

Course Title: Drill Press
Jet JDP-17MF

Course Hours: 1

Version: 2

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Course developed by Bill Brett for use in training at the Education Center of the Greenville Woodworker's Guild, Inc. in Greenville, SC., and cannot be reproduced or used without the approval of the Mentoring Chairman of the Guild.

Safety is a personal issue. The Guild and the author do not accept responsibility for any accidents that may occur while using this guide.

I. Course Objectives

1. To learn the basic safe practices while operating the drill press.
2. To learn the operating practices that are prohibited due to safety.

II. Class Materials

1. a drill bit
2. a test piece

III. Lesson Plan

A. Explain Safety issues:

- Never operate any machinery when tired, sleepy or under the influence of any medications which may cause drowsiness
- Wear clothing which holds close to the body. Shirts should be short sleeved. Pants should not snag on machinery
- Remove all jewelry possible. This includes watches, rings, and especially necklaces
- Footwear should be sturdy, have good traction and protect the toes. Sandals should be avoided
- Long hair should be secured under a cap so as not to hinder vision and pony tails should be tucked into the shirt
- Always wear approved safety glasses or goggles

- Always use hearing protection
- Always keep tool surfaces clean & clear of misc. materials
- Always be aware of other people operating in your vicinity
- Always provide proper support for materials as outlined later in this training plan
- Always make sure the tool is in proper working order
- Never use a dull tool
- Always seek assistance when handling heavy or awkward materials or anytime you are unsure about how to proceed
- Always respect the tool for what it may do to you or someone nearby if there is a lapse in safe operating procedures
- Never approach or distract another person operating a machine
- Remove adjusting keys and wrenches. Form a habit of checking to see that keys and adjusting wrenches are removed from the machine before turning it on.
- Do not drill pieces that are too small to be safely supported.
- When drilling a large workpiece, provide additional support at table height.

B. Show the location of:

- Power on/off switch
- Circuit breaker for hardwired equipment (#15)
- Table Height Adjustment
- Depth Stop
- Table Tilt Adjustment
- Work light switch
- Key storage

C. Show how to:

- Adjust Depth Stop - to drill multiple holes at the same preset depth, use the depth stop:
 1. Use a pencil to mark the depth the bit will drill into the workpiece;
 2. With the drill bit in the chuck, lower down

feed handle to advance bit to your mark.

3. With your other hand, advance the lock nuts on the depth stop rod until they are snug to the seat.

4. The drill bit will now advance to this point.

5. To release, unscrew the nuts counter-clockwise to the top of the depth stop.

- Change spindle speeds - a spindle speed and belt arrangement chart are found on the inside of the belt cover. Refer to this chart whenever changing speeds. Spindle speeds range from 200 rpm to 3630 rpm. The larger the bore and/or the deeper the hole, the slower the spindle speed should be. To change spindle speeds:
 1. Unplug the machine from the power source.
 2. Loosen two bar knobs found on each side of the head assembly.
 3. Rotate the tension adjuster to bring the motor base as close to the head as possible.
 4. Change the belts locations according to the speed chart and the speed you desire.
 5. Rotate the tension adjuster to tension the belts.
 6. Tighten two bar knobs. Belts are properly tensioned when finger and thumb pressure midway between the two pulleys causes approximately 1/2" deflection.

- Return Spring Adjustment - the return spring is adjusted at the factory and should not need further adjustment. If adjustment is deemed necessary:
 1. Unplug the machine from the power source.
 2. Loosen two jam nuts. Do not remove.
 3. Firmly hold the coil spring cover.
 4. Pull out the cover and rotate until the pin on the return spring plate engages the next notch in the coil spring cover. Turn the cover clockwise to decrease tension and counter-clockwise to increase tension.
 5. Tighten two jam nuts. Do not over-tighten. Nuts should not contact the housing when tight. The jam nuts should be tightened against each other.

- Table Height Adjustment
 1. Loosen the column lock handle, on the left side of the column.
 2. Turn the crank handle to move the table up or down.
 3. Tighten the column lock handle.

- Table Tilt Adjustment (Note: this procedure does not agree with the Owner's Manual, since the 2 drill presses in the Shop have been modified).

To tilt the table:

1. Under the table top, and up against the column tube, loosen the 15/16" hex-head bolt (Owner's Manual, page 14, Fig 10, item G), and pull out the alignment pin (item E/F).
2. Tilt the table to the desired angle.
3. Tighten the 15/16" hex-head bolt.
4. The alignment pin only works at 90 degrees, and must be re-inserted when the table is returned to 90 degrees.

