Yale *Environmental Health & Safety*

Shop Safety Procedure

Equipment/Task Name:	VERTICAL BAND SAW
Equipment/Task Hazard Class:	4 & 5 http://ehs.yale.edu/forms-tools/tool-classification-matrix
Shop Name:	
Shop Hazard Class:	

Purpose

Vertical band saws utilize a thin metal "ribbon like" loop with teeth directed downward to cut materials. Vertical band saws are different from other fixed shop saws as they can make three types of cuts:

- Cross cuts or "cutoffs"- cuts made perpendicular to the long axis of the work piece.
- Rip cuts- cuts made parallel to the long axis of the work piece.
- Radius or curved cuts – the narrow ribbon like nature of the blade allows the operator to turn the work piece about the blade while advancing the cut thru the material. The minimum radius is about three times the blade width.

While vertical band saws come in several varieties and applications, this procedure is limited to metal and wood cutting vertical band saws.

Metal cutting band saws:

- Have slower blade speed and slower infeed cutting speeds.
- Have special "metal cutting" blades that have finer pitch cutting teeth and more durable blade band material.
- Have more durable blade guide material and design.

Wood cutting band saws:

- Have higher blade speeds and usually faster infeed cutting speeds.

Hazards

As with all shop tools, there are many potential hazards associated with the use of a band saw. Full sized vertical band saws are Class 5 tools while smaller versions are Class 4 tools (http://ehs.yale.edu/forms-tools/tool-classification-matrix). Particular hazards associated with vertical band saws are listed below. Note that the list is not exhaustive as unusual or specialized uses may generate additional unique hazards.

Crushing / Pinch Points:

- The downward swing of the cutting head creates pinch points along the cutting plane axis.
- Only grab/ hold cutting head at the outboard end of the assembly.
- Be sure that work piece is the only object in the path of cutting plane/blade prior to lowering cutting head.

Hazards (cont'd)

Amputation:

- The fast moving cutting blade/band will quickly remove fingers.

Cut and laceration:

- Sharp edges are created by the cutting action.
- Multiple stationary and moving blade hazard.
- Blades can break and be thrown out of the work zone.

In-running nip pinch point:

- The moving blade can catch loose hair, clothing, gloves and pull body parts into cutting edges.
- The work piece must be firmly supported by table at all times or body parts can become pinched. Without proper fixturing spherical or cylindrical objects may grab and pull you or the material into the blade.

Hot objects:

The cutting process can generate significant heat in the work piece and scrap material.

Limitations

- Band saws are designed for cutting a variety of materials. Typically a shop will have a band saw setup and designated for a particular group of materials. The usual division of these is between wood and metal.
- Do not cut material that does not lay flat on the cutting table. Spherical or cylindrical objects may grab and pull you or the material into the blade.
- Do not cut thin sheet on band saws. Minimum material thickness should be such that at least 2, preferably 3, teeth are always engaged in the work piece.

Required Personal Protective Equipment

- Refer to the Shop Safety Postings and instructions provided by the Shop Supervisor.

Shop specific required PPE:

Required Training

- Applicable Shop Rules
  - **Student Shop Rules** (http://ehs.yale.edu/forms-tools/shop-rules-student-accessible-shops)
  - **Professional Shop Rules** (http://ehs.yale.edu/forms-tools/guidelines-professional-shops)
- For Class 2 through 5 Student Shops, review and signing of the **Yale University Shop/Tool Use Safety Agreement** (http://ehs.yale.edu/forms-tools/shoptool-use-safety-agreement).
- Shop Supervisors or Instructors must evaluate the tool user based on successful demonstration of the Training Competencies listed below as applicable.

Training Competencies:

- □ Identify and describe all controls, adjustments, and functions of the band saw.
- □ Dress appropriately and wear appropriate personal protective equipment for the cutting operation.
- □ Correctly setup and adjust the band saw for all types of required cuts.
- □ Apply good judgment in selecting clamping/securing method for work piece and accurately position work piece for cutting operation.
- □ Demonstrates proper application and use of miter cuts, relief cuts, and push blocks.
- □ Students must be able to reset all saw functions and clean up saw in preparation for next user.

