Instructions for Building a Sukkah

Designed by Jerome Danoff

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These are directions for construction of a basic 8' x 8' x 8' square frame, free standing sukkah. Roof slats are included as part of the design. To complete the sukkah, branches, siding, and decorations should be added. Instructions for enlarging the 8' x 8' sukkah to 8' x 12' can be found in the second part of this document.

Preparing the wood takes approximately 1 hour. Assembling the sukkah takes approximately 1 $^1/_2$ hours.

Part I — Purchasing the Materials

A. Lumber

size		part letter	# of pieces needed
8 ft.	2 x 3	A	4
8 ft.	1 x 3	B & C	8
4 ft.	1 x 3	D	1
8 ft.	1 x 2	E	4

1. We recommend #2 spruce or white pine for the 1 x 3 and 1 x 2 pieces. Furring strips are too rough. Redwood and clear pine are fine but will be expensive.

2. The 2 x 3 pieces may only be available as framing lumber, but if selected carefully can be good quality. If the 1 x 3 x 8 size is not available ask the lumber yard to "rip" lengthwise a 1 x 6 x 8.

3. Pressure treated lumber is not recommended since precautions must be taken when drilling and because it does not come in all of the above sizes.

4. Select the wood yourself if possible. A few knots and imperfections should be expected.

B. Hardware

size	# of pieces needed
$^1/_4$ x 4" hex bolts	7
$^1/_4$ x 3" hex bolts	12

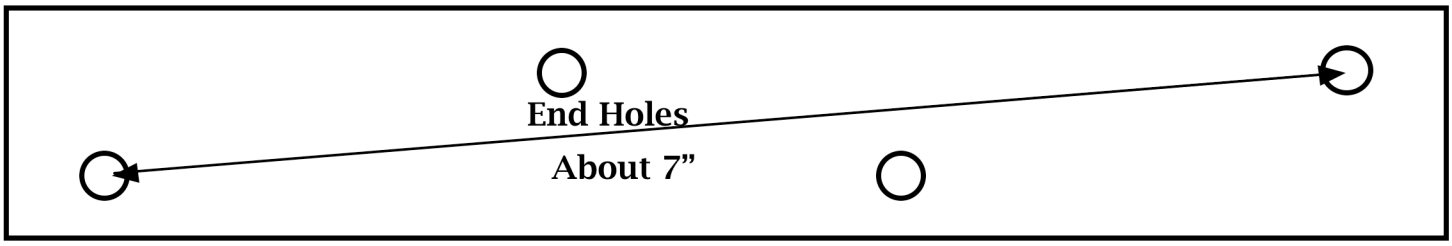
(continued)

1/4 x 2" hex bolts	6
1/4 x 1 1/2" hex bolts	8
1/4" wing nuts	33
1/4" washers	50
8" mending plates	8
elastic bands (3 1/2" x 1/4" size 64 or larger)	8 (optional)

1. Bolts should have a hex head and need only be partially threaded.

2. You may want to get 2 or 3 extras of small hardware items since they are easily lost.

3. Mending plates are 8" x 1 1/4" x 1/16" metal plates with 4 holes. We recommend Stanley # 30-1120 995 or similar to the one drawn below. Only the end two holes will be used and they must be very close to 7" apart. The holes must be large enough to accept a 1/4" bolt. National brand # 220-293 measures 8" x 7/8" and is acceptable, but the Stanley plate is preferred.



8" Mending Plate

C. Tools Needed

1. Electric saber saw or medium hand saw
2. Electric drill and 5/16" bit
3. Safety goggles
4. Work gloves
5. 7/16" wrench, nut driver, or socket driver, or (optionally) adjustable wrench or pliers
6. 5 ft. step ladder or equivalent

Part II — Preparing the Wood

Follow these steps in order. Try to cut and drill the wood as described below but don't worry about small deviations. A sukkah is not a precision instrument and the robust design allows for some error.

A. Sawing

1. Not all lumber yard wood is exact in length. Align the 8 1 x 3 pieces and saw off the ends so that the 8 pieces are the same length (Fig. 1). (NOTE: they do not have to be exactly 8 ft., but they do all have to be close (within $1/2$") to the same length.)

2. Similarly, check the lengths of the 4 2 x 3 pieces and cut if necessary.

B. Drilling the 2 x 3 's (A Pieces)

1. Drilling the first 2 x 3 — The true cross-section of most 2 x 3 's is $1\ 1/2$ x $2\ 1/2$. Keep this in mind when measuring for drilling locations. If your lumber measurements differ from this, adjust $1\ 1/4$" and $7/8$" dimensions (as seen in Fig. 2) so that holes are in center of face or edge. End and length measurements remain the same.

2. Drill 3 holes in the face (wide dimension) and 3 holes in the edge (narrow dimension) — Carefully measure according to Fig. 2. Four holes are near one end of the 2 x 3 and 2 holes are near the middle. (NOTE: the face and edge holes do not intersect!)

3. Drilling the remaining 2 x 3 's — After the first piece has been drilled it can be used as a template to mark the locations on the other three pieces (Fig. 3). Then drill them one at a time.

C. Drilling the 1 x 3 's (B & C Pieces)

1. Drilling the first 1 x 3 — Drill 4 holes (2 near each end) in the face of a 1 x 3. Measure carefully according to Fig. 4. If the lumber is not $2\ 1/2$" wide, adjust the face measurements to center the holes.

2. Drilling the remaining 1 x 3 's — Use the finished 1 x 3 as a template to drill holes in the other 7 1 x 3 's, one at a time. (Fig. 4.) (NOTE: there are no edge holes in the 1 x 3 's.)

3. Drilling Special 1 x 3 's (C Pieces) — Two of the 1 x 3 's will need an additional hole drilled near their centers (but not actually in the center). This hole is offset as shown in Fig. 5.

   Mark an arrow (using a felt-tip pen or something similar) on these two pieces pointing away from the offset center hole toward the wide side of the board. (Fig. 5.)

D. Drilling the 4 ft. 1 x 3 (D Piece)

1. Either purchase a 4 ft. 1 x 3 or cut an 8 ft. 1 x 3 in half.

2. One end of the 4 ft. 1 x 3 requires holes positioned identically to the two holes at the end of any of the 8 ft. 1 x 3 's. Either align the 4 ft. piece with the end of an 8 ft. piece and drill via the "template method" or measure and drill according to Fig. 4.

3. The other end of the 4 ft. 1 x 3 gets an offset hole as shown in Fig. 6.

Part III — Assembling the Sukkah

A. Preliminary

1. Please read all directions carefully before assembly. These instructions can be used to build an 8' x 8' x 8' structure. (Fig. 12.) Be sure you have adequate room to lay out lumber and that at least two people are involved in the job. An area 20' x 10' is ideal for laying out the lumber, but at least 10' x 10' is required.

2. Assemble all tools, and sort all hardware as described in Part I of this document.

3. Arrange lumber by size and use letters A - E to identify:

Part	# in Kit	Size	Description
Part A	4	8' x 2 x 3	Heaviest pieces. Used for legs.
Part B	6	8' x 1 x 3	2 holes near each end. Used for sides.
Part C	2	8' x 1 x 3	Same as B, but with offset center hole (with arrow). Set aside the 2 C pieces. Used for front.
Part D	1	4' x 1 x 3	A single short piece. Used for front.
Part E	4	8' x 1 x 2	Narrow pieces with no holes. Used for roof slats.

B. Assembly Steps

The two side panels are assembled first. Each panel will require about 10' x 10' ground space during assembly, but can be stood upright when completed. Do not fully tighten bolts until entire assembly is finished.

1. Lay flat two A pieces parallel to each other and 8 ft. apart. Be sure holes are at same ends (Fig. 7).

2. Place a B across the top ends. Select 3 bolts (1 $^1/_2$, 2, and 3 inch), 3 wing nuts, 4 washers, and 1 mending plate to connect each corner. For these and all other upper corners, see Fig. 10.

NOTE: correct length bolts for each location will protrude just enough to engage wing nut. If more than $^1/_2$ inch of extra threading protrudes, exchange for a shorter length bolt. Do not use washers against mending plates — only use washers where bolt heads or wing nuts are against bare wood.

3. Also place a B across the midpoints of the 2 A pieces in Fig. 7. Attach each end with 1 bolt (3 inch), 1 wing nut, and 2 washers.

4. Repeat Steps 1 - 3 to assemble the second side panel. Orient the 2 side panels with feet facing each other and the cross (B) pieces up (Fig. 7). This orientation will result in the B pieces being inside the A pieces when the sukkah is finished. **Caution:** If the B's are outside the A's, the roof slats (E pieces) will not reach from side to side of the finished sukkah.

