

# From the Pits.

The Newsletter of the Weston Model Flying Club

[www.weston-model-flying-club.org](http://www.weston-model-flying-club.org)

July 2003

## Editorial

The site is looking better these days, and it's good to see that people have been putting some effort into improvements this year. Thanks to all involved.

There are a couple of competitions in this issue. Since previous ones have not exactly drawn large responses even with the offer of prizes, these are only for fun with no replies required. Still, let me know what you think.



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## Grass Cutting

In the last issue I mentioned that we were looking for a contractor to cut the grass. Following that, two estimates were received, but it has been decided that they were both too high, and we have gone back to the idea of using the club mower, but keeping it on site. Therefore **Mike Pope** has put in an application for planning permission for a 10' container on the site to keep the mower in. At the time of writing the application was still wending its way through the system but is expected to be approved by the end of August.

In the meantime thanks go to **Mick Brumby** who has been regularly collecting the mower from Steve and cutting the grass. The field really does look good when cut weekly.

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## Club Meetings

For the September meeting we are going to try a new venue, the **Ashcombe** pub at 15 Ashcombe Road WSM. At that time we will decide whether to stay there in future or return to the Bristol Hotel.

The **Ashcombe** is situated just a bit further along Locking Road from our current venue, and has its own car park. If you don't come to the September meeting, ask someone or keep an eye on the notice board for the location of future meetings.



## Casualties



All hung up... My Cap232 caught on the fence at the water works after the battery went flat...

...and my Kamko Kadet trainer finally ran out of luck after 26 years.



“Now where did I put the rest of it?” **Gerry Crossman** finds his model is a bit shorter than usual...



**Steve Hockey's** Spitfire, seen here showing off its classic lines, was sadly lost a couple of weeks later.

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## BMFA

The Western Area of the BMFA, which represents about 35 clubs in this area including ours, is looking for volunteers to help on the committee. The existing Secretary and Treasurer are both standing down at the AGM so anyone who wishes to get involved will be welcome. Speak to me if you are interested, or come along to the Western Area AGM at the BAWA in Filton, Bristol on Dec 7.

## The Pylon Wing

It all started on that fateful day down at the field, another hand launch with the Old Faithful 2000 pylon racer. Confidently with a small shove it was lobbed into the air, right hand quickly onto the tranny, oh shizer missed the control stick, thumb caught on the rates switch and the pylon meets the deck. Oh well at least the wing has survived may be I will make a new fuselage.

On return from the field the plane was positioned carefully in the hanger, (OK it was dumped on the bench in the garage) to await a time when a repair could be made. A couple of days later it was out to the garage for further inspection, um, the damage was worse than first thought. Where did the plane end and the plastic bag begin?

There was nothing for it but drastic action, only the wing was worth keeping, *only the wing*. Now there's an idea so off to work and not much balsa required. The flying pylon wing was born.



A few nights work and it was ready for a viewing at the May club meeting. There were about twenty judges at the meeting and all seemed very interested, it was passed around the pub with comments like "interesting" and "different", you know the things you say when you think it won't fly.

Not to be discouraged a week or so later it was off to the field, ah good not too many judges at the field. Out with the wing with much encouragement from the other club members (I didn't know model flying was a blood sport) with "get it started", and "this won't take long", so off it went with a good hand launch from Alan, yes its flying, no control but its flying. Kevin calls "take cover and incoming", a full loop and half roll - not bad for the first flight, shame I had nothing to do with it.



We upped the rates and tried again, still no better. Back in the van and to the workshop for further refinements. I felt sure it would fly since it did when it had a tail. I know, it needs much more movement on the elevons, and I set to work moving the hole positions.

Back to the field wind blowing briskly and Pat offers a hand launch. An almost vertical launch saw the FX 25 pulling the wing straight up to a height of about 80 feet, a down wind turn and over the other field engine revs cut to half and the plane starts to tumble. Efforts to stop this had no effect, so the throttle was cut and the wing landed safely in the long grass with only minor damage to the front end.

