Tissue over Doculam - The Allan way

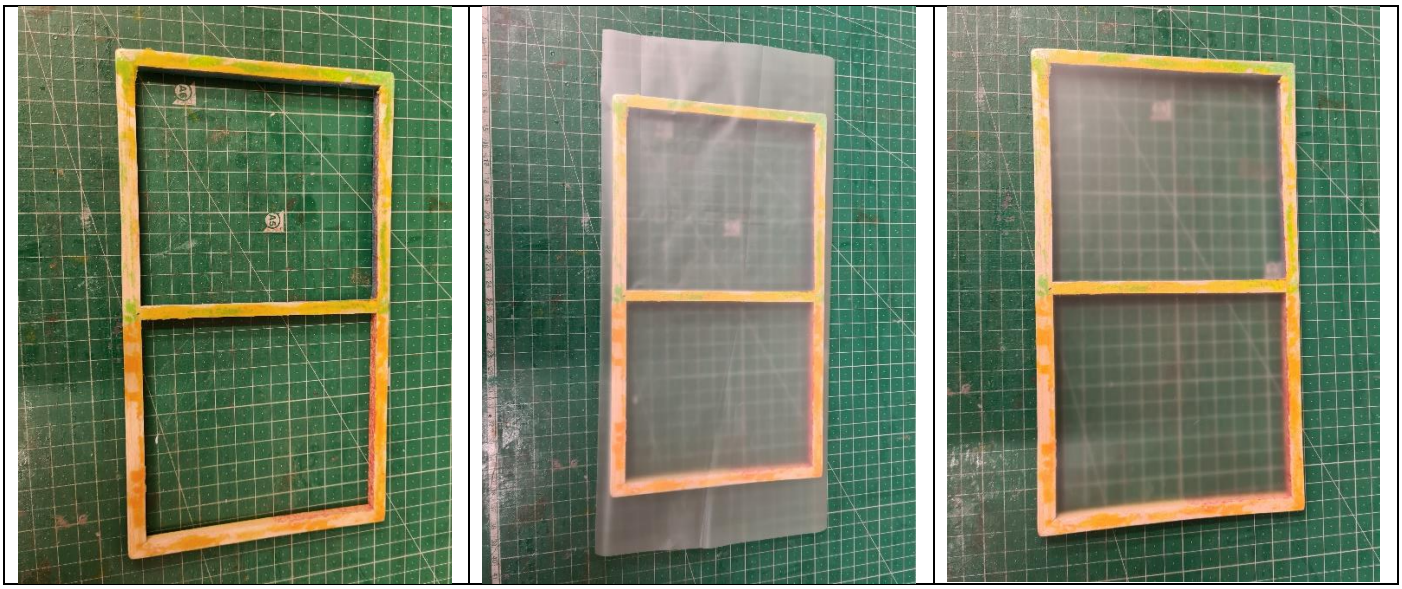
Introduction

Where did this start for me? I'm not quite sure! A local club member had tried covering the wings of a foamie slope soarer with quite a heavy laminating film. It wasn't very successful! It was way too thick & very rigid. Anyway, from somewhere I got the idea before it caught on of trying a much thinner film and some internet research found I could buy a huge roll of 25 micron in matte or gloss for not a lot. Matte seemed better, as anything applied to it might adhere better. This had sat around in my workshop for years before I did anything with it. First experiment was to cover an RC diesel powered model with it & tissue (an RC conversion of a KK Spectre C/L model as it happens – which flies very well). The doculam seemed fine but applying tissue with regular cellulose dope was a struggle. Again, the doculam sat around for a while. The breakthrough came with the finding that people were using it with tissue & water based 'dope'. Eventually tried it with Eze-dope & have never looked back! It doesn't add much weight at all and makes a tissue covering much more resilient.

I've found it quite easy to repair if one has to, just open out the damaged area, cut a piece of doculam to be around ¼", 6mm, larger and iron in place. Heatshrink it taut & recover with tissue. Probably best for the tissue patch to be a little larger than the doculam patch.

One of the advantages of tissue over doculam is that it is quite easy to remove and start again if it all goes wrong, it can be peeled off at any stage; the doculam does not adhere very strongly to the airframe. It and the other materials are not expensive.

If one hasn't done it before one can practice on a simple frame. This is my well used example, with & without doculam: -



