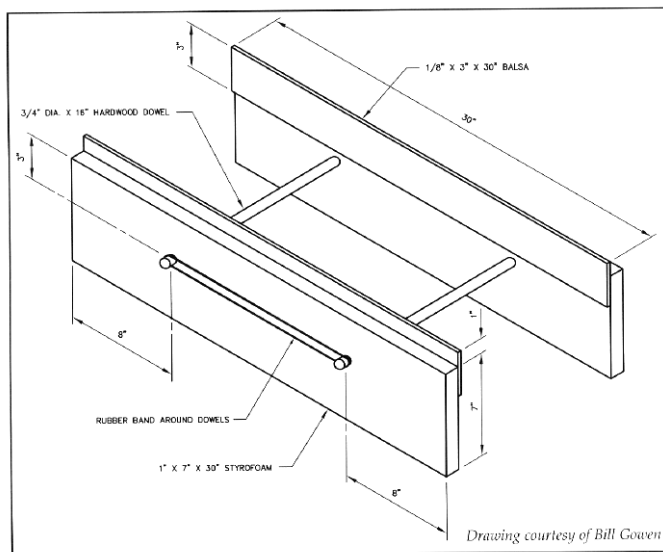


# FLAWLESS INDOOR FILM COVERING

by Mark Bennett

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1. Construct an adjustable two-sided frame to hold film, remembering film roll width is about 12 inches. A two sided frame (instead of four) will allow you to introduce camber into film in order to match the camber of ribs (before applying any adhesive.) The frame also works for flat outlines, but you may prefer a four sided frame for that. A 30"x 12" film holder is suitable for F1D wings. It can be as simple as two balsa sheets, such as 1/8" x 6"x 3", held apart and parallel to each other with 3/4" dowels. Two 16" x 3/4" diameter hardwood dowels connect the balsa rail sheets, holding them apart in parallelogram fashion. To avoid wobbly action at dowel intersection, thicken the sides right around the hole-such as with balsa. The rails are supposed to be able to snugly move across the dowels, giving it width-adjustability from, say 4" to 13". Long loops of rubber bands squeeze dowel ends toward each other in pairs, locking in the desired width, but adjustable. In the drawing the base part is 1"x7"x30" Blue Dow styrofoam, with 3" balsa rails.



2. Spread out a few inches of film onto a clean surface. Yellow foam rubber sheet works well as a spreading-out surface, having somewhat antistatic advantage. A big clean sheet of cardboard can work too. Hold down one exposed border of film across the 12" width using anything such as a wood ruler, balsa lumber, Scotch tape slivers, or (my preference) U.S. pennies.

3. Viddy, viddy, slowly unroll film to desired length. Watch for tears, and pray, if using original run Y2K film. (As of April 2010, the lightest commercially available plastic film is circa 1/2-micron "OS" film.) Add a few inches length for big model parts. Weigh down the other end near the roll-it is not really the film's end length yet, because there's no need for a final cut until you place the holding frame on top of film. Remove any big wrinkles and folds induced by static or

nerves. The idea is to get the film sheet laying down at its full width. Use either a big, soft, round women's powder brush, or pull the edges with fingers to roughly straighten out folds. Pennies work nicely here too, to hold down the lengthwise edge, or to anchor film whenever you wish. Don't fuss too much at this point, because further beauty adjustments are easier after getting it on frame.

4. Thinly grease the holding surface of frame with Vaseline. If using the above frame, this is of course the 1/8" edge of wood (to be greased.) Check width adjustment again. A setting of 11" should nicely avoid the pennies or other holddowns, but after some practice it's not hard to get a 11.9" wide span of film picked up (my film rolls are actually a little wider than 12").

5. Turn holding frame upside down, make a slow, careful aim, and plop it down on film. Walk away and breathe again.

6. Remove hold down pennies, etc. Use new thin razor to cut film away from roll, widthwise with a wood straight edge guide (metal will be sticky.) This cut could be performed before plopping down frame, and if your desired final length of film is any less than your jig, you will have to cut the film to its final length before dropping the rails on top.

