



March 2014

Newsletter

Spring is just around the corner and I've already been able to enjoy some good flying. The field is understandably rather wet and 'heavy' so it had to be my trusty Fun Cub.

I've been trying to make that model more aerobatic so I increased the rudder throws to absolute maximum. It's made a massive and worthwhile difference to it's performance. The rudder area is large and I can now use it to great effect. It has really transformed the way the model flies.

I am resolved this year to get out and make flyable some of the models I've bought at auctions and discarded. It is so easy to become lazy and safe in what you fly. I've got a Multiplex small delta - it's in rubbish condition but I've had it sitting there for about 3 years now - just needs a bit of commitment and who knows, it may well be quite an exciting flyer. The same goes for another few models - it's better to crash them than sit there grinning at them.

Most of my time goes to continually making indoor models - usually it's the biplane. I persuaded Dave Swarbrick to bind his TX to a biplane I was having a lot of problems with. On take off, it sat on it's tail and went up vertically - just the problem I was having! He landed, checked everything again and put in 4 or 5° of Down elevator and flew again. He had it rolling and looping - flying like I'd never flown it. He landed and told me to put in some down thrust. I will be flying it again tomorrow suitably modified to see what happens. When something doesn't fly properly, I always think that I've built it wrong - it never occurred to me that it could be down thrust.

I've now flown my latest Beta model. Thanks to Jason for trimming it out first - he had it doing 3D and literally everything - his only comment was that he would have preferred more aileron throw to do snap rolls. When I had re-bound it to my TX and tried to get the exact same settings, it flew away easily - dead smooth and satisfying. These models are so incredibly responsive. I still say that you learn much more flying these than 'normal, models.

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Workshop of the Month



For this month, it is John Prothero's turn. John is highly enthusiastic and I am one of many modellers who has been helped - he really is a guy you can turn to and know that you will get all the help anyone can give.

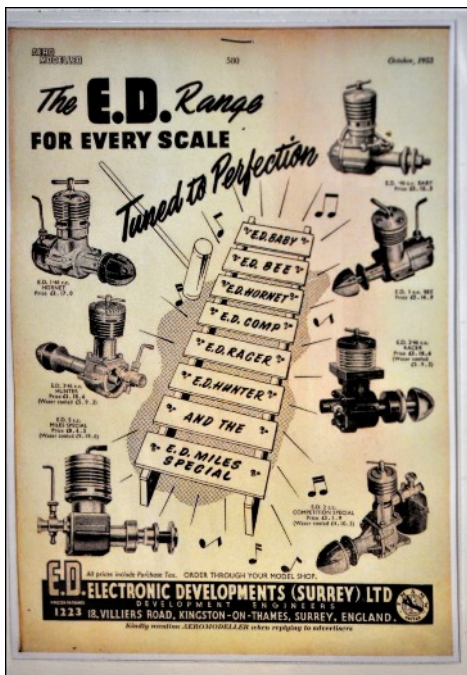
It was John who got me back into flying when I moved back into the Fylde area. He would come to the field always to help you fly. I was lucky that I am one of the few who flies Mode 1 - John does too. There again, he very unusually is able to fly Mode 2 and has saved a few models when their pilots had got into trouble.

He has many lovely models including an old Flair Fokker DV11 which he has just refurbished. He's fitted it with a Saito FG14 petrol - should sound just right. It's now powered with a petrol motor - the whole thing looks good without even starting to fly. You will have seen that he has a state of the art PA Bandit which he is continually improving just as he did with his foam AcroWot - he passed this model onto me just prior to buying the Bandit. Even in my hands, that Acro Wot flies nicely with almost no vices but it did take him a long time for him to fettle to what it is now.

Workshop of the Month

John was able to show me the very first deisel he bought, an ED Bee 1cc - it even turned over with good compression. He still has many of his old control line models including this 'Blue Pants' which he built back in 1962 which is powered by a 2.46cc ED Racer.

He has to be a bit keen on these Eds' because he has this ED chart showing all of the motors they produced.



I asked him if he had any Oliver Tigers he could show me. Sure enough he produced these two. The smaller one is the 1.5cc Cub and the larger one, the 2.5cc Tiger. I used to have a couple of the Tigers myself which I used for c/l combat. Lovely motors and so easy to start.

