Mission Folding Chair Plans©

Materials List

7/8" x 7 1/2" x 8' (2.2cm x 19cm x 2.43m) oak, maple or other hardwoods.
3/4" x 1 1/2" x 3' (1.9cm x 3.8cm x .9m) oak, maple or other hardwoods.
1 1/4" x 1 1/4" x 18" (3.1cm x 3.1cm x 45cm) oak, maple or other hardwoods.
2, 1/4" x 1 3/4" (8mm x 4.4cm) brass Chicago Bolts or Connector Bolts
12, 1" (3.8cm) brass # 8 pan head screws
12, matching brass cup washers
4 brass washers for Chicago/Connector bolts
27" (68.5cm) of brass upholtsery caps

Parts List

Part	Description	Quantity	Size (standard)	Size (metric)
A	Seat Support	2	7/8" x 7/8" x 15"	2.2cm x 2.2cm x 38.1cm
B	Seat Support	2	7/8" x 7/8" x 15"	2.2cm x 2.2cm x 38.1cm
C	Cross Bars	4	7/8" x 7/8" x 26"	2.2cm x 2.2cm x 66cm
D	Legs	2	7/8" x 1 7/8" x 28 1/2"	2.2cm x 4.7cm x 72.4cm
E	Legs	2	7/8" x 1 7/8" x 28 1/2"	2.2cm x 4.7cm x 72.4cm
F	Arms	2	7/8" x 2 7/8" x 21 3/4"	2.2cm x 7.2cm x 55.2cm
G	Top & Bottom Cross Brace	4	3/4" x 1 1/8" x 15 3/4"	1.9cm x 2.8cm x 40cm
H	Middle Cross Brace	2	3/4" x 1 1/8" x 15 3/4"	1.9cm x 2.8cm x 40cm
I	Top Slats	8	1/4" x 1 1/8" x 7 7/8"	6.35mm x 2.8cm x 20cm
J	Top Middle Slat	2	1/4" x 2 1/4" x 7 7/8"	6.35mm x 5.7cm x 20cm
K	Bottom Slats	8	1/4" x 1 1/8" x 15 3/8"	6.35mm x 2.8cm x 39.1cm
L	Bottom Middle Slat	2	1/4" x 2 1/4" x 15 3/8"	6.35mm x 5.7cm x 39.1cm
M	Spacers	48	1/4" x 3/8" x 1 1/8"	6.35mm x 1cm x 2.8cm
N	Front Arm Supports	2	3/4" x 1 1/4" x 9 3/4"	1.9cm x 3.1cm x 24.7cm
O	Back dowel Supports	2	1 1/4" x 1 1/4" x 6 1/4"	3.1cm x 3.1cm x 15.8cm
P	Dowel	2	3/4" x 14"	1.9cm x 35.5cm
Q	Seat (finished dimensions)	1	23" x 13 1/4"	63.5cm x 33.6cm
R	Lower Back (finished dimensions)	1	20 1/2" x 7"	52cm x 17.8cm
S	Upper Back (finished dimensions)	1	20 1/2" x 4"	52cm x 10.1cm

Tools Needed

1/2" (1.27cm) Lee Valley dowel cutter www.leevalley.com
1/4" (6.35mm) brad point or Forstner bit
1/4" (6.35mm) round over router bit
1/4" (6.35mm) straight router bit
9/16" (1.3cm) straight or plunge router bit
1/2" (1.27cm) brad point or Forstner bit
Chisels
Table saw, Drill Press, Radial Saw, Stationary Sander, Router & Table
Staple gun

Instructions:

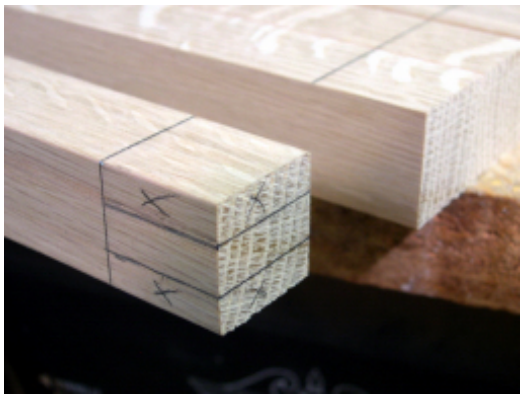
1 - Rough trim & plane all stock to final thickness. Cut all parts to rough dimensions.

