BRISBANE VALLEY FLYER

JULY - 2017

www.wattsbridge.com.au
www.bvsac.org.au

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

Old Station, 2017 (Image by P. Stanton)
See page 5.

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Priscilla Smith (Treasurer)	07 3206 3548	Rob Knight (Editor)	0400 89 3632

Weight and Balance – Why do it?

By Rob Knight

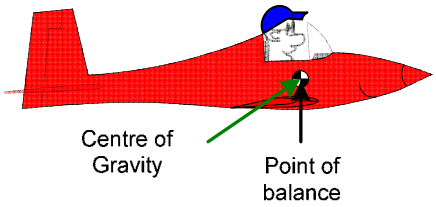
Weight and Balance is a subject discussed too often in hushed whispers, as if an out loud discussion might mobilise gremlins and smite one of the group out of the sky. Yet it is so simple that children play in perfect safety using its concept on see saws.

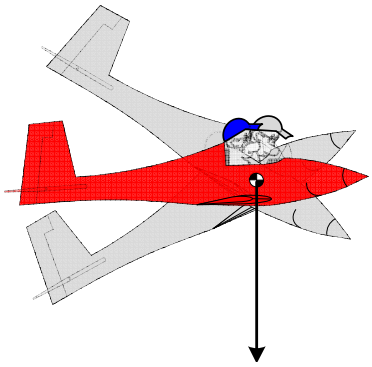
So what's the big problem with aeroplanes? An aircraft today, looking exactly as it did yesterday, rears up after take-off, rolls, pitches down, and dives into the ground. To the uninitiated, it could seem that the occupants must have got on the wrong side of the supernatural.

But black magic it certainly is not. Centre of Gravity issues are both very simple and potentially very deadly, yet, in almost all circumstances, very easily remedied. The problem is that for these dangerous issues, the remedial action must occur BEFORE the flight commences. After lift-off, it is already too late.

Centre of Gravity issues relate directly to the forces acting on an aircraft in flight. An incorrect Centre of Gravity position can create forces the controls cannot overcome so pilot control over the aircraft is irretrievably lost.

First – just what is the Centre of Gravity? It is the pivot point on which a see-saw balances. In an aircraft; it is the point on which the whole aircraft will balance, or, it is the point through which all the aircraft's weight may be considered to act. Its affect on the aircraft in flight is in that it determines the point about which the aircraft moves.



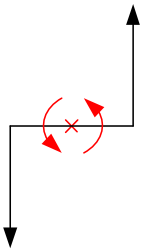


An aeroplane moving about its Centre of Gravity

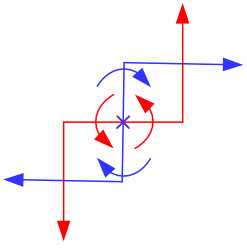
All aircraft movement takes place about the Centre of Gravity as is depicted on the left side illustration below. It remains stationary and the aircraft moves about it.

The location of the Centre of Gravity is fixed except for the minor changes (in most light aircraft) as payload may be dropped (cropdusting) or fuel is consumed. For this reason, designers try to keep the fuel and payload centres of an aircraft as close as possible to the Centre of Gravity.

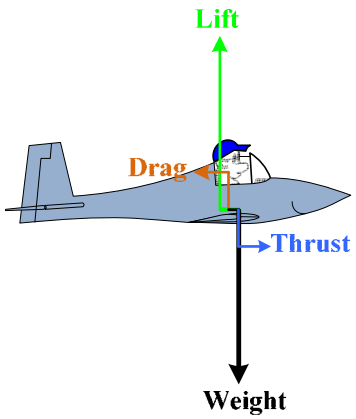
Now let's look at the forces acting on the aeroplane in flight. They comprise the lift which supports the weight, and thrust which counters the drag, but they are arranged in a very special manner – in couples. A couple is a situation where two equal forces act in opposite directions about a point. Below left is a depiction of a couple – two forces acting about a point and causing the arrangement to rotate. Opposing a couple relies on another couple, as shown on the right where the blue couple acts clockwise opposed by the red couple acting opposite. Because they equal each other and there is no residual imbalance, we say that they are in *equilibrium*.



