A set of sturdy tables for a model train layout

There are four tables, each four feet wide, giving a total width of 16 feet. The depth from front to back is a little more than six feet (74 inches).

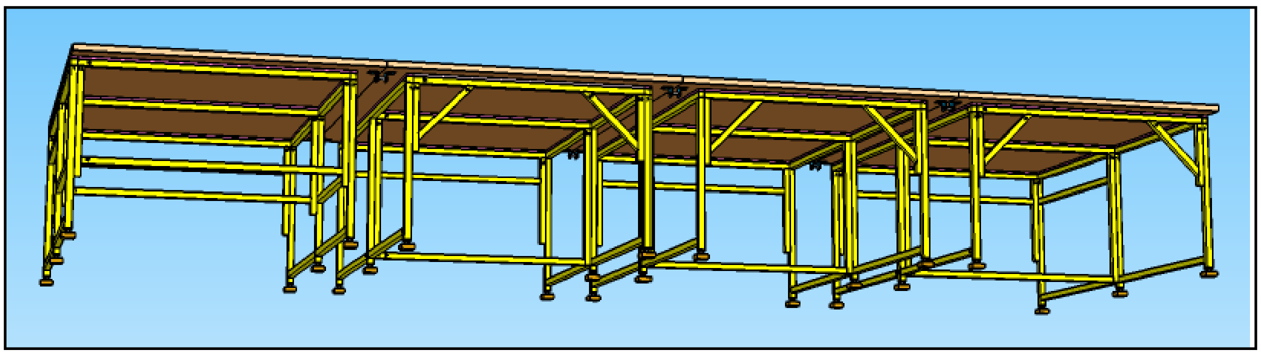
There is a shelf under the front half of the leftmost table intended to hold batteries, power supplies, computers and other electronics.

The front of the other three tables is shaped like an arch to leave enough room for a standard office chair to tuck right in. The table top is *** inches from the floor. Even a small child standing will have a pretty good view.

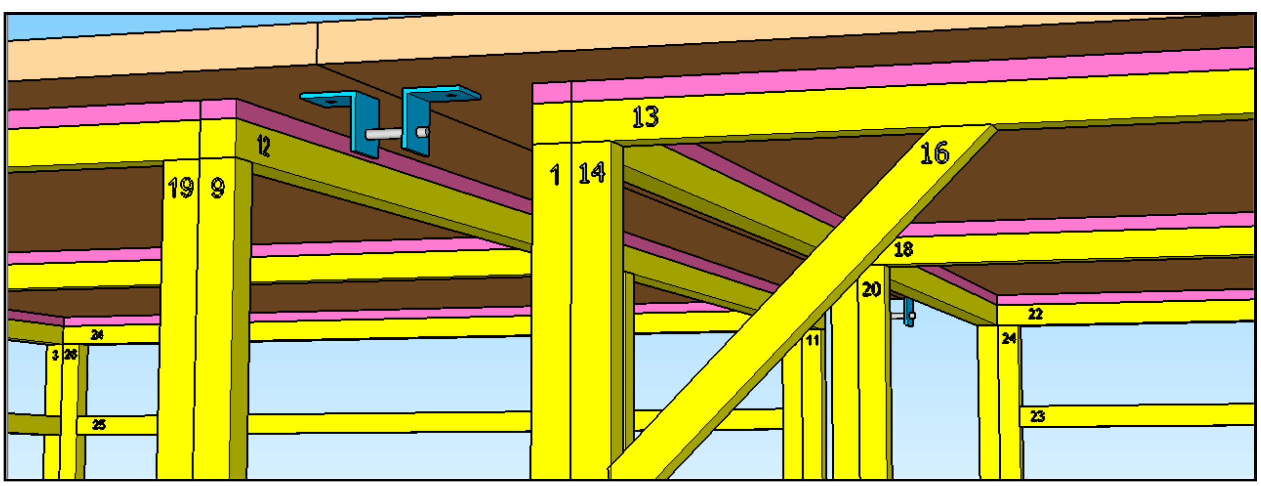
The table tops are cut from good-one-side plywood just under one inch thick (24 millimeters to be precise). Home Depot and the other big chains don't carry plywood this thick, but smaller lumber yards do. The sheets I purchased were very good. The edges were in good condition, with no marring or scrapes, and no voids. Even the bad side was surprisingly good. The cost was Cdn$85 per 4x8 sheet, which is approximately US$65 per sheet. Trimming the long side down to 74 inches leaves four pieces 4 feet across and 22 inches deep. I used two of those pieces to construct the electronics shelf.

The supporting structure is made from one inch square steel tubing with a 1/8-inch wall. I used 264 linear feet of tubing, which I purchased in 22 pieces each 12 feet long. There's a lot of metalwork involved in construction, with a lot of cutting, grinding, welding, and more grinding. If you don't like working with metal, or don't have access to the tools which make it easier, then this project is not for you. To give some idea, the tubing needs to be cut into 103 individual pieces and the majority of those pieces need to be welded at both ends.

Although the tables look similar, there are differences among them which I will describe below. To avoid mistakes, it is necessary to keep track of the pieces as they are cut and pre-drilled. I've found that the easiest way to manage something like this is with a SketchUp drawing.

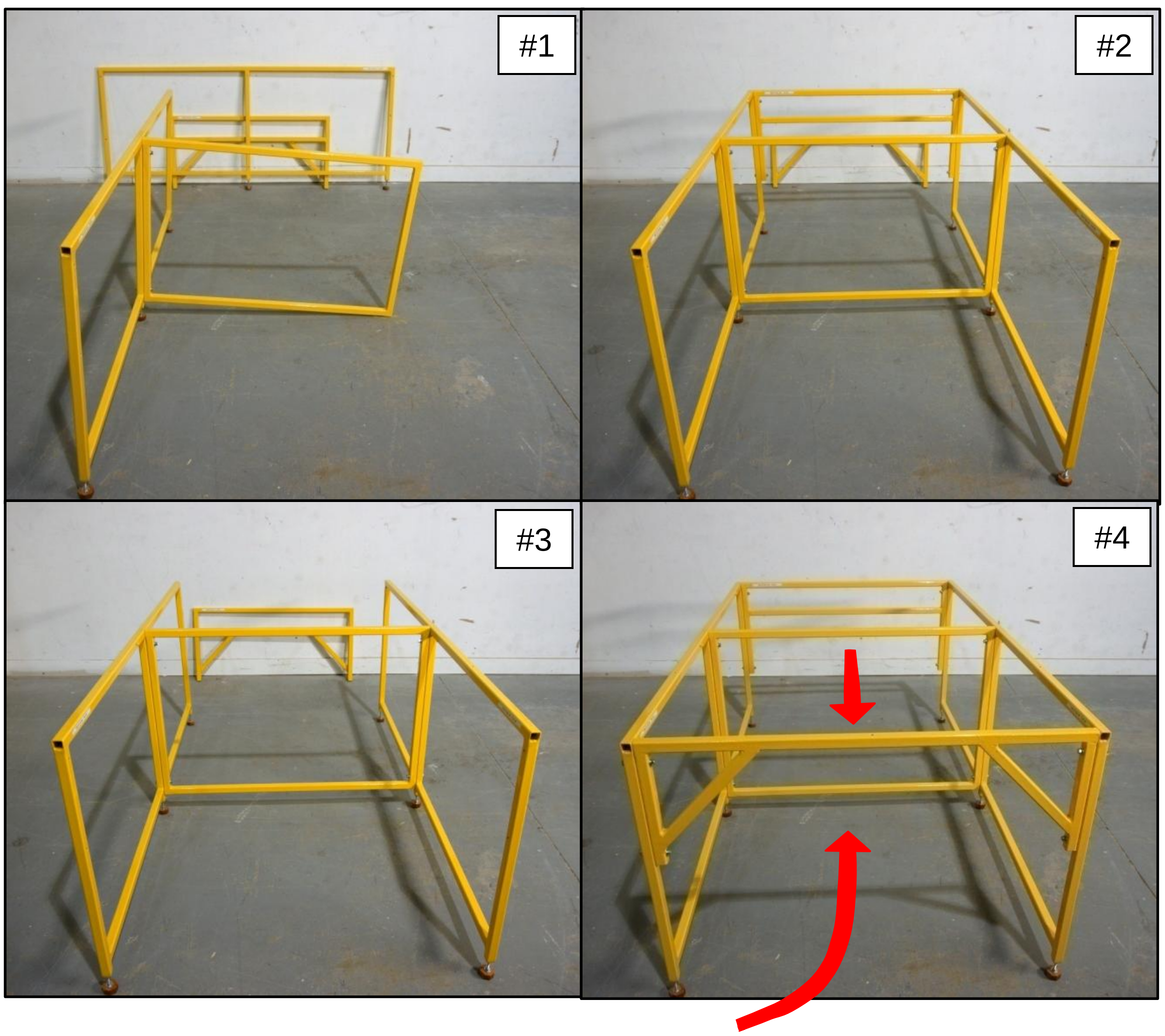


Using SketchUp (available free on the internet), one can draw objects with great precision and then rotate, zoom and measure as required to make sure things will fit together as desired. A close up of one spot on the drawing shows the numerical labels to keep track of each piece of tubing.



Each table is made up of five planar frames, one for the left and right sides and three cross members. These are the frames for one of the tables.

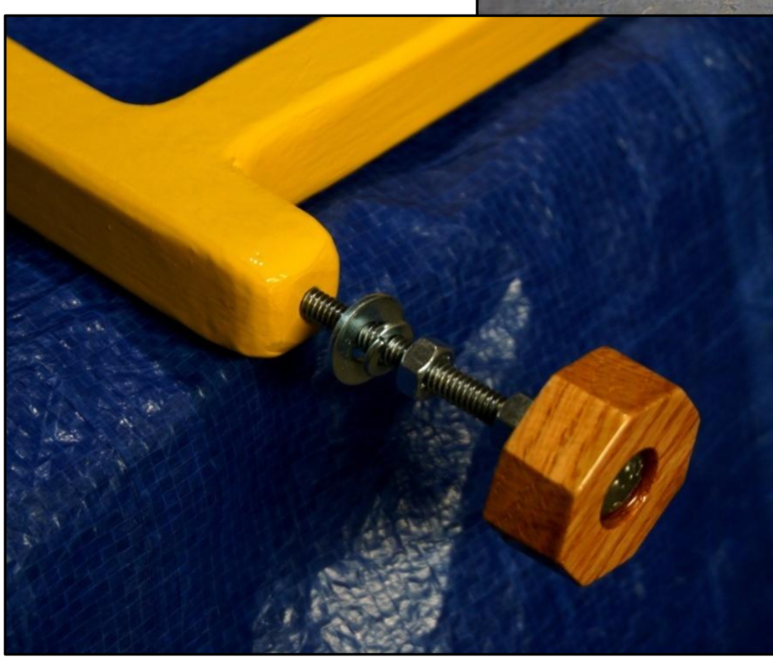
The frames are bolted together using 1/4-inch x 20 bolts 2-1/2 inches long. Should it become necessary, the frames can all be unbolted in preparation for transport or storage. The following sequence of pictures shows the frames being bolted together.



