The Electronic News letter of the Chichester and District Model Aero Club

Clear Dope

February 2023

March

Chichester and District Model Aero Club: Committee 2023
Chairman: Tony Chant: chairman@cadmac.co.uk
Hon Secretary & Treasurer: Tim Kerss: secretary@cadmac.co.uk
Thorney Rep Vice Chairman and Safety Officer: Derek Honeysett: thorneyrep@cadmac.co.uk
Deputy Thorney Rep: Jeremy Stuttard: thorneyrep-2@cadmac.co.uk
Portshole Farm Rep.and Safety Officer: Ken Smith: portholerep@cadmac.co.uk
Deputy Portshole Rep: George Gilchrist: portholerep2@cadmac.co.uk
Slope Rep and Safety officer Trundle Hill: Steve Newman: sloperep@cadmac.co.uk
Webmaster: David Hayward: webmaster@cadmac.co.uk
Junior & Welfare Rep: Alex Webb: juniorrep@cadmac.co.uk
BMFA Rep & CD editor: Ken Knox: editor@cadmac.co.uk
Membership Secretary, Jeff Cosford: members@cadmac.co.uk
Competitions' Secretary: Robin Colbourne: compsec@cadmac.co.uk
Social Rep: Ray Shivjee: socialrep@cadmac.co.uk

John Riall

My first memory of John is from around 1974; I had just joined CADMAC, and my father took me to Harting Hill to fly my newly completed Graupner Filou slope-soarer. Fortunately, John was there too, and introduced himself before offering to test-fly the model. This first meeting turned into a friendship that lasted for over forty years.

John began aeromodelling in the early fifties building and flying rubber powered, free-flight and control-line models in Oaklands Park in Chichester. This was in the days before CADMAC's formation in around 1957.

John was one of the founding members of the club although he did leave in 1960, but re-joined in the early seventies. By then model flying was taking place at Thorney Island, and radio control was becoming the norm.

John was a prolific builder and enjoyed all aspects of the sport, with a special interest in free-flight, control-line, IC and slope-soaring. To that end he could often be found up the Trundle on a summer's afternoon flying one of his gliders.

John accomplished so much within CADMAC and, indeed, the Southern Area of the BMFA. He was a long-standing CADMAC committee member, and his roles included Senior Training Officer, Chairman and thereafter he was elected Club President. John was also one of the first Southern Area Chief Examiners; a role that would see him assessing applicants from around the South who wanted to become club examiners. The training role within CADMAC often kept him so busy helping others during a flying session that he had no time to fly his own models!

John was an extremely active and proactive member of the club, and would take part in the majority of events and social activities including competitions, club trips, barbecues, giving talks on club nights, writing regular articles for Clear Dope and acting as the auctioneer at our club auction. So great was his passion for the hobby that he went all the way to America to watch Florida Jets, along with Morris and several other CADMAC members. Static and flying displays took John all around the Southern Area, and he was always keen to promote the club.

I am sure many of you have your own memories of John; for me it is flying with him at Thorney Island, and slope-soaring on the Trundle and at Harting. He was always happy to pass on his knowledge and to share his wealth of experience and, of course, to remind you of his love of pork pies!

Tony Chant and I visited John just before Christmas where we found him in good spirits and had a good talk about CADMAC. Sadly, he passed away on Saturday 7th January, and I know he will be missed by many of the long-standing members of the club.

John Riall was, in many respects, a CADMAC legend. His passing is a considerable loss, not just to our club, but to the sport of aeromodelling as a whole. He will be greatly missed.

Derek Honeysett

Vice Chairman CADMAC

Chichester Air Aces - Part 2

In the last edition I publicised the Chichester Air Aces Society, which holds monthly lectures about all manner of aviation-related topics, and I promised to provide an update on forthcoming lectures for the rest of the year.

