

The Simple & Low Cost "Tank Tough" Workbench

Beginner Level Project



Intro: Low cost tank-tough workbench

Build a workbench that can survive being run over by a tank, or at least anything you can throw at it you lily livered pantywaist.

The key to a workbench that can be pummeled and trampled and abused like a rented mule is anchoring. This presents a method for building a workbench that will not only serve as an electronics soldering, model airplane building, or knitting platform but will also support metalworking and woodworking vices and the subsequent abuse that comes with such duty.

This workbench plan assumes that you have access to a variety of 2x4 lumber scraps, some spare plywood, particle board, or OSB or the means to purchase said materials. Also required are rudimentary woodworking skills, the tools to cut wood, and the fasteners to bind wood together. Oh and 3 pounds of zombie flesh.



Image Notes

1. Woodworking vice
2. Tunes
3. 5 inch metal vice positioned over anchored leg for maximum toughness



Image Notes

1. Tool storage
2. tool storage

Step 1: Bill of materials

To complete this project you can use a variety of materials. The key pieces will be a few long sections of dimensional lumber such as a few 8' 2x4s. Otherwise some scrap 2x4 pieces and a few sections of plywood, OSB, MDF, or particle board will be sufficient. The following are roughly the amounts of scrap lumber needed, you can use this as a guide when scavenging or when buying your lumber.

Materials:

- 2x 8' 2x4s
- 2x 36" 2x4s
- 4x 24" 2x4s
- 12x 18" 2x4s
- 27"x8' 1/2" thick plywood
- 27"x8' 1/2" thick OSB
- Handful of 2.5" general purpose screws
- Handful of 3" general purpose screws
- Handful of 1 5/8" general purpose screws
- 1x steel L-bracket
- 1x 3/8" expanding concrete anchors

Step 2: Getting started: anchor to walls

When you are beating on a piece of angle iron in your vice to shape it for a new bike or siege weapon, you don't want the workbench that the vice is attached to to hop around the room so that you have to chase it while swinging your hammer wildly and cursing like a longshoreman. The answer to such a dilemma as any good seaman could tell you is proper anchoring.

Generally a workbench is required in an area suitable for working in a messy manner. A garage or basement for example. Such places have walls. These walls are usually tied securely to or comprise a foundation of some type. Thus, these walls can be thought of as structurally fixed and strong. What better place to anchor a workbench? That's right, no better place!

Furthermore, your workbench will probably be rectangular, and will benefit from being placed in a corner such that two of the four sides can be anchored. Since you can't work at all sides of your rectangular workbench at once, securing it to the walls of your garage/workshop on two sides will result in minimal impact on the workbench's utility.

Lastly, the floor on which the workbench stands is also most likely fairly structurally sound and can also serve as an anchor point for your ideal workbench. Now that you have the idea, we can get started.

In the presented example, I will show the process for building a workbench into the corner of a timber framed garage. The first step is to locate the studs. Use a studfinder or otherwise visually identify the fasteners to locate the framing members. Then decide on the height of your workbench. Be sure to take the thickness of the bench top (1" in this case) into account. I set my workbench bottom edge at 36" so that my rolling toolboxes could fit under it. That meant that the final top working height was around 40.5" which is a nice convenient height for me. Depending on your height and other considerations you may adjust the height accordingly.

The first step once you find your studs and decide on a height is to mark your wall and cut your 2x4s to length. You will need two short pieces of the same length and two long pieces of the same length so that you end up with a rectangle in the end. In the photo below you can see that you need 2 pieces of lumber to attach to the wall. Take a short piece (in my case 26") and a long piece (in my case 92") of 2x4 lumber and attach them to the wall into the marked studs with 3" wood or general purpose/drywall screws. Put in a screw at one end, and then move to the other end and use a level to ensure that the lumber is attached to the wall level. Put two screws into each stud. If

your wall is sheathed in plywood like in the picture, you can use shorter screws and screw anywhere you want since the plywood is already attached to the studs.

In the picture below you can see that I have also attached the matching short length of 2x4 to the end of the long stud and secured the leg to support the right side stud. These two short pieces will be connected to define the rectangle of the workbench. The leg is made from two sections of 2x4 scrap. One cut to the height of the bench and screwed to the side of the short side stud (pictured) and one that is trimmed to exactly fill the gap between the short side stud and the floor while maintaining level. The second piece is not attached until the end so is not pictured. Also you can see the beginnings of the diagonal bracing that will give the workbench its strength.



