

TECHNIQUES & TIPS FOR COVERING MODELS - 2019

I use a combination of techniques learned by trial, error or sharing (the best and most enjoyable means associated with being a member of the Flying Aces Club). If you are just starting out then I would keep it simple. I've yet to reach the ultimate covering jobs I've seen some of my friends do. I would advise not restricting yourself to any one technique or selection of materials. The best work is a combination using what works best for each area of construction. Another point, if you want the final outer finish to look great, well understand it will only look as good as what is underneath so make sure you don't skip the filling and sanding steps on the balsa structure. Also make plans for the transition points where you will have seams.

GRAIN DIRECTION – Most tissue has a direction to the grain. Grain is how the fibers making up the tissue are oriented. If you tear the tissue in line with the grain it will give a relatively nice straight tear line as seen in the bottom of the green tissue photo. A tear across the grain will give a jagged edge as seen in the top of the green tissue photo. Standard practice has been for the grain direction of the tissue you are applying to the frame oriented in line with the length of the part. For example, it runs from wing tip to wing tip or from the front of the fuselage to the rear. You would not run grain direction from leading edge to trailing edge. This is done for the strength and shrinkage characteristics. You want to keep grain direction the same when comparing one side of the structure to the other or you may end up with a twisted frame as it shrinks.



TISSUE COLOR – you will want tissue with a permanent color so it doesn't run when you shrink the tissue or if it gets wet. Even permanent colors are affected by UV rays of the sun, some more than others. Deep colors like black, red and blue seem to be really impacted. Florescent based colors tend to be affected too and fade with exposure. Krylon brand has a UV protective clear spray coating that can help slow this down. If you want to minimize the impact of the sun on your work of art then do not allow it to sit exposed to the sun when you are not flying.

WET TISSUE – First, domestic tissue is best applied dry, it has less wet strength and can fall apart in your hands while you work it. If you really want to apply wet then you need to switch to Esaki and Mt. Fuji tissue. Some people like to apply tissue wet allowing it to form around curves. Some brands of tissue work better wet than others. Some people use a 50:50 mix of rubbing alcohol and water to shrink the tissue as it reduces the rate of shrinkage. Always follow the

manufacturer's instructions for safety and use. Some people use nitrate dope to wet the tissue when they are applying it to the frame. Again, a mix of techniques works well, use dry and wet techniques in unison for the best results. For example, you may want to apply your tissue dry to delicate structures like the tail where it can warp. On compound curves I've had some great success with working soaked tissue gently to conform around valve covers and other bumps. Remember any tissue is made more fragile when the fibers are wet.

CHOOSING TISSUE - I don't think there is a perfect tissue, there are always trade offs of one for another. I like Mt. Fuji and Esaki tissue for its weight to strength ratio as well as it can be worked when wet with less risk of breaking. However, it is available in a limited selection of colors, the sheet size is smaller making it more expensive and it is stiffer when it comes to going around curves.

UHU GLUE STICK – we only sell this particular glue stick because we know it works the best from years of experience and we've tried many different brands. Some of the UHU sticks have a color to them, both their blue and purple dry clear. Once it dries it is resistant to water. Rubbing alcohol is a good solvent for the glue but follow the manufacturer's instructions for safety and use. I add a drop or two before I put the stick away after a building session; it keeps the stick's end surface soft and fresh for the next time. A quick spray during the building session will rejuvenate the stick if it starts to get dried out. This extends the life of the glue stick. How long will a stick last? As a general rule, I usually get one or two models out of a stick but there are a lot of variables. They last longer if you keep the caps on and you can refresh used ones as described above. Heat from an iron can be used to activate this glue after it dries. Most popular thing about this glue is its lack of odor compared to traditional use of dope. Nobody in the house will even know you are covering your plane.



WORKING WITH TISSUE –

TOOLS FOR COVERING – basically you only need to have a sharp pair of scissors, a sharp razor or #11 Exacto knife with a new blade, a UHU glue stick, some form of sealant, and a mister for spraying water to shrink the tissue. I can extend the life of my blades by cleaning off glue with a drop of rubbing alcohol on a tissue.

