

BRISBANE VALLEY FLYER

SEPTEMBER - 2015



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



Short finals for 12.

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Yaw is No Yawning Matter

By Rob Knight

Have a look inside the way you use your rudder and ailerons

For nearly 45 years I have been teaching Effects of Controls, and for 15 years assessing other pilot's handling of aircraft. My observations over these periods leave me clearly recognising that too many pilots find flying in a straight line is a difficult manoeuvre. This is so broad across the pilot spectrum that it's a serious indictment on pilot training. While almost all would argue with this, the evidence is abundantly clear. So what's the problem?

Essentially it's one of human nature compounded by inadequate flight instruction. Humans naturally ignore yaw. In learning to walk we quickly found that leaning too far forward or backwards made us fall over and it hurt. We also learned that leaning excessively left or right caused a fall sideways and that hurt, too. However, we could stand and spin around and around and get dizzy: it was actually fun. Yaw was safe, but pitch and roll were punished with pain. This conditioning is life-long unless modified so, when pilots learn to fly, they MUST be taught to amend this conception. Too many pilots qualify whilst still lacking the necessary clear understanding of yaw and the true function of the aeroplane rudder because their instructors suffer the same conditioning shortcomings and are unable to see it themselves. Pilot's carrying this fundamental misconception naturally place an excessive priority on monitoring pitch and roll to the detriment of discerning and controlling yaw.

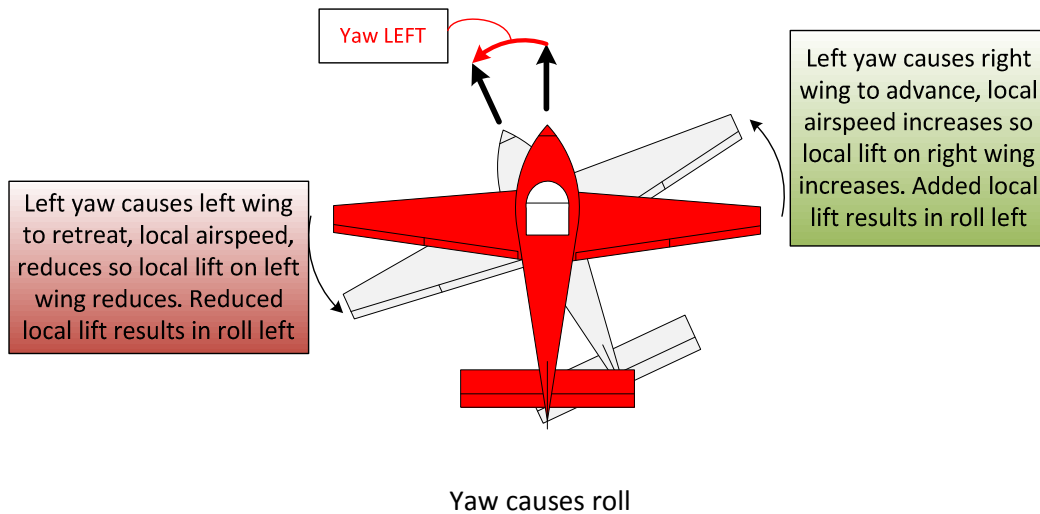
Over the years, asking flight test candidates what the rudder was for got me a virtually unanimous response, "To balance aileron drag". Further pressing may add, "Steering when taxiing". Both are correct but rudder function is much more than merely these.

Rudder controls yaw, either by causing it when input, or preventing it, or stopping it if it has already occurred. The *Effects of Controls* lesson provides details on further effects and these I will deal with in due course. Right now - understand that the rudder is the aeroplane's YAW control.

So what is YAW? YAW is movement about the aeroplane's vertical (or normal) axis or, from the pilot's perspective, lateral movement of the nose. Exactly as was taught in *Further Effects of Controls*, yawing the aeroplane will SUBSEQUENTLY promote roll. The reason is simple – if the aeroplane's nose, for example, is yawed left, whilst the yaw is occurring, the left wing will retreat compared to the right wing and the right wing will advance compared to the left wing. This creates an airspeed difference between the wings and, with a constant angle of attack, airspeed changes must result in lift changes. Therefore differing local airspeeds cause differing local lift values and, after these forces have been applied, the aeroplane will subsequently roll in the direction in which it yawed even though the ailerons are central.

So why the confusion with yaw? Because pilots don't perceive yaw since they are not looking for it - they still prioritise roll and pitch. If an aircraft yaws and then rolls, but the pilot doesn't see the yaw, they inevitably use aileron to resolve the roll symptom and not the yaw cause.