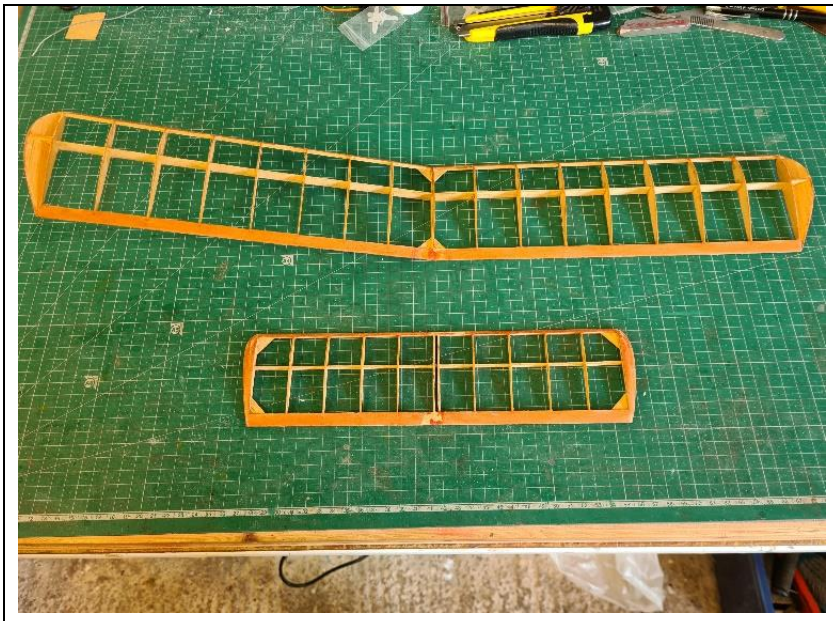
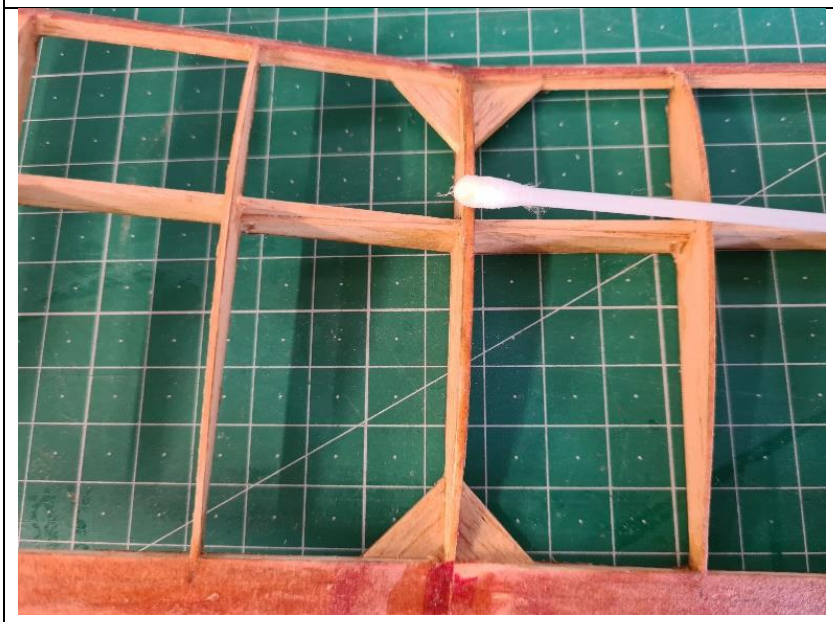
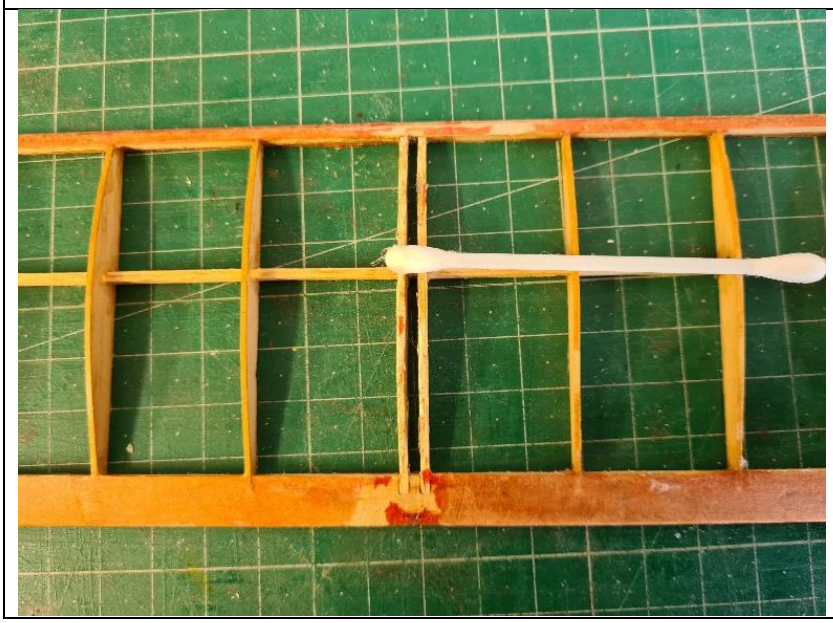
It can be quite a messy process. Gloves could be advisable because it is difficult to wash off initially when dry.

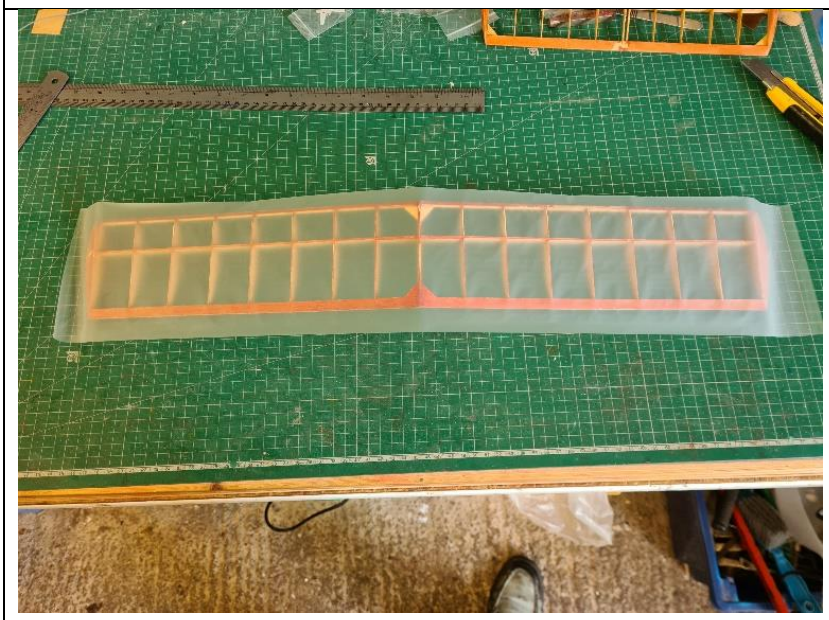
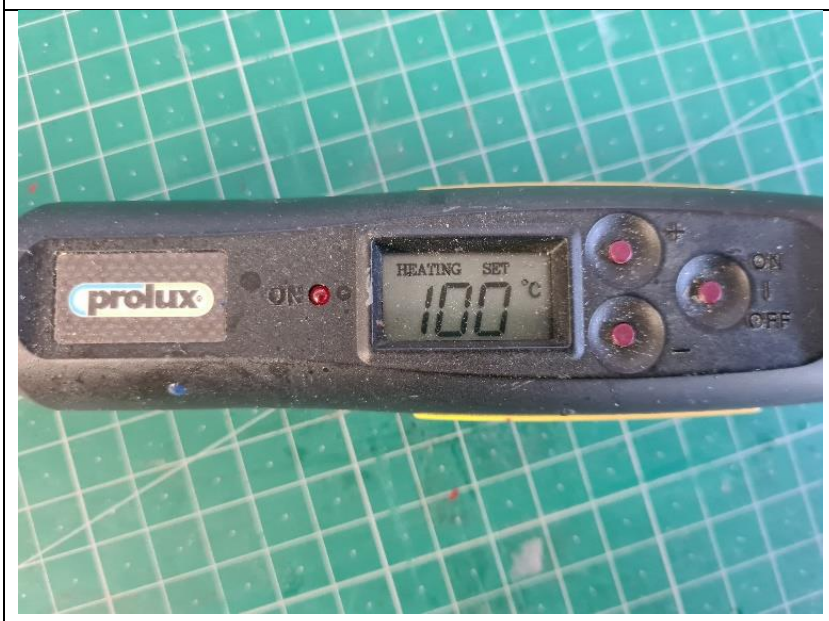
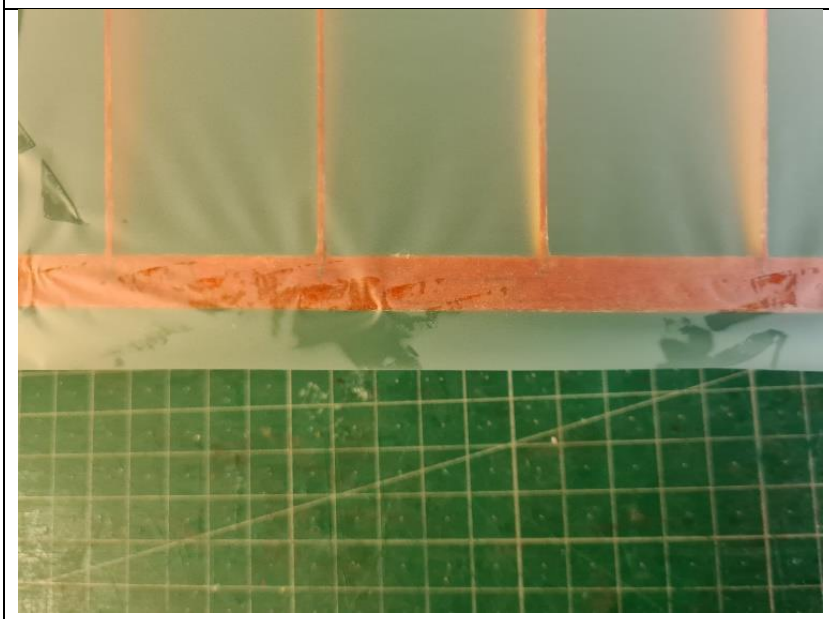
Weight. Overall, for the, in this example, Mini Cardinal wing of 25" (64cm) & 3.75" (9.5cm) chord, bare airframe weight was 14.0 gms and finished weight with two coats of Eze-dope 20.2 grams. I.e. a total of 6.2 gms added weight.