The reds arrow in the last picture shows an important design feature. There are no bars at the bottom of either the front or back. That makes it a lot easier to crawl underneath the tables to work on wiring. It also makes it convenient to use wheeled dollies if the space under the tables is used for storage.

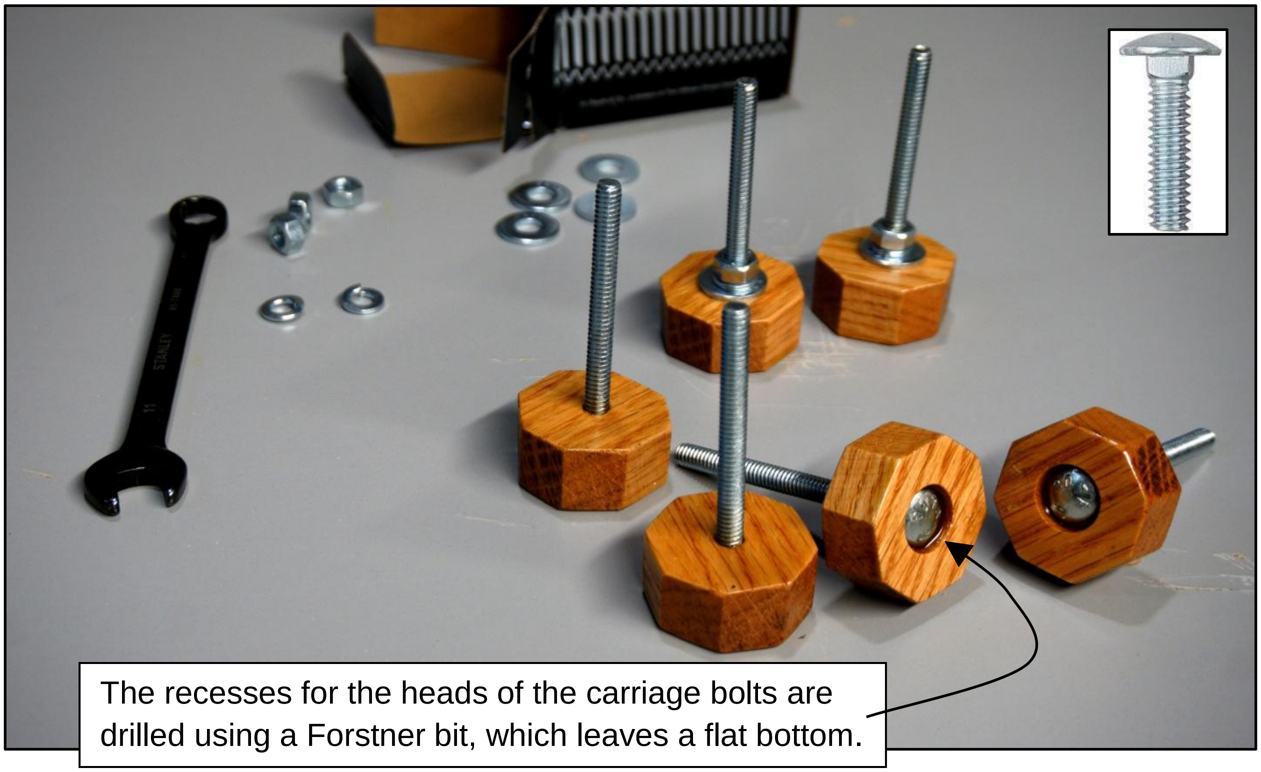
I applied an adhesive label to each frame to identify its correct position. The 2-1/2 inch bolts are the perfect length to join two one inch square tubes. I used two bolts on each vertical edge, so 12 bolts are needed for each table.

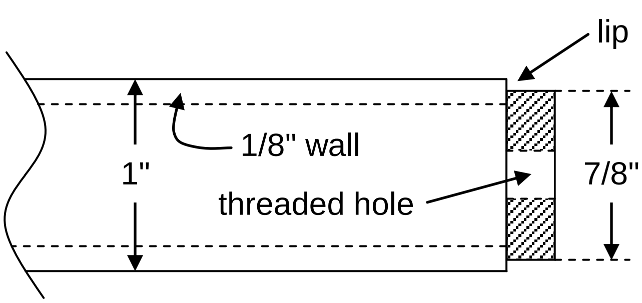
Each table has six legs. Each leg has a mechanism on the bottom to allow its height to be adjusted independently from the others. The body of each foot is a wooden octagon cut from 3/4-inch hardwood. It won't scratch tile or wood floors when the table is moved.



The head of a 1/4-inch x 20 carriage bolt 3-1/2 inches long is recessed into the bottom of the wood. The bolt is threaded up through a small plate welded onto the bottom of the leg, which is drilled and tapped to accept the bolt.

The following picture shows the six feet for one of the tables in the midst of assembly. Carriage bolts have a square neck. When the nut is turned to draw the bolt into place, the square neck punches a matching impression into the wood, holding it firmly in place. The leg can be raised or lowered by turning the wooden octagon, which will turn the shaft of the bolt, which will then advance inwards or outwards through the threaded hole in the plate on the bottom of the leg.





Welding the metal plates onto the bottom of the legs is a lot easier if you make a jig first. The shaded rectangle in this diagram is one of the plates in cross-section. The plates are cut from steel plate 1/4 inch thick. A hole for the carriage bolt is drilled and tapped through the center. Although the plates are going to be attached to the end of a one inch square tube, they should be smaller than the tube. I cut them to be 7/8 inches square. Then, when they are positioned at the end of a tube, there is a small lip all around the plate. This allows a much nicer weld to be made around the perimeter of the plate.

Once the hole in the plate is prepared, a 1/4 inch threaded rod can be threaded through it, just like a regular nut. The following picture shows this.

The jig consists of a short piece of 1-1/2" tubing welded at right angles to a scrap piece of the same one-inch tube from which the legs are cut. But, before it's welded into place, a 1/4 inch hole is drilled across the short piece. This hole is not tapped, but is large enough for the threaded rod to slide through. It is important that the hole be drilled accurately through the center of the cross piece. And it's important that the hole be centered along the axis of the longer piece before the cross piece is welded on.

To use the jig, the threaded rod is inserted through the guide hole. The plate is threaded onto the inner end and a normal hex nut is threaded onto the outer end. When the nut is tightened, the plate will be drawn up tight against the cross piece as shown in the next picture.

Then the leg is clamped to the jig, and the plate spot welded on three of its sides. (Note: the "leg" shown in the next picture is just another scrap piece of tubing. The actual legs are much longer than this.)

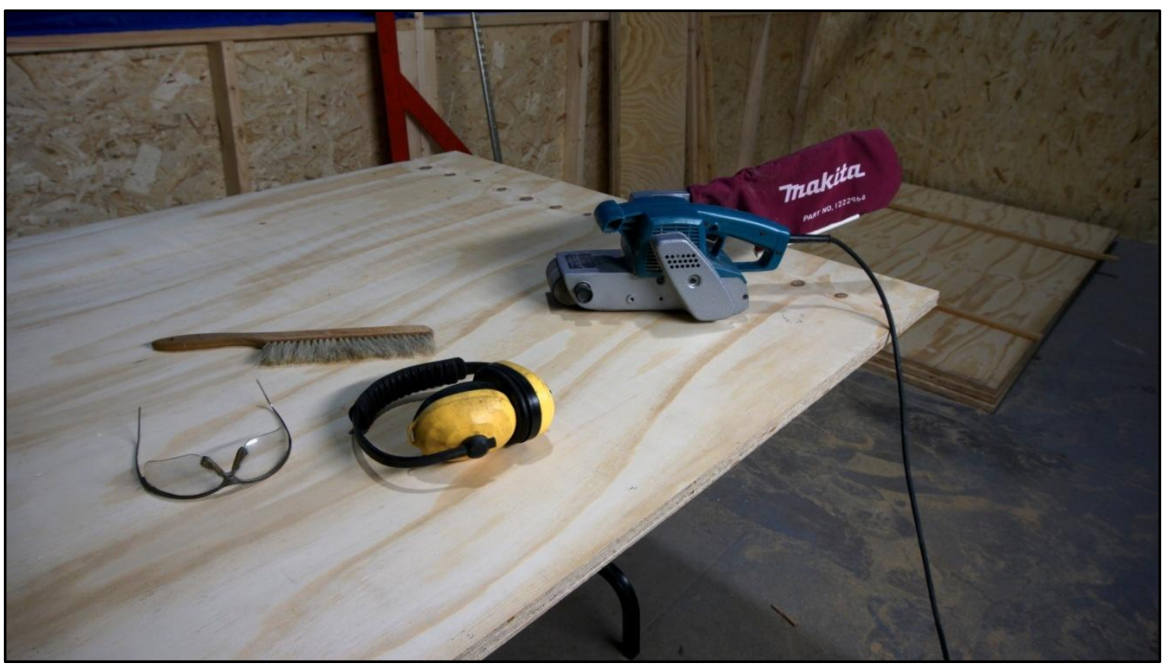
I completed all of the metalwork before starting to work on the plywood table tops. An important first questions is how to move the plywood sheets around. Being an inch thick, the sheets are heavy. And being so big, they are difficult to lift single-handed. If one wants to avoid scraping the surfaces or smashing the edges, one cannot simply drag the sheets around by one side.

If you have a wife who is prepared to lift heavy things and is keen to help you advance your passion for all things Lionel, then you're all set. (You lucky man.) Otherwise, your choices are a hernia or a shop crane. I chose the latter.

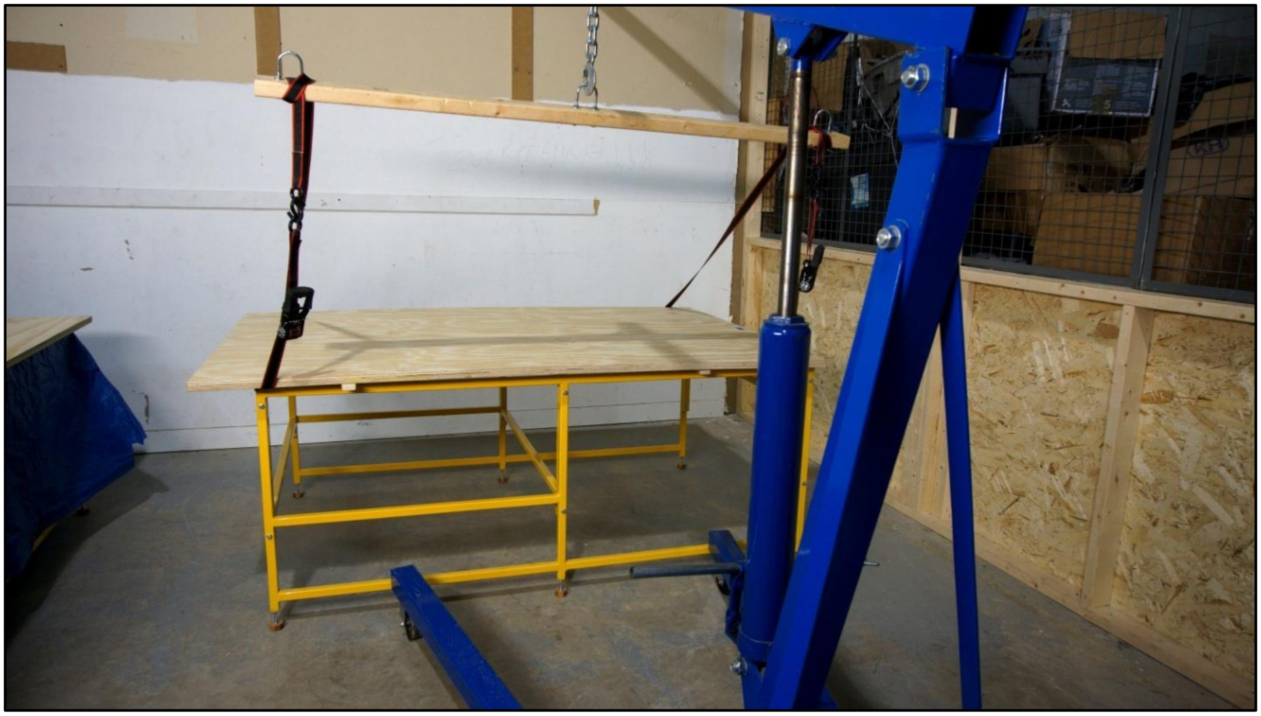
I made a spreader bar from a six-foot length of 2x4 and a couple of U-bolts. I ran a strap with a ratchet clamp through the U-bolt at each end of the spreader bar. The straps can easily be slid under the ends of a plywood sheet. Using the crane, a plywood sheet can be lifted up horizontally, moved over and then set down gently on a suitable worktable.

