

Basic Foamie Fuselage

My Last blog covered building a wing from 2mm wallpaper foam – time now to look at the fuselage.

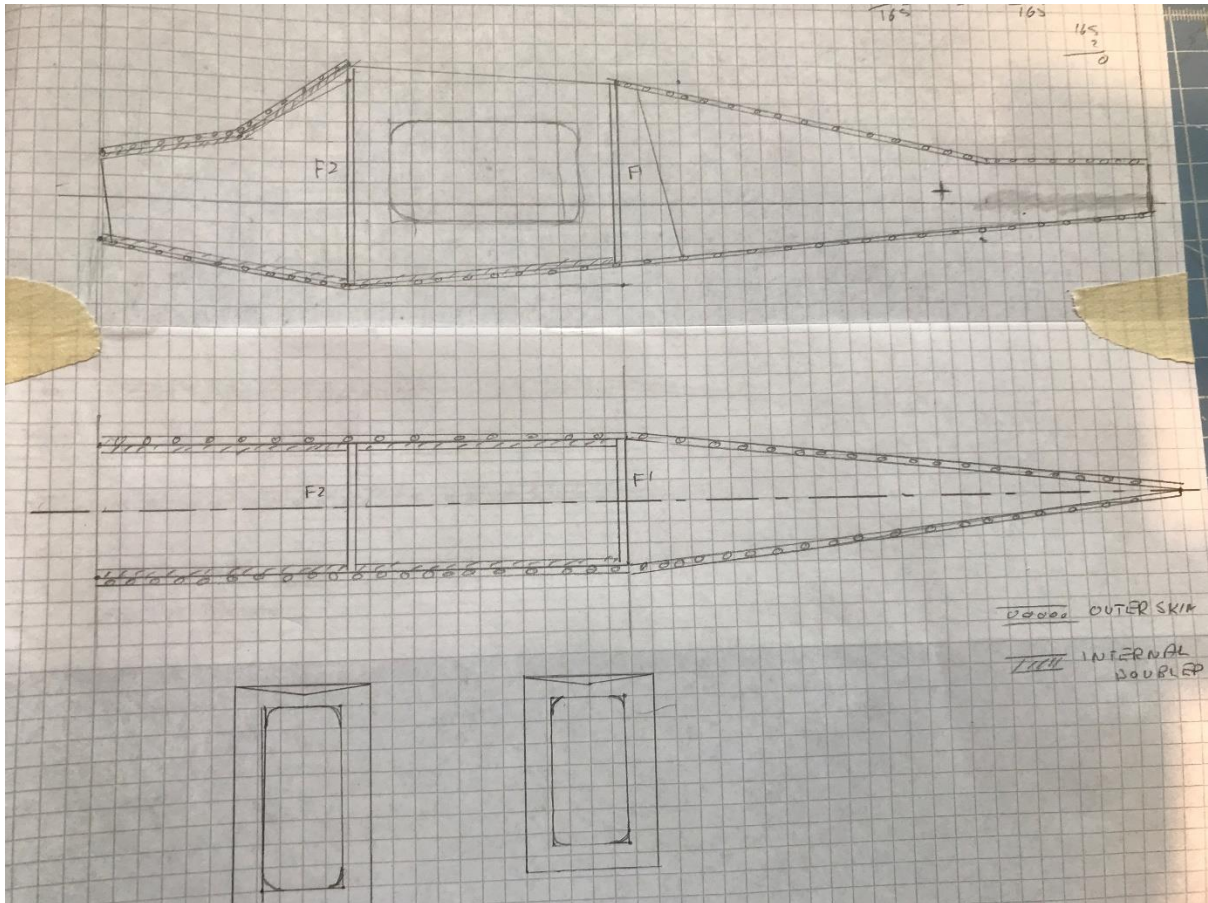
One option of course is a simple stick fuselage as per the foamies that we flew recently. This is certainly an easy way to go and can produce a high performance model. Critical to this type of model is the choice of balsa for the stick, it needs not to bend under a fully wound motor, but not be too heavy either. There can also be issues with the knot on the rubber catching against the motor stick and also its pretty difficult to the able to adjust the thrustline.

What I want to show here however, is a 'proper' made up fuselage.

