking away into turbulent flows and eddies. Here's the simplicity of it – no smooth flow – much less lift and much more drag.



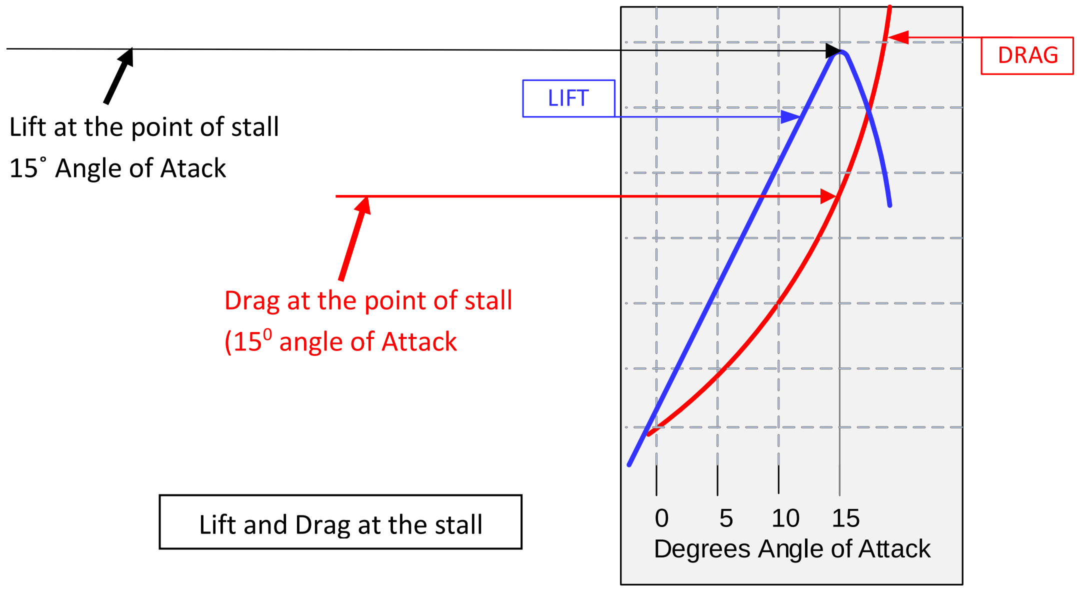
The change in lift and drag is indicated in the above sketch by the green and the yellow lines which clearly illustrate the magnitude of the change in lift and drag values.

The simplicity of the stall can now be easily seen. It is just the breakdown in smooth airflow over the wing to turbulent flow and it's caused by an angle of attack that is too great. Remove the excessive angle of attack and the aeroplane will resume normal flight – it really is as simple as that.

The MOST likely pilot to need to have a good recovery or exit technique is one that will NEVER practice stalls because they are too frightening. If such a pilot is ever faced with an unexpected stick buffet, they will assume that it is just turbulence. They will not instinctively check the stick forward. They have trained themselves that they don't ever stall so it just can't happen.

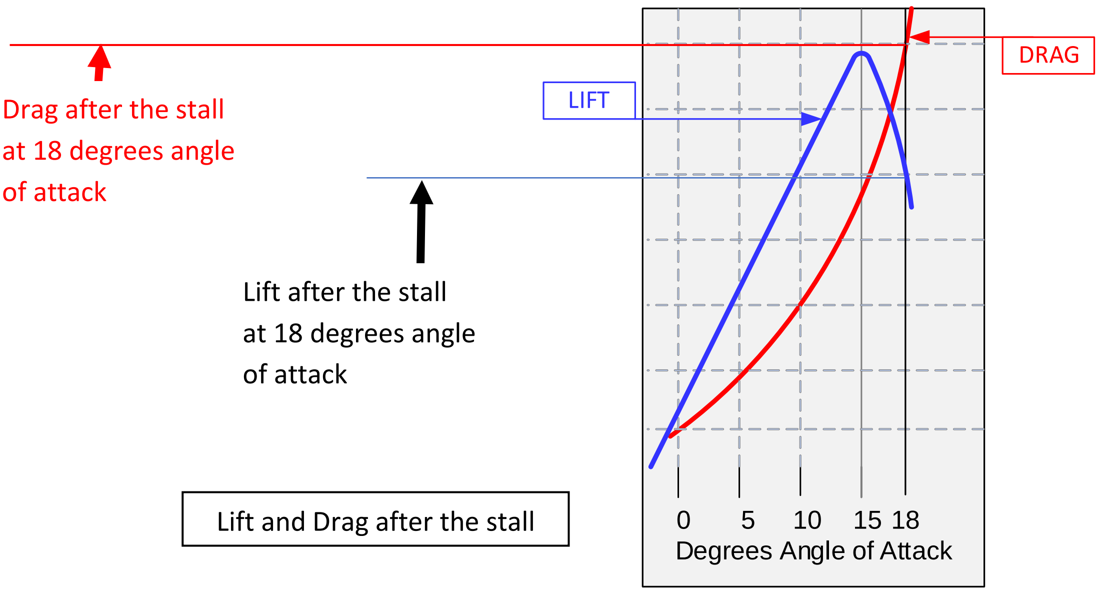
How dangerous is THAT?

Let's put some proportions in this change in lift and drag. Let's look at how the lift and the total drag on the aerofoil change with changing angle of attack. The easiest way to display this is on a graph. The graph displays the value changes in both lift and drag plotted against the angle of attack



The graph shows the rise in lift (the blue line) as the angle of attack increases until, at 15°, the stall occurs. Notice how rapidly the lift decreases after the stall angle has been exceeded.

BUT… also notice how quickly the drag (the red line) soars upwards with the increasing angle of attack. At the stall angle its rise is almost exponential.



What does this mean to a pilot? It means that, if you exceed the stalling angle of attack, the loss of lift may be savage but the rise in drag can be extreme.

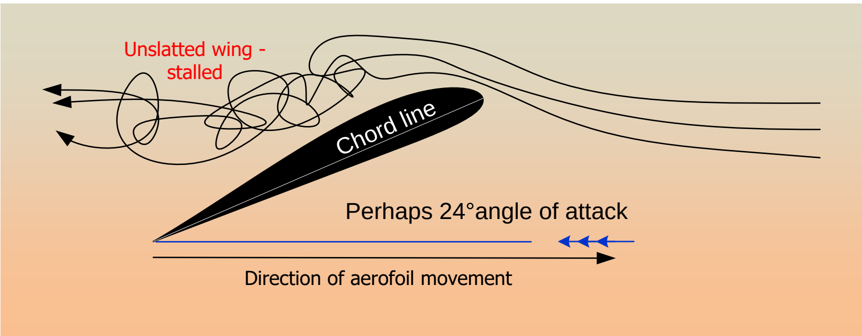
With all this emphasis on the stalling angle, where does the reference to stalling speed come from? That’s the term that everyone’s talking about. Alas, to consider that an aeroplane stalls at a stated airspeed is something of a misnomer, perhaps even dangerous. The often flight manual quoted stalling speed is the speed the aeroplane reaches the stalling angle of attack in straight and level flight when being flown by a test pilot, with no slip or skid, perhaps with power and all the available high lift devices applied. This is most often quoted as being applicable on approach which, of course, it can't be because it is in level flight where this speed is ascertained. As previously discussed, an aeroplane stalls at an angle of attack so an aeroplane can stall at any speed.

