Court CIRCULAR

THREE KINGS AERODMODELLERS

Summer - 07
INSIDE THIS ISSUE

2007 Nats Combat Action

Copy Deadline

All contributions are welcome send photos, ideas, letters, etc by email to duncan@east-two.co.uk as an attachment in Word for PC, or as a hard copy if you have no computer.

The Editor
31 Glyn Road
London E5 0JB
United Kingdom

The Newsletter of The Three Kings Aeromodellers London United Kingdom

Affiliated to the BMFA

Cockpit Comment

From Glasgow Airport Business Lounge!

Once again the year has flown by, flown by getit! The Nats have come and gone, perhaps the best weather ever, certainly in my experience. Lots of people, lots of competitors and fliers from around the world, Australia, Holland, Germany, Spain, Belgium, Denmark, Portugal even a few poms!

All in all a great event, the racing was close but we were not good enough to make any finals this year, so my hope of two years in a row on the Davis B trophy will have to wait!

This edition of the CC sees a conucopia of stuff, including technical stuff on racing and a few other things.

I hope that you have had a great year flying with the Three Kings.

Enjoy ***your*** Court Circular. – And don't forget Let me know what you are up to.

Cheers to this issue's contributors.

Duncan Bainbridge
duncan@east-two.co.uk

Club Contacts

Chairman
Brian Cordwell
15 Anglesey Gardens, Carshalton,
Surrey, SM5 3JD
T 020 8669 3021
cordwell6@blueyonder.co.uk

Secretary and Editor
Duncan Bainbridge
31 Glyn Road
Hackney E5 0JB
T 020 7682 0421
duncan@east-two.co.uk

Treasurer Brian Glithero
19 Military Road,
Rye,
E.Sussex,
TN31 7NX
T 017973 67143

Comp Sec and PRO and Patch Contact
Mike and Steve Waller
272b Woolwich Road,
SE2 0DW
T 020 83106101
SWSE20DW@aol.com

News and Views

Contests

VTR and F2CN at Croydon

21 October 2007

Pre entry essential to ensure event takes place please advise Duncan on 0207 682 0421 or duncan@east-two.co.uk

Racing to start from 11 am, access from 9 am, processing and line check from 9 am Sport flying on the grass all day.

BMFA License essential.

Letters to the Editor

Some really nice nice words from around the world, many thanks - Ed

Once again thanks for the 3 Kings Circular, it was a great read, and I enjoy reading it, look out for the Aussies at the UK Nats.
Kindest regards
Lance Smith
Speed Research Group, Australia

Excellent newsletter, Duncan, thanks for including us on your list.

Slope & Electric Aeromodellers Tasmania,

Three Kings in Action at Tangmere

Steve Waller

Three Kings Aeromodellers were invited to take part in the Tangmere 25 celebrations on 16th and 17th June 2007.

This event celebrated the museum's first 25 years on the site of this famous WW2 fighter airfield.

Also included in the celebrations were many working military vehicles with the owners in appropriate military uniform and of course the museum was open to show off the many full-size aircraft exhibits and aircraft and WW2 ephemera .

During the afternoon new museum facilities were officially opened and there was a full-size flying demonstration by a Mustang and Kittyhawk.

Our contribution to the event was to provide some demonstration control line flying alongside the Three Kings Carrier competition which would normally have been held at the Three Kings flying site at the old Croydon Airport.

There were 48 control line models on show (static and flying) in the flight line and 100 leaflets were distributed to members of the public.

These outlined what control line flying is all about and what some of the models on show represented. It also had some contact details for BMFA and other control line contacts.

Many of the members of the public we spoke to were 'lapsed' control line fliers;

I spoke to one lady whose husband had made some scale models but had nobody to fly with - perhaps this will be a new control line member for a local club.

Another father and son(s) team had been flying some 049 models on fishing line and now wanted to move on to some stunt flying with some more ambitious models.

Clearly there is still considerable interest in control line and the publicity at this sort of event provides considerable benefits for our hobby.

Having spoken to the organiser at the end of Sunday I know he was very pleased with the contribution that the control line flying had made to the event as well as the overall visitor numbers.

Although no firm decisions have been made as yet, there was a desire to repeat the event next year if possible with an increased contribution from the control line point of view.

I don't think the concrete surface will really be suitable for serious team racing but there is the chance of using a second circle; perhaps for a stunt competition.

Sad News

We have to start off this month with the news of a couple of bereavements in the aviation world.

Bill Wisniewski USA

Sad news indeed that Bill Wisniewski has passed away. An American Speed Flyer, Bill was perhaps one of the greatest engine men in the world.

Most of us in the UK would only know of him from short paragraphs in the modelling magazines, so not everyone would be aware that he produced many inventions and developments to improve engine performance.

He was the first man to use a pen bladder tank in a control line speed model aircraft.

An Obit by Pete Soule follows as does Bill's article on piped speed models.

Both make memorable reading

Alex Henshaw Great Britain

The other aviation person of note to pass away was Alex Henshaw.

He was perhaps not so well known to your average modeller, but he was a real “seat of the pants” flyer who achieved fame with some pretty good flying.

Just before the second world war he turned his attention to long distance flying.

In 1938 he flew his Percival Mew Gull from Gravesend in England to Capetown in South Africa and back again. He completed the whole 12,754-mile round trip in 4 days, 10 hours and 16 minutes, including 28 hours spent recuperating in Cape Town.

He broke the record for each leg and set a solo record for the round trip which still stands today.

During the war he was chief test pilot at Vickers Castle Bromwich shadow factory and flew over 3000 planes while he was there – mostly Spitfires.

His autobiographical book covering the Spitfire period `Sigh For a Merlin’ is well worth reading.

Check your local library or second hand bookshops.

I’m not sure whether he meant to do it, but Alex Henshaw was the first (and only) pilot to perform a barrel roll in a “Lancaster”!

Probably says something about the strength of the spars! If you have net access and would like more information on the man and his adventures, you could check out the following URLs.

http://en.wikipedia.org/wiki/Alex_Henshaw
http://www.angelfire.com/sd2/spitfirefactory/man.htm

William Wisniewski
1929 - 2007

It has been suggested that I prepare an obituary of sorts for Bill, partly because I have a number of photos of him and his activities that I can share. I do want to say things in tribute to the man, but I'm not sure anyone could write a good obituary. His inventions, contributions, and activities are too numerous and generated over a period of nearly sixty years for anyone to have a grasp on it all. In some ways the sum of his contributions and ideas in model aircraft engines and control line speed are about equal to those of all other fliers combined.

But this is not the measure of the man. Genius, often associated with some undesirable personality traits, was his no doubt, but the man I knew was a better human being than all but a few. Modest, always ready to help, good natured, soft spoken, ready and willing to share.

Everyone gets angry, but I never saw him mad.

So in this note remember that I'm talking about his technical genius, his achievements and the hobby we share. But above all this he was a good man in a world where there are so few.

When I first met him he had returned from the first control line World Championships in 1960 at Budapest.

Already a champion, a renowned engine designer, and the driving force at K&B I knew about him from reading magazines.

For example he set the AMA class A record in 57 with his Pink Lady. A wizard with engines but in 1960 he went id a new direction and introduced the Europeans to fuel chemistry.

The fuel he used with tetra nitromethane was so potent that the FAI banned it after he demonstrated how good it was.

Two complete articles covering this first World Control Line championship plus photos are on my microair.info web site http://www.microair.info/f2a/year60-61.htm

His speed was the fastest at the Champs, however, on the last round an Italian flier wrapped the lines around his shoulder to reduce the line length and managed a slightly faster time.

The FAI did nothing about this even after the British protested. So there Bill was - in second place - , but everyone knew who the champion was.

Back in LA we began hanging out at K&B on Saturday when Bill did most of his hobby work. Then for lunch to the Downy Hoffbrau.

What I wouldn't give to have a
time machine and do that even one more time. Schnurle porting was his interest for FAI and he eventually produced a fine engine, certainly the first Schnurle ported aeromodel engine of championship quality. The lumps on the side for the port were funny-looking to us and his wife asked "What is that on the side? It looks like a wart!" and that's what we called it.

From there to the team trials for the 1964 World Champs and then on to the champs with the K&B 15RS that all the team members used.

The complete account and results are on my site http://www.microair.info/f2a/year64-65.htm

The final flight made him World Champion.

Then again back to the Hoffbrau – and the breakthrough that changed F2A and speed flying in general forever. The tuned exhaust and the TWA engine (Theobald-Wisnewski Association).

Test flown at the Sepulveda Flood Control Basin with mind-boggling speeds, Bill asked me not to publish anything in MAN until after the world champs.

Then to England.

Test flying at a different venue, then the first flight at the contest in England.

The Russians, perhaps trying to put him off form, came over to him before his first flight and said they wanted to "Congratulate him in advance for his winning flights." The Czechs and Russians, tops in Europe, watched the first flight
snickering a bit as the airplane got in the air and was not on the pipe so pretty slow.

Then it came in. The contest was over at that point. Later Bill walked over to the Russian pits and reached in his pocket.

There was an assortment of English coins,
some lint, and a couple blow plugs.

He took one of the plugs and blew on it to clear it out and handed it to them saying "Try this, it might help you go faster".

But true to Bill's way, at the end of the contest he held an open meeting and showed all his equipment, explained it and answered questions. Ever heard of that before?

I asked him to write an article for MAN on the tuned pipe. He was a little reticent but gave in. I looked over what he had a couple times and it was a well done thing. It made MAN and was mentioned on the cover. See the article and pictures of the development of the pipe below.

In 1968 He went to the World Champs again.

All three US fliers used the TWA engine and the results were Arnold Nelson First, Bill Second and Roger Third. After this astounding string of victories an attempt was made to produce and marked the TWA engine commercially but was not successful. K&B slowly went down hill over the years and finally was bought by Bil Bennett, owner of the Circus Circus. The operation was moved to Boulder City and the entire line of K&B engines was re-engineered, and are still for sale by Randy Linsalatto.

Bill had to keep on working as K&B provided no retirement at all. He attended contests and brought his aircraft and those of his son and grandson.

They were flown regularly through the year 2006.

My knowledge of his early life is limited. He was born in Olympia and came to Los Angeles in the early 50's. Although I have heard people say he worked at Northrop it is my opinion that he went to the Northrop technical institute.

He began doing work for local engine manufacturers and by the end of the 50's was working for K&B and responsible for the design of the widely used K&B 15R and has set AMA records in speed.

I really regret having to say goodbye this way and I only wish I cold have told more about this really good human being.

Bill Wisniewski contest record at major championships

1955 - 1st A speed - Nationals
195-6 - 1st 1/2A speed, 1st A speed - Nationals
1957 - 1st A speed - Nationals
1958 - 1st A speed - Nationals
1960 - 1st A speed - Nationals; 2nd F.A.I. speed championships
1963 - 1st A speed; 1st B speed Nationals; 1st C speed
1964 - F.A.I. speed, World Champion
1965 - 2nd B PROTO - Nationals
1966 - F.A.I. speed - World Champion
1967 - 1st B speed; 1st C speed 1st Proto speed; 2nd A speed - Nationals
1968 - 2nd F.A.I. speed - World Championships
1971 - 2nd A speed - Nationals
1978 - 3rd B speed, 3rd Proto speed - Nationals
1979 - 1st B Proto speed, 2nd B speed - Nationals
1980 - 2nd B speed - Nationals
1981 - 1st B speed Nationals

Wow what a record - Ed

Tuned Pipes A New Era In Speed

Bill Wisniewski
With thanks to Pete Soule

This is an article on tuning the exhaust gases in a miniature two-stroke engine to produce an increase in power speed as well as effectively decrease the noise level. I hope that the information in this article can help further interest in speed as well as other events that put an emphasis on speed and power.

but will make an excellent muffler, reducing the noise level approximately 40%.

This silencing action could bring back some of the lost flying fields and the power increases could make the silencer a popular item.

I have been working on exhaust tuning with Roger Theobald for the past five years. The initial experiments prompted by conversations with Jack Smith, a motorcycle enthusiast and old time model airplane enthusiast were, therefore, patterned along motorcycle practice.

We have had quite a few problems along the road to success starting from those first experiments. The first bench tests showed an immediate improvement so they were encouraging. However, we were unable to realize this gain in flight.

Progress was slow after these tests, but during late 1965 1966, prior to the Control Line World Championships in England, work in this direction was accelerated. Progress was made in two directions: first in improving the dimensions of the exhaust pipe and, second, in developing a technique which would let us realize the bench test potential in flight.

The dimensions of the first pipes were taken using a typical motorcycle proportions and scaling the length to model engine r.p.m. by using the exhaust gas wave velocity corresponding to gasoline fuel. These figures were found to be considerably higher than the correct one for alcohol. In addition to the difference in fuel, model engine fuel is much higher in oil content than that used in motorcycles, which also adds mass to the exhaust gas.

By trial and error and with the help of thermocouple equipment, we were able to measure the temperature along the length of a fairly successful pipe and estimate the average velocity for our engines. It was determined that the temperature is quite high (as high as 750oF) and because of this, the exhaust pipe was insulated from the engine.

This insulation is a silicone rubber coupling and is constructed by casting General Electric RTV 90 compound in a plastic mold which has been machined to the same dimensions as the end of the pipe.

The RTV 90 coupling is bonded to the pipe by priming it with G.E. ss4004. Without this treatment, the coupling will not adhere to the metal.

The temperature measurements and the lack of success in flight tests led us to suspect that the pipe was cooling off a great deal in the air and reducing the temperature of the exhaust gases. The reduced temperature reduces the wave velocity in the exhaust and effectively makes the pipe too long.

The pipe was insulated with silicone rubber and this modification was fairly successful. The F.A.I. model jumped in speed from the low 140's to 150 m.p.h.

Experiments. with various coatings continued until the presently used black Sperex VHT exhaust paint was tried.

This coating resulted in the largest improvement in efficiency and resulted in speeds around 160 m.p.h. with the F.A.I. model on the standard 80 20 fuel (i.e. no nitromethane)

A few words on the principle of exhaust tuning are in order. The engine on the intake compression stroke pulls air and fuel into the crankcase and also compresses the fuel and air in the cylinder. The power and exhaust stroke is next.

This is where we make use of the hot outgoing gases to scavenge the cylinder and pull the excess fuel and air in the crankcase through the engine, fill the cylinder and pull part of the mixture into the headpipe of the exhaust system. Then the pressure builds up in the pipe sending back a positive pressure just as the transfer port closes and the exhaust port is still open, thus, pushing the mixture in the headpipe back into the engine under positive pressure giving a supercharging effect.

Now that the principle is known, we will have to design a pipe for an engine. First, we must measure the volume in the crankcase with the piston at bottom center. From practical experience, I have found that the internal volume of the pipe should be about ten times the crankcase volume and the headpipe cross sectional area should be 1.6 times the exhaust port area. The next step is to find the length of the exhaust system excluding the tailpipe length.

This is done by picking a useful RPM. This must be converted into time. To make it less complicated take the RPM and reduce it to revolutions per second (cps) by dividing RPM by 60 then divide cps by 1 to get the amount of time for one cycle.; 1/(cps)

Then we must figure the percentage of exhaust opening less the overlap or difference between the exhaust and transfer ports on the upstroke.