Back to the drawing board. Plan "B" still with lack of control. There was only one thing for it, the control surfaces had to be bigger, I now had 50mm wide elevons. It was at this stage that Paul said to me "I was reading an article in a mag about flying wings and it said that

the centre of gravity should be at 15% wing chord and not the normal 25-33%". Off to the workshop to extend the nose by 40mm to achieve the required centre of balance, and back to the field.

A warm and sunny Sunday afternoon, a good crowd at the field. It was with some apprehension and a bit of arm bending that the wing was bought back out.

It was too late now I had to have a go. I took off the prop and with assistance from Paul a test glide was tried. It had a good feel, not only being able to keep the wings level but I also managed to flare it out into the long grass. With much more confidence the engine was started and a good firm hand launch saw the wing heading skyward, amazing full control and only a couple of clicks of trim, a few minutes later and now buzzing around the sky with confidence, it was stable enough to trim hands off, the transmitter was passed to Paul, who was now suitably impressed.

What a result! I would not describe this model as a trainer, but there again neither is a standard pylon racer. It has many of the characteristics of the pylon but does not like being flown flat out on the FX25 probably due to the large elevons.

#### SPECIFICATION

Wing span	895mm
Chord	243mm
O/A length	575mm
C of G	36mm from leading edge
Elevons	50mm wide 10mm movement each way.
Engine used	OS FX 25



See you down the field.

**Mike Pope**

## Shared Frequencies

Recently a model was lost due to a transmitter being switched on when someone else was flying on the same frequency. The following was adopted at the July club meeting:

From now on, if two or more people are using the same frequency the procedure should be as follows:

- Only one card and peg should be on the board on the frequency position.
- The other cards should be pegged to their owners' transmitters, **NOT** on the top of the board.
- When it is your turn to fly, remove the card from the board, peg it to the owner's transmitter and inform him.

So if you see a card pegged on top of the board, remind the owner of the new system.

## It can happen to the best of us...



**Terry Davis**, probably our most experienced flier, was throwing his YT Magic Extra 300 around in his usual way when a gust of wind blew it into the hedge. Incredibly, not only was there no damage at all, but the prop was clear of the vegetation and the engine was still running. Terry recovered the plane, gave it a quick check over, and took off again! Not one of his better landings to finish with though...

## Seen at the Field



**MAINLY MODELS Me 109** Bought at Sandown 2003. Flies Great on an old but good OS 15

This is a picture of my twelfth scale blue foam combat plane for streamer chasing. **Mike O'Leary** has the Spitfire version (and more on the way). All being well we are hoping to fly these at a combat meeting in Yeovil at the end of August; 23rd I think.

**Mike Pope**

## A Bridge Too Far

Anyone who has been to the field this year will have noticed that the old bridge, which had been in place for the last 3 years, was rapidly becoming dangerous. A number of slats had already failed and the main timbers were rotting. Something had to be done... So on a showery day in May a working party assembled to build a new one.

The new bridge is built on two substantial steel girders on a concrete base, with 2" thick decking planks, so it should last for many years to come.

Thanks go to **Steve Hockey**, **Steve O'Brien** and **Alan Meaney** for masterminding the project, and to the dozen or so other members who turned up to help. Here are some pictures from the day.



Removing the old bridge was simple. A rope was attached, tied to Steve's 4x4, and just dragged clean away in seconds!



Steve H takes the easy way across. This man has no fear of heights...



The finished bridge is a great improvement over the old one. Concrete ramps were added a few weeks later



### A comment from the Chairman:

"I would like to thank everybody who took part in the organising and building of the new bridge and the concrete ramps. I have heard a few whispers that it was a bit expensive; maybe these points could have been made to the people giving up their free time." Mike.

## Caption Competition

You know, I think what's wrong here is that the bit with the propeller should go in front.



Can you do better than this? Shouldn't be difficult... Send me your caption to the above picture. No prizes, just for fun. The best (if printable...) will be published in the next issue.