5. Attach a C piece to the upper corner of a side panel assembly using 3 bolts (1 $^1/_2$, 3, and 4 inch), 3 wing nuts, 4 washers, and 1 mending plate (Fig. 8). NOTE: the side panel will be flat on the ground. The C will be pointing straight up. Also, the long edge of this C will be approximately $^1/_2$" beyond the upper end of the A. Be sure the arrow marked near the center hole of the C piece faces out and points to the roof.

6. Attach the remaining C piece to the inside center hole of the C piece from Step 5. Use 1 bolt (2 inch), 1 wing nut, and 2 washers. NOTE: be sure the arrow faces out and points to the entrance (Fig. 8).

7. Attach the D piece between the center hole of the C from Step 6 and the center hole of the appropriate A (Fig. 8). NOTE: one end of the D may have 2 holes — use the outer hole against the A (4 inch bolt). The other end has an offset hole. Orient the D such that this hole is offset toward the floor and then attach to the C (2 inch bolt).

8. Two people should now be able to gently raise this side/front assembly to a standing position (Fig. 9).

9. Carefully raise the second side assembly (from Step 4) such that its front upper corner can mate with the exposed end of the C piece (from Step 8). (See Fig. 9.) Have someone on the ground hold the assembly steady.

10. From a step ladder, connect the corner of the side assembly to the end of the C piece (Step 9) using 3 bolts (1 $^1/_2$, 3, and 4 inch), 3 wing nuts, 4 washers, and 1 mending plate. NOTE: all legs are now in place and the sukkah should be able to stand alone. However, it will be very wobbly. Do not allow children to play in the area at this stage.

11. Attach a B piece across the top rear of the sukkah by the following sub-steps (from a ladder) :

    a. Use 1 bolt (4 inch), 1 wing nut, and 2 washers to connect one end of the B to the upper end of one of the rear A pieces. This B will be free to swing at this point.

    b. Move the ladder to the opposite rear corner. Have an assistant pass up the swinging B piece. Attach the end with 3 bolts (1 $^1/_2$, 3, and 4 inch), 3 wing nuts, 4 washers, and 1 mending plate, as in Fig. 10.

    c. Move the ladder back to the location of Step 11a. Using 2 bolts (1 $^1/_2$ and 3 inch), 2 wing nuts, 2 washers, and the last mending plate, complete attachment of this corner. All four top corners should now be stabilized by two mending plates apiece, as in Fig. 10.

12. Attach the last B across the midpoints of the 2 rear legs (A pieces) using 1 bolt (4 inch), 1 wing nut, and 2 washers at each end.

13. Securely tighten (using a wrench or other tool) all bolts and wing nuts. Do not over-tighten since you must disassemble the sukkah again after the holiday is over. NOTE: if the entrance is not on the side where you want it, the D and vertical C pieces can be removed and reversed, or omitted altogether, without disturbing the rest of the structure.

14. Place the 4 E pieces across the roof from side to side. The ends can be secured with the elastic bands provided (Fig. 11). If E pieces are too short, you have your sides inside-out. See Step 4. NOTE: elastic bands will need to be replaced each year. If you prefer, the E pieces can be tied with string or left unattached. Do not attempt to nail these pieces to the roof.

15. One situation that may occur is that the vertical C piece in front does not touch the ground. Sukkah strength is not dependent on this piece for weight bearing. Remedies to try include:

    a. Slightly spread apart the front legs of the sukkah.
    b. Place a narrow piece of cardboard or wood under the C piece as a shim.

c. Hang a weight from the D piece.
d. Drill an additional hole in the D piece in a slightly different location.
e. Ignore it

Part IV — Decorating Suggestions

A. Roof — Place branches cross-wise to roof slats so that shade is provided but stars are still visible.

1. Bamboo, pine, or forsythia branches (use loppers to cut stalks)
2. Anything green in your yard that needs trimming
3. Grass mats from a store such as Pier 1 or roof mats designed for sukkahs (available on the Internet)

B. Sides — Siding should be approximately 96" wide x 84" long for three sides, and 48" wide and 84" long for the front side. This allows for a 12" opening at the bottom. Use staple gun ($1/4$" staples), tacks, string, or wire ties to attach to wood. If piece is too large, just fold under the edges.

1. Sheets — A queen size flat sheet (with edges folded under) covers one side. Double sheets may work but some are too small. A twin sheet covers half of one side.

2. Roll-up shades — Hang by string or wire ties from top cross-pieces. These can be raised and lowered as desired. Pier 1, Wal-Mart, and Home Depot have a variety of sizes, most of which come in 6' lengths. Shades may be placed on either the inside or the outside of the Sukkah frame, according to preference. One 4' x 6' plus one 3' x 6' shade will fit inside each side. Two 4' x 6' or one 8' x 6' shade will fit on the outside of each side. One 4' x 6' shade covers the front side next to the door.

3. Plastic or canvas tarps, window or shower curtains, large pieces of fabric — Staple to frame or hang by existing holes.

4. Wooden lattice — Usually sold in 2' x 8' and 4' x 8' pieces. Attach with string or wire to sukkah frame.

C. Finishing Touches —

1. Hang fresh fruit, gourds, Indian corn, vegetables, etc., by string or netting. If bees become a problem, plastic or paper items can also be used.

2. Hang or tape up paper chains, New Year's cards, pictures, or other art work. Jewish bookstores and the Internet have posters with Sukkot themes. Decorations can be laminated for year to year use.

3. Decorate fabric or sheets with permanent markers or fabric paints.

4. String lights by wrapping around wood or attaching with twine or wire ties.

Part V — Keeping the Sukkah Standing

This sukkah will stand alone and not be adversely affected by most weather conditions, including rain and moderate wind. However, a sukkah in a vulnerable location under high winds may blow over. For this reason we suggest the following precautions:

1. Leave a gap of 1 to 1 $^1/_2$ ft. at bottom of side coverings to allow for air circulation and to minimize water damage (unnecessary with lattice).

2. Cut slits in tarps, shower curtains, or plastic siding in order to allow air to pass through. Sheets do allow air through, but slits might still be helpful.

3. If unusually high winds are expected (greater than 25 mph), take the side coverings off the wooden frame and/or anchor the sukkah by tying it to a permanent structure or weighing it down with rope attached to bricks or cinder blocks.

Part VI — Care of Materials

A. Hardware — Bolts and washers will oxidize and may rust in places. This will cause them to look dull, but is not a problem and they should last for years.

B. Lumber — Store lumber indoors if possible. Laying the wood flat rather than on end will help prevent warping. You may wish to stain or apply preservative to prolong the life of the wood. It will, however, last for several years untreated if stored properly.

C. Identification — For storage, we suggest tying up the wood and marking it in such a way that it is clearly identified as the sukkah. If left unmarked, the wood and hardware are in danger of being used for household projects during the year, and next Sukkot you will be missing pieces.

Part VII — A Final Word

A. Thank you for your support of our sukkah project, which has as its main purpose helping Jews follow the commandment to dwell in the sukkah. We hope your family enjoys the holiday.

B. This sukkah was designed in 1988 by Jerome Danoff, a member of Congregation Beth El of Montgomery County, Maryland. During the next 14 years, over 300 pre-drilled sukkah kits were sold through the shul. Kits are no longer available, but everyone is welcome to use the instructions for a do-it-yourself family project.

C. Instructions for enlarging the 8' x 8' sukkah to 8' x 12' can be found in the second part of this document.

D. Synagogues or Jewish groups may copy this document for use by their own members. The design may be used for a fundraising sukkah project by such a group, however no individual may use the design or directions for personal profit. **Please be sure to include the cover page on any reproductions.** Contributions to Congregation Beth El of Montgomery County, Maryland will be appreciated but are not required.