Shop specific training requirements:

Authorized Tool Users

Shop Supervisor, Shop Monitors and those authorized by shop supervision to operate the tool.

Tool Safety Rules

- Observe and follow all Yale Professional or Student Shop Rules as posted.
- Understand and follow manufacturer operating procedures.
- Inspect the tool for damage prior to use.
- Verify all guards are in place and adjusted properly.
- Do not bypass any safety devices.
- Always stay at the machine while it is running.
- Clean the tool after use.
- Report any malfunction or damage to the Shop Supervisor after tagging the tool "Out of Service, do not use".
- Never clear small pieces while the blade is moving.
- Never back out of a radius cut while the machine is running.
- Do not force the stock into the blade at a rate faster than it can be readily cut.

Shop specific rules:

Proper Setup and Use

Prior to use:

- Evaluate the work piece material type and appropriateness of the saw, saw blade, and cutting speed.
- Determine the location and angle(s) of cuts required. Mark lines clearly on the work piece.
- Determine the required fixturing/tooling/clamping/cutting stops/supports needed.
- Prepare a cutting plan.
    - Determine if relief cuts are necessary to remove the blade from the work piece. These are cuts that cut through scrap portions of your cut out to give a better angle on accessing a section of the work piece. It is safer to make a lot of relief cuts and cut a tight curve in short sections than to try and make one long, inaccurate cut.
    - Determine if push sticks/blocks are needed to keep all body parts out of the path of the blade.
- Obtain personal protective equipment (safety glasses /shields) hearing protection and remove all loose clothing, jewelry and securely tie back all long hair/beards.

At the band saw:

- With the tool off inspect the tool. Look for damage, missing guards, and blade condition/tension/tracking. Look for missing teeth.
- Inspect the work area and remove any obstructions and trip hazards.
- Adjust guides and guards such that they are no more than ¼" above the work piece. The blade should be 1/32" from the rear roller bearing behind the blade (see Diagrams/Illustrations).

Cutting process:

- Turn on the band saw and listen for unusual and unsteady sounds. If clicking or ticking is heard, shut down the saw and seek supervision.
- Let the blade reach full speed before attempting the cut.
- Start cutting – apply steady pressure against blade while following your cutting plan- do relief cuts first.
- Use push blocks, miter guide or appropriate scraps of material in order to maintain a safe distance from the blade.

Proper Setup and Use (cont'd)

