

Rugged Bear Bench

Rustic carving highlights sturdy children's furniture

By Jeffrey Cooper



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This delightfully playful bench is sure to brighten any family room. The sturdy box construction provides a stable foundation for years of creative play.

The piece is made in two stages; one builds up the structure, and the other removes waste to produce the final form. It's actually a simple process combining woodworking and carving skills. The end result is a functional piece of furniture that will be handed down for generations to come.

I'm often asked if I make my pieces from one large log, but this would be impossible for two reasons: a large log would check and split, and the legs would be weak since the grain runs perpendicular to the length. The strongest construction design I've found is an end-grain plug construction for the core of the body with the legs attached to the core with mortise and tenon joints. "End-grain plug" means making a box with all of the grain going in the same direction. This minimizes the risk of checking as the piece ages.

When creating a project in this two phase fashion, the additive process is the more critical from the artistic point of view. Once the structure is assembled, you are limited to carving what you've already built. Therefore, you need to carefully plan how you are going to build the blank.

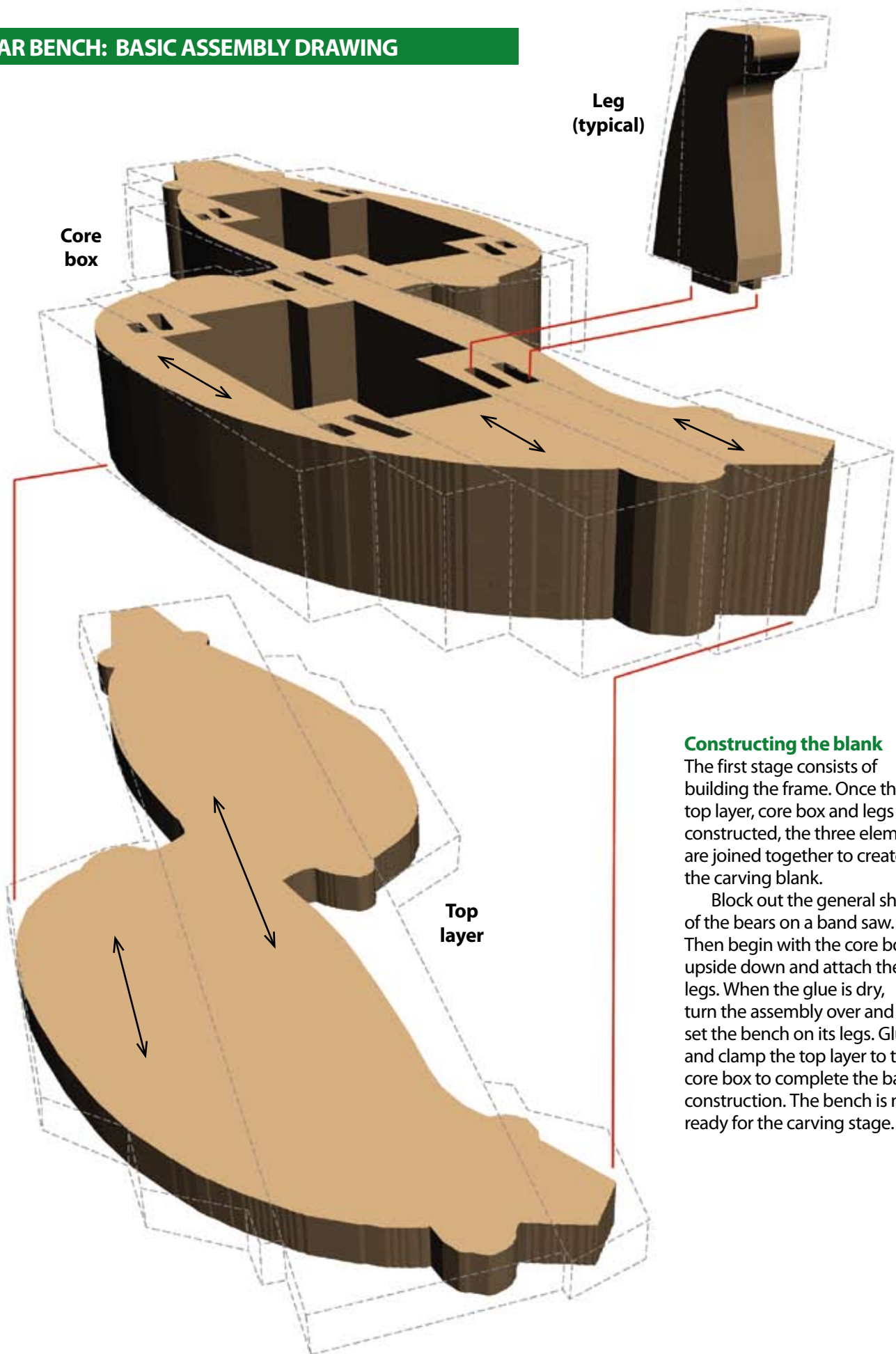
Once the blank is constructed, it's time to carve. I have a primitive, somewhat naive carving style. I'm not looking for realism. From a carving point of view,



