



## The Moravian Workbench by Will Myers



**Will Myers**

I know what you are thinking, Isn't this the guy who wrote the long droning article about building a Roubo work bench a few months ago?

How many work benches does this fella need?

Well the truth is I didn't really need another bench..., but I liked the design and it looked like it would be a fun to build.

My wife says I do very little that makes any sense, for the most part she is right. Anyway, here's the story.

I ran across some pictures of several of the workbenches in Old Salem, NC on one of Chris Schwartz's blogs last year. Old Salem is a historic Moravian village founded in north-west North Carolina in 1766.

Old Salem is not far from my home but I had not been there in years. I also have a friend that works there so I went and had a look. [Old Salem Online](#) is here.



This little bench was made to be portable for the craftsman to take to the jobsite they were working at. The bench will disassemble to the point you could put it in a small closet. From what I have been able to find out, the exact age of the original is not known for sure or who made it.





The original is in storage and not on display at this time. There is a copy of the original at the Single Brothers house in Old Salem that the joiners built in the 1990's for use in their woodworking shop. It is on display for public viewing. The reproduction bench is also featured on a Woodright's Shop episode #374 "German Woodcraft in America". It can be found on the PBS website.

My version of this bench is a close copy of the original with a few exceptions that I will note along the way.

I started with the undercarriage of the bench first. If you do not have a bench of some kind already you would probably want to start with the top first and set it on some saw bucks to work off of. The original bench had a mostly pine frame work and white oak top.

The legs and long stretchers are made of glued up yellow pine. The short stretchers are oak. I picked up some #1 yellow pine 2x10s at Casstevens Lumber in Hamptonville NC, not far from my home. They don't sell lawn mowers, inflatable Santas or



miniblinds. Just building materials. Strange huh? The boards were better quality than the home centers and priced less too.



I began by ripping the 2x10s to width then jointing and planing them to smooth and square them up. The legs are three pieces  $1 \frac{1}{8}$  thick and  $4 \frac{1}{4}$  wide. After the glue set I jointed and planed the assembled legs to a finished size of  $3 \frac{1}{8}$ in by 4in and about 40 in long. I did the layout on the legs in pairs to be sure the joints aligned correctly.



The top joint is a basic bridle joint. I used a mortise gauge to lay out a  $1 \frac{1}{2}$  mortise and then cut the top end of the legs to a 16 degree angle. After the cut was made, I



used straight edge and pencil to connect the gauge marks across the end.



Then I clamped it and used a backsaw to cut down the sides of the mortise.



You can chisel the waste out with a mortise chisel but I found it was much faster to auger a hole and then chisel out the remaining waste. The top stretcher is made from a red oak 3 ¾ by 2in by 24in long.

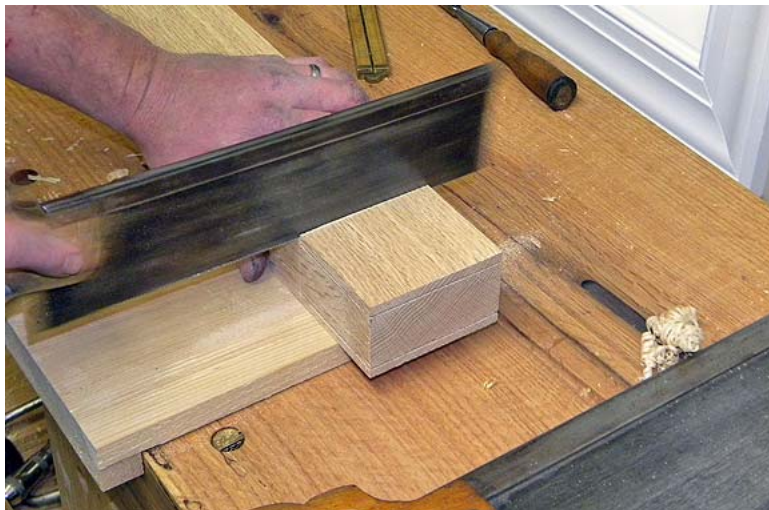


I started with a cutting gauge to mark the shoulders. Then I used the mortise gauge set to the same width as the mortise on the leg and moved the fence to center it on the stretcher and marked the tenons on both ends. After the cuts were finished I fitted them together and pared where necessary. I left the top of this stretcher square for now - it will be planed off flush to the angle of the legs later. Be sure to number the joints as you go to make it easier at assembly time.