7. Slowly rotate the frame right side up, grabbing around the midpoint of the dowel pair. With adequate beefy rubber band across dowel ends, the width should be locked in. You can now slide and nudge the film right along the balsa rails a little bit for a little while in order to remove wrinkles, and if desired, get it almost drum tight. After getting out the wrinkles, it's easy then to nudge the frame rails a little closer to each other (about 1/16" at a time) in order to put some slack into film to match wing or tail camber. This is easily accomplished right at the dowel-into-rail intersections, shove/pull both of them in equal amounts to prevent diagonal wrinkles.

8. Lay the dry wing outline upside down in middle of the film. Fuss with it's position until it is happy. Maybe push it around with a soft brush, or carefully pick it up (maybe with a balsa lever) and try again.

9. Mix a solution of 3M Super 77 spray into a bottle and dilute it at least 10 to 1 with your choice of thinner-lighter fluid (naphtha,) trichloroethylene (carbosol), Coleman lantern fuel, or xylene (xylol). The proper solution will not feel sticky until dry-it will be watery-so don't test with your fingers until experienced. To get a feel for the proper solution, do some tests with balsa scrap spar pieces placed in a far corner of the film mount. Don't soak the scrap with adhesive, but drop scrap dry onto film, then dab a tiny drop of adhesive where it contacts the film, on one edge of scrap. No brushing is required; the adhesive should wick itself across an inch or two. You can even miss the "drop zone" by a nervous amount, and adhesive may still find its way into wood/ film joint. Check for adhesion thirty minutes later, and adjust mixture if needed. The adhesive should not hold so firmly that you would tear the film by removing the stick. If it's stuck hard, then thin the mixture and repeat.

10. Use a squirrel or sable #1 scriptliner type brush to let the adhesive wick around the indoor outline in a series of dabs just barely touching wood/ film joint. Do same with the ribs. I put an extra swipe on the dihedral ribs. If you have a light outline that won't stay put upon the film bed, such as a 17 mg Easy B stab or whatever, it's possible to anchor it down with a couple light balsa sticks running chordwise. Beware that using too-heavy anchor sticks can introduce warps in light structures, or will reduce camber between the ribs if you make the frame sink far down into the film. (Not necessarily a bad thing, since loose film normally billows upward in flight anyhow.)

11. Thirty minutes or so later, the wing outline can be cut away from the film frame, preferably using a low wattage cautery, such as a 15-watt soldering pencil, (try Radio Shack.) Melt the film in series of straight runs, aiming to create about 1/16" to 1/8" film overhanging border outside of spars-but it's possible to get closer with experience. Make sure the point of cautery is cleaned now and then with sandpaper, because the burned film residue can accumulate on the copper point and snag the film causing a nasty tear reaching to the wrong side of wing outline. It helps to file the end of soldering pencil to a sharp, thin point. In a pinch a piece of wire heated in a flame will also work as a cautery. The trick is to find the happy speed to move the cautery point. Too slow or too close can shrink the film inside spar, and/ or char spar. Too fast leads to snags and tears.

12. The overhanging film should get sealed down to the spar face somehow, but I've seen competitive modelers not worry about it. (And they cut/burn almost right up to the spar face.) Anyhow, good sealing of film edge will involve a wicking action of a just barely wet brush using perhaps saliva, and burnishing the film down lightly with fingers. Or if weight is not a problem, it's easier to use the same adhesive mixture as used to attach the film-but only with a barely-wet brush. Some modelers use only thinner to seal overhang, but the risk here is it's easy to overdo it and detach the film altogether-a nightmare to be avoided.

Using this method, I have gained as little as 3 mg adhesive weight for an F1D wing, but I usually expect about 5-7 mg for longer-term happiness. This method also works fine for the heavier film-appropriate classes, such as Limited Pennyplane, F1L and Ministick. With these heavier classes, relax and enjoy a stronger glue ratio mix.