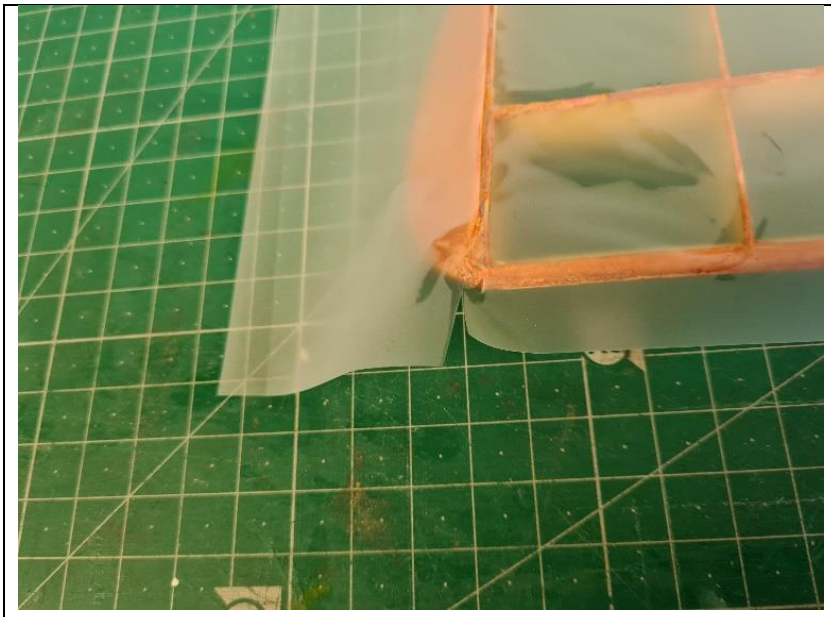
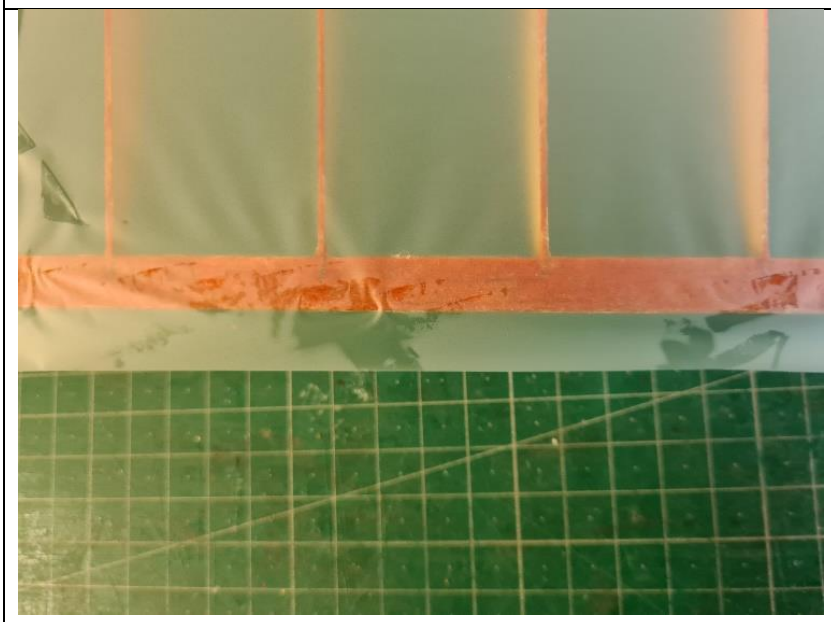
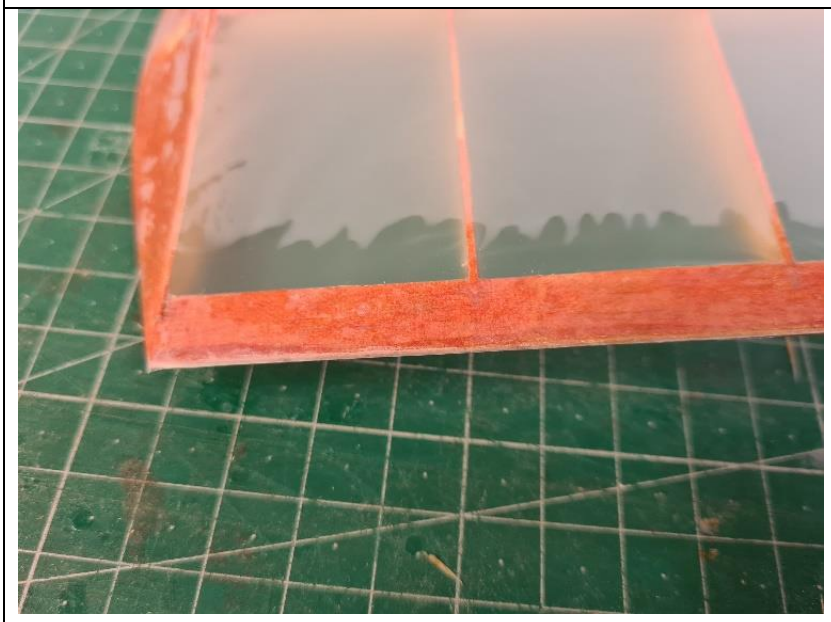
Note that the laminating film is 25 microns. This seems to be the thinnest available.

