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Don't be a Casual Swinger

By Rob Knight

I have loved instructing, ever since the day I qualified under the sharp, droll, discerning eye of Bruce James, my favourite Flight Testing Officer. Over the intervening 45 years I have instructed on everything with a single engine, wings, and wheels, whether it had a nose-wheel or tail-wheel. Of the two, I preferred tail-wheels because, at least in part, the student didn't have to take my word for swing issues – all those mentions of nose swing caused by propeller thrust and torque actually happen in a tail wheeler, and the aeroplane honestly depicts what nose-wheeled aircraft only hint at. Over time, because of my delight in teaching tail-wheel (mostly as conversion training from nose-wheel), I began to regard my tail-wheel students as a bit of a cut above the rest. I reached the point where I felt that I could relax more when I was in an aircraft with a wheel at the back instead of the front. Herein I didn't have to deliberately provoke student distraction to check on their ability to recover from an unintended swerve on the landing roll. Tail-wheeled aircraft do this admirably, frequently, and without Instructor assistance, so the student learns to control the aeroplane instead of reacting to the instructor. Yes, all those causes of nose swing I covered in briefings would rise up and bite savagely with me as a mere concerned observer, but ever-poised, and ever-ready to take over if necessary.

But complacency is dangerous. I knew it and heartily subscribed to it, but still it caught me out and could have easily ended my career if not my life.

A bright summer's day can turn in an instant to something darker. One blue sky'd day when I was doing a third conversion flight for a young woman PPL holder such a change occurred to me. Her PPL training had been done elsewhere in a Cherokee 140 and she was a recently new Waitemata Aero Club member at Ardmore, in Auckland, New Zealand. She had hired our Cherokee 140 ZK-CEQ several times and this conversion to a PA-18 100 hp Cub was her first to another aircraft type.

"Daisy", I'll call her that so she can't sue me, had already raised my concerns when, on the day of her first flight in the Cub, I had briefed her on ground handling with tail-wheels, and she had gone to the flight line to pre-flight the aircraft (which was blue and white) and, instead, checked out the orange and white Cessna 172D beside it. She had a university background – holding a degree in medicine and worked as a Doctor in a local Hospital. I made my first mistake in being more impressed with her qualifications than her performance, and not watching her more carefully in her activities with aeroplanes.

PA-18, ZK-BKW

ZK-BKW was the instrument of my blue-sky day turning to rain. This time "Daisy" had pre-flighted the right aircraft and had strapped herself into the front seat as I got out to the flight line. I climbed into the back seat and hauled my straps inside and suggested that she started up to save time. The switches clicked and she pressed the button and pulled the solenoid handle under the control panel. The prop groaned over, way too slow to start.

I reminded her to make sure she had pulled the solenoid out to its stop before pressing the starter. After a brief indefinite mutter, the motor groaned again, this time the solenoid rattled.

"Mags off, master off, I'll have to swing it", I called, as I dumped my straps to the side and climbed out. I reached across her and, yes, she had turned everything off as I had asked. I set the mixture to full lean, and opened the throttle wide. The Brake Park knob was full out in its park position. As I walked around the end of the strut I gently pushed and pulled the attachment point and, yes, the brakes were parked. I pulled the prop through eight compressions to clear any over-prime fuel, and set the prop coming up to the next compression with the prop low on my right. I placed my left hand fingers behind the blade trailing edge near the tip and balanced my weight forward on my feet.

"Mixture full rich, Throttle set, Mags on left", I called slowly and distinctly.

"Throttle set, mags on left, mixture rich she read back in reverse.

I stepped forward and smoothly pulled the prop through its lower arc. However, just as I was releasing the blade, there was a loud crack as the engine back fired and smacked my hand with the sharp, cutting edge of the corner of the blade tip.

I was already walking away in the normal fashion as it happened so, even had the engine started, I was out of the danger zone but my left shoulder felt numb, partially paralysed, and detached, and as though all my finger tips had been chopped off.

Daisy, her medical training obviously rising to the occasion, slid the window and asked if I was OK. Unable to speak, I was holding my hand expecting to see a Niagara of blood and bone cascading onto the tarmac. But no red waterfall, just waves of excruciating pain. After walking around a couple or three circles, I arrived at the open door and peered around at the mag switch. In front of me, in clear view, was the mag switch set to "BOTH".

Momentarily forgetting pain for anger, still holding my damaged hand in the other, I glared at her. What is the mag switch set to?" I heard myself say, in a far more pleasant tone than I felt. This woman was a practicing doctor of medicine and a current PPL!

"On both", was her innocent reply.

"I said left mag, and you read left mag back to me", I said in a tight voice.

"I thought you were saying, left because the mag switch is on the left side of the cockpit"!

"You know that we start this Cub on the left mag", I whispered in anguish. "You did that on the last two flights. It has a left mag start, just like CEQ".

"But CEQ has a key for the mags, not a switch like this one", was her clipped reply. "How am I supposed to know"!

I gave up, too traumatised to remind her of other past briefings and flights. She was a natural incompetent so why bother to remind her of her two previous starts, and the time that I had spent with her, showing her how to work the mags, the carburettor heat control, and the trim, all of which were located on the left sidewall of the front cockpit below the sill-mounted throttle.