As was the case with the wing, there are many different ways to go about this, there isn't any right or wrong way, they are just different. My technique uses two formers to ensure a true and square centre section. All of the forward areas, top, bottom and sides, have doublers to give a total thickness of 4mm all round and a structure that, given what its make from, is very rigid and easy to build true.

As an alternative example, the Wot Ho! by David Lovegrove, doesn't use any formers or so many doublers and is simply built 'in the hand'. Having built several of these now, I can assure you that every one has come out straight and true, so the technique works well as an alternative method.

First of course you need a design to work from. If you are doing a scale model then you should be able to find a three view to work from. For a non-scale model then I would recommend that you take a model that you know fly's well and use the general proportions from that, why reinvent the wheel ? I actually started with a Wot Ho! and a ruler to get the major dimensions and ended up with this :-



It's based on a Wot Ho! but with a very different fuselage, however I am sure that if you put the two together they would look pretty similar. It's not very elegant or imaginative or course, it's a simple exercise to show the techniques.

OK, I could have drawn this in CAD but decided that it would be much quicker just to use a pad of squared paper. Actually the fuselage length is just about the longest I could get on the A4 sheet, so that set the size!

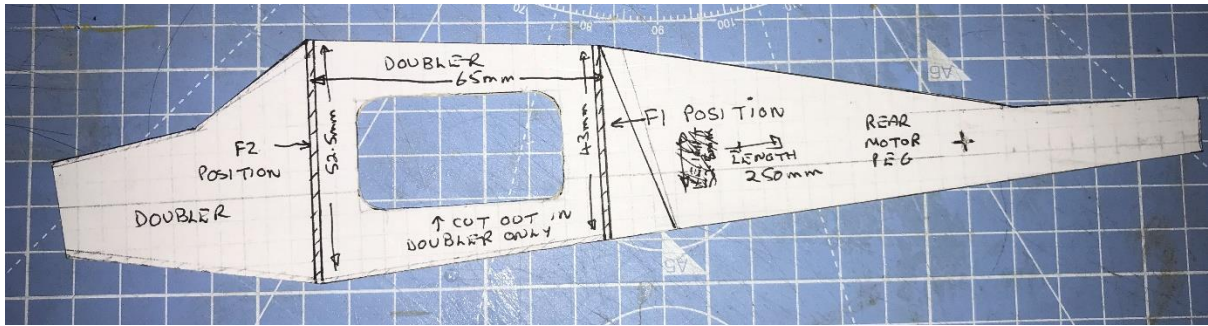
You can see the tailplane seat at the back, this is the datum line. With respect to this, ensure that the wing is about 3 to 4 degrees positive and that you have about 3 to 5 degrees of downthrust on the nose. I didn't measure either of these, just 'eyeballed them'

This is very much a 'design on the go' job, don't be afraid to make changes. On my drawing above you can see on the plan view that the fuselage is parallel sided all the way to the front. Actually, when I saw the prop we are using I realised that the large frontal area was going to mask too much of the prop, so the final design tapers at the front. Also look at the two formers. Having drawn them and the centre cut-out, I realised that I needed a V groove at the top for the wing to sit it. This has left that top beam very weak, next time I'll leave the top beam wider.

There seems to be a big hole in the side view, this is in the doubler only, not the side! Its to save weight but I'm not sure that the weight saving is really worthwhile, that's up to you.

Don't forget to mark a position for the rear motor peg.

As in the wing, all of the parts are cut with a card template. Mine looks like this :-



I have marked the major dimensions for reference. This template can be used for the fuselage sides and doublers. I also made templates for the formers F1 & F2. I made my formers from 2mm Depron but 1.5mm light balsa will work as well. I ended up with a kit of parts as below:-

