

Fabric Covering

A brief look at a first timer's efforts at Fabric Covering an Experimental Aircraft:

Subject Aircraft:

Corby Starlet CJ-1

Chosen Covering:

Polyfiber system, with **Polytone** final colors

Reasons for choosing Polyfiber:

- Local availability
- Highly recommended as easy to use
- Expert SAAA Technical Counsellor assistance and/or advice available if needed
- Excellent manual and video available
- Does not support flammable combustion (unlike highly flammable dope)
- Fully & easily repairable/repaintable/rejuvenatable
- Not polyurethane based (not extremely toxic)
- Long lifespan
- Full range of colors

Cost played no part in choosing **Polyfiber**, however I was somewhat pleasantly surprised to find that the Australian \$ price was only about 25% more than the converted US \$ price. I consider this to be not too bad. Local availability is a big plus.

Reasons other systems were rejected:

- Doped systems unacceptably flammable
- **HIPEC** Covering from Canada was seriously considered, but not available locally, import cost would have been high, delays unacceptable if I had run short of estimated materials

Previous covering experience:

30 odd years of model covering, using traditional dope and tissue, dope and silk, iron on polyester fabrics, iron on heat shrink plastics.



Preparing to cover:

- Workshop (garage) rearranged – NO junk!
- Workbench covered with plastic sheet
- Floor area covered with cheap tarps (there will be lots of drips!)

Tools Required:

- 1200 watt clothing iron (new)
- small hobby iron
- accurate thermometer to calibrate irons
- various scissors (new)
- pinking shears (new)
- edged razor blades
- various top quality pure bristle brushes
- rulers, pencils etc
- various paint pots, with and without handles
- jars for brush cleaning
- plastic spreaders
- Saw horses/stands etc

Initial Materials Required:

- **Fabric** – Polyfiber Light 1.7oz per sq. yard
- **Pinked edge tapes** – various widths – and some leftovers obtained from another builder
- **Polytak** - adhesive
- **Polybrush** - fabric sealing
- **Reducer** - for thinning Polybrush
- **MEK** (Methyl Ethyl Ketone) - for washing brushes and cleanup of drips/spills
- **Rib Lacing cord and needles** – obtained from a mate who had just completed his aircraft!
- **Reinforcing Tape**
- **New clean tee shirt cloth** for rags – “*bag of rags*” used rags are **NOT** to be used

Later Materials Required:

- **Polyspray** – an aluminium undercoat to protect against UV light
- **Polytone** paint – **DO NOT** use automotive, marine or any other type of paints recommended to you by so called “experts”. They will not be easily repairable, and may crack.



Preparation:

- Final sanding and preparation of all components to be covered
- One coat of two pack varnish applied to all structure
- Light sanding of all, then clean and dust.

Getting Started:

- Two coats of **Polybrush** (thinned 3:1) applied to all components

What bits first?

- Wings – large surfaces, recommended in the manual
- Uses large amounts of fabric – better to have small pieces left over *after* covering the wings, than to have small pieces left over *before* covering the wings!
- Ailerons, elevators etc can be covered with the offcuts!

Cutting the Fabric to size:

Bottom of wing covered first; fabric laid over wing structure and trimmed slightly oversize.

Aligning the Fabric:

Pencil lines drawn onto wing (as outlined in the manual) to enable straight fabric lines and joins

Gluing the fabric down:

Using a small brush and the **Polytak** cement, it quickly became obvious that I was using too little cement and trying to do too much in one go. Using more cement and over a smaller distance (about eight inches or so only) gave noticeably better results. Cement applied, fabric pressed down onto it, used plastic spreader as a squeegee to push cement up through the weave of the fabric. Move along and do the next 8 inches.... Refer to the manual and video for precise directions.

Going around corners etc:

The manual and video show how to do these areas – a scissor snip here, a tuck there. All pretty common sense really.

Shrinking the Fabric:

Both irons used **MUST** be accurately calibrated before use! This is an easy procedure, but takes a couple of hours to do carefully and properly. The manual and video explain how to do it. **ONLY** a correctly calibrated iron may be used to shrink the fabric – heat guns may not be used at all!

The first ironing is conducted at 225 degrees (F). Some wrinkles appeared, but these soon were able to be ironed out and a reasonable job was appearing! Later ironing at higher temperatures to 350 degrees F to achieve the correct tightness occurred.

Doing the other side:

Pretty much the same, consult the manual for the amount of overlaps required.

Sealing the Fabric:

When all is done, the fabric is sealed with one brushed coat of thinned **Polybrush**, which is colored pink so that you can see where it is (or isn't). It's thin, it runs, but this is normal, as long as you don't have so much on that it drips everywhere. These must be cleaned up with MEK immediately!