Pleading the need for first aid on my now bloodied fingers, I cancelled the flight and reported the incident, before attending the first aid box. Four fingers were badly cut and grazed by the trailing edge of the prop, but no stitches were needed and it was all healed in about a week.

"Daisy" never did complete her Cub rating with us, no instructors were available when she called. I later heard that she drove 250 miles south to a small country Aero Club and finished her Cub rating there. However, she drew more serious attention to herself a few months after getting her ticket to fly a Cub when she taxied another Cherokee 140 into a drain at full throttle. Apparently she confused the black "T" bar throttle with the red spiked wheel mixture control and pushed the throttle full forward during taxi. The damage to the engine and airframe was severe. Subsequent rumour had it that she refused to pay the owners' insurance excess, a condition of hire. I recall that it was to go to court but the final outcome is lost to me in the deepening mists of time.

If you are the pilot in command NEVER take someone's word for anything. You may pay a penalty for someone-else's ignorance, arrogance or abject stupidity. Just because this woman had a medical degree was no reason to trust her, especially when her past performance was so inadequate. I should never have trusted her. Also, propellers are like salt water crocodiles – never to be trusted. Even removed and leaning against a hangar wall a propeller is waiting to jump out and fall on you.

> Note: The importance for starting some aircraft engines on the left magneto lies in the use of an *impulse coupling. Fitted to just one magneto, t*he engine drives this coupling which, when the engine is stopped, winds up a powerful spring. When triggered, the spring spins the magneto far more quickly than normal engine cranking speed, producing a far hotter spark. Also, because the spring winds as the engine turns, the spark timing is retarded and the engine starts easier.
>
> Starting an engine so equipped on BOTH mags, sees the right magneto too far advanced and the piston it still rising towards top dead centre at the time of ignition spark. This often results in the engine back firing and severely injuring the swinger hanging onto the propeller.
>
> Now, at 70, I doubt I'll ever swing another prop but should I so do, it will be ME that checks the mag (magneto) switch position before I take a hold on that blade.
>
> An extremely good video on this topic is:
> **https://www.youtube.com/watch?v=qCqPtqvU9mg**

Turns Without Turmoil

By Rob Knight

A student pilot once told me that it is ailerons that make aeroplanes turn. It took an in-depth briefing to convince him otherwise.

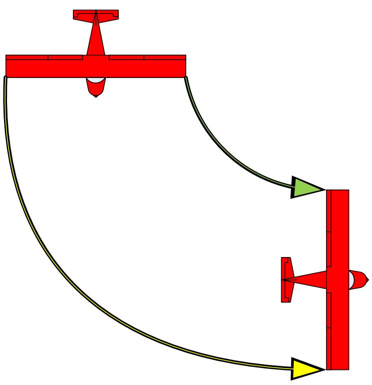
As discussed in the last issue, in reality it is the banked attitude that causes aeroplanes to turn and not the ailerons. Sure, ailerons create the bank necessary to turn, but they don't actually contribute anything to the change in heading desired by the pilot. In fact, as pointed out in my last treatise on turning, ailerons create aileron drag and aileron drag pulls an aeroplane's nose ***away*** from the direction of desired turn.

The mechanics of entry into a banked attitude for entry into a turn is simple and can be achieved with ease and precision. For entry into a level turn of less than about 45 degrees of bank:

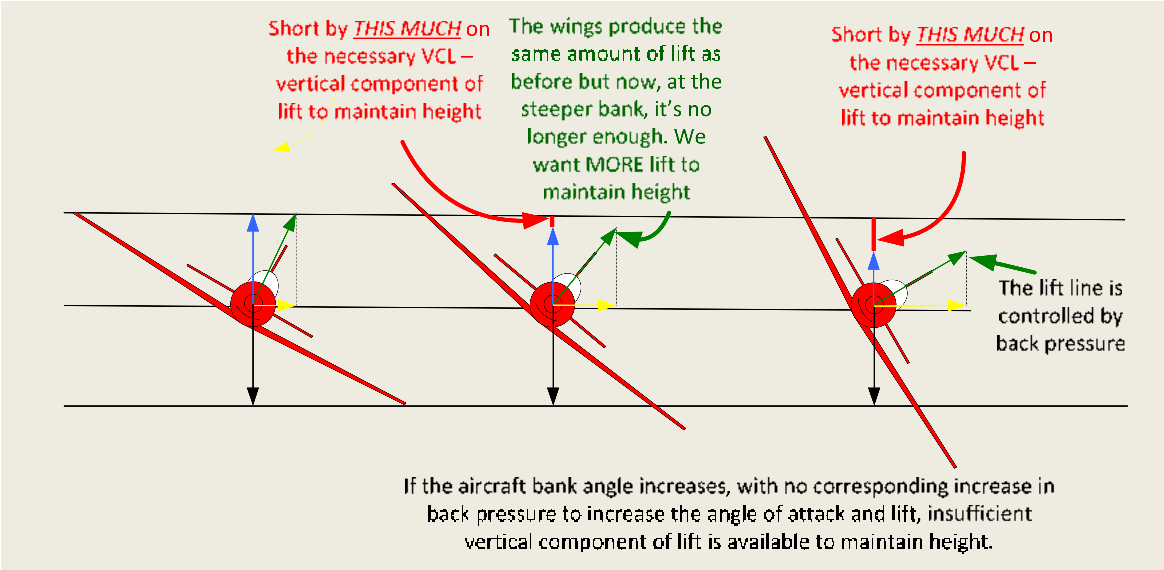
1. Lookout (particularly in the direction of turn).
2. Roll into the desired bank attitude with aileron WHILST BALANCING ADVERSE YAW WITH RUDDER.
3. STOP the roll at the desired bank angle by centralising aileron AND RUDDER.
4. ADD sufficient backpressure to maintain height (to increase the angle of attack to provide the extra lift required to both support the aeroplane, and to turn it)