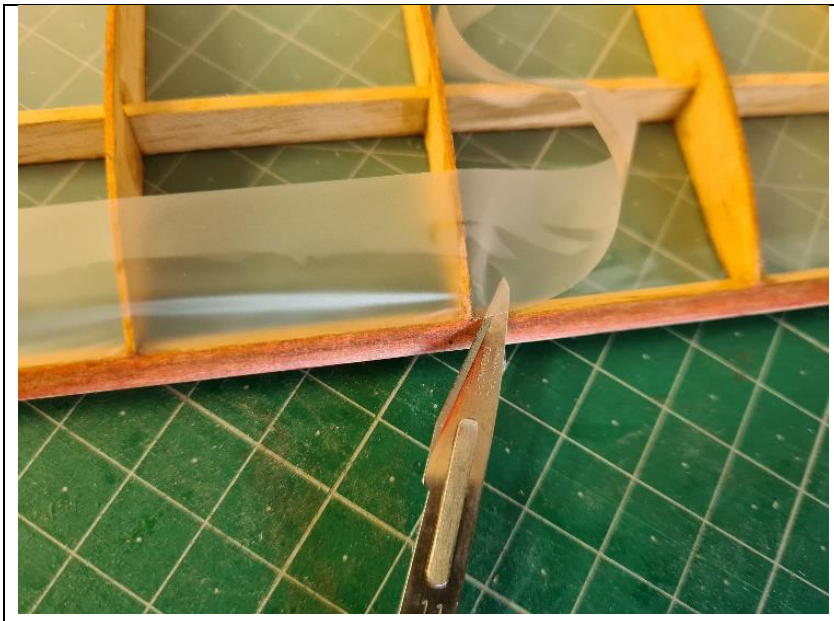
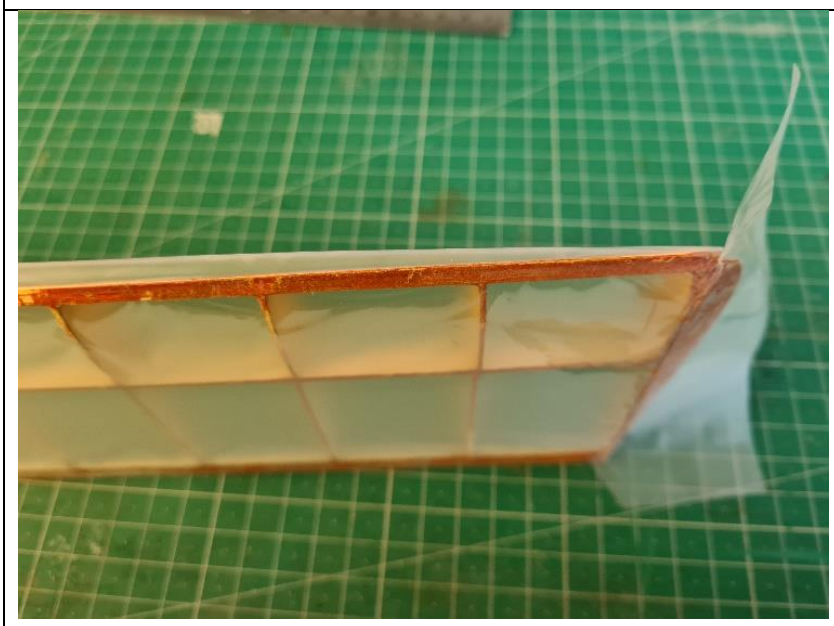
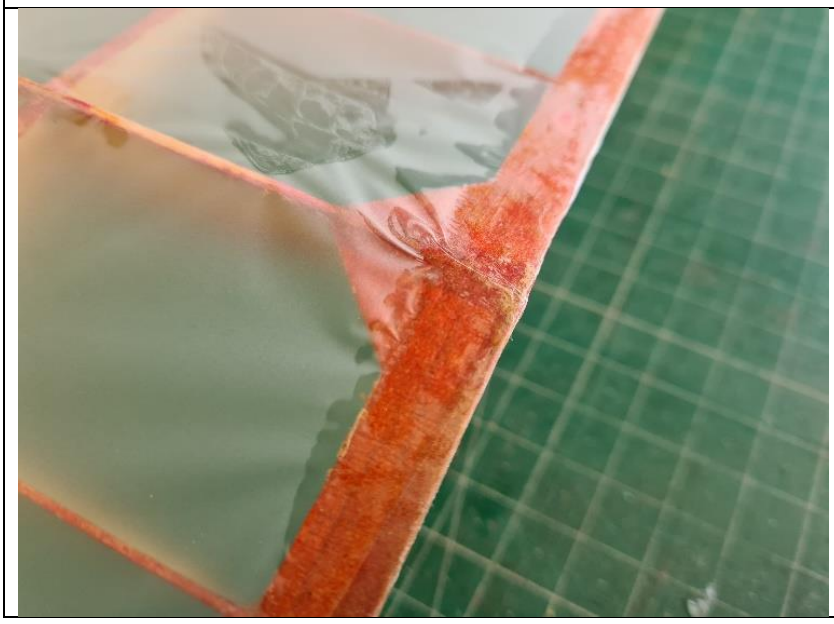
However, to begin: -