The center stretcher is basically the same except it is a regular thru mortise that uses draw bored pegs to pull it up tight. The original bench only had this stretcher on the vise end, I added it to the other end as well. It's dimensions are 3 in by 2 in by 24 in long with a 2 ½ by 1 tenons.





The bottom stretchers are a little different. They are 1 in by 2 ½ in oak with a lap dovetail joint on either end. To make these I started by cutting the tails first and then tracing off of them onto the legs. Then I sawed the shoulders of the socket as far as I could and chiseled out the waste (It is basically a big half blind dovetail). This is a pretty simple and quick joint to cut.







Before I glued and pegged the end assemblies I made the long front and back stretchers and cut the joints for them. It is easier to cut the mortises now than after the end assembly are put together. This joint is unique in that it is angled and is held together with tusk tenon.

For the long stretchers I glued two pieces of the pine face to face. After the glue dried, I jointed and planed these to finished dimensions of 3 ½ in by 2 ½in and 80 in long. This is a little longer than necessary and will be trimmed after the joinery is finished. The extra few inches helps prevent the ends splitting when making the thru mortise for the keys.



I used a bevel and square to lay out the 16 degree shoulders on each end of the stretcher for a 12 in long tenon. Then, I set a mortise gauge to 1 1/8 in and scribed from the face side all the way around the tenon. I then used a rip saw sawing on a diagonal and working from both sides down to the shoulder lines.



After this was complete I used a backsaw and made the shoulder cuts removing the waste. Be sure and save one of these waste pieces, you can use it as an angle gauge when cutting the mortise later.

I used the same mortise gauge to lay out the mortise on the legs. The stretchers are 3 1/2 in tall but the mortise will actually be slightly taller because of the angle of the



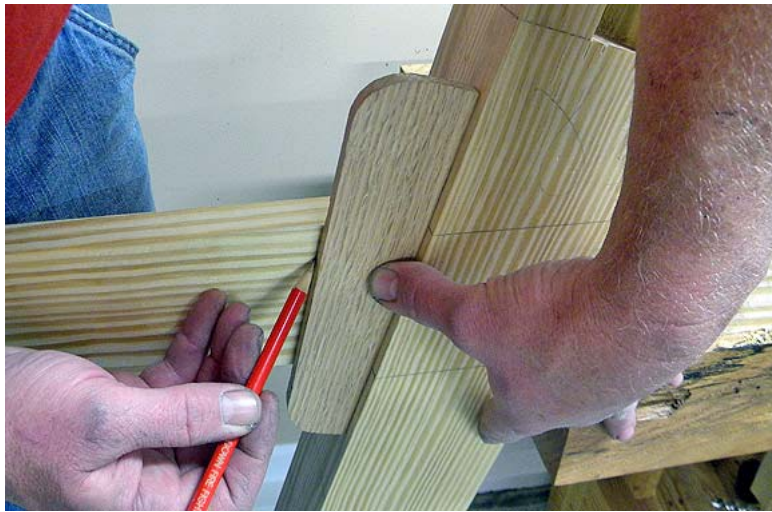
tenon. I laid the stretcher across the leg to mark the top and bottoms of the mortise.



With this complete, I used a 1in auger and bored halfway from both side to remove the majority of the waste. I used a waste piece from the stretcher tenon for a guide when boring the angle mortise. After the boring was done I used a chisel to square it up. This joint needs to fit well but not be so tight it has to be driven together or apart.



With the joint complete, assemble the leg and stretcher. Make sure it is seated completely and mark where the tenon passes thru the leg with a pencil.



You will also need to make the keys that drives in to pull it up tight. The ones on this bench are  $\frac{3}{8}$  thick by  $8 \frac{1}{2}$  long, tapering from  $2 \frac{1}{8}$  on one end to  $1 \frac{1}{2}$  on the other.



While the joint is together hold the key a little above where you want it to seat up and mark this on the tenon as well. Remove the stretcher for the leg.

When I mortised for the key I mortised about  $\frac{3}{16}$  in closer to the tenon shoulder. This is important, if you don't the key will wedge against the mortise wall and not pull the leg up tight. I mortised halfway thru the tenon form both sides.