However, using the stall speed as a guide does have one attribute. It allows us to compare the effects of variations that we can make to the aeroplane. For example, if we accept that an aeroplane stalls at 40 knots without flap or power applied, we can then see how effective the use of flap or power is to lift by noting how much slower we can fly before we reach the stalling angle. Thus, if the aeroplanes stalls at 38 knots with flap down, we can accept that we have a lower stall speed when the flaps are lowered. Not that it will always stall at 38 knots now the flaps are down, because it won't, just that we need less speed to fly with flaps lowered so we might have an increased safety margin.

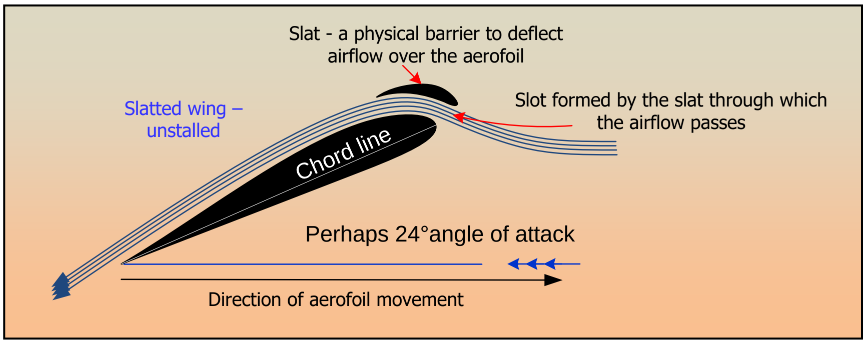
We also talk about the stall speed because we don't have a simple means of measuring or seeing the angle of attack. Without a practical angle of attack indication, we use a rule of thumb system which, if we follow, should mean that we are not about to stall. Alas, the stall/crash statistics clearly indicate there needs to be a better understanding of the whole issue so a better appraisal can be made by pilots instead of feeling happy because their airspeed is above the stall speed. This will only assist SOMETIMES.

Most modern aeroplanes are provided with high lift devices such as slats/slots and flaps. These have the effect of lowering the speed at the stalling angle in level flight.

Earlier I used an analogy of a motorway with a physical metal barrier to stop vehicles leaving the roadway – the safety barrier. Slats are exactly the same thing and provided for the same reason – to force the airflow around the curve of the aerofoil and delay the stall until an angle of attack higher



than the aforesaid 15° occurs. Slats can raise the stalling angle of attack to as much as 25°. Note that a slot is the gap between the wing and the slat and that some wings have slots built into them so there is no drag-creating protuberance above the wing to kill cruise speed. Slats are not a new invention. They were fitted by de Havilland's to Tiger Moths in the 1930s and to airliners ever since them. Storch make great use of them to aid their STOL capabilities, and Cessna 177 Cardinals have an inverted slot on the leading edge of their horizontal tail surfaces to delay the stall when the stick is pulled right back.

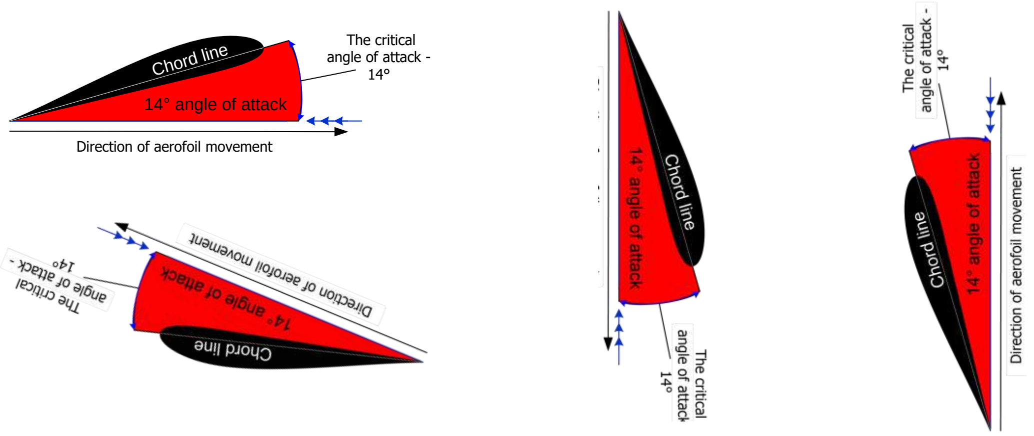


Flaps vary from simple hinged surfaces to flap types that descend below the lower wing surfaces and extend rearwards to increase the wing area and provide slots as depicted above to prohibit the flaps stalling. These are called Fowler flaps and excellent details are provided via the internet if one Googles fowler flap, slotted flap, or jetted flap. Fowler flaps can make very substantial changes to an aeroplane's slow speed flight profile but come with weight, complexity, and cost penalties.

Again – what does this mean to a pilot? It simply means that the aeroplane fitted with one or more of these high lift devices can fly in level flight at a lower speed. But don't be complacent – any aeroplane can and will stall, and will do so at any airspeed if the angle of attack exceeds the stalling angle of attack.

However, there are other things that can change the stall speed. I refer to changing aeroplane weight. Not only does this include additional weight at take-off, but also loading, the apparent increase in weight when the aeroplane turns or pitches. The greater the turn rate or rate of pull up from a dive, the greater will be the lift required from the wings so the greater will be the stall speed. Flying the aeroplane with slip or skid will cause shielding of part of one of the wings and this, too will provide a raised stalling speed. Imagine the scenario – set up on approach, descending through 600 feet AGL, turning from left base onto finals, a bit much into-turn rudder to pull the nose around and pulling a bit of G. There is a sudden buffet. What's that you wonder? Then, before you can answer your own question, the port wing just falls out of the sky. The aeroplane has rolled in a fraction of a second and now the nose is pointing vertically down. The left wing is still dropping – the world rotates in front of the windscreen with the nose so low all you can do is pull back on the stick to try and pull it up but it's not moving. The world is rotating even faster and the trees and buildings on the ground are whirling around and screaming up to you…………

Note 1. This illustration supposed a stall in level flight. The extra illustrations below are other situations where this situation occurs.



All that is required to encounter a stall is to have an angle of about 15° between the relative Airflow and the aerofoil's chord line. Nose attitude, airspeed, stick position or feel – none of this matters, just the angle of attack.

More next month in Part 2.

Happy Flying

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A War within a War, or The Miles Messenger Story.

By Rob Knight

The Miles M.38 Messenger was designed to meet an informal request made in 1942 by a group of British Army officers seeking a robust, low speed, low maintenance, air observation post and liaison aircraft. Such an indirect request that avoided the Top Brass and War Office was technically forbidden, but as the officers feared that normal channels would take years, and their need, to fight the war, was urgent with a capital "F", they went ahead anyway.

Miles M.38 2A Messenger in the UK in 2021.