These curious bears are built to withstand generations of serious use.

this makes things easier for me since I can interpret what I see and carve in a representational way. I can make even the meanest creature look friendly. I've made several hippo love seat benches, and just by giving the giant maw an upturned corner and raising the eyebrows, I can make anyone smile.

The first step to carving is to bring the piece to a stage where the general shape of the bears is apparent, but everything is chunky and crude. The next stage of sculpting is fixing the lines. A line is formed where two surfaces meet; in this bench, it is where curved surfaces make curved lines. By controlling the lines, we control the shadows, and that's how the bears will come alive. The lines must be fluid, and must start and end at an intersection with another line.



Constructing the blank

The first stage consists of building the frame. Once the top layer, core box and legs are constructed, the three elements are joined together to create the carving blank.

Block out the general shape of the bears on a band saw. Then begin with the core box upside down and attach the legs. When the glue is dry, turn the assembly over and set the bench on its legs. Glue and clamp the top layer to the core box to complete the basic construction. The bench is now ready for the carving stage.

BEAR BENCH: BUILDING THE FRAME

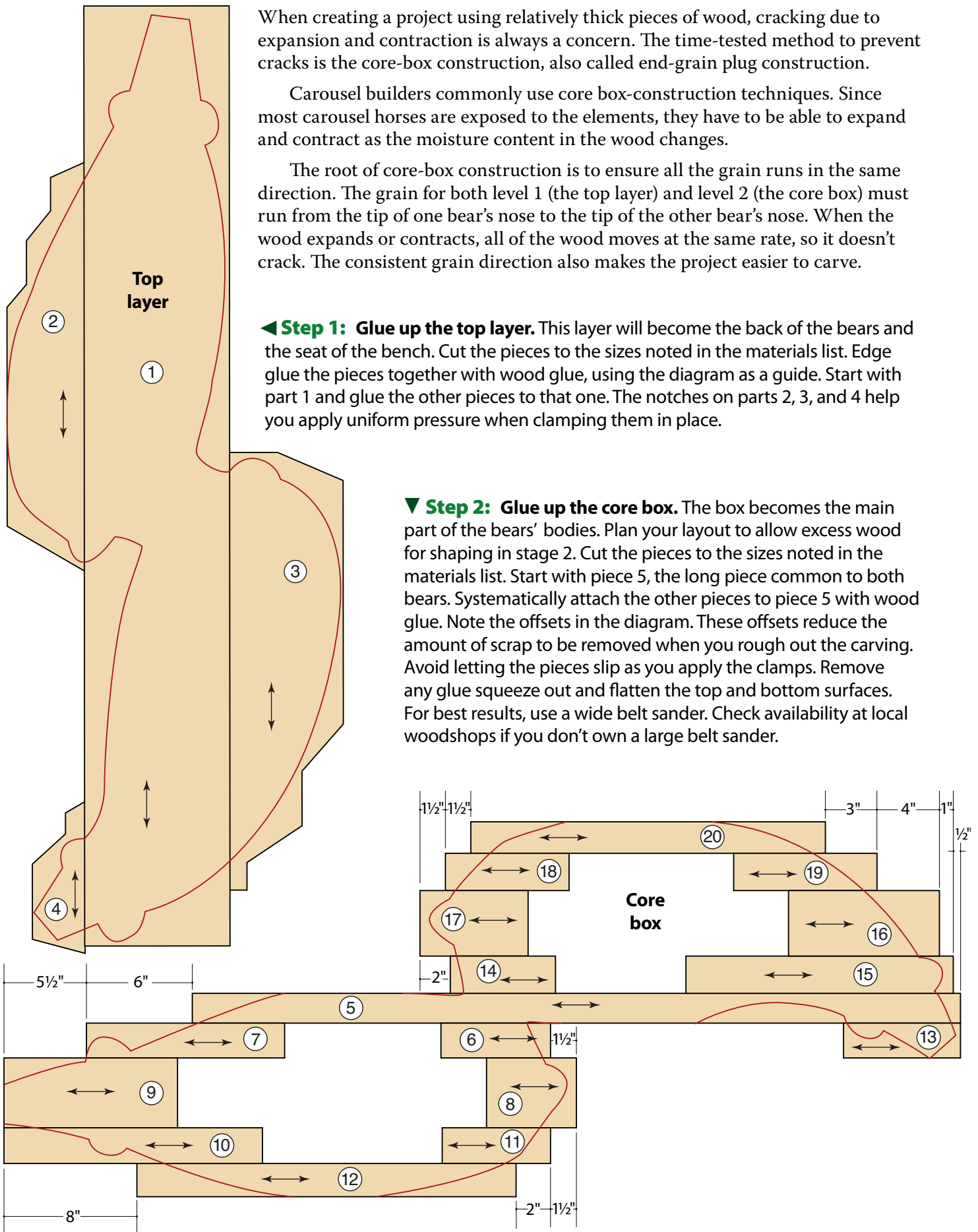
When creating a project using relatively thick pieces of wood, cracking due to expansion and contraction is always a concern. The time-tested method to prevent cracks is the core-box construction, also called end-grain plug construction.

