

Message started by planedaft on 29. Apr 2008 at 23:42

Title: **Design and Build of a Half Scale Fournier RF4**

Post by **planedaft** on **29. Apr 2008 at 23:42**

Well, I have been promising to do a build thread on my new half scale Fournier RF4 since last year but with one thing and another I always seemed to be too busy to get it written, so here it is – better late than never!

Why a Half scale Fournier? Well it all started after the success of my 1/3rd scale RF4 – it seemed to get so much attention everywhere it went and then at one of the shows (I think it was at the Nats) someone admiring the 12ft span as it hung in the marquee, half-jokingly said “couldn’t you make a bigger one?”

Well that was it for me – I have never needed much encouragement to make a bigger plane! So I set about scaling up the design in CAD to Half Scale. This is a simple procedure in essence – a couple of clicks and there it is, and then it’s a matter of changing all the stringer notches to fit more suitable wood sizes. So that was it – I had a half scale design.... But somehow it didn’t seem right and I wasn’t happy that there would be sufficient strength in the right places – the simple process was becoming more complex by the minute.

After several weeks of head scratching and dissatisfaction with the whole scheme I decided to scrap the drawings and start afresh from the original drawings that I had used for the 1/3rd Scale version. What had really bugged me was the structural integrity of the front end – what had worked well at 1/3rd scale didn’t work at 1/2 scale. I wanted the Front end from Firewall to back of Canopy to be as “Open” and as free of formers as possible to facilitate the retract and full depth scale cockpit detailing. Eventually I came up with the double walled front end based on a design I had used for a UAV which in common with the Fournier had to have a large portion of the Fuselage “open” and free of obstructions.

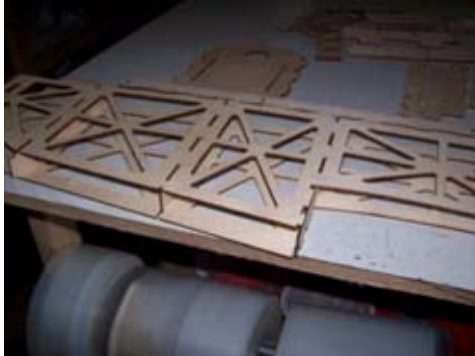
Once that was sorted the rest of the design fell into place fairly rapidly and within a month I had started cutting the parts out and construction began. :)

Title: **Re: Design and Build of a Half Scale Fournier RF4**

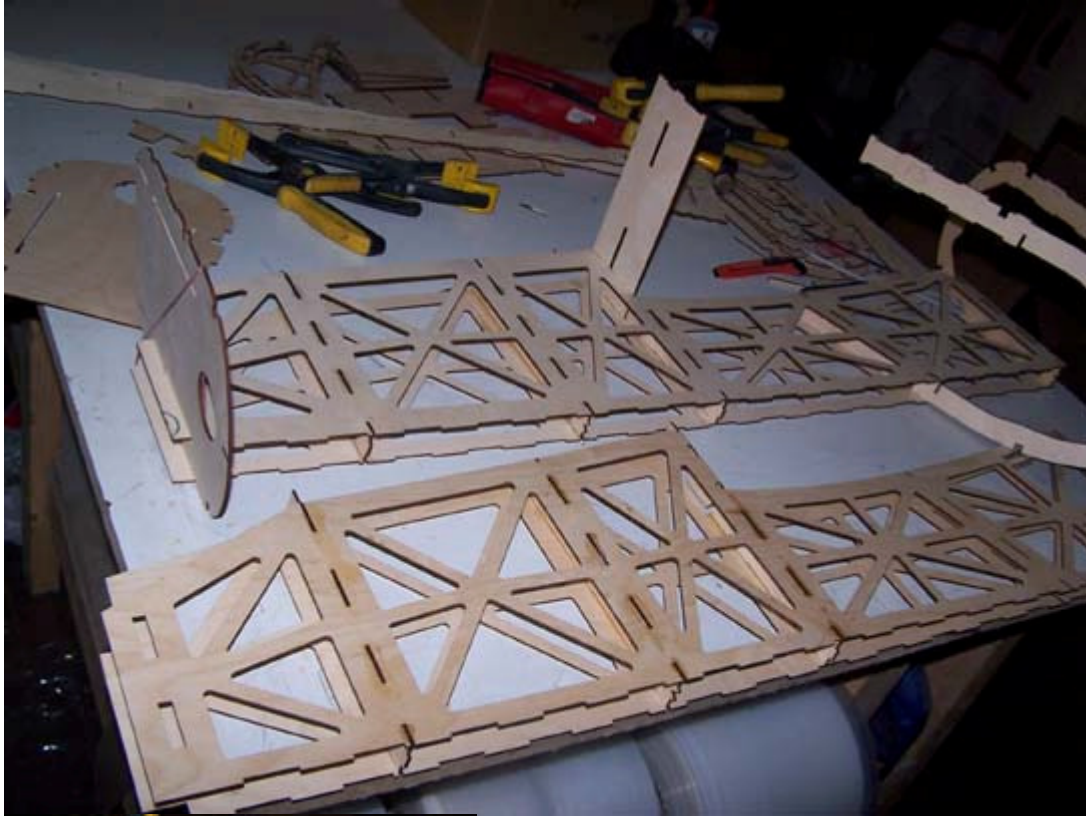
Post by **planedaft** on **29. Apr 2008 at 23:46**