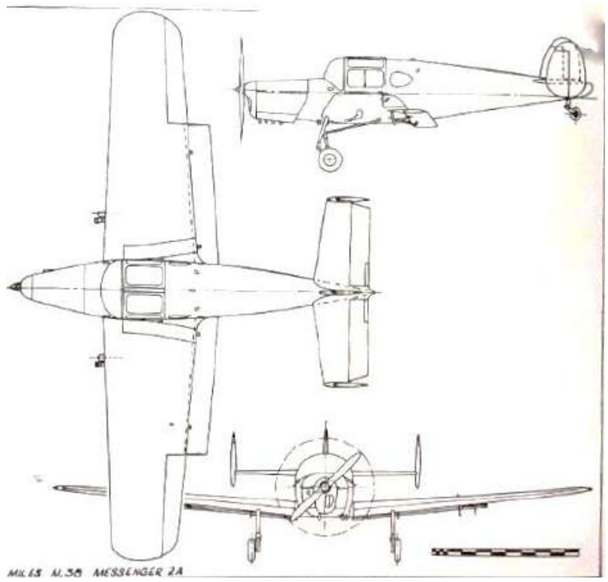
They found a sympathetic listener in George Miles, the designer at the Miles Aircraft Company, who agreed to provide, unofficially, an appropriate aircraft prototype. However, he did point out that it had to be clearly understood that producing a prototype was as far as he could go without official authority, and any production aircraft would have to be arranged and funded through the normal and conventional channels of the War Office and the Ministry of Aircraft Production.

Still without official sanction, the design and initial work began on a single engined aircraft with seating for two and the capability of operating with ease off a totally unprepared surface. It therefore needed the ability to make very steep approaches and have an exceptionally short landing roll. For take-offs, it had to have an exceptionally steep angle of climb at a low airspeed for obstacle clearance. It had to have excellent flight visibility and be able to be operated and maintained by limited-experience staff. It should also be operable in all weathers. So demanding were these requirements that the military group actually doubted that such an aircraft actually be built to cover all their varied demands.

The prototype developed was a cantilever low-wing monoplane with a fixed tailwheel undercarriage, powered by the 140 hp de Havilland Gipsy Major 1D inline engine. To enhance its low-speed abilities, it was fitted with large chord, external trailing edge flaps (non-retractable). However, flight testing clearly showed the twin-fin and rudder arrangement was inadequate to provide directional control and stability at the low approach and take-off airspeeds the aircraft could be operated at. This was remedied by a re-design and the fitting of triple fins and rudders as was displayed on the production aircraft.

Just three months later, when those same army officers were exposed to the performance of the prototype, they were ecstatic, and immediately sought to arrange for an official order for 100 production aircraft. And that's when the third world war started.

When application for funding was applied for, there developed a feud between the War Office and the Ministry of Aircraft Production that became so bitter the war with the axis powers paled into insignificance! The civil servants in the Ministry were outraged that Miles had not followed the deigned procedure with applications and approvals that were required. Miles had designed, built, and test flown a new aircraft typed completely without their knowledge or endorsement. The results were that the army officers that instigated the quest were summarily dispatched in disgrace, many to serve in North Africa, and the Ministry of Aircraft Production, in an act of absolute treachery, officially and firmly advised the enthusiastic AOP units in the army that their oh-so-well suited aircraft would not enter production because they hadn't followed the correct procedure for its development. Surely such men should have been awarded German Iron Crosses all around. In a fit of pique, the ministerial pettiness deprived service men from having access to something that would aid the war effort and potentially cost serviceman their lives.



Miles M.38 Messenger 2A

However, rising outrage within the services saw some limited commonsense prevail and the Messenger did enter limited production, but as VIP communications aircraft. From the first run, Field Marshall Montgomery, and another to Marshall of the RAF, Lord Tedder.

As an interesting postscript to this in-house clash, twelve years later, in 1954, the instigator of the group initiating the initial concept of the aircraft, was belatedly awarded £1000.00, in recognition of their foresight in using light aeroplanes for AOP operations, that same role now, that is filled by the helicopter.

An alternative use of the M.38 Messenger, George Miles suggested that it could provide convoy aerial support as an anti-submarine aircraft. With the heavy shipping losses in the spring of 1943 and, with the M.38's ability to operate from a very short runway, a number of ships in each convoy could be fitted with a temporary deck of the required length on their stern. This could allow the M.38s to deliver depth charges over a substantial patrol area. His idea was considered, and the concept an arrester hook being fitted was deemed eminently feasible.

Perhaps because of lingering hostilities with the Ministry of Aircraft production, no approvals for ship testing could be arranged with the Admiralty. Mr. J. A. Billmeir, the chairman of the Stanhope Shipping lines, was so enthusiastic about the potential to save the lives of his employees, that he offered to build a stern fitted runway on one of his ships at no cost to the war effort, and do the required testing, but his practical offer was bluntly refused.

Eventually, after great pressure, trials were reluctantly arranged, but with conditions attached by the Ministry. The trials were to take place on an aircraft carrier that was tracking at 90 degrees across the wind, no arrestor gear may be used, the weather conditions must be in low visibility in pouring rain, and the aircraft was to be flown by someone that had not flown the type before.

Regrettably for the ministry, in light of its serious attempt to skew the results against the aircraft, the trial went perfectly, and the aircraft was successfully landed on the carrier, complete with pitching and rolling deck, in the strong crosswind, and well within the tiny runway confines as were marked.

However, still no permission was forthcoming. Instead, it was stated by the Ministry, that helicopters, which were still under development, could better provide this same service. It's sobering to realize that that helicopters never did, and political interference prevented a defense mechanism with considerable potential to lives in the merchant Marine and allied navy, was never given the chance. Because of this pettiness, lives were potentially lost.

In spite of the resistance by the Ministry of Aircraft Production the messenger, late in the war an order was placed for 250 units to be produced. However, by the cessation of hostilities, a mere 21 had been delivered and the order was cancelled so the remaining examples were released for sale onto the civil market, some to civil operators abroad.

After the war, Miles continued to build M.38 2A messengers for the civil market. Civil certification restricted the engines to the 6.31 Litre, 150 hp, inverted, in lined, four-cylinder Blackburn Cirrus Major engine, and a coarse pitch propeller which gave a cruise speed of 100 knots.

A number of these civilian messengers came to the southern hemisphere – deliveries were made to both Australia and New Zealand, and the type did sterling service in the blossoming civil aviation arenas in both countries.

In all, at least nine M.38 messengers were delivered to Australia. Most were flown out without modification except for the fitting of long-range tanks for the journey. All arrived without mishap in spite of all having only steam driven instrument panels and no GPS, OZ Runways, or glass cockpits; just a basic panel with a magnetic compass and VHF radio. All navigation was calculated on a simple prayer wheel similar to what is used to day. Back in those days, pilots didn't seem to need the assistance they demand today, After delivery, some aircraft went to charter service businesses but many also served private owners.