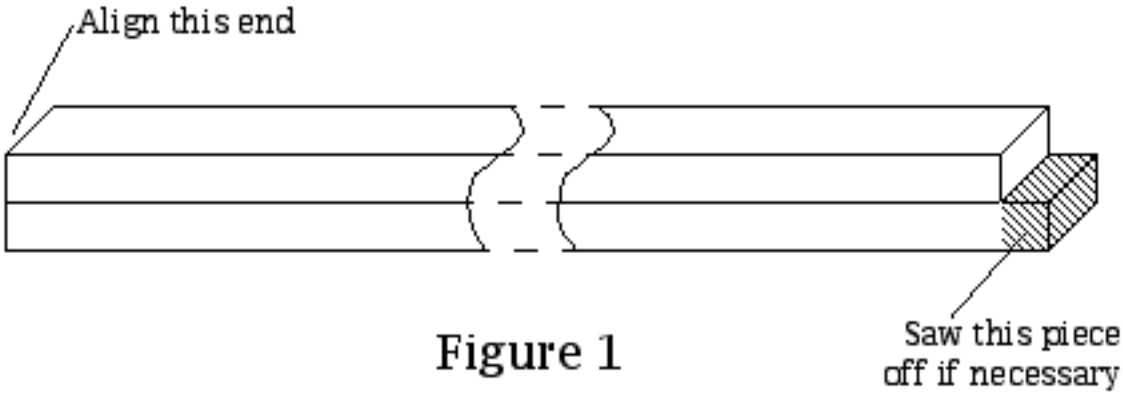


Figure 1

Cutting the 8' Lumber

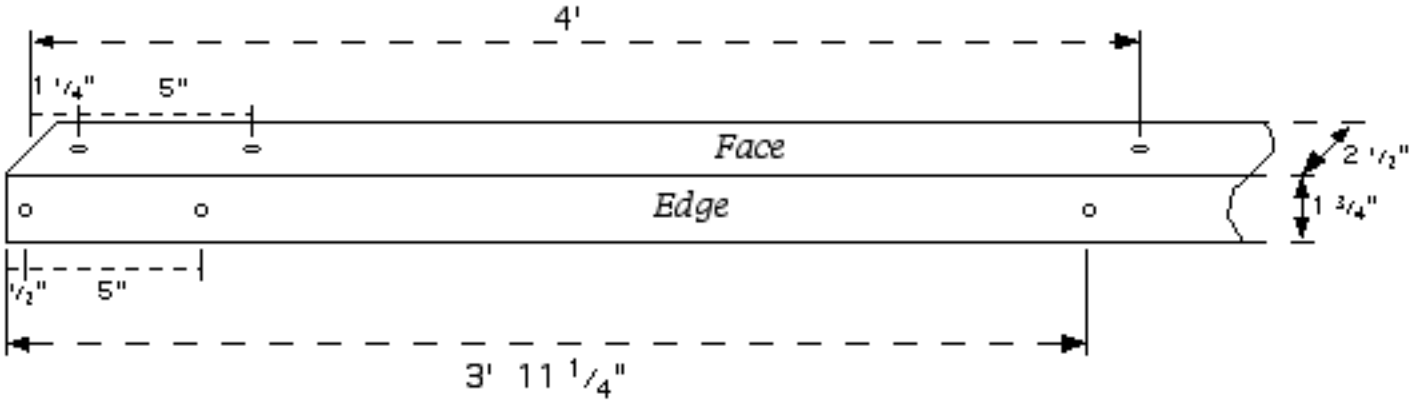
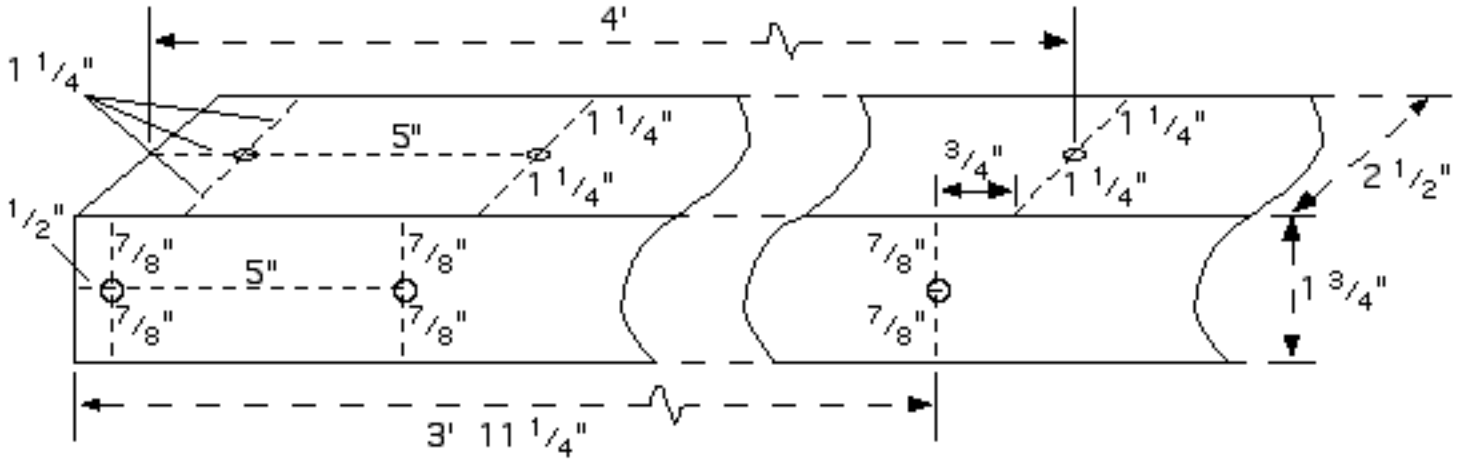


Figure 2 Drilling the 2 x 3's (A Pieces)



