

Operating Procedures for Router Table

INTRODUCTION:

The router table is a very versatile tool. It can be used to cut a molding profile, cut workpieces to match the shape of a pattern and cut a molding profile at the same time, make raised panels, cut cope and stick joints for rail and stile joinery, cut tenons and many other operations. It is similar to the shaper, but is not as robust and has fewer capabilities: most cuts require multiple passes; it can not cut profiles that are as high or deep; it is limited in the complexity of the shapes that can be cut; the direction of rotation is not reversible and therefore some cuts may be against the grain; The diameter of the cutter is smaller and therefore the cuts are not as smooth.

SAFETY RULES:

Warning! Willful violations of these safety rules, disruptive actions or horseplay may result in loss of the privilege to use the tools and machinery in the workshop.

As with all machines, there is a certain amount of hazard involved with the use of this router table. Use the machine with the respect and caution demanded where safety precautions are concerned. You are responsible for you own safety.

Warning! The router table uses a sharp rotating bit that can cause serious cuts to your hands and fingers, potentially leading to amputations.

Read and understand the operating procedures for this machine before attempting operation.

Personal Protective Equipment. At a minimum eye protection and hearing protection must be worn when operating this machine. Eye protection must be safety glasses with side shields, goggles, or face shield in combination with safety glasses, which meet ANSI Z87.1. Remove tie and loose jewelry. Button sleeves or roll up sleeves above the elbow. Remove loose outer clothing and confine long hair. Do not wear loose fitting gloves. If gloves are worn, they must fit tightly to the hand.

Use the appropriate NIOSH approved respirator in dusty work conditions (N95, N100, P95 or P100). Wood dust has been listed as a known carcinogen by the U.S. government.

Work Area. Keep the floor around the router table clean to minimize the danger of tripping or slipping. Be sure the table is free of scrap or foreign material. Make sure the dust collector is hooked up and operating.

Operator Position. Maintain a balanced stance and keep your body under control at all times, so that you do not fall or lean against the cutter or moving parts. Do not overreach or use excessive force to perform any machine operation.

Careless Acts. Give the work you are doing your undivided attention. Looking around, carrying on a conversation and “horseplay” are careless acts that can result in serious injury and loss of work shop privileges. Unplug the router before performing any service or maintenance.

Drugs, Alcohol, Medication. Do not operate this machine while under the influence of drugs, alcohol, or any medication. Do not operate this machine if you are tired, sick, or distracted.

Maintenance. A machine under repair or when changing bits must be Locked Out following the Club Lockout Procedure until the maintenance is complete.

Maintain Tools In Top Condition. Do not operate the router table with a dull or badly worn bit. Use a sharp and clean bit for safe and best performance.

Hand Safety. Follow the 3” rule. Keep your hands clear of the bit area. Do not place your hands within 3” of the cutting circle of the bit. Use push blocks, push sticks or jigs as needed to maintain this clearance. Do not reach past the bit to clear parts or scrap while the router is running. Avoid awkward operations and hand positions where a sudden slip could cause your hand to contact the bit.

Material Condition. Reclaimed or pressure treated wood is not to be cut on this machine. Do not attempt to shape boards with loose knots. The knots can come loose and become projectiles.

Do not attempt to shape twisted, warped, or bowed stock. Do not attempt to shape long or wide boards unless adequate supports are used to support the “off-table” portions of the workpiece. Do not attempt to shape man made materials like MDF, particle board or OSB. They will quickly dull the cutter and generate large amounts of dust.

Stock Length. Never shape stock less than 12” in length unless it is secured in a Shop Leader approved jig or fixture. When possible, shape long stock and then cut it to length.

Narrow Boards. Shaping narrow boards can be hazardous. Never shape stock that is less than three times the width of the profile being cut. Always use fixtures, feather boards, hold downs, push blocks and or other jigs to hold down the workpiece and keep it against the fence. The best way to profile a narrow workpiece, such as molding, is to cut the desired profile on a wide board and then rip off the molded edge.

Table Inserts. Use the smallest size table insert that the bit will be able to pass through. This maximizes support of the workpiece and helps to prevent hang-ups.

Bits. Use only bits that are designed for use in a router and that are rated for the speed to be used. Check the bits for cracks or missing carbide. Do not use a bit if it is cracked or has missing carbide. Make sure that the bit is held tightly by the router collet. Use the one-hand method to squeeze the collet wrenches to tighten the collet.

Feed direction. Do not try to climb cut unless a power feeder is used. Climb cutting can grab the workpiece and launch it into the air causing possible serious injury or death. Exception: Climb cutting may be permissible if cuts no more than 1/32” deep are taken and hold downs are used to hold the workpiece tight against the table and fence. Approval of the shop leader is required prior to using this technique.