Process

	As this was a repair and recovering of a tissue covered model, all previous tissue was removed & everything sanded smooth. Structure all prepared….
	Doculam has an adhesive layer but in this case, there isn't much surface area to adhere to. To assist in preventing the doculam pulling away from the centre rib as it shrinks I've applied a small amount of cover grip to the top of this rib.
	Same for the tailplane but for a different reason. The top covering I've done as one piece and when the slot for the fin is cut in the covering all the tension will be on the adhesion to the centre ribs. This can be mitigated by a bead of glue to the fin when the fin is replaced.

	For the wing I've cut a piece of doculam somewhat bigger than the overall size. And starting with the lower surface.
	Starting with the iron set as low as possible, 100 deg C in this case, start tacking down.
	I normally start at one point at one end of the wing, then one point at the other end of the wing, then the four corners, then multiple points along all the edges… Note. Do not iron down anywhere else. Only around the edges.

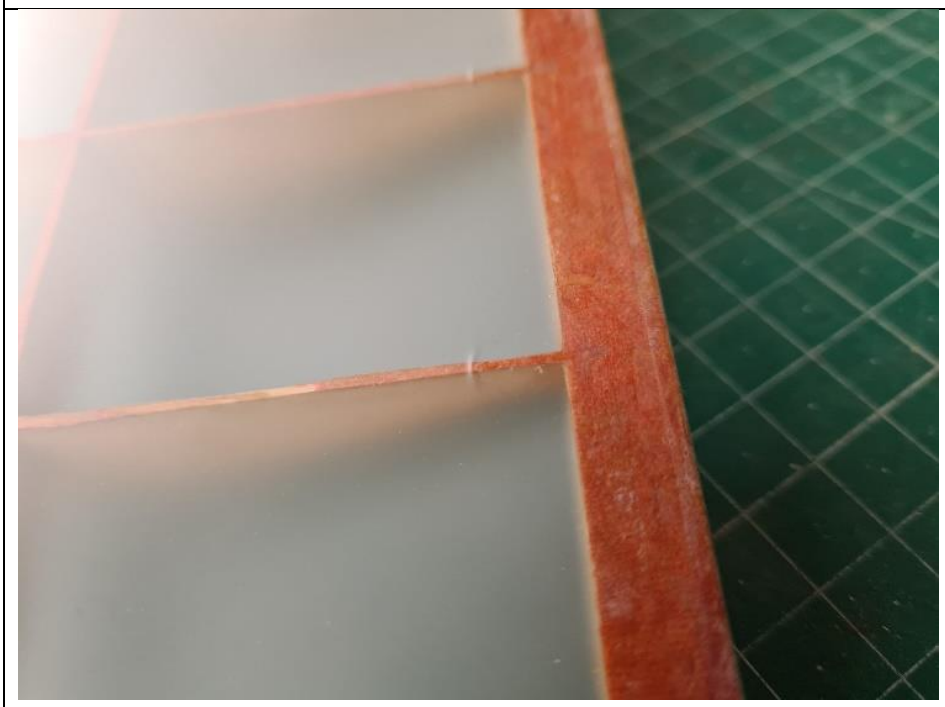
	Leading and…
	Trailing edge. It still looks very messy at this stage.
	You should find that you can begin to iron it down around the edges at this stage. Avoid creases – you can lift the doculam off the wood & try again to get the best results, but don't be too concerned as some are bound to occur.

	Trim off excess at the leading & trailing edges. I leave a few millimetres to wrap round the leading edge & none at the trailing edge.
	For wingtips, and such like, work it round gently as best possible fit & trim off excess. Again, don't be concerned about perfection too much.
	Good enough!

	The top surface is dealt with in a similar way but has to be done one wing at a time because of the dihedral. At the centre I've ironed down a few millimetres down the side of the centre rib. A trace of Cover Grip applied with a cotton bud to the edge to assist in a strong bond for the second wing.
	A little more cover grip added, and to the second piece of doculam.
	Tacking down the second piece. At the wing tip I've cut a few millimetres over size, made a few cuts, and ironed down it down over the edge.

	Again, good enough!
	The best bit! Using the lowest temperature that will work, shrink the doculam. Do use the minimum heat and proceed gently. Though thin, the doculam has quite a strong shrink.

And in a very short space of time it all looks wonderful!



Some niggly bits will remain. I get these with the iron at 125 deg. C. I also run the iron over all edges and sharp compound curves where it needs it, such as wingtips.

Now iron let the iron cool to 100 deg C and iron down on wing ribs and any other structure.