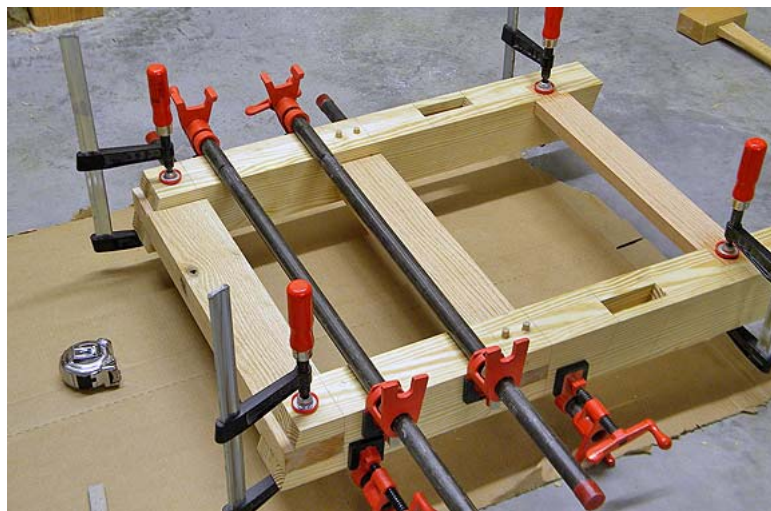
It takes much longer to write about this joint than to do it. It works like drawboring but uses a wedge instead of pegs.



These joints on the long stretchers do not receive any glue. The good thing about this tusk tenon joint is that the wedge can be knocked out and the joint can be disassembled.



After the long stretchers were fitted, I run a smoothing plane over the insides of the legs to smooth them up and remove the layout lines. It is easier to do now before the short stretchers are glued.



I glued all the joints on the short stretchers and assembled them. I then clamped them and drove in the pegs on the center short stretchers and let them sit overnight. After the glue set up I bored the  $\frac{3}{4}$  peg holes in the top bridle joints and drove the pegs in.

This adds some reinforcement to the bridle joints but it relies mostly on the glue. Last thing was to plane the top stretcher flush to the top of the legs. I used a jack



plane to knock off most of the waste and then evened it up with jointer.





In part two I will cover the top I came up with and the vises. I am going to add a tail vise that the original does not have.

Stay tuned and thanks for coming along on another of my journeys!

## The Moravian Workbench - part 2

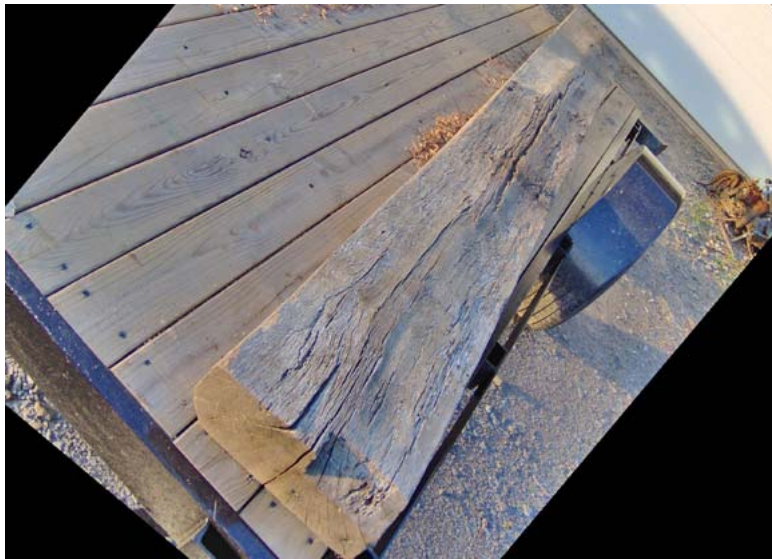
After the base was complete I moved on to the top.

The original bench had a 16 in wide by 2 ½ in thick white oak top. My plan was to glue up a yellow pine top because I didn't have anything of these dimensions.

In the meantime I ran across an old white oak beam from a dismantled barn built in the 1880's. It was kind of rough but it looked like it would work.

The beam was about 13 ½ in by 4 ¼ in when I started. Since the top was not as wide as the original, the tool tray would have to be a little wider.





I started with a scrub plane on the bench top. The old beam was full of dirt and grit which dulled the iron out pretty quick, but the little Stanley 40 was the right tool for this.

This plane with its sharply cambered iron still cut well even though it was completely dull. I even hit a piece of an old nail that made a big nick in the iron and it still was peeling off the wood.