These are as follows:

February	Monday 27	**"Formation Display Pilot"**
10th Anniversary Talk		*Andy Evans – Team Leader of Blades Aerobatic Display Team*
March	Monday 27	**RAF Reaper Force – Remote Air Warfare in 21st Century – Part2**
10th Anniversary Talk		*Prof Peter Lee*
April	Monday 24	**Flying for Films – pre CGI + Display Flying pre 2015**
		Johnathon Whaley
May	Monday 22	**The History of Gliding in Sussex + So What is Gliding About?**
		Dave Clews & Andy Wood
June	Monday 26	**Chaos & Comedy: A Summer on the Somme**
		Jill Bush
July	Monday 24	**Aviation Around Poole Bay – 1910 to 1976**
		Kevin Patience
August	Monday 21	**Royal International Air Tattoo : RIAT**
		Tim Prince
September	Monday 25	**The History of the C130 and how the RAF has used it +**
		The RAF – Past, Present, and Future – a general overview
		Flt Lt Benjamin Goodlad ARAes

The lectures take place at the Chichester Park Hotel (PO19 7QL), starting at 7.30pm (prompt). Cost is £5 for members and £8 for non-members. The cost of membership is £10 per year.

More information can be found on the Air Aces website: http://www.airaces.org.uk/index.htm

I can thoroughly recommend these lectures to anyone with an interest in full- size aircraft or aviation as a whole; the speakers are excellent.

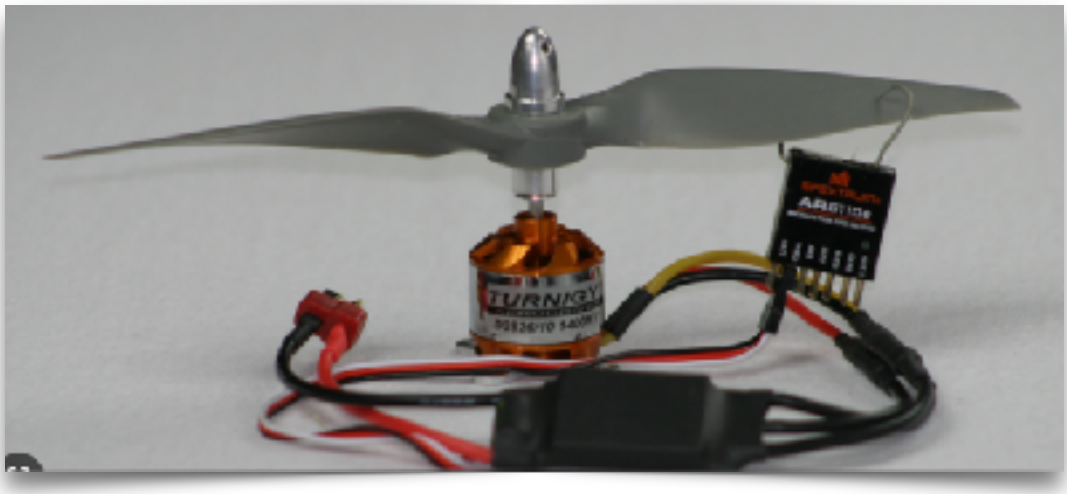
Tim.

Props are very difficult to understand!

I enjoyed Tim's "rambling tome" in last month's edition of Clear Dope, and given that the content centred around a subject close to my heart, propeller speeds and aerodynamics, I felt there was more to add to the subject. By his own admission Tim wrote the article primarily to provide an entertaining read and some food for thought, however the world of propellers is fascinating in its own right.

The article highlighted the fact that propellers and rotors spin at very high speeds and they have caused numerous fatalities over the years.

As we all know, propellers come in all shapes and sizes:



One point in Tim's article that is worth considering is whether you can simply multiply the Kv rating of an electric motor by the battery voltage to work out the propeller RPM. Tim acknowledges that this is a very simplistic view, and he's right! In the example given he cited his T28 which could have a theoretical maximum RPM of 11,100.

Of course, the kV rating is an unloaded parameter, and I don't think you will see 11,100 rpm unless you were in a dive that windmills the prop a little to overcome the parasitic FW&I losses of the motor in unloaded conditions.

By way of definition, and from my electrical engineering course of 70 years ago (!) -

F = friction - bearings, plus in the case of brushed motors, brushes.

W = windage - being the aerodynamic drag loss of the motor revolving parts.

I = iron losses - being eddy-current losses from currents induced in the iron components within the magnetic field of the motor, plus hysteresis losses in these iron parts due to the cyclic reversal of magnetic polarity as the motor revolves.

Since a motor has basically the same properties of a driven dynamo; when running it produces an internally-induced voltage, or back-EMF, which opposes the applied voltage.

Setting FW&I losses aside, the motor current when unloaded tends to zero, since the back-EMF equals the applied voltage and there is thus zero voltage to drive current through the windings.

