Bench Saw Table for a Wood Lathe

by **Phil B** on November 21, 2008

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intro: Bench Saw Table for a Wood Lathe

I became fascinated with wood lathes when I was in Junior High. I saved my money until I could buy my own lathe. Soon I wanted a bench or table saw, too. I decided to fit a saw blade to my lathe and make a table for it. The unit in the photo is not my first effort, but is an improved version.

step 1: Blade Mount

My lathe uses a smooth shaft 5/8 inch in diameter. There is a flat spot ground into the shaft for attaching fixtures with a setscrew. Blade mandrels are available from various hardware concerns. This one slides onto my shaft and is secured with a setscrew. It has a 5/8 inch diameter threaded end with spacers, a washer, and a nut. Check your lathe. Some lathes use a hollow shaft with a Morse taper. You may need to get a special mandrel direct from the maker of your lathe.

step 2: Mandrel and Blade

Here you see the parts of the mandrel laid out on top of a 10 inch carbide tipped blade. Notice the threaded end of the mandrel 5/8 inch in diameter.

step 3: Build the Table

Pardon and ignore the paint splotch on the piece of old plywood leaning against the wall behind the lathe and saw table.

I used some scrap plywood for this project. That limited the size of the table parts to some extent. Make the top of the table as large as you like. What I made is about as small as you would want to use.

The construction is a simple box open at the front and back. The front is completely open to allow room for tightening the bolt that holds the table onto the lathe bed. The top of the table needs to be high enough so any pieces of work clear the top of the headstock when moved over the table. You also want the top of the table to be as low as possible to take maximum advantage of the avaliable blade.

step 4: Back of the Table

I added this piece to the back of the table to give it stability and rigidity.

step 5: Bottom of the Table

I attached two cleats to the bottom of the table. These fit firmly against the front and back sides of the lathe bed to keep the table aligned with the saw blade. There will be more about that later. Notice the bolt from the lathe's tool rest and the fitting with nut to lock the table down on the lathe bed. It also comes from the tool rest. The cleats should be adjustable for keeping the table in alignment with the saw blade.

step 6: Cut a Slot for the Blade

Make a slot in the top of the table to accommodate the blade. If you are using a 10 inch blade, the slot does not need to be 10 inches long, but only as long as needed at the portion of the blade that meets the table at the bottom of the table. Drill a hole at each end of the slot and use a sabre saw to make the slot. Make the slot wide enough.

step 7: Cutting the Miter Gage Slot

I already had a steel bar 1/4 inch x 3/4 inch for making the miter gage. 3/8 inch x 3/4 inch is the usual size of a bar for a miter gage. I needed to make a slot in the table to fit my steel bar. Make the slot edge nearest the blade about four inches from the blade. The easy way is to use a table saw or radial arm saw. A dado head makes it very easy. In the absence of those things, a circular saw, a framing square, a couple of clamps and a precise rule will help you do a decent job, too. Set the saw depth to the thickness of the bar. Clamp the square at a right angle to the front of the saw table. Use the square's edge as a fence and guide. Make a cut. Use the edge of the cut to measure so you can move the square laterally almost the thickness of the saw blade. Make another cut. Keep the cuts parallel to the first cut. Make the last cut so it allows the steel bar to move smoothly in the slot, but without looseness side to side. Finish the slot with a file or scrape smooth with a chisel. (The second clamp on the square is outside the right border of the photo.)

step 8: Make the Miter Gage

Drill two holes 1/4 inch in diameter near to one end of the steel bar about 2 1/2 inches apart.

step 9: Countersink screw heads

Use a countersink bit to make room for the screw heads so they are recessed.

step 10: Insert Screws

Place a lockwasher onto each screw and tighten a nut on each screw. The screws are 1 1/2 inches long each.

step 11: Make the Rest of the Miter Gage

Cut a disc with a radius of 2 7/16 inches. Saw almost half of the disc off as shown. Drill a 1/4 inch hole at the center of the radius. Countersink the bottom of the disc for the nut. Glue a flat face to the disc as shown. To avoid slippage, you may glue fine sandpaper to the wood face of the miter gage.

step 12: Assemble the Miter Gage

Make a piece of strap iron to reach between the two screws as shown. Place a washer and locking nut on the axis bolt. Snug it up, but not so much that the miter gage is difficult to adjust. Place a wing nut on the other screw.

step 13: Square the Miter Gage

A homemade miter gage does not have a degrees scale, but you do not need one. Just use a square and lock the adjustment down.