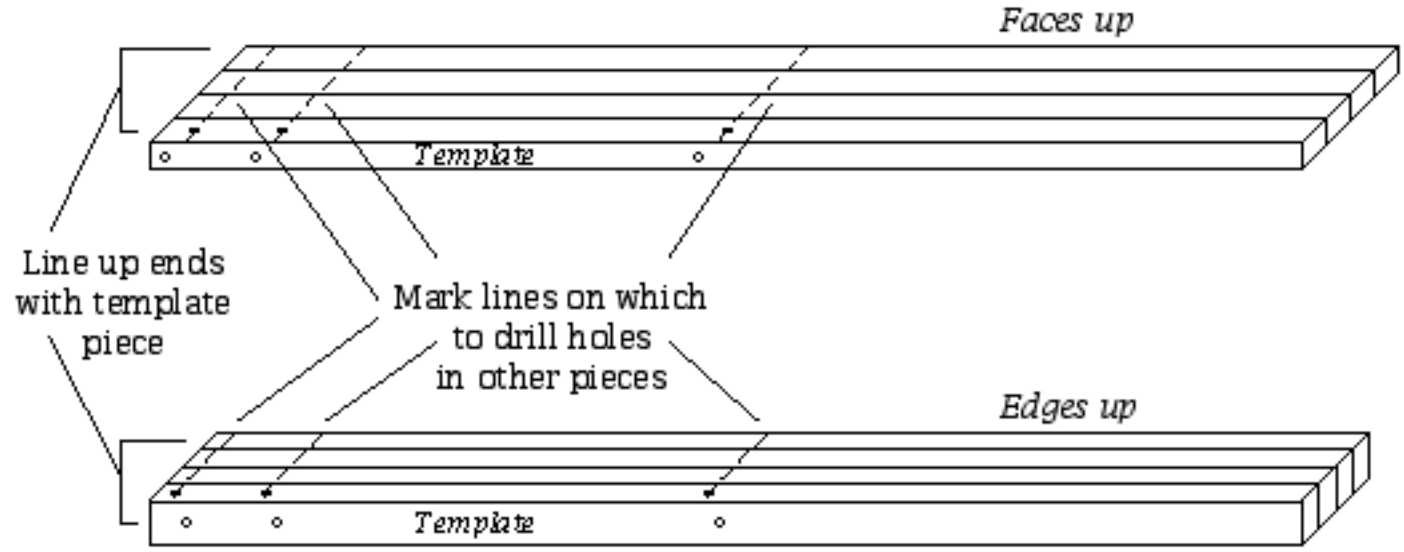


Figure 3

Drilling Additional 2 x 3's (A Pieces) from Template Piece

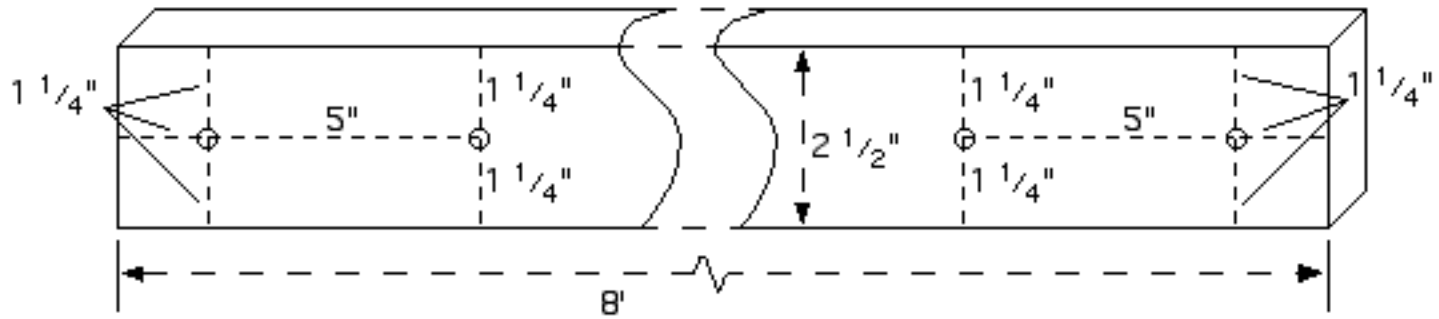
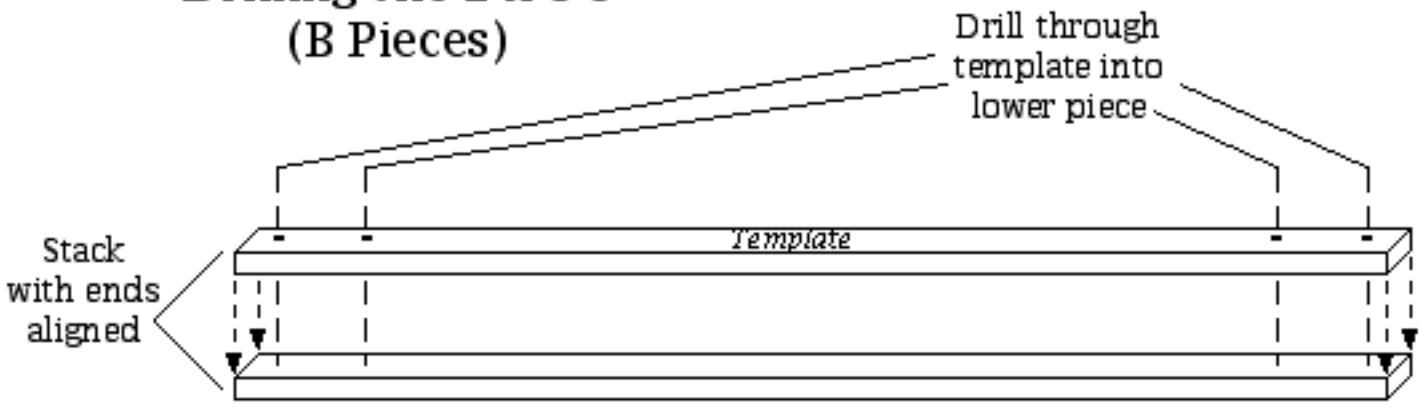


Figure 4

Drilling the 1 x 3's
(B Pieces)



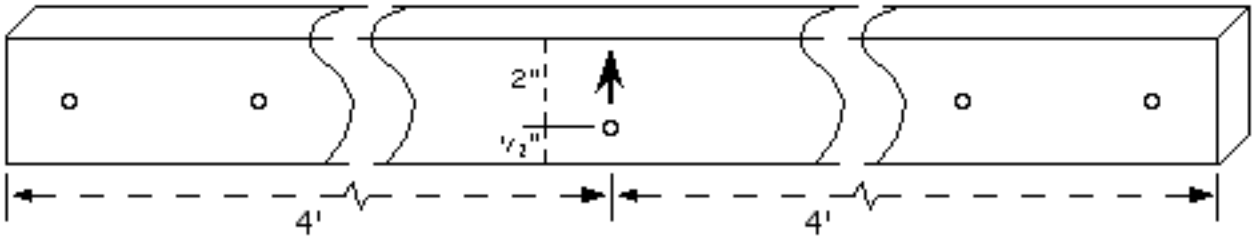


Figure 5 Drilling and Marking Special 1 x 3's (C Pieces)

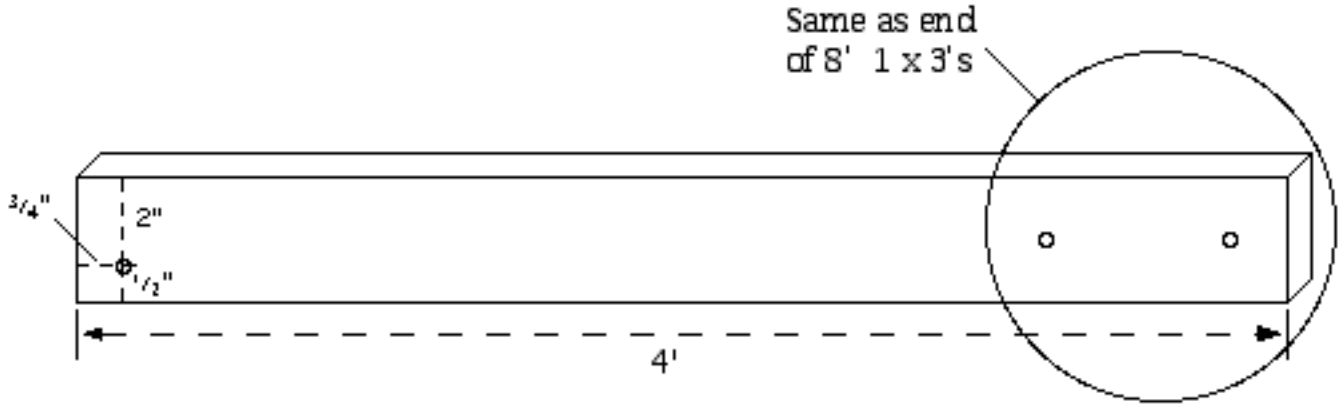


Figure 6 Drilling the 4' 1 x 3 (D Piece)

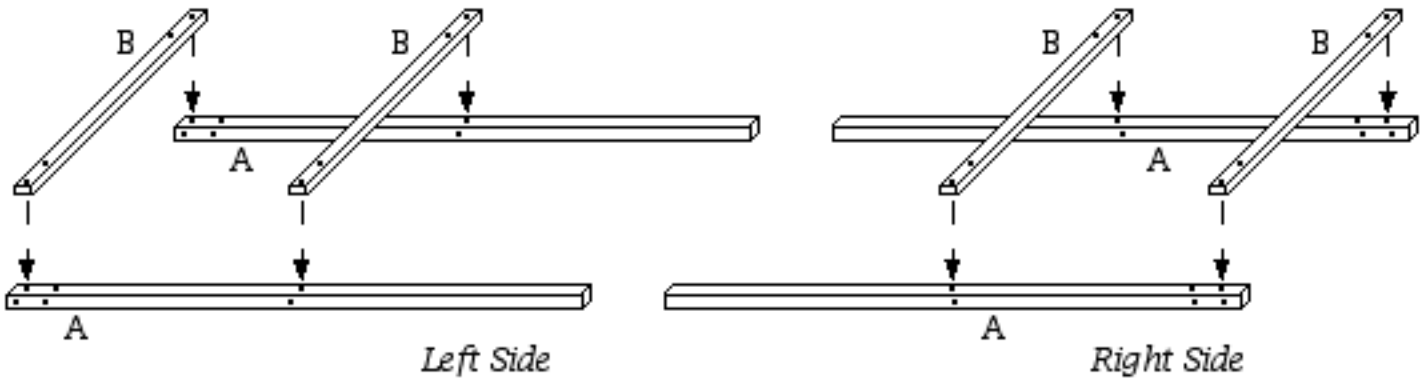
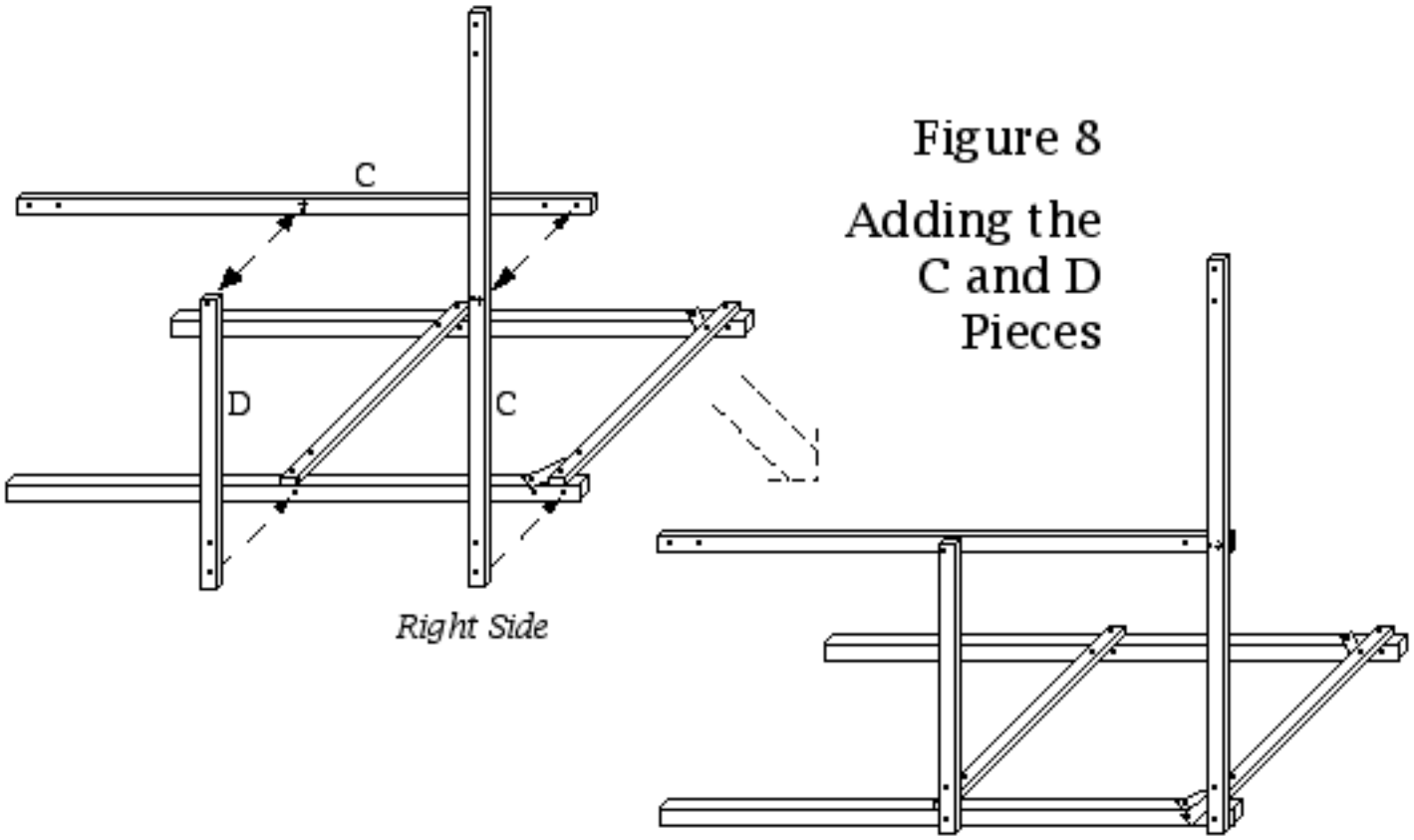