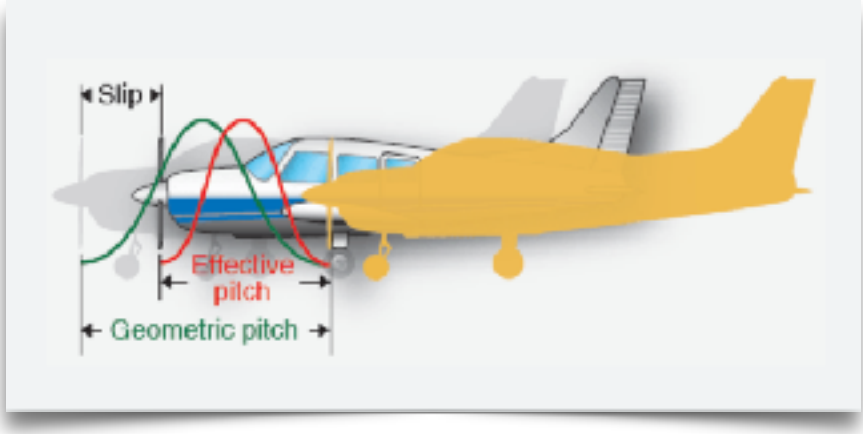
When loaded to stall, there is no back-EMF to oppose the full applied voltage, which when applied to the windings having very low resistance, results in damagingly-high current flow.

This explanation derives historically from brushed motors, but the same general principle applies to brushless motors.

When loaded by a prop then, the motor speed is reduced, and so thus is its back-EMF, leading to a current figure which is dependent on battery voltage and prop load. I find in the practical case when setting-up for best efficiency and survival, prop-loading down to about 80% peak RPM works well.

I believe the kV rating is usually derived by spinning-up the open-circuited motor using an external motor and measuring the induced voltage at the test motor terminals and dividing RPM by voltage.

There's also another adjustment to be made in assessing tip speed which is often forgotten - the spiral progression of the tips. They travel a little further than Pi x D in one revolution, and thus a little faster. Perhaps I'm a little pedantic here, because my calculation for a 12" x 6" prop at optimum angle of attack (later) shows only 0.85% further travel.



Moving on, the following paragraph in Tim's article got me thinking further:

"Given that the V1200 has a top speed of over 150 mph (and, as we saw on Ali Machinchy's video, can reach 201 mph!), which contributes to the overall speed across the prop."

Reading that statement the way I do, I don't think that treating the arrival velocity of the air at the prop as a separate entity to be added to the properties of the revolving blades applies. It seems to me that all velocity issues are bound-up in the pitch and RPM properties alone and that adding the arrival velocity would introduce factors that are already defined in the generation of thrust.

I believe that flying speed can never exceed the velocity of the flow we set-up through the prop. I justify that by noting that if the arriving flow velocity exceeds the forward velocity of the blade, the blade angle of attack moves toward negative and thrust disappears.

At this stage it's worth examining what is happening to the flow at the prop:

(a) Model tethered, engine revving, prop pulling in air = all inflow ahead of the prop, effective blade angle of attack is coarse, sometimes close to stall.

(b) Model released, accelerates forwards into flight, in-rush reduces and equilibrium is established with thrust balancing airframe drag, engine torque balancing prop rotational drag, and prop blade angle of attack settling to its best thrust/drag ratio. (I still have to find a way to demonstrate this more clearly to myself - equilibrium effect). The prop accelerates the flow passing through it, in accordance with Newton, thrust force requiring acceleration of mass. The in-rush still exists to a greater or lesser degree, depending on prop mass flow to airframe drag ratio, i.e. a small prop churning away at high revs, with a small core of high-speed exit and in-rush air (inefficient) vs a large prop moving a large core at a speed nearer the flying speed.

Thus, in flight we have an eager prop being held back by the airframe drag, and off the top of my head, I don't yet know how to calculate the properties here.

Trying to lay some groundwork, there is much to say about effective pitch. The approach at modelling level has always been a bit vague, and understandably so. We have got used to the idea of taking the prop manufacturer's pitch dimension and coupling that with rotational speed to derive "pitch speed". Accepting that this does not take into account other effects that we don't explore, we then apply a figure of about 18% reduction in pitch speed which we label "slippage" as representing the shortfall. This de-rated speed is then often offered as the potential flying speed, which then conflicts with in-rush flow properties. Many people add 30% to the needed pitch speed, however calculated, to ensure successful flight. Never mind, in some muddled fashion we get there in the end.