## Fun Fly League

Since the last newsletter one and a half fun-fly events have been held. "One and a half??" Well the May event was eventually abandoned after a couple of attempts to hit a helium balloon rapidly disappearing in the strong wind. Believe me it's harder than you think...

In June **Mike Pope** organised (and won!) a pylon race, with **Pat Teakle** runner up.

### Safety (1)

Please remember that if you have not yet gained your A-certificate you must **NOT** fly at the field **unless** accompanied by a club member who has. This is in the club rules.

## Fuel

The club has purchased 50 gallons of ProSynth2000, a fuel with synthetic oil and 5% nitro. The cost is £11.50 per gallon. See **Steve O'Brien**, **Paul Lathall** or **Mike Pope** if you want to buy some.

## Basic Flying Rules

Try to stay in the middle of the air. Do not go near the edges of it. The edges of the air can be recognised by the appearance of: ground, buildings, sea, trees and interstellar space. It is much more difficult to fly there.

(Anon, found on the Internet)

## The OS-Graupner Wankel engine

Why do things the simple way, when they can be made more complicated?

Pondering over what power source to fit to a recently built Merlin fun fly (Dave Smith Models) c/o Father Christmas, I stumbled across the internet auction site ebay.co.uk who over the course of a couple of weeks had several OS Wankel engines up for auction. The going rate seemed to be about £100 for a good runner (good discount on the shop price of £250) so I had a bash at the auction and for £92 and about £6 postage from the seller in Canada I had an OS Wankel engine.



Rapidly fitted, I test ran the engine in my garage. It started first turn of the starter (strange I thought) and screamed loudly, I thought I must have set the tickover at  $\frac{3}{4}$  throttle, but no it had a lot more revs (and noise) to come as the throttle was opened.

Next weekend at the field---test flight time, engine started just as easy and prop revs checked: 15000 on a 9x4 prop (5%club fuel). Test flown successfully by **Paul Lathall**.



Much interest was shown by the members present, it wasn't just the garage confines that made it sound noisy it was still noisy at a few hundred feet and thirsty (5 mins on a 4 oz tank) but it was different and that was what I wanted.

As an engineer I had been interested in Wankel engines for some time but didn't really fancy a Mazda RX7 so this was the first that I had laid my hands on. The workings seemed to be so simply I couldn't work out why the engine wasn't more popular. The following article was found on the internet which answered all my questions.

### Steve O'Brien

The OS Wankel engine is extreme in all regards. It is extremely powerful. Depending on the fuel used, it's not unusual to see it deliver about 1.5 kW! For those horse-lovers among you, that's about 2 HP! Not bad for an engine that weighs about 350 grams...! It is also extremely fast, producing its best power output in the neighbourhood of 20000 rpm. You need a small propeller, a 22-10 (metric sizes, this would be a 9-4 in inch-sizes) is good for many applications, and a 22-15 only for very fast planes. But be sure to get a first-quality prop! Cheaper ones disintegrate under this power, and this can be very dangerous!

The extremes go on. This engine is extremely thirsty, using about 3 times as much fuel as a similarly powered 4-stroke piston engine. But the carburettor setting is extremely uncritical: A full turn barely makes any difference! It runs extremely smoothly: Almost no vibration, very good idling (at about 2500 to 3000 rpm). Unfortunately it is an extremely dirty engine too: It spills fuel and oil out of all bearings and joints, and as it also runs extremely hot, the spilled oil immediately bakes into the metal surfaces! Be sure to use

castor oil in the fuel, there is simply no synthetic oil that holds up under the extreme working temperatures of this little devil!