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So what other causes are there for yaw that the non-discerning pilot can miss? The list is longer, even for single engined aircraft, than most people realise. It's not just the rudder that instigates yaw so let's look just at the two most predominant causes.

First, and the one actually taught, aileron drag causing adverse yaw when entering or exiting turns. Ailerons deflect in opposing directions – when one is UP the other is DOWN and each produces a different drag signature when deflected. The up aileron enjoys relatively lower drag whilst the down aileron suffers relatively higher drag. Thus, and again, as taught in *Further Effects of Controls*, ailerons promote roll and then, fractionally later in time, subsequent yaw. It's important to recall that the drag differential between the wings will produce YAW AWAY from the direction of intended turn. Any time a pilot enters or exits a turn using aileron the aircraft will subsequently yaw (the wrong way) unless pilot corrected.

Second, and the one not regularly taught, the atmosphere. Turbulence and horizontal wind gusts both cause yaw. If turbulence lifts a wing the aeroplane slips away from the raised wing. The keel surface behind the centre of gravity causes weathercocking so the aeroplane will YAW and then roll. Even more insidious are horizontal wind gusts which are most prevalent on approach, especially as height diminishes. Horizontal wind gusts also cause weathercocking and result in --- YAW --- and then roll - and too many pilots don't recognise this. They tend to see only the resulting roll and correct that leaving the yaw uncorrected. Turbulence and gusts are perfectly natural occurrences and what the pilot does about them is the element that, in my experience, differentiates between pilots and airplane drivers.

The driver will use aileron to level the wings. That is what they're there for, isn't it? Well, yes and no: it depends on what else is happening at the same time. Remember that roll follows yaw. If the pilot only sees the roll and misses the yaw he is behind the aeroplane and using aileron alone will only aggravate the situation. The driver will then, after the aileron application, continue to try and get the nose back onto the reference point with his hand, tolerating the, hopefully, reducing swerves and wanderings of the nose. This can take from a few seconds or, on finals, take the entire leg and perhaps result in a go around because the aeroplane is too close to the runway edge for safety.

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Pilots giving yaw recognition and yaw control a higher priority than roll or pitch will recognize the yaw before the roll occurs. They apply sufficient rudder to arrest any lateral nose movement and restore it to the original reference point. As roll is subsequent to yaw, if the pilot is quick and precise, the nose can be put back in place BEFORE roll has occurred. A pilot must FIRST keep the aircraft straight relative to the reference point ahead and only then use aileron, with appropriate rudder to balance, to level the wings. Otherwise they have overlooked/missed/not seen, the yaw that needed to be arrested by the rudder a just a few milliseconds before..... ergo THEY ARE BEHIND THE AIRCRAFT! They are controlling the symptoms, not eliminating the cause.

While entering and exiting turns is a subject for another time, a view heard from other experienced pilots is that they prefer to lead with rudder when applying, adjusting, or controlling bank. I do not subscribe to this. Personally, except for turns of just a few degrees, I find this technique not to be universal, but more applicable to specific aeroplane types with particular aileron designs and longitudinal stability issues. This is especially so when using small aileron deflections necessary for gentle roll-ins. I use just sufficient rudder to counter any adverse yaw created. As I don't have adverse yaw before I use ailerons, there is no point in applying rudder before the aileron. It is really a case of recognizing the aeroplane characteristics of the machine that you are in.

However, when making an approach after setting the aeroplane up on finals on the extended centre-line, the situation requires a finer look. I have sat through an uncomfortably high number of qualified pilots making approaches that would do great justice to a ski slope slalom. The cause – they under used the rudder to stop yaw and keep straight, and over used the aileron trying to keep the wings level. If they kept the aeroplane straight with the rudder their wings would have stayed level without, or with only minor, aileron input.

On finals, keeping the highest priority on yaw will ease the pilot load because the aeroplane will be steadier and there will be no need to engage in combat with the controls. This will provide time to exercise better judgment so the approach will go easier and the flare and hold-off float will be easier to judge. This will make for better landings so confidence rises and so then will competence and expertise. All for the sake of applying a higher priority on yaw prevention and control.

Don't be an aircraft driver, be a pilot – it's much more comfortable.

**Remember – YAW causes ROLL so uncontrolled
YAW causes pilot uninitiated ROLL.**

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NOTICE OF PROPOSED RULE MAKING (NPRM) Part 0, Section 000 (a) 1(c)

Section I

No mechanic or mechanics, pilot or pilots, or person or persons acting on the direction or suggestion or supervision of a mechanic or mechanics, pilot or pilots may try, or attempt to try or make, or make attempt to try to comprehend or understand any or all, in whole or in part of the herein mentioned Aviation Regulations, except as authorized by the Administrator or an agent appointed by, or inspected by the Administrator.