D. Basic Operation

1. Always use a back-up piece of scrap wood to cover the table. This protects both the table and the drill bit.
2. Place material to be drilled in such a way as to come into contact with the left side of the column. This prevents the material from spinning. If the workpiece is not large enough to come in contact with the column, use a clamp or drill press vise that is securely fastened to the table. Failure to comply may cause serious injury.
3. Feed the bit into the material with only enough force to allow the drill bit to work. Feeding too slowly may cause burning of the workpiece. Feeding too quickly may cause the motor to stop and/or the drill bit to break.
4. Generally speaking, the smaller the drill bit, the greater the RPM required. Wood requires higher speeds than metal. Metal is usually drilled at slower speeds.
5. In dusty environments, frequently blow out any dust that accumulates inside the motor.

- E. Review with the student the operations that have been covered in this lesson plan.

F. Performance testing and Certification

Secure appropriate materials and have the student perform:

1. drilling a series of holes to the same depth.

Drill Bits

Twist bits



Usually referred to as twist drills, twist bits are probably the most common drilling tools used by the handyman with either a hand or electric drill. The front edges cut the material and the spirals along the length remove the debris from the hole and tend to keep the bit straight.

They can be used on timber, metal, plastics and similar materials. Most twist bits are made from either:

- 'high speed steel' (HSS), these are suitable for drilling most types of material, when drilling metal the HSS stands up to the high temperatures.
- 'carbon steel', these bits are specially ground for drilling wood and should not be used for drilling metals, they tend to be more brittle, less flexible than HSS bits.

Twist bits are also available coated with Titanium nitride (TiN), these are easily identified by the gold like colour. This coating increases the hardness of the bit and adds a self-lubricating property. The coating is only really effective when metal is being drilled, it has little effect when working with other materials.

Twist drills are usually available in sizes 0.8-12 mm plus. They are designed for drilling relatively small holes, they sometimes tend to clog quickly especially when the wood is 'green' so when drilling deep holes (especially in hardwood) the bits should be withdrawn regularly to remove the waste.

Special care is required when using the smallest sizes since these bits are thin and brittle. Always hold the drill square to the work and apply only light pressure when drilling.

Sharpening - use a drill sharpener, a grindstone jig or an oilstone.

Titanium nitride bits cannot be sharpened without destroying the coating (although if the drill needs sharpening, the coating will probably have already been destroyed). Forming the correct angle at the tip is important for efficient cutting.

Spur point bit



Also known as a wood or dowel bit, they have a central point and two raised spurs that help keep the bit drilling straight. The bit cuts timber very fast when used in a power drill and leaves a clean sided hole. They are ideal for drilling holes for dowels as the sides of the holes are clean and parallel. Sizes range from 3 to 10mm. Spur point bits should only be used for drilling wood or some plastics.

Sharpening - a bit fiddly as it has to be done by hand. Sharpen the point and spurs with a fine file or edge of a fine grindstone; the angle between the point and spurs should be 90°.

Flat wood bit



Intended for power drill use only, the centre point locates the bit and the flat steel on either side cuts away the timber. These bits are used to drill fairly large holes and they give a flat bottomed hole (with a central point) so are ideal where the head of a screw/bolt needs to be recessed into the timber - always use this bit before drilling the clearance hole for the bolt.

The larger bits require a fairly powerful drill to bore deep holes. The bits cause a lot of splintering as they break out the back of the workpiece - using a sacrificial backing board will reduce this. Flat wood bits are not really suitable for enlarging an existing hole.

Sizes range between 8 and 32mm.

Sharpening - use a fine file, oilstone or grindstone.

Forstner bit



Used to form holes with a flat bottom, such as for kitchen cupboard hinges. Best used in a power drill held in a drill stand as there's little in the way of a central point. If used freehand, the positioning is difficult to control as there is no central pilot bit. .

Sharpening - on an oilstone or with a fine file.

Wood Auger bit



This is ideal when drilling large-diameter, deep holes in wood or thick man-made boards. Generally an Auger bit should only be used in a hand brace. The bit will cut a clean and deep, flat bottomed holes. The single spur cuts and defines the edge of the hole while the chisel-like cutting edge removes the waste within the previously cut circle. The threaded centre bites into the wood and pulls the bit into the timber. This 'pulling' action means that the bit is really unsuitable for use in a power drill.

Sharpening - use a fine file or oilstone to keep the spur and main cutting edges sharp.