A couple



Opposing couples



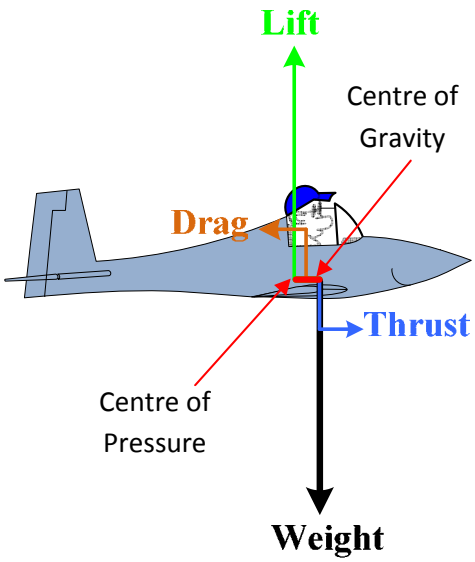
Similarly, the four forces acting on the aeroplane are paired and set up as two couples. Lift and weigh are coupled to act about the Centre of Gravity and pitch the nose down, while thrust and drag are paired as couple two to pitch the nose up. As previously stated, if they can be arranged so they oppose each other equally, the aeroplane will require no further force to maintain its attitude. This is a designer's dream because it minimises drag and so maximises speed which, in turn enhances the range and endurance of the aeroplane design.

For these couples to function correctly, the weight must always be forward of the lift which is represented by the Centre of Pressure , and the thrust line must be lower than the drag line as shown in the image on the left. This sketch presents a state of equilibrium.

What we are doing when we calculate the position of the Centre of Gravity, is identifying the point where the weight line is acting. It is presented as a distance from the datum, or as a percentage of the MAC (mean aerodynamic cord). Where MAC is used, details should be provided in the Flight Manual. In definition, MAC is simply the average chord length along the span of a wing.

Now let's consider the interaction of these four forces and their couples as the aeroplane is maneuvered in flight. If we lower flaps in flight in a high-winged aeroplane, the drag line will rise and increase the power of the thrust/drag couple. This is likely to cause a nose pitch up. In a low winged aeroplane the reverse may occur. A decrease in thrust in either a high-winged or low-winged aeroplane will decrease the power of the thrust/drag couple and cause the nose to pitch down – a highly desirable trait as an aid to maintaining airspeed if an engine failure occurs.

Of greater consequence is movement of the Centre of Pressure. As mentioned earlier, the centre of pressure is the point on the aerofoil chord through which all the lift forces act. It is the equivalent of the Centre of Gravity insofar as the aeroplane's lift is concerned. Also as mentioned earlier, the lift upwards and the weight downwards are arranged as a couple with the effective arm between being the linear distance between the Centre of Gravity and the Centre of Pressure. And herein lies the problem – as the angle of attack changes so does the location of the Centre of Pressure. With an increase in angle of attack, the Centre of Pressure moves forward along the chord. This is unstable and effectively reduces the arm and thus the strength of the lift/weight couple. This means there is less natural force to hold the nose down and the elevator must be used for attitude control.