Figure 7 Constructing the Sides On the Ground

Figure 8

Adding the C and D Pieces



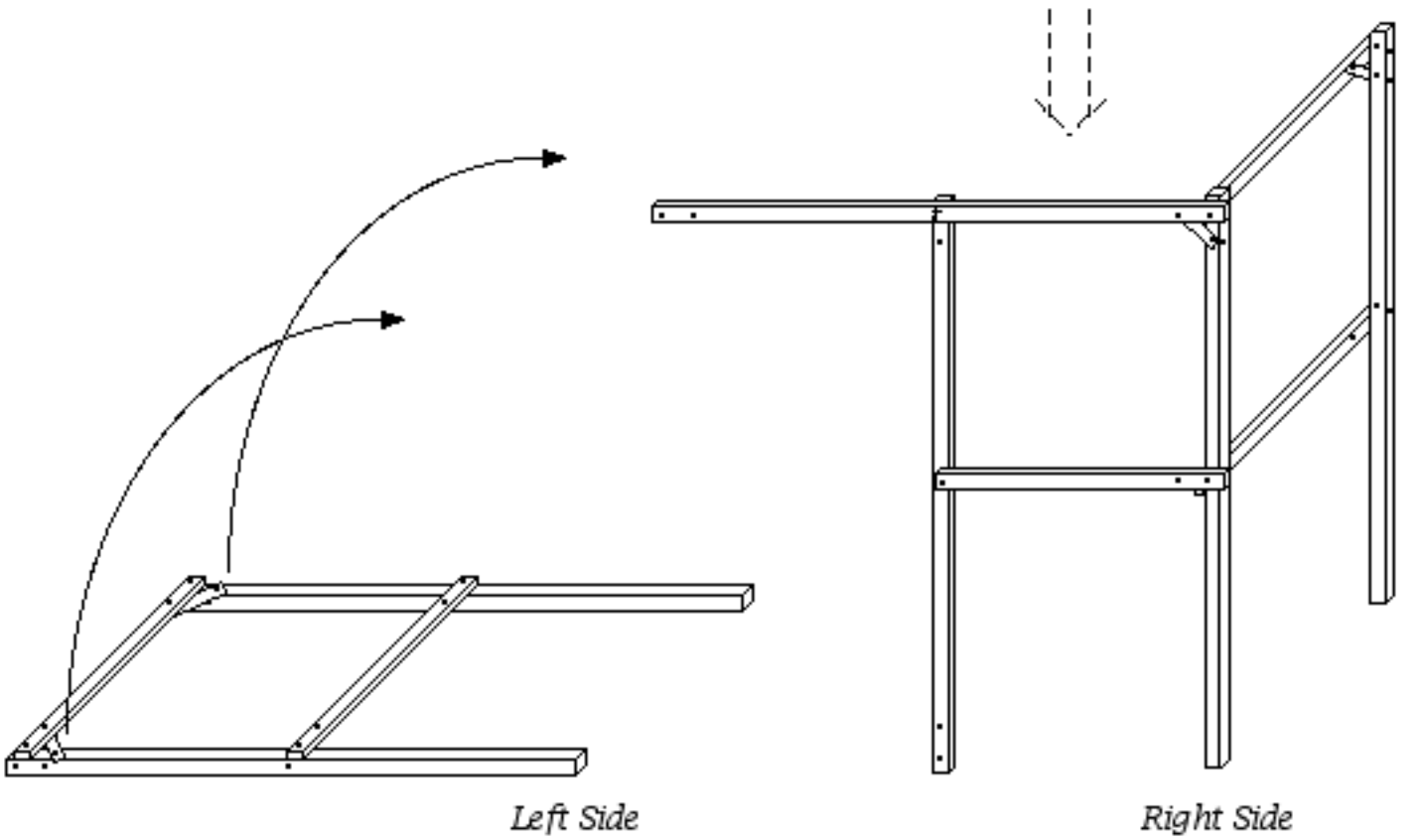


Figure 9 Joining the Sides Together

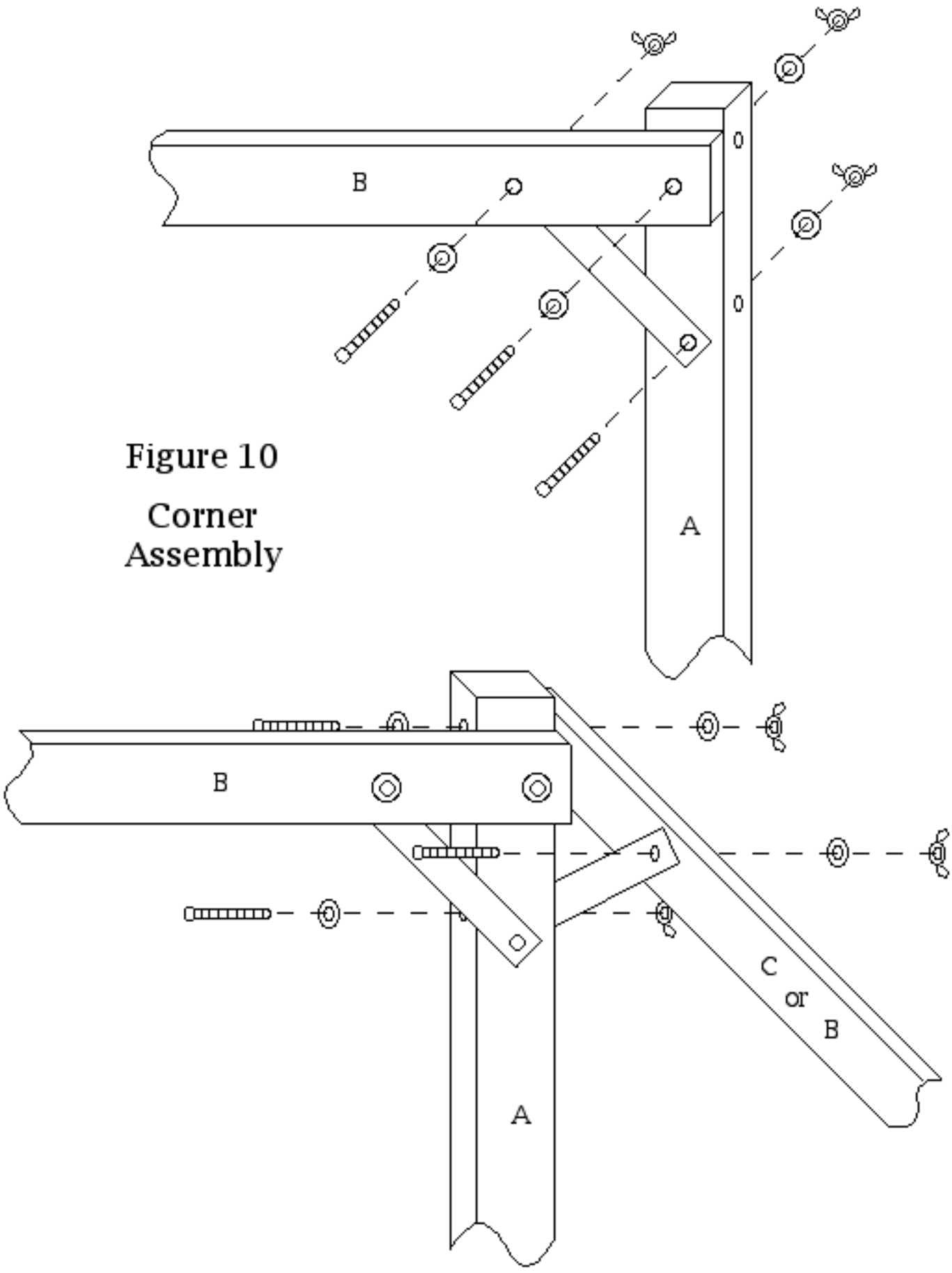


Figure 10

Corner
Assembly

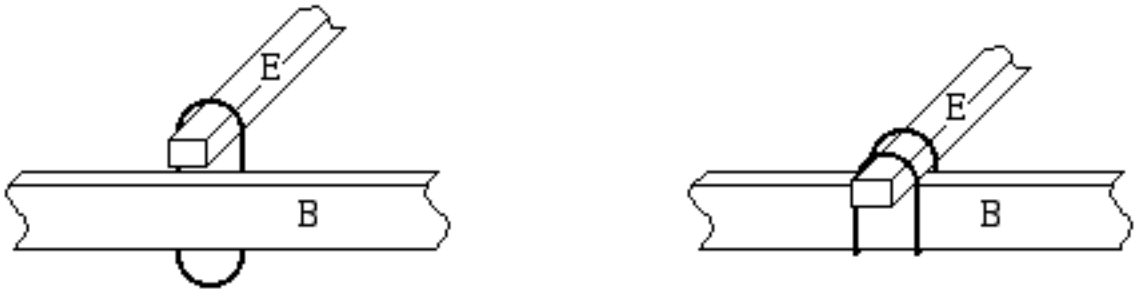


Figure 11 Attachment of Roof Slats with Rubber Bands

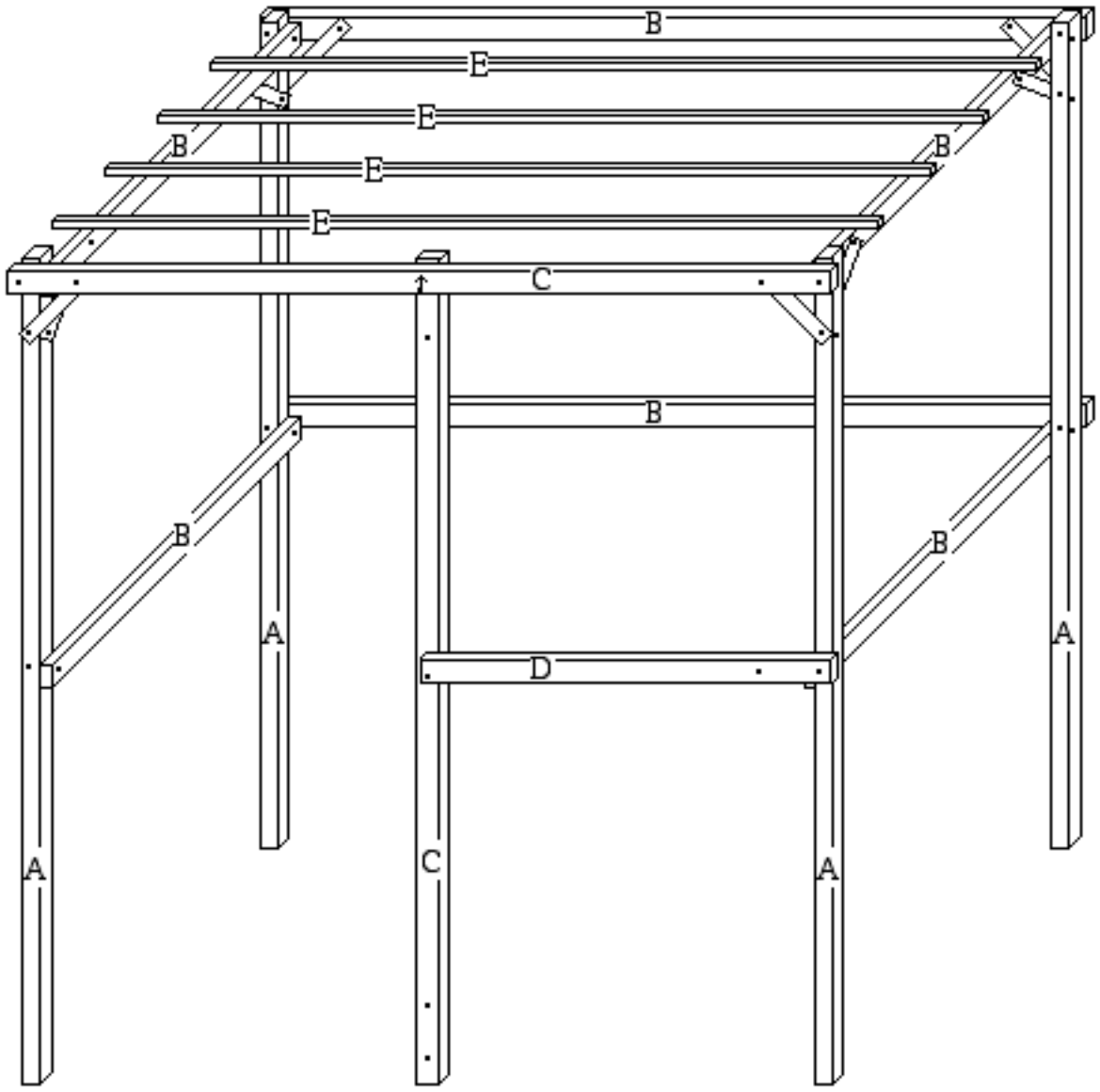


Figure 12 Completed Sukkah

Instructions for Adding a Sukkah Extension

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These directions will enable one to expand the 8' x 8' sukkah designed by Jerome Danoff to an 8' x 12' size. It may be necessary to consult the original instructions when preparing and/or assembling the extension.

One should buy the required lumber and hardware and drill according to the original sukkah instructions. The extension kit contains the same types of lumber and hardware as the original sukkah kit, and therefore materials need not be kept separate.

The only new items not used in the original sukkah are the 4" corner braces and the $^{7}/_{8}$" cane tips. We recommend corner braces by Stanley #30-3960 997, or National #220-145.

Materials required for sukkah extension kit:

Lumber

Item	Part Letter	Number
8' 2x3	A	2
8' 1x3	B	1
4' 1x3	D	4
8' 1x2	E	4
$^{7}/_{8}$" cane tip	(optional)	2
rubber bands	size 64 ($3\ ^{1}/_{2}$" x $^{1}/_{4}$")	4

Hardware

Item	Number
8" mending plates	4
4" corner braces	4