For example, if an engine has 170deg exhaust opening and 130deg transfer opening, we have 40deg difference total then divided by two is 20deg 170deg - 20deg = 150deg.

Then divided by 360deg will give us the required percentage. Let's call this number in the formula (P). Now we must use a constant which is the speed of sound at the average exhaust temperature in inches per second. Practical experience has come up with 22000 in/sec for our constant.

Then to reduce this to a half wave divide by 2 so the formula resolves itself to
(P * 22000)/(2* c.p.s.)

For proportions see Figure 1.. These proportions are derived from experience also.

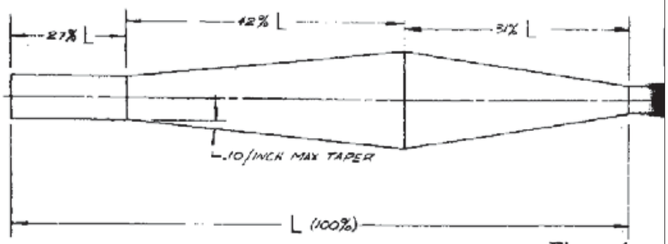


Figure 1.

The tailpipe cross section area is 1/3 the cross section area of the headpipe and the length is the intersection of the convergent cone plus one diameter of the tailpipe.

Now to the engine:

It must have no sub-piston induction, that is, at top center there should be no gap showing under the piston.

The reason for this is that the pipe creates such a violent negative wave just after the exhaust opens that at top center you are pulling some of the crankcase charge into the pipe which leaves you with a very weak mixture in the crankcase with a decrease in power rather than an increase.

Also, the more difference between the port heights on transfer and exhaust, the more range of RPM you have.

For example, 5deg overlap = 1000 RPM range.

Construction of the pipe is not too difficult, but it is time consuming. All the pipes used were machined from aluminum and magnesium bar stock.

A taper attachment for the lathe is handy, but not essential. Here are the steps we followed.

1. Bore the inside diameter of the headpipe to about 2 inches deep.

Turn the outside diameter of the headpipe 1.5 inch in length.

Thread the end of 1/8 inch.

We used a forty pitch thread on the headpipe so that extensions can be made for varying conditions.

Then turn a 1 inch diameter x 1 inch length. Face to 42 % L + 3/32nds inch. (See Figure 2.)

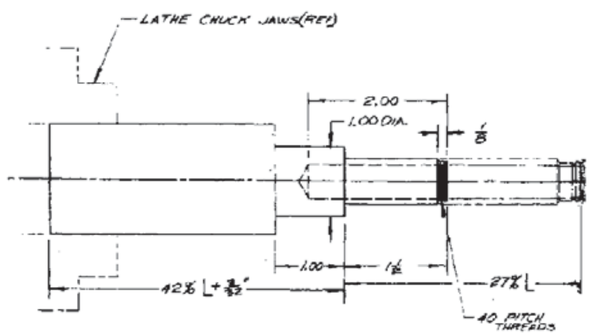


Figure 2

2. Reverse part hold on one inch diameter and bore press fit diameter for mating part 3/32 inch deep.

Bore major inside diameter 1/8in deeper than press fit diameter. Set taper with a dial indicator. Bore taper blending at major inside diameter. (See Figure 3.)

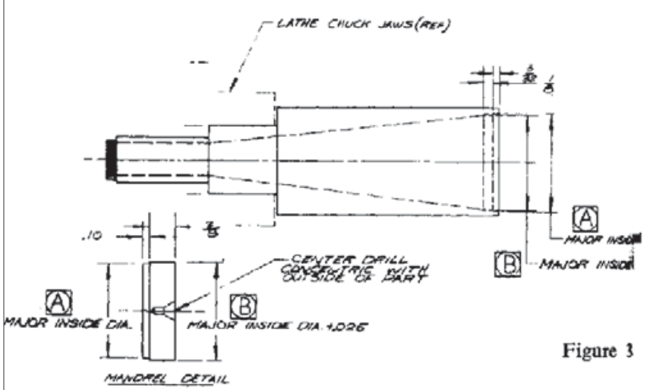


Figure 3

3. Make a plug to fit the major inside diameter of pipe as shown in Figure 3.

Hold on the headpipe with the plug in the end supported by a live center.

Turn the outside taper to a .016 in, wall thickness.

Then turn major outside diameter to major inside diameter plus .050.

Blend outside taper to the headpipe. (See Figure 4.)

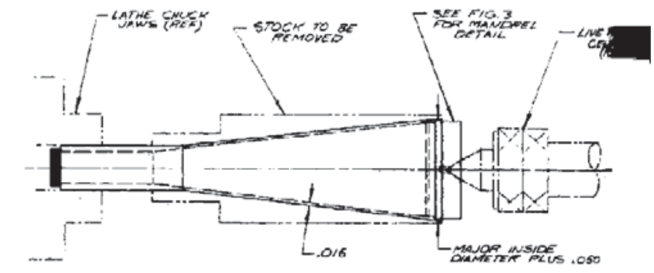


Figure 4

4. Make rear cone using the same procedure as the front cone except as shown in Figure 5.

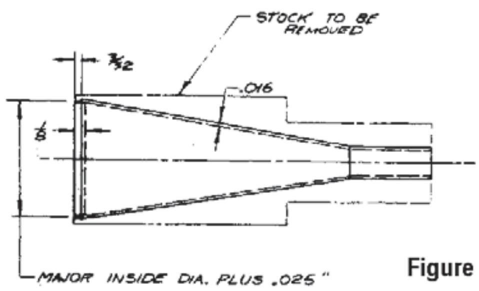


Figure 5

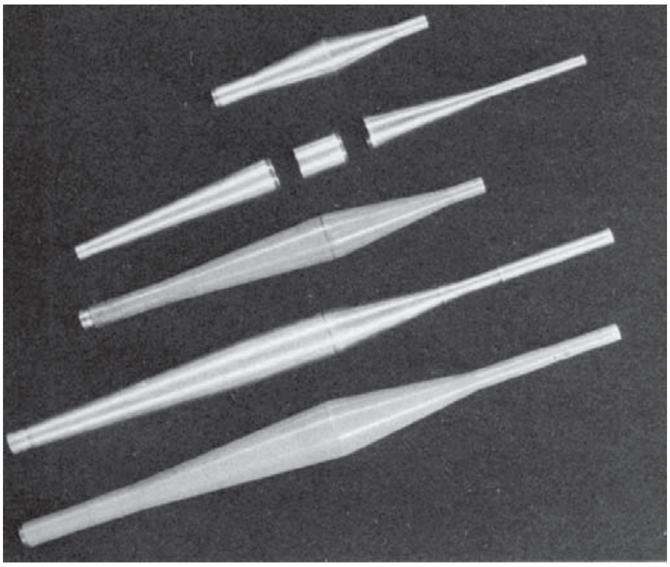
5. Bond the two cones together using a good high temperature adhesive at the press fit joint.

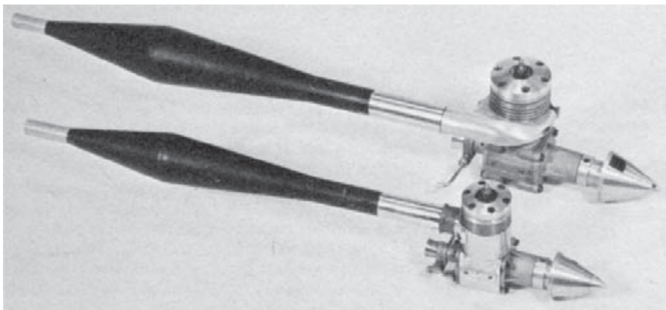
The engine which was used in the World Champs and which has had the bulk of the development effort is a special engine of our own design which also uses some K&B 15 R components.

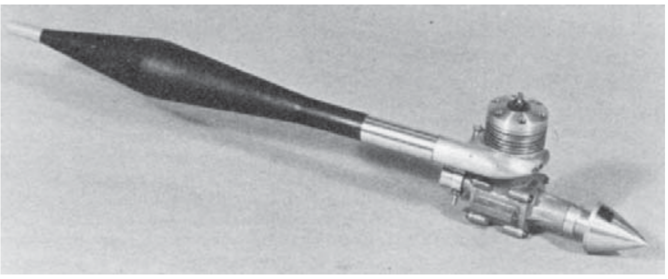
During the past few months, however, we have been testing these systems on standard K&B engines with very gratifying results.

We have gained up to 1500 rpm with no other change to the engine other than adding a tuned exhaust pipe. Experiments with raising the exhaust port are still going on, but could yield a further performance increase.

The photos show Experimental Pipes, the World Champs engine and and 29 R for comparison TWA and 29R and the experimental KB 29 R







I believe that the tuned exhaust system can work on any size of engine although there is a lot of development work for each new application.

The tuned engine exhaust seems to have no effect whatever on the engine.

We had 30 to 40 high-speed flights on each engine with no apparent wear at all.

Fuel consumption is approximately 10% than normal even though the power output is increased considerably. We have gotten as many as twenty and never less than five flights per glow plug.

The engines are not hard to start adjusting the needle valve is quite different due to the garbled exhaust and reduction in noise.

Once it is set however it does not have to be changed with each flight.

There seems to be some controversy about the tuned exhaust system.

The tuned exhaust is not a startling new concept. It has been used for a good years in several racing sports. Indianapolis racers, motorcycles, sports cars all use some form of exhaust tuning.

Roger and I have merely applied a 30 year-old physics principle to model aeronautics.

True, this is not immediately available on the commercial market, but this has not stopped modelers before.

They have a knack of turning the difficult task into an accomplished fact. This is where we progress in our sport.
Of course, you can go faster by using so called super fuels. Most of these fuel ingredients are prohibitive in cost as well as being difficult to obtain.

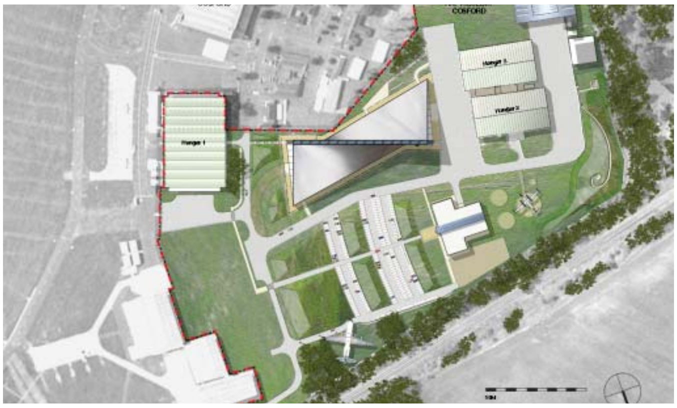
If not handled with extreme care, they can be very dangerous to your health .

In this article, I have tried pass on to you modelers the benefit of our six yers of work and study.

All construction details are given so that those who do not have the facilities to do the work may have someone else make it.

Most important, let us keep an open mind and not regress to the past, rather progress to the future.

‘’You are now leaving the American Sector’’ – Cosford Cold War Exhibition.



New Museum Hall at the RAF Museum at Cosford, designed by Feilden Clegg Bradley
Reviewed by Duncan Bainbridge

To most who have visited Berlin, before or after the fall of the Berlin Wall, this phrase sums up the Cold War. Born in Australia in 1969, when I was growing up the Cold War was not really a major concern.

Russia and the Warsaw Pact had no place in the scheme of things in Australia. Or did they?

From the late 1950’s until 1975 the Vietnam War raged on Australia’s doorstep, a direct result of the West’s Cold

War policy.

Whilst not quite the MAD policy, it was a major conflict and one which proved and still proves to be politically controversial in the U.S. and Australia.

But to most plane-crazed kids the Cold War is the era of the big jet and heavy metal fighter; cool white big jets and hardcore silver fighters.

The icy stand off of the Cold War melted on Christmas Day 1991 to be replaced by the strange dichotomy of former Russian states which included the Ukraine, home of the best F2C team race pilots in the world, Moldova home of lots of superb combat pilots and a host of others, some of which, but not all excell at CL aeromodelling!

But whatever your outlook, this Cold War era has, more than anything, structured the way the in which we live. To commemorate what is possibly one of the strangest periods of detent between the great powers of the latter 20th century, to be a testament to a huge investment in a war which never happened and as a reminder to future generations; the RAF has preserved a significant number of aircraft and amount of equipment from the time as part of the larger collection of the RAF museum.

The National Cold War Exhibition, taking its cue from the Royal Artillery Museum at the Woolwich Arsenal and its Cold War exhibition designed by architects Austin-Smith:Lord in 2004 (Austin-Smith:Lord were also responsible for the design and conservation of the RAM).

The RAF Museum based at Howdon and Cosford under took a comprehensive appraisal of its collection and quickly realised that it now had to bring the outdoor collection based at Cosford indoors as it was deteriorating rapidly.

The review presented the opportunity to display Britains there V Bombers – Vulcan, Valiant, and Victor indoors for the first time ever.

Added to this was the fact that this review made it evident that the air frames most in need of a home indoors all fell into the post war era – all basically ''Cold War Warriors'' meant that a theme quickly became apparent.

The resulting project was made possible by funding from the Heritage Lottery Fund, Advantage West Midlands, the EU Regional Development Fund, The MOD, The Local Authority Bridgenorth Council, rural regional funding, and the museum's own funding activities.

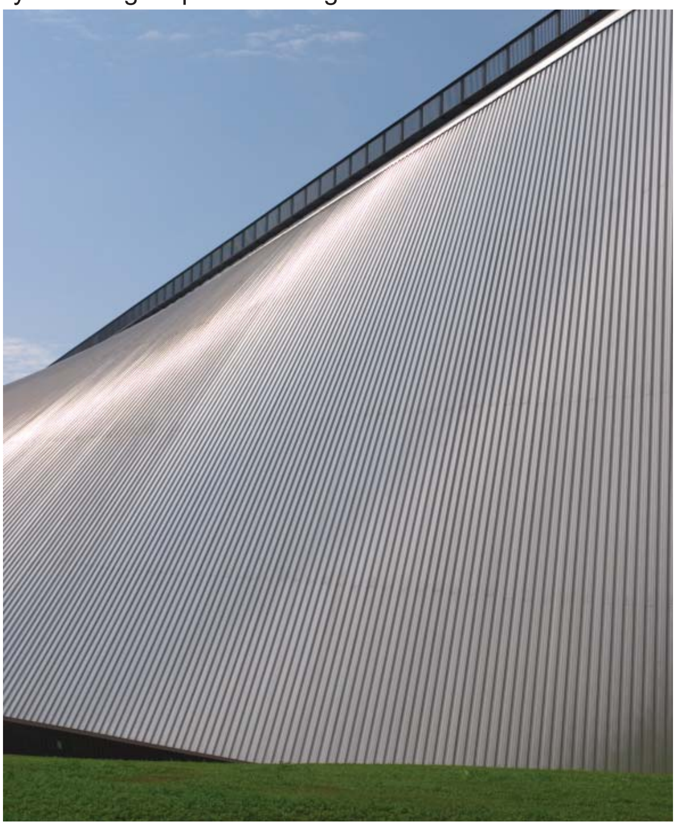
The project was powered via OSN proceeds and the successful design team was comprised of architect Feildon Cleag Bardley, structural engineer Michael Bradley, partnership and exhibition design Nell Potter.