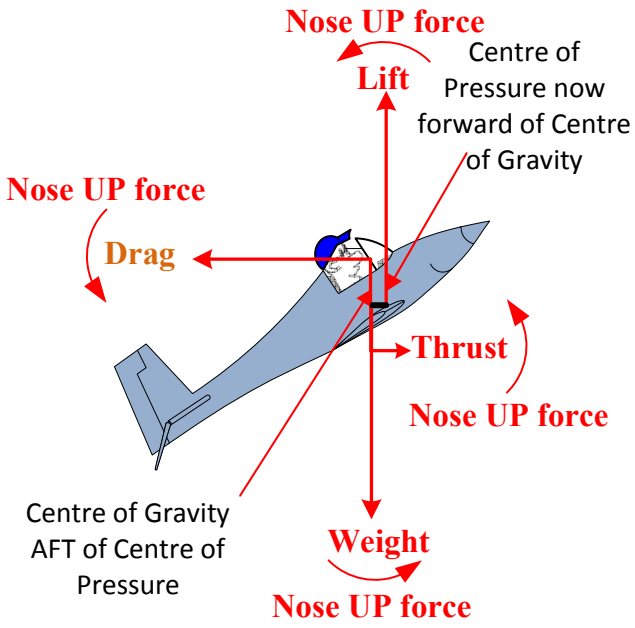


Before the stalling angle is reached, any increase in angle of attach will cause the Centre of Pressure to move forward along the chord, and ALWAYS closer to the Centre of Gravity. If the Centre of Gravity is already too far back, catastrophe is waiting with bated breath.

So what is the message here? It is as simple as it is dramatic and just in case you missed it, the point is that operating an aeroplane with a Centre of Gravity position aft of aft limit stated in the flight manual for that aircraft is extremely dangerous. Follow me through one more time – an aeroplane is improperly loaded and its Centre of Gravity is aft of its aft limit. This means that the arm between the Centre of Gravity and the Centre of Pressure is diminished which reduces the strength of the nose-down lift/weight couple. At some stage of flight, the thrust/drag couple may overpower it or the arm may reverse and control of the aeroplane will be inevitably and irretrievably lost.

So, also again, how does this catastrophe develop? If the Centre of Gravity is only slightly aft of the limit and the aeroplane's angles of attack during the flight remain low, maybe nothing at all. Perhaps, at most, the lucky pilot might be surprised at how easily the aircraft flares and settles onto the ground at the end of a short flight. However, on a longer flight, in an aeroplane whose Centre of Gravity moves aft with fuel burned, the outcome could be entirely different. In an accident report in New Zealand a Piper Seneca took-off from Auckland International on an IFR flight south. It was overloaded but, worse, it had an excessive baggage weight in the aft baggage locker. The flight was uneventful until the aircraft was slowed down to enter the holding pattern at 7000 feet a little north of Wanganui. The accident report indicated that, as the pilot slowed the aircraft and raised the nose to maintain height, the lift/weight arm had diminished almost to zero. The aircraft stalled and entered a spin from which there was inadequate elevator authority to effect a recovery. All on board were killed.

Perhaps a more typical stall/spin caused by an aft Centre of Gravity position is where and aircraft takes off and at about 50 feet above the runway suddenly rears up, rolls and dives into the ground. Here, the aft Centre of Gravity position casues a slower response and is aided by the increasing lift with increasing airspeed. As the pilot eases the controls back to establish the correct attitude for the climb, he increases the angle of attack and the Centre of Pressure moves forward diminishing the power of the lift/weight couple. The Centre of Pressure might actually move ahead of the Centre of Gravity in which case a complete reversal of the couple's force takes place and it changes from being a nose down to a nose up couple. Now two nose-up couples are in force and there is no hope of ever recovering control of the aeroplane.



The Centre of Gravity must ALWAYS be ahead of the Centre of pressure. The aft Centre of Gravity limit must NEVER be exceeded.

In conclusion, we should also note the effects of a Centre of Gravity forward of the forward limit. Here the pitch control is also lacking but, because this error makes the aeroplane effectively nose heavy, the issue is in raising the nose to the correct attitude after take-off and raising the nose with falling airspeed when landing. This may lead

to landing with excessive speed which can cause a runway over-run. Whilst this has obvious dangers of its own, it is not nearly as potentially lethal as an uncontrollable stall/spin after take-off which can ruin one's WHOLE day!

Prudent pilots NEVER operate their aeroplanes onside of any flight manual stated limitations or limits. Next month we will take a look at how to find the Centre of Gravity position on an aircraft.

Happy Flying

Old Station Fly-In 2017

By Peter Stanton.