The best way to cut the plywood down to the desired length is to use a metal straight-edge and a skill saw. The edge of the saw's metal base is held firmly against the straight-edge while the cut is being made. If the straight-edge is clamped to the sheet in the right place, then the kerf of the cut will be right where needed. The trick is to make a couple of tests cuts on a scrap piece of wood beforehand to find the distance between the cut and the straight-edge that your saw and blade makes.

If you use a good blade, the cut edge will need only very light pass with a sander. You can see from the picture that I did this work with the "bad" side of the plywood facing up.



Once a plywood sheet has been prepared, holes must be drilled through it for the bolts which will secure it to the metal base. Use the shop crane to move the sheet over to the base, and then clamp it down in the appropriate position.



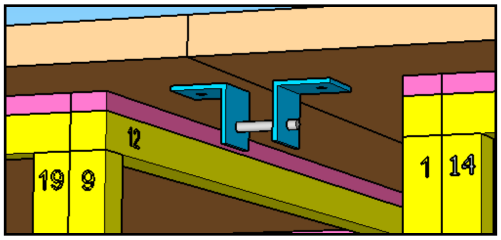
The picture happens to show table #2, which is the second-from-left of the four tables in the set. The plywood overhangs the metal base by four inches on each side and by six inches at the front. But, at the rear, the plywood is flush with the metal frame. The picture shows that I used a scrap piece of plywood at the rear edge as a backing block to ensure that the plywood was flush there. I will explain below why I designed the tables in this way.

The plywood table tops are bolted to the metal bases using six 1/4" x 20 bolts three inches long. These bolts have countersunk heads so they will lie flush with the wooden surface. I drilled holes for these bolts through the top rails of the metal frames at an earlier stage of construction, back before they were welded together. Now that the plywood top is positioned in place, one can drill upwards from below through the holes in the metal frames. This will ensure that the holes in the plywood sheets are perfectly positioned for the metal base on which they rest.

When drilling the holes from below, it's best to clamp a backing block onto the top surface to prevent splintering when the bit breaks through the plywood.

For certain of these mounting holes -- those along the back, for example -- there is not enough vertical room for the drill and bit to approach the underside at right angles. For these holes, I used a right-angle driver, as shown in the following photograph.

In addition to the six holes per table for the mounting bolts, a few more holes need to be drilled to accommodate the clamps which hold the tables together from side-to-side. These clamps go beneath the table tops. One is shown in the diagram at the bottom of page 2 above, and a detail is shown here. There are two of these clamps at each edge where two tables meet, one near the front of the table and a second near the back. Each clamp consists of two pieces cut from steel L-angle. The L-angle has sides 1-1/2 inches long and the steel is 3/16 of an inch thick. I cut the pieces 1-1/2 inches long. Each piece is bolted to the underside of the plywood about two inches from the edge. A bolt is passed through holes in the vertical faces of the pieces. When the bolt is tightened up, the tables will be drawn together.



It's best to drill holes for these clamps at the same time as the mounting holes are drilled. The middle two tables have four holes each; the outer two tables have only two holes each. These holes can be drilled from the top. I made templates to make sure that the holes would be in the right places. It would be a big disappointment to make a mistake this close to completion.

This completes the woodworking. Next, I varnished the plywood. I used a water-based Varathane intended for indoor use. I selected a satin (i.e., matte) finish to minimize any glare reflecting off the surface. A standard 3.8 liter can was enough for two complete coats on the top and bottom, including the electronics shelf I mentioned above.

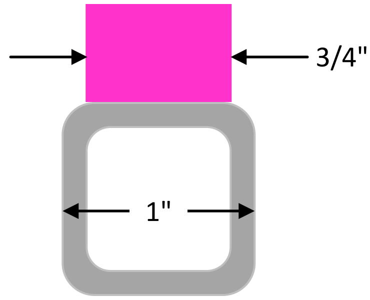
To make enough space to be able varnish all of the table top at the same time, I laid them out on top of their metal bases, using plastic tarpaulins for protection.

This is a picture of the bottom side of the electronics shelf while the varnish is drying. The shelf is made from two of the pieces left over when the plywood sheets were cut down to the desired 74-inch length. I planed the edges with a jointer and glued them together. For extra strength, I glued a spare piece of hardwood onto the bottom of the seam. The photograph shows the square cut-outs I made at the corners. The electronics shelf will not be bolted to the metal base of the leftmost table. Instead, it will be held in place by these corner cut-outs.

We're not finished yet. The next step is to add the insulation. That's right -- insulation. A sheet of wood held rigidly in place around its perimeter has many of the same characteristics as the skin on a drum. It vibrates. The bane of some model train layouts is the low frequency rumble of moving trains, which is amplified by the table top. Using very thick plywood, as I have done, helps to some extent. It will still vibrate, but the fundamental frequency of the vibration will be much higher than for thinner plywood.

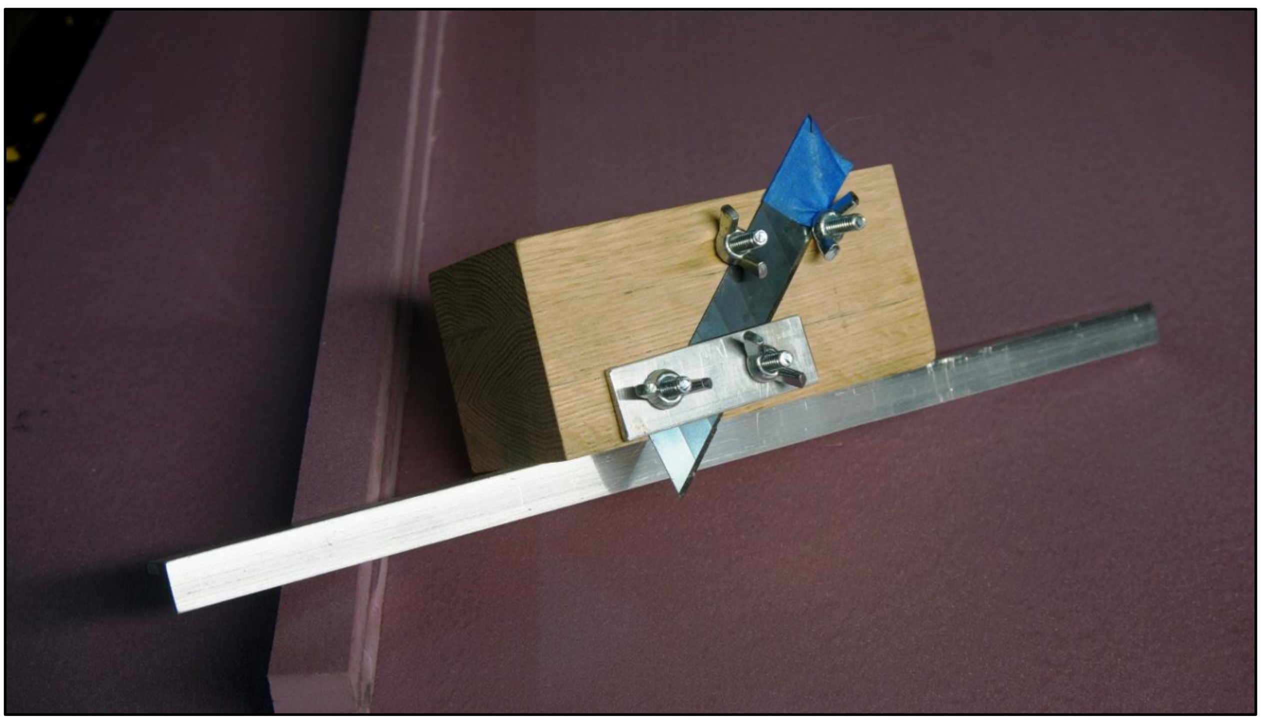
A further enhancement is to add a layer of something between the plywood and the metal base which can absorb the kinetic energy of vibration (and turn it into heat). I chose to use a layer of closed-cell insulation. I used a sheet of half-inch thick rigid pink insulation sold by Home Depot. A standard-sized sheet eight feet long and two feet wide contained about twice as much material as I needed for all four tables.

The sheet needs to be cut lengthwise into strips three-quarters of an inch wide. Although the tubing in the metal bases is nominally one inch square, the edges are rounded. A strip of insulation three-quarters of an inch wide sits on the frame perfectly.