As a team what they have done borders on the magical. They have solved the age old architectural problem of fitting the interior within a structure which is one that works, designing a building for a static exhibition of aircraft of varying size, plus associated equipment, graphics, and it showcases is a challenge.

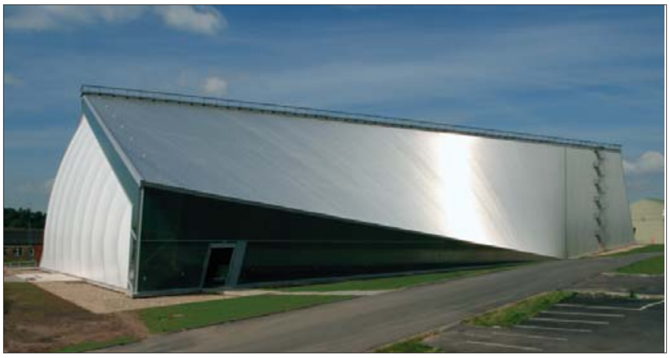
Aircraft have odd shapes and do not easily fit into rectilinear buildings. The success of FCB's design has not just saved several major airframes from mutually assured death by corrosion, they have conceived, designed, and delivered a building which is a massive sculptural basically form, one which contains a dramatic exhibit of some of the most historic aircraft of the 20th century, some are in flight, some parked, waiting to take off.

All packed in, but not too closely, they provide a tableu that is both intimate and dramatic!

To be able to accommodate such a diversity of aircraft and exhibits the architects utilised a conceptual idea of two triangles placed in opposition joined by a gap which acts as a dividing line between the light and dark sides symbolising a split of ideologies.



It is by no means as contrived as Libeskind's Imperial Museum of the North, yet still acts as a metaphor, one which may express its importance and status of subject and content.



The structure utilises a palette of materials which echoes this cold utilitarian militaristic environment of the time.

This plan rises up into a walkway and viewing platform, both placed under a continuous rectilinear roof light which acts as a structural spine.

Falling away from this spine the roof drops vertically and sweeps to the ground in catonary style curves.

Formed of an aircraft like aluminium standing seam roof cladding, the roof mirrors this sweeping geometry of this aircraft within creating a supremely powerful and sculptural structure on the landscape of the airfield.

The buildings elevations are finished with interlocking translucent panels which are to provide delighting at ground level, dismountable frames allow aircraft to be moved in and out of the building.

They also provide diffused light to the church-like interiors.

The scale of the building is intensified by simple and sinuous detailing, complimented by limited colours and material, aluminium, green glass, white fabric, and fair faced white concrete, all imposing on the gloss green or the airfield.

The 12-4 building covers 80,000 ft which is used to house over 20 aircraft; including the V bombers, Mig 21, Mig 15, Sabre, Meteor, Javelin, Canberra, Hunter, and many more, along with a trabant and a section of the Berlin Wall.

The major exhibition pieces are interspersed with information points and interactive units detailing very incidents.

This equated to a bass cost £155 sq ft – cheap at ½ price.

Key to the success of this structure are the steel roof beams. These have been left untreated and present as a wonderful rust coloured spiders web.

Humidity control is created through the use of controlled installation, low conservation heating, exposed thermal mass and strong roof insulation.

As part of this strategy it was decided that the structural shell would would not be painted.

Within this structure the exhibits are posed together in a way perhaps never imagined by their designers despite their size, proximity, and complexity, the visitor has close and unconstrained easy access to them.

This new addition to what already is an incredible museum is well worth an unhurried three or four hours.

It will be rewarding time well spent, just remember there are three other hangers!

The NCWE is a credit to FCB, they have avoided the current trend to use the computer a little too much.

Informed by history, ideology, and functional form they have designed a building which responds and fulfils the requirements of the brief.

It is a building which uniquely reflects the spirit of the age, it is representative of new content and use.

A structure which is inspired considered yet not overly extravagant containing an immensely successful exhibition which is of award winning status and well worth your visit.

Royal Air Force Museum Cosford
Shropshire, TF11 8UP
01902 376 200 (General Enquiries)

Open daily 10am - 6pm
Last admission at 4pm

Combat Capers and Comment

Mike Waller

It's been a while since I have written anything for the CC, it just one of those things where work, and now college always takes over!

And model toys always get a back seat!

At last year AGM there was a lot of criticism aimed at the 3K committee. Although criticism in itself not always a bad thing, it would be nice if we could have some help esp. from those pointing the finger!! We didn't stand down because we felt that we could no longer give our time as we once did, we both reluctantly stayed on the committee when no other person put there name forward.

You will have noticed that there has been little activity over the last year and the club has moved in to the shade so to speak.

The coming year 2008 I will not stand again, I am sorry but emotional blackmail will not get me on the committee again, even if it does mean that the patch and club is lost for good. So please this is advance warning the Three Kings needs your help if it's not just to become part of control line history.

Any way I am here putting off work again,

I'll take some time and talk combat as its what I fly and love.

Trifonovs combat models,

Dad and I have always wanted to go to watch at the WCh, and in early 2006 it was mentioned at our Cosmo club meeting, after some research we found that all it cost was £150 each (based on 4) for hotel, car hire and flights to get the one in Spain.

Peter Tribe and our good friend Roy Green wanted to go.

Early Friday morning 2am, we all turned up at Steve's house and we where away, after a flight of just 1 hour and then 3 hours of manic driving by yours truly we got there.

About the first person I talked to was Gordon Price and the first thing he said was take a look at Trifonovs models.

A wander over there, and wow, that's different, carbon LE, TE, centre rib, reversed carbon bellcrank and new style horn enabling super fine adjustment. This was different, what was on my mind was did it make any difference?

Yes it did, although great flying by Trifonov he would have won easily anyway, but his models didn't break at all!

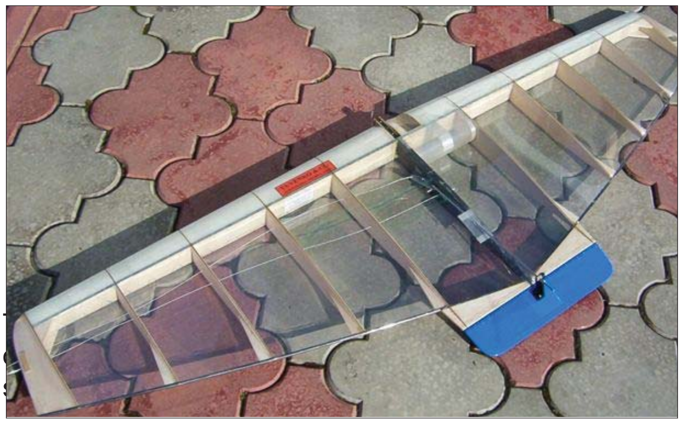
They just bounced off other models, and when hit by another model just kept going and the other model didn't. It has to be said that Trifinovs flying was so good (I have never seen anyone fly that well since or before) that I believe even with standard models he still would have won.

The models caused a stir at the world champs!!

On the last day I went to ask if he would sell his models, yes was the answer, great I thought, go to the bank and buy all his gear.

Then came the bomb shell, 'I want $200 per model', ok not what I was thinking. It was reckoned to have $70 of carbon and the labour involved to build was said to be great. I walked away empty handed and I believe some guy from USA got some of the models.

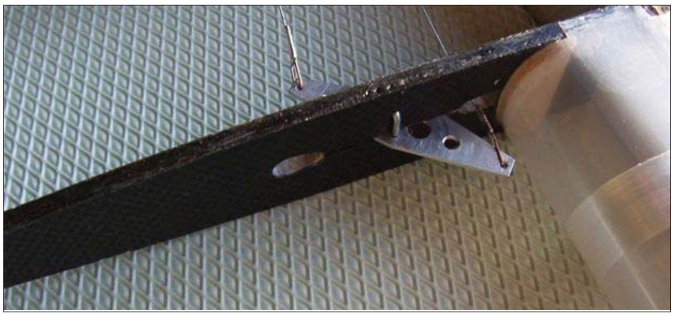
When I got home I did some research and I think the $70 carbon was a bit over cooked more like $50, but after further investigation into the design, kindly given by Joe McKenzie from Canada who picked a model up.



So what's the next step I thought, do I make the models, could do but it will take ages, do get my newly retired dad make them, he would say no. That was that, but then when chatting to Uvenkco he let me know that he was making prototype Trifinvo models. That was it, 5 were in the post a month later.

The LE is slightly different with out the timely front LE spar, but still retains most of the Trivfnov design. In the air, they turned very tight after some weight to balance, but remained very stable, because of the lightness and stiffness the models are quick.

Carbon makes the engine run faster due to the stiffness and solid bolting down of engine!



Reversed bell crank, only done for strength?

The copy, great quality and super light!

Now I have 20 of the models, and they are truly great models, 5 competitions and 8 midair's later I have not broken one!!!!! There has been some doubt from the F2D hierarchy, but thay have proved themselves time and time again. Because of my investment I don't have to buy any more models this winter!!

Price of the models?   Well let's say they aren't $200 and they aren't $35!

One year later this design and concept is starting to creep through the F2D world, slowly but it has started, even 3 years ago I was contemplating this idea, its taken a while and I am not sure why this didn't happen ten years ago!!

The WCh was great and I'll be going to France in 2008,

Some Nat's photos

Second batch in action at the Nats07, even more carbon and what I call critically balanced model - no extra weight needed!! FORA powering faster than everyone I meet except Igor D,

Dave Riley launches me against Roger Fisher,

The Three Kings combat team hosted Robert Owen from down under, Robert was a really good guest and really nice guy, another good friend!

Robert against Stuart Vickers, great match

Robert and Martyn, pitting my models,

I was given a master class by Russian, current European champion Igor, never flown someone like that, flying very different from any English pilot, very fast and low!! I gave him a good match, and its given me a lot to think about. Better get my combats kites out and try some of the moves he did.

Dave Riley and Martin Coe, two great pilots, Martin was my man of the match/competition so to speak, truly great flying, only been flying combat three years, not bad eh?

Combat Kites,

Some of you will be thinking, combat kites what's he on about. Well its one of F2D combats best kept secrets, last year I took delivery of 10 combat kites. They are basically a kite about the size of an A3 piece of paper, and you have a handle the same size as a combat one. Light weight fishing line for the lines, and its go. Roll out the lines wrapped around the handle that's all that's needed to fly. You can practice with them for as long as you want, I did a solid non stop 2 hours flying once, its great no smashed models or broken props. What's more is they are quick; get the wind about 15mph and they start going quicker than a F2D model. What's more is that you can fly combat with them!!

Round & Round
Duncan Bainbridge

Racing at Croydon 1 April 2007
Ted Horne

Catlow Jephcott

What a shame, the sun shone, but the wind blew, and blew, and blew.

Competitors came from far and wide, Sheffield, Leicester, Odiham, and London and made valiant attempts to beat the elements, but were forced to admit in the end, that it is better to retire hurt, but live to fight another day.

Two Classes were flown, British G/Y, and F2CN. Potentially 5 teams in each class, but in the event 3 teams pulled out for a variety of reasons, including, too windy to fly 2-up with a new model in this wind, stripped engine bolts, broken model flying 1-up, can't land without breaking a prop each time, etc..

The first race was Brtish G/Y where Crawfurd/ Vaughn were paired against Barker/North.

The times were 5m 37s, and 6m 30s respectively. The next race was to have been Bowman/Bellamy and Bainbridge/ Orchard, followed by Catlow/Jephcott and a team from a previous heat.

No one was ready to fly so a second round was flown by the Crawfurd/Vaughn, Barker/North team, where times of 4m 28s, and 4m 37.5s were recorded.

By the time this heat was over, all the other entrants had decided that they had seen enough.

A somewhat unhappy final was flown with Barker/ North Tipping over on landing at100 laps, and ripping the filler valve of the tank, leaving Crawfurd/Vaughn the winners, who decided to stop racing at 146 laps.

F2CN. Whilst a number of solo flights were flown condition were such that no two up races were flown

Mike Bellamy;s Argander


Winners Crawford Vaughn with CD Duncan B


Barker North


Furthest Travelled - Bowman Bellamy

Wings over Croydon 2007

Duncan Bainbridge
F2CN & Brit GY

1 April 2007 saw the much awaited first major contest for F2CN & BGY get under way with not a single April fool's joke insight. Well almost; the unveiling of the 3kg access keys was a bit of a joke! One working but the other failed and Croydon security had to be called. A nice bloke called Ken turned up and we were off up the hill to rock & race.

All Show – No Punch

Nine teams had pre-entered but winds of 18mph gusting up to 23 mph obviously put a few off as only five braved the adverse conditions. The much awaited debut from carbon boys Sykes / Bathes didn't happen, and the lack of practice during the winter layoff was obvious as conditions and unfamiliarity with new gear was evident.

For yours truly my choice of weapon was not up to the task. My 25 year old MVVS D7 Fired, ran strong, spat the bolts out of the back plate and sang its last hurrah. Well and truly clapped.

So we withdrew.

The new team of Red Frog, AKA John Boman all the way from North Wales who has taken up this challenge of being handle grabber for Yorkshire Terrier Mike Bellemy, they had a shiny new model, sadly it was not to stay shiny for long and a bad catch saw a big chunk of Mike's arm to be left in South London! Along with, I guess quite a bit of blood!

They went to their reserve, (wow that's being organised!) but that came to grief in this wind; scratch team two.

Last Man Standing

Carlow / Jephcott also had a go in the wind but for reasons unknown to your scribe opted out as well. So under the keen eye of CD Ted Horne ably assisted by veteran handle man and 3k's stalwart Allan Jupp, the two teams left standing Barker / North and our very own Roy Vaughn / Steve Crawford battled it out for a couple of rounds and a somewhat incident prone final. B/N broke the tank valve at the100 lap mark and C/V carried on until the CD called a halt to this one horse race.

Side view

On the sidelines Dick Miles, John Bashford, and Danny Hoare along with Pete Last, and with visitors Dick from Cadmac Tams, ran up a few motors and daws some more. Dick had his usual range of nice Vintage speed models and was running up a nice Nelson with a Dutch origin modified back plate. In hindsight they sensibly didn't venture into the air.

Regulars Jill and Sharon also elected not to fly sensibly opting to peruse the papers!

Welcome also to returning flyer and local resident Henry Rennie,

Henry has a loft full of models and is keen to get back into this sport.

Another visitor was Simon Warren, a friend of mine who was witnessing CL for the first time! As this wind increased and the racing stopped, Simon was last seen wandering off down the hill muttering ''interesting, not quite what I expected but interesting", with two daughters we shall see, but I will keep on at him!

Onwards and Sideways

After our good year debacle out came the FZCN. Catlow / Jephcott had theirs wound up and going nicely, so we launched ours; going well, but I too became the third victim of this day! Crash! I removed the bottom of the fuse and in the process lost a brand new Mazniak wheel.

Ho hum the gods were unkind! But is repairable, and we will carry on!