He has a few Mills, a couple of Frogs, a DC 1.5cc a tiny little Cox - the list just goes on and on. He's just 'doing up' an ED 2cc Competition Special. Yes, this guy is keen!!

John started making models when he was 8 years old. He built a KK Sportster rubber powered model - he said it flew well - it's first flight (in the kitchen!!) - It hit their cat.



Of course, now he flies jets. Here is his Boomerang.

Some of John's Models

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The petrol powered MX2



The B17 which he says will fly soon.

His workshop isn't all that big but he has some cracking models - the Huey



Some of John's diesels.

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Modern version of the Mills 1.3cc



This one is the Oliver Cub 1.5cc



The legendary Oliver Tiger 2.5cc

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Recently bought 2nd hand at the Phoenix swapmeet the FW190



The old Keil Kraft range of models.

It was a great pleasure visiting your workshop John and thanks for that state of the art coffee. I took loads more pictures than I've shown here but I think there are enough to show the type of guy John is, and enthusiast through and through.

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A VIEW FROM THE HEDGE. (By Will Sparrow)



Birds of a feather flock together. We've all heard the phrase, but few of us feathered folk have actually thought why birds of a feather actually do flock together. There must be some advantage to be gained, otherwise why would we do it? A few of us had a twig-in the other evening and the topic of flocking together came up. Contributions to the debate ranged from the profound ("agglomeration of interests and aims leads to a more cohesive feathered community") to the less than helpful ("it's what we do, init"). As the discourse progressed, a general feeling seemed to establish itself: being together as a group enabled us to keep a better lookout for things that might want to do us harm, helped us to locate food sources and gave us a social framework in which to share ideas and experiences. In short, as a group, we were more than the sum of our parts and were all the better for it.

The parallels with your model club are too obvious to raise comment: you band together in order to afford your flying site, you use extra pairs of eyes to keep a look-out for full-size aircraft (and local loonies!) and you share ideas and experiences in order to contribute to the common good. A flying session shared with like-minded individuals is infinitely preferable to an outing with only the grass for company and just your ever-watchful scribe on hand to note your antics. Okay, now and again, it's nice for the individual modeller to sally forth to do a spot of trimming, practice or testing free from peer group observation (and sometimes unwelcome comments ...those prone to such comments know who they are!). Are we better together? You bet.

Once we were into March it was inevitable that spring should assert her presence and, lo and behold, on the tenth of the month the longed-for good



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A View from the Hedge continued...

weather finally arrived. I had expected hordes of modellers, anxious to shake off cabin fever, to descend like locusts onto the field. There was a decent turn-out throughout the week but not the numbers that I had expected. The usual suspects were there and at least one member, freshly roused from hibernation (I might just give hibernation a go myself next winter), put in a Wednesday afternoon appearance. As for the models on display... nothing new was seen; not too much of a surprise since the strip was still in soft-and-long-grass mode and was not really conducive to the flying of other than hack models. The only model of note was not a new model at all but a well-worn trainer; a trainer, though, with a difference. Jason Modeller had fitted a GPS unit to the ancient hack which provided not only "heading hold" and "return to base" capabilities but also height and speed logging. To my untutored eye the flight path looked the very opposite of smooth, but then, few innovations work perfectly first time out and I'm sure that once fully sorted I will be able to gaze in wonder from my twig on yet another technological marvel.

The increased day length and March's drying winds have combined to provide the conditions needed to allow the grass to be cut. Yes, the first cut of the year has taken place! So, put away your hand-launched winter models, it's time to get the proper stuff out. If you happen to notice a small, brown bird perched discreetly in the hedge, that will be me... watching you.

WS



LOTTERY FUNDED

Propeller Selection

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By Brian Holdsworth

The load presented by a propeller to its driving motor is largely determined by the diameter and pitch together with rotational speed. The blade width also affects this load but propeller brands vary little for a particular size so will be ignored in this simplistic analysis. The blade thickness also affects the load and this can be very significant; for example, the ic version of a propeller imposes about 50% more load than the electric equivalent with its thinner blades; note that the electric version is considerably more fragile and should never be used on an ic engine since it is quite likely to shed blades! Practical constraints at model sizes mean that multi-bladed propellers are much less efficient than two-bladed items. Some seem to think that there is a fixed ratio between diameter and pitch but a quick scan of the available propeller sizes will show that this is a gross over-simplification.

