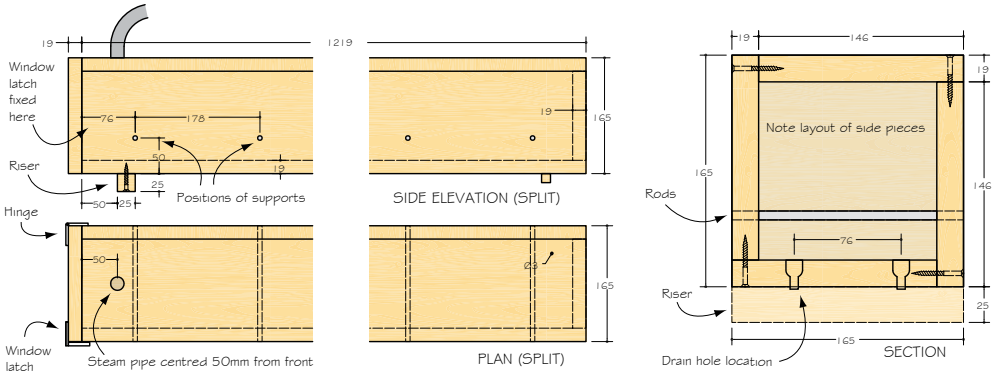
Making a steam bending box

PHOTOGRAPHS BY MICHAEL T COLLINS

Things you will need

- Pine/exterior ply sides – 4 @ 1220 x 145 x 20mm
- Pine/exterior ply end – 1 @ 110 x 110 x 20mm
- Pine/exterior ply door – 1 @ 145 x 145 x 12mm
- Door latch
- Hinges
- Oak or other material for dowels 10mm or 6mm
- Length of rubber weather strip (self-sticking)
- Wallpaper steamer
- Assorted plumbing fittings

Warning!
Wear thick leather gloves (steam is very hot and will scald on contact with skin!). Carefully remove the wood and place in a bending form. Never leave the steamer unattended.



Michael T Collins looks at making a steam bending box

Several years ago a friend of mine approached me saying that he wanted my help to make a Shaker rocking chair. After looking through several reference books, it was clear that in order to get the shape needed for the back legs and the splats we were going to have to bend the wood, a technique I wasn't terribly familiar with.

There are several methods to bend wood. In last month's article, we soaked wood in warm water as an effective way of bending wood; heat and glue lamination are another option. But the quickest is to combine heat and moisture. I introduce you to the steam box.

A steam box should be just small enough to accommodate the largest work piece you need to bend – if it is too big it is going to need a greater volume of steam to raise the temperature to the point where the wood becomes pliable. It also needs to be fairly airtight, but not so tight that steam cannot escape. Steam under pressure is an explosion waiting to happen. The best way to achieve this is with small drain holes, which allow the moisture to escape.

For this project you can use any material that can stand up to high temperatures and humidity. I'm using 20mm exterior grade ply. You could also use pine (*Pinus* spp.) boards. Pine works well for the box construction, producing a sturdy long-lasting box. ➤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Construction

Creating a steam bending box is simple and consists of butt joints, glue and screws.

1 Cut the 4x8 sheet of ply into four equal widths approximately 145mm each, this will give an internal dimension of approximately 125 x 125mm and accommodate lengths up to 1195mm.

2 Glue and screw three pieces together as per the diagram, to produce the base and sides of the box.

3 Next, drill the two drain holes 32mm from the end and 38mm from the sides and insert two copper fittings – these serve to guide the dripping condensate.

4 Position the support locations every 180mm (this was because I only had enough dowelling for seven supports!). However, you decide on the positioning, adjust the spacing and quantity of supports accordingly. Drill the holes (slightly under-sized).

5 Cut the supports to size and file off any burrs.

6 Hammer the supports home so they form a tight seal.

7 Here are the supports in place to carry the steamed components.

8 Glue and screw the top into place. Drill and counter sink first.

9 An end cap can either be glued onto the end or, as I did, inserted into the end, giving a cleaner finish.

10 Drill the steam feed hole and insert a double-ended male fitting.


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11 Secure a 25 x 25 x 180mm block of wood about 50mm from the front of the box.

12 Add a door (made of 12mm ply) with a couple of hinges.

13 Position a window latch so that it tightly seals the door.

14 Add a rubber draught seal between the end of the box and the door.

15 Drill a 3mm hole at the end with the drain holes and 38mm for the meat thermometer – this will give a reading farthest away from the steam's entry point.

Priming the steamer

16 Attach the steamer, fill up and let it come to the boil. Check the thermometer to see that it reaches 215°F before putting the wood in. Place a bucket under the drain holes. If you make this out of pine, the smell and the sap steaming away is quite aromatic. As a guide, it takes about 1 hour of steaming at 215°F for every 25mm of thickness, but wood will vary with species.

Preparing wood to steam

The best wood to bend has continuous grain running the length of the piece. This is generally with wood that has been riven or split along the grain. Wood that is sawn will need support when bending as the fibres are likely to have been cut through and bending may cause the wood to splinter and break. Soft wood such as pine is easier to bend than hardwood.

Preparing to bend

17 Once the steamer has reached the desired temperature – load the wood. While it is most desirable to have air-flow around all pieces, this is not always possible and you may have to move the pieces inside the box around. Treat steam bending like baking something in the oven, you may need to move things around and increase the cooking time, check to see if it needs more 'cooking'. Take out a piece and test its pliability.

18 Once the wood has 'cooked' enough, remove it from the steamer and immediately place in the bending form.

19 Leave the wood in the form until it has fully dried out. Remove the wood from the form. Don't be surprised if the wood tries to spring back to its original shape. It is a good idea to design the form to over bend the piece so the wood relaxes to the shape you desire. There you have it; a cost-effective way to bending wood. ■