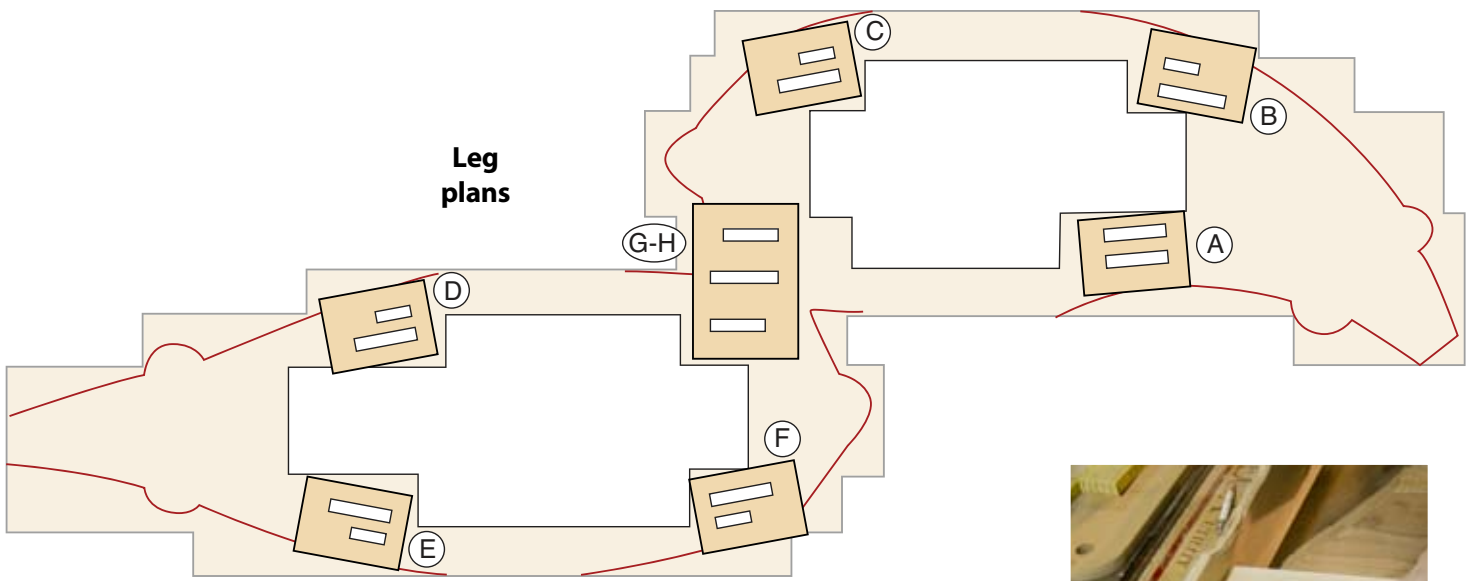
Carousel builders commonly use core box-construction techniques. Since most carousel horses are exposed to the elements, they have to be able to expand and contract as the moisture content in the wood changes.