The most critical parameter is pitch due to a characteristic known as pitch speed. A propeller may be approximated to a screw where each revolution produces a movement equal to its pitch. In this context, this can be regarded as a combination of moving air past the aircraft and moving the aircraft through the air. Thrust is generated by a combination of the volume of air moved and its relative speed past the aircraft. Thus maximum thrust is generated when the aircraft is stationary dropping to zero should the aircraft reach pitch speed. If the pitch speed is exceeded, thrust becomes negative, slowing the aircraft. This simplistic description is complicated by several factors including :-

- 1). As the effective thrust reduces with increasing aircraft speeds, the load on the motor reduces so that, within limits, the rotational speed will increase together with the pitch speed.
- 2). The air reaching the propeller is already moving, reducing the effective angle of attack of the propeller blades and consequent load.
- 3). As the pitch speed is increased, the effective angle of attack of the propeller blades is also increased. If greater than the stall angle, the



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Propeller Selection continued..

By Brian Holdsworth

blades will stall, so reducing thrust and reducing the motor load resulting in higher rotational speed; the drag on the blade increases significantly, limiting the speed increase. This effect can be quite noticeable for aircraft such as pylon racers using high-revving motors with high pitch propellers, where the note drops noticeably during the take-off run as the blades unstall, increasing the load; the note then rises again as the aircraft accelerates to full speed. The effect generally becomes significant for pitch speeds greater than about 100mph but may become apparent at lower speeds with slow-revving motors (less than about 7,000 rpm) where a high pitch propeller is used to maintain pitch speed. Ducted fans use a high pitch impeller with high rpm to give a very high pitch speed and suffer greatly from this effect, resulting in poor take-off and climb out performance until the aircraft accelerates beyond a critical speed to unstall the blades.

The thrust from a propeller is proportional to its diameter and the pitch speed margin over the aircraft speed. The load on the motor increases as pitch or diameter is increased so that for a given load, a change in pitch requires a corresponding change in diameter. For example, a 10"x7" propeller presents nearly the same load as a 11"x5.5" while a 12"x6" presents a higher load than a 11"x7" so that, very roughly, an increase of 1" in diameter requires a reduction of 1.5" in pitch to maintain the load. In stable level flight, the thrust matches the aircraft drag so that, with a specific motor/propeller combination, higher drag results in a lower airspeed than for lower drag; in a rare example in aerodynamics of a beneficial interaction, the greater margin between pitch speed and the lower airspeed increases the effective thrust so reducing the effect.

Most aircraft perform well with a static pitch speed of about 60 mph resulting in a flying speed up to about 50 mph; this may be achieved with a 6" pitch at a



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Propeller Selection continued..

By Brian Holdsworth

rotational speed of about 11,000 rpm, which is a suitable value for most two stroke engines. Where higher flying speeds are required, the pitch speed needs to be increased accordingly, necessitating a higher pitch and/or rotational rpm; an electric thermal soarer, with its low flying speed and low drag, may need a pitch speed as low as 40 mph. Petrol engines are frequently operated around 7,000 rpm, while four-stroke engines are generally limited to about 9,000 rpm to avoid internal damage; this implies that at least a 7" or 8" pitch will be required. Electric motors generate relatively little vibration so that propellers with thinner blade roots can be used with increased efficiency; folding propellers are often used, especially for gliders, but should be limited to lower rotational speeds due to their limited strength - typically, manufacturers suggest a maximum limit of about 14,000 rpm, reducing for larger sizes. A simple ratio for an electric motor is ' $Kv * LiPo \text{ cell count} * \text{propeller pitch} > 20,000$ '; for example, a 1000Kv motor on 3 cells performs well with 7" pitch.

A low pitch speed results in good static thrust but reduced flying speed; too low and the aircraft struggles to fly!

A higher pitch speed than needed reduces the efficiency due to the greater rotational drag and the drag from the higher speed of the air past the airframe. The maximum speed in a power dive is increased since greater thrust will be available due to the increased margin to pitch speed; climb performance will be reduced due to the lower efficiency. The effects of motor torque and rotational airflow are reduced which can alter roll trim, especially at lower airspeeds, and so may affect roll coupling in knife-edge flight.

Summarising - estimate the intended motor rotational speed and select propeller pitch according to the required pitch speed and consequent flying speed; the diameter is then defined by the required motor load, noting that about 2" ground



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Propeller Selection continued...