TOOLS FOR COVERING, THE ADVANCE CLASS – the following tools can make the task easier: rulers, sharp pointed tweezers, rounded nose tweezers, one or more of



our [burnishers](#), cotton swabs on a stick, [our awl](#) or a pin on the end of a dowel rod, paint brushes, a flat spatula, blue low tack tape, tooth picks, good lighting, practice, etc.

ON WETTING TISSUE AND APPLYING GLUE STICK - As for wetting the tissue, I lay out a dry towel, place a piece of tissue a little larger than the area I'm covering, then mist the tissue until it is obviously or evenly wet. I dabbed off the heavy wet areas and then apply UHU glue stick on the structure that I will stick the tissue to. While I'm working with the glue the tissue goes from wet to damp, it evaporates quickly between the a/c and water, faster if I use the 50/50 mix of rubbing alcohol and water. The alcohol slows the shrinking down. I then put the damp tissue in place and starting from one point work out in both directions trying to minimize any wrinkles. Don't worry if it does not come out taught. Once the whole structure is covered, I then do a light misting to shrink it tight. I recently moved up to a double action air brush that allows me to apply water and then air only to trouble spots and work wrinkles out further. The glue stick allows you to work it over. Just use rubbing alcohol only to soften the glue joint and gently lift the tissue. Sometimes it tears but the alcohol is gentler on the fiber and so you can work the tissue more than if you used water. You are only limited by your imagination on working with tissue and practice, practice, practice.

Another option in prepping the tissue – consider pre-shrinking the tissue to reduce how much it shrinks once on your model. I have several homemade frames from whole sheet size down to letter, legal, and tabloid sizes. Gives me options. I use glue stick all the way around the frame to secure the tissue. Then I spray it with water and let it get drum tight. I do this 2-3 times. Then I cut out the tissue as I need it. When you apply pre-shrunk tissue, it is important not to undo your work here. If you put it on wet and stretch it further to smooth out the wrinkles you are undoing the pre-shrink effort and the tissue will now pull hard on your structure as it dries with likely warps. I try to get it on with minimal wrinkles. Then I mist it. If I see an area that won't pull tight, I can use my [needle awl](#) to lift and work the area a bit more. Don't plan on being perfect on your first couple of models. Be realistic, the goal here should be to make your next covering effort better than your last.

THE SEAMS - The tissue needs to overlap in order to give a finish appearance. You don't want to make the overlap overly large or it won't look as nice as it could. I usually start with the center or root rib of the wing and work outwards. I always start with the underside of any structure and work upwards so that it covers the seam below and when looked upon from above it doesn't show as much. I also start from the rear and work forward as this also allows for overlap of the seams in a manner that both reduces drag and visibility of the seams. So, width wise this tends to be about the thickness of the stringer or wood that you are gluing onto. It seems to be builder experience and preference as to whether to place glue on every wood contacted by the tissue or just around the periphery. On big



planes I put glue on all points of contact since the overall weight percentage will be small but on small models, I prefer to do the outline to minimize the weight and also you do not need as much strength.

OVERLAPPING TISSUE OF DIFFERENT COLORS - One thing to remember is you always put down light colors first whether tissue or paint and darkest colors last. This way you get a crisper color definition. In the picture here you see the red over white. I covered the section first with white then installed the red stripes. If I did it the other way putting light over dark then the white stripes would look more pinkish.

TRIMMING THE TISSUE - Now once you have a piece of tissue down in place, let the glue dry, glue sticks don't take too long. Work on another piece of the plane in the mean time. Once the glue is dry, I take a sharp new Exacto #11 blade or a new razor blade and slice off the excess. Now the next piece of tissue will overlap so I take the new piece of tissue and for the overlap, trim it as close as possible to what I expect to be the finish point. I turn over the trimmed piece of tissue and apply glue stick to the under-side surface along the trimmed edge(s). This way I don't have to try and neatly cut one tissue over another on the structure, a difficult thing to do. I apply the glue stick to the portion of the frame where the rest of the piece of tissue attaches and apply the piece.

