

A Handy Gluing Fixture

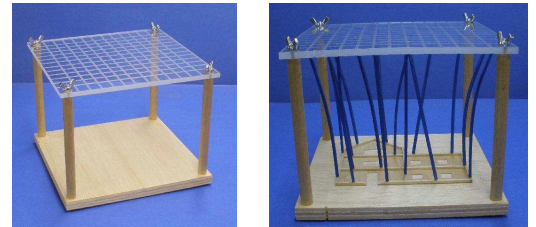
In the 17th and 18th Centuries, harpsichord and piano makers were faced with the problem of clamping soundboards to the frame of their instruments while the glue set. Their solution was to place the instrument under a large wooden framework and use flexible battens, commonly made of hickory, one end resting on the overhead frame and the other on the soundboard.

The same technique is often used today for attaching ribs to guitar soundboards. These recent photos show this technique in action.



The same procedure can sometimes be helpful while making structures for model railroads. The device is one of those things you may not use much but is essential when you need it. Here is a simple and effective design that can be built in an evening for just a few dollars, with help from the scrap box.

I made this clamping structure from 1/4" clear acrylic, 1/2" birch dowelling and a piece of 1/2" plywood. The dimensions were arbitrary (7" X 7" base) and suitable for small HO scale (and smaller) buildings. The 1/4" acrylic can be as long as 15" and still provide sufficient rigidity.



In this example, the posts are 5" high. That gives me enough room to move around inside the fixture to position pieces for gluing and clamping. A little more height wouldn't hurt. If you have large hands or are working in a larger scale, posts from 7" to 9" are recommended.

I cut the acrylic and plywood to the same size, clamped them together and cut a groove along one edge to provide a registration guide. Still clamped, I drilled the four holes for the dowel risers. With masking tape, I marked the top of both the plywood and acrylic. At this point the clamps were removed.

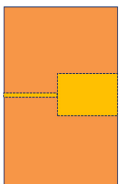


Registration groove

The risers were attached to the base with 1" sheet rock screws. I countersunk the screw holes on the underside so the screws would be flush with the bottom. The acrylic was attached to the top of the risers with hanger bolts; the wood screw portion threaded into the top of the dowel and the acrylic held in place with a wing nut over the machine screw portion.



It is important to center the dowel holes, both top and bottom for a clean fit. A lathe is nice for this operation but I also use the following technique for centering holes in the dowel ends:



Using a scrap piece of 2" X 4" pine, I drill a small hole all the way through the 4" side, then counterbore half way through the hole with a bit the diameter of the dowel. These two holes provide a reasonable chance of getting the dowel holes centered, the smaller hole keeping the drill bit straight as it enters the dowel. Close enough!

To provide firm anchor points for the tops of the battens, I cross cut a narrow groove, about 0.060" deep and a thin saw kerf wide in the underside of the acrylic, spacing the grooves about 1/2" apart. I used a table saw and a fence. With a single setting, I rotated the acrylic and cut on all edges, reset the fence 1/2" and cut again until the grooves met in the center. I kept the protective cover on the acrylic until it was cut. However, if your acrylic has a paper backing, rather than a plastic one, you may want to remove the backing first. The paper can be difficult to get off after the grooves are cut.

Before assembly, I sanded the wood parts and put on a few light coats of acrylic polyurethane, sanding lightly between coats. After assembly, four padded feet were applied over the screw holes on the bottom of the base.



A variety of materials can be used as battens. I have used 1/16" – 3/32" basswood strip wood, heavy brass and steel piano wire successfully. Ironically enough, hickory doesn't work, even when cut to 1/16" square sections. I cut the battens the full inside height of the fixture.

Using the Fixture

I have an arsenal of adhesives but for gluing wood to wood I invariably use Elmer's white glue from the small bottle. I place a small bit of glue on a 2" X 2" piece of hardboard first, then apply it to the part using the point of a toothpick (not the flattened variety). Sometimes I use a 'micro-brush' if the wood is very porous. (Your dentist can supply you with tubes of 100 brushes in three different sizes for about \$7.00 a tube if you ask him nicely.) Most glues develop a 'skin' very quickly when exposed to air, so it's good practice to dispense only small quantities at a time to the hardboard.