In defence of the slippage notion, it is justified by the observation that the prop manufacturer's pitch dimension is measured across the max. chord-line, thus representing a low thrust coefficient at that angle of attack, so therefore 18% slippage may be a reasonable guess for a prop operating at its optimum angle of attack.

Further to the model speeds Tim mentions: Current speeds of I/C pylon racing models are around 225mph with engine speeds up to 38,000rpm!

Now take away the encumbrance of the prop, to see what can be achieved without its limitations, and we see that the current speed record for a glider is 548mph, achieved in dynamic soaring off a mountainous ridge in a gale. The designers reckon that it's difficult to make significant further progress until they solve the new problem of transonic flow over the wing. There's a really excellent paper by the Royal Aeronautical Society at https://www.aerosociety.com/news/a-need-for-speed/, showing details of the glider, its build techniques and the principles of dynamic soaring. See if you can spot the model at speed in the included video!

Now for that prop noise: Just where does it come from? Is it the shockwave from transonic flow over the blade ends? Is it truly created just at the tips, and is the flow transonic at that point? Does the noise come from the span-wise flow at the tips being accelerated into the tip vortex? Can the rotational velocity in a vortex reach transonic? Certainly, it's an effect that is often admirably demonstrated by the Harvard!

Vortices do make a noise when generated at the sub-sonic, a weird aetherial whispering when standing underneath a vigorously-flown aircraft like a Skyraider at Woodvale. Fertile ground for conjecture here.

It's been a most interesting canter over some of these issues, so thanks to Tim for his CD contribution, and also for supplying nearly all of the graphics used here, although you will have to make-up your own minds where the heading picture came from! I must point-out that I'm only an amateur student of this subject, and I would welcome comment of any complexion from our readers, especially to hone-up the accuracy of my own understanding.

Cheers!

Colin

Chichester and District MAC
are holding their annual auction
at
Fishbourne social club
Blackboy lane
Fishbourne
Chichester, PO18 8BL
on
Thursday 9th February, doors open for registration 7.30 pm bar will be open

For those more recent joiners, like me, the format is fairly straightforward, with modelling items being booked in on arrival at Fishbourne's smaller hall, once that is completed, the auction begins in the large hall, with Mr Andrew Gibbs very kindly resuming his role as auctioneer.

Also, the booking-in process allows the seller to set a reserve price for their item, making the sale process risk free, and to keep things simple, payment for successful bids is dealt with privately between the seller and the winning bidder, who come together once the item is sold.

So, any unwanted modelling items, large or small, please bring them along on the 9th and convert them in to cash! (no unwanted Xmas socks please).