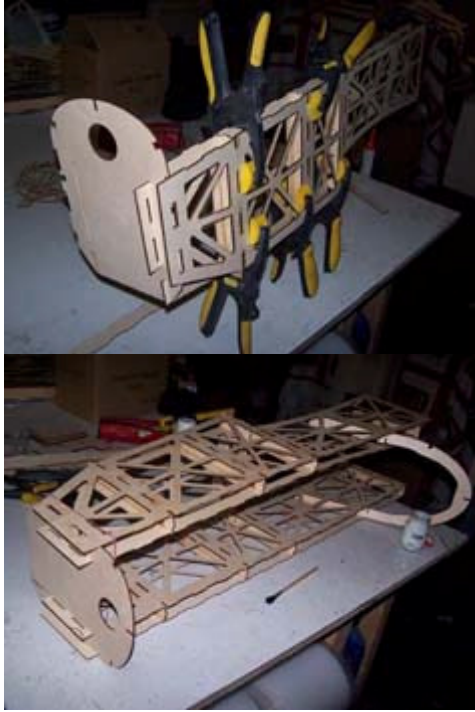
Construction starts with the front half of the fuselage. Here are the parts laid out and then forming the double walls of each side. Like the principal of corrugated cardboard it makes a structure





Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **29. Apr 2008 at 23:50**





Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **29. Apr 2008 at 23:54**



The front Hatch assembly is built in place so it aligns perfectly

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **30. Apr 2008 at 00:00**

I'll get the hang of positioning these pictures eventually!



then the top strips help form the shape further and add a lot of rigidity followed by lots more clamping!



Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **30. Apr 2008 at 00:03**

the front hatch assemble is built in place - it includes the bits that will form the fuselage top either side of it - these are part cut through so that a few moments work with a hacksaw blade will



Title: **Re: Design and Build of a Half Scale Fournier RF4**

Post by **planedaft** on **30. Apr 2008 at 00:10**

Then I turned my attention to the wings - these are in 3 sections for ease of transport.
the centre section first....





I made all the joints to be "interference fits" so a few gentle taps taps here and there and it all locks together....





Title: **Re: Design and Build of a Half Scale Fournier RF4**

Post by **planedaft** on **30. Apr 2008 at 00:17**

Then I added the rest of the centre section - because of the dihedral this is done one side at a time - weighting the ribs down as you go - note that there is no plan needed to build this as it all



notches together in one way only - if something is in the wrong place it shows up!

The mainspar is made up of several layers of ply cunningly designed so that each layer works in a different way and one layer is "boxed in" with cypress stringers to add even more strength and



here you can see the layers going in one by one...



Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **30. Apr 2008 at 00:24**



I used short lengths of steel bar to weight it down along its length and keep it down in the jig



here George lends a bit of scale to the fast growing fuselage!

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on 30. Apr 2008 at 00:29

Lengths of aluminium angle clamped in place along with several set squares and levels helped to align it all before gluing it up....





and a few cross pieces added in to help reduce twisting



Title: **Re: Design and Build of a Half Scale Fournier RF4**

Post by **planedaft** on **30. Apr 2008 at 19:18**

Next on to the tail feathers...

They are made up from a central ply form onto which balsa is glued around the edges, then the shaped ribs are glued in position between these.







Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on 30. Apr 2008 at 19:21

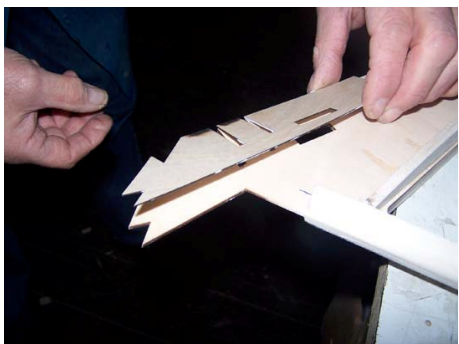
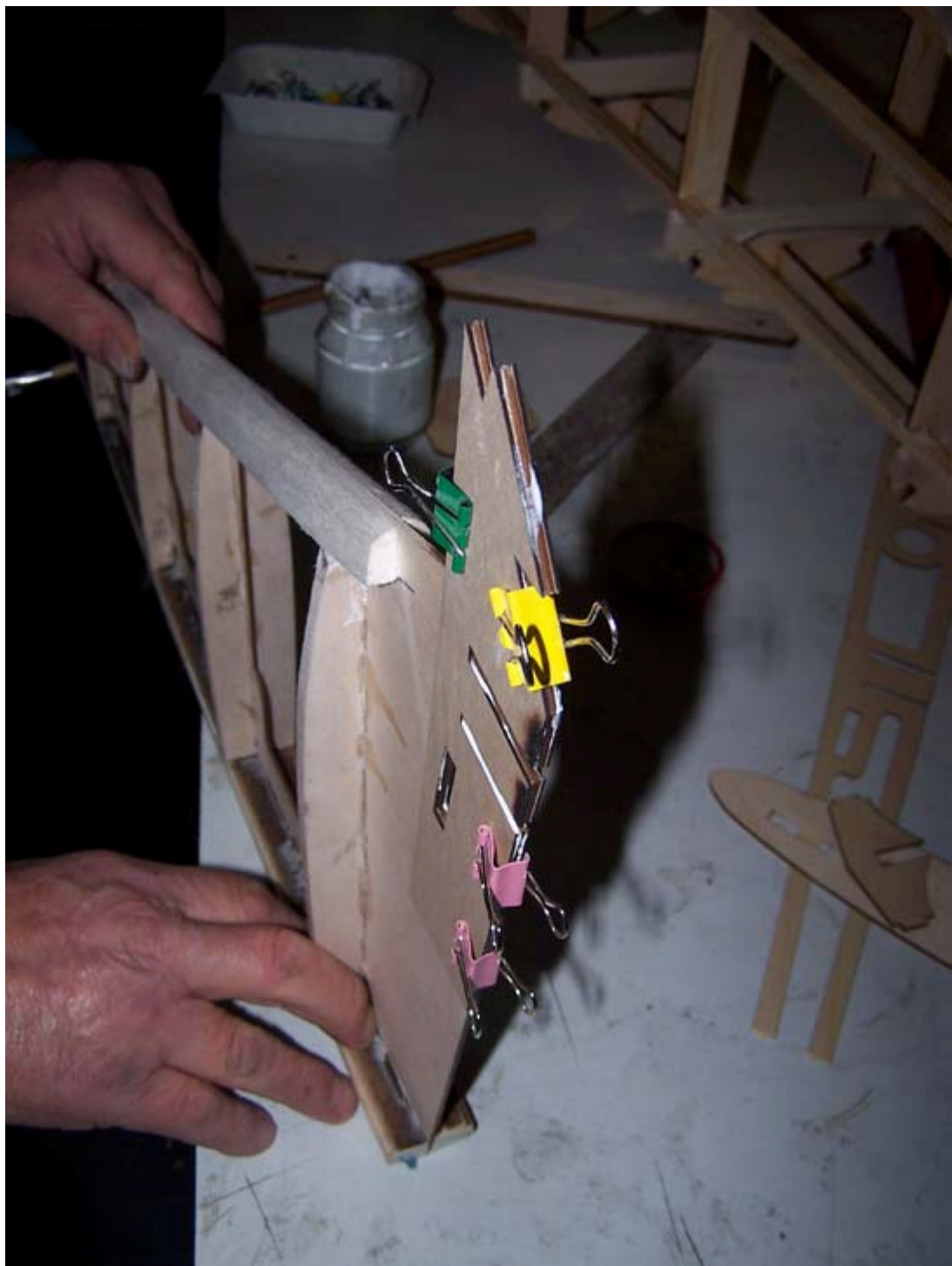