step 14: Align the Saw Table

After the miter gage has been squared, place the miter gage in its slot. Here it is placed backwards of the usual position, which is very helpful sometimes. Place a square against the face of the miter gage and adjust the table until the other leg of the square fits the saw blade.

step 15: Fasten the Cleats to the bottom of the table

Once the table has been aligned to the blade, slide a cleat against the lathe bed without moving anything. Clamp it in place. Screw the cleat to the bottom of the saw table. Slide the other cleat against the other side of the lathe bed. Clamp it in place. Screw it to the bottom of the saw table. The table should be in alignment each time you place it back onto the lathe bed.

step 16: Using the Saw

Crosscutting with the miter gage is straightforward. In order to rip, use a framing square to locate and align a fence. Clamp it down. Remove the miter gage and square. Rip your work. You may add a support farther down the lathe bed near the tailstock, if needed.

This saw is a handy saw to use as a second saw when you need to make a quick cut; but your other, bigger saw is already set up for some very precise cuts. it is also a handy saw for someone with a lathe who is on a budget.

step 17: Tilt Table Feature

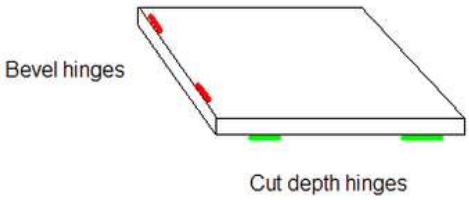
The original version of my saw table featured a hinge system so I could tilt the table to make a bevel cut. A second set of hinges allowed me also to raise the back of the table in order to reduce the cutting depth of the blade.

In the graphic the three dimensional square is a piece of sturdy plywood. It would be mounted under the table top and above the table base. The red lines show the location of hinges that allow the table to tilt for a bevel cut. The green lines show the location of hinges that allow the blade's cutting depth to be altered.

Wedges or slotted struts would be used to hold desired angles of tilt. The slot in the table top through which the blade passes will need to be altered to make it wider if you are tilting the table top for a bevel cut.

As always, be sure you know how to use a table saw safely. They can be very dangerous during any lapse of attention or unsafe practice. I already like you because you read my Instructable, but I cannot be responsible for any accident or injury you have making and using what is described here. There are plenty of sites on the Internet that describe safe table saw practice.

(Note: If you looked at this step before, I corrected the hinge positions. The previous arrangement would have created problems if both tilts were used at the same time. What is shown now will work.)



Related Instructables

Precision Puzzlemaking Primer -- Volume 1 by lkrasnow

Reuse Old Fence Boards! by Creativeman

Get More from Your Circular Saw by Phil B

The ultimate, heavy duty, stackable, bullet proof, extreme saw horses! by Mikey D

Turn a generic plastic gadget in to something a little more beautiful by radiorental

A tall work table with angled legs and simple joints by threesixesinarow

Multi-Purpose Woodworking Bench by gsport george

Parsons Table by Popular Mechanics

Comments

37 comments **Add Comment**

LinuxH4x0r says: Nov 22, 2008. 6:19 AM **REPLY**

Great idea! A little dangerous, but that never stopped me before. I already have two table saws and no lathe. Any way to do the opposite?

5/5*

0087adam says: Dec 9, 2008. 6:34 PM **REPLY**

ive been trying to do this too.

Phil B says: Nov 22, 2008. 7:19 AM **REPLY**

By "do the opposite" I assume you mean adapt a table saw for use as a lathe. That might be tricky, but a lathe is not real complicated. In Germany I saw a foot-powered lathe that worked with a springy bough from a tree and a piece of cording that wrapped around part of the work. It was at a medieval craft show. The remainder was a sturdy wooden bed with metal centers at the head and tailstock. Someone did an Instructable on a nearly identical lathe.

Someone else did an Instructable on a lathe powered by an electric motor. All you really need is a sturdy bed. Some 1 inch or larger iron water pipe will do. Clamp some short pieces of 2 x 6 inch stock in layers to make the headstock and tailstock. The tailstock spindle could be a 1/2 inch bolt or threaded rod ground to a point. Feed it through two nuts mounted on the top of the tailstock. Clamp something down over the threaded rod to keep it tight while the lathe is running. Use some shafting and pillow blocks for the headstock. If you use 5/8 inch shafting, you could buy a commercial chuck that mounts like the mandrel I used for mounting the saw blade in this Instructable. Make a toolrest from almost anything. Attach an electric motor. Buy a belt and a couple of pulleys.