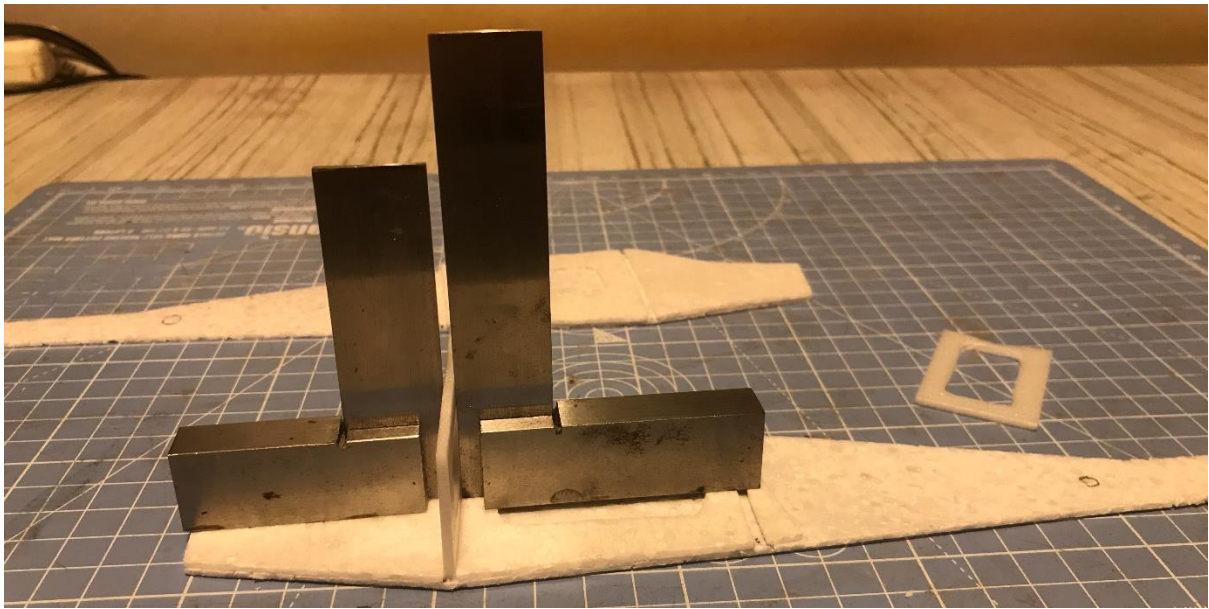


The first job (which I forgot) is to add small reinforcing pieces at the rear motor peg position. These are essential to stop the rear motor peg just pulling through the foam, they can be seen in a later picture and I made them from 0.5mm ply. You could use 1/32 balsa or probably even some thin card. **MAKE SURE YOU END UP WITH A 'HANDED' PAIR OF SIDES !!!!!**. You need to drill these with a suitable drill such that the rear motor peg is an easy sliding fit but doesn't fall out. This may take some careful work with a small round file.

Following this, you need to add the doublers as shown below. Don't try to use PUR here, you need to be able to slide these around to position them correctly. Make sure that the formers are a good fit into the slots between the doublers. Weigh them down with a heavy book while they dry. Again, note, it's a handed pair.



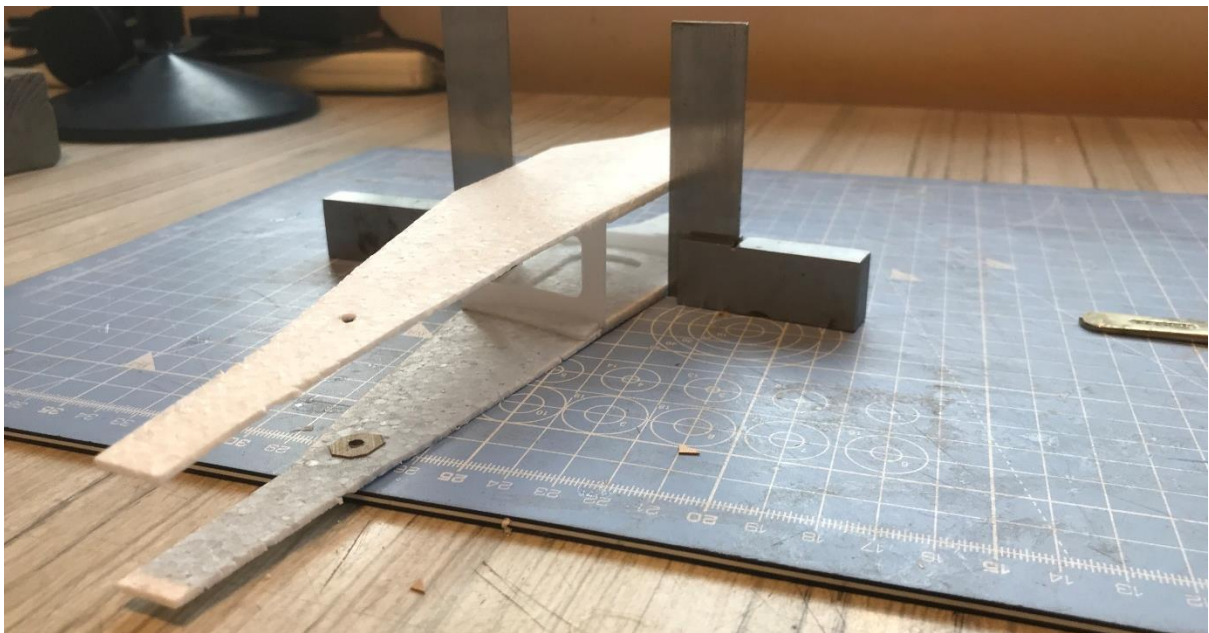
You can now add the formers to one side, making sure they are square. I used PUR for this and did one at a time.