[img]

once the parts are all glued up the shape is sanded to the ply profile and rounding off all the edges.

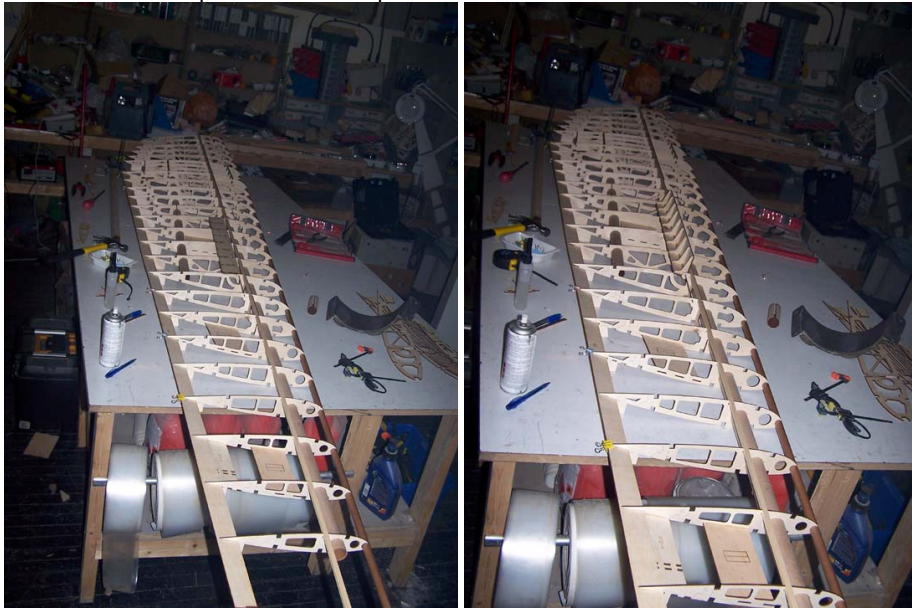
Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **30. Apr 2008 at 19:34**