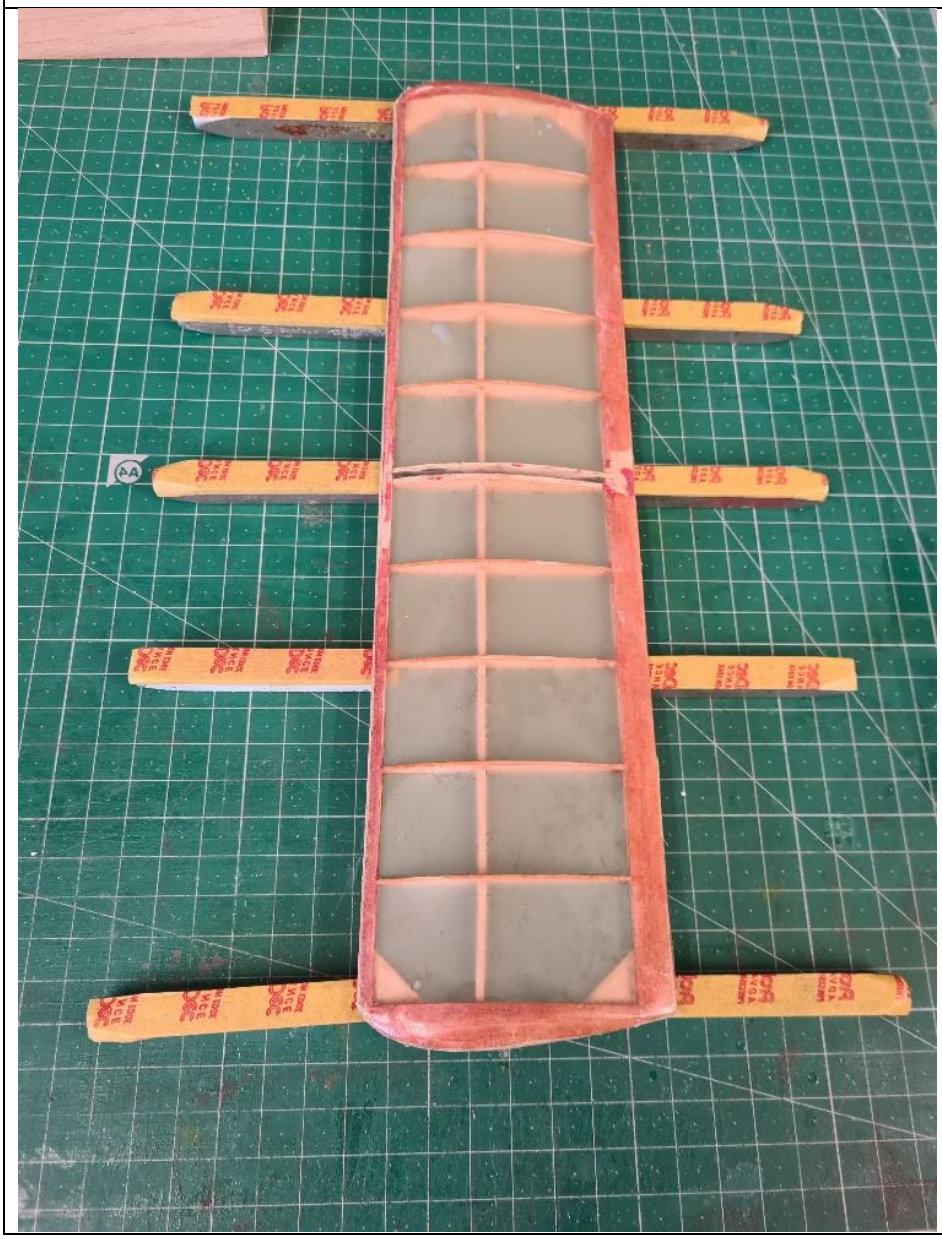
Covering with doculam is complete. Next, applying tissue.

	And the messy bit! A bit of preparation is needed before starting. Mix up sufficient Eze-dope beforehand. Notice the polythene sheet over the building board. And the large very soft brush.
	For me, my building technique has evolved to use weights & a nice flat surface rather than pins, but no matter, work as you see fit. I use letter stamps as weights & spacers. To stop the workpiece sticking to them I apply some masking tape to one side. Spacers will be needed to allow airflow under the workpiece, these can be wood packing pieces. Use suitable tape to stop unwanted adhesion.
	Starting on the underside, cut a piece of tissue around 10 – 15mm oversize. The tissue must have good wet strength, I'm using Deluxe Materials Eze-tissue.

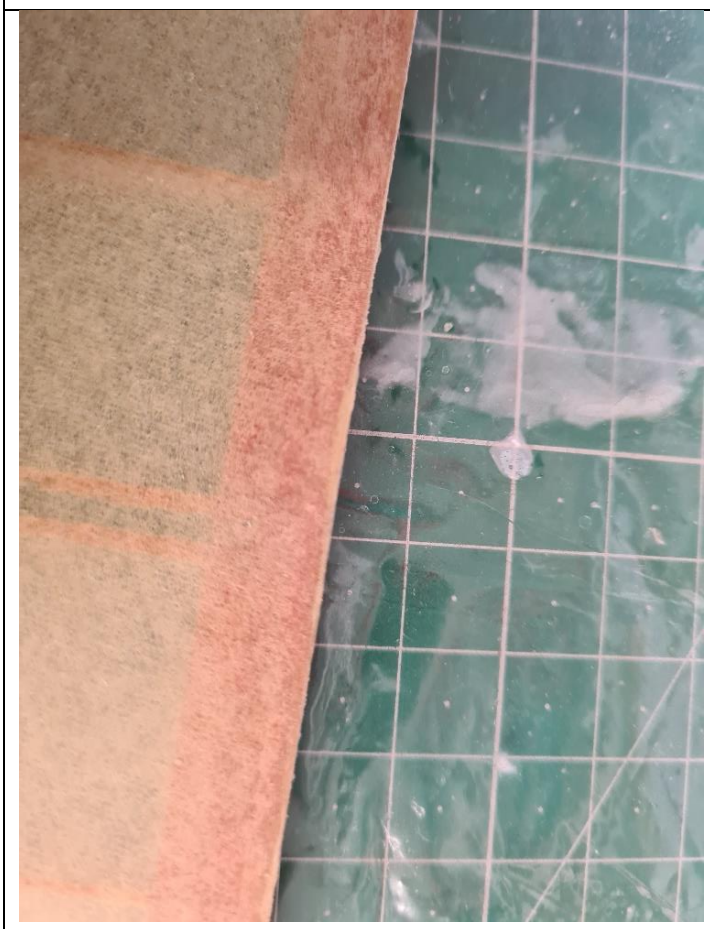
	Slap it on! No ceremony here!
	Go to town! Plenty of fluids! Make a mess! Make sure all the tissue is wet, including all edges and extents.
	Getting more delicate here, the tissue will expand so lift carefully and lay back, using the brush as you go to smooth it out. This is where wet strength is necessary. Note the relative copious amounts of Eze-dope. Too much is much better than too little. Brush out the air bubbles as you go. It may be necessary to lift the tissue several times, both from left & right and up & down. Use care here and work patiently. It is a little slow and quite messy!