Most of us use too much glue. In the 1960s, NASA did extensive testing on adhesives and found that the best bonds resulted from the thinnest layers of adhesive. "Oozing glue" is not the way to go. A failed joint is frequently the result of glue absorption, leaving none on the surface to bond. "Double gluing" solves this problem.

My usual routine consists of applying a very thin coat to one or both surfaces, letting it set 30 seconds or so, then applying a very thin coat to just one surface. I 'wiggle' the part into place and apply clamping.

Using this fixture helps move the project right along. I cut the parts, one or two at a time, glue and place them on the structure and apply clamping as I go. The fixture keeps everything in good contact and flat as I work.

Cut your battens to provide just enough pressure. Allow a little bending in the batten. If the structure materials are fragile, I place a protective surface over the parts before applying the clamp. My favorite batten is basswood strip wood about 1/16" square. I keep a variety of thicknesses and lengths on hand and re-use them. I also paint them, color coding for length and to make it clear they are battens and not part of the structure I'm building.

Yes, battens can break. They only need a little bowing to hold parts securely. In the photo, I started on the left back of the structure, measuring, gluing and clamping as I worked my way across the piece.



Photo has barrel distortion. Acrylic does not bowed under pressure.

Materials List

Sande-ply plywood, 1/2" – 3/4". A light-weight, stable plywood. (Home Depot).

Birch dowel rod, 1/2".

Clear acrylic, 1/4". (Britt & Tilson, Asheville, NC.)

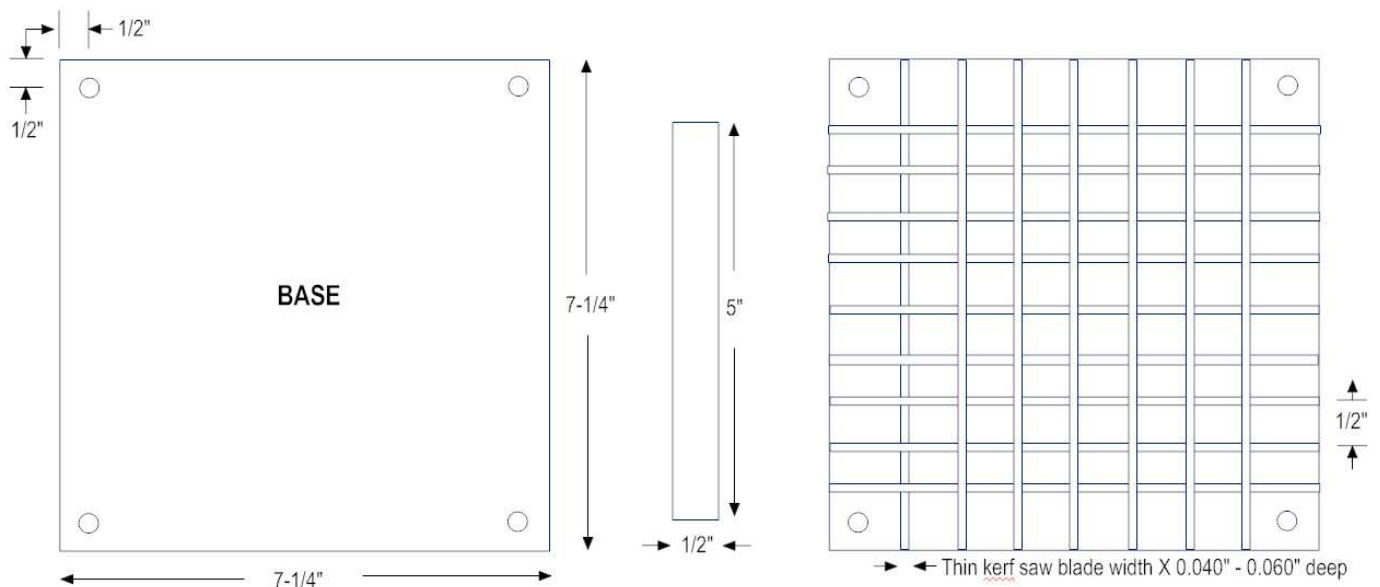
(4) 1" sheet rock screws, Phillips head.

(4) 8-32 X 1" hanger bolts. (Madera brand, Lowes.)

(4) 8-32 wing nuts

(4) Felt pads for feet

Battens: 1/16" – 3/32" basswood strip wood



DRAWING NOT TO SCALE

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