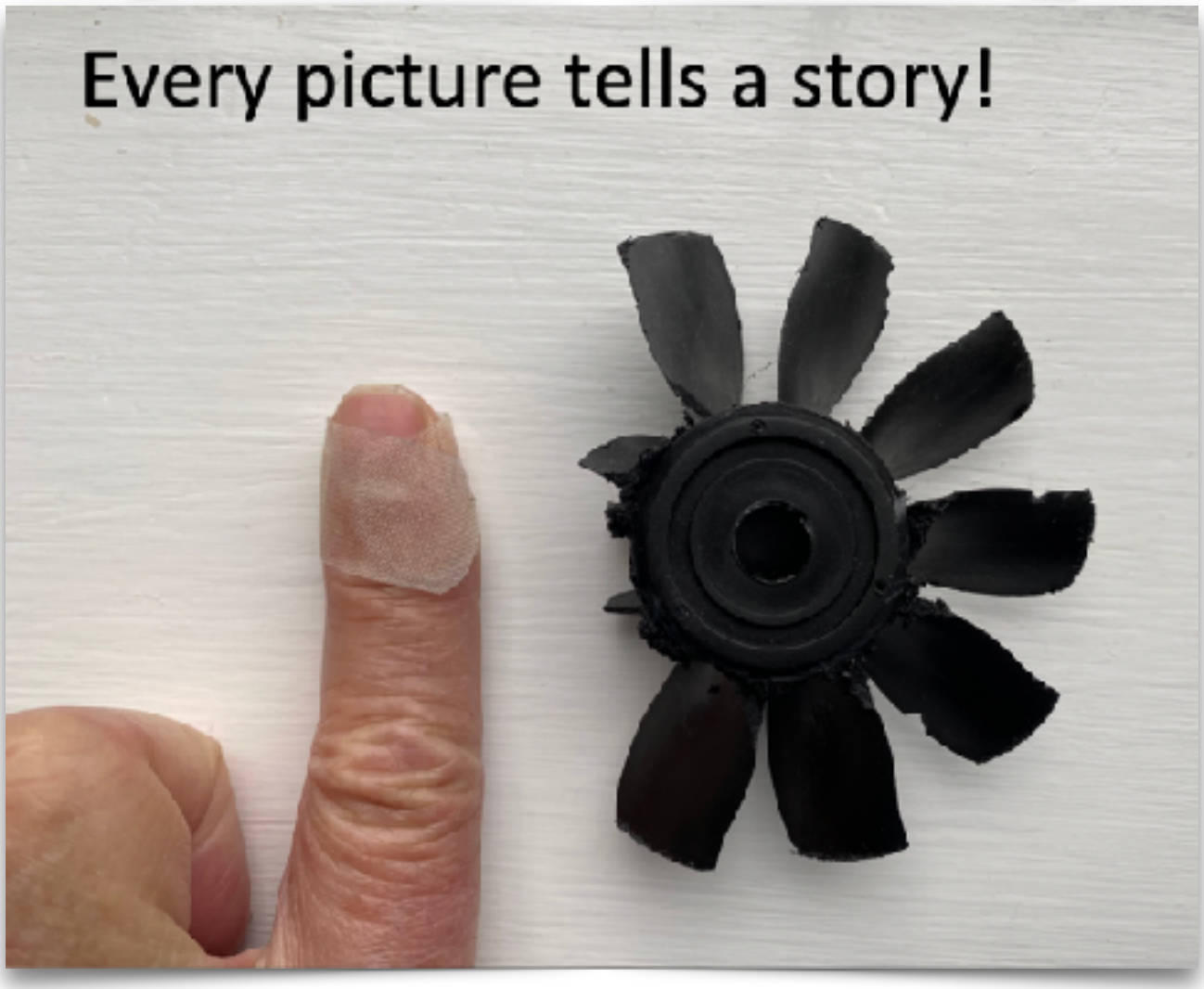
Hope to see you at Fishbourne!

Ray

CAA Registration information,

In the early days, a number of members paid for this through the CAA rather than the now more popular route, the BMFA.
I phoned the BMFA this morning to ask if it was possible to switch, and to my surprise they said yes, everyone can pay the £10 through the BMFA.
The possible advantages are:
1. Country Members won't have to deal with the CAA, only the BMFA.
2. Full Members who up to now pay the CAA themselves can switch membership types and become Senior Member (CAA), so the club pays it all.

Regards.
Jeff



The image above supplied by
A.N.Other

Date:	Event:
Thursday 12th January (2023)	Club evening: lecture by Alan Key - "Flying for fun".
Thursday 9th February	Club evening: Auction or Talk - Details TBD
Thursday 9th March	Club evening: lecture by Rod Dean - "Flying the Hunter and other things"
Thursday 13th April	Club evening flying - Fishbourne Centre playing fields.

Please Try to leave Porthole as tidy as possible, making sure no fuel is left on site & lock the gate.

Flying alone on Thorney is now not allowed on the grounds of safety

30 metres from "uninvolved" persons"

15 metres when taking off & landing, subject to mitigations

From 1 Jan 21 BMFA Article 16 is law: know the separation minima!

When driving around Thorney be aware of young children on bikes and 20mph speed limit

The Commander at Baker Barracks Thorney and the MOD have decreed that there shall be NO drone flying whatsoever

When flying at Thorney please keep an eye out for traffic(all kinds walkers, horses, bikes, runners, and low flying aircraft) coming from behind the flyers and inform them accordingly

The club Facebook page is now in its fifth year. It has over one hundred members. It contains many contemporary site reports, and has a wealth of photos in its archives.
Administered by Nick Gates. David Hayward & Ken Knox
Here is the link:-
https://www.facebook.com/groups/Chichesteraeromodellers/