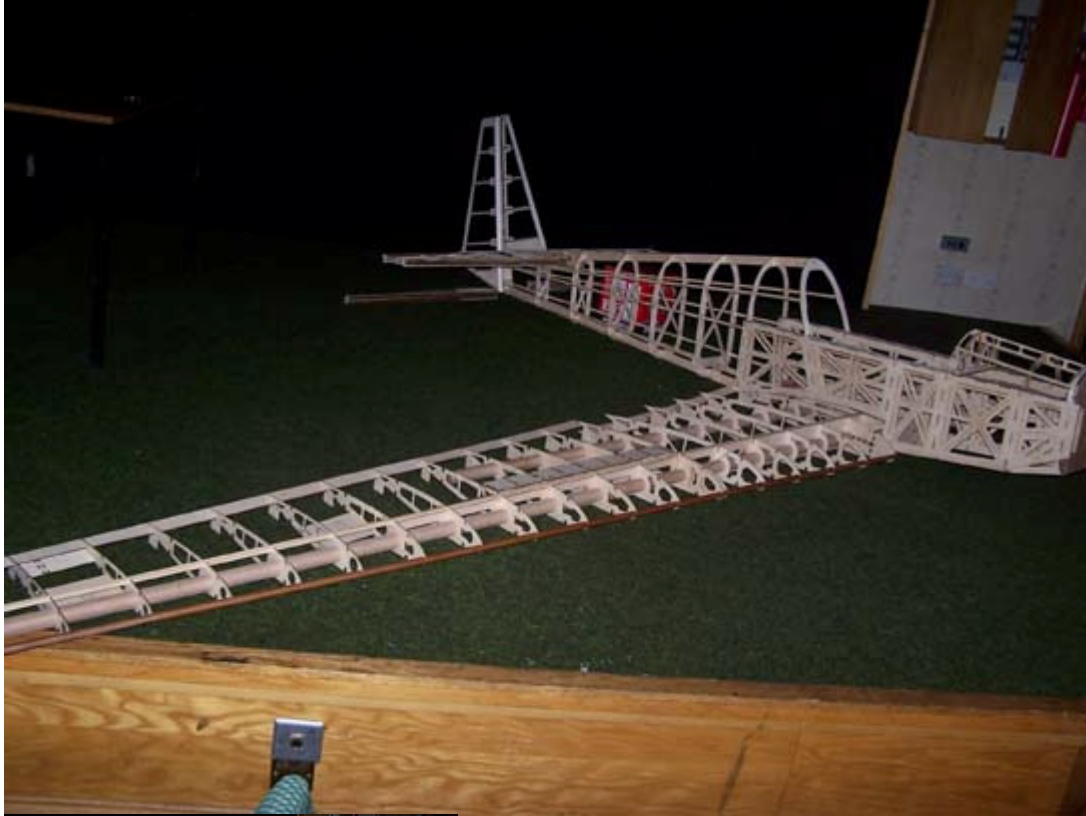


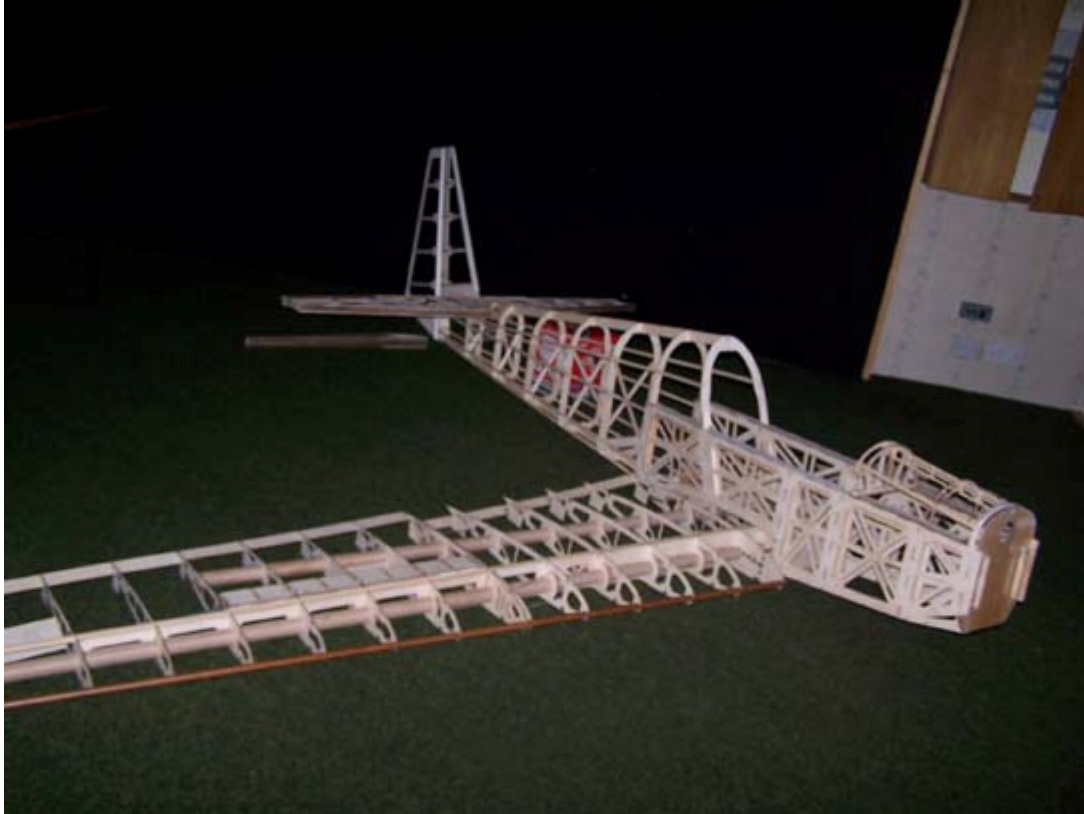
Title: **Re: Design and Build of a Half Scale Fournier RF4**