The root of core-box construction is to ensure all the grain runs in the same direction. The grain for both level 1 (the top layer) and level 2 (the core box) must run from the tip of one bear's nose to the tip of the other bear's nose. When the wood expands or contracts, all of the wood moves at the same rate, so it doesn't crack. The consistent grain direction also makes the project easier to carve.

◀ **Step 1: Glue up the top layer.** This layer will become the back of the bears and the seat of the bench. Cut the pieces to the sizes noted in the materials list. Edge glue the pieces together with wood glue, using the diagram as a guide. Start with part 1 and glue the other pieces to that one. The notches on parts 2, 3, and 4 help you apply uniform pressure when clamping them in place.

▼ **Step 2: Glue up the core box.** The box becomes the main part of the bears' bodies. Plan your layout to allow excess wood for shaping in stage 2. Cut the pieces to the sizes noted in the materials list. Start with piece 5, the long piece common to both bears. Systematically attach the other pieces to piece 5 with wood glue. Note the offsets in the diagram. These offsets reduce the amount of scrap to be removed when you rough out the carving. Avoid letting the pieces slip as you apply the clamps. Remove any glue squeeze out and flatten the top and bottom surfaces. For best results, use a wide belt sander. Check availability at local woodshops if you don't own a large belt sander.

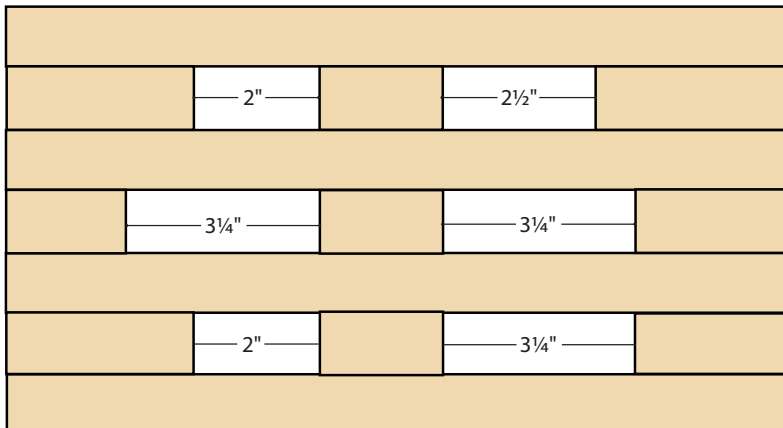




▲ Step 3: Cut the mortises. Mark the locations of the leg mortises, using the diagram as a guide. If you've altered the pattern at all, use your best judgement to locate the mortises in the thicker areas of the box. For additional strength, I use two thin mortises instead of one large one. I built a jig to cut the mortises with a router (see the diagram below). It is possible to rough out the holes with a drill. Clean out the holes and square off the edges using a bench chisel that matches the thickness of the tenon. For the strongest possible joint, keep the bottom surface flat and the corners square.



Router mortise jig



▲ Step 4: Cut the tenons. Set the table saw to cut the thickness of the tenons. I use the two outside parts of a stacked dado blade so I can cut the entire tenon in one pass, but you can also use a traditional blade and make two cuts. Use the diagram and jig to lay out the tenons, matching the mortises cut in the core. Cross cut along the bottom of the tenons to shape the shoulders. Remove the waste from between the tenons and from both ends with a chisel. Test fit the tenons into the mortises and carefully shave them down until they fit tightly. Don't make them too snug; the tenons should slide into the mortises easily. Since they are double tenons, there is plenty of surface area to make a good glue joint.