With practice this really is not difficult and, if the roll is stopped and held accurately at the desired bank angle, maintaining the turn is a matter of sitting and watching it happen. However, whilst in the turn, other factors creep in to upset this oh-so-neat applecart.

Firstly, with no aileron or rudder applied, in a level turn most aeroplanes will tend to continue to roll (very slowly) into the turn so the bank angle will increase without pilot input. The reason is that the outer wing travels a greater arc than the inner wing, and, as the arcs are travelled in the same time, the outer wing must travel faster. Faster speed means more lift so, even with aileron's central, the bank angle will slowly increase because the outer wing has more lift. The greater the bank applied the more back pressure will be required to provide sufficient lift to both support and to turn the aeroplane. Also, the rate of turn will increase with the increasing bank angle if height is maintained. Otherwise a descent will ensue.



This overbanking tendency is easy to understand. We all learned at school that the larger the radius of a circle, the greater will be the circumference. In a turn, our wings follow circles with different radii as shown in the sketch. Even in this simple expression obviously the inner wing is travelling a lesser distance during the turn. However both wings are turning for an identical period of time so the outer wing travels faster, and being faster, produces more lift than the inner wing. As the higher speed wing is on the outside of the turn, the lift imbalance will tend to tip the aeroplane into a steeper and steeper bank angle which means that greater and greater lift is required to provide an adequate VCL to support the aeroplane. Now, unless the angle of attack is increased with stick back pressure, the aeroplane will enter a steepening spiral descent with rising airspeed. In the sketch below it is clear that even a small increase in bank angle will necessitate a substantial increase in the lift to develop sufficient vertical component to support the weight.



A discerning pilot who notices the beginnings of the overbank can stop the whole scenario with just a touch of out of turn aileron balanced with smidgen of adverse yaw countering rudder. However, if the pilot is waving the stick around as if signalling by semaphore, the likelihood of recognising this overbank is lost in the turmoil. To fly with precision a pilot must let the aeroplane tell what it needs and this cannot occur when excessive control is used.

The art of maintaining a constant angle of bank in a turn is one of the most significant skills that a pilot can have in their toolbox. Overbank is singularly the greatest cause of turn problems because it has such a profound effect on every other facet of the turn. When overbank occurs, the height (or airspeed if in a climb or descent) will not remain constant, the angle of attack (backpressure requirement) will change and, if the bank gets too steep, a power requirement change may be necessary.

However, once the art of maintaining and controlling an accurate angle of bank in a turn is attained, turns become much easier and a pilot can exercise control over all aspects of their turns using angle of bank control.

This is possible because, for any aircraft in flight, for any given angle of bank there is only one angle of attack to maintain height (or speed if climbing or descending). If the angle of bank can be accurately held, within limits, it can be used to control either height in a level turn or airspeed when climbing or descending. Look again at the sketch above. If, whilst continuing to hold the original constant back pressure, the pilot in the illustration were to roll back to the original bank angle, the descent would cease in an instant. At that reduced angle of bank there would be sufficient vertical component of lift to support the aeroplane, and the height would remain constant. Ergo – the turn would be as desired.

Let's look at level turns. If, in a turn, the aeroplane begins to climb a little, either the angle of bank is too low for the angle of attack being held with back pressure, or the back pressure (angle of attack) is too high for the angle of bank. For any given value of one, there is a corresponding single value of the other. With this in mind, an undesired climb in a level turn can be arrested by holding a constant angle of attack with a constant back pressure, and making a small increase in the bank angle. Obviously, were the aeroplane descending in the turn, an appropriate slight reduction in bank angle whilst holding constant back pressure could stop the descent, Simple, eh! But don't lose sight of the fact that, before this technique is achievable by a pilot, they must be able to hold the bank constant on their own account. Otherwise the whole exercise turns into a dog's breakfast and all accuracy is lost.

The steeper the required bank angle, the more important can be the ability to hold height using angle of bank control. In fact this is a recognised technique doing maximum rate turns where the aeroplane is at CL_{MAX}, right on the edge of the stall onset. If a buffet begins and indicates a stall is developing, taking off a little bank whilst holding constant back pressure solves the problem admirably and precisely. To hold the back pressure with greater accuracy, try using your fingers to hold the stick back pressure. Don't hold the stick in a ham-like fist and use arm and shoulder muscles to provide precise control of the stick. Fingers are made for precision and will give the ability to make much finer and more accurate stick movements. If a surgeon approached you with scalpel in his fist instead of his fingers, I am sure that you wouldn't trust him to make precision cuts.