By Brian Holdsworth

clearance is desirable to minimise ground contact damage. If the resultant diameter is too great, a higher pitch would have to be used, sacrificing some efficiency.

The noise generated by a propeller is largely determined by its tip speed and becomes significant over about 350 mph, which is reached at around 15,000 rpm for 8" diameter and about 8,000 rpm for 15". Pusher propellers can be very noisy due to the interaction of the turbulent airflow at the trailing edge of the wing with the adjacent propeller blades; increasing the gap by as little as 1/4" can have a dramatic effect on the volume. Claims are made about the beneficial effect of pointed tips against squarer profiles, but the practical difference is not great. Glass-filled nylon propellers can be quite flexible, generating noise; wooden propellers are generally stiffer and quieter but very vulnerable to damage, particularly cracks near the root, with obvious safety implications.

Significant flywheel effect is required for ic engines to maintain rotation between firing strokes and is provided by the propeller. Glass-filled nylon in larger sizes become heavy due to the thick blade roots needed to give adequate strength so that wood may be advantageous over about 18" diameter; however, wooden propellers are problematic for four-strokes which require greater flywheel effect due to their alternate firing strokes and slower rotation speed.

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The Man from the LMA

It's the first time I've heard Dave Johnson give a talk. The guy was good - some people are able to easily give talks - he is surely one of those. He brought 3 nose cones with him, belonging to the Vulcan jets which he has flown at the LMA shows. The nose cone shown here on the right is his current 20 foot span model.



This beautifully detailed nose cone on the left is from his second model. This was all foam which he skinned - looked very realistic.

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The Man from the LMA

Here are the three nose cones he brought. The smallest one is beautifully detailed. He bought this one from Roy Lever's shop at Bolton. It was a 10 foot span model and very complicated to put together. Then you see the foam cone and finally his 20 foot span white cone which is traditional balsa construction.

He uses simple white glue - doesn't believe in Cyano. His 20 foot span current model is right on the top weight limit. He was asked as to whether he intended to fit it with bomb doors but it was the weight restriction which would stop him in case the model became overweight.

It is powered with 4 Merlin turbines which he says are quite noisy. He is looking for ways to make the engines smoke just like the real thing.



Here is his 20 foot span model about to touch down - that undercarriage is an scale copy of the real thing - an engineer from Chester constructed it.



March 2014

For your Diary

Social Evenings at the South Shore Tennis Club, Midgeland Road.

2nd April

Chuck Glider competition organised by John Prothero. This is a fun evening. John is arranging something a bit special this year. Bring some PritStik and a pair of scissors, some crayons or colour felt tip pens. He hinted at there being a mystery prize. Do come along.

7th May

Safe Flying presentation and Aerobatics event briefing. This will be presented by Dave Swarbrick and Jason Reid.

Spring Auction at Prestwich British Legion Tuesday 8th April.

The address is: 225 Bury Old Road, Prestwich, M25 1JE (right next to Heaton Park Metro Station)

Doors open 3.00pm for registration and viewing.

Auction starts 8pm Prompt

Full Bar open from 7.30pm (Cheapest pint in Manchester!)

Entry Fee & Raffle £3.00 inclusive

10% sellers fee to club funds

£10 minimum reserve

Multiple items will be sold as one lot.

ALL GOODS SOLD AS SEEN.



March 2014

Shows/Events for 2014

This is not a definitive list of every show in the country - I've kept it to relatively local areas only. If you know of any other shows/events

LMA

RAF Cosford 19th - 20th July

Elvington - 9th - 10th August

Much Marcle - 6th - 7th September

Other Events/Shows

BMFA North West Area Scale Fly in RAF Shawbury - 9th September

In Conclusion

Thanks to Mark Conlin who spent many hours getting me sorted with a new fast computer. My old one was becoming a pain - it could take me over $\frac{1}{2}$ hour to process just one photo - now it's all done in minutes. He carefully specified everything and then put it together - works great Mark - thanks.

Once again I sincerely thank John Higgins, Brian Holdsworth, John Prothero and last but not least our lovely tame Sparrow. You guys make this newsletter. As ever, I appeal to more of you to contribute to this newsletter.

I'm looking for my next 'victim' for next month's 'flyer' - any offers?? Bye for now.