LinuxH4x0r says: Nov 22, 2008. 7:36 AM **REPLY**

I actually plan on making a lathe in my welding class in the spring. I have also seen spring lathes and like them a lot, but I plan on doing metal.
Thats pretty much what I had planned. I got a free (dumpster) motor thats a little under a horse.
I'll definitely do an ible about making it

bluGill says: Nov 30, 2008. 2:50 PM **REPLY**

You can do metal on a spring lathe as well. Your foot controls the speed. The spring is just for the return (non-cutting stroke).

LinuxH4x0r says: Nov 30, 2008. 3:49 PM **REPLY**

Yeah, but I don't have enough power to keep it up for 30 mins

bikerbob2005 says: Nov 26, 2008. 8:01 PM **REPLY**

turning wood might want more than a horse motor,my craftsman had 1hp on it and it would bog down very easy when the furnace kicked off i got a 1.5 from it .
for metal work 2 horse wont turn much have to gear it down and then get a rough finish,when you build the head for the lathe make it 2x stronger than you think it needs to be,you do not want to be near a 20 lb chunk of metal when the head self-destructs .

Phil B says: Nov 22, 2008. 7:49 AM **REPLY**

The lathe I bought has a swing of about 4 inches over most of the bed. The first few inches next to the tailstock allow a swing of about 6 1/2 inches. That means I can turn pieces 8 inches in diameter over most of the lathe bed and almost 13 inches near the headstock, as in turning a bowl. See the Instructable I did on enlarging the arbor hole in a regular saw blade to 1 1/4 inches for use on a Sawsmith radial arm saw. I needed a faceplate with a wood disc about 11 inches in diameter. Make sure your lathe has a way of fitting a larger disc to a faceplate.

0087adam says: Dec 8, 2008. 7:01 PM **REPLY**

that looks like one mean saw blade!

Phil B says: Dec 9, 2008. 6:05 AM **REPLY**

All saw blades are mean and should be treated that way. This one is usually mounted on my radial arm saw. It looks just as mean there. I have a rule for myself that I keep my hands and fingers at least six inches away from all parts of the blade. I avoid standing in-line with the blade's line of cut, especially with the radial arm saw where the blade could catch something and kick the motor with spinning blade back toward me or my hand. I also think a lot about avoiding any situation where something could drag my hand into the blade. After using a power circular saw off and on over 40 years I have never had a hand or a finger come into contact with a spinning saw. I did get a couple of scratches while changing a blade. But, even then I have the power to the saw disconnected.

Burf says: Nov 27, 2008. 8:45 AM **REPLY**

As a retired carpenter of 40+ years, I have seen the evolution of safety devices for power tools. I have also seen a number of severed fingers and a thumb or two (none of which were mine, fortunately).
Though I appreciate the idea of making a tool a multi-tasker, dismissing some obvious safety devices makes me cringe. A blade guard, completely boxing in the blade and a large, prominent kill switch would help alleviate some of those concerns.

Phil B says: Nov 27, 2008. 2:59 PM **REPLY**

A couple of people asked about blade guards in the earlier comments and I gave responses then. While I would never discourage blade guards, my first experiences with circular sawing blades involved one about 24" in diameter mounted on the back end of a tractor. It used a tilt table and was for making firewood from brush. Blade guards on that were almost non-existent. It had many years of use in our family and everyone knew to keep hands and arms far from the spinning blade.

The unit in my Instructable gets very minimal use. My main saw is a 1972 vintage radial arm saw with no drop down blade shrouds like one sees today. I just learned never to get my fingers close to the blade, not even in its path, but always off to the side by several inches. I use pusher sticks a lot.

Safety devices are great, but each time a new one comes along we want to condemn all earlier models made without it as unsafe when people used them safely for years. Someone has a new table saw that senses changes in electrical capacitance and locks the blade immediately. I expect the day will come when someone will call any saw unsafe that is not equipped with that feature.

Burf says: Nov 29, 2008. 8:52 AM **REPLY**

I'm not trying to comment on your skills or the caution you use with your lathe/saw conversion. This is after all, an Instructable, and I believe there is an obligation to point out to anyone that doesn't possess your skill or knowledge, and who might attempt to duplicate your instructable, there are some real safety issues that they should know about.
I have read several Instructables that I was tempted to try and then after reading some of the comments, I became aware of dangers unknown to me beforehand. With that knowledge, I was able to reconsider and in some cases revise the instructable to eliminate a potential hazard that may have injured me or someone else. I feel that is one of the benefits of having member comments following the instructable.