Image Notes

1. Support leg
2. Diagonal brace
3. Long stud attached to wall
4. Short stud attached to wall

Step 3: Triangulate and brace

Once you are roughed-in with the back and left side anchored to the wall and the right side supported by the leg you need to add cross bracing and triangulate to add strength to the workbench top. Since we know that the two sides anchored to the walls are square, or at least as square as we can get them, cut a 2x4 scrap to make a diagonal brace as in the picture, anchoring it with a pair of 3" screws at each end. The length of the piece is not critical but shoot for 10" or so.

At the right (or free end supported by the leg) end of the bench, use a square to make sure your side is square and attach another diagonal brace as pictured. The easiest way to do this is to sink a screw on one end and then to start a screw on the other end of the diagonal brace. Use the square to make sure everything is lined up and then sink the second screw to lock everything in.

Since my bench is about 8' long, I added two cross braces connecting the front to the anchored back of the bench. You should brace your bench about every 24" to 36". To do so, cut some scrap 2x4s to the depth of your bench, minus the 3" for the front and back 2x4 thicknesses. So since my bench is 27" deep, I needed to cut 2x4 scraps to 24". Toenail these to the back 2x4 and then cut some more diagonal braces. You will want to triangulate every square you make in your bench. Since I added two more cross braces and thus had 3 squares, I needed 12 total diagonal braces. Since we already installed 2, I only needed to cut 10 more. See pics below for more detail. With the cross braces installed, triangulate them to the back 2x4 as pictured.

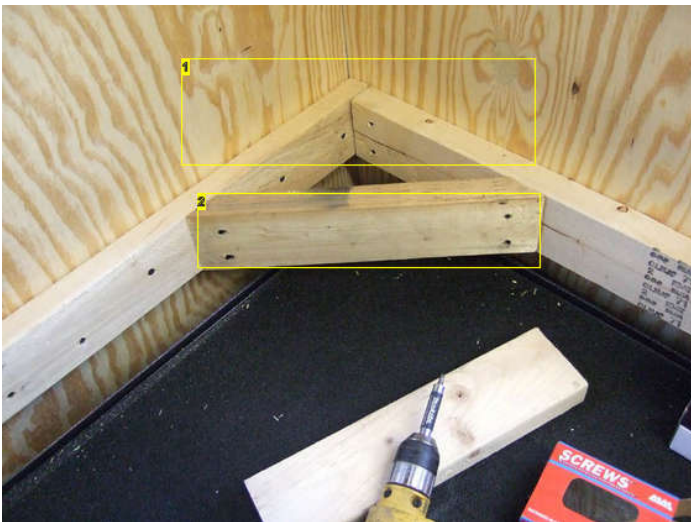


Image Notes

1. 2x4s tied to wall make a good strong benchtop support
2. Triangulated bracing makes it stronger

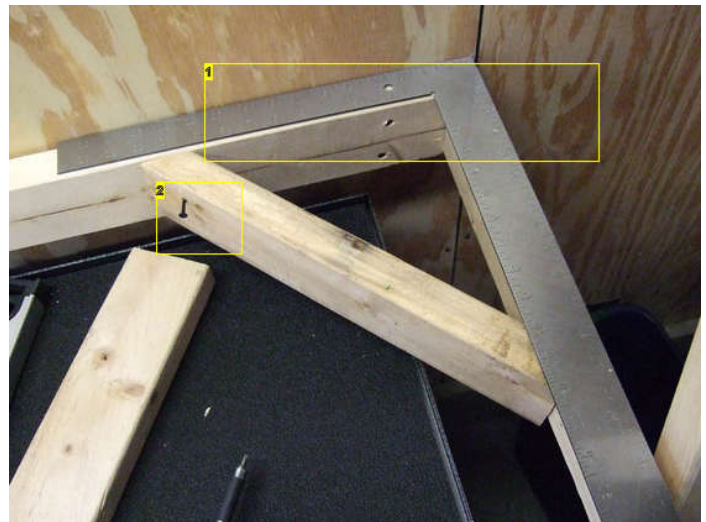


Image Notes

1. Check square
2. Sink screw when square



Image Notes

1. triangulate to the back 2x4
2. heater, it is cold!
3. Cross braces
4. cross braces
5. triangulate

Step 4: Finish the frame

The next step is to attach the front of the bench. Cut a 2x4 to length and then screw it into the end pieces and the cross braces using 3" screws. With the front attached, start screwing the diagonal braces in place between the end and cross pieces and the front lumber. When attaching the diagonal braces to the front, you may want to use 2.5" screws so you don't pop through the front and leave sharp tips to cut you. See pics to get an idea.