2 - Begining with parts A & B, the seat supports, set up your drill press with the 1/2" (1.27cm) dowel cutter. If you don't have a full size drill press, you will have to set up a jig like mine shown below, to allow the full 15" (38.1cm) part to fit under the cutter. I reversed my drill press, clamped it to the bench, turned the head around 180 degrees, and used my homemade squares to hold the parts vertically under the bit. Cut the dowels to 5/8" (1.6cm) deep, and trim off the excess with the radial arm saw or hand miter box.

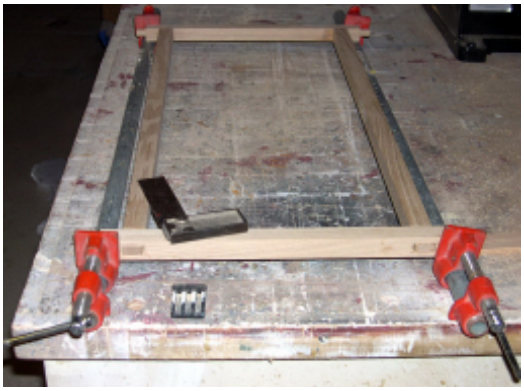
NOTE:You can substitute the dowel cutter process, by drilling 1/2" (1.27cm) holes into the ends of parts A & B, and gluing in 1/2" (1.27cm) hardwood dowels. If this is done, the parts will have to be trimmed by 1 1/4" (3.2cm), so the dowels will protrude out 5/8" (1.6cm) on each end, making the parts 15" (38.1cm) long.

3 - Mark all mortise positions on parts A & B. Using the drill press and a 1/4"(6.35mm) brad point bit, cut through mortises and trim the insides square with a sharp chisel. The mortises in parts B are closer together than parts A, so when the cross braces are added, they will fit inside each other.

4 - Mark the ends of parts C, the cross braces, for the tenons that fit into the mortises in A & B. Cut the tenons at the radial or table saw, & dry fit in the mortises.



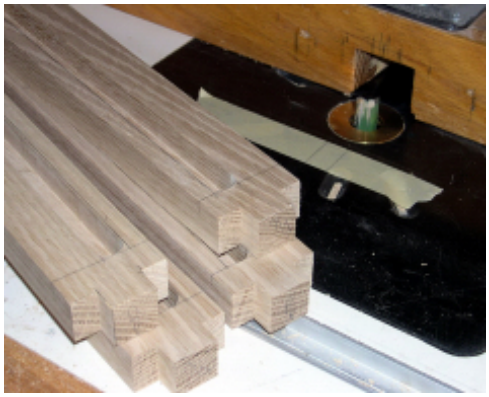
5 - Mark the centerpoints in parts C and drill the holes to accept the Carriage Bolts or Connector bolts. The Carriage Bolts will need 1/4" (6.35mm) holes, but the Connector Bolts will need a larger hole on the one brace and a 1/4" (6.35mm) hole on the other. Round over the top edges of one of A & B for the fabric. Use a 1/4" (6.35mm) round over bit at the router table. Parts A are attached to the opposite ends of parts C to form a rectangle, and the same with parts B. Once assembled, they must be the same length, but the assembled brace frame B will fit into the brace frame A. Attach the Carriage/Connector bolts with 2 washers between the frames. Glue & clamp each frame, checking for square. The assembled folding frame is shown below



6. Mark the tenon locations as shown, on the tops of all leg parts D & E. You will have 1/2" x 1/2" (1.27cm x 1.27cm) rabbets, forming 7/8" x 7/8" (2.2cm x 2.2cm) tenons.

7.Mark 2 legs as D, and 2 as E. The dados you will be cutting are opposite on D & E, but the leg turns around and is at the opposite corner.....ie:D is one front and one rear opposite back leg.

8. Mark each leg as shown, for the dados to accept the doweled ends of the cross bars. Set up the router table with a 9/16" (1.4cm) straight bit, set 3/8" (1cm) from the fence. Mark a piece of masking tape on the table surface as shown, with the start and stop edges of the bit, and line up the work pieces with the start and stop lines marked on the wood. You will need to make 2 passes in oak or any hardwood, to get to the 5/8" (1.6cm) depth.