The same technique of using bank angle changes to improve turn accuracy can also work when climbing or descending at a desired speed. If, in a climb, the airspeed reduces from that desired, if noticed early, before the speed decay is significant, reducing the bank may stop the fall without further action by the pilot. Conversely, if the airspeed is rising, increasing the bank angle whilst holding a constant back pressure may steady the rise and settle the airspeed on the desired value.

Another issue that stumps too many pilots is how to make a quick and accurate decision as to which rudder to press if the ball is not centred, whether turning or in straight flight. It works for all – just step on the ball. If it is out to the left of centre, press gently on the left pedal and see the ball slip right back into its correct place. Now consider why it moved in the first place - perhaps a little left rudder pressure was necessary to hold it there in the first place. Only by flying the aeroplane gently and feeling what the aeroplane is attempting to tell you, will the answer come. When it does it will be obvious.

Happy flying.

REPORT - Grumman American AA1 Trainer

The following report was compiled from the Aviation Consumer used airplane guide printed in 1989. The prices in this edition are out of date of course.

If you drive an old MG or Austin Healey, you might be the sort to fly an AA-1. The sprightly two-placer built originally by American Aviation and then Grumman American, and officially known by a variety of names but usually referred to as the Yankee richly deserves the cliched label of "sports car of the air."

In the tradition of the post-war British sports cars, it is small, simple, quick handling, noisy, idiosyncratic and tremendous fun for the stout of heart. But be careful. The AA-1 has a terrible accident record, particularly in the hands of pilots transitioning from other models. It's twitchy on the controls, sinks like a brick at low speeds and is dangerously lacking in climb performance under heavy, hot and/or high conditions.

On the plus side, an energetic owners' group, the American Yankee Assn., provides cut-rate insurance, plus advice on how to handle the AA-1's idiosyncrasies both in the air and the maintenance shop.

Genealogy

The AA-1 series was born in the mid-I960s as the BD-1, the first airplane designed by Jim Bede, the loquacious designer/promoter who later became notorious for his ill-fated BD-5. The BD-1 was Bede's notion of a cheap airplane for the common man, small enough to fit into a garage (with folding wings) and using interchangeable parts to keep costs down. Bede managed to raise money to build a prototype, but the company ran into financial turbulence and Bede was kicked out in 1965. The company was reorganized as American Aviation, and the BD-1 was greatly modified (no more folding wings) and eventually certified as the AA-1 in 1967.

It first appeared on the marketplace in 1969. Named the Yankee Clipper, the first AA-1 was a sporty, responsive little hot-rod with a rakish slide-back canopy and superb visibility. The Yankee won many admirers for its snappy flying characteristics, but it had a rather violent stall and a severe tendency to "get behind the power curve" - i.e., a rapid build-up of induced drag at low speeds.

Image Alteration

In an attempt to change the Yankee's image from that of a hot sports plane to a flight school aircraft, an additional model was introduced in 1971 the AA-1A Trainer, with the wing leading edge redesigned to improve stall and induced drag characteristics. The "hot-wing" Yankee was discontinued in 1972 after a production run of 459 aircraft. Soon thereafter, American Aviation was bought by Grumman and became Grumman American. In 1973 the AA-1A became the AA-1B, with gross weight upped from 1,500 pounds to 1,560. Two versions were available: a basic flight school training model with a climb prop, and a fancy “Sport” version called the TR-2 (talk about your sports cars of the air!) with a cruise prop for better top speed.

More Power

A big change came in 1977 with the AA-1C. The Lycoming 0-235 was revved up to increase horsepower from 108 to 115, and gross weight was boosted to 1,600 pounds. A new Sensenich prop increased thrust, and the size of the horizontal stabilizer was increased to improve the airplane's marginal pitch stability. The trainer version of the AA-1C was called the T-Cat, while the sporty version was called the Lynx. Production was halted after 1978 due to falling sales of only 88 that year, compared to the 200-plus annual sales figures chalked up during the early 1970s. (Meanwhile, the rest of the industry saw sales soar to record levels that year.) A total of 1,774 AA-1s was built.

Used Plane Market

An estimated 1,200 of the AA-1 series (for convenience' sake, we'll call them all Yankees) are flying today, and they are generally undervalued in the current strong used plane market. A careful shopper can get a real bargain. The used Yankee market is basically divided into three tiers: the stock AA-1, -A and -B models at the bottom; the stock -C models in the middle, and the modified airplanes with big engines at the top. Typical price for stock AA-1, -A and -B aircraft in decent shape is $7,000-$8,000 or so, according to David Fletcher, a Yankee enthusiast and Houston aircraft broker. A barely flyable dog can be had for as little as $5,000 (think of it, an airplane for the price of a Yugo!), while a clean, low-time aircraft will command up to $9,000. A -C model, with its more powerful engine and smoother pitch control, averages around $11,000 for a decent mid-time airplane, with the dog/cream-puff range at about $8,000-12,000, according to Fletcher.