Section II

If a mechanic, pilot, or group of associate mechanics or pilots becomes aware of, or realizes, or detects, or discovers, or finds that he or she, or they, are or have been beginning to understand the Aviation Regulations, they must immediately, within three (3) days, notify the Administrator in writing.

Section III

Upon receipt of the above-mentioned notice of impending comprehension, the Administrator shall immediately rewrite the Aviation Regulations in such a manner as to eliminate any further ease or likelihood of comprehension.

Section IV

The Administrator may, at his or her discretion, require the offending mechanic or mechanics, pilot or pilots to attend remedial instruction in reading Aviation Regulations until such time that said mechanic (s), pilot (s) is (are) too confused to be capable of understanding anything.

As advised by Peter Wilkinson

The letter of the Law

An indigent client who had been injured in an accident went looking for a lawyer to represent him without cost. One lawyer told him that he would take the case on contingency. When the client asked what 'contingency' was, the lawyer replied "If I don't win your lawsuit, I don't get anything. If I do win your lawsuit, you don't get anything".

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BirdsiPhotography

Want an air-to-air or ground shot of you and your dream machine? It's easy to arrange and will cost less than you might think. Grab the phone and contact Peter Davies or Rob Knight on 0400 89 3632, or email kni.rob@bigpond.com



FLY-INS Looming

Saturday September 12	Murgon	Angelfield Breakfast Fly-n
Saturday 12 September	Warwick	Wind Over Warwick Annual Fly In.
Sunday September 13	McIntyre Aero Club	Goondiwindi
Saturday September 19	Dunwich	Straddie breakfast Fly-In

Mystery Aircraft (September Issue)

What's this?



Mystery Aircraft (Last Issue)



Designed and built by Geoffrey Wickner, a cousin of Edgar Percival in 1932 the Wicko Sports Cabin aircraft was the first aircraft to be completely designed and built in Queensland. Initially powered by an 80 hp Anzani radial engine, the remains of this aircraft now hang in the Queensland Museum at Caloundra.



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The lower the level the higher the risk

Rob Knight

I have watched the available video clips of the tragic air disaster at Shorham in the UK where a vintage Hawker Hunter aircraft failed to recover from a loop and crashed onto a busy motorway. No cause has yet been attributed to the accident and I believe that it will be some considerable time before one is.

The actual cause of the accident is obvious – the aircraft took too much height to finish the loop. The question is WHY? Either the pilot didn't operate the controls correctly or the aeroplane's controls didn't function as they should have. The aircraft was serviceable and in excellent condition. It had only done 370 hours since it left Hawkers in 1955. It had only used 30% of its stress life so the machine should have been operating normally. However, that doesn't eliminate a catastrophic control failure although I doubt if this occurred; the aircraft appeared to be under control in the first part of the loop recovery, it was just pitching too slowly for the available height.

The other option is pilot incapacitation or pilot critical distraction and I have considerable sympathy with the pilot if this is the case. In 1983 I held a low-level aerobatic display endorsement issued by the NZ CAA. At the time I was the CFI of the Rukuhia Flying Club in Hamilton, NZ, and the Club held a contract to provide a low level aerobatic display each day for 5 days at the Mystery Creek Field Day Expo at a venue quite close to Hamilton Aerodrome. I was using a Cessna 150 Aerobat as the more powerful Bonanza I would have preferred to use was waiting for its propeller to be replaced. On the 3rd display, I entered a slow roll to the left when, as I got inverted, my seat unlocked and started to slide rearwards. I released the stick and the roll ceased; the nose started to pitch up with the aft moving C of G caused by my weight shifting aft. I grabbed the hole in the roof where the skylights are and I could just touch the very corner of the wheel with my finger tips to press forward and slowly roll/fall out. All at about 400 ft AGL. According to my commentator, the crowd was silent. I flew back to the aerodrome and looked the aircraft over. Not finding any obvious flaw in the locking system, which now worked perfectly, I took the aircraft across to Pacific Aerospace who did all our maintenance and passed it to the engineers.

It turned out that some Aerobats were fitted with a double pin lock on the slide track – one pin pushing up and one down. Both were held apart by a spring about the size of the spring in a ball-point pen. Except MY spring had broken. The entire mechanism was internal and hidden and couldn't be checked on a pre-flight unless the seat track locking system was disassembled.

That was my last ever low-level aerobatic sortie. I had two small children (6 and 8 years) and was not paid extra for such exercises so I refused to provide any further displays. I still did, and taught, aerobatics, but never at low level.