After roughing the top and bottom sides with the scrub plane I moved on to the jack plane with a cambered iron and cleaned up the heavy tracks and brought it closer the final dimensions. When that was complete I went over with the jointer plane to level everything up.



After the top and bottom sides were flat and parallel, I jointed and squared the long edges as well.

Lastly, I squared up the ends and planed them smooth.



After the top was leveled I turned it bottom side up and set the base assembly on it.

With the base assembly centered, I traced around where the base would be located and made marks where the dowels were to be located also.





After this was done, I measured from my marks on the top and stretchers for the dowel holes and bored  $\frac{1}{2}$  in holes. I glued the dowels in the stretchers and left about an inch protruding.

The back dowel holes in the top were enlarged to accommodate seasonal expansion and contraction of the top slab.





With the top and base assembled it was time to move on to the face vise. I made a leg vise like the original bench has.

The reproduction bench at the jointers shop has the face vise mounted to the right of the leg. The original bench is made with the vise closing over the leg. This was the way I chose to make mine, this gets the vise a few inches farther to the left and more out of the way.





The back piece of the vise is a piece of 2 in by 9 ½ in oak mortise and tenoned between the top and front stretcher.

I cut the mortise and tenon on the lower end first. I set a mortise gauge and marked a 7/8 in wide and ¾ in long tenon off set to the rear to leave as much support in the front of the stretcher and top as possible. With the tenon cut I used the same mortise gauge to lay out the mortise.

I used an auger to remove most of the waste and cleaned it up with a chisel. The left side of this piece is angled to match the leg it sets up against.

With the base assembled I lined it up with its mortise and traced off the leg to mark where to cut. I then used a rip saw and cut off the line a bit and finished up with a plane until I had a nice fit. Once the back vise piece was fitted I marked the shoulder for the top tenon with a long straight edge setting across the top of the front legs.



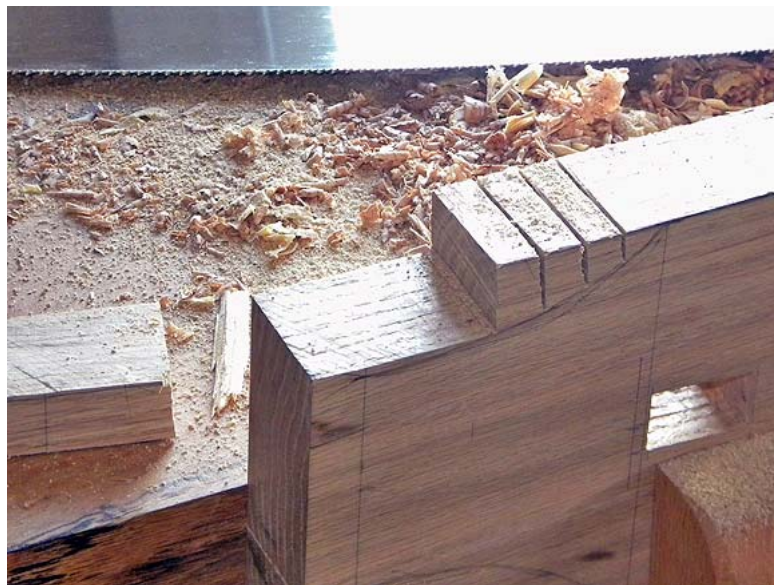
I then cut the tenon and mortise on this end in the same manner as the lower one. The last thing is to cut the slot for the parallel guide. It is 2 in by 7/8 in and is centered where the chop of the vise will be.



After I had the back piece fitted I made the vise chop and parallel guide. The chop is a piece of white oak 8 in wide and 25 1/2 in tall. The lower part tapers down and has two covers cut in the bottom.



I sawed the tapers first and then cut several stopping cuts into the coves.



Then I used a wide chisel to chop out the waste in the coves and cleaned it up with a rasp. I also chopped a 3/8 in by 1 1/2 in mortise for the internal garter in the left side of the chop to hold it to the screw.