Don Andrew, a partner in Air Mods NW, a Statelier mod shop specializing in the AA-1 and AA-5 series aircraft, reports higher prices in his area. The minimum for an AA-1 there is about $7,500, with a maximum of $11,000 or so for the -1 and -A models and $12,000 for a -B. Andrew sets the price range for the -C at $9,500 to $13,000, with $11,000 typical for a mid timer.

AA-1s tend to get souped-up with 15O-hp engines, long-range tanks, speed fairings, fancy panels and paint jobs and other expensive mods, and these aircraft can be worth a lot more. Fletcher knows of a 1969 Yankee Clipper with a 150-hp engine that recently sold for $18,000, and a hopped-up -C model can be worth even more.

Performance

In terms of cruise speed, the AA-1 is the class of its class. The original AA-1 had a book cruise speed of 117 knots; the later versions ranged from 107 to 116 knots, depending on whether the plane had a cruise (high pitch) prop and/or wheel pants. Its main competition, the Cessna 150, listed at 100 knots, and even more recent two-seaters like the Piper Tomahawk and Beech Skipper fall well short of the AA-1. Yankee owners tell us that the airplane delivers pretty close to book numbers; the typical AA-1 gets an honest 113-117 knots at 7,000 feet and 75 percent power, burning seven gph, according to Ken Blackman, a long-time Yankee guru and partner in Air Mods NW. That's a good 17 knots faster than the other two-seaters. (We recall a Grumman American sales demo flight a few years ago during which an AA-1B blew by a C-150 by a good margin in a side-by-side flyoff) At more modest power settings, you'll get 109 knots on six gph, according to Blackman, and that's the speed range reported by most owners. The AA-1's speed advantage should be no surprise; it's a tiny plane, with short wings and about 15 percent less wetted area than the competition. The bonded skin surfaces are rivet-free, which helps cut parasite drag.

Climb Problems

Climb performance is another story. The book says that climb performance is comparable to other two-seat trainers, but the book is wrong. At light weights, or in cold weather, the AA-1 climbs well enough, but load it to gross, throw in a hot day and a high field elevation, and you've got trouble--induced drag builds up rapidly at higher angles of attack, and climb performance decays at an astonishing rate -particularly in the original "hot wing" Yankee. Comments one owner, "With density altitudes over 5,000 feet, I do not recommend gross weight." Even the factory test pilots couldn't hide this unfortunate characteristic completely; the AA-1's service ceiling is only 11,000 feet, compared to 12,000 to 15,000 for the various 150 models. Book takeoff performance is adequate, but once again, the book lies when it comes to hot weather or high field elevations, says Mike Antoniou, one of the original factory test pilots, "The induced drag is so high that the "bucket" of the- power-required curve (the speed at which the airplane flies on the minimum amount of power) occurs at a high airspeed, around 80 mph. "The problem is that the owner's manual tells you to rotate on takeoff at 60-65 mph. That means you're leaving the ground well on the back side of the power-required curve. At heavy weights, you are depending on ground effect for acceleration, and there are certain wind conditions where ground effect is substantially reduced. I seriously doubt that a grossed out AA-1 can make it out of ground effect at 65 mph at moderate density altitudes."

The climb problem is exacerbated by the speed hungry factory's propensity to use high pitch cruise props, which boosted cruise speed a few knots, but degraded climb power. "That cruise prop is a joke," commented one former Grumman American dealer. "I don't know how they ever got it certified." The Sensenich prop on the AA-1C, on the other hand, improves climb performance noticeably.

Accident Payoff

The AA-1's poor climb performance is reflected in the accident statistics; there is a high incidence of crashes in which the airplane fails to clear an obstacle (More details on this in the Safety section.) The lesson is clear: The AA-1 is a ground lover that should be flown with great care with two people aboard. Ironically, one way to improve runway performance is to completely ignore the pilot's operating handbook (which calls for flaps-up takeoffs) and deploy one third to one-half flaps. Climb rate is about the same, but climb angle improves markedly. "I always teach people to use partial flaps for takeoff," says Blackman. Comments test pilot Antoniou, "Yes, our test data did show takeoff performance to be improved with flaps. My guess is the sales department didn't want people to think that the plane was so "hot" that it required special flap manipulation for takeoff. Remember, it was supposed to be a trainer."

Landing performance is excellent, however, due to the high sink rate available. Even though the AA-1 has small, marginally effective flaps and an approach speed 10-15 mph higher than a Cessna 150's, it can come close to matching the 150's landing performance. (Just be careful taking off again.)

Payload/Range

Gross weight of the AA-1 ranged from 1,500 to 1,600 pounds, with empty weights running around the 1,000-to-1,100 mark with normal VFR equipment. The typical 450-pound useful load of the AA-1 and AA-1A allows for two 170-pounders, 18 gallons of fuel (a bit less than full tanks) and nothing else. (The -B and -C models will haul about 50 pounds more.) Get a couple of fatsos on board, and you'll be over-gross real fast. "It makes a good single-place airplane," comments one owner who lives in Albuquerque, elevation 5,000 feet. The unfortunate irony is that, at the same time the limited useful load encourages pilots to overload it, the AA-1's takeoff and climb performance degrade drastically in an overload situation. This is one airplane in which weight limits should be strictly observed.

