

## **Sanding Table Workbench**

My shop is never big enough, so I try to make as many multi-functional gadgets as possible. Our project today combines the assets of a workbench, sanding table, storage drawers, dust control system, vices, cooling fan and clamping table all into one. Once you have all the materials this is an easy weekend project. Probably the most difficult part will be collecting the material.

### **Collecting the materials:**

FAN - If you are a packrat like me you might have most of the materials lying around the shop. I am also cheap so I recycle everything which you may notice from my photos. If you are not a packrat, the first step is gathering all the materials. The parts will be much easier to find than you might think. The centrifugal furnace fan and the workbench are the highest priority items, since all other components are built around them. The best place to locate a fan is your local heating / air-conditioning installer. They throw dozens of furnaces in the landfill every week; talk nice and the price will be right. The motors are easily replaceable if you can find a good blower with a bad motor. Be sure to oil the bearings on the fan before assembly. Older models do not have sealed bearings. The style of workbench we are using will not accommodate a large fan. The fan you choose should be 17" wide or less to fit inside the cabinet and allow for adequate airflow. Most furnace fan motors are three speed and range in volume from about 800 CFM to over 2000 CFM. Smaller is better in this case. 800 to 1000 CFM is more than enough airflow and the variable speed motor adds enough flexibility to meet our needs.

WORKBENCH - The next step is to choose your workbench. The one I used in the photos is an older Sears model which measures 18" x 44" the top is 22.5" x 54". There are several other brands like Kobalt, which are almost identical. Most configurations will work as long as you coordinate the size of the fan with the opening in the workbench. If you are purchasing a new workbench, pre-assemble the workbench; do not install the door that comes with the unit. HOT TIP – Make a copy of the drawings for this project and plug in the dimensions for your particular brand of materials. This will help you to see any places where you might need to adjust the cut list. There are no magic dimensions on this project; they were simply a result of the salvage materials used.

**SUPPORT GRATE** - The wire grate used for the filter support is a commercial refrigeration storage shelf cut to size. These shelves are made from 3/8" rod, are very rigid and provide great airflow. Do not use a residential refrigerator shelf; they are simply not strong enough. Check with local restaurant supply warehouses. Like the old furnace fans most old refrigeration shelving is simply sent to the landfill. If you cannot find a used shelf, new refrigeration shelves sell for about \$25.00 each.

**SANDING MATT** - The other key component is the rubber mat used as a non-slip sanding surface. You have several options for the rubber sanding mat. The product in the photos is snap-together garage flooring, commonly referred to as drainage flooring. Home Depot carries their own brand; a 30" x 36" piece sells for \$19.95. Sears carries two types. Rubber stress mats can also be used. Just make sure the product has enough holes for good airflow. The thickness varies by brand from 1/4" to 1" so be sure to adjust your spacers accordingly.

**VICES** - The main clamp running the full length of the workbench is made from a Workmate that was disassembled. If you do not have an old one lying around that you are willing to cut up, buy the cheapest one you can find. You only need the cranking assemblies from the Workmate. Remove the wood top and drill out the factory rivets to remove the legs. These products are assembled with metric bolts.

**FILTERS** - That narrows the list down to the two washable furnace filters, which are readily available. Use a dense foam style filter; do not use a corrugated style filter for the top. The filter must support the weight of the item being sanded. The filter pictured is a 20' by 25" washable adjustable electrostatic filter manufactured by Web. It can easily be cut to size. Do not install the frame, as it will make the top uneven.

**Assembly:**

**FAN COMPARTMENT** – If you are using an existing workbench remove the door panel that comes on the workbench. You will want to replace the door with a wood panel to create a good vacuum through the sanding surface. Use 3/8" or 1/2" material, Luan or hardboard will not be rigid enough to withstand the vacuum created by the fan. You can use plywood, OSB or particleboard depending on how much money you want to spend and what scrap you might have; the end result will be the same. Cut and install the

bottom first. Set it into place, but do not screw it into place at this time. The side panels will require a saw kerfs in the top of each piece to accommodate the flange on the upper table support. Use 1/4" x 1 1/4" screws to attach the side panels. Most of the workbench models have pre-drilled holes in the side jam for shelving. If yours does not you will need to drill these holes. Use the factory drilled and threaded holes where possible.

Cut the hole into the factory top. Watch the hold down clips on the underside to ensure you do not cut into one with the saw.