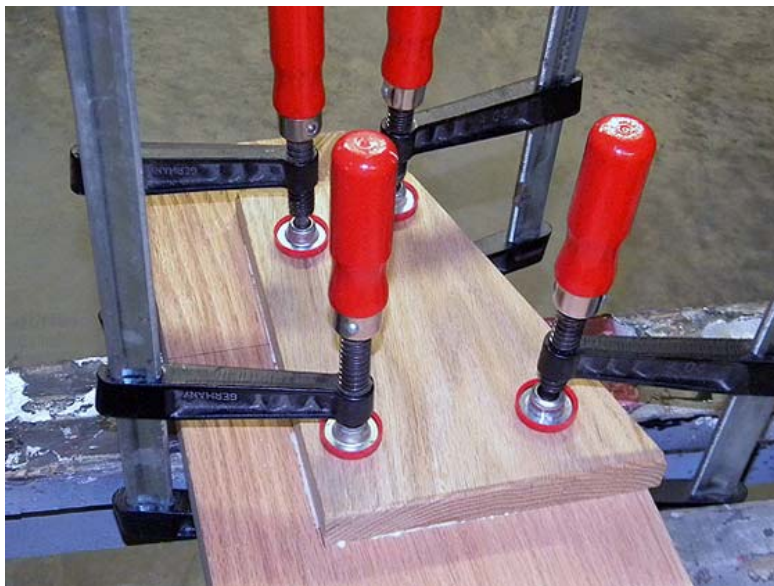
The parallel guide is oak also, 2 in by 7/8 in by 18 in long. I drilled two rows of 3/8 holes 1 1/2 in apart with the rows offset 1/2 in from one another. On the end that joins the chop I cut 1/4 in shoulders on top and bottom.



Then cut a 1 1/2 by 7/8 in mortise in the chop to receive it. I sawed two slots in the end of the parallel guide for wedges to be driven into. I then glued the parallel guide and mortise in the chop. Last thing was to drive in the wedges.



Once the chop and guide were together and the glue set, I installed it on the bench. I used a couple of clamps to hold it in position and bored the 2 5/8 in hole for the wooden screw. I used a hole saw and an electric drill, you could also bore several smaller holes and chisel out the waste.



The screw and nut I used is from Lake Erie Toolworks. They did a custom turning based on pictures I sent of the original bench's screw. Like the screw I purchased for the Roubo bench, it is perfect. The next thing I did was mount the nut for the screw. I



made a  $\frac{3}{4}$  in spacer and glued it to the back piece of the vise.



I then laid out on the back of the leg where the nut would cross it and cut a shallow mortise in the leg level with the spacer. This mortise will help support the nut and keep it from twisting under pressure.

I then drilled holes for two screws in the nut and installed it on the back of the back piece of the vise.



The original workbench did not have any kind of tail vise. For me a tail vise is something a bench has to have. One thing about these vises I have realized is it does not take much pressure to hold the work in most cases.

I had an idea for a simple wagon vise mechanism using threaded rod and wooden bearings. I made one and mounted it to a mock up bench top to see how it would work. It did work except for one little glitch; it worked backwards. This would probably be fine for most folks but righty losey lefty tighty confused the peanut I use for a



brain.

Another problem with the threaded rod was that I figured the threads would wear quickly. What is usually used in vises is what's called acme thread screws, they are tougher and have more robust threads. After some searching I found several places to purchase the acme threaded screws even in left hand thread which is what I needed for this application. I ordered the screw and nuts from Roton Products.

The only problem is most of the companies that sell this kind of thing have a minimum order amount. I had to order more than what I needed, this drives up the cost. The first screw assembly I made with regular threaded rod cost about \$15. The second one with the acme screw was close to \$90. Anyway, here is what I came up with.



In trying to stay in the original dimensions of the bench I only had about 12 ½ inches of overhang on either end of the bench. This is not much room for a tail vise.

This little vise is very simple, the screw moves the dog back and forth. Plus it supports the dog, the slot in the bench is the guide. For that reason this design probably needs to have a fairly short travel or it could bend the screw (or you could use a larger screw for a longer application).

This one has 8 inches of travel which seems to be plenty. I started by cutting a piece of the 5/8 diameter screw to 14 in long. Then I welded the piece of 3/4 steel pipe the dog goes in to the two guide nuts.



This has to be done with the nuts on the rod to be sure they are aligned. Next I cut two pieces of  $\frac{1}{2}$  in steel pipe  $1 \frac{1}{4}$  in long. One is welded to the very end of the screw, the other is welded about 12 inches away with a  $\frac{5}{8}$  in washer welded to the end toward the dog.