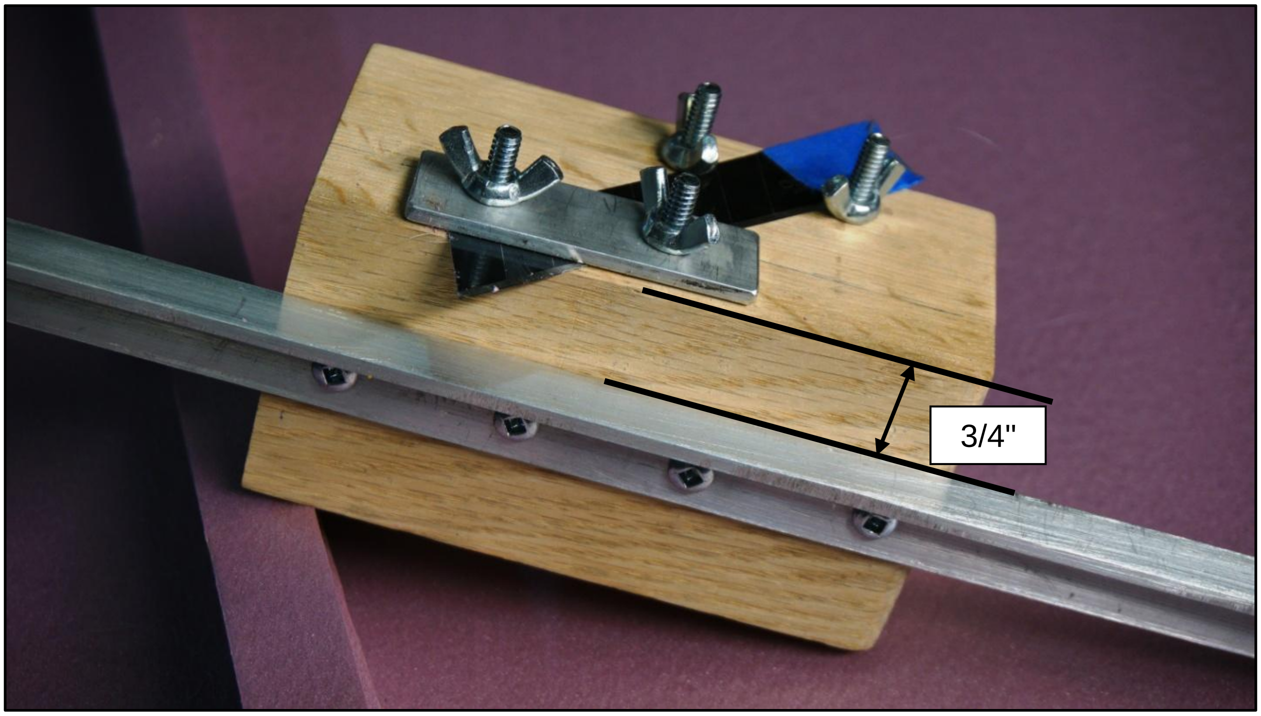


Unlike some foams, rigid foam like this cannot be cut with a hot wire. Foams like styrofoam vaporize when burned, but rigid foam like this melts, leaving an unsightly edge. The foam cuts easily enough with a saw, but the resulting edges are horribly scarred. The best way is to cut using a sharp knife. But cutting long thin strips with a knife is tricky, even when using a straightedge as a guide. The solution is to make a cutter.

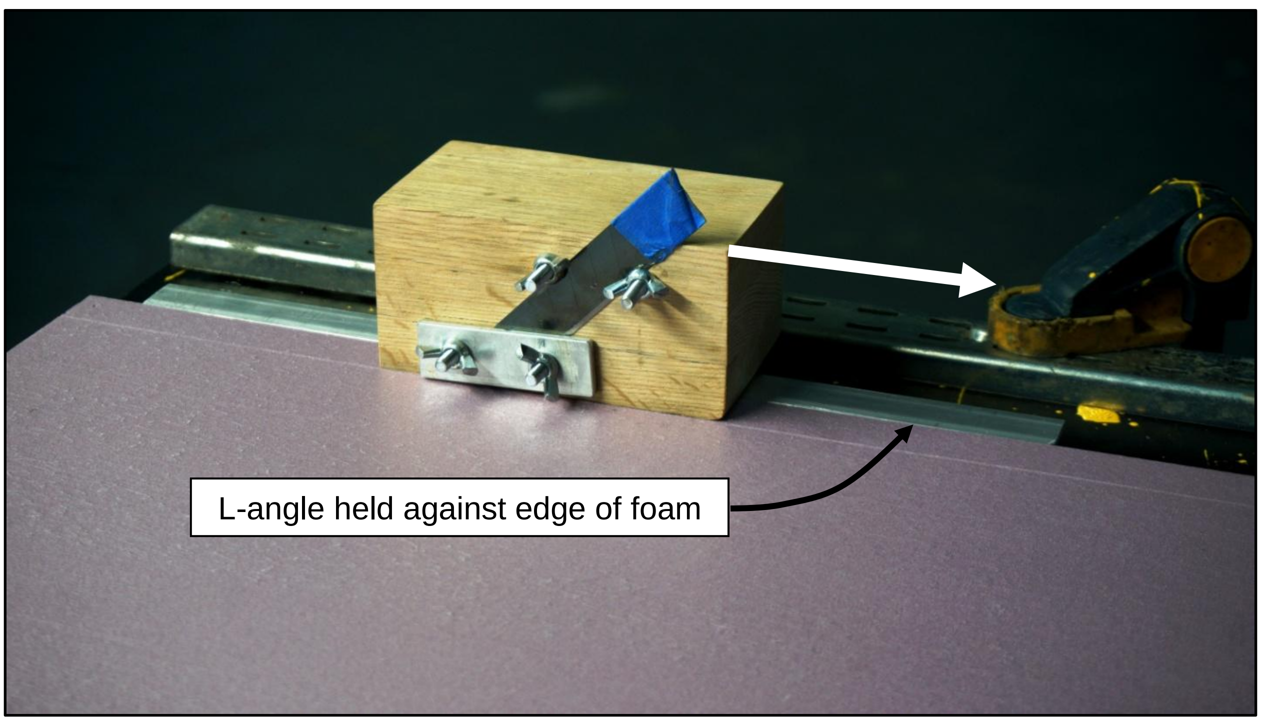
I cut some pieces of scrap hardwood and glued them together to make a parallelepiped four or five inches long on each side. (Reminder from geometry class: Opposite sides of a parallelepiped are parallel and all edges are square.)



I cut a one-foot length of three-quarter inch aluminum L-angle and bolted it to the bottom. The side of this piece is a guide which slides along the edge of the foam. The blade itself comes from a standard utility knife (called a "box cutter" in the U.S.) I drilled four holes in the side for three-sixteenth inch bolts and, after cutting off the heads, glued the threaded shafts into these holes. Thumbscrews hold the blade in place.

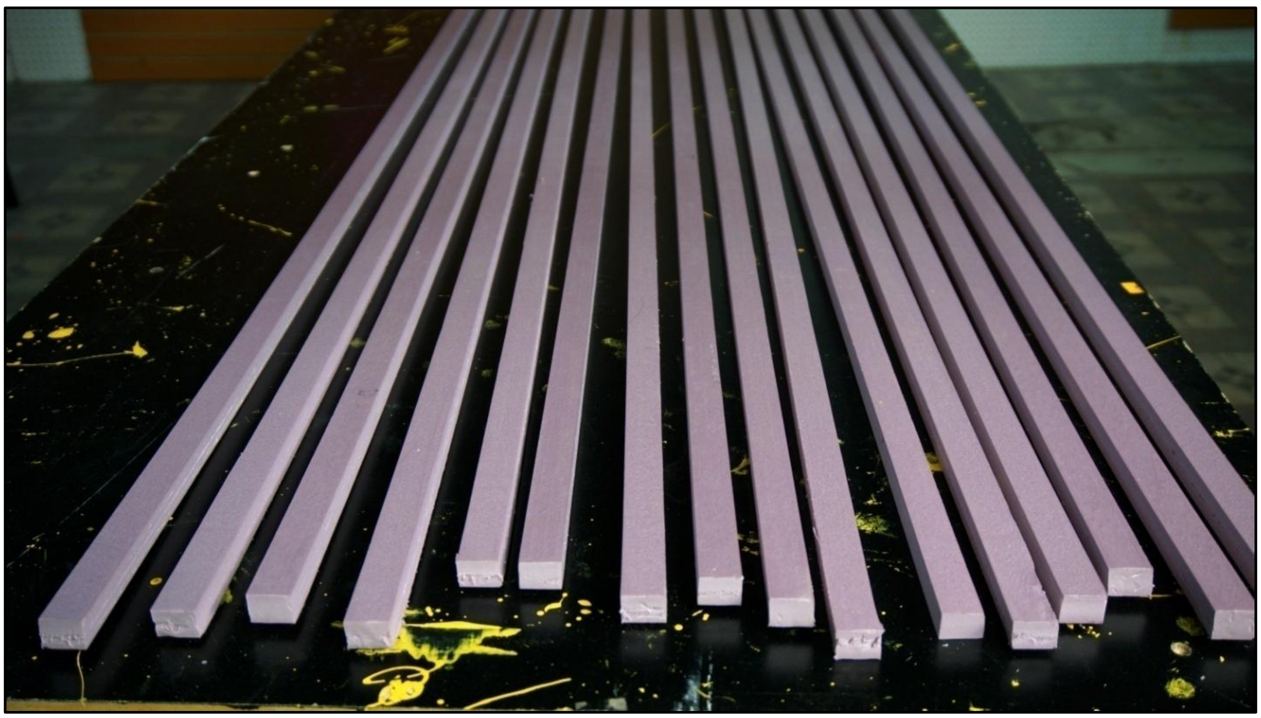


The aluminum L-angle is set back three-quarters of an inch from the edge with the knife blade, so the strips will be three-quarters of an inch wide. The thumbscrews can be used to adjust the depth of the cut made by the blade. The white arrow in the following picture shows the direction the cutter is pushed to make a cut.



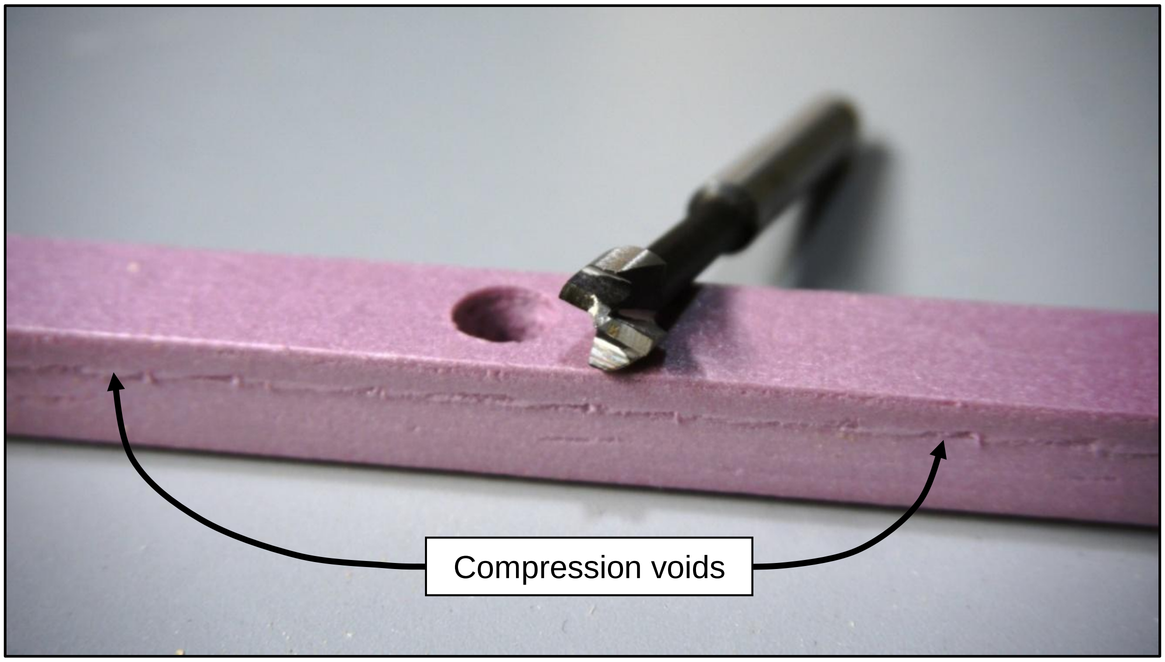
Note that there is a metal straightedge clamped to the worktable a couple of inches away from the edge of the foam. This straightedge doesn't serve any purpose for the cut being made. However, there is an identical straightedge on the other side of the foam, out of sight "below" the bottom of the picture. That other straightedge is a backing block which prevents the sheet of foam from sliding away as the cutter is slid along the edge of the foam shown. I used two such straightedges, one on either side of the foam, so that I could cut strips from both sides -- up one side and down the other.