With the frame fully triangulated, cut some scraps to increase the load bearing capacity of your bench. The idea here is to cut a diagonal that will extend down from the cross braces at an angle and anchor to the wall. See pics below. Toenail the bottom part of the 2x4 into the wall. The screws are to hold the brace in position, the real strength is that this brace is loaded in compression so you want to be sure it fits snugly between the top and the wall. Use your level to make sure you don't over do it and tip the top of the bench in towards the wall.



Image Notes

1. attach the front 2x4
2. brrrr

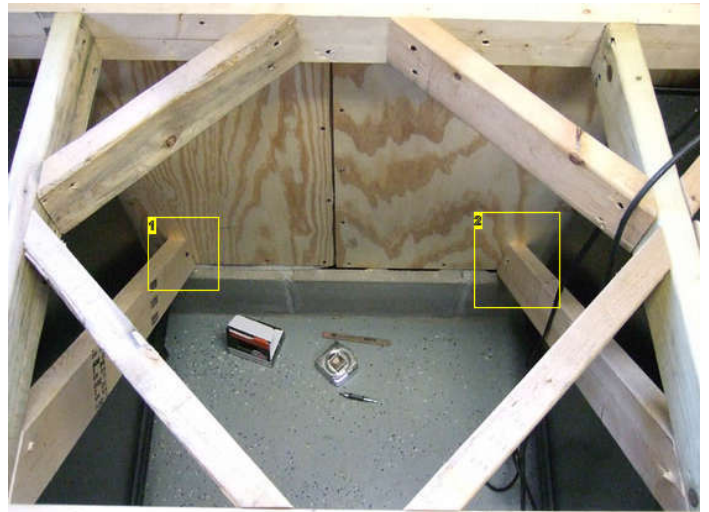


Image Notes

1. vertical support seen from top
2. vertical support seen from top



Image Notes
 1. Triangulate
 2. triangulate

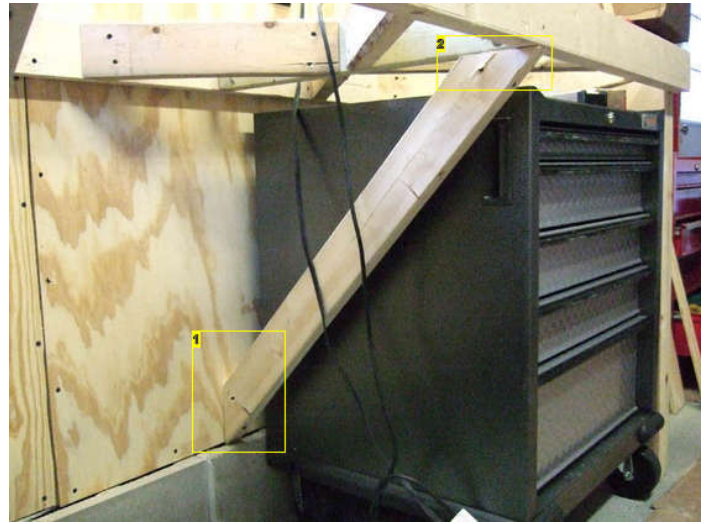


Image Notes
 1. toenail the diagonal vertical supports to wall
 2. anchor to cross braces

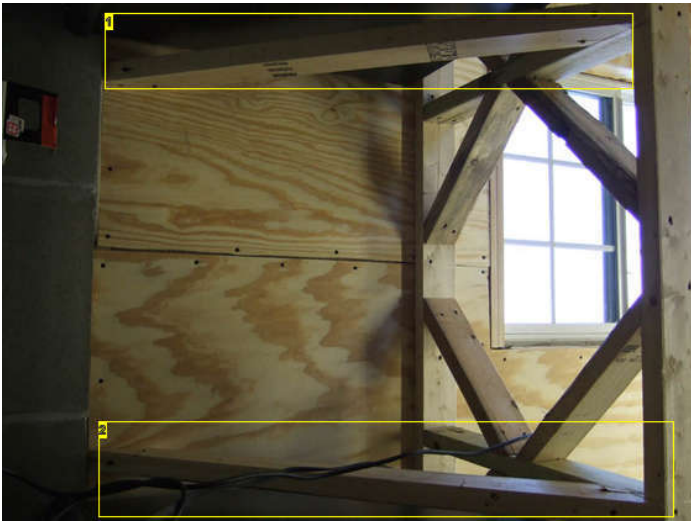


Image Notes
 1. vertical support seen from underneath
 2. vertical support seen from underneath