VH-BBK, in Australia

Then, in 1962, disaster….. On 21 September of that year, the then Minister for Civil Aviation announced restrictions on certain aircraft types that used wood in their load-carrying components. This was because potential catastrophic failure had occurred in one such aircraft that displayed serious deterioration of the glued joints which used synthetic resin glues. W.E.F. 1962, these aircraft types had their Certificates of Airworthiness restricted to Private Category operations only, the pilot must be the owner and no passengers were to be carried. Their said Certificates of Airworthiness would be permanently withdrawn on 31 December 1963. The decision had been taken following the investigation into the structural failure in flight of Proctor 5 VH-AIE and the evidence that this aircraft had been well-maintained

This example was built after the war, in 1947, and was used in the UK as an air taxi. After a number of years in Australia it was sold and shipped to NZ in 2003. It has been painted to represent the last of three Messengers operated by Field Marshal Montgomery, RH368.

and hangared most of its life. A total of 28 aircraft on the current Australian Civil Register were affected, including such types as DH.94 and DHA Moth Minor, Miles Messenger, Mercury, Gemini, Aries, Mraz Sokol M1C, and Percival Proctor V.

The 1963 DCA Annual Report refers to the airworthiness investigation of stressed ply shell wooden aeroplanes of late wartime and early postwar manufacture. One of the several incidents which confirmed the necessity of these restrictions occurred on 14 November 1962: Miles Messenger VH-AVD was being flown on a routine flight on a sheep station near Cunnamulla Queensland when the aileron controls jammed in a left-hand medium turn. The pilot tried thumping the control stick with his hand and finally moved it far enough to straighten the aircraft and permit it to be flown back to a safe landing at the owner's airstrip, except that the Messenger veered sharply to the left off the strip. On opening an inspection hole, the pilot saw that a timber block carrying the aileron control arm had broken from its normal position, apparently due glue failure. In the owner's words *"I decided that the best thing to do with my aircraft was to make it so unserviceable that I would not be tempted to fly it again".*

The owner invited the DCA aircraft surveyor to cut the wings open to the point of destruction to allow unhindered inspection. The initial diagnosis was confirmed and there was alarming evidence of adhesion breakdown in the spars and skin-to-rib bonding. This aircraft had been hangared and maintained throughout its life and all recommended inspections to detect deterioration had been performed.

For an extended period, no Messengers were on the civil register, and none flew. However, several have now been restored using modern adhesives that meet the requirements of Casa and are now airworthy.

I am advised that a total of nine M.38 Messengers have featured on the New Zealand civil register over time. They, too, have had their problems with safety issues from the glue used in their construction. I understand that one sole example is airworthy at the time of writing and another, a more recent import from the UK, is almost ready to take to the air again. Now, with its magnificent rebuild completed, and the aircraft listed on the civil register as ZK-AKE, it has undergone brake checks and taxi trials so its first flight in New Zealand is imminent.

Miles M.38 Messenger IIA, with its lower engine cowl removed, about to commence brake trials. Image courtesy of Michael Bach.

The AKE Panel. On the far left is the compass. Image courtesy of Michael Bach.

In the left seat – Michael Bach, in the right, Bruce Lynch, the owner of ZK-AKE and its restorer.

- Brisbane Valley Flyer -

Specifications

Crew:	**1**	Height:	**2.9m**
Passengers:	**3**	Aspect Ratio:	**6.8:1**
Length:	**7.32m**	MTOW:	**1,089kg**
Wingspan:	**11.02m**	Powerplant:	**1 X Cirrus Major 155 hp engine**

Performance

Max. Airspeed	**117kts**	Endurance:	**5 hrs, 12 min**
Cruise:	**108kts**	Service Ceiling:	**16,000ft**
Stall speed	**22kts**	Rate of Climb:	**750fpm**
Operating Range:	**400nm**	Take-off to 15m:	**750ft**

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Piper's Fastest – the M700 Fury

By Rick Durden. Published in Flying Magazine September 02, 2024

A bit different to cruising around at 100 knots…….

Piper gave its late single-engine aircraft a name that reflected its goal of speed and performance—Fury. [Image - Leonardo Correa Luna]

It's about speed - because that's what it's ALWAYS about, one's rate of change of position, That's what **SPEED is!**

For Piper singles, it started with the Malibu since Piper had long wanted to build a pressurized piston single that would outrun Cessna's pressurized 210. Delivered at the end of 1983, the PA-46-310P Malibu, with its cabin-class appointments did just that. Naturally, Cessna's nose was out of joint, so it developed the R model of the P210, which was introduced in 1985 and was one whole knot faster than the Malibu. Forty were sold before production ceased for good.

Of course, Piper couldn't let an out-of-production Cessna be faster than its top-of-the-line single. By 1989 it was delivering the PA-46-350P Malibu Mirage, which whistled along at a maximum cruise speed of 213 knots.

However, about that time there was a new sort of single-engine entrant into the speed competition—turboprop power. By 1990, the TBM 700 was reaching customers. Then, Piper watched as Malibu and Mirage owners paid big money for the JetProp turboprop conversion for their birds, producing speeds in the 260-knot range.

It was not to be tolerated, and it wasn't.

Piper made significant tweaks to the PA-46 wings and tail to handle a big power upgrade as it dropped a 500 hp turboprop up front. The new PA-46-500TP Meridian began deliveries just before the close of the century in November 2000. With a max cruise of 260 knots at a lower fuel burn than the JetProp, the Meridian was an immediate success.

Not willing to leave well enough alone and recognizing the payload limitations of the Meridian, Piper developed a new wing that could carry more fuel for the tried-and-true PA-46 fuselage, upped the horsepower to 600 and introduced the M600 while announcing that the PA-46 line would henceforth be referred to as the M-Class. The Malibu Mirage became the M350 (for its 350hp engine), and the Meridian the M500. With deliveries starting in 2016, the M600 had 50 percent more range than the M500 and could carry 100 more pounds in the cabin. Yet, it was about speed—it was 14 knots faster at 274ktas. It immediately outsold the M500 handily.

Not surprisingly, customers figuratively pounded the table crying, “We want more!” Not being the slightest bit foolish, Piper responded “your wish is our command” and dropped even more puff—700 hp—into the airframe and certified the M700 (PA-46-701TP) earlier this year. This time Piper gave it a name that reflected its goal of speed and performance—Fury. Gone are the laid-back Malibu, Mirage, and Meridian names: It’s time for something fire-breathing.

The name Fury harkens back to a Royal Air Force biplane fighter of the 1930s. However, with an ability to cruise at 301 ktas, Piper’s Fury is more than 100 knots faster than the RAF’s 640 hp combat machine from Hawker. As the M700 breaks the 300-knot barrier for personal single-engine aircraft, the name Fury seems most appropriate. Good grief, at $4.2 million nicely equipped, it’s within 5 knots of being as fast as the Cirrus Vision jet.

THE BASICS

The fuselage is almost pure Malibu/M350—the aircraft are assembled on the same production line with some changes for the needs of the M700’s speed. Max differential pressurization is 5.5 psi, giving an 8,244-foot cabin pressure at FL 280. The Pratt & Whitney PT6A-52 powerplant is flat-rated at 700 hp—which it can maintain up through FL 240. It’s also used on the King Air 260, where it puts out 850 hp so it’s not breathing hard on the M700. Max operating altitude is 30,000 feet. At FL 250 max cruise is 301ktas on a standard day, where it burns 55 US-gph (208lit). Usable fuel is 260 gallons (1,742 pounds or 984lit).