C/V decided that discretion was the better part of valour and elected not to fly so the day came to an end. Winners and grinners got medals and the furthest travelled and most blood prize of some top Aussie wine (of course) went to John and Mike the double B's! Who vowed they would be back – nice one lads!

It's a Wrap

We wrapped up the barrier tape and took up the stakes to be faced with an onslaught of mini bikes and not so mini bikes! Blimey where did they come from?

The answer was provided as headed home through the industrial estate that we drove past hoards of young guys on bikes, quadscars, even bicycles all hanging out hooning up and down the roads and across our patch.

If we are to make any improvements this large element of illegal and anti social behaviour must be suppressed. Your commitment is working for you to find a solution so we can enhance our facilities for you. Watch this space!

It was a good day but in the end the real winner was the wind. But we will be back with the best in vintage team race on 27 May 2007. Be there or be a platypus!

My thanks to Ted and Alan, Peter and John for the photos, Sharon North for her sensible advice, Pete Jophcott and the double B's for their support.

Thanks to all of you for coming. And last but by no means least, special thanks to Peter Last for bringing the stakes and not coming to fly, and to Steve Waller for painting the bloody things!

Also to Steve and Roy for helping clean up. Til next time, cheers folks.

Incorrectly Assembled Model Engines

Alwyn Smith

About 1970 while in New Guinea Garth Bartlett approached me about his NEW Mills .75. The engine would run, but very POORLY.

On checking I found the cylinder was the wrong way round (180 degrees out) Garth had lost interest in this engine and asked if I would swap it for a NIB O.S. Pet 1.6 cc Glow. I still have the Mills .75

Brian Mason the president of the Doncaster Aero Club in Melbourne asked me to look at his son's Enya 19. This was about 1977.He told me that they had been flying it in a C/L model, and after landing and refueling, the engine would not run correctly. It was taken to a model shop in Melbourne and checked, and was returned to Brian with the instructions that there was nothing wrong with the engine.

The engine still would not run correctly. It was given to another model shop for checking. They fitted a new piston and liner, but the engine still would not run correctly. It would START but would not tune with the N/V. Brian asked me to have a look at this engine. I straight away realized that the cylinder liner was inserted the wrong way round.

I fitted the original piston and liner back into the engine, and ran it for Brian.The story about flying the engine and then having problems, was obviously not correct as the engine had to be pulled apart to turn the cylinder liner.

Again at the DAC a junior member had two Enya 15 s fitted into C/L models. This was probably about 1985. He asked me to have a look at one of these engines, as it would START but would not put out any power, and would not tune up with the N/V. It was fitted into a Geoff Pentland 44" W/S Kawasaki Hein (Tony)

On checking this engine after removing the muffler, it was obvious that the PISTON was in the wrong way round. The BAFFLE on the piston should be on the transfer side of the cylinder and it was on the EXHAUST side. The Cylinder Head had also been turned to fit the baffle.

Another junior (Rohan Cleary) at the DAC also had two Enya 15 s in models. One engine was difficult to START and would not tune. It had been used many times over the previous months I asked if the engine had been pulled apart, and I was assured that it had NOT been. On checking inside the exhaust port after removing the muffler, the piston baffle was obviously on the wrong side.

The engine ran correctly after the piston and the cylinder head were fitted the correct way round.

A senior member of the DAC asked me to have a look at his O.S. Max 40 R/C which he had purchased S/H from another member. He told me that the engine would START but would not tune up, and was spitting a lot of fuel out of the carburetor. I suggested that he check the cylinder liner as it showed the typical symptoms of a cylinder liner the wrong way round.

The following week he confirmed that the cylinder liner had been fitted the wrong way round by the previous owner.

About 2001 I was offered an O.S. Max S 35, very cheaply, by a hobby shop as I was told that it was probably only good for spare parts. I purchased the engine, as it was a C/L engine and had a muffler (Very difficult to buy) and a good N/V assembly. I had looked inside the exhaust before buying and noticed that the piston baffle was on the wrong side. I guessed that the engine had been pulled apart and re-assembled the wrong way round and probably had none or very little running.

Another friend John asked me to look at an O.S. Max 15 that he had purchased at a Sunday market. The engine looked NEW. The engine would START but would not tune up with the N/V. Another friend (An engine collector) looked at the engine and could not find anything wrong with it.

As soon as I looked into the exhaust port I suggested that the cylinder liner was in the wrong way round. Normally when the piston is at the bottom of the stroke (BDC) the top of the piston is level with the bottom of the exhaust port. If you can see about 1.5 mm of the wall of the piston at BDC, you are obviously looking in through the TRANSFER port, which is slightly lower on the wall of the cylinder liner. After turning the cylinder liner round 180 degrees, the engine ran correctly.

Another friend loves his Merco engines. His Merco 35 broke a crankshaft in a C/L model. I had a new crankshaft made by a friend in Melbourne.

The Merco was sent back to my friend overseas and fitted back into his C/L model.

I visited my son in Dubai in the U.A.E. in 2003 and while there I was offered a fly of the C/L model with the Merco 35 and the new crankshaft.

The engine had not been run since fitting the new shaft. The engine was difficult to START, and would not tune up with the N/V and ran very POORLY in the air. I suggested that the engine had been re-assembled with the cylinder the wrong way round, and I was found to be correct when the cylinder head was removed and the height of the exhaust and transfer ports checked. The engine ran well on the newly made crankshaft when the cylinder liner was fitted the correct way round.

About two years ago my friend Colin who I fly with at the Nambour Model Club in Queensland, was given an O.S. Max 15.

It was very dirty. It probably had not been run, but was dirty after the owner tried to start it and left it on the shelf covered in oil. Colin pulled it apart and cleaned it and

re-assembled it and loaned it to another member at Nambour, and it was put into a C/L combat model.
The engine was very difficult to start, but this was put down to being a new engine. Eventually the engine started but would not tune with the N/V. The model was launched with a POORLY running engine and cut out on T/O.

The engine was then re-started and still would not tune with the N/V, but this was put down to the engine being new and tight. The model was again launched but cut on T/O. I asked them to remove the muffler and let me look at the engine. The piston was about 1.5 mm above the bottom of the exhaust port when the piston was at BDC. I suggested that the cylinder liner was in the wrong way round.

Colin immediately realized that he had not check the two ports (Exhaust and Transfer) when he had re-assembled the engine.

When the cylinder head was removed and the two ports checked and it was confirmed that the cylinder was in the wrong way round, the cylinder was rotated to the correct position, the engine re-assembled, started very quickly and easily and peaked out when tuned with the N/V.

I purchased a Gordon Burford Taipan Tyro 1.9 cc Diesel at a Sunday market very cheaply. It looked new and I guessed that it had not been run. The cylinder had been fitted 90 degrees out so the internal transfer ports will not align and the engine will not run.

I purchased two engine on eBay about July 2005, a Taipan Tyro 1.9 cc Diesel and an Enya 15 111 Glow engine. The Taipan has the cylinder on 90 degrees out, and has every chance of running if fitted correctly.

The Enya 15 111 mentioned in No 11 above arrived with the piston fitted the wrong way round.

I purchased an Enya 19 V (BB) engine on eBay in England about July 2005. When it arrived I realized that the Cylinder had been put in the wrong way round.

The engine looks very new and may not have been run, as someone had pulled the engine apart and re-assembled it the wrong way.

I carry these three engines around in my model box and show them to my modeling friends, to help them to recognize this sort of problem.

The latest engine problem came from a modeller in Sydney who had contacted me about a model plan for which he was searching .

He mentioned by email that he had been given a C/L model and had acquired an O.S. Max 20 R/C engine, which fitted the model.

The engine was running very POORLY and would not tune up with the N/V.

I suggested that he check the piston baffle and the piston at BDC in relation to the exhaust port.

He removed the cylinder head and confirmed that the piston was in the correct way BUT the cylinder was in the wrong way round as I had suggested.
With the cylinder inserted correctly the engine ran at peak RPM We have sent him an O.S. 20 C/L Venturi and N/V and S/B (OS Part No 2151 1000)

The same modeler mentioned above sent me an email with a photo of an Enya 15 that he was given at the same time as the O.S. Max 20.

After reading about all the problem engines that I had found he decided to look at his Enya 15. Sure enough the piston was in the wrong way round. The baffle was on the exhaust side, and the baffle on the piston should be on the transfer side.

An Enya 15 111 was purchased from Canberra on eBay in January 2007. The engine appeared to be in excellent condition with glow plug and good N/V & S/B, but no muffler, and a little oil dried on the outside of the crankcase. The compression was possibly the best I have ever found on an Enya 15.

The piston was in the wrong way round, the baffle on the piston was quite clearly on the exhaust side, where it should be on the transfer side inside the cylinder. The cylinder head is obviously also turned 180 degrees as there is a slot in the cylinder head to accommodate the baffle on the top of the piston.

Engines that have been incorrectly assembled as is this Enya 15 111, will start, with difficulty, but will not tune up with the N/V and will not reach peak RPM.

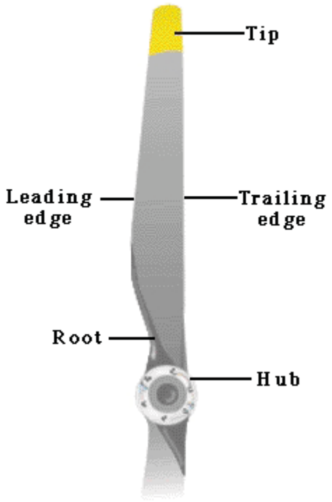
I have fixed these problem engines over the last 35 years. An article appeared in the American magazine Model Aviation in I think March 1989 by Tom Francher, and he explains that he helped a friend who had purchased a second hand Super Tigre G 21/46 C/L engine, and the engine was hard to start, and would not tune up correctly and was running with a very hot crankcase.

There was a drawing with the article showing the different heights of the exhaust port and the transfer port on a cylinder liner. The EXHAUST PORT is the HIGH one Tom also explained the hot crankcase, as the exhaust gasses are going down into the crankcase as the exhaust port is opening first when the cylinder is in the wrong way round, and this is allowing the exhaust gasses to go into the crankcase and stops the correct flow of new fuel into the cylinder.

I have written this up as over many years I have explained this problem to many friends and felt it was about time that I listed all the various engines that I had found with incorrectly assembled parts .

More Propeller Thoughts

Duncan Bainbridge



The following came from reading Chapter 14 of Model Aircraft Aerodynamics by Martin Simons

The purpose of the propeller is to convert engine power into thrust used to drive the speed plane.

In general, speed planes use small diameter high pitch propellers. These are thought to be low thrust as compared to large diameter low pitch props.

In reality, speed props develop as much if not more thrust as an aerobatic plane. Before going further, lets look at what is happening with the prop.

As the aeroplane moves, the air in front of the prop disk area (called the inflow) is drawn into the propeller and is accelerated so that the speed of the air after the prop (called the outflow) is greater than that in front.

This is intuitive as we have all felt the prop wash on our models.

The acceleration of the inflow causes a low pressure in front of the prop disk and the out flow causes a high pressure behind the disk.

The difference in pressure between the inflow and the outflow is the thrust generated by the prop.

The greater the volume of air that the prop moves, the greater the cumulative pressure difference. Thus an increase in prop diameter increases the prop disk area and correspondingly increases the volume of air.

Props, like wings, generate greater pressure differential when the angle of attack in increased.

In props, this is the pitch. Like a wing, too much pitch can stall the prop.

A curious thing happens though when the model plane starts to fly. The inflow begins to pick up speed as the model picks up speed.

The prop gets more efficient, that is, the drag on the prop is reduced as the plane picks up speed. We know this as the unloading of the prop. At some point as the inflow air speed increases, the low pressure in front of the prop turns the inflow to the direction of the prop rotation.

The result of this is to decrease the effective angle of attack (pitch) of the prop.

If the initial pitch of the prop is too low, the increased air speed can reduce the pitch to zero or to a negative value where the prop becomes a brake. To compensate, speed planes run very high pitches.

The difficulty with high pitch props is that as the pitch increases, so does the drag. As prop diameter increases, so does the drag.

Consequently, for a motor to run an increased pitch prop at the same rpm, the diameter must be reduced or the power output of the motor increased.

All the above tell us is that low pitch props provide good acceleration until the airspeed causes the effective angle of attack to be reduced. High pitch props provide poor acceleration because the high pitch prop is stalled until the air flow gains enough speed to reduce the pitch to an operating level.

So how to use this information on a speed plane? If the event allows the flier several laps before the timed run begins, use a high pitch prop.

The first few laps as the airplane takes off can be used to build up the airspeed and get the prop working before timing commences.

If the event is timed from the first lap, a compromise is required between the acceleration of a low pitch prop and the higher speed of a high pitch prop.

Another important point is that the props modellers generally use are constant pitch props.

The combination of pitch, diameter, and blade shape make a prop efficient at a specific air speed.

If the model or engine is modified so that the air speed will be higher, a new prop must be found.

Engine Review
Cyclon JAK 09

Maris Dislers

A new 1.5cc diesel

The 1.5cc model engine size has had a long history in competition circles, despite being overshadowed by the 2.5cc engines needed for competition in most International control line classes. Perhaps for this reason competition classes for the 1.5's have tended to be less intense and engines have enjoyed a longer tenure of competitiveness.

Aside from Half-A Team Racing, which has retained a small kernel of interest and has created some gorgeous "tool room specials" for the event, the main competition outlet has been Half-A Combat.

This class has been very popular in SA and Victoria, as well as the UK and New Zealand over the years, perhaps because a PAW 149 or good Taipan Series 66 diesel was all one needed to be competitive.

Earlier engines of modern type, like the CTAH and CS have come and gone. The new 1.5cc diesels from Fora in Ukraine are now joined by the JAK09 from Cyclon Engines of Novosibirsk, Russia.

A number of Cyclon JAK 09's have been imported into this country, thanks to the attractive bulk purchase discounts available. We set out to find out just how good this new engine really is.

Sizing up the goods

As we've come to expect from this company, the Cyclon JAK 09 is a first class piece of work. In particular, the satin finish on the superbly cast crankcase gives it a look of quality more akin to a digital camera than a model engine. Perhaps with crash-resistance in mind, the lower crankcase profile is smoothly contoured.

The engine has generous cooling fins and the rearward facing exhaust discharges via an outlet tube with 8mm I.D. This is angled in the usual manner to make side-winder mounting in a combat model more practical.
The engine has no machine screws in its construction, which helps to keep weight down to 94g, or 99g with muffler.

The general design is more conventional than some of the Cyclon F2D engines, but the general layout suggests that it is intended for mini-F2D models that can accommodate the rear exhaust arrangement. In usual F2C manner, the threaded aluminium cylinder head has a 7mm dia. push-pull contra piston, adjustable with a 5mm Allen key.

A pin-spanner with 2.5mm diameter pins spaced 20mm apart is required for head removal. The aluminium cylinder is of the drop-in sleeve type with a wall thickness of 1.25mm. The finish on the hard chromium plated bore is excellent. Examination after one hour's running showed no sign of distortion or out of roundness.

The conventional three-port Schnuerle porting is somewhat mildly timed – exhaust 138 degrees, transfers 116 degrees and boost 111 degrees.