$^{1}/_{4}$ x 4" hex bolts	4
$^{1}/_{4}$ x 3" hex bolts	4
$^{1}/_{4}$ x 2" hex bolts	4
$^{1}/_{4}$ x 1 $^{1}/_{2}$" hex bolts	8
$^{1}/_{4}$" wing nuts	20
$^{1}/_{4}$" washers	26

STEP 1: Construct 8-foot sukkah frame according to the original directions. When the extension is added, the new sukkah will be 8' x 12'.

STEP 2: Facing front of sukkah (doorway) decide whether to have extension on door side or away from door side. If you attach the extension on the door side, the final enlarged sukkah will have its doorway centered. If you attach extension away from original doorway, the enlarged sukkah will have its doorway on the end. Possible configurations are shown in Figure 1. (These directions will produce the sukkah pictured in Figure 7.

If a centered door is desired, slight differences from the illustrations may be noticed.)

STEP 3: Carefully remove the lower horizontal (1 x 3) cross-piece (B piece in original instructions) from the side on which you plan to add the extension (as decided in STEP 2). The two nuts, two bolts, and four washers removed will be used in STEP 4.

STEP 4: Combine the 1 x 3 you have just removed in STEP 3 together with the two 8' 2 x 3's (A pieces) and the one 8' 1 x 3 (B piece) included in the extension kit. Lay the lumber flat on the ground and using hardware from the extension kit assemble a new sukkah wall as described in Section III B #1 - 3 of your original directions.

