Cluster #3 — Drill Press

Primary Use

The primary use for the Powermatic PM2800 Drill Press is for accurate drilling or boring holes. The drill press incorporates a 1-hp motor, a large cast-iron table with sliding extensions, an aluminum split fence with a 2inch dust port, twin LED lights to illuminate the work, a variable speed control with a large digital readout and laser crosshairs to pinpoint the drill position.

Important Parts

The most important parts of the drill press are the:

Large, lighted power button – a large, red, plunger-type switch located on the front of the machine. Pull to turn the machine on, and push to turn the machine off. The switch incorporates a safety pin that must be in place before the switch can be activated. An illuminated green light in the center of the power button indicates there is power to the machine.

Laser Crosshairs – Used to pinpoint the center of the drill position.

Feed Handle – controls the raising and lowering of the drill.

The Chuck – the drill or bit is held in the keyless, 5/8" Chuck.
Double-nut Locked Depth Stop – controls how deep the drill will penetrate into the wood.
Variable Speed Control – controls the drilling speed [RPM]. Factors to consider when adjusting the speed include the diameter of the cut (drill bit) and the hardness of the material. The instructor will demonstrate how to change speeds and explain the factors used to determine the correct speed to use.

Tilt Table – The surface the wood is placed on for drilling. It should be set to the correct angle for the cut. 90 degrees is most common.

Adjustment of the Tool

1. Be sure the table is locked in the position of your choice.
2. Be sure the drill is secured tightly in the chuck.
3. Consider clamping your work down to the table.
4. Set the correct cutting speed and ensure the speed adjustment knob is locked.
5. Adjust the table so the bit is approximately ½" above your work piece.
6. Adjust the split fence and lock each side in place.
7. Be sure the drill will not cut into the metal table. A backing board may be needed for this purpose and to reduce tear out. Ensure the table is free of scrap and the dust collector system is on.

Demonstrate the basic operations

Demonstrate drilling holes with a Small & Large Twist Drill, Forstner bit or Spade Bit. Demonstrate the Hole Saw by drilling from one surface and then turning the work piece over to finish the hole. Explain the advantage of backing up the wood when using a spade bit. Explain the advantages for using a Forstner Bit.

Safety

- **Always wear eye protection.**
- Make sure your work is clamped properly before drilling. Clamps should be used when using a large drill or bit or drilling into a small piece of material
- Ensure the table protection board is in place when necessary.
- On deep cuts, back out often to clean out the hole.
- If the tool smokes and the sawdust is dark brown, reduce the speed or check the sharpness of the tool.
- Do not wear jewelry, lose clothing or gloves that can get caught up in a turning Drill Press.
- Roll sleeves above the elbow and secure long hair.
- The Drill Press is a one-operator machine. Do not have someone hold the work for you.

Give hands on experience

DRILL PRESS, MEMBER DEMONSTRATION

Put your safety glasses on

Have member do the following using ¾" wood as their practice piece.

1. Check the table is set for a 90 degree cut. This can be done by placing a drill, spade bit or short dowel in the chuck and checking with a square.
2. Check that the table protection board is in place if necessary.
3. Demonstrate how to change speeds and what speed to use. Unlock the speed control, move the lever forward and back, then re-lock the knob to prevent inadvertent speed changes. Read the speed on the digital readout on the front of the machine.
4. Drill a ¼" hole through a ¾" piece of wood.
5. Clamp the work piece down and drill a hole with a Forstner bit ½" into the wood by using the depth stop adjustment.
6. Clamp the work piece down and, using a ¾" spade bit, drill a hole.
7. Remove your work and clean the table.

Cluster #3 — Band Saw

Primary Use

The primary use of the band saw is to cut curves or irregular shapes. It can also do a variety of straight cuts as well as re-sawing.

Important Parts

The most important parts of the Band Saw are:

Blade Guard

The blade guard is the cover over the blade. It should always be in place.

Upper and Lower Blade Guides

The correct adjustments of these guides are very important to making an accurate cut because they provide stability to the blade and ensure blade movement is kept to a minimum. Always check the positioning of the guide pins or wheels, ceramic guides and the blade support.

Blade Tension Control

Be sure the blade tension is appropriate for the blade size. The Powermatic tension is set by maintenance because we do not change the blade width, but the Laguna blade tension can change based on the blade width. Use the Saw Blade Tension Indicator on the back of the saw.

Table Tilt Control

Be sure the table starts out 90 degrees to the blade.

Foot Brake

The foot brake removes power to the motor through a switch mounted on the body of the machine, and slows the flywheel by applying a brake pad to the flywheel.

Adjustment of the tool

The blade guide should be kept to a minimum above the surface of the wood. The teeth of the blade should be in front of and clear the guide pins or wheels.

Demonstrate the basic operations

- Plan how you will make all of your cuts before turning on the saw.

- Make short cuts before long ones if you plan to back out the blade from the wood. Consider using Radial cuts when the radius of the cut is too sharp for the width of the blade.
- Whenever possible, cut out through waste wood rather than backing out of the wood. If you must back out of a cut, leave the saw running and back out as slowly as possible or the blade could be pulled off the drive wheels or ceramic guides.
- Make use of turning holes at inside corners of your design if appropriate.
- At rectangular cuts, cut to one corner, back out, and then cut to the other corner. Then take a curved cut to the first corner to clear out the waste wood. ? Break up tight curves with the use of relief cuts.

Safety

FOR THE INSTRUCTOR- Focus on the placement of the hands rather the accuracy of the cut. Accuracy will come with practice.

- **Always wear eye protection.**
- In case of a blade break, do not let anyone stand to the right side of the band saw.
- Never have your hands so close to the blade that you do not have enough reaction time to pull away.
- Wait for the saw to stop before removing scrap with your hands. Use your wood to remove scrap at other times.
- Do not use dull, dirty or cracked blades.
- Roll sleeves above the elbow and secure long hair. Don't wear loose clothing or jewelry. Do not wear gloves.
- If backing is a problem, stop the Band Saw, raise the guard, and use a piece of scrap wood to push against the teeth of the blade as you manually back the blade out of the cut.

Give hands on experience

* Demonstrate this operation exactly as the members will be doing it.
* Demonstrate how to back out of a cut if the blade is binding in the kerf.
* When backing out of any kerf, be sure to indicate how slowly you must move when backing out, even when making relief cuts.
* Watch the front of the blade to be sure it is not pulled forward when backing out.

BAND SAW, MEMBER DEMONSTRATION (Put your safety glasses on)

Power off demonstration: Turn on the saw. After the saw is at full operating speed, turn it off. Before the blade stops running, initiate a cut on the demo board. This will show the members that the blade is capable of cutting for a period of time after the saw is turned off.

Push Stick pattern cutout

* Trace out the pattern of a push stick onto a ?” piece of wood.
* Plan out the order of your cuts considering the possibility of relief cuts.
* Set the blade guide to the correct height. * Check all adjustments. [guides, tension, and tilt] * Cut out the Push Stick pattern.
* DO NOT brush scrap wood off table while the blade is moving. * Turn off saw and lower the guard.

Cutting out an inside rectangular corner

* Trace out a pattern for an inside rectangular corner.
* Cut out the pattern by cutting to one corner first, then backing out.
* Cut to the next corner, back out a bit, then curve your cut to the first corner. Most of the wood will fall out at this time.
* Your last cuts will clean out the bottom of the cut.
* Do not brush scrap wood off the table with your hands while the blade is moving. * Turn off saw, lower the guard, clean the area and release blade tension.

Repeat either procedure if the member is uncomfortable with what they did.