Step 5: Attach the bench top

With the bench frame complete and anchored to the wall via the sides and some vertical diagonal supports, the next thing to do is attach the top. I used two layers for my bench top. The bottom layer is made of 1/2" thick plywood scrap which is structurally very strong. However, the wood fibers in plywood and regular dimensional lumber will compress and dent under hammer assault and other hard workbench duty. Fiber products like OSB (oriented strand board), MDF (medium density fiberboard), and particle board can handle hammering much better even though they are not as structurally strong in many cases. So the first step is to cut and screw down a layer of plywood or whatever scrap sheet stock you have handy. Use 1 5/8" screws or similar. See pic. I tried to tie the plywood layer to each diagonal and cross brace underneath with at least two screws per member. By boxing this frame securely you add a great deal of strength to the workbench.

Once you have the first layer on, attach your "punishment" layer. As discussed, I used OSB since I had extra piece laying around and because it can handle abuse. Also, in the event that you need to replace the top later, you can strip the cheap OSB and add more or another material of your choosing. Since this top surface is the sacrificial layer, I only used a few screws so that it would be easy to remove if it ever got too ratty. See pic.



Image Notes
1. first plywood layer



Image Notes
1. final OSB layer. notice there are seams in the top since I didn't have any single pieces big enough. this is no problem.

Step 6: Anchor the leg(s)

With the frame and top complete, the last step is to anchor the leg(s) to the floor. With your level make sure the top of the bench is level while you move the temporarily attached vertical leg into position. Use the level or similar to make sure the leg is plumb. When the leg is in position, take your angle bracket and put it into position against the leg and floor, marking the holes on the wood and floor with a pencil. Since I was anchoring the leg to a concrete floor, I used a masonry bit to drill a 3/8" hole into the concrete and sunk a wedge anchor into the hole. Tightening the anchor according to manufacturer specs, I now had a secure spot to bolt the leg to. See pics.

You can also see in the pics that the vertical leg is now two 2x4s thick. Using the level on the top of the bench I cut a section of 2x4 that snugly fit between the bottom stud frame of the bench and the floor while keeping the top level. This vertical support will bear a lot of the bench abuse so cut it square and snug.

Now that the hole is drilled and the anchor set in the concrete, take your angle bracket and bolt it to the concrete anchor. Then screw the bracket to the bench leg. Repeat this process for any other legs you may have. Viola, you now have a super tough workbench that is anchored to your walls and your floor that will withstand anything you can throw at it. If the bench collapses, so will the building.

You can now attach any auxiliary items such as vices and other things you may want for your bench. Try to attach you most brutal item right over the concrete anchored leg. In my case, the 5' metal vice would take the most pounding, so it is mounted right over the leg. Happy hammering!



Image Notes
1. masonry drill bit
2. angle bracket
3. 3/8 inch wedge style concrete anchor
4. hole in concrete

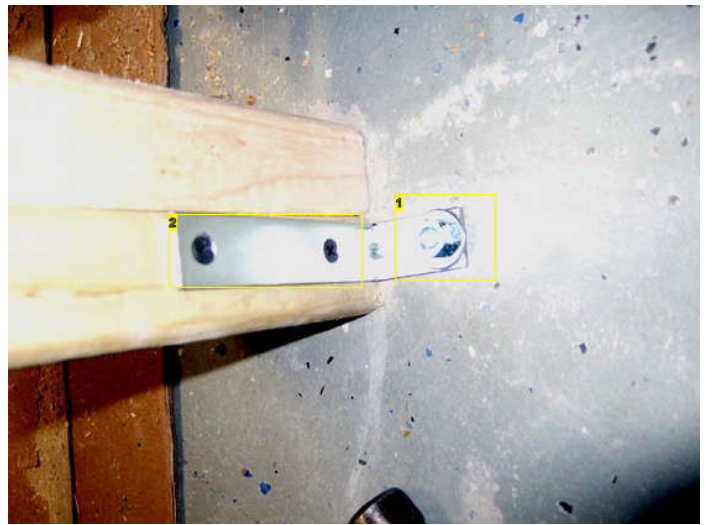


Image Notes
1. anchor bolt to concrete
2. angle bracket screwed to bench leg



Image Notes

1. Woodworking vice
2. Tunes
3. 5 inch metal vice positioned over anchored leg for maximum toughness