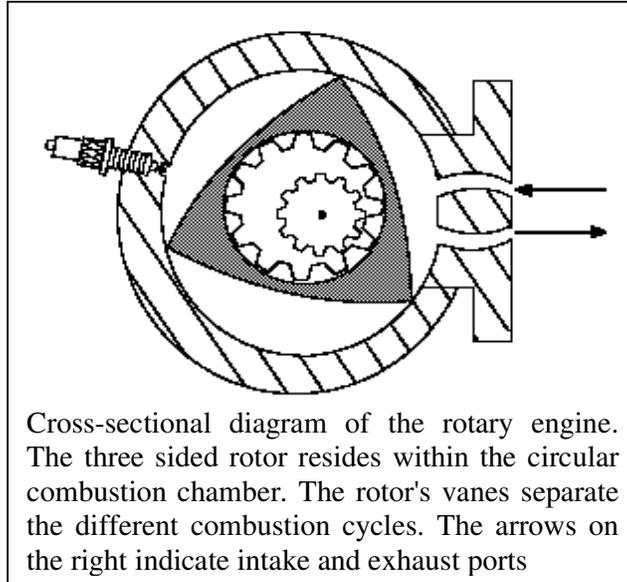
For starting, the glow plug must be extremely hot. Red-glow is not enough here! It needs to glow bright orange, almost yellow, otherwise the engine won't start. But then, it starts easily! Contrary to what some people have reported, it can be hand-started without trouble. Probably those who reported needing an electric starter got Wankels with bad compression... But on the other hand, an electric starter keeps your fingers safe. This beast really likes to eat fingers!

### 2-cycle or 4-cycle?

Many people have asked me if the Wankel is a 2-cycle or a 4-cycle engine. Well, it's neither. It's a Wankel! It has some characteristics of each system:

Like a 2-stroke engine, it has one power stroke for each crankshaft revolution; no separate valves, the rotor controls inlet and outlet ports.

And like a 4-stroke engine, it fully separates admission, compression, combustion and exhaust; the crankcase is not used for precharging.



Cross-sectional diagram of the rotary engine. The three sided rotor resides within the circular combustion chamber. The rotor's vanes separate the different combustion cycles. The arrows on the right indicate intake and exhaust ports

The OS Wankel sounds more like a 2-cycle model engine than like a 4-cycle one, but specially at idle speed the sound is dominated by the grinding noise of the rotor gearing. One has to become accustomed to the sound, but I love it!

### The future of Wankel engines

Despite its many advantages in the areas of power to weight ratio, freedom from vibration, and some others, the Wankel engine suffers from two mayor problems: Sealing, and fuel efficiency.

The problem of properly sealing a Wankel engine's moving parts is a tough one. While piston engines use multiple springy steel rings for sealing their round pistons against the round cylinders, and get reasonably good results from this simple and age-old technology, the problem is much harder in the Wankel. There are long, flat edges to be sealed. The corners formed by the apex seals and the rotor-to-wall seals are particularly hard to get airtight. And bad sealing not only makes an engine loose power, and burn more fuel, but it also causes lots of additional pollution - something that is unacceptable in today's world.

Fortunately the technology has brought great advances in this field. In the 1950s it was still very common that the Wankel cars failed because of broken seals, but nowadays some companies specializing in sealing have demonstrated Wankel engines that run almost forever without such breakdowns. So today it all boils down to Wankel seals being more

costly than piston rings, but they are approaching the same level of reliability and effectiveness.

Another matter is fuel efficiency. If you take a certain amount of fuel, and burn it, you get a certain amount of energy, which can be removed from the burned mass as heat, or as mechanical power through expansion. In a real engine, both things happen, and the ratio between the two defines the fuel efficiency. In the interest of good efficiency, as much energy as possible should be removed by expansion. So it is in the interest of fuel efficiency that the combustion chamber be as closely spherical as possible, thus minimizing the conductive surfaces for a certain amount of enclosed volume. This ideal is approached reasonably well by the piston engine with properly shaped pistons tops and cylinder heads, but the Wankel is very far from this! Its long, thin combustion chamber, having lots of surface, really sucks the heat out of the working gases, producing severe losses. The Wankel is inherently inferior to the piston engine in fuel efficiency matters, because of this fact.