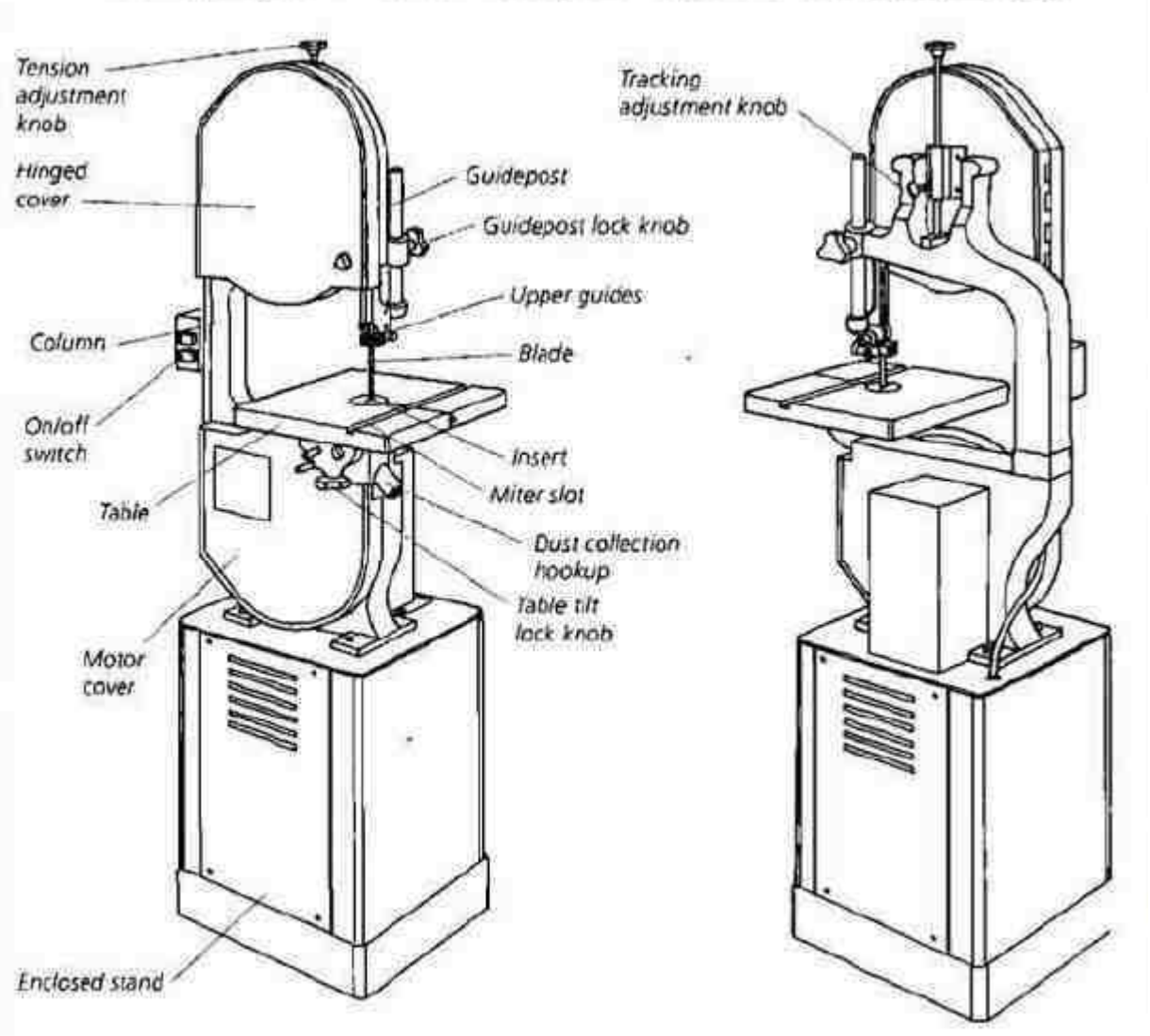
Completion:

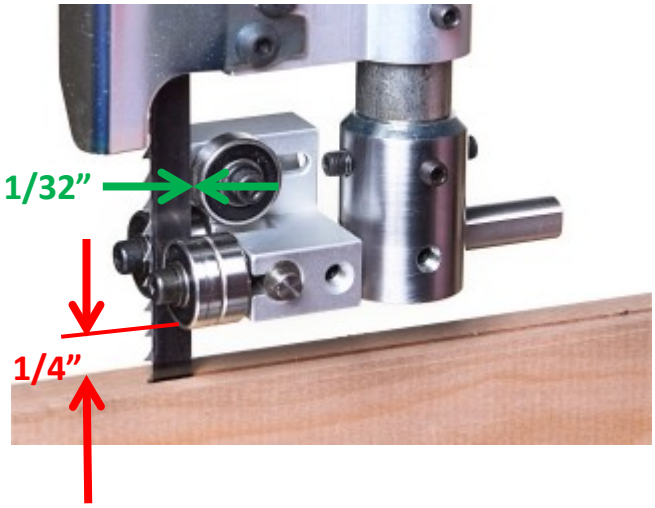
- Allow blade to come to a complete stop before carrying out completion tasks.
- Clean up saw and work area for the next user.
- Report any issues to the shop supervisor.

Shop specific procedures:

Diagrams/Illustrations

Typical Vertical Band Saw Components



Diagrams/Illustrations (cont'd)	
Proper Blade Guide Adjustments  	
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Suggestions, questions, or comments? Please contact your shop supervisor or EHS.	