Phil B says: Nov 29, 2008. 9:22 AM **REPLY**

In the last frame I did tell users to read on table saw safety practices before using a table saw. When I started, there was no Internet, but I have several articles on table saw safety I clipped from Popular Mechanics and Popular Science. They all advised keeping hands and fingers far away from blades. Those were the days before blade guards, too.

wa7jos says: Nov 26, 2008. 5:30 PM **REPLY**

This is the scariest contraption I have ever seen.
Where are the blade guards? Especially for the exposed portion of the blade below the table. This could be a death trap without them.

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roguegeer says: Nov 24, 2008. 9:40 AM **REPLY**

This is a great idea and a great instructable!

The actual idea is very similar to the Magna ShopSmith. Check them out if you'd like some more ideas. there is a thriving shopsmith community too, if you were looking for parts or photos of parts and pieces in operation.

(i have a ShopSmith VII, which isnt technically the same breed as the vaunted shopsmith V and 5xx series... but i grew up with one and like it just fine.)

the ability to raise and lower the table (for deeper or shallower cuts) is great, and your hinge system is very simple and robust!
another option would be using threaded rods as post for the table-top, and nuts at the corners of your cleat-base, with sprockets welded/attached to the nuts, and a chain around the outside. then rig an oversize "wheel" rim to one or two of the nut-sprockets: turning them would cause all four posts to raise or lower in unison (assuming the sprockets are ll the same size!)
many thickness planers use a similar system for adjusting the bed/blade depth. obviously you would need some stabilizer posts too so the table top isnt wobbly, but that could just be plywood perpendicular to the table that slides through slots in the cleat base.

but the hinges are surely simpler!

for some more ideas:
shopsmith main site
shopsmith community forum

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roguegeer says: Nov 24, 2008. 9:42 AM **REPLY**

and NOW i see that you even mention the shopsmith in your comments. *sigh* eager beaver misses the worm. or something like that.

Phil B says: Nov 24, 2008. 11:42 AM **REPLY**

Oops! I just overlooked what you wrote about thickness planers and mentioned thickness planers. We humans are a strange and funny lot.

Phil B says: Nov 24, 2008. 11:40 AM **REPLY**

Hey, we have all been there and done that. Do not let it bother you. Thanks for your comments. I like your idea about the threaded rods and the chain. I think I have seen that on some thickness planers.

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jongscx says: Nov 22, 2008. 8:35 AM **REPLY**

cough BLADEGUARD!!! *cough*

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grunthos says: Nov 24, 2008. 9:35 AM **REPLY**

One can certainly make a bladeguard to go with the saw table. I made one for my old tablesaw, which can be adapted to various configurations. It is not too hard to form and bend polycarbonate plastic ("Lexan") using a heat gun, or even a propane torch if you are careful.

http://www.bolis.com/amillar/category/project/tablesaw

Phil B says: Nov 22, 2008. 8:44 AM **REPLY**

I first began to use circular saws before bladeguards were anything but a novelty. Basic safety procedures and alert caution are better than bladeguards any day. The only injuries I have had from a circular saw ever were light scratches incurred while changing or otherwise handling a blade. During those events the saw was not running and there was no power to it. But, in our politically correct, lawsuit happy world, we have come to expect bladeguards.

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jongscx says: Nov 22, 2008. 9:19 AM **REPLY**

I agree with that.

I'm more concerned about the underside though, with the giant expose saw blade under the visibility of the table top...

Phil B says: Nov 22, 2008. 9:40 AM **REPLY**

There is no reason to reach under the table while the machine is running or even get close to doing so. It would be easy enough to add a panel in front of the blade where it runs under the table.

Years ago American Machine and Tool made a line of very inexpensive power tools that worked pretty well, including a bench saw. It sold for $9 new at the time! (I think their planer/joiner was $19.) It had an open front with adjustment levers for tilt and cutting depth right in front of the blade. That could have been dangerous.

fentanyl3 says: Jun 29, 2009. 9:27 PM **REPLY**

In today's society, no one wants to take responsibility for there own safety. This is partly due to the OSHA attitude that no one can look after themselves so a guard or switch or brake or some other device that can fail is now responsible for your safety. Manufacturers are terrified to produce a product that may even look like it isn't safe. All due to people refusing to accept responsibilty for their own actions. You are now seeing this in the multitudes of drones that mindlessly inform you they can see the blade, so therefore it must be unsafe.
In my mind and attitude a majority of guards are quite unsafe in several different ways. The most important flaw in a guard or cover is the false sense of security it gives people. They can't see the danger, so they tend to be more careless.