WORKING THE SEAMS - Now I personally use a 50% mix of rubbing alcohol (follow the safety instructions on the bottle) and water to allow me to wet the seams if I need to reactivate the glue stick material or reposition the tissue. This takes a little careful nursing to work the damp tissue without tearing it. Another trick is to use a [needle awl](#) or a pin on the end of a small dowel to take bits of glue and work it under lifted spots on the tissue. And still another trick I use sometimes for smoothing seams, take a Q-tip and lightly run it back and forth on the seam to burnish it, this really helps with seams in tight corners, we have a series of [burnisher tools](#) with rounded tips that work great for this.

FOR DEALING WITH WRINKLES, they can usually be removed when the tissue is dampened when you are putting it on the plane. You can also use an iron to remove the wrinkles. I don't know that anyone can assure you won't get any wrinkles in your tissue although they are not common, they do appear sometimes.

TIGHT SPOTS – Most planes have them, the joints where the wing and stab join the fuselage maybe gun slots or under exhaust features. I find that having a couple of simple tools on hand can make the work easy. Again the [burnishing tools](#) work great for this but a 1/12" diameter dowel rod, a piece of 3/32" solid aluminum rod, a curved spatula, a pair of curved tweezers with rounded noses and most importantly a [needle awl](#) or a dowel with a pin glued in the end. These allow you reach under tissue, in hard to reach spots on the plane, and apply soft pinpoint pressure. The dowel rod placed in the tight corner against the freshly

positioned tissue can be rolled and in effect pull the tissue in a direction toward the fuselage where you otherwise cannot get your fingers.

SEALING - All my planes are sealed to make them moisture resistant using Krylon Satin Clear paint. I spray them with several light coats. I use glue sticks, white glue, and rarely nitrate dope to apply the tissue. I have a small trim iron used by r/c guys for putting on their plastic covering. It has a real low heat setting and small foot. This can be used to really set the glue whether white or glue stick in problem areas. I use rubbing alcohol as a solvent for the glue stick to work the material sometimes. It takes practice to get skilled at applying tissue with minimal warps. Sometimes I have to cut and remove problem areas and recover to make it look right.

KRYLON is a brand of spray paint available at department and home building stores. I use the satin or matte finish as this gives the nicest sheen and hides small blemishes. If your subject had a glossy finish then choose gloss finish.

ANOTHER RESOURCE on covering with tissue can be found in Don Ross's book on Rubber Powered Model Airplanes.

FLOATING ALCOHOL - When Tom Hallman talks of floating alcohol, he is using a small brush and allowing the alcohol to be sucked into the seam where it re-activates the glue allowing him to work the glue seam.

FOR DELICATE STRUCTURES I will pre-shrink or iron the tissue before applying so it doesn't warp the structure. This is specific for the tail surfaces.

EASY BUILT LITE TISSUE is our domestic brand of tissue. I've been building with it for years - I like it because although it is not as light as Esaki (Japanese) tissue it is still light for a tissue, it is more opaque, with the exception of the couple of florescent colors the tissues are somewhat more resistant to the effects of UV rays, and last we have it available in 28 different colors that have been selected to best represent what is used on most real aircraft. Dimensions are roughly 20" x 30" and it has a grain that runs the length of the tissue. It shrinks when dampened with water. Overall it has a smooth finish without obvious pores or texture as you might see in some of the silk types of tissue

MT. FUJI AND ESAKI TISSUE – We carry these Japanese tissues which is a lighter tissue with a higher wet strength. It has a smooth finish and is translucent when sealed with dope. Mt. Fuji runs about 25% heavier than Esaki so I prefer it for 16" and larger models. It is available in a larger assortment of colors. Mt. Fuji is more opaque and gives a nicer finished appearance than the Esaki. Esaki is available in 5 colors at the time of this righting and is becoming more difficult to obtain. Both have dimensions just under 18" x 24". The grain runs the length of the tissue, it shrinks when dampened with water.