The piston is shaped internally to prevent unwanted rearward movement of the conrod when running. This presents a problem for disassembly, as there is insufficient space with the cylinder removed to disengage the conrod from the crankpin.

Alexander Kalmykov recommends the use of an L-shaped lever applied at the big end of the conrod to do the job. Never the less, it is not something to be done without a genuine reason.

The hardened steel crankshaft has a 4mm dia. crankpin. Owing to the conrod removal problem, it was not possible to see whether or how the crankweb is profiled to counter-balance the reciprocating parts.

The gas passage is a very generous 7mm diameter, which by necessity is angled at the back away from the crankshaft axis, to clear the conrod and retain adequate strength for the 10mm dia. main journal at the intake port.

The intake opens 24 degrees after BDC and closes 50 degrees after TDC, giving intake duration of 206 degrees. The crankshaft journal is reduced to fit the 5mm ID front ball bearing and is threaded M5 for the aluminium prop nut. A regular glowplug spanner fits both prop nut and backplate spigot.

The prop driver seats on a tapered collet and its rear edge is recessed slightly into the crankcase to minimise the ingress of grit.

The venturi insert is of the peripheral jet type, but quite unusual, as the two jet holes (facing fore-aft) are located around 5.5mm away from the spraybar location. An annular fuel chamber of significant volume, formed by a deep and long groove in the insert's outer wall, connects the spraybar and jets.

The air intake is a long hole of 2.5mm diameter, with a shallow flare at the top and slight chamfer at the bottom.

We believe this venturi is intended for Half-A Team racing work, where fuel economy plays an important work.

The value of the particular design remains a mystery, but might perhaps have a bearing on starting in the inverted position.

On the test bench

Alexander recommends a fuel with 10% oil content. We opted for a more conservative brew consisting of 15% castor oil, 30% ether, 55% kero and 1.5% added DII.

This suited the engine well enough and as the JAK showed only gentle tendencies towards overheating, a fuel with lower oil may well be perfectly safe and add a few more RPM.

As is normal now with top-shelf equipment, there was no particular need for running in the engine, although we took it a little easy for the first 15 minutes. The first series of tests were made without the muffler. This made exhaust priming simple enough, but it was not found necessary. Choking or a carburettor prime worked well. While it would not be a problem in a side-winder or inverted position in a model, filling the carburettor's fuel chamber in the upright position during tests was a bit of a pain.

This of course made starting less reliable. Aside from this, the JAK was not particularly fussy for starting, either hot or cold, but cannot be regarded as foolproof in this respect.

There was no need to adjust compression, but opening the needle a bit from the very leanest running setting was necessary for reliable restarts and some care was needed to prevent flooding when cold.

I found the response to mixture setting too coarse. Perhaps the NVA was originally designed for the Cyclon F1C or F2A engines, which use a lot more fuel than the JAK? By contrast, compression adjustment is very fine compared to engines with contra pistons of "full-bore" size.

As mentioned earlier, the engine does not suffer from overheating, but over-compressed settings do drop power output and cause the engine to run dirty. Adjustment for peak revs was not easily discerned by ear and it was therefore best to set the needle just short of a lean misfire and wind up the compression, while monitoring revs with a tachometer. Final tweaking of the needle would optimise the tune.

The range of compression adjustment available in the head made it possible to load the engine down with large propellers without needing to add head shims. It would pull an APC 9x4 prop quite happily, despite this being some way below its truly useful running range.

The main observation was a tendency for the engine to surge owing to fluctuations in mixture supply. This got progressively worse as speeds went up. No amount of adjustment of mixture or compression would eliminate this and the problem.

While tolerable with a 7x4 prop on board, it was quite acute at the top end of the speed range.
This aggravated engine vibration, which was noticeable around 17,000 RPM, becoming severe around 20,000 RPM.

Fuel consumption was checked with a Graupner 7x4 prop and a "safe" mixture setting. It took the JAK over five minutes to empty the 24ml fuel tank. The engine was surging in its usual way between 15,400 and 16100 RPM. Noise level was 94 dB (A) at three metres from the exhaust.

A second series of tests were conducted with the muffler in place. Spot readings with APC 7x3 prop registered a drop from 99 dB (open exhaust) to 93 dB (muffled). RPM checks indicated little or no loss of power across the useable speed range and starting was not greatly affected.

The session concluded with mixed feelings. This engine certainly has a high power output, but did not deliver it in a smooth, consistent manner. The recommended Seryogin F2D prop (163mm diameter and 93mm peak pitch) seemed an impractical choice owing to severe vibration and erratic running.

A significant improvement

We've experienced problems in the past with some venturi designs having single or multiple surface jets, which for a number of reasons can be less effective (despite theoretical advantages) than the traditional spraybar in a tube type. We were particularly suspicious of the long parallel section of the throat.

As an experiment, a venturi insert of conventional internal profile was made to fit the JAK 09 engine. It has four jets located at the spraybar level, a bell-mouth inlet and 45 degree chamfer below the jet area. The original 2.5mm diameter choke size was retained.

The new venturi's effect on running characteristics was remarkable. The surging problem was eliminated and (perhaps because of its less restrictive shape) the custom venturi added around 600 RPM with the larger prop sizes.

Furthermore, the ability to get a consistent setting essentially allowed the engine to run smoothly beyond its vibration period between 18,000 and 20,000 RPM. So the engine changed from an apparent 0.3 BHP unit, peaking around 18,000 RPM, to a livelier peak power of 0.35 BHP in the 20,000 – 23,000 range. The engine ran very sweetly with the Seryogin prop spinning at 23,000 RPM, presumably just as Mr Kalmykov intended.

The effect can be seen clearly when comparing the lower power curve in the chart (original venturi) with the middle curve (custom venturi).

Similarly, the drop in torque was reduced significantly with the custom venturi such that the JAK 09's torque levels dropped by only 10% per 1000 RPM to 15 oz-in at 23,000 RPM.

What about using a larger venturi?

With all that free-breathing potential, it is likely the standard JAK 09 is held back in the interest of fuel economy. Alexander reckons they use a 4mm diameter choke for combat. This seems excessive based on our experience with similar engines, so we bored out the custom venturi to 3.5mm diameter, which never the less doubles the effective choke area to almost 10mm2.

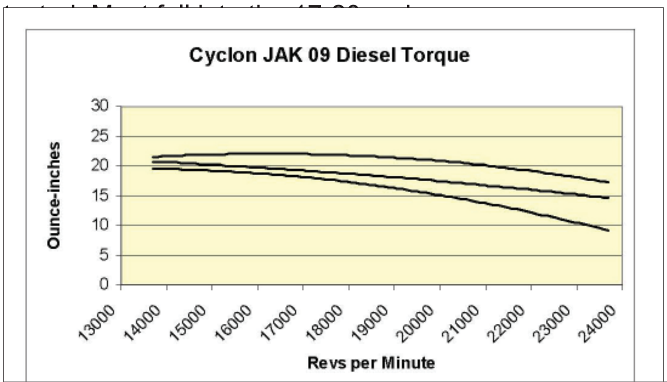
A third series of tests showed that the engine retained good suction with the enlarged choke. By continually opening the needle, the engine was able to draw fuel up from a lower level of 38cm.

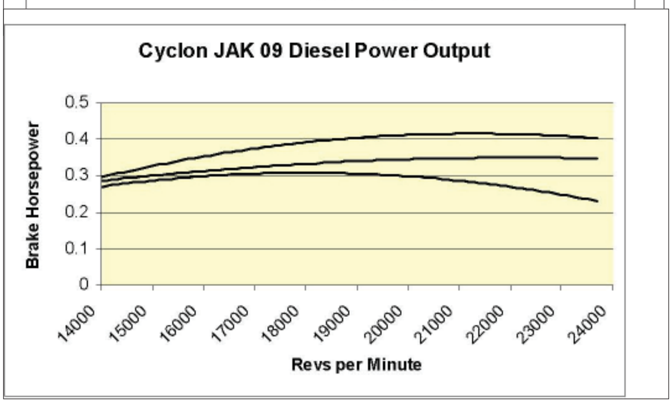
That sounds a lot, but might easily be needed if the fuel pickup is significantly outboard and rearward of the carburettor in flight and high G-forces take effect. Flight test will be needed to confirm the practical maximum carburettor size for combat.

The larger carburettor's effect on power output was to arrest the decline at higher revs. In fact, the JAK 09 in this configuration gained 20% more power and is able to deliver 0.4 BHP or a little more anywhere between 19,000 and 24,000 RPM. Needless to say that this is the highest power output recorded by us for a 1.5cc diesel.

For reference, a really good PAW 149DS can deliver 0.25BHP and recent tests of a CTAH 09 diesel gave a figure of 0.32BHP.

The torque curve shows that nice little rise at medium speed, to around 23 oz-in at 16,000 RPM. This is the highest torque level of all the 1.5cc diesels we have





Conclusions

A check of the engine after testing showed all to be in perfect order. There was no appreciable change to the "fits", which bodes well for a long life (providing no dirt gets inside).

Some carbon build up was evident, suggesting that attention to detergent additives or other means of keeping the engine cleaner inside would be a good idea.

In its as-delivered form, the JAK 09 did not entirely live up to expectations. We experienced an unnerving mixture surge that made high speed running almost impractical.

Note that this may possibly only occur with the engine mounted upright, when the "head" between fuel entry in the venturi insert and the elevated delivery jets has maximum impact.

It is safe to assume that Alexander had good reason for designing the venturi in this way (although that reasoning is not apparent to us).

It may well work perfectly with the engine mounted in the anticipated sidewinder or inverted arrangement.

A substitute venturi of different shape cured our problem, allowing the engine to show its true potential. Perhaps the test engine is an exception, but if others exhibit the same symptoms, then a relatively simple solution is at hand.

The JAK is a real fuel miser. Especially with the standard venturi, you get a lot of running from a half-litre of fuel.

The JAK 09 diesel is not the easiest engine to mount or cowl in a racing model, but given its good manners and very high power output, this engine will surely find a home in racing models.

We've recently heard that Russia has a Junior team racing category for1.5cc diesels, which might explain the recent emergence of such engines.

Conventional wisdom is to use a nylon propeller in the one model per bout Half-A combat event.

Our tests gave 17400 RPM with Kavan yellow 7x4 prop and almost the same figure with Taipan white nylon 7x4 prop, both with the larger venturi.

At full diameter, this prop would not allow the JAK to work at its best in the air. It would be running right in the middle of its vibration zone and fall short of its peak power output. Unfortunately, commercial prop sizes go down in one-inch increments.

A 6x4 nylon prop would be too small and probably too weak anyway.

So the best prospect might be a 7x4 prop trimmed as needed to bring up the revs- say 19,000 RPM on the ground.
The Seryogin F2D prop appears to be too small for the job.

An older F2D prop from 20 years ago (if you could find one) would probably be just the ticket.

It may seem strange to have a muffler on board a 1.5cc diesel engine, but it really should be used. It weighs only 5 grams and this muffler does not appear to adversely affect power output or starting.

However, the noise reduction is nowhere near that of modern “sport” engine mufflers.

It is a simple push fit onto the exhaust stub and in all our tests the muffler stayed in place without any support at the back end.

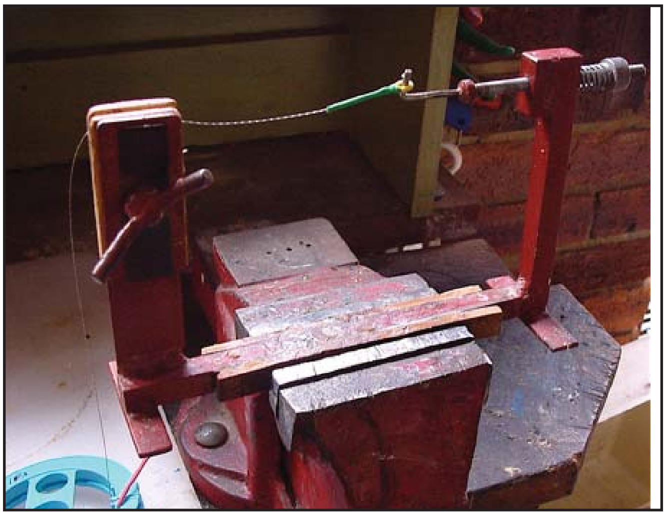
A simple retainer on a model would still be a good idea. A proper clamping arrangement that allowed firm attachment to the engine’s exhaust stub would have been a lot better.

As expected, noise went up with revs. The muffled engine, running with the Seryogin prop produced a peak noise level of 97dB (A) at three metres in diesel form and 101 dB (A) in glowplug form.

Oh yes. The JAK 09 can be run as a glowplug engine.

Eddie Farmer Line Machine

John Hallowell - Australia



When you fly 1/2 a dozen T/R events, plus stunt and combat, you really need some help when it comes to line making.

The assistance comes from one of the most valued bits of equipment in my workshop. It’s the ‘Eddie Farmer Line Machine’.

It holds the line, so you have both hands free to work with.

That makes life so much easier!

Having seen quite a few soldered lines break at the brittle point at the end of the wrap.

I resolved to change my methods in the early 90’s.
The way I do it now is:

Cut an extra piece of line about a foot long.

Thread them both through a small piece of electrical tubing.

Install on line maker and adjust loop size.
Bind with fusewire and cyano as you go.

Take binding down about 30mm from loop.

Make sure the cyano can penetrate the binding.
Trim the 3 ends in layered stages.

When cyano is completely dry, coat with 5 min. expoxy.
Avoid using epoxy on the last 3mm where the line join is.

Apply heat shrink tubing when the expoxy is almost cured.

I am convinced colour coding leadouts and lines is a great help.
How many times have you found the up line been connected to the down?

This method has been successfully used for many years on all classes including .46 Stunt models and Bendix racers that try and pull your arm out of its socket.

Tests have shown that the line will always break before this type of connection will.

Miniature Engine Fuels

FCB Marshall PhD, DIC, Bsc, FRIH. via Lance Smith

This treatise considers the fuel constituents and additives suitable for the three types of model internal combustion engine: compression ignition (aka "diesel"), spark, and glow-plug.

It was written at the virtual dawn of model diesel engine history, and while lubricant technology has progressed in the intervening half century, the data on the combustibles remains valid and really should be better understood by modern model engine users.

As with all gems from the past, caution and responsibility should be exercised when handling the substances mentioned—if you can get them that is!

While the ready availability of such chemicals was higher back then, life expectancy was a lot lower.

You decide which is more important to you.

The author, FCB Marshall, was the Technical and Managing Director of BARRON INDUSTRIES (CHESTERFIELD) LTD from its foundation in 1947. Prior to that, he was for some years senior research chemist to the British Diesel Oil Co. Ltd. During World War II, he was engaged in research on rocket design with the Ministry of Supply.

Finally, paraffin was the popular name in England for what most of the rest of the world would call kerosene.

I know one ancient modeller who, as a young lad in Australia of the early 1950's, read the British recipe for diesel fuel and tried valiantly to make paraffin wax dissolve in ether and castor oil—in the family kitchen naturally.

By all accounts, Mum was not all that pleased.