Rib Lacing (sometimes called stitching):

- **What is it for?**

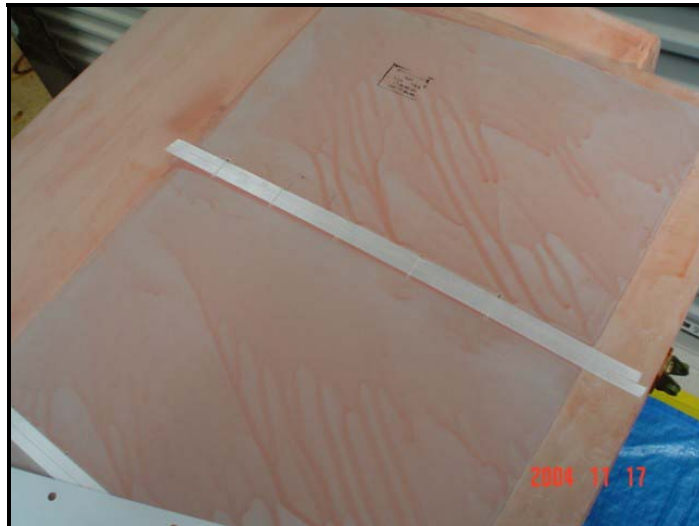
To *mechanically* or *physically* attach the fabric to the wing ribs. They go *right through* the wing, from top to bottom. Adhesive alone is not enough, although I have seen it done... but how long will it last?

- **To lace or not to lace?**

Other Starlet builders have successfully used thin plywood strips screwed down into the rib cap strips. After much thought, this was not for me. After seeing a mates professional looking job of Rib Lacing, the decision was easy. Learning how to do the lacing was the unnerving point! Fortunately, the video tape shows precisely how to do it, in great detail, step by step, and they repeat it several times! So, not having the TV and video in the workshop, I made five pages of step by step notes, written in simple terms and “code” I could understand. I practiced lacing on a cardboard box, then was happy to proceed.

- **Reinforcing tape:**

A self adhesive polyester cloth tape applied over the rib capstrips, to prevent the lacing cord cutting through the fabric.



- **What “spacing” for the lacing?**

Mate Stephen to the rescue (again!!!) – he sent me his paper templates that he calculated his spacing with. Correct spacing is guess what? Outlined in the manual! Holes are marked onto the covering then punched through with the long needle. A bit unnerving, but it has to be done. Care must be taken to avoid any internal gizzardry in the wing – pitot tubes, cables and such.

- **Start the Sewing!**

Followed my notes: thread here, tie there, loop this, cross that, pull this way and that way, in and out, over and under, snip snip and it’s done! Really very easy, nothing to worry about. Just another skill to be learned when building an aeroplane! What about all the knots? Aren’t they visible? Nope! They all disappear under the covering job! How is this possible? I don’t really know *how*, all I can say is that it works, as advertised. Someone with far too much time on their hands worked it all out I think.

Taping using “pinked” cut tapes :

- **What is it for:**

To reinforce and hold down over the rib lacings, and to reinforce any “hard to soft” edges where the covering goes off a hard surface edge. Also used to cover over (and thus neatly finish off) any overlaps, such as the wing leading edges, where a four inch tape is used.

After lines are drawn onto the structure, tapes are cut to desired length with pinking shears, then the tapes are applied with **Polybrush**.

The finished product: You can clearly see the runs of the pink colored Polybrush inside the wing, the two inch tapes over the rib capstrips, and the rib lacing bulges. Also visible, the short diagonally placed tape over a “hard to soft” edge.



Covering the rest of the aircraft:

Ailerons and elevators etc are just little wings, so they should cover nicely! I've actually done the ailerons, and they've come up a treat. The fuselage should be a doddle I think.

Conclusions:

Initially I had some reservations about covering the aircraft myself, not so much that I thought I couldn't do it, but that I was getting a bit sick of the whole thing after six years of building – I just want to go fly! I came close to getting it done by a professional who I'd personally trust implicitly, but fortunately for me, he had too much work on at the time, and he really prefers builders to do it themselves for the satisfaction!

After having covered half the aircraft now, I'm so glad I have done it. It really has been **THE** most enjoyable part of the whole construction phase. It's relaxing, it's quiet, you get visible results quickly, you don't have to wait around – you can go straight on to another component.

Painting:

Haven't done that yet! **Polytone** final colors will be used throughout. I'm not a spraypainter, in fact I hate painting with a passion, but I'll probably give it a go I think. I've heard horror stories about aircraft getting painted by "expert" car painters who are not familiar with specialty aircraft coatings – it aint just "paint"!

I will call upon my brother and or another mate who are both qualified spraypainters, not so much for the actual spraying, but to show me how to use the spray gear – set up the compressor, adjust the sprayguns, clean the guns etc.

The Polyfiber manual actually recommends that you do it yourself, even if you're a nong, as many outside painters do not have the same passion for a good job as you yourself do. They won't read the instructions for the paint coz they already know everything there is to know!



I hope you liked this little introduction to Fabric Covering. It really is enjoyable and ***EASY!***