BEAR BENCH: SHAPING THE BEARS



1

Shape the feet and legs. Refer to the diagrams on page 44. Cut the materials to size, and glue the toes to the legs. Shape the feet with a chain saw disc in an angle grinder, and smooth them with a rasp. Carve a line between the foot and ankle with a V-tool. Use the V-tool to shape the claws, and smooth them with a small gouge. Smooth the legs and feet with a #3 gouge.



2

Cut the core box to shape. Sketch in the shape of the bears and cut outside the lines using a band saw with a large blade. The core can be heavy, so you may need an assistant to help you move it and to help you guide the block around on the band saw. Trace the shape of the core onto the top layer. Cut just outside the lines with the band saw to remove the waste from the top layer.



3

Glue the pieces together. Place the core box upside down and dry fit the legs. Let the corner overhang the bench and glue and clamp the legs in place. Glue and clamp the thigh pieces in place. Spread Unibond 800 on the top of the core box with a toothed trowel. Position the top layer on the core box and clamp it in place. Make sure the glue squeezes out evenly around the joint.



4

Remove the sharp corners. Make a series of cuts across the grain with a saw—I use a chain saw disc. Remove the waste between the cuts with a gouge. Use the same technique to rough out the area under the chin. Use a Surform® rasp plane followed by a coarse sanding disc to remove the gouge marks. Smooth the surface enough to sketch in the major landmarks.



5

Rough in the face. Remove the wood near the ears to make them stand out. Remove wood from beside the nose to create eye sockets. Locate the tip of the nose and carve the mouth. Check the proportions of the face. Line your thumbs up with the centerline and check the symmetry of the eyes with your index fingers. Move your thumbs up the centerline to check the symmetry of the ears.



6

Carve the shoulders. The straight lines denote areas where two planes intersect. Use a #3 gouge or a Surform plane to remove the shaded area between the lines. The ridges at these lines show how the shadows will fall on the carving. The areas where you use the Surform plane will be smoothed later, but the gouged areas shouldn't need to be smoothed if you use a sharp tool.

BEAR BENCH: FIXING THE LINES



7

Shape the legs. Notice that when I draw a line from the side and from the front, the lines do not match up. Carve the side view line first, and draw back in the front view line. Then carve in the front view line, and redraw the side view. You may need to repeat the process several times until the guidelines merge, creating a form that is pleasing from the front and the side.



8

Sketch in the main body lines. The surface from the back of the ears connects to the shoulders. The cheeks also attach to the shoulders. The arched eyebrows connect with the jowl area. Taper the jaw to tuck it under the muzzle. The shoulders and hips create slight humps. Leave the backs flat for the seat. The hams merge with the tail, which is raised from the butt.



9

Shape the areas between the lines. I use a Kunz radius spokeshave, which is rounded in both directions. Keep the tool sharp, and pay attention to the grain direction to prevent tear out. Clean up any remaining rough areas with a 1" #3 gouge. Use a V-tool to clean up the area where the bears' butts meet. Touch up the surface lightly with a Klingspor soft foam sanding pad.



10

Finish the eyes. Apply black aniline dye to the eyes, inside the ears, and the nose. Seal them with shellac or lacquer to protect them from the white stain applied in a later step. After the sealer is dry, shape the area around the eye and remove any unwanted black dye. I use a skewed palm gouge to remove the black and go back with a knife to remove any fuzz. Do not mar the eye itself.