The only way a Wankel could approach a piston engine in efficiency would be by using materials that either are thermally nonconductive (impossible for now), or by operating the entire engine at such a temperature that little heat is extracted from the gases. We do have metals now that can work hot enough, but we do not have proper lubricants. All present-day engines are temperature-limited by the available lubricants. And when higher-temperature lubricants become available, they will first benefit piston engines, since these expose no sliding surfaces to the gases at the moment of highest compression, while Wankel engines do. Wankels would need much better lubricants than piston engines, to improve efficiency by the path of running hotter.

## Safety (2)

Not a warning this time, but a word of thanks. As far as we can tell, all members are now using model restraints all the time. This has been a shining example of how a real improvement in safety has been achieved by mutual co-operation and has become second nature without the need for another rule.

Now let's do the same for flying on the same frequency, as described elsewhere in this issue.

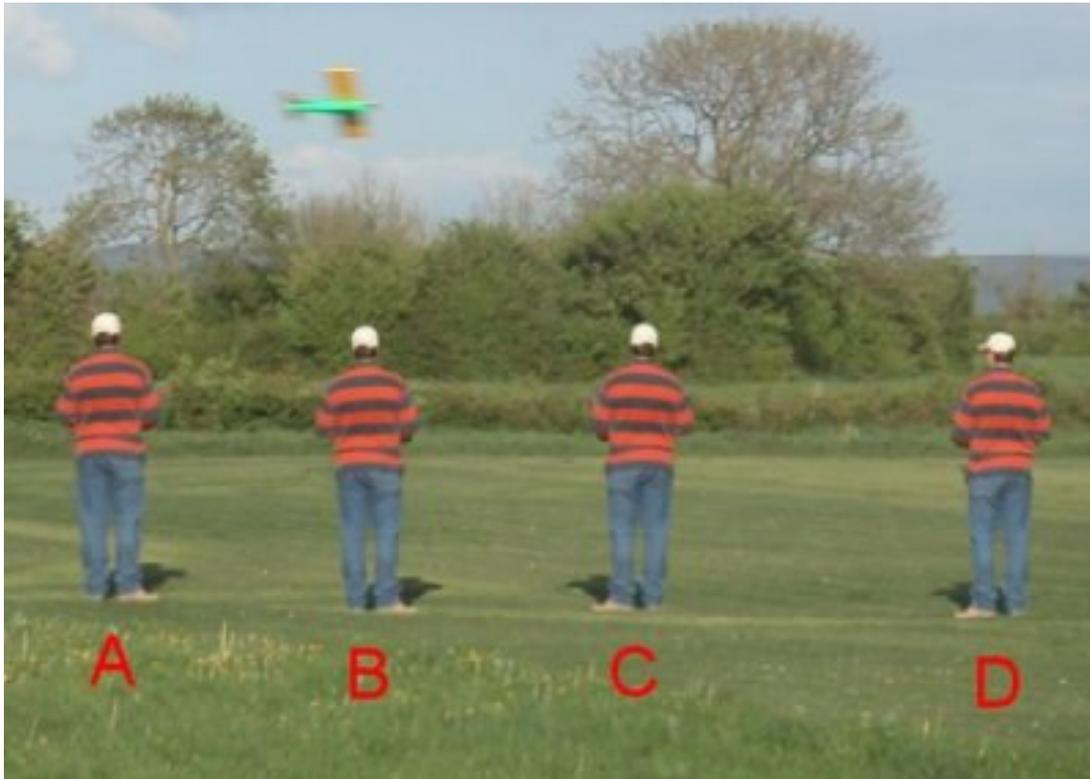
For the time being, the Wankel is a novelty that can be rightfully applied in places where its specific advantages outweigh its disadvantages, but the great mass of internal combustion engines will keep employing pistons. And I will keep looking for a nice plane that deserves being powered by my Wankel!

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## Wanted – JR transmitter for club buddy system

Buddy leads are a very effective way to train new fliers. The club presently has a spare Futaba transmitter and buddy lead, but this is not compatible with JR sets which a small number of members use. Hence we could do with a spare JR transmitter. If you have an old one you could donate or know of a cheap second hand one we could buy, please let **Paul Lathall** or a committee member know.