Phil B says: Jun 30, 2009. 6:48 AM **REPLY**

Thank you for your comment. It also reminds me of a radio broadcast about new safety features on automobiles, like ABS brakes. Drivers with various additional new safety features on automobiles tend to take additional risks they would not normally take. It is too easy to rely on a safety feature rather than on caution and good sense. I check to make sure my guns are unloaded before I handle them, but I also keep my finger off of the trigger and do not point the barrel at anything I do not intend to shoot.

kelseymh says: Nov 22, 2008. 10:27 PM **REPLY**

That is extraordinary! The concept itself has that feel of "it's so obvious", but only after someone like you has created it. The I'ble is sufficiently detailed that someone else (lucky enough to have a lathe!) could reproduce it. Well done, sir, well done!

Phil B says: Nov 23, 2008. 3:54 AM **REPLY**

Thanks. I think of this as my homemade Shopsmith. They basically put a saw table on a lathe.

There are ways to make your own lathe. If you simply need a saw, mount a motor and a bearing mandrel. Then you can build a saw table over it.

rc jedi says: Nov 22, 2008. 4:20 PM **REPLY**

I got a lathe but no tablesaw.
Great idea! Thanks!

Phil B says: Nov 22, 2008. 6:08 PM **REPLY**

I wish I could remember where I got the thing I called a mandrel. There is something similar at Amazon.com called an arbor. The threaded portion is 1/2 inch in diameter, rather than 5/8 inch. You could add a piece of metal tube to take up the slack. Of course, I do not know what kind of lathe you have. Maybe it uses a Morse taper.

gscott69 says: Nov 21, 2008. 4:03 PM **REPLY**

Very cool idea. It looks great. I would suggest mounting a splitter behind the blade to help prevent kick-backs. You can also get an after market blade guard to help save your fingers. Keep up the good work.

Phil B says: Nov 22, 2008. 7:35 AM **REPLY**

I have never had problems with kickbacks as long as the saw was properly adjusted. That means the blade is not heeling, but running true. I know some wood pieces have internal stresses that cause the ends to push the kerf closed and may bind on the blade. The other problem is wood with a lot of sap in it. I should also clean the teeth on this blade from accumulated gums.

rimar2000 says: Nov 21, 2008. 6:15 PM **REPLY**

Excellent instructable!!

Phil B says: Nov 22, 2008. 7:32 AM **REPLY**

Thank you.

mowdish says: Nov 22, 2008. 2:14 AM **REPLY**

Nice idea. I can see something like this being adapted to turn a circular saw into a table saw.

One question: You said that your previous version could tilt the table for bevel cuts and different depths, but you also said that your current version is improved. So what is the improvement and did you run into any specific problems with the tilting system?

Phil B says: Nov 22, 2008. 7:04 AM **REPLY**

I forgot to respond to your comment about turning a circular saw into a table saw. After the first version of the saw table mounted on the lathe I got a nice circular handsaw with some Christmas money. I bought a commercial miter gage because I had not yet figured out some of the things that went into the miter gage shown in this Instructable. I also wanted a larger table with a big extension for ripping pieces of plywood. I used that saw to make some of our furniture we still use after almost forty years. I would have continued to use it, but Sears had a really nice sale on radial arm saws. When my wife saw all of the things you could do with one of those, she said, "I think you should have one of those." I was not hard to convince, but she made me get rid of the circular saw and its table. I sold them to a friend. His moving van was broken into during transit and the saw was stolen. I made my new saw table for the lathe to have additional sawing options whenever I wanted them.

A few weeks ago someone did an Instructable on making a table for a circular saw. The comments to his Instructable suggested a better, more economical arrangement would be just to buy a little 10 inch bench saw with a built-in motor for about $80 US. I have thought about doing an Instructable on the table I made for my circular handsaw, though.

Phil B says: Nov 22, 2008. 6:53 AM **REPLY**

The current version improved because I used a better quality of plywood, and the fit and finish is better.

I liked the table tilting arrangement and did make use of it. The hinges I had were a little sloppy. That introduced the possibility of some wiggle in the table. I also had made a frame of 1 x 2+ inches instead of using a rectangular piece of sturdy (3/4 inch or better) plywood.

If you tilt the table for a bevel cut, you have to watch out because the end of the work on the left side of the blade is likely to be obstructed by the headstock of the lathe. The left end dips down. When I tilted the table I had to cut the work near to the desired length, and then tilt the table and make the bevel cut. If the work is not clamped or otherwise supported, it wants to creep by force of gravity toward the blade. But, that is pretty much the case with any tilt table system, including the commercially produced Shopsmith units.

Actually, the double tilt system (bevel and cutting depth) was pretty simple and worked pretty well, all things considered.