Piper advertises range at max cruise with 45-minute reserve as 1,149nm. Slowing just 9 knots pushes the range up more than 200 nm to 1,424. Pulling the power back to what one considers max cruise for many piston singles, 206ktas, bumps the range to a bladder-aching 1,852 nm. Yes, I know, people are buying the M700 for speed because it’s always about speed. I suspect that M700s are going to spend a significant portion of their flying lives at or near 301 knots.

Max rate of climb at sea level—2,048 fpm—is 30 percent greater than the M600. The Fury can claw its way to FL 250 in 13.9 minutes. Welcome to power and a five-bladed prop that can convert it to thrust. It’s no surprise that with the introduction of the M700, Piper is phasing out the M600.

The M700 I flew had an empty weight of 3,855 pounds (1736kg)—and it appeared to have every available option. That’s 125 pounds (56kg) more than Piper advertises and 79 pounds (35.6kg) more than the average for the first aircraft off the assembly line. With a maximum ramp weight of 6,050 pounds, the aircraft I flew had a useful load of 2,195 pounds (988.5kg). Max take-off weight is 6,000 pounds (2721.5kg)—thereby making it a BasicMed aircraft so long as the PIC stays below the flight levels. With full fuel, 453 pounds can be carried in the cabin.

Max landing weight is 5,800 pounds (2630.8kg), so 200 pounds (91kg) of fuel must be burned off after a gross weight launch. Max zero fuel weight is 5,050 pounds (2274kg) (any weight above 5,050 pounds must be in fuel). That allows for a maximum of 1,195 pounds (538kg) to be carried in the cabin of the aircraft I flew. Filling the seats means watching individual weights, although it can come close to carrying six 200-pounders (96kg)and no baggage. The aircraft is designed to be owner-flown, and it just isn’t that common for owner/pilots to fill the seats in their aircraft. For families with three or four kids, the aircraft might be perfect if care is taken in how much stuff everyone carries.

With a max cabin load, 1,000 pounds (149 US gallons (564lit)) of fuel can be loaded. That's nearly three hours of flying at low cruise settings. Not bad at all.

When I ran some sample weight and balance problems, I observed that with full fuel and a partial passenger load, the center of gravity tended to stay near the middle of the envelope. However, with a full boat of passengers (I used 190 pounds (85.5kg) each) and partial fuel, the aircraft was loaded 1.37 inches aft of the aft limit—and that's with no baggage. The takeaway: If you're going to fill the cabin, load the heavier folks forward.

The sharp end looks pretty swish……

Fortunately, with the G3000 avionics suite, running the departure and landing weight and balance is easy. Unless a pilot has the blind staggers and total disregard for self-preservation, it should be easy to keep the aircraft inside its loading envelope.

I'll note here that I like the warranty offered through Piper's Ultimate Care Program. It covers all scheduled maintenance either to 1,500 hours or the aircraft's fifth annual inspection as well as labour and parts for any mandatory service bulletins.

Avionics

Beyond the speed of the Fury, the major selling point is the stunning avionics suite that comes standard. It includes a Garmin 3000 system that I observed to be seamlessly integrated into the aircraft, a GFC 700 Digital autopilot, autothrottle, GWX 75 weather radar, GDL60 datalink, integrated digital cabin pressurization, and HALO safety system, which was the stuff of science fiction only a few years ago.

It also includes Garmin's emergency Autoland, a fully autonomous landing system that can be activated manually by anyone in the aircraft or automatically if the system senses pilot incapacitation. Reduced to its essentials, once triggered, Autoland selects an appropriate airport for landing, notifies ATC of the emergency, keeps the occupants advised as to what's going on, and lands the aircraft—activating deicing equipment as needed, extending the flaps and gear when the time comes. It slows the aircraft to a stop on the runway, shuts down the engine, and instructs the occupants on safe exit from the aircraft.

Garmin won the prestigious Collier Trophy for Autoland in 2020. The Collier isn't given away for simply showing up at a fly-in and not wrecking the aircraft on landing. It is awarded "for the greatest achievement in aeronautics or astronautics in America, with respect to improving the performance, efficiency, and safety of air or space vehicles, the value of which has been thoroughly demonstrated by actual use during the preceding year." Other Collier winners have included the NASA/JPL's Ingenuity Mars Helicopter Team and NASA/Northrop Grumman's James Webb Telescope Industry Team.

As this is going to press, Autoland has not been used in anger, however, as with lifesaving whole aircraft parachutes, I think that it's only a matter of time. In talking with Piper sales personnel, I was assured that the Garmin Autoland system has sold a number of M700s.

Above 14,100 feet with the autopilot engaged, HALO monitors pilot interaction for signs of hypoxia. If it detects hypoxia, it will fly the M700 to a lower altitude while it continues to monitor pilot activity. If activity is not detected, it will automatically activate Autoland.

Automatic Level Mode—a push-button— returns the aircraft to a wings-level attitude with zero vertical speed. In addition, Electronic Stability & Protection (ESP) is monitoring when the aircraft is being hand flown. Should selected pitch, bank, and speed (high or low) parameters be exceeded, the system gently applies control forces to return the aircraft to flight within the parameters. Given that in-flight loss of control is up there on the fatal accident causation list, I think this system may be a lifesaver, especially when things start going south in weather while a pilot is hand flying and having difficulty programming the automation.

The autothrottle is an integral part of the above systems, helping prevent overspeed or stall. I found that it was also handy on take-off. Bring the power lever up to 800 pounds of torque, and the autothrottle takes over and sets max torque (1,840 foot-pounds) so the pilot doesn't have to fiddle with setting power while the Fury is scorching down the runway toward its 75-knot rotation speed—it gets there quickly.

WALKING AROUND IT

Approaching the M700 Fury from head on, its clean lines and five-bladed prop serve notice that this flying machine was built to cook. The radome is on the leading edge of the wing, not in a draggy pod hanging from it. Even the exhaust stacks give the impression of speed as they're subtly more swept and tapered than I'm used to seeing. I was advised that they help make the aircraft quieter than the M600 and the engine slightly more efficient.

The large cuff on the inboard leading edge of the wing helps the Fury meet the 61-knot maximum stall speed for single-engine aircraft and it, along with some fairings, are easily removable for maintenance. The cuff also allows for fuel lines from the wings to the engine to be routed outside of the fuselage pressure vessel, a big plus for crashworthiness. The two big nonicing NACA ducts under the nose deliver air to the engine without a need for ice vanes, inertial separator, or inlet deicing. The large flaps have three positions—up, takeoff/approach, and down.

Walking around the Fury with Joel Glunt, Piper's head of flight test, I was impressed by the overall fit and finish. The paint job was first rate, and I was interested to see the colors change subtly when viewed from different angles.