## Spot the Kevin Competition



Isn't digital photography wonderful? Here's a whole load of Kevins flying this pylon racer, but which is the real one? No prizes, just for fun; answer in the next issue or on request if you can't wait that long... And while we're at it, just what is the correct collective noun for Kevins???

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## On the Web

A few useful web addresses for those of you with internet access:

<http://community.webshots.com/user/flyingclub>

**Paul Lathal** has put some of the club photos here.

[www.phoenix-mfc.freeserve.co.uk/links.htm](http://www.phoenix-mfc.freeserve.co.uk/links.htm)

An extensive list of web sites connected to RC flying.

[www.rcgroups.com](http://www.rcgroups.com)

A US-based discussion forum, covering all aspects of the hobby. Mainly US dominated of course, but with some international contributions.

<http://www.rcmodelflying.co.uk/forum>

A UK-based equivalent, quieter than the US one but still some interesting discussions.

<http://www.kitcopter.com/videos001.html>

<http://www.kitcopter.com/helocrash.wmv>

A video clip (about 2Mb) showing how not to learn to fly...

## Trimming Chart

These tests assume that the plane has been built perfectly aligned, wings square to fuz, stab in line with wings, vertical fin is exactly 90 Deg. to horizontal stab. Thrust, incidence, and balance (CG) are set according to the designer's recommendations. The wings are not warped as checked with an incidence meter, and the elevator halves are moving together as checked by a "Throw Meter". These flying tests should be done in near calm conditions. Double-check each of the following tests before making any changes.

**The most critical component of aircraft set-up is finding the proper Centre-of-Gravity. It must be correct for each airplane, regardless of differences due to building variables and weight. Because of this requirement, it is important that this trim chart be followed in the order in which it is written.**

Test for	Procedure	Results	Adjustments
Control Neutrals	test response to each control	Adjust trims for straight & level flight	adjust clevises to center xmter trims
Control Throws	Apply full deflection of each control	Check for response; Aileron hi rate 3 rolls in 3 secs. Elevator, square loop corners Rudder, 35 to 40 Deg.	Change control horns, ATV, and Duel Rates as required
Center of Gravity Method 1  Method 2	1. Roll into a vertically banked turn  2. Roll into inverted flight	1. A. Nose Drops 1. B. Tail Drops  2. A. lot of down required to hold level flight 2. B. up elevator needed to hold level flight	Change control horns, ATV, and Duel Rates as required
Up/Down Thrust, test 1	Fly model straight & level, then cut throttle Note Either change B or C requires retest of Decalage and Verticals	A. Model continues level flight with a gradual drop B. Model abruptly dives C. Model abruptly climbs	A. No Change B. Increase down thrust C. Reduce down thrust
Up/Down Thrust, test 2	Fly model straight & level, then pull up Note Either change B or C requires retest of Decalage and Verticals	A. Model continues straight up B. Model pulls to canopy C. Model pulls to belly	A. No Adjustment B. Increase down thrust C. Reduce down thrust
Decalage, Angle of Incidence	Power off vertical dive from high altitude (neutralize elevator) (see Note B at bottom)	A. Model continues straight down B. Model pulls to canopy C. Model pulls to belly	A. No change needed B. Increase wing or stab incidence C. Reduce wing or stab incidence
Knife Edge Pitch	Fly model on normal pass, roll to knife edge, left and right, use rudder to hold model level	A. Model does not change pitch B. Model pitches to canopy C. Model pitches to belly	A. No adjustment needed B. Either move CG aft; or increase wing incidence; or mix down elevator with rudder C. Reverse of B
Tip Weight - Test 1	Fly straight; level, roll inverted, release aileron stick	A. Model does not drop a wing B. Left wing drops C. Right wing drops	A. No adjustment B. Add weight to right tip C. Add weight to left tip