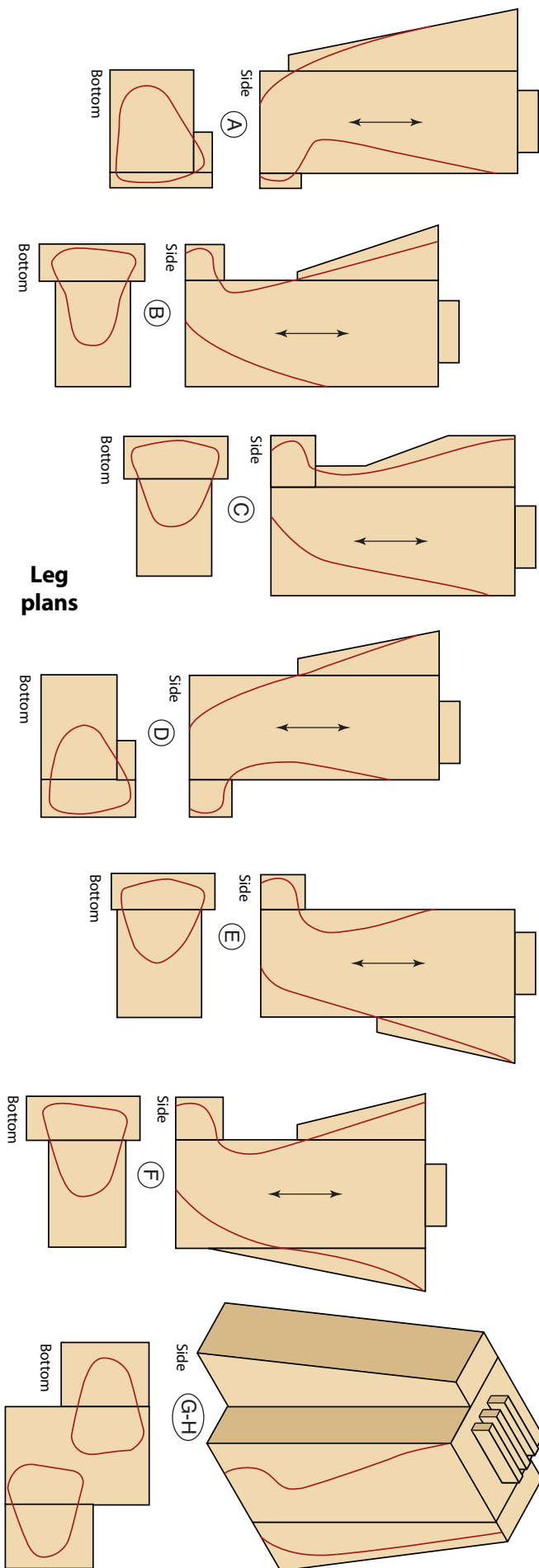
11

Sand the muzzle smooth. Since the bear's fur is short on the muzzle, it looks better if the area is smooth. Use a random orbit sander to smooth the surface and remove any black marks. Leave the black on the tip of the nose and work to create a transition between the sanded surface and the tooled surface.



12

Finish the carving. Remove any remaining lines. Use a 1/2" and 3/4" #3 gouge to clean up the tail and butt, and smooth the legs and sides with the spokeshave. Apply a white pickling stain to the bear and wipe the stain off the black areas. Apply a durable clear finish after the stain dries. I spray on a Duravar catalyzed lacquer.



Leg plans

MATERIALS:

- 2" x 9" x 56" maple or wood of choice (1)
- 2" x 5" x 24" maple or wood of choice (2)
- 2" x 7" x 26" maple or wood of choice (3)
- 2" x 5" x 8" maple or wood of choice (4)
- 2" x 6" x 45" maple or wood of choice (5)
- 2" x 6" x 7" maple or wood of choice (6)
- 2" x 6" x 12" maple or wood of choice (7)
- 4" x 6" x 6" maple or wood of choice (8)
- 4" x 6" x 10½" maple or wood of choice (9)
- 2" x 6" x 16" maple or wood of choice (10)
- 2" x 6" x 7" maple or wood of choice (11)
- 2" x 6" x 23" maple or wood of choice (12)
- 2" x 6" x 7" maple or wood of choice (13)
- 2" x 6" x 7" maple or wood of choice (14)
- 2" x 6" x 16" maple or wood of choice (15)
- 4" x 6" x 9" maple or wood of choice (16)
- 4" x 6" x 6½" maple or wood of choice (17)
- 2" x 6" x 7" maple or wood of choice (18)
- 2" x 6" x 8½" maple or wood of choice (19)
- 2" x 6" x 21" maple or wood of choice (20)
- 3 each 4" x 4" x 11" maple or wood of choice (single leg base pieces)
- Assorted scraps to glue onto legs for toes and thighs
- 4" x 8" x 11" maple or wood of choice (double leg)