FUEL TECHNOLOGY is a modest, not very highly publicised, branch of knowledge, with the result that the average Aeromodeller probably knows less about the fuels he uses than about any other aspect of his craft.

This is greatly to be regretted since engine performance—and engine life—depends not only on engine design and workmanship but also on the characteristics of the fuels used in them.

These notes have been prepared for the guidance of modellers who like to experiment with fuel mixtures of their own—to help them to experiment intelligently without undue waste of time and materials—and to assist them in judging the suitability of commercial brands of fuel for whatever purpose they may have in mind. No attempt has been made to write a "Formulary" or to review existing commercial fuels. What has been attempted is a concise and simplified account of the properties and functions of the major fuel ingredients, and an outline of the basic scientific principles to be followed in working out the design of a fuel for any particular purpose.

Before it is possible to proceed to the formulation of a satisfactory "Diesel" or "Glo fuel", it is necessary to be familiar with certain fundamental properties of fuel components such as Flash Point, Heat of Combustion, S.I.T., etc., and a short explanation of the more important of these terms is given below.

EXPLOSIVE LIMITS.

When the vapour of an inflammable liquid is mixed with air the mixture will only burn if the concentration of vapour lies between certain limits known as the "Explosive Limits". These limits vary considerably for different liquids, as shown in TABLE I.

SUBSTANCE	*EXPLOSIVE LIMITS*	
	Lower	*Upper*
Benzene	*1.35*	*8*
Acetone	*3*	*13*
Methyl Alcohol (Methanol)	*5.5*	*21*
Ethyl Alcohol (ordinary alcohol)	*2.8*	*9.5*
Ethyl Ether	*1.7*	*48*
Paraffin Hydrocarbons	*about 1*	*about 3.5*

TABLE I—Explosive Limits.

Taking Methanol as an example it can be seen that if the concentration of methanol vapour in the air is less than 5.5% the mixture will be too weak to fire, whilst if it exceeds 21% the mixture will be too rich.

FLASH POINT.

"Flash Point" is a measure of the inflammability of a liquid. If a little inflammable liquid is placed in the bottom of a small metal cup it will give off vapour into the airspace above it. If this concentration reaches the lower explosive limit the mixture of air and vapour will "flash" if a small flame or spark is brought above the cup. If the liquid does not vaporise readily (paraffin oil for example) it may be necessary to warm it until a certain critical temperature is reached at which enough vapour is given off to form the explosive mixture.

This temperature, below which ignition will not take place, is known as the "Flash Point", and varies widely for different liquids, as shown in TABLE II.

LIQUID	*FLASH POINT*
Ethyl Ether	*-41°C*
Benzene	*-21°C*
Acetone	*-17°C*
Toluene	*-2°C*
Methanol	*0°C*
Butyl Acetate	*25°C*
Paraffin Hydrocarbons	*about 65°C*

TABLE II—Flash Point.

SPONTANEOUS IGNITION TEMPERATURE

Also known as Self Ignition Temperature, Auto-Ignition Temperature, and S.I.T. for short. This is the temperature at which a mixture of inflammable vapour and air will ignite without the application of a flame or spark. S.I.T. is totally unrelated to the Flash Point, and should not be confused with it. TABLE III gives some typical values.

SUBSTANCE	*SELF-IGNITION TEMP*
Acetone	*630°C*
Benzene	*580°C*
Toluene	*553°C*
Ethyl Acetate	*484°C*
Methanol	*475°C*
Ethyl Alcohol	*421°C*
Amyl Acetate	*379°C*
Petrol†	*280°C*
Coml. Diesel Oil	*240 to 260°C*
Paraffin about	*250°C*
High cetane Gas Oil	*220 to 240°C*
Ethyl Ether	*188°C*

TABLE III—Spontaneous Ignition Temperature.

† This refers to a straight-run petroleum fraction of low Octane value before leading or admixture with benzene etc. A good commercial petrol will be higher than 280°C and an aviation spirit higher still.

It can be seen that paraffinic hydrocarbons (paraffin, diesel oil etc., are mixtures of these), and ethers, have low S.I.T.'s whilst "aromatic" hydrocarbons from coal-tar like benzene and toluene, and the alcohols, have very high values.

HEAT OF COMBUSTION.

The Heat of Combustion, also known as the "Calorific Value"—is the total amount of heat liberated when a given quantity of a substance is completely burned.

It is, therefore, a direct measure of the total intrinsic energy, and hence of the available power, of a fuel.

Some approximate values are recorded in TABLE IV, from which it can be seen why, for example, an alcohol fuel requires larger carburettor jets than petrol; more fuel must be flooded into the cylinders per stroke in order to give a comparable power output.

The figures also make it clear why alcohols run" cooler" than hydrocarbon fuels, and are therefore favoured for racing engines.

OCTANE VALUE.

Pure Iso-Octane is a very good antiknock fuel for spark ignition engines, since it has a high S.I.T., whilst Pentane, with a very low S.I.T. is a bad fuel.

Other fuels are compared as regards performance with mixtures of iso-octane and pentane and thereby given an "Octane" rating. If the fuel is as good as iso-octane its Octane Value is l00, whilst if it is only as good as a mixture of equal parts iso-octane and pentane its Octane Value is 50.

CETANE VALUE.

This is a method of assessing the values of diesel fuels by comparing their performance in a test engine with mixtures of different proportions of the excellent diesel fuel cetane and the very poor diesel fuel methylnaphthalene. Cetane and Cetene Values may also be calculated indirectly from the specific gravity and Aniline Point of the fuel, but this method is not applicable if "dopes" are present. A high Cetane Value means a low Octane Value, and vice versa.

IGNITION LAG.

When a mixture of a diesel fuel vapour and air is raised to the Self Ignition Temperature, there may be a considerable delay before the explosion actually takes place. This time interval is known as the "Ignition Lag" and for smooth running should be small. The running characteristics of a poor fuel may be enormously improved by reducing the ignition lag by making small additions of certain "dopes".

This must not be overdone since too short an ignition lag causes detonation, etc.

SUBSTANCE	*HEAT OF COMBUSTION (calories)*
HYDROCARBONS:	
Paraffin Oil	*11,000*
Diesel Oil	*10,900*
Petrol	*10,000*
ETHERS:	
Ethyl Ether	*9,600*
Methylal	*8,800*
KEYTONES:	
Acetone	*7,300*
ESTERS:	
Ethyl Acetate	*6,100*
ALCOHOLS:	
Ethyl Alcohol	*7,000*
Methanol	*5,330*
NITRO HYDROCARBONS:	
Nitrobenzene	*6,030*
Nitromethane	*5,370*
Nitroethane	*4,300*
Nitropropane	*2,790*
ETHYL NITRITE:	*4,450*
ETHYL NITRATE:	*3,560*

TABLE IV—Calorific Value

TYPES OF LIQUID FUELS

Liquid fuels for internal combustion engines are of two fundamentally different types, namely those to be fired by spark or hot-wire ignition and those designed to ignite under the heat of compression alone, without the application of a spark or other local hot-spot.

The former fuels, of which petrol is the commonest example, should contain a low-boiling fraction (the “light ends”) of low Flash Point to ensure starting from cold, but must have a high S.I.T. to prevent firing taking place under compression alone before the spark passes.

The second type of fuel, for use in Diesel engines, need not possess a low Flash Point but must have a low S.I.T. It follows that a good petrol fuel will be a bad diesel fuel- and vice versa.

Miniature Diesel Fuels

The diesel fuels used in road transport vehicles are fairly high-boiling fractions from natural petroleum consisting mainly of certain types of “paraffinic” hydrocarbons. Such a “gas oil” has a Spontaneous Ignition Temperature around 250°C. and when forced into the cylinders in finely atomised form will fire satisfactorily under the high-temperature conditions prevailing in these very high-compression full-scale engines.

But they will not ignite in a model “Diesel” unless it is hot, and to enable miniature compression-ignition two-stroke engines to be started it is customary to add a proportion of Ethyl Ether, which combines the phenomenally low S.I.T. of 188°C with very wide Explosive Limits.

Since the miniature “Diesel” is a two-stroke engine, lubricant must also be incorporated in the fuel. Finally, to ensure smooth even running it is often advantageous to include a small proportion of a further component, the “dope”.

It is worth while to study in some detail the functions and properties of these four vital compounds.

(1) The Paraffinic Base-Fuel.

This is the main ingredient of the fuel. Its function is to provide most of the energy of the fuel, and it should therefore possess high Calorific Value and low S.I.T.

Reference to TABLE III will show that, with the exception of certain ethers. the only readily available substances with relatively low S.I.T.’s are the paraffin hydrocarbons—which fortunately also possess very high Calorific Values.

Ruling out individual pure hydrocarbons like pentane, hexane, heptane, etc., on the grounds of expense, this virtually narrows down our choice of base fuel to PARAFFIN OIL, COMMERCIAL DIESEL OIL and special HIGH CETANE GAS OIL FRACTIONS, if available.

There is little to choose between paraffin and diesel oil, the latter having its higher viscosity and greater “oiliness” to recommend it. It can be seen, partly by reference to TABLE III, that the addition of petrol, benzene, toluene, naphthalene, turpentine, white spirit, or in fact any of the fantastic materials that have from time to time been recommended, must of necessity make the fuel worse, because of the high S.I.T.’s of these substances.

Their use to “deaden down” the detonation of the ether is a case of two wrongs failing to make a right: a fuel that needs deadening down has got far too much ether in it.

(2) The Lubricant.

The lubricating component of the fuel may be any good quality lubricating oil, either mineral or vegetable. The only limitation imposed by vegetable oils like Castor Oil is that, alone, they will not blend with paraffin base fuels; castor oil can be used only in a fuel ready-mixed with ether, which will keep all the components in solution.

There is scope for experimenting with different grades and qualities of oil.

With regard to the quantity of oil to incorporate in the fuel, this again is a matter for experiment. Many miniature engine fuels are grossly over-lubricated, with the result that they are unnecessarily messy in use, and also require more ether than they otherwise would. In designing a diesel fuel it should be borne in mind that the oil has one function only—to provide adequate lubrication—and that it should not be expected to burn, to moderate the explosive tendencies of excess ether, or to do anything else.

A two-stroke motorcycle engine runs on the road for long periods at a time under much greater (and varying) load than any model engine, and with considerably greater bearing and piston speeds, yet seldom does the percentage of lubricant in the fuel exceed 7.5%. It is desirable in formulating a model diesel fuel to increase this proportion for the following reasons:-

1. A new engine may have tight spots and require excessive lubrication till it is run-in.

2. In a very old, or badly made engine, the piston may be a poor fit in the bore, so that a fairly thick viscous fuel is needed in order to seal the compression, and

3. The manufacturer must allow a reasonable safety factor.

Point 2 normally affects only the ease of starting: once the engine has been started it will usually continue to run perfectly satisfactorily even on a very thin fuel. With old engines starting can usually be facilitated by injecting a drop or two of lubricating oil through the ports.

For a normal fuel for use in a run-in engine in good condition, oil percentages in the region 30% to 50% are unnecessarily high.

If the aeromodeller experiments with proportions of oil in the range 12%-20% for racing blends and 20%-30% for general-purpose and running-in fuels, he will not go far wrong.

Diesel oil based fuels tend to require rather less than those blended with paraffin.

(3) Ether.

Apart from its low S.I.T., which enables it to start easily, and its wide Explosive Limits which ensure that throttle settings are not critical, ether is a bad diesel fuel. It has a considerably lower Calorific Value than the paraffinic base fuel and it detonates or "knocks" badly.

Excess of ether means correspondingly less base-fuel in the formulation, and hence a fuel of lower calorific value than need be, whilst its detonating propensities when present in excess cause diesel knock and impose undue strains on the con-rod. Ether should, therefore, be added to a diesel fuel for one purpose only, namely to make the engine start.

Just enough for this purpose should be added—and no more. 30%-35% is excessive, and modellers are recommended to experiment in the range 20%-30%. It cannot be overstressed that the function of the ether is solely to bring about easy starting; it should not be expected to usurp the function of the base-fuel.

There seems to be some confusion regarding the grades of ether suitable for use in fuels. Ether is manufactured from ordinary ethyl alcohol, two molecules of which join together, with the elimination of water, thus:-

C2H5-O-H + H O-C2H5	→	C2H5-O-C-2H5 + H2O
2 Ethyl Alcohol	→	1 Ethyl Ether + Water

The process is usually carried out by heating the alcohol with concentrated sulphuric acid, which absorbs the water formed—which is why the product is sometimes called "sulphuric ether".

The ether which distils over is washed free from acid, purified, dried and re-distilled.

It therefore contains no acid whether it is sold as "Anaesthetic Ether", "Ether '720", "Ether B.S.S. 759", "Sulphuric Ether" or "Ether Meth.".

All these materials are, effectively, the same thing; and if properly manufactured are all harmless to model engines. The '720 refers to the specific gravity of the product and shows the substantial absence of water; B.S.S. 579 refers to the appropriate British Standards Specification laying down the standard of purity; "Ether Meth." indicates that the ether was not manufactured from pure ethyl alcohol but from methylated spirits, which contain a few percent of methanol—this will give traces of methylethyl and di-methyl ethers in the product, which are not harmful.

Anaesthetic ether is made from pure alcohol and usually contains a proportion of deliberately added alcohol, and sometimes other additives, to prevent peroxide formation on storage.

It is more expensive than other grades and, if anything, is slightly less suitable for fuel work.

The di-ether, Methylal, with the chemical formula CH3O-CH2-O-CH3, may be used partly or wholly to replace ethyl ether in certain specialised fuel formulations. The higher ethers Amyl Ether and Butyl Ether are too high boiling to be valuable alone, but may be used mixed with ethyl ether. Isopropyl Ether, unlike the straight-chain ethers above, has a very high S.I.T. and is not suitable for use in diesel fuels. It is a possible ingredient of glo-fuels.

(4) Dopes.

There are a number of well recognised "dopes" which may be added to diesel fuels, best known of which are

- Ethyl and Amyl Nitrites
- Ethyl and Amyl Nitrates
- β-Chloro-ethyl Nitrate
- Paraldehyde
- Various organic peroxides like Tertiary Butyl Hydro-Peroxide, Di-Tertiary Butyl Peroxide, etc.

The choice of dope is usually determined by price and availability.

The function of the dope is to reduce "Ignition Lag" and thereby give smooth powerful running. Very little dope is needed for this purpose, the precise amount depending on the particular fuel formulation, and is a matter for experiment in each case.

Seldom is more than 3% required, and modellers would be well advised to start with about 1% of dope and gradually increase, by not more than 0.5% at a time up to a maximum of about 2.5%, until smooth even running is obtained—and then to STOP.

This is a case of "a little of what you fancy does you good"—but a little bit more can play hell. Dopes should be used solely for the purpose described above and should under no circumstances be used in excess to assist starting.

They do, indeed, lower S.I.T. somewhat, but their effect in this direction is most marked with the first few per cent. and then falls off very rapidly It should be remembered that nitrate dopes are, in effect, high explosives and that when they burn they generate nitrous fumes.

An over-doped fuel requires the compression setting of the engine to be drastically reduced as the engine warms up it sets up unnecessary strains in the engine, and it is corrosive.