I found that the best cuts were made using five passes of the cutter. The first cut had the blade set to a depth of one-eighth of an inch. The next two cuts were made with a depth of one-quarter inch and three-eighths inches, respectively. The fourth cut was made at seven-sixteenths. The final cut pierces through the foam. If the cuts are made too aggressively, the tip of the blade can compress little pockets of foam in the interior. They will show up as voids when the edge is inspected after the cut is completed. Since only about 16 strips are needed, there's no reason for undue haste.



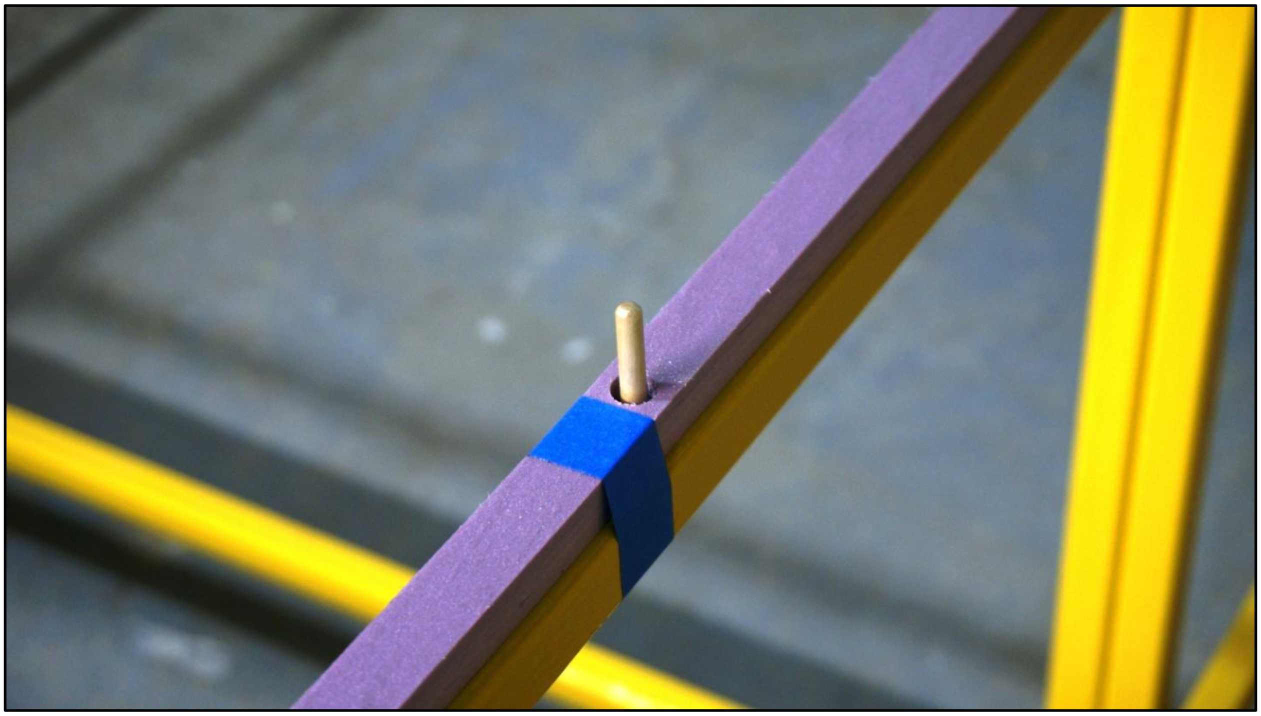
The strips need to be cut to the correct length, of course, before they can be affixed to the metal bases. In addition, holes need to drilled through the strips to accommodate the mounting bolts which hold the plywood table tops to the bases. An ordinary drill bit won't do; it will merely chew up the foam. A better choice is to use a Forstner bit, as shown in the next photograph. Forstner bits are usually used to drill holes which need to have flat bottoms. They have two cutting blades on their circumference. These blades cut circular arcs as the bit is turned, so the wedges on the inside of the cutting face can lift up complete chips. The photograph shows that the resulting holes are nearly perfect.

(Incidentally, the strip of insulation shown in the photograph is a piece of scrap left over from my early tests with the cutter. One can see a horizontal scrape running along the side of the foam about a third of the way down from the top. This was the result of making the first slit with the cutter set too deep. If the blade is advanced downwards only one-eighth of an inch per pass, the resulting edge is nice and creamy.)



Once the strips of insulation are cut to length and drilled, they can be glued to the tops of the metal bases. I had originally intended to use the kind of adhesive which automobile mechanics use to glue rubber parts to metal surfaces. But testing showed that that kind of adhesive eats the foam. Instead, I used a silicone adhesive from Home Depot. It can be applied with a caulking gun and worked out well.

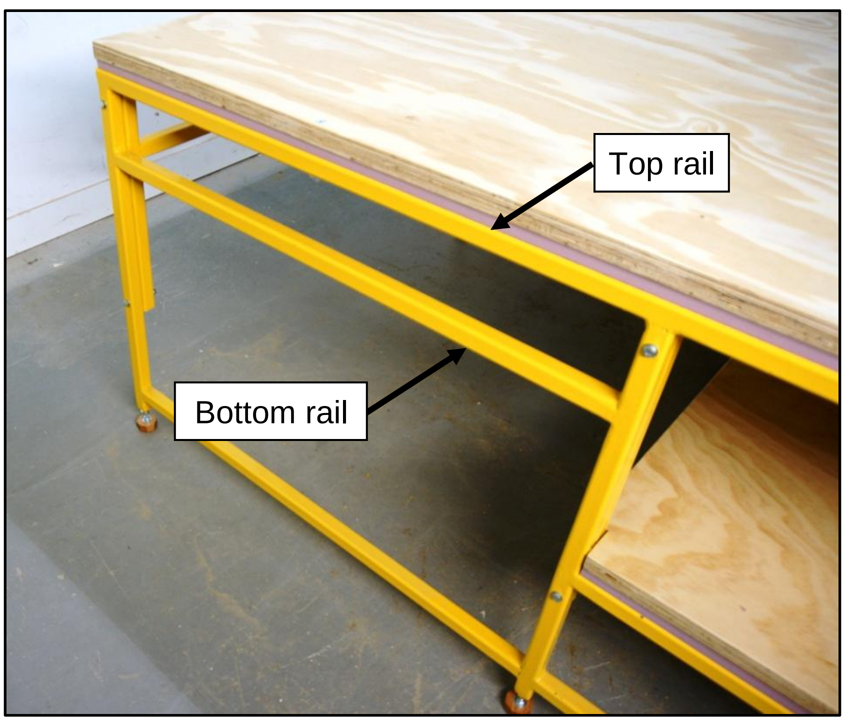
I cut two short lengths of quarter-inch dowel to help align the strips as they were positioned on top of the bead of newly-laid adhesive. The dowels are a friction-fit through the mounting holes in the top rails of the metal bases. They should poke upwards through the centers of the holes in the insulation, which I cut slightly oversize.



I found it helpful to use blue painter's tape (or masking tape) to hold the strips in place while the adhesive set.

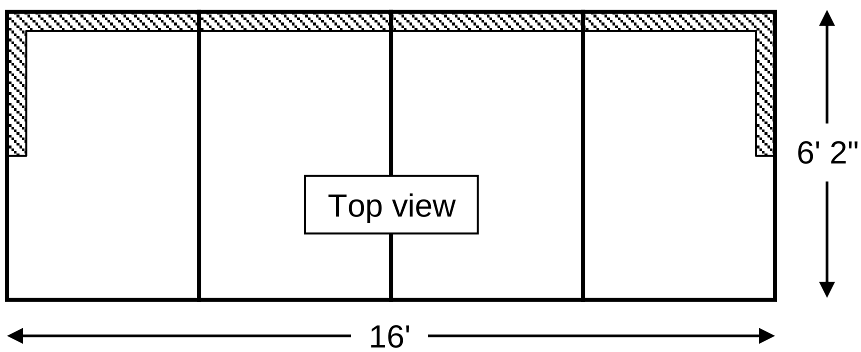
The final step in assembly is to bolt the table tops down onto the metal frames. Because the pink insulation is relatively delicate, it is necessary to be gentle when moving the plywood sheets into position. I found it helpful to make an extension arm for the shop crane using a couple of pieces of scrap 2 x 4. I used four lengths of threaded rod to sandwich the 2 x 4's onto the top and bottom of the main arm of the crane. The extension allowed me to hold the plywood sheets parallel to the floor and yet far enough away from the crane's vertical post to lower them at the centers of the tables.

I want to take a moment to describe a feature of the tables as shown in the following photograph. The photograph shows the left-hand side of the leftmost table. There are two horizontal rails located four inches apart. This pair of horizontal rails continues all across the back of the four tables, and up the rear half of the right-hand side of the rightmost table.



The following photograph shows the rails across the back.

The following diagram is a top view of all four tables. The hatched area represents the parallel rails.

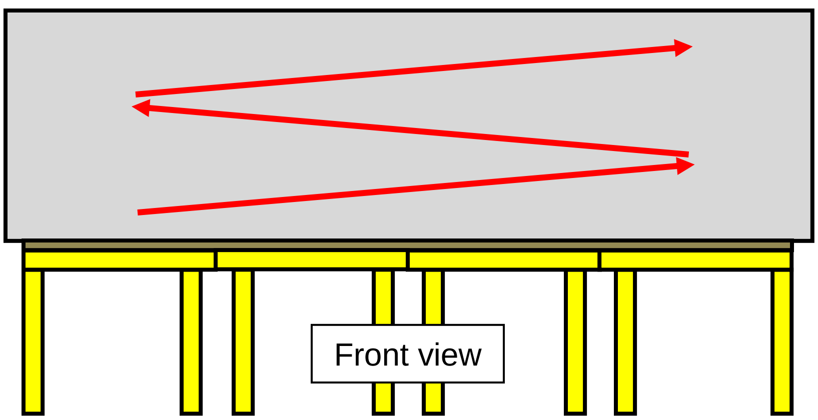


The parallel rails provide a convenient way to mount vertical sheets of plywood all along the back and halfway up the sides. To make the following photograph, I clamped a piece of plywood to the top and bottom rails.

My longer-term plan is this. I will lay out a conventional (horizontal) track plan on the table tops. Along the back, though, I want something different.

Imagine taking the train from Cusco to Machu Picchu, in Peru. Machu Picchu lies to the northwest of Cusco, but Cusco is walled in by high mountains in that direction. The train navigates a series of switchbacks to gain altitude.

I want my Lionel trains to climb through a set of switchbacks mounted on the back "wall" of the layout, as is shown in the following diagram.