STEP 5: Attach the four 4' 1 x 3 's (D pieces) from the extension kit to the sides (edges) of the new wall. One end of each of the 4' 1 x 3 's will have two holes and the opposite end will have a single hole that is offset (that is, **not centered**). (Figure 2)

Step 5A: Place two of the 4' 1 x 3 's by the **mid-points** of the 2 x 3 's used for the new wall. The end with **two** holes should be next to the 2 x 3 's. Attach each of the 4' 1 x 3 's to the *outside* edge of the wall using one 4" bolt, one wing nut, and two washers. At this time they will pivot freely, and the holes at the free ends should be offset downward. (Figure 2)

Step 5B: Attach the two remaining pieces to the **tops** of the 2 x 3 's using three bolts, three wing nuts, four washers, and one mending plate. This will create a sturdy triangulated corner in two planes (see Fig. 13, original directions). Align the 4' 1 x 3 's so that the single holes at the free ends are offset downward. These pieces will be secure at 90˚ to the wall. Set the new wall aside. (Figure 2)

STEP 6: Attach the four corner braces to the standing wall that is part of the original sukkah frame. Use the near hole of the brace (closest to the angle). Orient so that the sides of these pieces face outward, and tighten just enough to barely hold in position. The upper two

attachments will be made with hardware already on the sukkah corner. The lower two will each require one 2" bolt, one nut, and one washer from the extension kit. (Figure 3)

STEP 7: Raise the new wall with the four attached D pieces into position approximately four feet from the original sukkah frame. **You will need an assistant to hold the wall in place.**

STEP 8: From a step ladder or stool, move each of the 4' 1 x 3 's (from STEP 5) into position and attach to the *outside* of the corner braces (from STEP 6). Use whichever hole of the corner brace seems to give the best fit (this will probably be the far hole). Use one 1 $^1/_2$" bolt, one wing nut, and one washer at each location. (Figures 4, 5, and 6)

STEP 9: Securely tighten all nuts and bolts on the sukkah, but remember that it will be taken down in a week, so do not over-tighten.

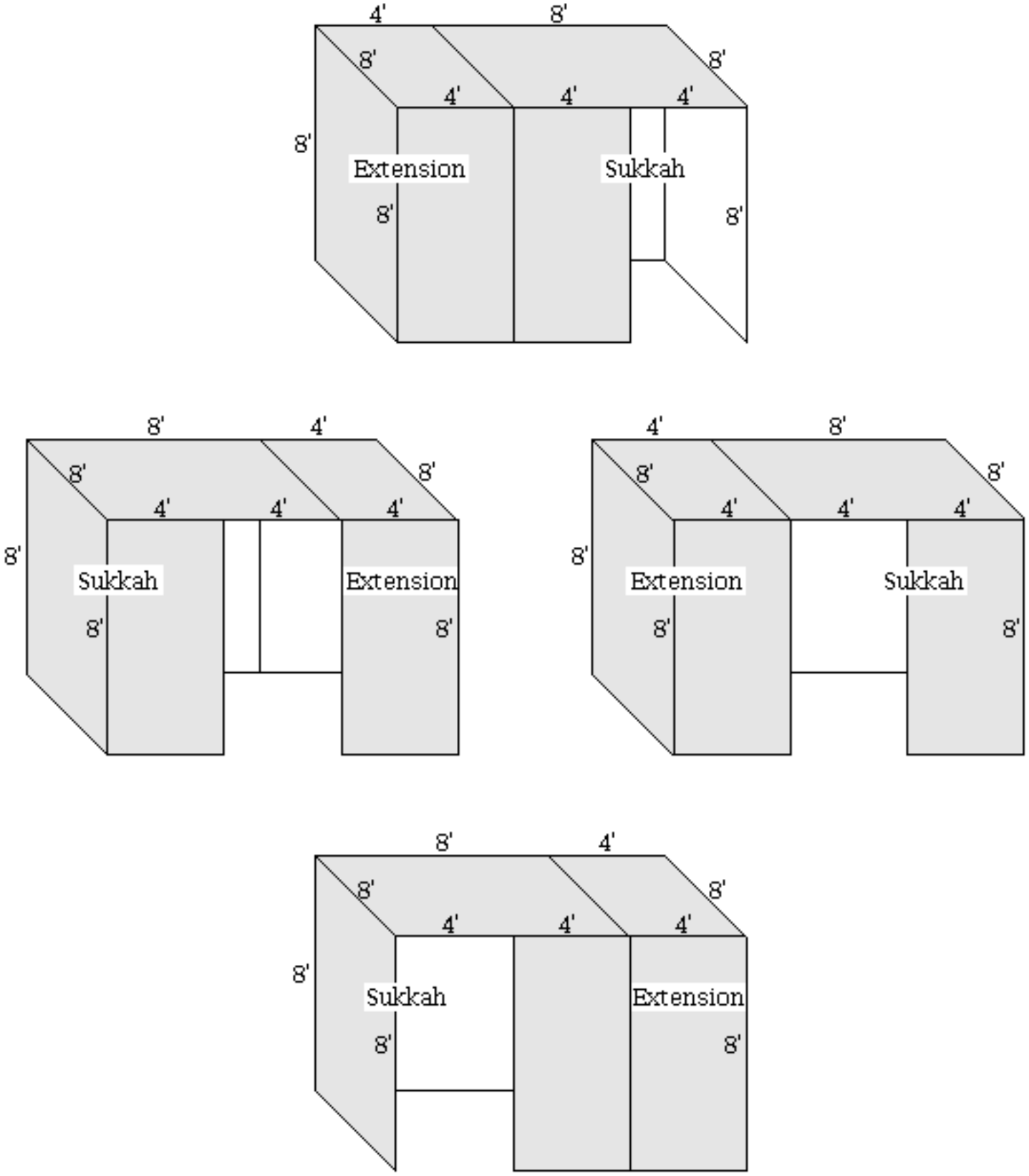
NOTE: A 2" portion of each lower corner brace will stick out into the sukkah and could be dangerous. We suggest that they be padded. Two $^7/_8$" rubber cane tips are recommended for this purpose.

STEP 10: Place the four 8' 1 x 2 's (E pieces) across the roof of the extension from side to side and attach one end with the rubber bands provided, following the technique shown in Figure 14 of your original directions. The extra length will extend into the original part of the sukkah and need not be attached. If you prefer, roof slats can be tied on with string, but do not nail them in place.

You should now have an 8' x 12' sukkah frame, ready to be decorated. (Figure 7) See the original instructions for suggestions and a warning about keeping the sukkah standing in bad weather. Unfortunately, the extended sukkah seems a little more prone to wind damage than the original size, so if high wind is expected we suggest that you tie it down and/or remove the siding. Under normal conditions, the sukkah should stand alone without any problems.