A proprietary brand of fuel will be a carefully balanced blend of ingredients with the correct amount of dope; no attempt should be made to "improve" it by further dope additions.

Following the basic principles discussed above, and bearing in mind that each component of the mixture has its own specialised part to play in the performance of the final fuel, it is now possible to set about designing a good diesel fuel for a particular engine or for a specific purpose.

A good running-in fuel for new engines and for general purpose flying would look something like this :

PARAFFINIC BASE FUEL	45-60%
LUBRICANT	20-30%
DOPE	1-2.5%
ETHER	20-25%

whilst a Racing or Competition fuel might well be :

PARAFFINIC BASE FUEL	55-65%
LUBRICANT	12.5-20%
DOPE	1-3%
ETHER	20%

If the fuel is of the ready-mixed variety all the ingredients are mixed together, and the lubricant may be castor oil.

But if the fuel is to have its ether added immediately before use, only the first three components are mixed in each case; in which event mineral lubricant must be employed.

Starting with either of the above basic formulations as a guide, the ideal fuel for a particular purpose and individual engine can readily be worked out on the test bench by modifying the components of the appropriate formula a very few per cent at a time until optimum performance is obtained.

It should be borne in mind that the perfect fuel for one engine may not be ideal for another with totally different design characteristics and the really scientific flying enthusiast will study the individual fuel requirements of all the more important engines in his “armoury”.

It should also, of course, be appreciated that different fuels may require different starting and running settings—and the careful experimenter has to develop a considerable amount of patience.

RUNNING-IN ENGINE TEMPERATURE.

It follows from the increased proportion of base-fuel and the reduced proportion of ether that a “racing” fuel will run hotter than a running-in or general-purpose fuel, because of its higher Calorific Value.

This relatively high-temperature running has been known to worry some modellers, who sometimes attribute it to frictional heat arising from under-lubrication.

Any well-formulated racing fuel is, by its very nature, bound to run hot—and it is advantageous that it should do.
The efficiency of operation of the internal combustion engine increases, within reasonable limits, with increase in temperature of running, hence the modern practice of cooling full-scale aero engines with ethylene glycol (b.p. 198°C), instead of with water (b.p. 100°C).

It is clearly not the wish of the reputable fuel manufacturer to ruin his customers’ engines, and his branded fuels will have undergone extensive tests on a range of engines before being launched on the market.

There should, therefore, be no cause for uneasiness in using well known proprietary brand fuel. But if the modeller is still anxious, it is suggested that he feel, not the cylinder head where combustion of powerful fuel is taking place, but the crankshaft main-bearing. If this remains moderately cool he need have no fear of a seizure.

WARNING.
In fairness to the manufacturer, as well as in his own interests, the modeller should. of course, be careful only to use a fuel for the purpose for which it is intended.

A “Competition” or “Racing” mixture is, as its name implies, intended for high-speed work, and the manufacturer assumes his customer will not be expecting to develop maximum power and revs with a new engine straight out of its box.

A “Standard” or “Running-In” fuel should always be used with new engines, which should first be run on the bench for some time with an oversize propeller.

After the engine has loosened up it should be run for another half-hour or more with a standard prop., still on the same type of fuel. Only after proper running in, and after a fair amount of work, should peak output with racing fuels be attempted.

Glo-Plug Motor Fuels

The glo-plug engine is without ignition control, and fuel formulation might therefore be expected to be more critical than for spark ignition engines.

For maximum racing performance this is undoubtedly true, yet it is surprising on how many weird and wonderful concoctions the average glo-motor will run passably well.

A good general purpose fuel on which any glo-plug engine will run is a simple mixture of

CASTOR OIL	30%
METHANOL	70%

but performance may not be outstanding.

The castor oil proportion may with advantage be increased for some engines for the preliminary running-in; it should seldom be reduced below 20% even with well seasoned engines.

Methanol does not have the natural inherent oiliness of diesel oil, and glofuels must have a higher oil content than diesel fuels.

In order to develop the high revs of which it is capable the glo-engine must be fairly “sloppy”, and to ensure adequate compression for starting a fairly oily viscous fuel is needed. Castor oil, and not a blended lubricant like Castrol “R”, is to be preferred since it does not contain additives insoluble in methanol and therefore yields a clear fuel without sediment.

A very large number of substances have been suggested from time to time as useful additives to simple Castor Oil/Methanol blends in order to give increased performance.

This list includes Amyl Acetate, Ethyl and Amyl Nitrates, Acetone, various cellulose solvents, Nitrobenzene, and many more.

Extensive experiments in the Author’s laboratory with these, and a host of other materials have led to the conclusion that whilst one or two may have a slight effect in glo-plug engines of early type, most of them are valueless in a modern glo-engine.

In work with, for example, the latest type “Yulon”, replacement of part of the methanol in a methanol/castor oil blend by
Ethyl Nitrate
Amyl Nitrate and Nitrite
Amyl, Butyl, Ethyl and Isopropol Ethers
Ethyl and Amyl Acetates
Paraldehyde
Acetaldehyde
Nitrobenzine

and many other solvents was found to have little or no useful effect, even when added in quite substantial quantities. It is true that in some instances the engine developed a very satisfying statico note suggestive of increased revs, a very portent exhaust flavour, or both, but in no case was any significant speed improvement recorded by the instruments.

An approach to the problem of improving simple methanol blends can be made by replacing part of the methanol by a fuel of higher calorific value such as benzene, toluene, acetone, ethyl alcohol or methylal.

In some cases these materials effect a slight improvement, but usually more in the direction of improved fuel consumption than in increased speed. In any case there is a limit to the proportion of such substances that can be added since without exception, they have narrower Explosive Limits than methanol; after quite a small percentage has been added the throttle setting may become too critical for reasonably easy control.

Furthermore, excess of some of these compounds of higher calorific value can cause an engine to run very hot indeed and to eject showers of red sparks so that risk of seizure becomes very real. Acetone was invariably found to give erratic running, which is surprising.

METHANOL.

Some straight methanol castor oil blends have been found to run more smoothly than others.

Modellers would be well advised to purchase only the purest methanol. Methyl and Ethyl alcohols come on the market in various “Proof” strengths, i.e. containing varying proportions of water and for best results only 74° over-proof methanol should be used (this contains over 99% of methanol).

METHANOL/CASTOR OIL RATIO.

Unlike diesel fuels, the speed is not greatly influenced by variations in the base fuel/oil ratio. If a particular engine is adequately lubricated by, say, 20% of oil and 80% of methanol, there is no significant loss of speed when the ratio is altered to 30 : 70. On the other hand, if the former mixture is somewhat under-lubricating the engine, there may be a substantial increase in r.p.m. when the oil ratio is raised.

NITRO PARAFFINS.

Whilst most of the substances so far discussed are without any profound effect on the speed of a glo-engine, this is certainly not true of the nitroparaffins. Replacement of part of the methanol in a Methanol/castor oil blend by Nitromethane,

Nitroethane or Nitropropane may increase engine speed by between 1,000 and 2,000 r.p.m. In this respect the nitroparaffins appear to be unique—and are indispensable for really high speed work.

Unfortunately, they have not hitherto been readily available in this country, they have been fantastically expensive, and except in carefully balanced fuel formulation they involve high fuel consumption.

However, the outlook is improving; nitromethane and at least two proprietary nitroparaffin fuels are now on the British market, and nitropropane is on its way.

Just why nitroparaffins are so effective is not clear. They have very low energy contents, as reference to their Calorific Values in TABLE IV will show.

Nitromethane, for example has only half the Calorific Value of Methanol and a nitromethane fuel might more logically, in fact, be described as a “cool” fuel than a “hot” fuel.

Their effectiveness would seem to lie not in their intrinsic energy contents (which are very low) but rather in the extreme rapidity with which this energy can apparently be liberated.

In their effectiveness, Nitromethane and the Nitropropanes are closely similar on the test-bench, nitropropane possibly giving a slightly more stable mixture under flight conditions.
They would appear to be interchangeable in glo-fuel

formulations, the choice depending mainly on price and availability. Nitroparaffin blends require a slightly wider throttle setting than non-nitrated blends, and are hence a little less economical in use.

With regard to the amount of nitromethane or nitropropane to include in a glo-fuel formulation, it is the Author's considered opinion that the proportions sometimes advocated are excessive.

A fuel with 25% to 40% of nitromethane. apart from its exorbitant cost, usually seems to kill off gloplugs with fair rapidity.

Secondly, careful speed tests on a number of engines have shown that at first there is a considerable speed increase when nitromethane is added. but that the effect gets progressively less with each further addition until it becomes insignificant.

The experimenter is recommended to start off with a fairly small percentage of nitroparaffin in his fuel mixture and to carry out several speed determinations on his engine. Another mixture should then be prepared with the same base-fuel/oil ratio, but with a leper cent. more nitromethane, and further speed readings taken.

This process should be repeated with small nit:roparaffin increases until there is no further speed increase measurable.

In this way the most effective, and at the same time most economical, fuel will be worked out with the minimum waste of expensive materials. It will often be fcund by trials of this sort that 20% of nitromethane is just as useful as 30%.

The response of an engine to changes in fuel composition depends to a very considerable extent on the design of the engine, particularly as regards timing, porting and compression ratio.

One engine may be found on test to be very much faster on a nitroparaffin blend than on a straight castor oil/methanol, whilst the performance of another engine may be found to be almost identical on either fuel. The moral is, clearly, do not run on expensive nitroparaffin blends if a non-nitrated racing methanol blend will give as good results.

And equally, a commercial fuel should not be condemned because it does not improve the performance of your engine; it may be giving your friend another 1,000 revs on his engine of identical make.

Engine manufacturers are constantly experimenting and incorporating minor design changes so that two apparently similar engines may, in fact, differ noticeably in compression ratio, timing, or both.
Finally. there is ample scope for studying the effect of combining nitroparaffins with other additives like amyl acetate etc., which are ineffective by themselves. The guiding principle in all such work always being to make only one change at a time, and to make the changes small gradual ones.

FUEL TESTING

Smoothness of running the absence of "missing" etc. can be tested fairly well with a critical ear—although an electronic stroboscope is better if you can borrow one. Adequacy of lubrication can be checked by feeling the crankshaft bearing (not the head!), by holding a plate behind the engine when it is running and noting how much oil is ejected, by noting whether the engine slows of its own accord when hot even with correct throttle and compression settings, and by seeing whether the engine runs any better when a few per cent. more oil is added to the fuel.

But SPEED cannot be checked by ear—USE INSTRUMENTS.

An electronic stroboscope, if available, is the ideal instrument since it puts no load on the engine and since it shows variations in speed from second to second as well as overall average speed.

Failing this, use a good Revolution Counter and watch, or Tachometer.

The vibrating reed type of Revolution Indicator, if properly calibrated and carefully used. is capable of detecting reasonable variations in r.p.m. at the slower speeds. but is not capable of showing up small speed differences. It is suitable, therefore, for the preliminary experiments with diesel fuels, but is too insensitive at the higher revs to be of much value in glo-fuel development.

In all cases the engine should be reasonably flexibly mounted; a well balanced engine fitted with a properly balanced prop, if firmly clamped in a vice, seldom gives a reading at all on a reed indicator.

In conclusion. do not be satisfied with a single speed reading—take half a dozen and average them. It is surprising what a difference twentieth of a throttle turn can make to a precision engine running near its flat-out maximum speed.

And check back from time to time the values of your earlier fuel mixtures—the apparent increases in speed you have been getting with the later mixtures may be due to the engine loosening up with prolonged running. Elementary, but it happens every day.

Reference:
Marshall, FCB: Miniature Engine Fuels, Part 1, The Aero Modeller, Model Aeronautical Press Ltd, Volume XV, Issue 170, March 1950, p148.
Marshall, FCB: Miniature Engine Fuels, Part 2, The Aero Modeller, Model Aeronautical Press Ltd, Volume XV, Issue 171, April 1950, p266.

Successful Team Race Piloting – One Persons Guide

Duncan Bainbridge

No one is ever too old to learn or to do anything; look at the rise of grey power and the popularity of the current crop of Vintage Team Race events.

Look also at the average age of the average F2C pilot; it must be over 50!

However no one, experienced or just starting out as a racing pilot is too old or unable to be able to concentrate on improving their piloting technique.

Many people subscribe to the idea that VTR is most definitely not F2C and should not be covered by the same rules, models handle differently and speeds are not as fast. I agree and in VTR there is not the level of carnage that is prevalent in F2C.

But....

Across the board, air speed in VTR is increasing and with current piloting styles, speeds may need to be reduced greatly in order to decrease the number of accidents that do occur.

What follows is based on a number of ongoing discussions I have had with pilots and mechanics in both this country and abroad and a desire to update a piece by Dave Clarkson, informed by a number of pieces by Rob Fitzgerald, Chris Wee, Andy Sweetland, Racer X and Marlon Gofast and discussions with Tony Toogood, Dave Smith, John Green, John Hallowell, Dave Finch, Stuart Robinson and others.

I feel it is always helpful shine a light on your own actions and endeavour to improve them.

Therefore I believe that Successful Team Race Piloting should be based on three overarching principles.

1. **Know the rules**
2. **Always strive for the best results**
3. **Be considerate**

So what do I mean?

Well I believe they are all obvious.

1. The Rules
Regular blatant rule breaking will get you disqualified and a bad reputation. You should take time to read the rule book and understand what each rule means and then you should learn and practice how to fly to the demands of the Rule Book.

2. The Best Results
It is important also to always strive to obtain the best results, isn't that why we persevere at out sport?

More frequently that not in VTR it is the fastest pilot, not the fastest model that wins, this means the winner is the pilot that knows best, how to fly to the demands and limits of the Rule Book.

3. Consideration
Why consideration, it is racing after all?

Yes, but think about No. 1, a bad reputation does nothing to endear you to other contestants, a bad rep for poor or bad flying, blocking and pushing or holding centre is not good, and it is good practice to treat others as you would wish to be treated, harsh, but fair is a good starting point.

The points that I have highlighted below are presented as a guide, and are meant to engender thought and perhaps dialogue.

Over the last five years there has been an increase in the level of leniency given to pilots in regard to interpretation of the rules.

This also applies to issues of safety and personal conduct on the flying field. But it is important to remember that all CD's and Jury members are volunteers, they do the job because they want to, but in many cases they can't be everywhere at once and standards can and sometimes do slip.

Because of the generally competitive nature of pilots, they have taken every bit of this drop in standards to attempt to get away with as much as possible.

Sadly this has produced the untidy and accident-prone style of piloting that is currently accepted as being reasonable.

The points that I have listed are very simple and with a small amount of thought, practice, video and self-assessment can be of benefit to all pilots.

In order to understand others, you must understand yourself. The most difficult change to introduce is psychological; attempting to get pilots to acknowledge that there is always room for improvement.

Thus there are a few things which I believe should be considered.

Race Conduct

It is important to maintain a high standard of general race conduct, when called for your race by the CD, try not to keep him waiting, get into the circle as quickly as possible and when your race is over, move back to the line check as quickly as possible, that way the day can progress smoothly.

When in the pilots circle remember to crouch down with your handle as near to the ground as practical, get into the practice of keeping your left hand in contact with the ground, good practice if you wish to compete in modern events and do not obstruct the other pilots.