In the picture above you can see the reinforcing discs at the rear motor peg positions. Yes, I should have added these earlier, but forgot!

The next stage is to add the second side, again checking for square:-



You should now have a centre section that is true and square.

Before I went any further, since this model is to have an undercarriage, I added a small sub former to provide a slot for this:-



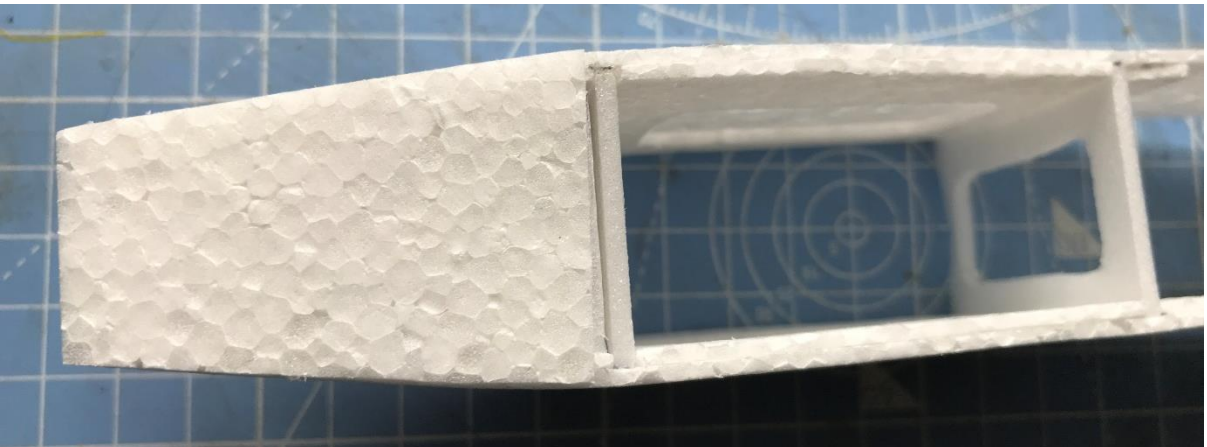
The sub former is 2mm Depron(or 1.5 mm balsa) and the slot is formed by a small 0.5mm ply spacer. No need to go overboard on the U/C fixing, if it needs to be robust the model is too heavy!



Now it's time to add to top and bottom sheeting, but these are going to include doublers. I started by cutting a piece of foam that would fit between the fuselage sides for the forward underside section. Again, make a card template and check the fit before cutting from foam. This is the doubler that is going to fit inside the fuselage, its glued to a second larger piece of foam that forms the outer sheeting, this second piece is cut oversized for now and will be trimmed to size later.