Figure 1

Four possible configurations of 8' x 12' sukkah



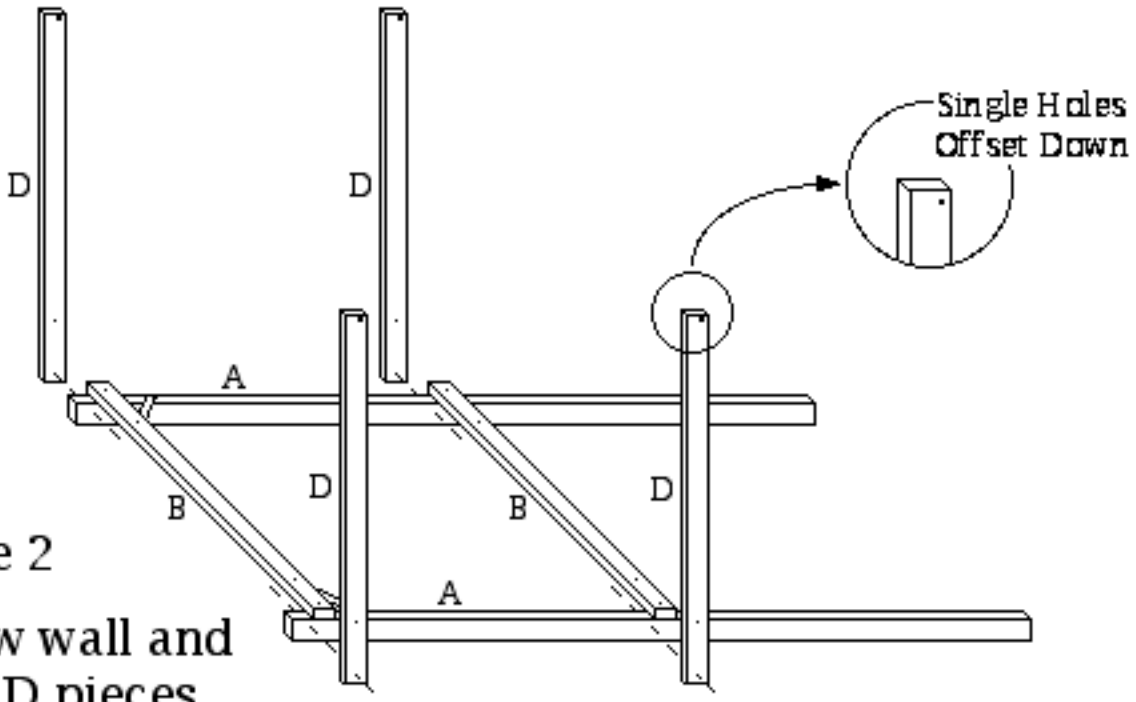


Figure 2

Assemble new wall and attach four D pieces

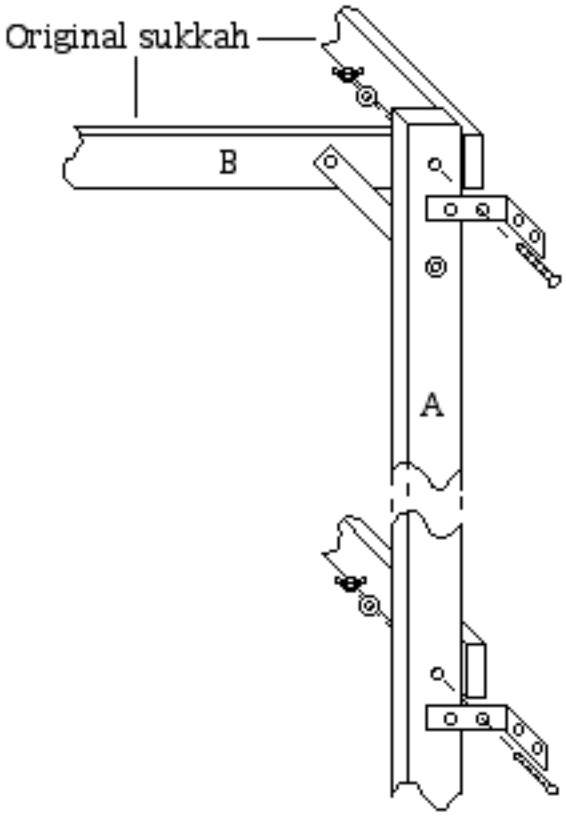


Figure 3

Corner braces attach to original sukkah

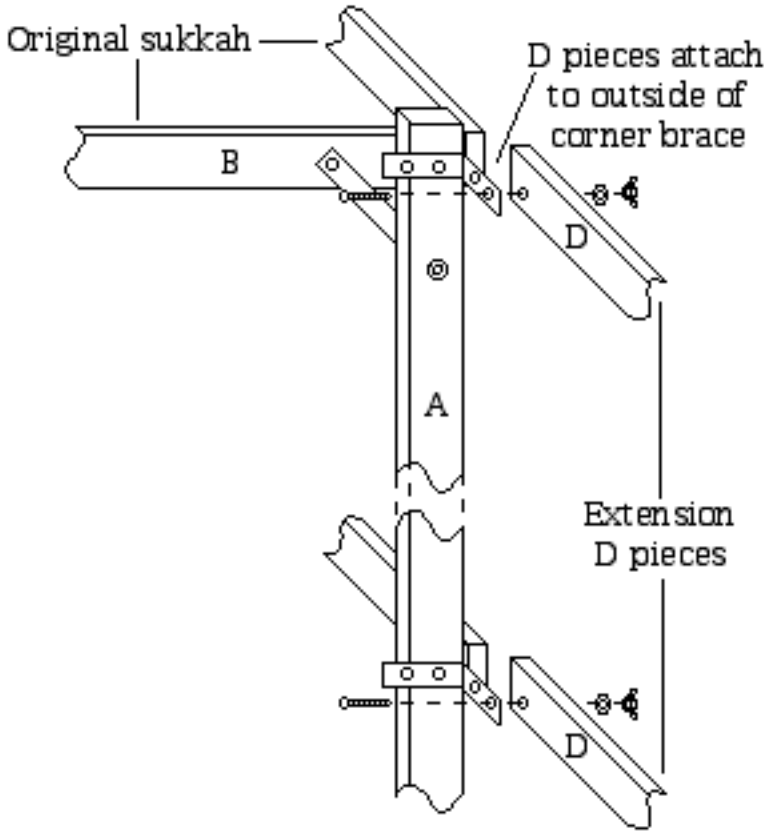


Figure 4

Extension D pieces attach to corner braces

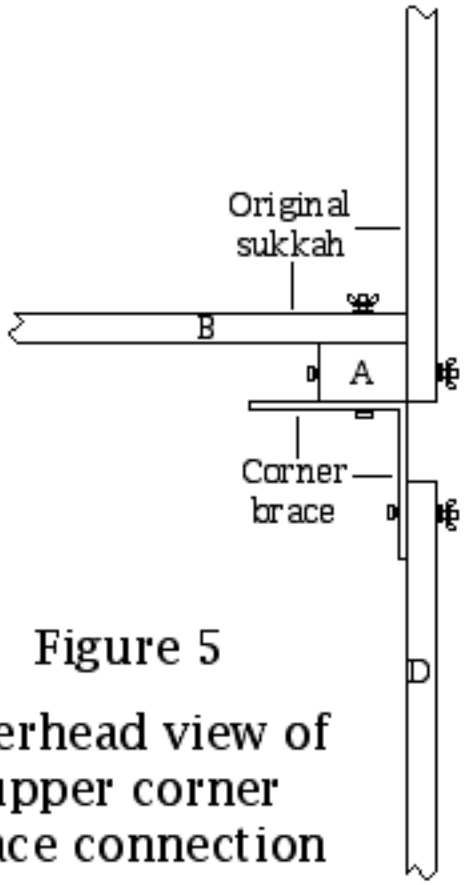


Figure 5

Overhead view of upper corner brace connection

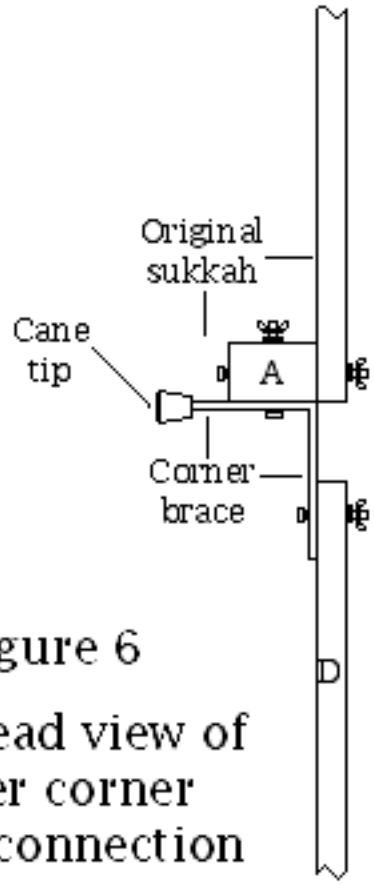


Figure 6

Overhead view of lower corner brace connection

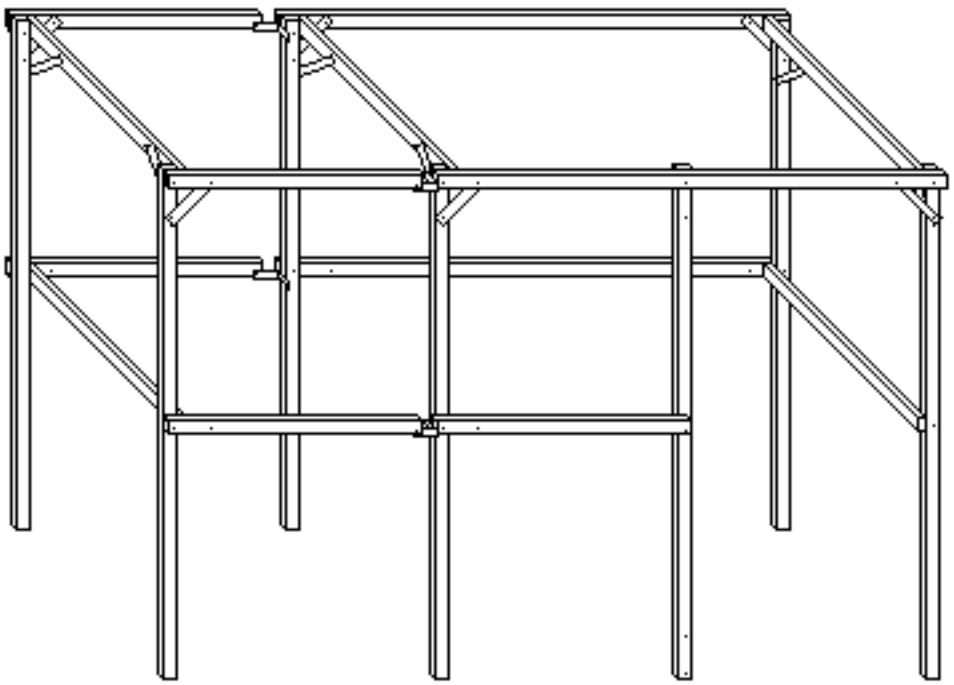


Figure 7

Completed sukkah and extension

(roof slats not shown)