Other than the shape of the exhaust stacks, the only noticeable exterior difference between the M600 and M700 is a Gurney flap—a low-drag, high-lift device from the auto racing world—on the left side of the rudder trim tab. As Glunt pointed out, adding more power to an aircraft can be destabilizing. To achieve the desired roll and yaw stability on the M700, the Gurney flap was added, and rudder travel was increased.

FLYING IT

Firing up the Fury is pure PT6—turn the engine, wait a moment, introduce fuel, and monitor temperature and pressure as it lights off and comes up to speed. The G3000 boots up quickly. It will display whatever you need in the moment—checklist, synoptic pages showing systems status, taxiway routing, even synthetic vision on the ground while taxiing.

Once moving, the nosewheel steering is positive and predictable. There is enough thrust at idle due to prop pitch and the faired exhausts that it's usually necessary to taxi in Beta with occasional forays into reverse. There is a nose gear squat switch that locks out Beta and reverse in flight.

Acceleration on take-off is just plain exhilarating. Directional control was positive throughout the take-off roll and climb-out with much less right rudder required than I expected. Published take-off performance on a standard day at sea level is a ground roll of 1,261 feet and over an obstacle in 1,994 feet. While Glunt and I weren't in a position to measure our take-off distance, loaded about 300 pounds (below gross weight, it looked like we didn't roll much more than 1,000 feet.

Rotation required only light back pressure, but once the M700 broke ground, significant nose-down trim adjustment was required immediately, increasing workload as the gear and flaps were retracted. I suspect that moving the gear aft with the new wing (for the M600 and M700) meant that setting take-off trim was a trade-off between control force required on rotation at 75 knots (as opposed to 85 knots for the M600) and the trim required for climb at VY—122 knots.

In the initial climb, I saw a rate of 2,300 fpm, which was consistent with our weight and a published rate of 2,048 fpm at gross weight on a standard day at sea level. Handling was positive and lighter in pitch than I anticipated for an aircraft of this size with a downspring in the pitch control system. Max yoke deflection in roll is only 45 degrees, something that I suspected would make it easy to overcontrol as little control displacement is needed to deflect the ailerons. That was initially the case, but within a few minutes I adjusted to the pressure required to get the response desired. The aircraft can be tossed around nicely.

Leveling at 17,500 feet and holding max torque, I observed a true airspeed of 291 knots burning 385 pph. The book called for 284 ktas while burning 390 pph.

Descending below 10,000 feet to do air work revealed that the M700 is rock solid in slow flight and just plain fun to fly in steep turns—the long nose helps with pitch control. The stall is a nonevent, with lots of warning and a straight-ahead, gentle pitch down.

Programming the Garmin automation for a descent and intercept for an ILS approach was as it usually is—easy. The autothrottle nailed programmed speeds and descent rates.

Disconnecting the autopilot and hand flying the ILS revealed that the Fury stayed on its trimmed speeds nicely. The hydraulically actuated gear can come down at 170 kias, with approach flaps at 147 kias and full flaps at a surprisingly low speed, 112 kias. There is a noticeable pitch change with flap extension and retraction. Gear extension causes what I considered to be a surprising amount of yaw as the nose gear comes down.

Holding 85 kias on final, bringing the power lever to idle, and making a good pull on the yoke gets the nose up smoothly for a 70-knot touchdown. Putting the nosewheel on the runway allows using reverse, and that big prop stops the aircraft rapidly without directional excursions.

In Conclusion

I liked what I experienced in the M700 Fury—more performance in an aircraft that is fun to fly matched with the most sophisticated avionics suite and safety automation available is quite a combination. Yes, it's about speed, and it looks like Piper has come up with another fast-moving winner. So, if you're ready to pull the trigger on a new Piper turboprop, this one's a bullet.

Spec Sheet for Piper M700 Fury

Price:	**$4,519,272 (IFR)**	Nominal Useful Load:	**1,023kg**
Engine:	**Pratt & Whitney PT6A-52**	Max Useable Fuel:	**984lit**
Propeller:	**Hartzell 5-blade**	Service Ceiling:	**FL 30**
Horsepower:	**700hp**	Rate of Climb-Vy:	**2,048fpm**
Length:	**9.017m**	Max Cruise Speed:	**301ktas**
Height:	**3.505m**	Max Range Hi-speed:	**1526nm**
Wingspan:	**13.146m**	Range at Eco Cruise:	**1852nm**
Wing Area:	**19.417m^2**	Fuel Burn (Max Cruise):'	**164kg/hr**
Wing loading MTOW:	**140.174kg/m2**	Vs (with flap, LDG):	**62kias**
MTOW:	**2,702kg**	TO (over 15m):	**609m**
Std Empty Weight:	**1700kg**	Land (over 15m):	**595m**
Max. Baggage:	**45kg**		

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Fly-In at YBCM Coominya

By Rob Knight

Mark Leaney has the devil's luck with the weather. Two years ago, when he held his inaugural fly-in at YBCM (Coominya), the weather Gods smiled and a great day ensued. This time, on Sunday 15, the of September, the Gods positively beamed.

The air was dead calm, the rising sun was yellow bright and there was not a single cloud to be seen.

By 0900, the line-up was populated with a flight line of classic Chipmunks and a brand-new Rans RV14. Also present was Philip Orr's FK14 Polaris LSA. Arriving a little later, around, 0920, was Steve Newing is his immaculate Great Lakes 2T A1 biplane, all the way from YGAS - Gatton Air Park. On display in his Coominya hangar, was Mark's newly acquired RV7, also immaculate and so shiny it hurt your eyes.

Present, but without his aircraft, was Dave Lillistone, his vintage J3 Cub undergoing its annual check-up at Boonah, but he proved his hidden -worth as the Chief BBQer and cook. Also present were Clyde Howard and Manfred Hitchins, who own a syndicated Drifter in Hangar 2 on the field were present, as was Vern Grayson, builder, owner, and keeper of the Zenith Zodiac 650 in Coominya's Hangar 3. Another resident, Dan Schloss, took his Eurofox for a fling in the delightful conditions that Mark had so successfully arranged.

Mark and his team provided and presented a great breakfast in his Bali-Hut beside the hangar where seats and table space were plentiful.

??? ????'s RV14, looking great in the clear morning air.

Steve Newing arriving on 30 in his Greta Lakes biplane.

Mark Leaney's MK 10 Chippie, at home.

Mike Hocking's Mark 22 Chippie

Willans Fredrick's Chippie, another MK 22 version.

Rod Blievers DHC-1 MK 22A.

David Charles DHC-1 T MK 10 "Chippie", from Gatton

Enjoying breakfast.

Philip Orr's FK14, Polaris, departing breakfast

The last of the breakfasts. The host, Mark Leaney, on the right, after working hard.

The Great Lakes Panel.

YBCM resident, Dan Schloss, departing on 21 in his Aeropro Eurofox.