Router Speed. Ensure that the router speed is correct for the diameter cutter that is being used. For cutters up to and including 1" in diameter, the spindle speed can usually be set at the maximum rpm. For larger bits, such as cope and stick and panel raising, the speed will need to be reduced. If the router is bogging down, or burning the wood, a slower speed is required.

Fence. Adjust the fence halves so that the bit passes within 1/16" to 1/8" of each half. This maximizes the support of the workpiece and minimizes the open area around the bit that your hand could get caught in. Always hold the workpiece against the fence when shaping straight stock.

Pattern Shaping. When cutting a profile on irregular stock, arches, or curves, the workpiece must be held securely to a jig or pattern that bears against a rub bearing on the router bit. No free-hand shaping is to be done.

Job Completion. If the operator leaves the machine area for any reason, the router should be turned "off" and the bit should come to a complete stop before his departure. In addition, if the operation is complete, the operator should clean the router table and the work area. Never clean the table with the power "on" and never use the hands to clear sawdust and debris; use a brush. If you are not thoroughly familiar with the operation of the router table, obtain advice from the Shop Leader.

ADJUSTMENTS:

The position of the fence can be changed by loosening the fence locking knobs at each end of the fence. Move the fence so that it provides the desired depth of cut and tighten the locking knobs. The knobs must be tight, but such that it is difficult to loosen them.

The fence has MDF faces that are attached to it. They are held in place with 5/32" socket head cap screws. Loosen these screws and position each face so that it is 1/16 to 1/8" from the outer diameter of the bit, then retighten the screws.

The height of the bit is set by turning a crank. A scale on the table indicates the relative height of the bit. The scale can be zeroed by turning it with your fingers.

OPERATING CONTROLS:

Start – Stop Switch. The Start-Stop switch is located on the front of the right-hand side of the stand.

SETUP

Bit Installation. When installing, removing, or changing the bit the machine must be Locked Out following the Club Lockout Procedure. In this case, that requires unplugging the router and placing the plug near you where you can see and control it. Remove the table insert. Raise the router as high as possible. Change the collet if needed to match the diameter of the shank of the router bit to be used. Clean any sawdust from the router collet socket and the collet before screwing the collet to the router shaft. Insert the bit into the collet, being careful that only the straight portion of the bit shank is in the collet. Any radius that transitions from the shank to the cutter must be above the collet. Tighten the collet using two 27mm (1-1/16") wrenches. Position the wrenches so that you can squeeze the two wrenches with your hand, and tighten it.

Install the table insert with the smallest hole that will clear the router bit.

The depth of cut is controlled by the position of the fence and the height of the bit. You will have the most control of the depth of cut by positioning the fence to the full depth of cut desired and raising the bit a little each pass until the desired profile, or height is achieved. In most cases, the height of the router bit should not be increased more than 1/8" per pass. For the best finish, the final passes should be made with bit height increases of 1/32" or less.

WARNING! The fence must be positioned so that the workpiece is in front of both the bit and the fence. Never position the fence so that the profile is cut on the side of the workpiece opposite from the fence. This setup will be a climb cut that will energetically eject the workpiece off of the table.

The router table is equipped with a sliding miter gauge that is attached to the fence. This has a significant advantage over using a standard miter gauge and the miter gauge slot in the table. The sliding miter gauge always travels parallel to the fence. This allows coping cuts to be made accurately on the end grain of workpieces. The fence on the miter gauge is replaceable and can be of any reasonable length desired. Stops can be placed on this fence to ensure that workpieces of equal length are produced while coping. The fence also provides good support for workpieces that are shaped while held in the vertical position, such as when cutting dovetails in table legs to accept dovetailed rails and for cutting the dovetails in the rails.

OPERATION

Open the dust collection blast gate and ensure that the dust collection system is operating.

As seen from the top of the router table, the bit turns counterclockwise and the cutting edges face accordingly. The safest and cleanest cut will be made when the workpiece is fed into the rotating bit. For workpieces where the exterior edge is to be profiled, feed the workpiece from Right to Left using the front side of the bit. If profiling a shape, feed the shape in a counter-clockwise direction. For workpieces where the interior edge is to be profiled, feed the workpiece in a clockwise direction.

Start the router and feed the workpiece from right to left while holding the workpiece tight against the fence and table. Hold downs and feather boards can be used to help achieve this. Feather boards and hold downs not only provide added safety, but also hold the work piece tight against the table and fence. As a result, there is less vibration and a smoother, more consistent cut.

When shaping the edge of a narrow board, the board must be wide enough to support the cutting forces of the router bit. Always use a board that is at least three times as wide as the final depth of cut. Rip the board to final width after shaping if needed.

