

## Do It Yourself

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### Contemporary Dining Chair: Templates, Jigs, and Laminates

From "[Wood Works](#)"

episode WWK-507 -- [More Projects »](#)

In this episode of *DIY Wood Works*, host David Marks builds a contemporary dining chair. This simple, elegant dining chair is crafted from Bubinga, a beautiful African hardwood. The chair back is gracefully curved to support the lower and upper back and was made by tapering laminates. The bubinga stock is cut at the band saw into 1/4-inch-thick strips, then tapered, using a custom jig, at the planer. Once the laminates are planed, the back is glued and bent in a one-part bending form using the vacuum press. The two front legs are tapered slightly and joined to the seat with hand-cut joinery. The seat is hand-sculpted for comfort.

The solid, sculpted seat and contoured legs complement the curved back and give this piece a distinctive look -- as if it were carved from a single piece of wood.

Woodworkers agree that building chairs is among the most advanced and challenging of woodworking projects. This one is no exception. It requires first building a mockup, bending form, custom tapering-jig and series of templates from MDF.

Materials:

Bubinga Stock

MDF for bending form, templates and mockup

Bending-plywood for bending form

Vacuum press

Table saw

Band saw

Carpenter's tape

Clamps

Yellow woodworker's glue

Slow-setting resin glue

Straight-edge

Carpenter's pencil



This elegant dining chair is crafted from Bubinga, a beautiful African hardwood. The chair back is made from tapered laminates and is gracefully curved to support the lower and upper back. The solid, sculpted seat and contoured legs complement the curved back and create the illusion that the chair was carved from a single piece of wood.

Chalk

Safety glasses or goggles

**Safety Alert:** *Always* wear safety goggles or safety glasses when working with wood, power-tools, saws, drills, routers, etc.

## Templates, Jigs and Bending Form

The back of the chair is made by cutting, tapering and bending six laminates. The seat (**figure A**) is made by edge-gluing two pieces of bubinga, then sculpting the top surface by hand. The tapered legs are joined by a combination of half-lap and mortise-and-loose-tenon joinery.

In a project this complex, it's advisable to first make up a mockup of the piece using inexpensive wood or MDF. This will help you develop and perfect the design before you begin work on the chair itself (**figure B**).

### Bending Form

- Starting with the back-support, use a flexible strip of wood to lay out and draw a pleasing curve onto a sheet of MDF.
- Create the curved template for the support by cutting out the curve at the band saw (**figure C**). This template can be used to make up the back-support of the mockup. The mockup is intended only provide a general idea of what the finished chair will look like. It's an important step, however, in that it provides the rough dimensions, helps in determining the placement of the seat and legs, and allows working out the most comfortable placement of the lumbar support in the chair's back.
- With the curve of the back worked out, you can begin work on the bending form that will be used to shape the bubinga. Using 3/4-inch MDF, cut out five ribs using the curved template as a guide. Secure each of the ribs, approximately 2 inches apart, to a sheet of MDF using wood glue and nails. Cap the end of the form to provide additional strength, securing the cap also with glue and nails (**figure D**).
- Glue a sheet of 3/8-inch bending plywood to the curved surface (**figure E**), and place the assembly into the vacuum press. Once



Figure A



Figure B



Figure C



Figure D

the bending form is complete, some plastic can be added to the curved surface so that the laminates won't stick to it during glue-up.

## Tapering Jig and Templates

- For the back-support, the design calls for a taper that starts at the base 1-1/8 inch, and tapers to 3/4-inch at the top. To create the taper, a custom jig is made to help in tapering each of the laminates by 1/16-inch. The laminates are run through the drum sander using this custom-made tapering jig.
- To build the tapering jig, use a 1/16-inch shim (**figure F**) to create five tapered ribs of MDF using the table saw. The green tape on the stock helps keep both the stock and the shim aligned as the cuts are made (**figure G**).
- Attach the tapered ribs -- evenly spaced apart -- onto a sheet of 3/4-inch MDF (**figure H**) using yellow glue and nails.
- Cover those tapered ribs with another sheet of MDF and fasten it in place also using glue and nails. Cap the ends of the jig (**figure I**) to create stops that will hold the laminates in place as they go through the drum sander.

**Tip:** If you don't have access to a drum sander, you could perform the next steps by double-stick-taping the laminates onto the jig and running through a planer. If you use this method, make sure that the knives of your planer are extremely sharp.



Figure E



Figure F



Figure G



Figure H



Figure I

In addition to the mockup, bending form and mockup, there are still other aids that are used in building this chair (**figure J**). The template for the chair-back is made with a curved top and flared sides. The two

seat templates (**figure K**) define the shape of the seat and the curved profile of the front edge. Two templates are used for the legs: one to shape the taper and one for the curve (**figure L**). A small custom jig is made from MDF to cut the mortises in the legs. These templates can be used over and over again since you'll likely be building more than one single dining chair.

[3 images across]



Figure J



Figure K



Figure L

## Cutting and Tapering the Laminates

- To create the back of the chair, begin with a piece of bubinga that's 10 inches wide, 54 inches long and milled 1-3/4 inches thick. At the band saw, cut the bubinga stock into six 1/4-inch-thick laminates. Because of the bending process, the six laminates should be cut slightly wide and long. Once you've cut the stock, mark the laminates with chalk to keep the grain in the proper order.
- Set the first laminate onto the tapering jig, and run the jig and stock through the drum sander (**figure M**), feeding the tall end of the jig into the sander first in order to minimize slipping. To taper each of the pieces 1/16-inch will take about eight passes per piece.
- Once the laminates are tapered, and before gluing them up, conduct a dry-fit on the form. While the laminates are clamped in place on the form, drill two pilot holes in the laminates as shown (**figure N**). These are for two screws that will hold the stack in alignment while it's in the vacuum press. (The holes will be cut off later when the back is cut to its final shape.)
- Once the holes are drilled, add slow-setting resin glue to the surface of each of the laminates using a glue roller. Place the sheets in a stack using the layout marks as a guide. Once the pieces are glued up, they should look like a single piece of wood.
- Secure the glued-up stack onto the bending form using the screws. Next, add a 3/8-inch-thick bending-plywood caul that's been covered in plastic (**figure O**).



Figure M



Figure N



Figure O

- Slide the entire assembly into the vacuum press (**figure P**). The press will apply more than 15 pounds of pressure per square foot as the glue hardens. This will bend the laminates to create the curved back. Allow the glue to cure for 12 hours before cutting the laminate to its final shape.



Figure P

In the segment that follows, the bent laminate is transformed into the curved chair-back, the seat is rough-cut and the joinery is created for joining the back to the seat.

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