Because this document serves as my record of the design and construction, I have attached as appendices some of the additional aids I used.

Appendix "A" -- Template for the steel plates at the bottoms of the legs
Appendix "B" -- Template for wooden feet
Appendix "C" -- Template for 45º gussets
Appendix "D" -- Templates for table clamp locations
Appendix "E" -- Sketch of the foam slitter
Appendix "F" -- Template for table-to-table clamps
Appendix "G" -- Materials and cutting procedure for Lionel layout tables

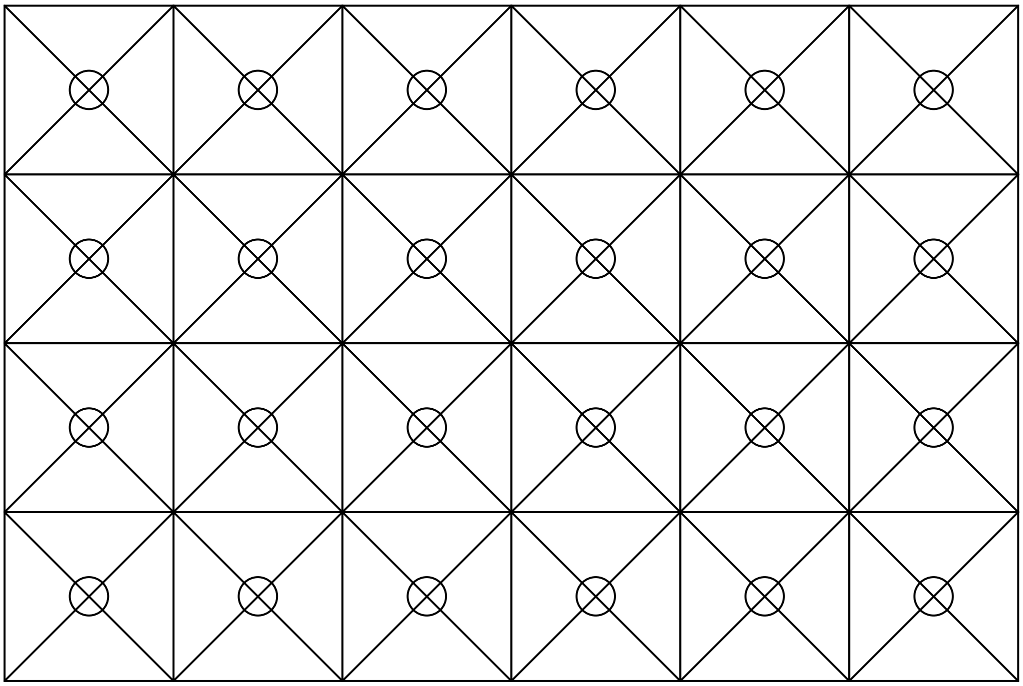
Jim Hawley
February 2021

Appendix "A"

Template for the steel plates at the bottoms of the legs

Plates are 7/8-inch square and 1/4-inch thick
This allows 1/16-inch setback along each edge
Central holes are drilled and tapped for 1/4-inch bolts
24 pieces are needed

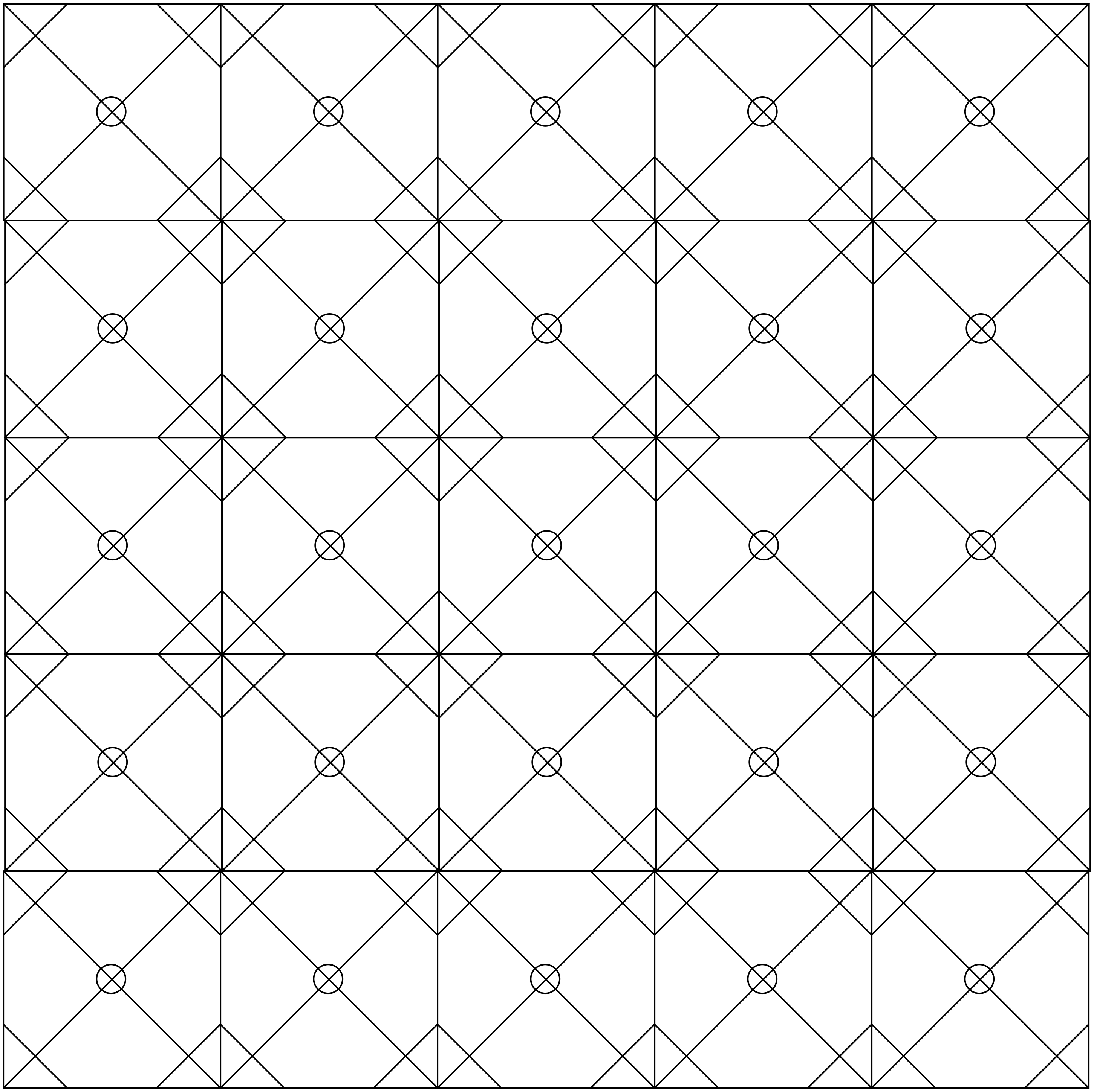
Note: Drill bit size for 1/4" x 20 bolts is 13/64”



Appendix "B"

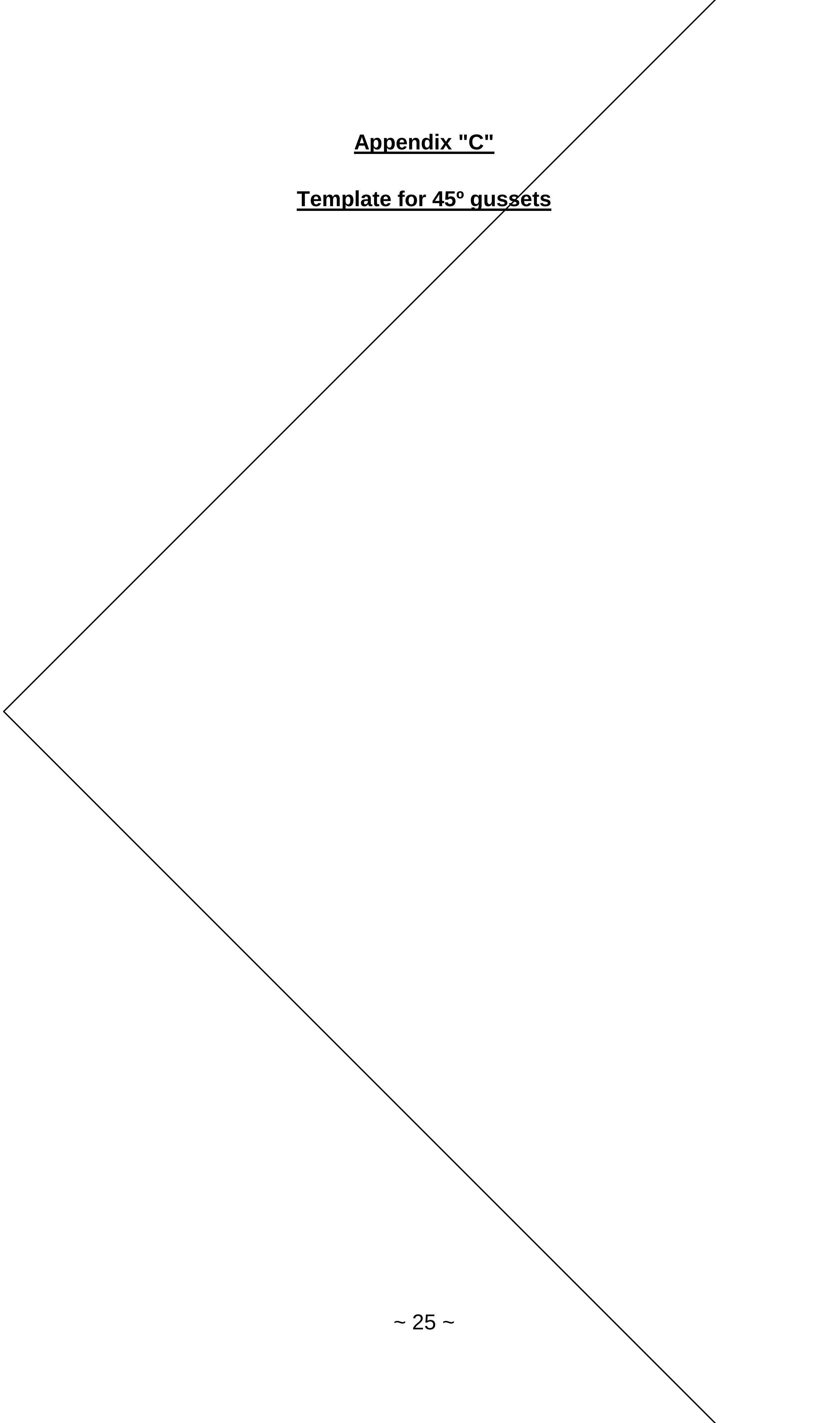
Template for wooden feet

Feet are 1-1/2-inches square and 3/4-inch thick
Central hole is drilled and countersunk for 1/4-inch carriage bolts
24 pieces are needed



Appendix "C"