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Queensland Recreational Aircraft Assoc Incorporating
Warwick Aero Club

invites you to

Wings Over Warwick

Warbirds, Recreational & General Aviation
from 8.00am, Saturday

12th September 2015



**Food and drinks available from 8.00am to
2.00pm**

- Trial Introductory Flights in a Jabiru Aircraft
- Bike, car and model aircraft displays
- Additional Information: 0402705877 or 0427377603
- Email for information: graawarwick@gmail.com
- Details at: www.graa.info

FREE ADMISSION

WE LOOK FORWARD TO SEEING YOU THERE!

**Aerodrome is located at 89 Massie Bony Mountain Rd, Massie
(12km North of Warwick, turn off the back road to Allora)**

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

1. Which of the following options provides the most accurate description of a TAF.
 - A. A coded report on weather conditions within a radius of 5 NM of an aerodrome reference point.
 - B. A coded prediction of expected weather conditions within 5 nm of an aerodrome reference point.
 - C. A coded statement of current aerodrome weather conditions, upgraded every hour.
 - D. A weather report relating to a specific aerodrome between specific times
2. As a pilot flares and holds off their aeroplane for landing, what movement of the Centre of Pressure (CofP) occurs?
 - A. The CofP moves forward along the chord line.
 - B. The CofP moves aft along the chord line.
 - C. The CofP remains stationary.
 - D. The CofP moves either forward or aft depending on the flap setting.
3. Propeller slip is most accurately defined as which of the following?
 - A. Movement of the propeller about its hub, caused by loose attachment bolts or hub failure.
 - B. The aerodynamic 'slipperiness' of the propeller considering its surface friction.
 - C. The reduction in drag when RPM is increased in a steep descent.
 - D. The difference between geometric pitch and working pitch.
4. On an aeroplane fitted with a moveable trim tab, holding the stick still in flight, and winding the trim forward will make the nose:
 - A. Pitch up.
 - B. Pitch down.
 - C. Neither – it will have no effect.
 - D. Either, depending on the position of the Centre of Pressure.
5. From the following calculate the true compass heading.

Compass heading 089, Variation 11W, Deviation 2E

 - A. 080°.
 - B. 091°.
 - C. 083°.
 - D. 078°.

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

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

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BRISBANE VALLEY SPORT AVIATION CLUB Inc

MINUTES OF THE 01.08.2015 GENERAL MEETING

MEETING LOCATION:	Watts Bridge Memorial Airfield – BVSAC Clubrooms
MEETING DATE:	1 st August 2015
MEETING OPENED:	10:24AM
MEMBERS PRESENT:	15
APOLOGIES:	John Innes, Scott Meredith, Mary Clarke, David Ratcliffe, Peter Ratcliffe, Ian Ratcliffe, Wayne Petty, Liz Cook
VISITORS:	Nil
NEW MEMBERS:	Lasse Peterson, Kevin Walters, Damien Gates
MINUTES:	June 2015 meeting of the BVSAC Inc. (There was no July meeting due to the Poker Run) Proposed: Mike Smith Seconded: Bill Oates Acceptance motion carried.
PRESIDENT'S REPORT:	No report due to the president not attending the meeting. In his absence the meeting was chaired by Sandy Walker.
SECRETARY'S REPORT:	Richard Faint outlined the inward and outward mail for the month and mentioned the new club members.
TREASURER'S REPORT:	Priscilla Smith provided a financial statement summary and advised that the BVSAC ING account balance is \$548.12 and that the BVSAC NAB account balance is \$5,166.76. Priscilla tabled financial documents for those members requiring additional details.
WBMA REPORT:	Bruce Clarke reminded the meeting that the WBMA Gathering of Eagles requires volunteers to make the event possible and encouraged everyone to assist where possible. Bruce also announced (referring to the SEQ Water sale of the airfield land) that the airfield's future had been secured and that a General Meeting will be called in the near future to advise the WBMA Membership of the outcome that had been achieved.
BUSINESS ARISING:	Nil
GENERAL BUSINESS:	Richard Faint gave a summary report on the Fun Fly Poker Run which was held on the 4 th July. The Gathering of Eagles was discussed and it was agreed BVSAC would again be selling cold drinks. Mal McKenzie offered to frame aircraft photo's to decorate the clubrooms. That offer was accepted by the membership.
NEXT MEETING:	The next meeting date will be 5 th September 2015 in the BVSAC Clubrooms Watts Bridge at 10:00AM. A BBQ lunch will follow the meeting.
MEETING CLOSED:	There being no further business, the meeting was declared closed at 11:43AM. A BBQ lunch was held after the meeting.

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