Mount the fan in the enclosure with the exhaust opening facing the rear of the bench. Drill two 1/8" holes through the fan housing into the lip of the lower workbench support. Attach the fan with 2 #10 x 1 1/4" self-taping screws. Drill two more holes in the top of the fan exhaust and use two 1" screws to attach it to the 2x4 brace. Drill two 1/8" holes in the front side of the bottom panel and secure it with 2 #10 x 1 1/4" self-taping screws.

**ELECTRICAL** – Cut a hole for a double gang box with zip-mount retainers. The color code for most fans is: Green – ground, Brown – high speed, Blue or yellow – medium speed, Red – low speed; brown with a white tracer is the run capacitor the same as white. White is the natural or common from the electrical panel; this wire may be black coming out of the fan. Be sure to verify your fan's color code. If your fan is missing the wiring diagram the nice man at the HVAC shop may be kind enough to help you out. A 3-speed attic fan switch works well for this application. The wider prong on a power cord is the common conductor; use a volt/ohm meter to determine which wire is the common on the other end, many power cords are not color coded. Ensure the power cord and switch you use is rated for the amperage of your motor. The fused power bar is strictly for convenience. Always practice basic electrical safety and comply with local codes.

**THE TOP** - The rubber mat, filter and refrigeration grate you have selected can vary in thickness considerably. The most difficult part of this whole project is the coordinating the thickness of the top. The rubber mat pictured is 1/4" thick, the grate, filter and mat total 1 5/8" thick. Stack the three together and measure the exact height of your components. This is where you will want to use spacers or different combinations of

plywood to achieve the proper thickness. 1/8" hardboard or Lauan are good and cheap spacer for this purpose. If you choose to make the top larger watch two points: 1) Additions to the front will obstruct the drawer. 2) Extending the rear could make the table flip over under heavy workloads. If you extend the top to the rear more than a few inches add two additional legs to the outer edge for stability.

Cut the 2x4 picture frame top pieces. If you used a thick rubber mat you may need to increase the deck screws from 2" to 2 1/2". Be sure you countersink the screws far enough to penetrate the full depth of the original wood top. IMPORTANT NOTE – notice that the refrigeration shelf is cut larger than the filter and rubber mat. The only reason for this difference is to leave as much of the 3/8" shelving intact as possible. Also the notches in the picture frame were only to accommodate the pattern in the rubber mat used. These can be eliminated if you are using a different rubber mat and choose to cut the filter and mat 15" wide instead of the 18" wide as in the photos. Rip a 2" strip from a 2x4x54" stud to complete the underside of the top on the back.

Cut the doors for the front and back of the fan enclosure. Use the existing workbench bolt hole locations, drill 1/4" holes in the wood panels and attach using 1/4" x 1 1/4" screws.

CLAMP – The Workmate assemblies are installed with the flanges to the inside. Counter sink holes for the bolt head and washer using a 3/4" Fostner bit. Drill 5/16" holes for mounting block bolts. The inside end of the mounting block requires a 5/8" hole 3/4" deep for the nipple on the block. First attach the rear bolt into the plastic mounting block using the M8 x 80 mm bolts; this will hold the blocks into place. Next attach the Workmate assembly with the second bolt. Screw two 54" 2x4's together for the movable side of the clamp. A notch or spacer may be required on the bottom side depending on the actual thickness of your top. Assemble and close the clamp completely before attaching the 6" wood vices. Ensure the vices miss the threaded rod from the Workmate clamp when it is fully closed.

EXHAUST - The fan exhaust doesn't absolutely need another filter, but it does need a protective cover to ensure little fingers or the cat does not get into the fan blades. In my case, I happened to have an old Allergy Free Air Filter lying around that didn't fit

anything. The extra filter just helps with the dust. If you choose not to use a second filter, cover the opening with ¼" wire mesh for safety. Drill ¼" holes in the lower filter bracket and attach it to the bench using the ¼" x 2 ½" lag bolts. Attach the upper filter bracket with 2 - 3" deck screws. Allow enough clearance to slide the filter in and out easily.

That's it; you now have an extremely functional workbench with dust control and storage. I personally love the full length bench vice. You might notice a few extra shims in my photos. Since I bought all the M8 x 80 mm bolts within 20 miles of my house I had to use 100 mm bolts to finish the project. That's why they call us craftsman, we live for the challenge.