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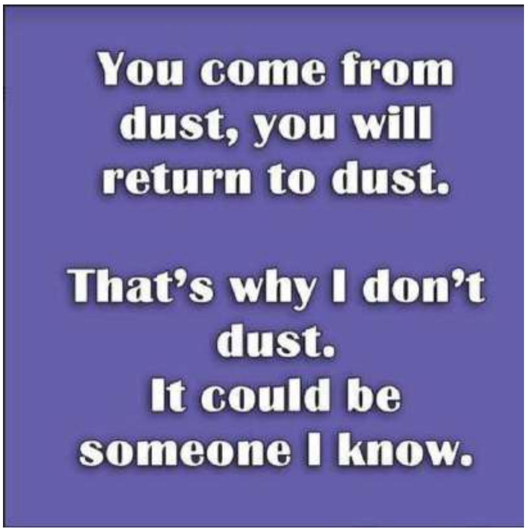
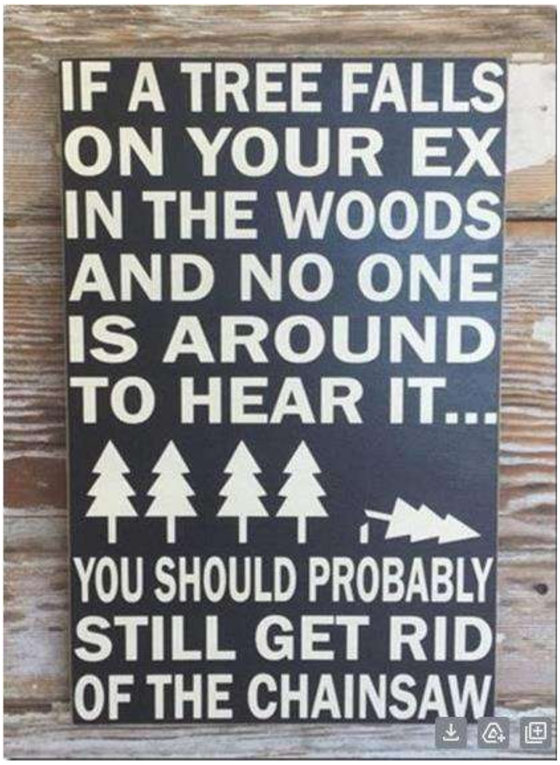
FLY-INS Looming

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 (Feedback from a Flying Instructor).

By Rob Knight

Helen was a PPL who simply shouldn't have been. She and her husband owned a large and very successful dairy farm at Parakai. Their house was very large, large enough for her and her husband to live completely separate lives, in completely different parts of the house under some sort of a nuclear truce. Her husband had no interest in flying, he was a local Golf Club enthusiast, while Helen, at some stage in her past, had acquired a PPL and was high up in their local dog fancier's King Charles Spaniels Club.

When Helen got lonely, she'd drive out to the Waitemata Aero Club for some company and to go for a flight in a Club aircraft and this is how our paths crossed.

One Saturday, Helen had booked ZK-DIX for a trip out to Great Barrier Island. She had not done a BFR and so could not fly herself but she only wanted to stay one night with her daughter, and there was just her and her three dogs to go in the aircraft. With plenty of young PPLs hanging around looking to put hours in their logbooks she quickly found someone who'd fly her over and who could stay overnight so they loaded the aircraft.

The Club's rules stated that all animals carried in Club aircraft had to be in cages. She had none, but she negotiated with the duty instructor (not me) to tie their leads to the baggage tiedown points in the rear luggage locker so they were secured. Then she and her accomplice departed for the blue waters of the Hauraki Gulf.

ZK-DIX was newly acquired by the Club. It had been the Piper agent's demo aircraft and so had extra soundproofing and beautiful upholstery – much better than the standard issue. It was a beautiful aircraft and a delightful machine to operate

The following day, mid-afternoon, Helen and her entourage arrived back. It was quickly noticed that they parked DIX well away from the club and drove her car out to load her bag and dogs. It was also noted that the dogs went into the boot, not the interior. Her pilot, carrying a signed blank check to pay for the flying time, came in to the Club as Helen drove away. He entered the meter readings and wrote up the cheque for the required amount and then he too, departed.

The aircraft was a disaster. When someone went out to taxi it back to be nearer the Club, the interior was badly fouled with dog vomit and faeces. Apparently, the dogs messed the interior on the way over, but Helen insisted they leave it and clean it on their return so it had had 24 hours to thicken, solidify, and dry into the carpets and the velour seat coverings. For the return trip, she'd placed newspaper over the mess but the dogs had played a repeat performance. Now we had to clean up two levels of mess, and the newsprint had strained the cream seat coverings and red carpets.

Commercial cleaners were employed but they could not remove the smell or the stains, so an insurance claim was made for new rear carpets and the two rear seats to be recovered. Helen was billed for the claim excess and for the cost of our loss of the Club's no-claim bonus from the insurance company. At that time, 1976, the total cost of the refurbishing of the cockpit came to around NZD$680.00, not an insignificant amount.

She paid, but was forbidden to carry her dogs in any club aircraft at any future time. Her husband objected strongly, he probably had to foot the bill. He claimed that such happenings were merely normal wear and tear and the Club should have carried all the costs.

The committee disagreed, as did the staff.

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WTF - The World's Worst Aircraft – The Rolls-Royce Flying Bedstead 1954

By Rob Knight

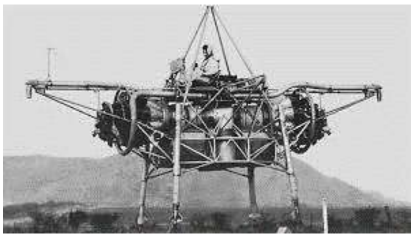
The TMR was once described as the most dangerous flying machine ever flight tested in Britain – there was no chance of pilot survival in the event of an engine failure

The Flying Bedstead, aka the Rolls-Royce Thrust-Measuring Rig (TMR), was a vital part of the data collection necessary for the design and early development of VTOL (vertical take-off-and-landing) aircraft.

The TMR was powered by two MK4 Nene jet engines, which were standard power plants for the Hawker Sea Hawk, the TMR engines only being modified to supply a 10% air bleed system that was used in compressed air jets to provide control about the TMTs three axes. The engines were mounted in opposition to each other, at the ends of a tubular construction. The jet efflux from the tail pipes was turned downward through 90 so thrust became lift to oppose weight.

95 gallons of Jet fuel, in two tanks, was located beneath the engines, and the whole rig was mounted on four hydraulic oleo legs. A pilot's seat was bolted to a platform on top of the structure, with a conventional control column and pedals operating control valves to diametrically opposed nozzles, each swivelling 30° in either direction for turning the rig left or right. The control valves were also interconnected to the control column so that movement of the column would restrict the flow of air to the nozzles, thereby reducing the thrust and so controlling which direction the rig would move in accord with pilot stick and rudder inputs.

The thrust-to-weight ratio of the rig was critical: any VTOL aircraft must have engine thrust that's greater than the total weight of the aircraft. Each engine provided a thrust of 3,850 pounds, which, added to the 325-pound thrust from each of the bleed nozzles, gave a total available thrust of 8,350 pounds. This compared with a total weight for the rig, complete with pilot and full fuel tanks, of 7,196 pounds. Handling improved as fuel was consumed; total operating time was about 15 minutes.


The TMR, airborne.