9. Mark each leg with cross hairs for the 1/2" x 5/8" (1.2cm x 1.6cm) deep holes at the bottom of each leg, being sure that they are on the same side as the slot above. Follow the diagram for correct positioning, 2" (5.0cm) from the bottom & 3/8" (1cm) from the inside edge as the dado above. Set up the drill press with a 1/2" (1.2cm) Forstner or brad point bit, drilling a 5/8" (1.6cm) deep hole. File the dowel ends to give smooth movement in the holes.

10. Clamp the legs to the cross braces as shown, to view the final leg assembly. Be sure that the slots are on the inside edges of the legs, as shown in the right image, or the side panels will not fit on.

11. Cut all 1/4" x 3/8" (6.35mm x 1cm) deep dados centered on one edge of parts G. Parts H need the dados on both top & bottom edges, to accept the slats on either edge. Then chop out 7/8" (2.2cm) off each end as shown, leaving a 1/4" (6.35mm) lip. Taper the outer three sides of all ends on the stationary sander at a 45 degree angle to 1/8" (3mm) wide. Drill pilot holes for the brass screws, centered from the ends.

12. Cut all 1/4" (6.35mm) side slats I, J, K & L to the correct length, and sand to be sure that they all fit in the dados on G & H. Keep the 1/4" (6.35mm) scraps to use as filler strips later.Mark the center line on parts J& L with cross hairs at 1 1/4" (3.1cm) from each end. Drill 5/8" holes at each end with a forstner or brad point bit, being sure to have a sacrifice board underneath to reduce tearout. Set up the 1/4" (6.35mm) router bit on the center line and run each part J through from hole to hole, to form the slot in between.

13. Mark the center of part G, place the center slats J in place with 1 1/8" (2.8cm) space between the other slats I & J. Cut 1/4" x 3/8" x 1 1/8" (3.1cm x 1cm x 2.8cm) spacers and glue between the slats. Cut longer spacers about 1 3/8" (3.5cm) for the ends. Do the same for the center part H and the top part G. Clamp the chair together on it's side as shown. Mark a line at 1 1/2" (3.8cm) from the bottom of the legs. Square the lower part G to the legs, drill # 8 pilot holes and fasten to the legs with the # 8 brass pan head screws and cup washers. Flip the chair over, and do the same process with the other frame. At this point you should be able to open and close the chair assembly to test it's construction.

14. Taper the arms parts F at one end to 2 1/4" (5.7cm) with a taper sled on the table saw. Mark each end with a gentle curve using a coffee size can. Cut the curves at the band saw, and sand at the stationary sander. Mark a line 3 1/8" (8.25cm) from the wide ends.

15. Place the arms flat on the work surface, tapered sides out. Clamp the completed leg assembly together with a 1/8" (3mm) spacer between the legs, upside down on the arms as shown. This is easier to mark the mortise locations on the arms, than measuring. Make sure the leg assembly is centered and to the edge of the 3 1/8" (8.25cm) line, and mark the edges of the tenons to give you the mortise locations.

16. Chop out the mortises to 1/2" (1.27cm) deep at the drill press, with a 1/4" (6.35mm) Forstner bit. Clean the holes square with a sharp chisel. Dry fit the tenons in the mortises to be sure the cheeks are square and flush.

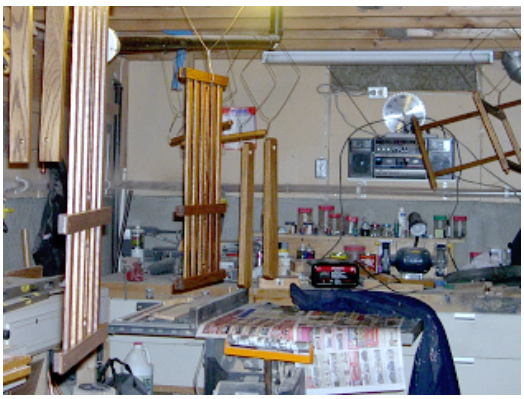
17. Mark the center point lines for the 3/4" (1.9cm) dowel holes on the top of the arms, 1 1/2" (3.8cm) from the ends and 15/16" (2/35cm) from the **straight** edge. Set the drill press at a 10 degree angle with the arm's **straight** edge against the fence. Tightly clamp the arm to the table so it doesn't move. The drill press will have to be set at the opposite angle for the other arm.