Primitive Fuel Gauge

Fuel capacity is just barely adequate. The tanks hold 24 gallons, of which 22 is usable, good for maybe two and a half hours with a slim reserve. Comments one owner, "The practical range is low, about 250 nm. Once I went 300 nm, but the adrenaline content was high, and I had only four gallons when I landed." The range problem is exacerbated by the AA-1's primitive fuel gauge system, which is highly inaccurate and demands extra fuel margins just in case. All in all, it's probably prudent to consider the AA-1 a single-place airplane at even modest density altitudes. By all means, never overload it. And don't try to fly it much more than two hours at a stretch unless you throttle well back.

Handling Qualities

Finally, it's time for some good news. Those suspecting us of Yankee-bashing will be pleased to read that the AA-1 series has marvellous fighter- like handling qualities --or sports-car handling, if you prefer the automotive cliché. Pitch and roll control are astonishingly quick, and will come as a revelation to Cessna-trained pilots. There's hardly a better airplane for zooming around clouds in mock dogfights, indulging one's fighter pilot fantasies. For all its aerial agility, however, the AA-1 is not approved for aerobatics. Loops, rolls and spins are forbidden. We imagine that plenty of Yankee pilots have done rolls and loops without hurting themselves (watch the induced drag at the top of the loop), but we can't emphasize enough that no one should ever spin an AA-1. It tends to go flat (especially the -A and -B models), and in the early days spins were the leading cause of AA-1 fatalities. Unfortunately, the other side of the quick-handling coin is marginal longitudinal stability, which makes airspeed hard to control The AA-1 is by no means an IFR airplane - don't even think of serious instrument flying in this one. At cruise speeds, simply leaning forward and back in the pilot's seat will trigger 500 fpm altitude excursions.

At slow speeds, the Yankee tends to wander away from its trimmed airspeed. In pilot's language, the Yankee is a twitchy little sonofagun.

Poor Stability

The poor stability presents problems on landing. In 1969, military test pilots at Edwards AFB evaluated the AA-1's handling qualities. The final report noted, "Oversensitivity of directional and longitudinal control system presented a problem on both takeoff and landing . . . too light in pitch." An aeronautical engineer/ student pilot who participated in the evaluation noted, "Longitudinal stability is so low that beginning pilots are unable to maintain or control airspeed... the low stability contributes to a tendency to over flare the airplane." On the ground, the AA-1 is highly manoeuvrable. With its free-castoring nosewheel, the AA-1 must be steered with brakes at low speed, and it can pirouette with astonishing agility. At the beginning of the takeoff roll, aim well to the right; by the time the nose swings around to the left, the rudder will be effective. otherwise, you'll have to ride the right brake during the early part of the takeoff, which degrades the already mediocre takeoff performance even further.

Cockpit/Cabin

The first thing everybody notices is the Yankee's sliding canopy. If you're young and agile and wearing pants no problem, but others may not like it. The canopy provides superb visibility and adds to the fighter plane ambiance. The cabin sound level is deafening, however, particularly in the early models. "The noise has to be heard to be believed," comments one owner, who uses noise attenuating headphones. "Without them, hearing loss is a virtual certainty," he says. The AA-1 is roomier than a Cessna 150 (but then what isn't?), and the clear canopy adds to the feeling of spaciousness. The seats are Spartan. The panel is fairly standard for modern aircraft, much better than the random arrangements of post-war two-seaters.

The AA1's front and only office

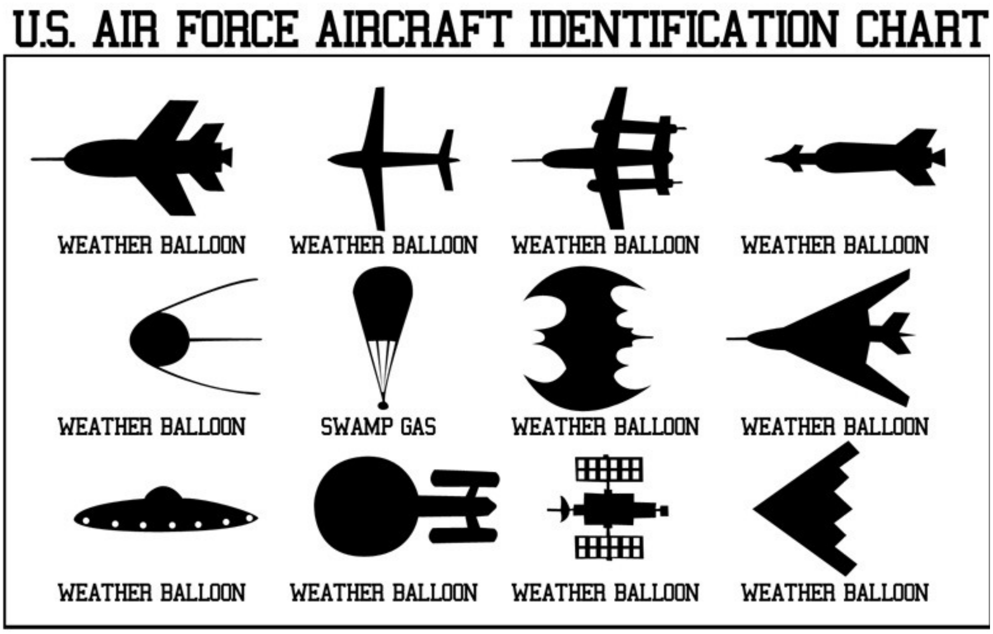
The AA-1's major ergonomic disaster is the fuel system, particularly the gauges. There is no "both" position on the fuel selector; one must select either the right or left tank. This can lead to inadvertently running one tank dry, and is much less safe than the simple on-off system in the 150 or the left-right-both system in larger Cessnas. The fuel gauges themselves are laughably primitive: a couple of clear plastic tubes beside the occupants' knees on the left and right sidewalls. The tubes are plumbed directly to the fuel tanks, and the pilot gauges the fuel level by watching the fuel in the plastic tube. Admirably simple in theory; the only problem is that it doesn't work worth a damn. "Pathetic" is how Antoniou described it.