To cut the slot in the bench top for the dog I laid it out with a mortise gauge on top and bottom set to  $1 \frac{1}{16}$ th inches about 2 inches in from the edge of the bench top. I then used an auger to remove most of the waste working halfway from either side, then squared it up with a chisel.

The bearings are two blocks of walnut 4in by  $1 \frac{3}{8}$ in thick by  $1 \frac{3}{4}$  tall with a  $\frac{13}{16}$  hole bored in them.



Once the slot was cut I set the screw assembly on the bottom side and marked where the bearing blocks would set. I then chiseled 3/8 in recesses for them to set in, I used a router plane for the final leveling to ensure they were even with each other. I also had to cut a small recess parallel to the slot for the dog to clear. Once every thing fit I drilled the four mounting bolt holes in the bearings and used 5/16 in lag bolts to secure the assembly to the underside of the top. I also greased the bearings with mutton tallow before assembly.





The handle was forged from a piece of 5/8 rod patterned off of a pipe clamp screw handle. It is welded to a short piece of 1/2 in pipe and attached to the screw with a roll pin.



Last thing I did was to bore the dog holes, I spaced them 4 inches apart down the length of the top.





Well, that is all I have for right now. The next part will be building the shelf and finishing up the little bench. Thanks for following along!

## The Moravian Workbench - part 3

The next step on the bench is the tool tray.

There is not a lot to it, basically four pieces of wood. I made the tool tray from 1 inch yellow pine.

I started with the rim first and cut the three rim pieces 3 ½ in wide. The back piece is the full length of the bench, the ends are 11in. long.

I used a plow plane to make a 5/16ths wide groove 3/8ths deep on the lower edge of all three pieces.

After the groove was made, I laid out the ends for dovetails.



The dovetails are pretty basic except for the file on the pin board that is left to fill the space left by the groove in the lower tail.



I cut the tails first, then scribed them onto the pin board and sawed to the waste side of the lines.





Once the dovetails were cut and fitted I glued them up making sure the corners were square.



The bottom board has a rabbit around the three edges that joins the rim boards. I cut the bottom board to length and width leaving it a little wider than what was needed. I then used a moving fillister plane to cut the rabbit on the ends.



After that was done I used a regular rabbit plane to cut the rabbit down the long edge. With this complete I glued the back edge of the bottom board and assembled it with the rim. I did not use any glue on the end grain to allow for seasonal expansion and contraction.

The ends of the rim are supported by one screw at the front edge, I enlarged the hole to allow for movement. After the glue had set and the screws were in I set the tool tray in place and used a pair of dividers to scribe off the back of the bench top.



I planed down to this line to get a nice fit between the shelf and top.



Last I laid out where the dowels needed to go leaving an 1/8in or so for expansion.

Then I used a 1/2 in auger and bored thru the tool tray and into the stretcher about an inch or so deep. I cut four dowels 2 inches long and tapered one end. I then glued them in the tray with the tapered end protruding thru the bottom of the tray.

After the glue was dry I trimmed the dowels flush with floor of the tray. The rear dowel hole in the stretcher is enlarged slightly to allow for seasonal movement also.

With the construction complete the finish was all that was left. To be honest I didn't spend much of time on this ( I don't have much patience finishing wood for some reason).

All I did on the undercarriage was two coats of Danish oil. On the top and tool tray I used 2/3 Danish oil - 1/3 satin poly mix in two coats three days apart, sanding between coats.

Is it portable?



It is not like those little folding chairs you can buy that weigh two pounds. When disassembled it is fairly easy to move.



The top on this bench weighs 97 pounds which is a handful for one person.



The rest of the undercarriage is not a problem at all to move. When completely assembled it weighs in at 221 pounds.

I have moved the Roubo bench I built last year around a time or to, it is pretty well connected to the Earth and impossible to move alone (unless you own a crane). This bench knocks down in a minute and I can load it in the truck with no problems.

So the answer is yes, it's pretty mobile for a work bench.





At the time of this writing I have not found anything I would change. One addition that I might add later is a sliding dead man on the front. I have not needed it yet but it is a handy thing to have.



The 13in wide top works out well too. I kind of had reservations about the narrow work surface but in use I have noticed that 99% of the time I am only working on the front six inches; so that concern was really unfounded.

I really like the tool tray too. The places I have to work both have concrete floors which are hard on old tools. With the tool tray I don't have to worry as much about knocking tools in the floor accidentally. The tray might end up collecting junk, but at least it may prevent some broken junk in the floor.