18. Draw the back support parts O onto the 1 1/4" (3.1cm) stock. Do not cut the parts out until you have drilled out the 3/4" (1.9cm) holes on the drill press. Cut the top 10 degree angle **only** at this time, and mark corner to corner for the center point. Drill to 1 1/8" (2.8cm) deep. Use angle squares for support at the drill press.

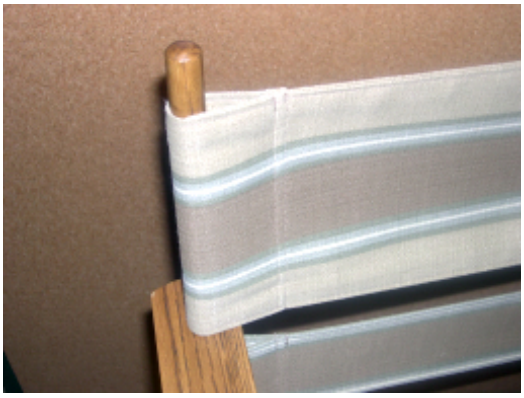
19. Cut out the pattern for parts O, and clamp approximately 3" (7.6cm) to 3 1/2" (8.9cm) from the underside of the arms. The brackets should be 1/4" (6.35mm) from the inside edges of the back legs. Test the fit of the dowels so they slide in & out freely to allow the placement of the material. If parts O do not sit at the 3" (7.6cm) to 3 1/2" (8.9cm) area, you may have to file the angled hole in the arms, to give some leeway in the angle. Be sure that both parts are at an equal distance from the underside of the arms, as well as parallel to the legs. Glue & clamp in place.

20. Using the template, cut the front arm supports part N slightly longer, from the 3/4" (1.9cm) stock. Trim in length to match the bottom edges of the back dowel supports. Glue & clamp in place after final sanding of all chair parts.

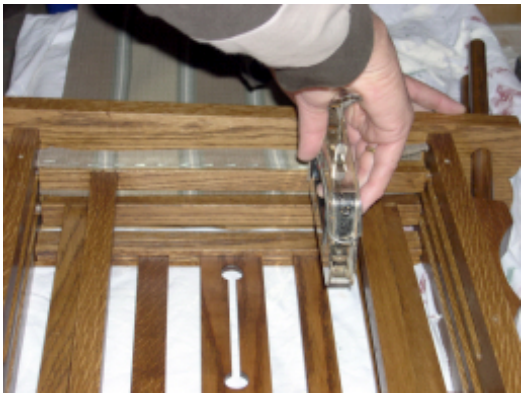
21. Mark "left" & "right" on the underside of the bottom cross bar of each side panel before removing them for final sanding. You need to sand the outside edges of the front & back legs, while the side panels are still in place. You don't want to round over the butt edges of the cross bars. Remove the side panels, sand all edges and pencil marks before staining and finishing. **Stain & finish all parts seperately**, then glue & clamp the arms in place after final assembly. I found it best to hang all parts by a coathanger while staining & finishing.



22. Before cutting the material to the rough dimensions, wash and iron it first. Use a tailor's tape or string line, to measure the distances to be sure. Wrap the tape around the seat supports to the bottom edges of the cross bars for the seat. Check the back support material length as well. For strength, the material needs to be doubled, with the pattern out on both sides, so it looks better folded. The hem should be 1" larger all around than the finished dimensions. Double stitch around all edges 1/4" (6.35mm) apart. Be sure the loops for the dowels are not too tight to slip over.



23. With the material completed, lay the folded, stained and finished chair on the work surface, with a board between the upper cross braces as shown. Staple the seat flush to the lower edges of the cross braces, then nail on the brass upholstery strip over the staples. The material should be tight when the chair is completley open. It will stretch somewhat as you use it.



Enjoy !

Phil Barley

www.plansinwood.com