Post by **planedaft** on **30. Apr 2008 at 19:39**

OOPs - I got so carried away building the wings that I fogot to take pictures along the way!
so its a bit of a leap forward to thsi point.....







Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **Barry_Cole** on **30. Apr 2008 at 22:56**

WoW

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **Henk Goosen** on **01. May 2008 at 07:12**

Impressif ;D

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **Tony Woods** on **01. May 2008 at 09:09**

The Workshop is very impressive as well!! ;D

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **AndyM** on **01. May 2008 at 11:51**

Nice machine. I have workshop envy :-[

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **rossco** on **29. May 2008 at 02:44**

any more updates there guys??

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **02. Jun 2008 at 11:02**

UPDATE - the RF4 is being covered at the moment - I am hoping to have it flying within the month (although that might be with a foam canopy as the plug for a proper one is taking an age to make!

I must say that I am very pleased with the quality of this build - it is all looking very good (thanks in large part to the efforts of my building buddy George who has excelled himself!

The 1/3rd scale version is flying great and everyone is saying that if this one fly's as well as that then it will be a great success - by all rights it should fly better (you know big-uns fly better!) but only time will tell.

If anyone is interested then you can see the 1/3rd flying on youtube or if you cant find it see the link on my website www.falcon-aviation.com and go the RF4 page under the [aircraft] section. This was only its second flight and I had to run back for the camera – Andy Johnson was doing point rolls at about 50ft! blew me away with what he could do with it – then I was flying it this weekend at Langar and it even makes me look good and I have hardly flown in the last 5 years! (I was getting many comments after about how nice it flew even though personally I was a bit disappointed with my flying – need more practice!)

More later!

Cheers

Richard

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **VinceC** on **02. Jun 2008 at 11:18**

What's the progress on the electric version?

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **rossco** on **02. Jun 2008 at 13:48**

looking great Richard any idea as to a preproduction or production price yet?

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **Kit Pig** on **22. Jun 2008 at 08:04**

Wow that is awesome. What size motor will you mount to pull it around? Do you sell the plans?

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **MikeA** on **22. Jun 2008 at 10:20**

It looks fantastic. If you can't wait for the kit to come out, then why not try the 1/4 scale version I have for sale in the classifieds? You know it makes sense! ;)

Sorry about the shameless plug! :-[

Mike

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **13. Sep 2008 at 13:10**

Just thought I had better post an update as time (unlike me) is flying on!

This build seems to have been fraught with setbacks and delays. To be fair they have been nothing to do with the model itself but on the personal front – 2 spells in hospitals, a couple of months with my building buddy George away living it up in France, and masses of work keeping me away from the build has meant that instead of a first flight in April-May its still has not flown here in September!

The model is completely finished – in fact it was finished over 2 ½ months ago and we have been waiting ages it seems for the CAA exemption to come back, and when that finally arrived, we scheduled several flying sessions which were all rained off –will we ever see a good summer in this country again?