Accident Record

Here's what Yankee buffs don't like to talk about: accidents. The AA-1 series has historically had a very bad safety record. Although the AA-1's accident rate has improved significantly over the years (as has all of general aviation's), the latest news is still bad: an exhaustive Aviation Consumer study of all AA-1 accidents from 1976 through 1984 reveals a total accident rate of 14.6 per 100,000 aircraft hours, and a fatal rate of 3.2. Although this is better than it used to be, it's worse than average for two-seat aircraft. The Cessna 150/152, for example, had a total accident rate of 10.0 and a fatal rate of 1.1 - barely a third of the AA-1's. Yankee accidents tended to be more serious as well; 22 percent of AA-1 crashes were fatal, compared to only 11 percent for the 150/152. AA-1 boosters insist that you can't blame the plane if some idiot flies it into a mountain in a thunderstorm. Surprisingly, however, only three out of 48 fatal AA-1 accidents we studied were weather related. By contrast, a random sample of Cessna 172 accidents showed that nearly two thirds of Skyhawk fatalities involved bad weather. Clearly, it's not those big black clouds that are getting AA-1 pilots into trouble. What is?

Some are converted to tail wheel configuration

Leading cause of AA-1 accidents was engine failure, due to both fuel mismanagement and mechanical failures. In 29 percent of AA-1 accidents and 25 percent of the fatalities engine wasn't running when the plane hit the ground. By contrast, the Cessna 172 showed only 11 percent engine failures.



FLY-INS Looming

09.09.2018	YGDI, Goondiwindi	FLY IN Gondiwinidi Breakfast
09.09.2018	YWSG, Watts Bridge	Watts for Breakfast. Fly-In, Vintage
09.09.2018	YRED, Redcliffe	Redcliffe Aero Club Open Day
15.09.2018	YCCA, Chinchilla	Chinchilla "One Long Table" Festival
16.09.2018	YCCA, Chinchilla	Chinchilla "all flyers" Breakie fly-in

Mystery Aircraft (This Issue)

What's this?

Mystery Aircraft (Last Issue)

The Cirrus VK-30 is a single-engine pusher-propeller homebuilt aircraft originally sold as a kit by Cirrus Design, and was the company's first model. As a kit aircraft, the VK-30 is a relatively obscure design with few completed aircraft flying. See Wikipedia.

Congratulations to Richard Faint for identifying this rare aircraft.

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

1. "Which option below reflects most correctly, the factor/s reducing the take-off run of an aeroplane"?
   - A. Rising QNH.
   - B. Rising Temperature.
   - C. Rising pressure altitude.
   - D. Rising density altitude.
   - E. C & D are correct

2. At 0827 hours AEST a pilot looks at his Grid Point Wind & Temperature forecast and sees the time options available for his desired region as being QLD-S: 00Z | 03Z | 06Z | 09Z | 12Z | 15Z | 18Z | 21ZUTC. Which UTC time bracket is correct for that AEST?
   - A. 03ZUTC.
   - B. O9ZUTC.
   - C. 15ZUTC.
   - D. 21ZUTC.

3. A pilot, downwind for runway 36, finds no pressure on his starboard hydraulic brake unit. The wind sock indicates 090/12 knots. No other airfield is available. Select the pilot's best option for landing considering an aeroplane's tendency to weathercock?
   - A. Continue for runway 36 and land with about 12 knots of crosswind from starboard
   - B. Continue for runway 36 and land diagonally to reduce the crosswind from starboard.
   - C. Re-circuit for runway 18 and land diagonally to reduce the crosswind from port
   - D. Re-circuit for runway 18 and land with about 12 knots of crosswind from port.

4. Excluding pilot technique, which of the following has the greatest influence on reducing landing distance in a short landing?
   - A. Minimum ground speed.
   - B. Minimum IAS.
   - C. Minimum TAS.
   - D. Increased aircraft weight to reduce float and improve traction and thus improve breaking.

5. Why does adding power whilst in a steady cruise cause the aeroplane's nose to pitch?
   - A. It increases the power of the thrust/drag couple
   - B. It increases the propeller asymmetric blade effect ("P" factor).
   - C. It increases the propeller torque effect.
   - D. It increases the propeller slipstream effect.