If you finish first, allow your mechanic to move the model out of the flight circle and weight your lines so that they are not snagged by other landing models. The pilot should move to sit outside and at the back of the pilots circle.

Good Handling

The smaller the handle the better the handling; ditch that big monster combat or stunt style handle, get a top quality racing handle from Mike North Racing Products, or Mejzlik Model Bau or even make your own.

It is not difficult; a good comfortable sized bit of broom stick and some brake cable, with two finger separation, well soldered with some small Sullivan type clips will do the job, but remember race crashes can be caused by handle failure, so ensure that yours is up to the job, add a grouper that is about 200mm from the top of the handle and that is your lot.

Clothing

As a pilot don't do a David Cameron and try and hug a hoodie, avoid them at all costs. Hoodies are bad news, as the hood can act like a magnet for someone else's lines.

The same goes for big baggy jumpers, just use your common sense.

Footwear should be a good pair of trainers, with lots of gripping tread, cross trainers are good, and leather soles are bad.

I think the days of pilots wearing platforms – ie the '70's are long gone, but hey who knows!

Always remember that when racing including practicing, the mechanic should at all times wear a helmet, for safety and best practice.

OK – the flying bit!

1st things first…

The Take Off

At the signal, your well trained Mechanic and race tuned model will start first flick, once the motor is going, all pilots must realise that the model is theirs, the mechanic should forget all ideas of holding, pushing or launching, with or without hand signals.

That all takes too much time, when the motor goes, let it go, don't waste time thinking.

Get rid of it as fast as possible, as a pitman, make your problem the pilots as fast as possible. It is up to the pilot to get the model off the ground and into the race.

Keep well ahead of your model and ensure that the pilot does not enter the race with a bang, or causing a bang, he must keep low, take off smoothly, moving forwards in a smooth forward motion towards the centre of the moving pilots circle, don't just pop up as that will cause chaos, and in no way endear you to your fellow pilots.

Also if your model doesn't go straight away, and you are still crouching with one hand on the ground, don't stand up in an attempt to encourage your mechanic, it will just annoy him and will annoy your fellow pilots and potentially cause an accident.

Keep your head down and out of the way, if you don't you will quickly be in the firing line as the fastest pilots fly the lowest and you will not be too popular if your big bonce gets in the way when it doesn't need to.

Normal Level Flight

The best advice on offer here comes from someone I consider to be one of the best FRC pilots in the world – Rob Fitzgerald, and is backed up by one of the UK's best pilots – Derek Heaton, age wise they are perhaps a few years apart by skill wise they are in my eyes legendary.

I have flown against both and have learnt a massive amount from watching and competing against them and I am first to admit that they are both heroes of mine. Derek's NATS and worlds record is exemplary as is Rob's.

Rob has also produced a number of critical videos which should be watched by all pilots.

Many years ago Dave Clarkson viewed DH as one of his heroes and the fact that Derek is still flying, speaks volumes.

From watching Rob and Derek, I have identified a few ways to obtain and maintain your best flying performance.

1. Style

Keep your handle right on your chest just under your chin. This enables the pilot to keep the model in sight and you will learn to race with your model in a useful flying position, which is essential when the going gets tough in the centre circle.

Flying from lower down in front of the torso can lead to confusion and inability to overtake as your lines will get tangled with another pilot's body.

Flying from the top of the head ala 70's style will restrict your own vision and get in the way of less talented pilots, both are not good.

2. Flying Height

In vintage TR flying height has proved a particular problem, with many pilots flagrantly breaking the rules and using high flying to cut the distance around the circle that the model has to travel, and as a result, lead to the potential to cause accidents.

Therefore it is important to remember that the natural horizon represents the lowest effective limit for level flying.

So as a pilot you should apply that as a rule of thumb and practice so that you are able to fly just above the horizon.

In a perfect world the contest organisers will provide height markers in a vivid colour to FAI specification, but at most of our domestic competitions this is sadly a luxury oft not provided so my rule of thumb is worth applying.

It is best practice to try and learn to trim and fly your model eyes off, whilst still knowing where it is. Thereby allowing you to watch and see where the models of your fellow competitors are.

An important ability to develop is the practice of looking your pitman on each passing lap this assists in the maintenance of good communication and is second only to a radio link between pilot and pitman.

It is also useful to note specific landmarks around the circle in the middle distance, which will enable you to maintain your own orientation, regardless of your pitman, the jury other pitman and wind, etc.

Maintaining Level Flight

The way you physically navigate the pilots circle is crucial to the way you race your aircraft. Practice walking tight circles using small steps.

If you can walk on your toes, (giving a slight height advantage) even better.

Avoid big bounding steps or running, as both reduce your effective height and serve to compound any blocking your fellow pilots may be trying to implement.

When blocked, act quickly and push against the arm of the blocking pilot keeping as close to the body of the blocker and get your flying hand up on his shoulder, or as high as possible.

If you do get blocked avoid at all costs being pushed to the edge of the pilots circle where you will be forced into the navigation of big circles at a running pace.

Small circuits, at the centre of the pilots circle with small bouncy stops will maximise your height as previously mentioned, and with contribute significantly to the overall airspeed of your model throughout the race.

It is important to ensure that your model doesn't have to work too hard; the higher your handle position means that your model has to generate less lift in order to remain at a racing height between the height markers, therefore less drag is developed and less drag equals greater airspeed.

Overtaking

To any good and correct pilot, overtaking is the most difficult part of a race.

Generally in any race class; be it mini Goodyear or open B racing speed differentials between models are usually quite small and to get your overtaking done successfully and legally in the time the rule book dictates, requires speed, skill and practice, practice, practice.

The key to successful overtaking is to manoeuvre your body in behind the back of the pilot you wish to overtake, fly your model right on his shoulder and get your hands up and over his head when your model is directly behind his. Pull hard to get over and clear the overtaken model by at least ½ m.

At all times continue to walk forward using small bouncy steps whilst avoiding cross lines for no more than necessary and move through the centre of the pilots circle.

At no point should the overtaking pilot stop the forward movement of the pilots circle.

(You can see this in greater detail in if you watch Rob Fitzgerald's video at http://www.fesselflug.eu/html/downloads.html#robert

Overtaking appears to be simple.

But to do it correctly and quickly without blatant rule infringement is difficult.

A simple descriptive solution for the overtaking pilot is to walk forward, taking those small bouncy steps holding your handle up to bring your model level, but to the rear of the model to be overtaken.

Then aim your left shoulder at the rear of the left shoulder of the pilot to be overtaken.

Get as close as possible and you will find that you are in the perfect position to overtake; hop over and walk forward without pivoting or stopping and continue racing.

The key facts are practice, practice, practice
- Small bouncy steps
- Tight pilot circle
- Don't cross lines and never fly from the back of the circle
- Walk forward and don't stop

Landing
Usually referred to by US Naval aviators as a controlled arrival, the job of landing a team race model is often more difficult than it looks.

Especially when the model you are trying to land has two wheels.

Perfect landings each and every time are achievable, but good techniques and practice, practice, practice is essential.

In VTR, where the use of shutoffs during races is not permitted, it is a case of practiced team work so that the pilot knows to the lap or two when the engine will cut.

As it cuts the pilot must move to the outside of the forward moving pilot circle, extend your arm and move to the inside of the pilot circle get your head down and keep down, looking out for any other models already on the ground, keep the model in board until the last minute overflying the other pit stations where possible.

Remember that the F2C pitstop overfly guidance does not apply to VTR, however if you can do it, it is good practice, but when your models is on the ground and running in to your pitman stretch out, don't pull in, and do not overstep the pilots circle until the model is in the hand of your pitman.

When it is, keep your flying hand as close to the ground is practicable with your alternate hand in contact with the ground.

This is not a rule requisite in VTR but is good practice and a necessity for modern TR events so why not? Good practice is best practice.

For modern events where shut off use is allowed ensure that you have practiced the distance from shut off to landing and only shut off after you have started to move out of the pilots circle.

Sight, Sound, and Speech
In 2007 Physiology is a very interesting science and plays a crucial role in the life of our full size pilots, so why should it not apply to model flying?

Eyes – Always watch what is occurring, not just your model but the race around you.

Ears – Listen to your fellow pilots (but avoid conversation.

Concentrate on the job in hand) Listen for warnings and listen to your pitman (easier if you have a radio link) Listen to your motor.

Henry Nelson said ''the pilot has his hand on the needle.''

Mouth – Always engage the brain before releasing the mouth.

As I said earlier, CD's and Jury members are volunteers who carry a demanding and very important role, it is all too easy for contestants to 'fly off the handle' and vent frustration caused by a DQ or a poor time at race officials.

Any such behaviour is almost always counter productive.

Keeping a straight face and directing any such frustration through the correct channels if warranted will always stand you in good stead with the race officials and mark you out, not as troublemakers and 'hard done by souls' but as good sportsmen.

If you ever find yourself in a situation where you are DQ'd, politely ask for an explanation from the CD, not individual jury members, challenge the decision if you feel it is necessary or learn from your mistakes and don't put yourself in that situation again.

A considered and adult response will always win you respect.

An explosive response will stay with you forever and may be detrimental to the enjoyment of the sport for all.

Being prepared to listen and learn is essential.

Conclusion

The Greek philosopher Plato said ''the minute you stop learning; you die.''

The same applies to the development of your personal piloting technique.

If you think that the quest to become a good TR pilot is difficult then you are on the right track.

The getting of wisdom takes time, effort, dedication, and practice.

It does not happen overnight. But the end result is worth the heartaches, frustration, and the effort.

CL racing is the zenith of our sport; there are no prizes for being second best.

Choosing the Best Pit Station

Mick Orchard

Choosing the best Pit Station is always a matter of discussion between pilot and pitman, may years ago a pilot – Dave Clarkson wrote a piece that was pretty much on the nail, but he was a pilot! With the benefit of a few years and the fact that I have been a pitman for some years I have reviewed and added my take on what I believe to be a crucial element of how you win races.

It is a given that the selection of the best pitting segment generally relies upon the choice that the team is given as the result of a draw done by the Contest Director.

This is either First, Second or Third choice.

If you have the luxury of First Choice, then you have carte blanche and if your choice of segment is wrong then the blame must rest solely on your shoulders.

Choosing the right segment might appear to be easy and a rather insignificant aspect of racing.

If you think like this then you are wrong; very wrong.

Where to Go?

Choosing the right segment is the key to winning races.

If you aren't winning races it may be worthwhile to look at your selection of pit segment, review it and change it if need be.

Lets face it; much of the UK racing calendar is sadly subject to poor conditions, this year in particular, although the usual bad weather which affects the Nationals was nicely absent.

It is commonly regarded that the best segment is the downwind one, however sometimes this is not always the case.

During races which are held in windy or adverse weather conditions, even the most experienced pilot will have difficulties.

For the pilot the wind is the enemy; more so if there is less than 10 grams of tip weight in your race tuned Vintage Team race model.

Windy conditions and poor segment selection are a recipe for disaster.

So what can you do?

What to Do?

When called into the circle for your heat, with your model all ready and your pilot raring to go you will generally but obviously not always find that the best segment is taken by the team that beat you in your last heat, oops, sorry just being cynical there!

There are usually or should be six segments painted or drawn in chalk on the circle, but even if one of those is anywhere near down wind, then the chance of getting that segment is one to three against!

Therefore it is essential that as a team, you have practiced flying from one which might not be the one that you love but one that you can use.

If you get Second Choice, then your preferred selection is a matter of judgment and almost always reliant on a good understanding of your model, its characteristics, weight, agility, flyability and most importantly, the ability of your pilot.

However the most important factor is the proximity to the down wind mark.

Even if the Second Choice is in front of the First Choice (i.e. in front of the downwind mark) in nearly all cases this indicated second choice is correct. (See sketches for further info)

A situation when the "best" case position is right on the downwind mark and is taken, then you should usually go forward to your second preferred choice.

At the least from this position the model will take off and if your pilot can and does react quickly enough, then the model get off in perfect safety.

From the position behind, however, especially in high wind the model may never get off, at best running in, at worst, taking out itself and another model.

This is the reason that most CD's opt to run two up races in extreme conditions – the chances are so much better when two of the pitting segments will allow safe take offs.

However two up races should only be run when weather conditions are extreme, two up is not racing, it does not challenge either team and unless there are extreme or mitigating circumstances, CD's should attempt to avoid them.

Conclusion

Finally two points for you to consider; especially if you are new to team race.

First –

If your segment is covered in fuel from previous races or has rough patches, politely ask the CD permission to move the half metre to clear the obstruction.

Always move forward, never back, you don't want to kneel in that mess or on that bump when you are catching your model!
Second –

My second point concerns the way that teams are selected to go into the racing circle. Normally the CD does a draw or gets the pilots of the teams to draw straws for preference.

However, if the natural system is employed; where the CD allows the teams to 'fight' over segment selection is used.

If you are dissatisfied it may be worth your while to point out to the CD that under the BMFA general rules that a draw should be used when considered necessary. It is up to the discretion of the CD.

By doing this you have a two in three chance of improving your segment.

So it is usually worth asking for a draw. In line with the age old adage of "If you don't ask, you don't get!"

Good luck and happy racing.

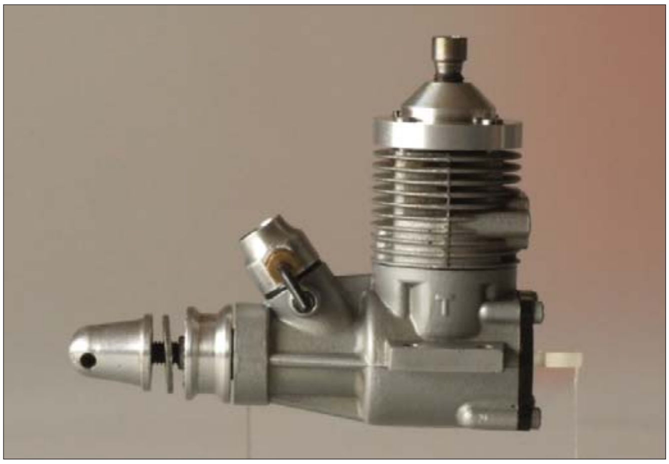
Gallery Pages

Nipper Vintage Speed Model

OS 15 in Nipper

Dave Platt Barton B Models

Super Saint Barton B by Dave Platt



What is it?

Can you name these engines?

No one got back to me on these engines so either you don't know what they are or don't actually read this far! So...

If you can name at least one of these there is a very nice prize waiting for you! So get you your thinking caps on!

Send me an email duncan@east-two.co.uk

Looks like a K & B, but no?

Absolutely no idea?

2006 World Champs - More Photos

Pit facilities

Ferenc Orvos - Hungary

Processing - Jakov Mazniak far right

Claire Perret - France

Quick F2C Catch

F2C

F2C

More F2C Pit action

2007 Euro Champs Photo Journal Zagreb


Malcolm Ross


Malcolm again


Bernie Langworth


Chris Barker


F2D action


Pete Halman F2A


Mike North & Jill and Chris Barker


Processing activity

More Photos

Big Sign

Site

A few models

Lets go shopping

Chris all alone!

Site