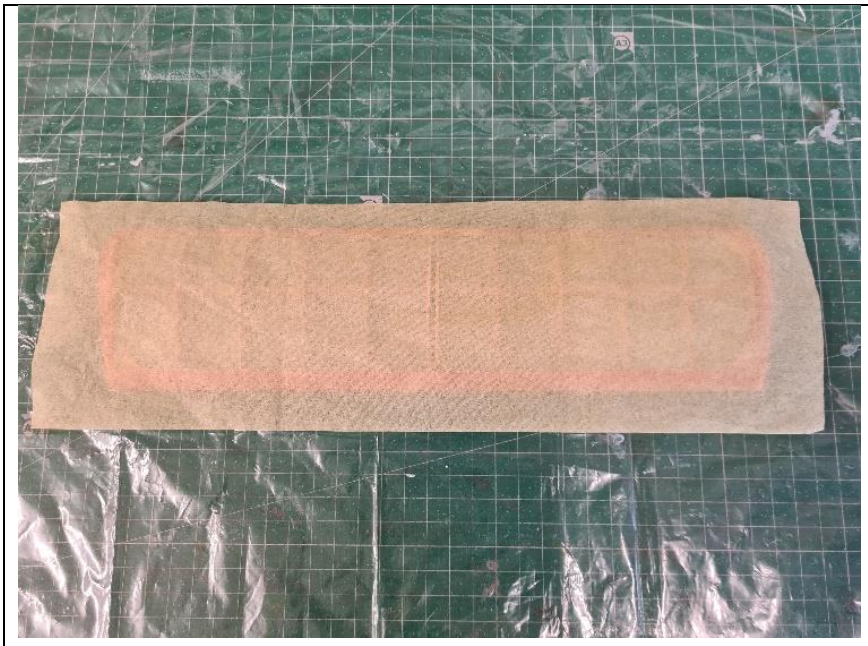
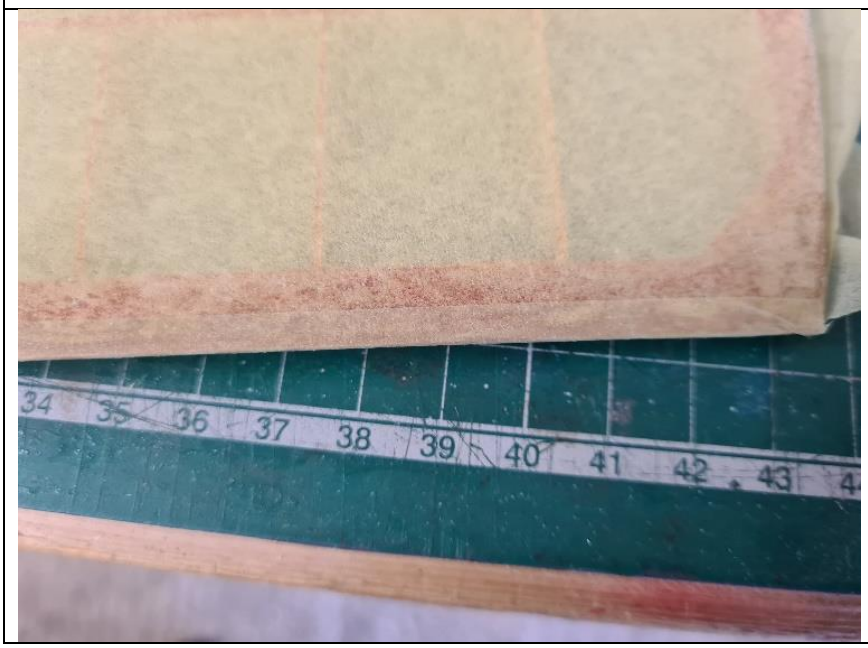
	Voila! Perfection arrives suddenly!
	Trim off most of the excess.

	Fingers make good squeegees for wing tips.
	Trimming off at the trailing edge.

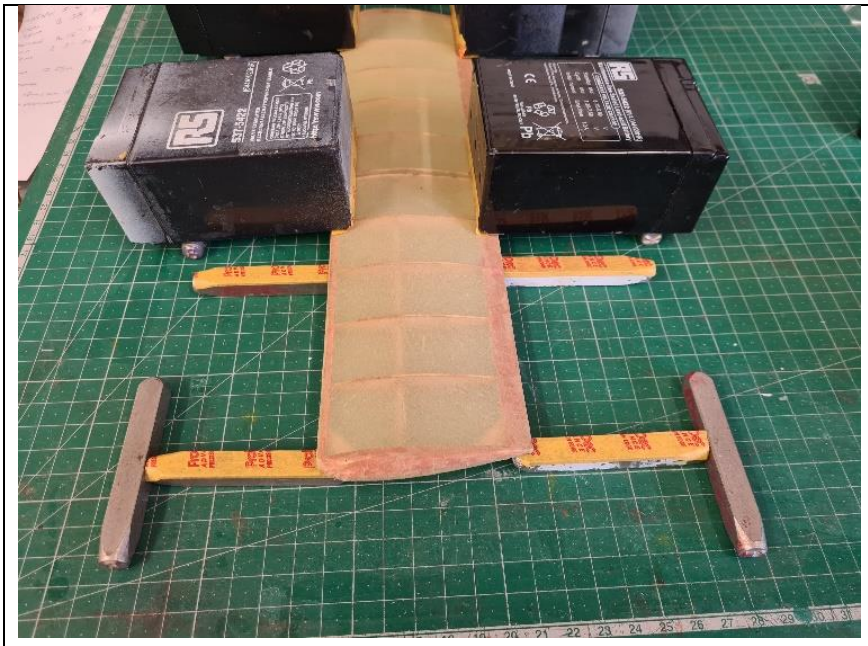
	All done. Still slopping wet but any drips mopped up. Leading edge has a few millimetres wrapped round.
	Then onto the spacers, leaving a big airgap to assist drying…