Photos by Peter Davies

Greetings Rob, my fine feathered flyer friend,

Recently I was fortunate enough to attend this year's 'Old Station' fly-in. As you can see from the photos attached, it was a bumper crowd indeed. From the moment we headed off from Gympie on Friday we were part of a flock of aircraft that continued to fly in to Old Station, right until the airshow at 3pm on Saturday. Guessing, I would say that around 200 aircraft flew in and camped overnight, but there were many more that flew in as a day trip.

The facilities were exceptional. There were plenty of food vendors, two ATM machines, a mechanical bull, motel rooms to rent, live music, an officer's mess (i.e. a booze bar), hot showers, open fire places, and a very large camping area. All in all, no one could reasonably ask for more.

The aerial entertainment was nothing short of spectacular: one of the best, if not THE BEST, airshow that I've ever seen! The 2 HOUR performance included some of the very best pilots Australia has to offer (although I wasn't asked to participate - my invitation must have got lost in the mail). Such pilots included Paul Bennet in the Pitts S1 and Matt Hall in the Extra 300L. We also saw a performance by the 'Roulettes', who appeared to be tied together by an invisible piece of string! No matter how hard they tried, they all stuck to each other like bat pooh on your windscreen.

But wait - there's more! After their performance four of the six roulettes landed and parked their PC 9s just 10 metres in front of where I was camped and stayed the night. Now where have you ever seen that happen at an airshow in Australia, I ask you?

If nothing other than the above had been organised for the fly-in, I still would still have considered myself very fortunate indeed. But there was more, my attentive friend, much more. Not only did they repeat the airshow the next day, they threw in a tractor pull, and a fireworks display on the second night. As I said earlier. You really couldn't ask for much more.

So, I say a heart-felt thank-you to the organisers and their army of helpers who donated their time over the weekend just so pilots like myself could have the experience of a life-time.

I didn't see you there. Maybe I just missed you in the crowd or did you get lost on your way up or something?

Let's catch up again soon,

Cheerio,

Peter S.

Chopper over a small part of the ground display.

Ian Borgh's Vans RV4.

Helilift Australia arriving.

Paul Bennett's Grumman TBM-3 Avenger.

The Avenger waking up in the fog.

The RAAF Roulettes sleeping in.

B.V.S.A.C.

FUN FLY POKER RUN 2017

THE EVENT

The Brisbane Valley Sport Aviation Club's Fun Fly Poker Run will be held on Saturday 1st July 2017.

Starting time is 9:00am and finishing at 2:00pm.

It doesn't matter what you fly—Recreational, Homebuilt, General Aviation, Gyroplanes — we would love to have you join in the fun !!

THE GAME

Fly to any three of the participating airfields, Forest Hill, Kilcoy*, Gatton Airpark or Mc Carron's Field and collect an envelope which contains a playing card from underneath the primary windsock*.

DO NOT OPEN ANY ENVELOPES UNTIL REGISTERING AT THE BVSAC CLUBHOUSE — WATTS BRIDGE.

You can start anywhere you like and go to the airfields of your choice in any order that suits you. Then just fly on to Watts Bridge Memorial Airfield where you pay your entrance fee of $5.00 and register your hand.

BBQ, Drinks and Snacks will be available all day.

THE WINNER

The organizers will have drawn two cards at random prior to the start of the game. These cards will complete the five card hands for all players.

The best Poker Hand wins the Trophy for 2017.

THIS IS FUN FLYING AT ITS BEST, SO COME ON EVERYONE - GIVE IT A GO !!

CONTACT

Richard Faint
Phone: (07) 5427-0816
Mobile: 0412-317-754
Email: president@bvsac.org.au

AIRFIELD LOCATIONS

FOREST HILL	S 27° 36.3' E 152° 22.3'	KILCOY*	S 26° 58.2' E 152° 34.0'
GATTON AIRPARK	S 27° 35.4' E 152° 15.4'	MC CARRON'S FIELD	S 27° 05.9' E 152° 36.2'
WATTS BRIDGE	S 27° 05.9' E 152° 27.6'	* Kilcoy cards can be found at the base of the corner post in the aircraft parking area	

FLY-INS Looming

July 1st	Watts Bridge, YWSG	BVSAC Poker Run
July 2	Gympie	Gympie Aero Club Brekkie Fly-in
July 9th	Watts Bridge, YWSG	Watts for Breakfast brekkie

Mystery Aircraft (July Issue)

What's this?