XA314, the first rig built, made an initial ground run on 3 July 1953, and first lifted off the ground on 6 July, piloted by Rolls Royce chief test pilot, wing-commander Harvey Hayworth. The rig lifted only to the full extent of the hydraulic oleo legs so that the wheels did not actually leave the ground. During these early days of testing, safety dictated that the rig should be tethered and a large gantry was built with cables attached to rig so movement was restricted to safe limits only. After 20 hours testing the rig was withdrawn on 19 November 1953 for extensive modifications and overhaul inspection of the engines.

After remedial work, a tethered flight was carried out to test the efficacy of the modifications. These were so successful that preparations were made for the first free flight. This took place on 3 August 1954, and was piloted by Capt. Ron Shepherd. The rig rose slowly into a steady hover, before moving forward and completing a circuit of the test area. It then demonstrated sideways and backwards movements, before successfully landing. During the next four months a number of free flights were made, all at a height of 13–15 feet but one flight was made up to 50 feet to ensure that there was no ground effect influencing the rig. The final flight took place on the 15 December 1954. The rig was then transferred from Derby to Farnborough. A second rig, the XA426, was built and first flown on 17 October 1955. It conducted extensive tethered flying for 12 months before its first free flight on 12 November 1956. Tragically, this rig crashed a following year, on 28 November 1957, killing the pilot. Testing of the TMR subsequently ceased at Rolls Royce.

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

1. What is the name given to a pecked line on an aviation chart that depicts the local magnetic variation?
   A. Isogonal.
   B. Isohyet.
   C. Isograph.
   D. Isotrace.

2. When should a pilot check for fuel contamination?
   A. Before every flight.
   B. After every refueling exercise.
   C. When the pilot believes there is any risk of fuel contamination.
   D. All the above are correct.

3. Which of the following aviation meteorological forecast types list's the cloud height as being above ground level?
   A. GAF.
   B. Grid Point wind & Temp
   C. TAF.
   D. METAR.

4. Two light aeroplanes are exactly 1.5 nautical miles apart, and are on a head-on collision course. If they are each doing 90 knots, how long before they collide.
   A. 30 seconds.
   B. 60 seconds.
   C. 90 seconds.
   D. 120 seconds.

5. Why do tail-wheeled aircraft tend to be more affected by crosswind conditions during ground handling?
   A. Because tail-wheeled aircraft have less-effective rudders.
   B. Because tail-wheeled aircraft have their rudders closer to the ground.
   C. Because the payload area in a tail-wheeled aircraft is ahead of the Centre of gravity.
   D. Because the main wheels are further from the tail fin in a tail-wheeled aircraft giving it a longer arm which empowers crosswind effects.

See answers and explanations overleaf

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 +64 400 89 3632), or email me at kni.rob@bigpond.com.

1. A is correct.
   An Isogonal (or an isogonic line) joins points of equal magnetic variation on a chart.
   Notes: An isohyet joins points of equal rainfall. An isograph is a drawing instrument and an isotrace is a device that conducts analyses using Isotope Ratio Mass Spectrometry (IRMS).

2. D is correct.
   It is recommended as a minimum, that the aircraft fuel and fuel system be checked prior to the first flight of the day, after each fuelling, and always after taking on board fuel that has potential to be contaminated with water.
   See: AC 91-25 v1.1 – Fuel and Oil Safety.

3. C is correct.

   A TAF displays cloud heights above the surface of the relevant aerodrome.

   GAFs, because they cover an area of varying height terrain, give cloud heights in feet AMSL. Grid point wind and temp forecasts don't provide cloud heights, and METARs are reports not forecasts.

4. A is correct.
   They are each travelling at 1.5 miles per minute, so will collide in 30 seconds.
   Better brush-up on your lookout. Eh!

5. D is correct.
   The main wheels, the primary point of contact with the ground, are further forward than those on a nose-wheeled aircraft which gives a greater arm and thus a greater moment which increases the weathercocking tendency of aircraft in crosswind conditions. For the same magnitude of W/V or gust, a tail- wheeled aircraft will suffer a greater nose yaw result.

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Aircraft Books, Parts, and Tools etc.

Contact Rob on mobile – 0400 89 3632

Tow Bars

Item	Condition	Price
Tailwheel tow bar.	Good condition	**$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

Aircraft for Sale

Kitset - Build it Yourself

Reduced Price
$1,480.00 neg

DESCRIPTION

All of the major components needed to build your own aircraft similar to a Thruster, Cricket or MW5.

- Basic plans are included, also
- Hard to obtain 4" x 3" box section, 2 @ 4.5 metres long.
- Wing spar & lift strut material - 6 tubes of 28 dia. x 2 wall.
- 20 fibreglass ribs plus the moulds,
- 16 spar webs plus the moulds,
- 2 fibreglass flat sheets for the leading edges - 4 metres long x 1.1 metres wide.
- A ballistic parachute,
- A 4-point harness,
- Set fibreglass wheel pants, and
- More.

Box sections and tubes

A very comprehensive kit of materials

Support parts – Harness etc.

Colin Thorpe. Tel: LL **(07) 3200 1442**,

Or Mob: 0419 758 125

Ribs, tubes, spats, etc

Aircraft Grade Bolts for Sale

Aircraft AN Bolts - $500

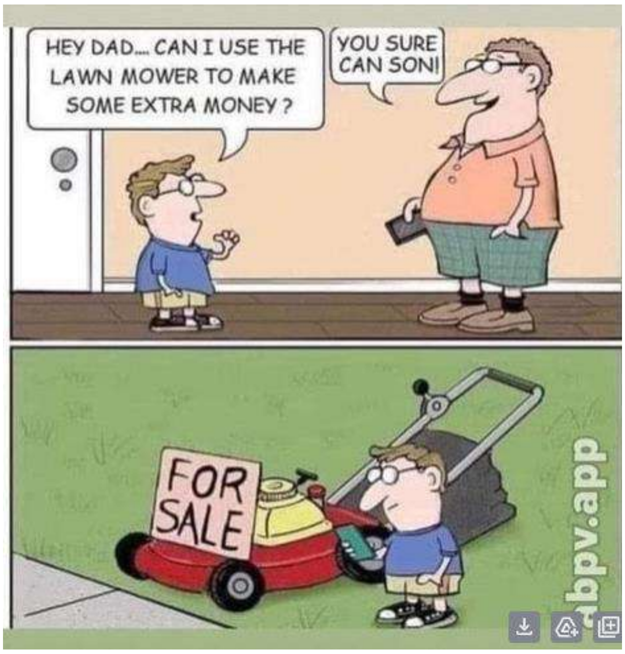
AN3, AN4 & AN5 bolts, all bagged - 500 bolts in total.

Today's cost – approximately **$5,500**

A list can be supplied if required

Contact Colin Thorpe –

0419 758 125



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**

Aircraft Engines for Sale

Continental O200 D1B aircraft engine

Currently inhibited but complete with all accessories including,

- Magneto's,
- Carburettor,
- Alternator,
- Starter motor,
- Baffles and Exhaust system, and
- Engine mounting bolts and rubbers.

$POA

Total time 944.8 hours. Continental log book and engine log are included.

Phone John on 0417 643 610

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