When finished, turn off the router and close the dust collection blast gate. Clean the router table and the area around it.

Pattern Shaping. Pattern shaping is used to profile the edge of irregular workpieces using a bit with a rub bearing. The bearing rubs against either a pattern or the workpiece itself and controls the depth of cut.

The use of a pattern allows the entire edge of the workpiece to be profiled. In these operations, the workpiece is typically cut to the approximate shape using a band saw, and about 1/16" to 1/8" oversize. The workpiece is then secured to a pattern, typically with double

sided tape or screws. The purpose of the pattern is to duplicate the pattern shape on the workpiece and to secure the workpiece and allow it to start and finish the cut in a controlled manner. Note that any imperfections on the edge of the pattern will be duplicated on the workpiece. It is therefore important that the pattern be carefully prepared.

The pattern is held against a rub bearing on the bit as the workpiece is fed past the bit. However, when starting the cut, the pattern must be held against the starting pin and rotated into the rotating cutter. Once the workpiece is in contact with the rub bearing, it must be moved away from the starting pin. This operation can only be performed with the fence removed from the router table. It is desirable to construct the pattern so that the pattern extends past the workpiece. With this type of jig, the extended portion of the pattern is brought up to the rub bearing, and full contact is made before the workpiece is fed into the bit; no starting pin is used. Care must be taken to ensure that the cut is started from the side of the pattern that allows the workpiece to be fed into the blades of the rotating bit. If fed into the bit as in a climb cut, with the bit blades rotating away from the workpiece, the workpiece may be grabbed and propelled away from the cutter with significant energy. The pattern must be in full contact with the rub bearing at all times as the workpiece is fed past the bit. The pattern must also extend past the end of the workpiece so that the cutter completes the profiling of the workpiece before the pattern loses contact with the rub bearing.

If only a portion of the workpiece edge is to be profiled, the workpiece can usually be used as the pattern. In this case, the workpiece is cut and smoothed to final shape and size. The rub bearing on the bit is then allowed to rub directly against the workpiece as the profile is cut. As with outer cuts made with the router table, it is preferable to cut the profile in several passes by raising the bit a little for each pass. Due to the low height of the rub bearing, the initial cut may be deeper than optimum to produce a good finish. After the initial cut, raise the bit in 1/32" increments until the desired depth of cut is obtained.

Shaping the ends of narrow stock.

Workpieces that are narrow or long often need to be shaped when cutting tenons, cutting slots for splines or when making the coping cut on rails for frame and panel doors and cabinets. These cuts are usually best performed using a shaper, but for light duty applications, the router table can be used. These workpieces can not be cut by using the fence to guide the stock. Unless the workpiece is at least 12" wide, the fence will not provide adequate support. Even if the workpiece is 12" wide, if the board is long, it will be difficult to control the movement of the workpiece as it is pushed into and through the bit. A rotating bit also tries to force the work away from the cutter in a lateral direction. This makes it difficult to hold the workpiece steady as it is being cut. The best way to shape the ends of narrow or long boards is to use the sliding miter gauge.

The miter gauge is attached to the fence and moves parallel to it. This ensures that the gauge moves in a straight line and does not move laterally. A replaceable wood fence is attached to the front of the miter gauge fence using Tee Track bolts that allow it to be repositioned laterally.

Example: How to cope the ends of a rail. This method produces any number of exactly the same length rails. This is essential if square doors or panels are to be produced. This method cuts the coping cuts on the rails first and then the coped rail is used to position the height of the bit to make the matching pattern cuts on the stiles.

1. Cut the rails to the exact length desired;
2. Install the coping bit(s) in the router;
3. Adjust the position of the table fence so that it is even with the outside diameter of the rub bearing between the top and bottom cutters. This position must be exact.
4. Adjust the wood fence on the miter gauge so that it is about 1/32" away from the table fence;
5. Raise or lower the bit as needed to position the cutters so that the desired profile will be cut. A fillet depth of 1/16" to 3/32" usually looks good;
6. Hold the workpiece so that it is tight against the table fence and the miter gauge fence;
7. Start the router and set the speed at about one-half of maximum.
8. Push the workpiece through the bit to make the first coping cut. Do not pull the workpiece back through the cutters with the bit still rotating;
9. Turn the workpiece end-for-end with the face side still down. Position the workpiece against both the table fence and the miter gauge fence.
10. Push the workpiece past the cutters to make the second coping cut.
11. Follow steps 6 to 10 for each rail.
12. The pattern cuts are made using the pattern cutters and the table fence. Adjust the height of the cutters to correspond with the cuts made with the coping bit. This means that the center pattern cutter elevation should match the elevation of the groove made by the coping cutter. The fence should be adjusted so that it is exactly even with the rub bearing on the pattern bit.