SILK SPAN is a heavier weight covering designed for heavy / large models. It is very strong but also heavy.

WANT TO SEE EXAMPLES OF DIFFERENT TECHNIQUES –

As I tell everyone and also see what others do when I go to flying contests, you are only limited by your imagination and willingness to trial and error new ideas. But just to give you some ideas to try I'll fly some examples past you from my experience. There are a number of methods you are seeing on the planes featured on our website.

FF6 - www.easybuiltmodels.com/ff06.htm

This is currently my most favorite plane to fly. I won first place in Oct'07 at a big contest up in the NYC area with a flight of 3 minutes 47 seconds using 2 loops of 1/4" rubber. Anyway, this model was covered using tissue as supplied in the kit to the standard yellow and blue primary trainer colors. Our Easy Built Lite tissue is quite opaque compared to others and up in the sky reflects the colors well instead of passing through the plane. The colors just jump out against the clear blue sky. I only had to overlap some color tissue for the red/white striped tail and finished with some Tissuecals™.



FF89 www.easybuiltmodels.com/ff89.htm - I covered this model first with white tissue and then masked off and airbrushed each color.



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FF98 <http://www.easybuiltmodels.com/ff98.htm> - This one I colored using a combination of techniques. The undersides are black and white and were done using tissues in those respective colors. For the top surfaces I put on olive tissue and then masked before spray painting brown. I sprayed the upper wing before it was attached to the model as well as the spraying the lower wing that was attached to the model. Tissuecal™ markings round it off.



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FF88 www.easybuiltmodels.com/ff88lc.htm - The Blue Flash Racer with the 32 on the side, was



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done by first applying the light color tissue sliced to a specific pattern. I then took the dark blue tissue with the opposite angle cut to match and overlapped only 1/8". The wheels were brushed by hand with flat black craft paint and silver tissue discs were added for the hubs. Remember you can get a good seam by overlapping dark over light colors but not the opposite.

FF72 - www.easybuiltmodels.com/ff72.htm This plane was done completely different from the others. I hand painted the inside areas that would be visible through the canopy before I did any covering. I then painted the tissue before applying it. This required planning for overlap, etc. This gave a much higher quality level for details but more time was required up front to plan it out. I really enjoy flying this one, so neat in the air that I just keep patching it up.



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FF90 www.easybuiltmodels.com/ff90.htm - the camouflage pattern was done on a flat piece of tissue using a series of masks for each color. After words I used two pieces of tissue for the fuselage camo-scheme. First I covered one side and pulled the tissue over the top. I then sliced it off at the center point. The second piece was the tricky one. I cut it oversize in both directions. The model frame was built but still in main components - wings, fuselage, tail surfaces but not glued together. I took the oversize piece and moved it back and forth until I found a good match in the pattern. I then had to cut the zigzag pattern to match the lozenges. All was glued down using a glue stick. It came out hard to notice that there was an overlapped seam across the top. It still gets lots of oohs and ahs.



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[PD06](#) – the first of our “Skins” from Easy Built Models used to cover this model in a winter / green color scheme. The camo pattern comes on the tissue. To get the best visual effect you will want to cut curvy lines and avoid straight edges in the tissue. Doing this makes it hard to see where one piece is overlapped by another. Solid white tissue was applied to the underside and along the fuselage edges again I was careful to cut a wavy line around the green spots so when glued in position it looks like the pattern was sprayed on. Using the “Skin” made this color scheme come together quickly. Not



necessarily for the beginner and it takes some patience to work with but the results are worth it.

There are many ways to cover a plane, you just have to give it a try and I recommend that once you find a way you prefer then make that the standard for most of your covering tasks and only use the others for special situations.

To learn more about covering I recommend Don Ross' book Rubber Powered Models. He goes in to discussing grain direction, shrinking, etc.
<http://www.easybuiltmodels.com/b02.htm> This is like the bible for the rubber powered model airplane builders.

Remember this is a hobby and you are supposed to have fun, don't let yourself fall into the trap that it has to be done one particular way or sweat it that it is not exact.

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