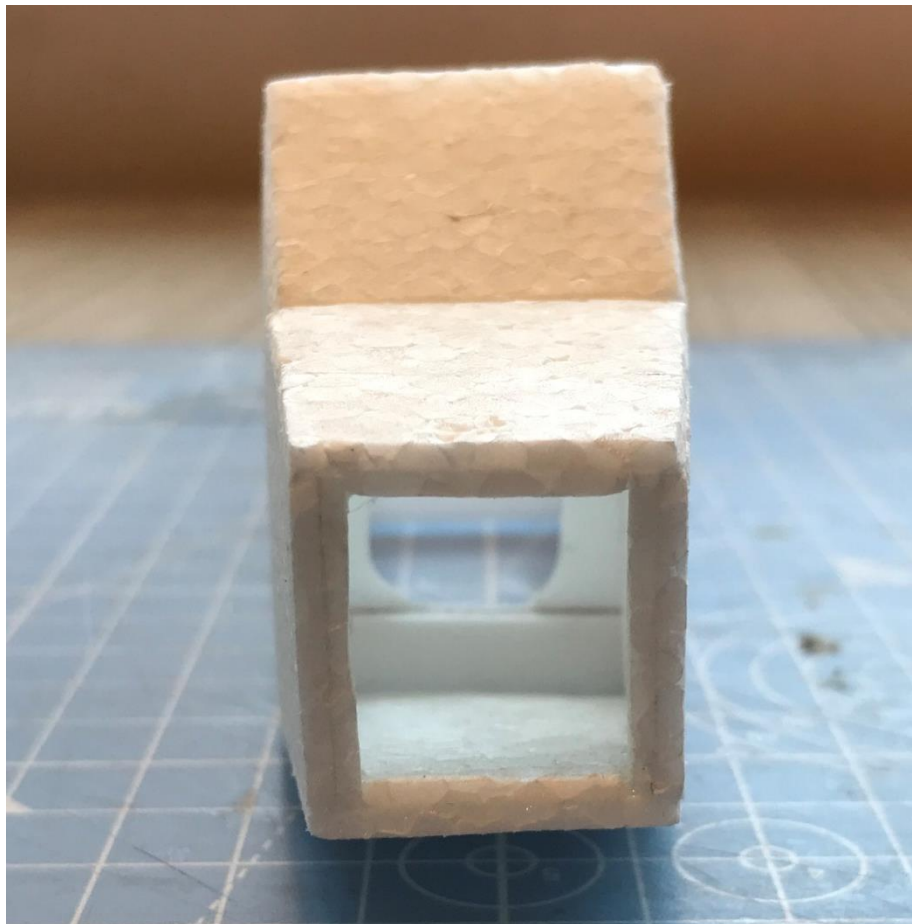
I then glued the composite piece above into place so that it forms both a doubler inside and an outer skin. The outer skin was trimmed to size after gluing. I used PUR for this.



I then repeated the process for the top sections:-



Viewed from the front, you should now have a something which is 4mm thick all around and nice and square. You can also see the sub-former for the U/C slot.



The next step is to repeat the same process again for the lower centre section:-

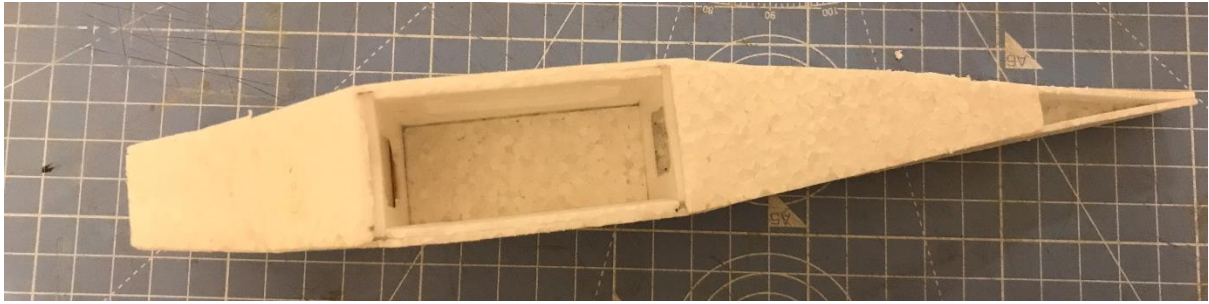


All that remains to be done now is to sheet the upper and lower rear end sections of the fuselage. These don't need the internal doubler, just the outside sheeting. If this were a balsa fuselage I would start by pulling the back ends together and joining these but if you do this with the foam it's all so flexible that it would get bent out of shape when you add the top and bottom, so don't join the back ends just yet.