- Black aniline dye
- White pickling stain
- Clear finish of choice
(I use catalyzed lacquer)
- Wood glue
- Unibond 800 urea resin glue
(optional)
- Assorted grits of sandpaper

TOOLS:

- Assorted clamps
- Saw of choice (to cut tenons)
- Router and mortise jig
- Carpenter's chisel
(to clean up mortises)
- Angle grinder with chain saw
disc and coarse sanding disc
- 1", ¾", and ½" #3 gouges
- Assorted chisels and gouges of choice
- Surform® rasp plane
- Spokeshave of choice (I use a Kunz radius spokeshave)
- V-tool of choice
- Klingspor sanding pad
- Random orbit sander
- Skewed palm gouge
- Assorted brushes to apply finish

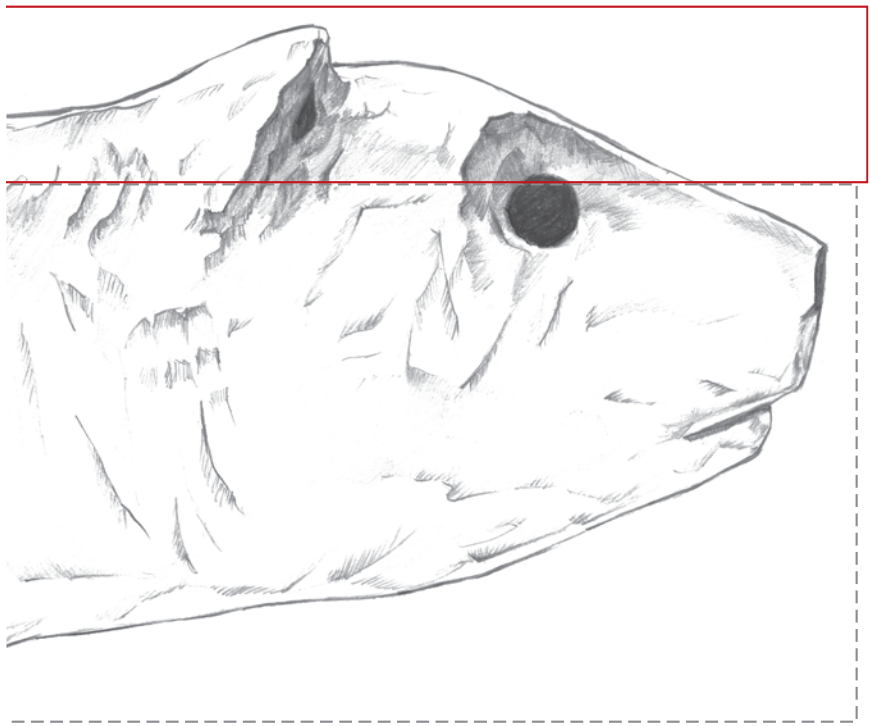
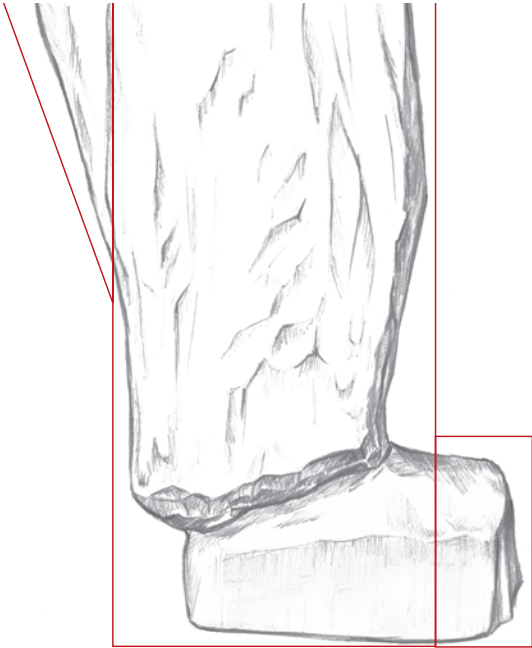
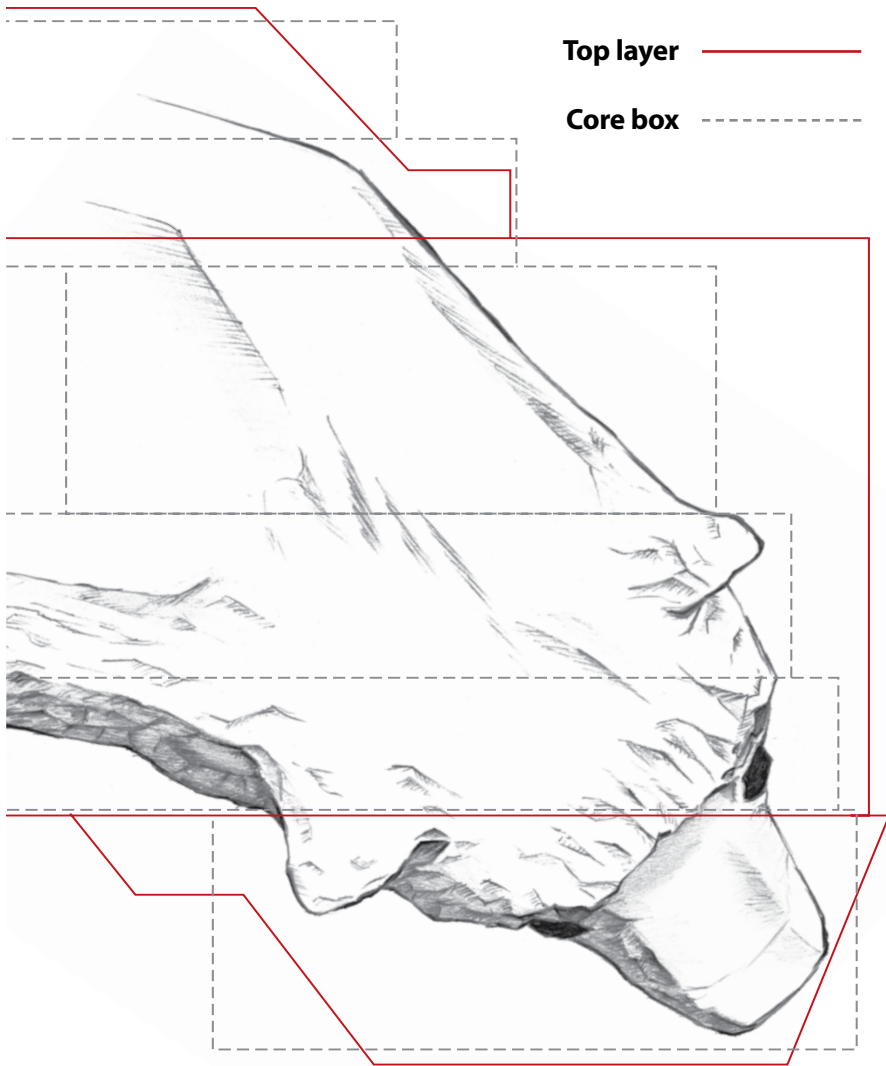
NOTE: I buy rough-sawn lumber so I can keep as much of the original thickness as possible. Rough sawn lumber is usually sold in quarters (8/4 = 2" thick). Dimensions have been converted to the standard measurements for your convenience. By using rough sawn lumber, most of my pieces end up 1⅞" thick, rather than the standard 1½" thick. Surfacing the wood myself also ensures that the wood is flat. Assemble the core box promptly after surfacing, while the stock is flat, to promote strong joints.



About the Author

Jeffrey Cooper, of Portsmouth, NH, started carving at a young age, but it wasn't until the birth of his daughter in 1988 that he incorporated his interest in carving into furniture. Now his work is on display in libraries, hospitals, and galleries around the country. For more of his work, visit www.cooperwoodsculptor.com/.

Top layer ———
Core box - - - - -



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