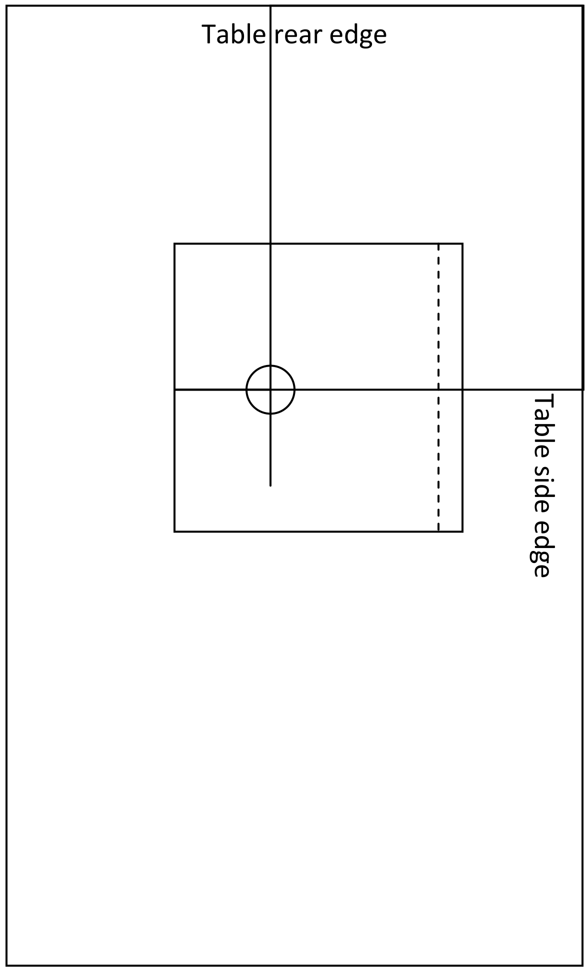
Template for 45º gussets



Appendix "D"

Templates for table clamp locations

Table clamps are 1-1/2" x 1-1/2" angle iron, cut into 1-1/2" lengths
1/4-inch holes are drilled on both flanges 1" from the hinge line



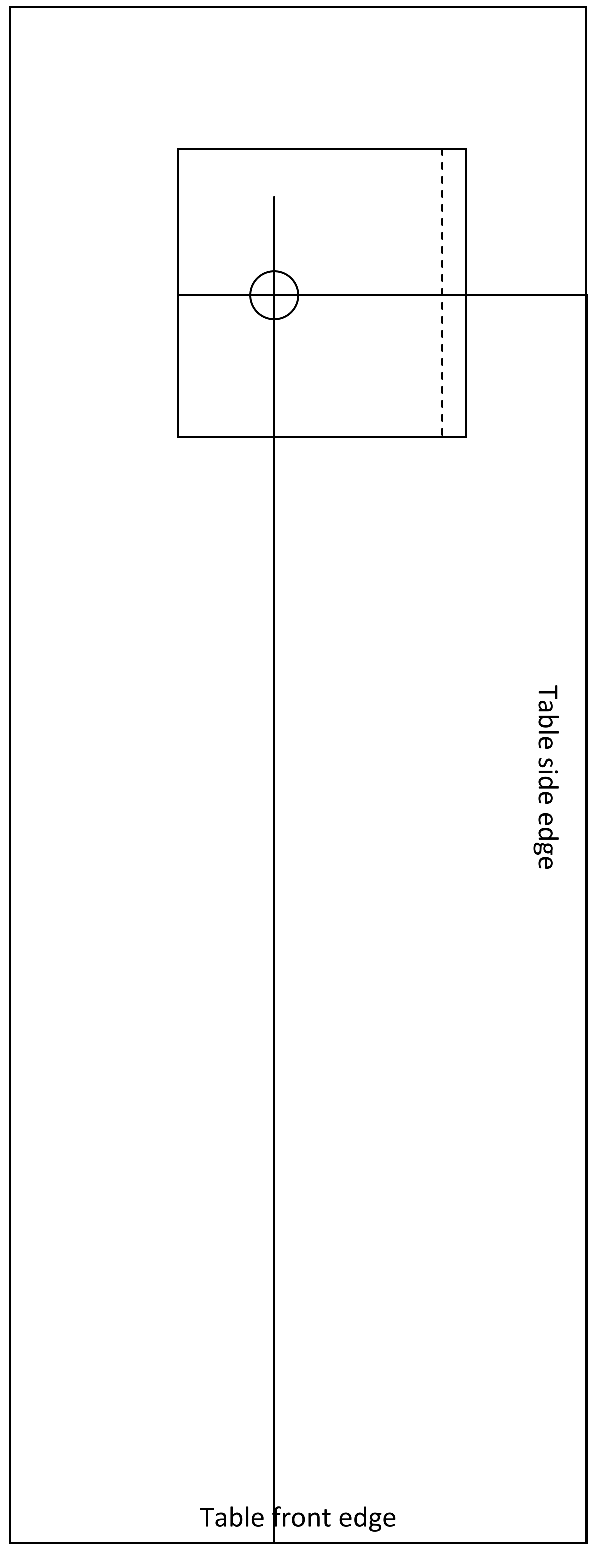
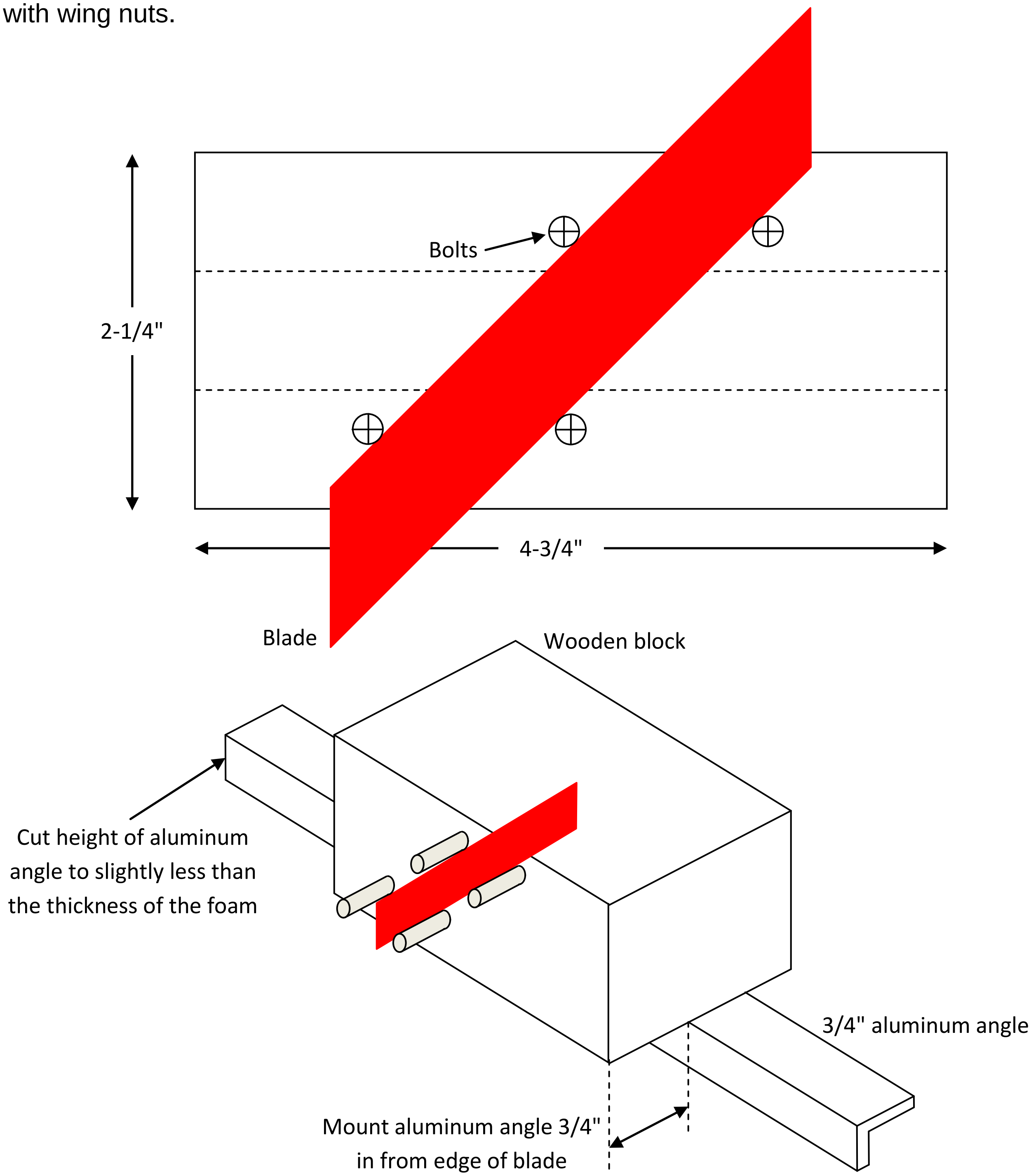


Table side edge
Table front edge

Appendix "E"

Sketch of foam slitter

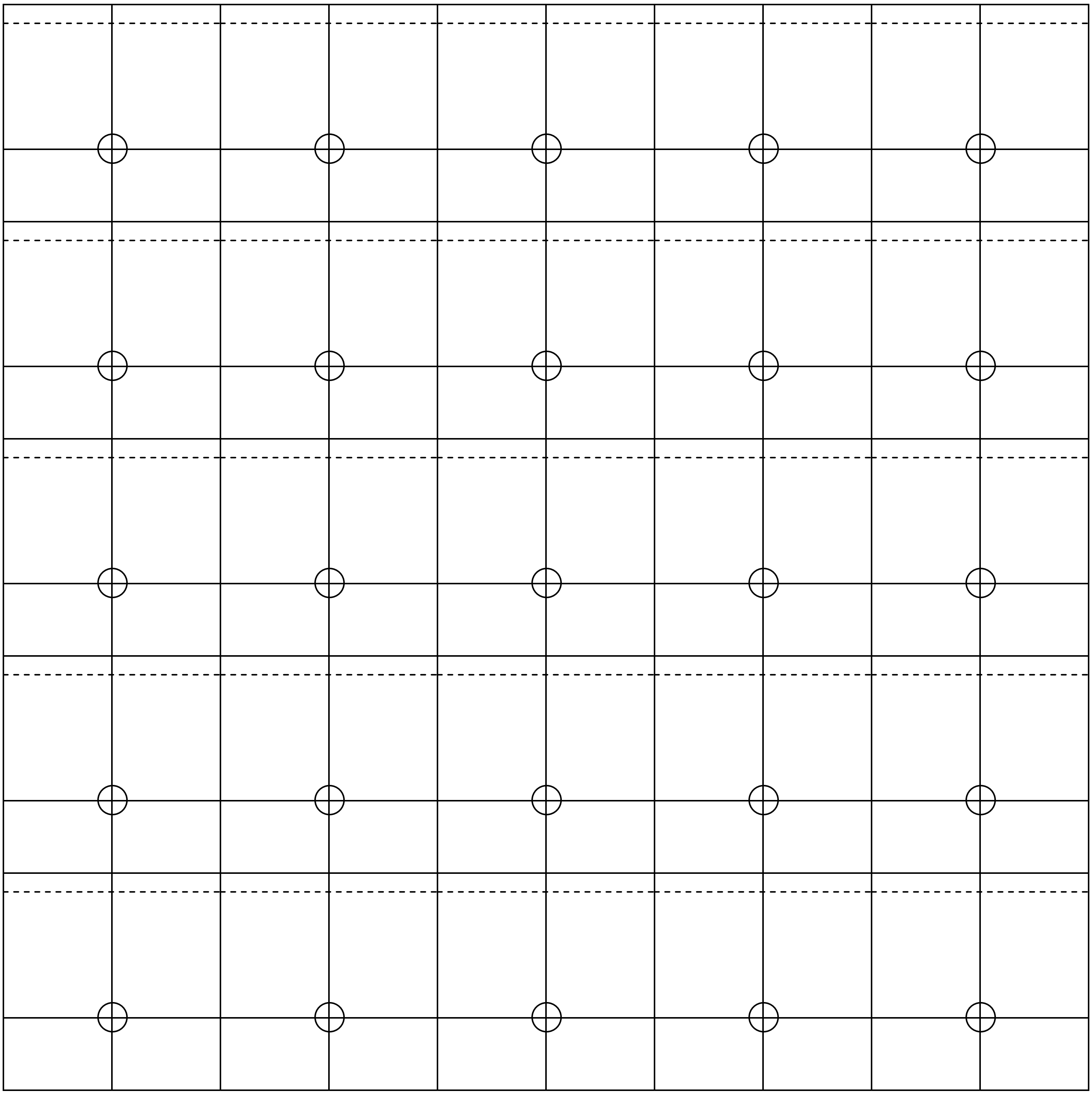
Cut three pieces 4-3/4" long from a 2-1/2" x 3/4" hardwood bar and glue in a stack. Slitter is an 18mm wide DeWalt utility knife blade, mounted at 45 degrees to the foam surface. Slitter is held in place by four 3/16" bolts (glued in holes with the heads cut off) with wing nuts.