Mystery Aircraft (Last Issue)

This mystery aircraft was a Boeing Model 200 Monomail. Designed as a civil, high-speed mail-plane it first flew in May 1930.

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

1. If the aircraft's heading is less than it's track, the aircraft must be experiencing
   A. Starboard drift.
   B. Port Drift.
   C. A falling QNH.
   D. A and C are correct

2. The inertia of a body is controlled by which of the following?
   A. The velocity of the body.
   B. The mass of the body.
   C. The momentum of the body.
   D. The formula MV^2*Mo.

3. Two aircraft of the same type but different weights are turning at the same altitude, IAS, and bank angle. The heavier aircraft will have:
   A. A lower rate and greater radius of turn than the lighter one.
   B. A greater rate of turn than the lighter one.
   C. The same rate and radius of turn as the lighter one.
   D. A greater radius of turn than the lighter one.

4. The mixture on an aircraft engine is correctly set for best power. An increase in altitude with no adjustment to either throttle or mixture controls will produce?
   A. A richer mixture and less power.
   B. A leaner mixture and less power.
   C. No change in mixture and less power.
   D. A richer mixture and more power.

5. The maximum fate of climb possible at a given aircraft weight is primarily governed by:?
   A. The minimum possible drag.
   B. The maximum possible lift.
   C. The maximum excess thrust.
   D. The maximum excess power.

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

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

HANGARAGE

Hangarage is available at Forest Hill airfield (YFRH). The airfield gate and hangar are both kept locked to all except key-holders.

Surveillance camera to be installed

Contact Rob Knight on 0400 89 3632

¼ Share for sale - $4500
A share in a WB Drifter 582 is being offered. The aircraft is based at Lynfield west of Brisbane.
¼ share price of $4500 (includes hangarage
Contact Kev Walters Tel 0488 488 104

Safety Helmet

The COMTRONICS ULTRA-PRO HP FLIGHT HELMET has a plush fully upholstered liner and beaded foam inner shell. High quality speaker muffs are attached to the chin strap so they can be pulled down tightly against the ears. Compatible with all Comtronics intercoms and radio interface cables (it requires an interface cable particular to your radio type). High quality adjustable boom microphone (from left hand speaker muff). Compatible with push-to-talk control column switches. Black peak visor with adjustable wind flow head cooling vent (not shown in photos). This helmet was imported from the States in 2010 (total cost then about $1000), and has been stored in a lamb's-wool lined carry bag. It is in good condition. Very comfortable to wear. Real protection if ever (hopefully never) required. Keeps head warm in open cockpits and visors are available from Comtronics (does not have one at the moment, though). Head size extra large (61-63cm).

$300.00 neg

Interested? – Call Arthur Marcel. Tel.: 3376 5331 L/L home, or 0407 590 513 Mobile.

Aircraft for Sale

Quicksilver GT500 Tandem 2 Seater 582 Pusher in Good Condition. Tri Gear. Enclosed Skin Removable Doors. Analogue Gauges, Icom-A200 VHF Radio. Manual Flaps, Full Elevator Trim. Climbs 1000 fpm at 55kts. 70ltrs carry 3+ hours endurance. Removable Auxiliary 50ltr Tank Customised to fit rear seat. Trimmed up at 5300rpm can cruise 70kts. To steal a quote - "Like a Drifter on Steroids" Engine - 582 Silver Top. TTIS - 382hrs (rebuilt at 292hrs). Also see advertisement on Recreational Flying website.