ANSWERS: 1. A, 2. D, 3. B, 4. A, 5. A

If you have problems with these questions, call me (in the evening) and let's discuss it! Rob.

BRISBANE VALLEY SPORT AVIATION CLUB Inc

MINUTES OF JULY 2018 GENERAL MEETING

LOCATION: Watts Bridge Airfield - BVSAC Clubroom

MEETING DATE: 7 July 2018

MEETING OPENED: 1310hrs

MEMBERS PRESENT: 7

VISITORS: 0

APOLOGIES:

- Liz Cook, and Richard & Glenda Faint

MINUTES:

- Minutes of the June were emailed out

BUSINESS ARISING: Nil

PRESIDENT'S REPORT:

The new fridge has been ordered and Peter will pick it up and deliver it. Sandy presented a cheque for $50 from the South Queensland Astronomical Society for the use of the shower. They will be there again on the 13th July. Sandy informed the meeting that he will be resigning from the position of President and from the club and Watts Bridge due to health issues. The floor all wished him well. Peter Ratcliffe will take on the position of Acting President until the elections that will be held shortly.

SECRETARY'S REPORT:

- Emails in 21
- Emails out 8
- 11 new members have joined the club as provisional members (The list of names were read out) Please make them feel welcome.
- There has been a new member join and he has also rented a section of the hanger.

TREASURER'S REPORT: ING Acc $11,064.75

NAB Acc $7629.51

- Ian spoke on the upcoming audit.

WATTS BRIDGE REPORT: Peter Freeman

- Watts is getting ready for air show, mowing grass and putting up fences.
- The windsocks have been serviced.
- The runways have been watered and are doing well after the airshow.
- Peter has been combing the airfield looking for ant nests and when found he is poisoning them. If you see any please let him know.

GENERAL BUSINESS:

- Mark Purdy spoke about the upcoming Watts for Breakfast.
- The club is in need of a ride on mower as Sandy has taken his one back.

Discussion was held and it was decided to get some prices on a new replacement. Peter will look into getting some prices for the next meeting. The meeting suggested a new one around the $3000.00 mark.

As most of the executive will be away in August the monthly meeting will be not held and the next meeting will be the September meeting.

MEXT MEETING: 1 st September at 10.00AM

MEETING CLOSED: 1415hrs

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

FOR SALE

Verner Aircraft Engine

Offered for sale is a Verner twin cylinder horizontally opposed aircraft engine.

General characteristics (from Wikipedia)

- **Type:** Twin-cylinder, horizontally opposed, four-stroke aircraft engine
- **Bore:** 97 mm (3.82 in)
- **Stroke:** 90 mm (3.54 in)
- **Displacement:** 1,329 cc (81.1 cu in)
- **Length:** 617 mm (24.29 in)
- **Width:** 736 mm (28.98 in)
- **Height:** 456 mm (17.95 in)
- **Dry weight:** 61 kg (134 lb)

Components

- **Fuel system:** Two Bing 64 carburettors pressurized by a Pierburg 7.20971.63 fuel pump
- **Fuel type:** 95 octane auto fuel or 100LL Avgas
- **Oil system:** oil class SH/SG 5
- **Cooling system:** air-cooled
- **Reduction gear:** 2:1 or 2.29:1 oil-filled gear box

Performance

- **Power output:** 63 kW (84 hp) at 5500 rpm for three minutes, 51 kW (68 hp) at 4200 rpm continuous
- **Compression ratio**: 9.8:1
- **Fuel consumption:** 11 litres (2.4 imp gal; 2.9 US gal) per hour at cruise settings
- **Power-to-weight ratio:** 1.03 kW/kg

This engine was originally fitted to an ultralight aircraft imported from the USA,

For inspection, price and/or other details, contact Neil Morgan via Rob Knight. Telephone 0400 89 3632.

Aircraft Re-offered for Reluctant Sale

After approaches by several tire-kickers and dreamers, I am refreshing the advertisement for my Colby.

My Colby-503, a single-seat, one-off aircraft, based on the highly successful American Pioneer Flightstar. Currently flying most weekends, it has around 200 hours airframe total time and around 30 hours on a rebuilt Rotax 503 power plant. These hours will increase as the aeroplane is in use. STOL, this aircraft cruises at anything between 45 and 60 knots, depending on the power setting and can comfortably exceed its VNE in a climb. It holds 40 litres in a belly tank and a further 10 behind the seat. A 95-10 aircraft, its rego is 10-1918, and this will be valid until July 30, 2019.

The sale will include a purpose-built trailer (uncovered and unregistered), a spare 503 engine (disassembled), and a ground handling tow bar. There are some other assorted spare parts such as a strut, control surface tubing, fuel pump, spark plugs etc.

Also included is a hand-held ICOM radio with headset and PTT on the stick. This unit works well in the aeroplane.

I am putting my aeroplane up for sale only on the advice of my health professional.

$5,800.00 for the lot.

Contact Rob Knight. Tel: 0400 89 3632

Hangarage at Forest Hill.

A hangar space is currently available at Forest Hill (YFRH) near Laidley in SEQ. The current fees are $110/month, payable in advance.

Contact Rob Knight on **0400 89 3632**