Appendix "F"

Template for table-to-table clamps

Table clamps are 1-1/2" x 1-1/2" angle iron, cut into 1-1/2" lengths
1/4-inch holes are drilled on both flanges 1" from the hinge line
12 pieces are needed



Appendix "G"

Materials and cutting procedure for Lionel layout tables

1” x 1” square steel tube for table frames
22 pieces 12 feet long of 1" x 1" square steel tube with 1/8" wall (very little waste) = 264 feet, cut into 103 individual pieces of tubing

25 square inches of 1/4" steel plate for leg bottoms
Each leg bottom is a square with 3/4" sides. Each table has six legs, so a total of 24 leg bottoms are needed.

Welding consumables
Seven pounds of #6011 electrode, 3/32" diameter

2-1/2” long 1/4” x 20 hex-head bolts with 3/4" of threading
48 hex-head bolts, 96 flat washes, 48 lock washes, 48 nuts

3” long 1/4" x 20 carriage bolts for attaching feet
24 carriage bolts, 48 flat washers, 48 lock washers, 48 nuts

1” plywood sheets
Each table top is 4’ x 6’2", so four tables require four pieces 4’ x 8'

Yellow Tremclad paint for metal frame
Three liters

Varathane varnish for table tops
Water-based Varathane, indoor, satin finish, 3.8 liter can

Two-foot length of 1-1/2" x 1-1/2" L-angle for table-to-table clamps
Each table is clamped to its neighbour(s) with two clamps, and each clamp requires a piece of this L-angle 1-1/2" long. 12 such pieces are needed.

Cutting schedule for Table #1 (leftmost)

Left-side frame

Legs #1,2,3	Length = 25”
Table top support #4	Length = 68”
Electronics shelf support #5	Length = 32-1/2”
Bottom cross-bars #6,8	Length = 32-1/2”
Mountain cross-bar support #7	Length = 32-1/2”

Right-side frame

Legs #9,10,11	Length = 25”
Table top support #12	Length = 68”
Electronics shelf support #13	Length = 32-1/2”
Bottom cross-bars #14,15	Length = 32-1/2”

Front cross-frame

Table top support # 16	Length = 42”
Electronics shelf support #17	Length = 40”
Stub legs #18,19	Length = 17”

Mid cross-frame

Table top support #20	Length = 42”
Electronics shelf support #21	Length = 40”
Stub legs #22,23	Length = 17”

Back cross-frame

Table top support #24	Length = 42”
Mountain cross-bar support #25	Length = 40”
Stub legs #26,27	Length = 16-1/4”

Drilling schedule for Table #1 (leftmost)

Leg #1 mates with stub leg #18
Leg #2 mates with stub leg #22
Leg #3 mates with stub leg #26
Leg #9 mates with stub leg #19
Leg #10 mates with stub leg #23
Leg #11 mates with stub leg #27

Drill 1/4-inch hole one inch from the top of each stub leg
Drill 1/4-inch hole one inch from the bottom of each stub leg
Drill two matching holes through each leg

Side table top supports #4,12 -- Drill 1/4-inch hole top-to-bottom 17 inches from each end

Cross table top supports #16,20,24 – Drill 1/4-inch hole top-to-bottom at midpoint

Drill small relief hole in middle of bottom face of all tubes which would otherwise be welded closed

Pre-weld bevelling schedule for Table #1 (leftmost)

Legs #1,2,3,9,10,11 – Bevel all four edges at top and bottom
Stub legs #18,19,22,23,26,27 – Bevel all four edges at top only
Side table top supports #4,12 – No bevels
Cross table top supports #16,20,24 – No bevels
Side bottom cross-bars #6,8,14,15 – Bevel all four edges at front and rear
Electronic shelf supports #5,13,17,21 – Bevel all four edges at both ends
Mountain cross-bar supports #7,25 – Bevel all four edges at both ends

Labels for Table #1 (leftmost)

Table #1 (Leftmost) Left side - Front end
Table #1 (Leftmost) Right side - Front end
Table #1 (Leftmost) Front side - Left end
Table #1 (Leftmost) Middle cross - Left end
Table #1 (Leftmost) Rear side - Left end

Cutting schedule for Table #2 and Table #3

Left-side frame

Legs #1,2,3	Length = 25”
Table top support #4	Length = 68”
Bottom cross-bars #5,6	Length = 32-1/2”

Right-side frame

Legs #7,8,9	Length = 25”
Table top support #10	Length = 68”
Bottom cross-bars #11,12	Length = 32-1/2”

Front cross-frame

Table top support #13	Length = 38”
Stub legs #14,15	Length = 10-15/16”
Gussets #16,17	Length = 13” (before 45-degree cut)

Mid cross-frame

Table top support #18	Length = 38”
Bottom cross-bar #19	Length = 36”
Stub legs #20,21	Length = 24”

Back cross-frame

Table top support #22	Length = 38”
Mountain cross-bar support #23	Length = 36”
Stub legs #24,25	Length = 16-1/4”

Drilling schedule for Table #2 and Table #3

Leg #1 mates with stub leg #14
Leg #2 mates with stub leg #20
Leg #3 mates with stub leg #24
Leg #7 mates with stub leg #15
Leg #8 mates with stub leg #21
Leg #9 mates with stub leg #25

Drill 1/4-inch hole one inch from the top of each stub leg
Drill 1/4-inch hole one inch from the bottom of stub legs #14,15,24,25
Drill 1/4-inch hole two inches from the bottom of stub legs #20,21
Drill two matching holes through each leg

Side table top supports #4,10 -- Drill 1/4-inch hole top-to-bottom 17 inches from each end

Cross table top supports #13,18,22 – Drill 1/4-inch hole top-to-bottom at midpoint

Drill small relief hole in middle of bottom face of all tubes which would otherwise be welded closed

Pre-weld bevelling schedule for Table #2 and Table #3

Legs #1,2,3,7,8,9 – Bevel all four edges at top and bottom
Stub legs #14,15,20,21,24,25 – Bevel all four edges at top only
Side table top supports #4,10 – No bevels
Cross table top supports #13,18,22 – No bevels
Bottom cross-bars #5,6,11,12,19 – Bevel all four edges at front and rear
Mountain cross-bar supports #23 – Bevel all four edges at both ends
Front gussets #16,17 – Bevel all four edges at both ends

Labels for Table #2

Table #2 Left side - Front end
Table #2 Right side - Front end
Table #2 Front side - Left end
Table #2 Middle cross - Left end
Table #2 Rear side - Left end

Labels for Table #3

Table #3 Left side - Front end
Table #3 Right side - Front end
Table #3 Front side - Left end
Table #3 Middle cross - Left end
Table #3 Rear side - Left end

Cutting schedule for Table #4 (rightmost)

Left-side frame	
Legs #1,2,3	Length = 25”
Table top support #4	Length = 68”
Bottom cross-bars #5,6	Length = 32-1/2”
Right-side frame	
Legs #7,8,9	Length = 25”
Table top support #10	Length = 68”
Bottom cross-bars #11,13	Length = 32-1/2”
Mountain cross-bar support #12	Length = 32-1/2"
Front cross-frame	
Table top support # 14	Length = 42”
Stub legs #15,16	Length = 10-15/16”
Gussets #17,18	Length = 13” (before 45-degree cut)
Mid cross-frame	
Table top support #19	Length = 42”
Bottom cross-bar #20	Length = 40"
Stub legs #21,22	Length = 24”
Back cross-frame	
Table top support #23	Length = 42”
Mountain cross-bar support #24	Length = 40”
Stub legs #25,26	Length = 16-1/4”

Drilling schedule for Table #4 (rightmost)

Leg #1 mates with stub leg #15
Leg #2 mates with stub leg #21
Leg #3 mates with stub leg #25
Leg #7 mates with stub leg #16
Leg #8 mates with stub leg #22
Leg #9 mates with stub leg #26

Drill 1/4-inch hole one inch from the top of each stub leg
Drill 1/4-inch hole one inch from the bottom of stub legs #15,16,25,26
Drill 1/4-inch hole two inches from the bottom of stub legs #21,22
Drill two matching holes through each leg

Side table top supports #4,10 -- Drill 1/4-inch hole top-to-bottom 17 inches from each end

Cross table top supports #14,19,23 – Drill 1/4-inch hole top-to-bottom at midpoint

Drill small relief hole in middle of bottom face of all tubes which would otherwise be welded closed

Pre-weld bevelling schedule for Table #4 (rightmost)

Legs #1,2,3,7,8,9 – Bevel all four edges at top and bottom
Stub legs #15,16,21,22,25,26 – Bevel all four edges at top only
Side table top supports #4,10 – No bevels
Cross table top supports #14,19,23 – No bevels
Bottom cross-bars #5,6,11,13,20 – Bevel all four edges at front and rear
Mountain cross-bar supports #12,24 – Bevel all four edges at both ends
Gussets #17,18 – Bevel all four edges at both ends

Labels for Table #4 (rightmost)

Table #4 (Rightmost) Left side - Front end
Table #4 (Rightmost) Right side - Front end
Table #4 (Rightmost) Front side - Left end
Table #4 (Rightmost) Middle cross - Left end
Table #4 (Rightmost) Rear side - Left end

Labels for the underside of the table tops

Table #1 (Leftmost) - Rear edge
Table #2 - Rear edge
Table #3 - Rear edge
Table #4 (Rightmost) - Rear edge
Battery tray - Rear edge