Tip Weight - Test 2	Fly model towards you / away from you, pull tight inside loop, repeat with outside loop	A. Model comes out with wings level B. Model comes out with right wing low C. Model comes out with left wing low	A. No adjustment B. Add weight to left tip C. Add weight to right tip
Side Thrust	Fly model away from you and pull up to vertical	A. Model continues straight up B. Model veers left C. Model veers right	A. No Adjustment B. Increase Right thrust C. Reduce Right thrust
Aileron Differential	Fly model toward you, pull into a vertical climb before it reaches you. Neutralize controls then half roll	A. No Heading Changes B. Heading change opposite to roll command C. Heading change in direction of roll command	A. Differential settings OK B. Increase differential C. Decrease differential
Dihedral	Fly model on normal pass, roll to knife edge, left and right, use rudder to hold model level	A. Model does not roll B. Model rolls indirection of rudder C. Model rolls opposite to rudder	A. Dihedral OK B. Reduce dihedral C. Increase dihedral

**Note A:** These two methods for determining the C.G. of a model will give approximate results only. Start out with the C.G. where the Designer suggested, or somewhere between 25% to 35% of the Mean Aerodynamic Cord. The optimum C.G. for your model will require further testing while performing manoeuvres. The results will only be an approximation at best.

**Note B:** This portion of the trimming chart may be unclear for the following reason; In order to maintain level upright flight; the wing of a plane with a symmetrical airfoil wing needs to have a positive Angle of Attack (AOA, usually less than 1 degree). This positive angle provides the lift required to cause the plane to fly level. If the plane is balanced slightly to the nose heavy side (required for pitch stability), it will require a slight up elevator trim to hold level flight. A plane with a zero / zero wing to elevator angle will also need a slight amount of up elevator trim to hold level flight. Therefore, a plane trimmed in this manner will have a tendency to pull to the canopy on a straight, thumbs off, down line because the elevator is controlling the AOA of the wing.

This positive AOA may also be achieved by a positive incidence change, which requires an offsetting down elevator for level flight. Thus, a power-off down line should fall straight down, with neutral controls. There are significant interactions between wing incidence changes and CG; therefore it is most important that the C.G. of the airplane be established first.

In the final analysis, flight trimming an airplane is a personal preference issue after you have taken care of the basic essentials.

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## Events

Forthcoming events this year:

Thursday 7 <sup>th</sup> August 2003, 8pm	Club meeting <b>at the field</b>
Sunday 10 <sup>th</sup> August 2003	5 <sup>th</sup> Fun-Fly league event
Thursday 4 <sup>th</sup> September 2003	Club meeting <b>at the Ashcombe pub</b>
Sunday 7 <sup>th</sup> September 2003	6 <sup>th</sup> Fun-Fly League event
Thursday 2 <sup>nd</sup> October 2003	Club meeting (venue TBA)
Thursday 6 <sup>th</sup> November 2003	Club meeting & AGM (venue TBA)

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## Membership Secretary

Some people have had difficulty in contacting our membership secretary since his recent move, partly due to the fact that the phone number on the application forms & web site was wrong. Here are his current contact details:

### John Hopkin

55 Lower Kewstoke Rd.

Worle

Weston-super-Mare

Somerset

BS22 9JN

Tel: 01934-522148                      mob: 07966-263919

Email: [saxwing@talk21.com](mailto:saxwing@talk21.com)

### Email

If you currently get this newsletter by post and you would prefer to get it by email, let me know at the address below. Email recipients get their copy earlier and in full colour!

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## How to contact the Editor

### Ian Armstrong

Address: 4 Jubilee Drive, Failand, Bristol, BS8 3XD

Tel: 01275 392 995

Email: [iarmstrong@cix.co.uk](mailto:iarmstrong@cix.co.uk)

Thanks to **Steve O'Brien** & **John Hopkin** for printing and distribution.

The Newsletter is issued (with luck!) 4 times a year, at the end of January, April, July and October. Any contributions should be sent to the editor by the middle of that month.