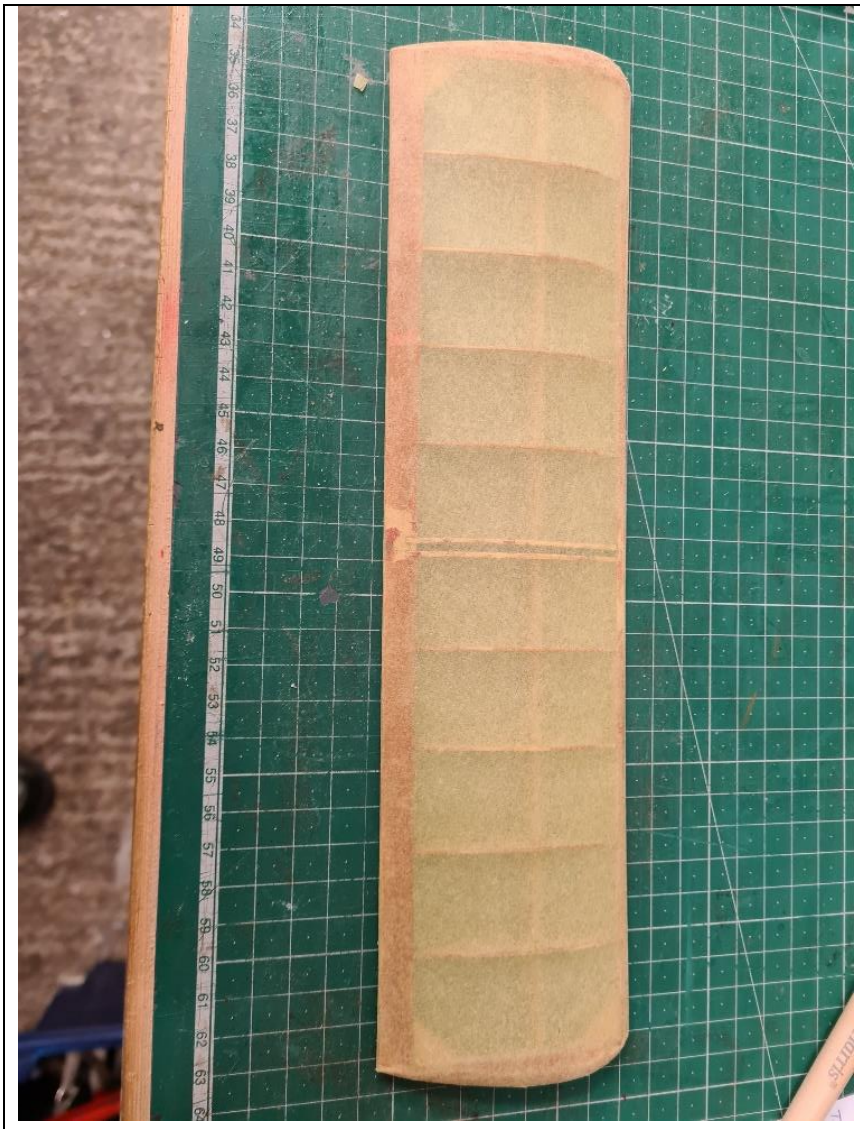
	And weights to hold it down as it dries.
	When dry various imperfections become obvious. I give these a very light sanding and…

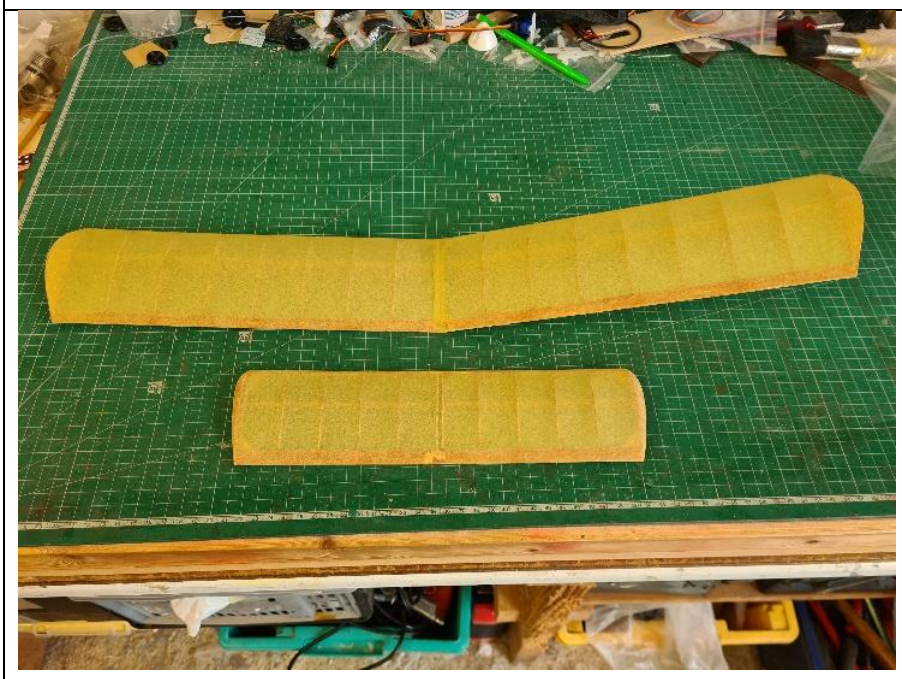
	apply a bit more Eze-dope with a fingertip. This might need to be done more than once.
	Probably to other spots as well.

	Top surface starts off in a similar way to the bottom, but perhaps with a larger piece of tissue.
	More sploshy fun! Don't try and be miserly with it!
	Trailing edge overlap.

	Leading edge trimmed ready to overlap.
	Tip ready for overlapping. Plenty of Eze-dope & a fingertip again…

	Then weighted down.
	Masking tape on the weights.

	Again voila! This is with just the first, initial coat of Eze-dope. The surface feels quite rough at this stage.
	Also a few rough points again, mostly at corners.

	A very light sanding with very fine paper all over. I use an old foam pad. Beware that many foam pads are too coarse and it can be better to use fine paper. Ready for the second coat of Eze-dope.
	There we go! This is after the second coat and another sanding. At this point the finish is quite matte. This is where I would add decals or tissue prints, then add further coats of Eze-dope as required. For me three coats are adequate. Nice and wrinkle free!