Doing the next stage does require a bit of care to ensure that you get a straight fuselage. Start by cutting a piece of foam to the correct shape for the outside covering. Apply PUR to all of the surfaces that will be in contact and leave for a few minutes. Then, starting at the centre section bring the sides into contact with the bottom covering, working slowly towards the back end and checking to ensure that it's all straight and true. With a bit of luck it should look like this:-



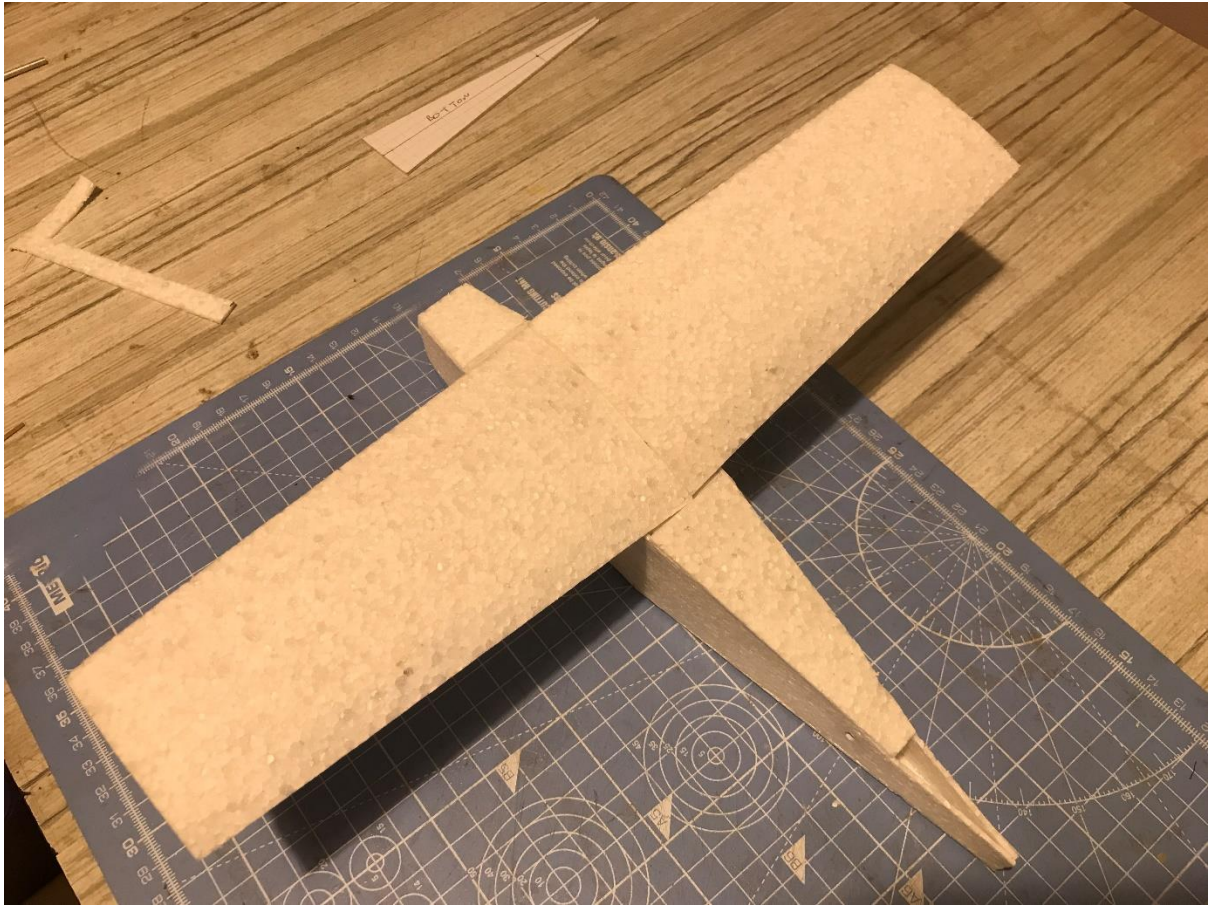
You can now repeat the process for the top surface:-



Congratulations, you now have a fuselage ! I had to weight it, 2.3 grams :-



And I had to just dry fit the wing to see what it is looking like :-



The next part of this blog will finish the job off:-

Adding the noseblock and prop

Making an U/C

Tailplane, fin and wing attachment

Fitting a rubber motor

Trimming advice

Watch this space !