And then when I tried to start the motor I couldn't get it to run. This baffled me as it had worked perfectly in its last model (my 40% Pitts 12) so I couldn't understand it. A whole day of flicking (not as easy as it sounds on such a big engine as my now immensely muscled right arm and shoulder will testify) I checked the plugs – good sparks and there was fuel coming through so it should have run. But there was nothing except an occasional spectacular big bang backfire from the muffler (in Switzerland they have spent billions on the Hadron Collider to recreate the big bang that created the universe and I did it in my workshop with the just a reluctant 3W engine and a lot of muscle power!)

Anyway after thinking overnight I decided to take the hub off and check the timing. I discovered that the woodruff key had sheared neatly in two, which meant that the magnet was now at about 90° after TDC! So it is no surprise that it wouldn't run!

So at this time I am awaiting a new woodruff key to arrive so that I can get this big beast flown.



to take this picture I had to stand on top of a 7ft Ladder



Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **rossco** on **13. Sep 2008 at 13:48**

Looks great guys good luck with the maiden.

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **29. Sep 2008 at 15:00**

Engine now running beautifully - broke 6 woodruff keys over 3 days! but seems to be sorted now - then after tinkering about with the timing it was running OK but decided to go the whole hog and treat it to some new plugs - restarted and WOW! what a difference! nearly pulled the model out of Georges hands! I expected a bit better performance of course, say 10-15% better, but the difference was phenomenal - nearly double the power! - so here we are now waiting for a break in the summer rain - we had scheduled tomorrow for another attempt at the maiden, but the summer is back with a vengeance - heavy rain and 28mph+ winds predicted, so it looks like it will have to wait a bit longer! - so frustrating!

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **Steve Fraquet** on **29. Sep 2008 at 21:18**

'but the summer is back with a vengeance - heavy rain and 28mph+ winds predicted'

Looks like you chaps are in for a good old british summer then? :-/

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **12. Oct 2008 at 22:01**

I am delighted to announce that after many months of delays over engine trouble, getting the right people together, work commitments and most frustratingly, waiting for a decent weather window, the Half Scale Fournier RF4 finally had its maiden flight today. ;D The model flew faultlessly in the able hands of Andy Johnson and looked great in the air. I am hoping that the video of the flight will be up on the web soon, meanwhile some photos can be seen at www.123pc.org/RF4-2_maiden.htm. We can now start production of the kits! ;D

I would like to thank to Andy for his help and for flying it and also my greatest thanks to my co-builder George Murgatroyd for his dedication to this project, it really is his 'baby' as much as mine and it would not have been possible to have completed the model in the time frame without him.

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **rossco** on **14. Oct 2008 at 09:14**

Congratulations guys I look forward to the video.

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **planedaft** on **14. Oct 2008 at 22:29**

Video now up on youtube - search as FOURNIER 1/2 SCALE. FALCON AVIATION TEST FLIGHT.

<http://www.youtube.com/watch?v=dsdQhrkEIXQ>

link inserted by webmaster

Bear in mind this was its maiden flight and the engine was giving problems - (only running on one cylinder part of the time and the silicone tube connection from the manifold to the expansion chamber had broken on one side making it much noisier and loosing power) but that aside, Andy said it was a real pleasure to fly and the rolls were very axial and straight (no rudder needed). We also decided that it was a bit nose heavy (safe but less responsive) which made the takeoff interesting on this bumpy field, so we will move the CofG back for the next flights. the video is a bit speeded up -s hades of "keystone cops!" I am afraid, I am told this is due to the compression rate etc used on the video and my guy is working on improving this now. Anyway - despite this I hope you enjoy it! ;)

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **rossco** on **09. Jan 2009 at 11:48**

Hey guys your link didn't seem to work but here is one that shoud be of some interest to RF 4 lovers like myself

http://au.youtube.com/watch?v=nOVD9-_ofds

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **Noël Rumers** on **16. Jan 2009 at 23:29**

Nice! Nice! Nice!!!!
Noël

Title: **Re: Design and Build of a Half Scale Fournier RF4**
Post by **rossco** on **19. Jan 2009 at 02:30**

Good work Barry good to see your inner wookie is still working....