One other thought on the tool tray, I did not add the wedged blocks called dust risers at the ends. The original bench did not have them either. I figured when the tray fills up with debris you can simply pick it up and dump it.

One other item I did not completely address is the attachment of the top to the base. The only connection between them is the 1/2 in dowels I spoke of earlier. You could add bolts or screws to connect them but at this point I see no need for it. Gravity seems to be plenty.

The bench stays put well too under heavy planning, I thought it might scoot around but it does not.



It has been very enjoyable to make a version of an old design bench that I was fortunate enough to be able to go see in person. I do not know who built the original at Old Salem, but he still speaks in what he left behind.

I think this is a sound design that will serve you well if you decide to build one, this bench also has a lot of possibilities for adaptation to whatever kind of work you may want to do with it. It also has a very nice appearance that appeals to me with the angled legs and tusk tenoned stretchers.

It seems like most projects I build but by the time they are getting towards done I am getting tired of the project and ready to move on to something else. Finishing up the little bench has been sort of bittersweet.

This project has been a lot of fun and I didn't really want it to end.



I have also attached a measured drawing with major dimensions of this bench.

If you have any questions or comments please let me know! Email:

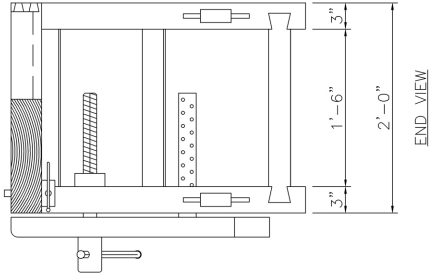
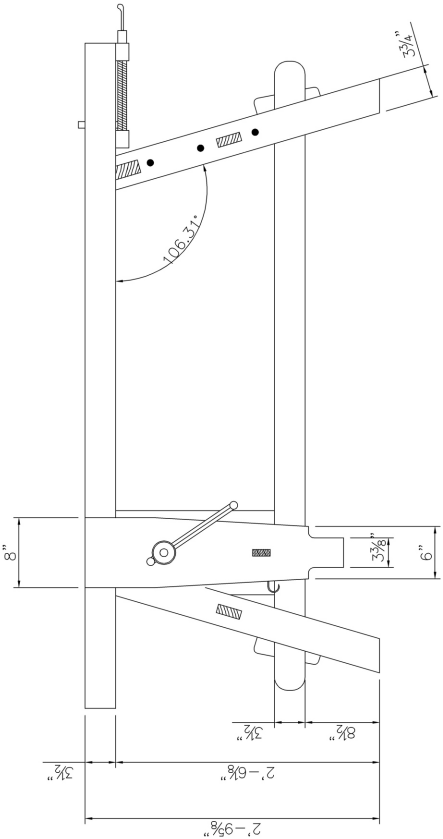
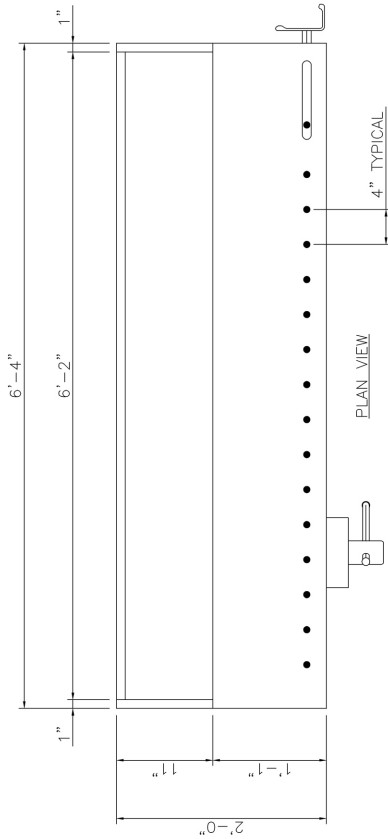
[sbhemi@yahoo.com](mailto:sbhemi@yahoo.com)

Thank you so much for reading!

**Will Myers**

**April, 2012**

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NOTES:

MORAVIAN WORKBENCH

BUILT BY: WILL MYERS

DRAWN BY:

DRAWING ISSUED DATE

4-10-2012

REV. # DATE

DESCRIPTION

SHEET NO.

001