$16,000.00

Call Mike Cosgrove on 0414 517 856 or visit www.cypresslodge.com.au

Forest Hill Airfield, downwind for Runway 21

BRISBANE VALLEY SPORT AVIATION CLUB Inc

MINUTES OF THE JUNE 2017GENERAL MEETING

MEETING LOCATION: Watts Bridge Memorial Airfield – BVSAC Clubrooms

MEETING DATE: 3 June 2017

MEETING OPENED: 10:11hrs

MEMBERS PRESENT: 11

APOLOGIES: Scott Meredith, Mike Smith, Priscila Smith, Brian Fitch, Liz Cook,

John Innes.

VISITORS: Nil

NEW MEMBERS: Nil

MINUTES:

May meeting of the BVSAC Inc.

Proposed: Ken Hulse.Seconded: David Ratcliffe. Acceptance motion carried.

BUSINESS ARISING:

- Hangar doors are sagging – Kev Werner has been advised and will attend.
- Completion of canteen area – waiting for Mike Smith to arrange completion of wiring before other work can proceed.

PRESIDENT'S REPORT:

Red Thunder

- BVSAC invited to lunch with Red Thunder participants

Poker Run

- No meeting in July due to Poker Run. As usual this is partnered with Christmas in July at the Aerobatic Club.
- Bradfield strip is not available for the Poker Run this year. Replaced with Forrest Hill.

WBMA Special General Meeting

- Many BVSAC members attended the meeting. The major outcomes were
  - The potential change in governance process is continuing. No vote was taken on the proposed changes.
  - The WBMA joining and annual membership fees increased to $250

Weather Station

- Weather system up and running. Link is available from the WBMA website. Cameras yet to be installed.

SECRETARY'S REPORT:

Correspondence in –

Date	From	Subject
8/517	Watts Bridge BoM	• Amberley incursion report • Peter Biddle acting as WBMA Leaseholder Representative on Airfield Council
9/5/17	Peter Biddle	Forwarded email from Cheryl Brown re proposed to WBMA governance
9/5/17	Watts Bridge BoM	Change to Amberley airspace NOTAMS
12/5/17	Peter Biddle	Forwarded email from Mark Norman re proposed to WBMA governance
13/5/17	Peter Biddle	Information from BoM meeting re WBMA General meeting on 24 May
16/5/17	Watts Bridge BoM	April BoM minutes
16/517	Mike Cosgrove	Aircraft for sale advert
19/517	Watts Bridge BoM	Changes to Special Resolution for general meeting on 24 May
22/5/17	RA Aus	RA Aus News Issue 33
22/5/17	Watts Bridge BoM	May BoM minutes
25/5/17	RA-Aus	Notification of fatal accident
2/6/17	RA Aus	Board Nominations open

TREASURER'S REPORT:

The President read the Treasurers report for May 2017.

- BVSAC ING account - $567.20
- BVSAC NAB account - $9,109.82

Membership payments are due by the end of June 2017**.**

GENERAL BUSINESS:

Poker Run on 1 July– replaces normal meeting in July

- Catering will be sausage sizzle, soup, tea/coffee/cold drinks
- Sandy Walker will arrange the BBQ
- Peter Freeman will put out cards

Gathering of Eagles – 19/20 August

- Commercial catering will be arranged for during the day
- Each Home based Group will provide evening meals
- BVSAC will provide BBQ (similar to club meetings) and bar facility
- Extra BBQ facilities may be required. Peter Biddle to source.
- Ken Hulse to arrange the bar

Clubhouse hot water system

- Repairs/adjustments have been made. Appears to be working OK.

NEXT MEETING: There will be no meeting in July.The next meeting will be on 5August 2017 in the BVSAC Clubrooms at Watts Bridge at10:00AM. A BBQ lunch will follow the meeting.

MEETING CLOSED: There being no further business, the meeting was declared closed at 10:50hrs.

After the meeting James Crocket, President of the Watts Bridge BoM addressed the meeting covering his aviation experiences, the work of the BoM, and his participation in the Red Thunder event.

--ooOOoo--

Both optimists and pessimists contribute to our society. The optimist invents the aeroplane, the pessimist the parachute.

— George Bernard Shaw