Yale *Environmental Health & Safety*

Shop Safety Procedure

Equipment/Task Name:	WOOD SHAPER
Equipment/Task Hazard Class:	5 http://ehs.yale.edu/forms-tools/tool-classification-matrix
Shop Name:	
Shop Hazard Class:	

Purpose

Wood shapers are powerful vertical rotating head devices used to profile edges of wood stock. They have interchangeable cutters profiled to match the required shape. The cutter head assembly and spindle height can be adjusted to suit the desired profile. There is also an adjustable fence to set the depth of the cutter profiled into the workpiece. Due to a large possible variation in the cutter diameter the shaper usually has a stepped pulley assembly so that the operator can set the correct speed for the cutting edge and material. Due to the large cutting forces involved, hold-down "fingerboards" or a power feed should be utilized whenever possible (See Diagrams/Illustrations). For the purpose of this Procedure, it will be assumed that no power feed is attached to the shaper. Specific manufacturer and Shop Supervisor instructions must be followed for power feeds.

Hazards

As with all shop tools, there are many potential hazards associated with the use of a shaper. Consequently, wood shapers are Class 5 tools (http://ehs.yale.edu/forms-tools/tool-classification-matrix). Particular hazards associated with shapers are listed below. Note that the list is not exhaustive as unusual or specialized uses may generate additional unique hazards.

Amputation and Laceration

- Due to the nature of the high speed rotating cutter any contact with the cutter will result in serious injury.
- All body parts should be kept outside of the guarded area and push sticks/blocks utilized for moving workpiece beyond the cutter.
- Power must be disconnected when making any adjustments to the cutter, fences, and guards.

Flying Objects

- Serious injury and death can occur due to "kickback" of the workpiece.
- Anytime the cutter is engaged with the workpiece it can kick and make a projectile of the workpiece.
- Always maintain firm control of workpiece against the fence. Never make freehand cuts.

Spinning High Speed Cutter

- Large amounts of energy are stored in the rotating blade/motor.
- Always allow the blade to come to a complete stop and disconnect power before making adjustments or approaching the cutting head.
- Never put anything into a spinning cutter to stop it.

Limitations

- Shaper and proposed workpiece stock setup must be approved by the shop supervisor prior to any work.
- Stock should be stiff enough to maintain straightness during shaping operation. On occasion this will mean that wider stock must be used and ripped to final width on a table saw or similar tool.
- The cutter speed must be appropriately matched with the type and diameter of the cutter being used.
- Due to the very high potential for kickback it is imperative that cutters be maintained sharp to reduce kickback/cutting forces.
- The shaper is typically designed for wood shaping only. Machining of any other material, including wood composites, must be approved by the Shop Supervisor.
- Due to the hazard of the rotating cutter the operator should keep their hands and other body parts at least 12 inches away from the rotating cutter at all times – push sticks and block must be used in a hand over hand operation to maintain a safe distance from the cutter.

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:

- □ Understand the uses, limitation, and hazards of the machine.
- □ Be able to dress appropriately and don correct personal protective equipment.
- □ Be able to inspect workpiece for imbedded objects and loose knots and appropriate size prior to operation.
- □ Be able to select an appropriate cutting plan, technique, and fixturing.
- □ Know how to inspect the shaper, configure the shaper for the selected operation, and adjust guides and guards as needed.
- □ Show good judgment in equipment start-up process, cutting technique, and form and body positioning.
- □ Operates the shaper in an acceptable manner, recognizes machine feedback and responds accordingly.
- □ Know how to properly clean the tool after use.

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 release a workpiece that is still engaged with cutter.
- Do not make measurements of the stock while the machine is powered.
- Do not over reach. Keep proper footing and balance at all times.
- Never joint workpieces less than 12" long.
- Do not force workpiece into cutter. Allow the tool to dictate speed of operation.
- Always use fence to guide workpiece. Never perform an operation free-hand.
- Always hold the workpiece firmly against the tables and the fence.
- Always feed the workpiece against the rotation of the cutter head.
- Use both hands to support and control the work piece at all times.

Shop specific rules:

Proper Setup and Use

Prior to Use

- Determine appropriateness of the tool and workpiece. Evaluate for the following:
  - Workpiece wood type and grain direction
  - Maximum/minimum wood thickness, width, and length
  - Proper cutter type and configuration
  - Is the workpiece flat and straight so that it will lay flat on the table
  - Cutting and fixturing plan
- Carefully inspect all surfaces of the workpiece for imbedded debris and loose knots.
- Bring any concerns or questions to the attention of the Shop Supervisor for review and proper disposition prior to starting the shaper.
- Don all personal protective equipment.

At Shaper

- With the tool turned off, become familiar with all tool controls, guards, and emergency stops.
- Obtain and install all necessary push sticks/blocks to ensure all body parts are kept away from the blade at all times.
- Adjust the cutter, fence, guides, and power feed (if applicable).
- Obtain final approval of the tool setup and cutting plan from the Shop Supervisor.
- Inspect the tool and the surroundings. Ensure that there is a clear zone around the machine to allow for proper clearance of the workpiece to be fed and removed.

Shaper Operation

- Conduct a final safety check of the tool and the surroundings. Notify others in the immediate area that the tool will be turned on.
- Turn on the dust collection system if available.
- Turn on the shaper and listen for a smooth startup and as the cutter reaches full operating speed.

Proper Setup and Use (cont'd)

- While standing out of the cutting path line, carefully align the workpiece with the fence and table and slide the workpiece toward the cutter.
- Firmly guide the workpiece completely across cutting head. Use push sticks and blocks to increase the distance between you and the cutter.
- Feed stock opposite to the direction of the cutter rotation (See Diagrams/Illustrations). Never back stock out of the cutter once the cut has been started. If necessary, pull the stock straight out away from cutter and begin the cut again.
- Away from machine inspect the workpiece and shut down the machine if any adjustments need to be made.

Completion

- Shut down shaper and allow the machine to come to a complete stop.
- Disengage the dust collection system (if available and as directed by the shop supervisor).
- Clean up the shaper and the work area for the next user. Remove the cutter and put into proper storage as directed by the Shop Supervisor.
- Report any issues to the shop supervisor.

Shop specific procedures:

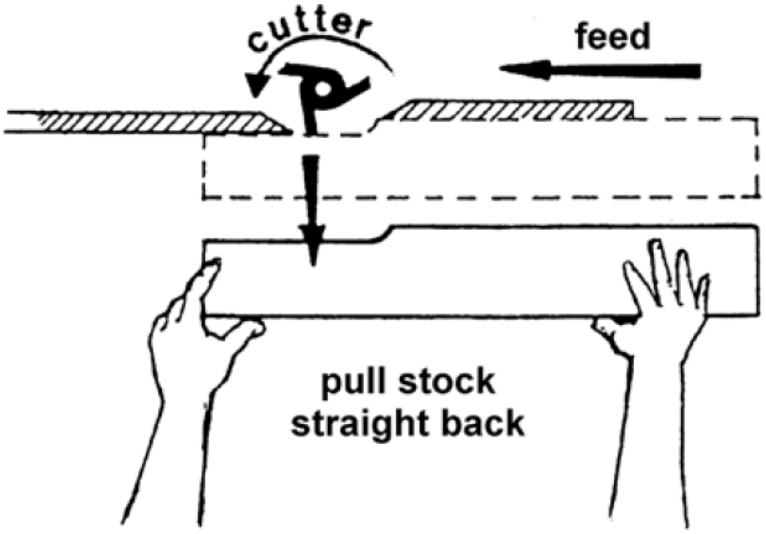
Diagrams/Illustrations

Example of a Power Feed

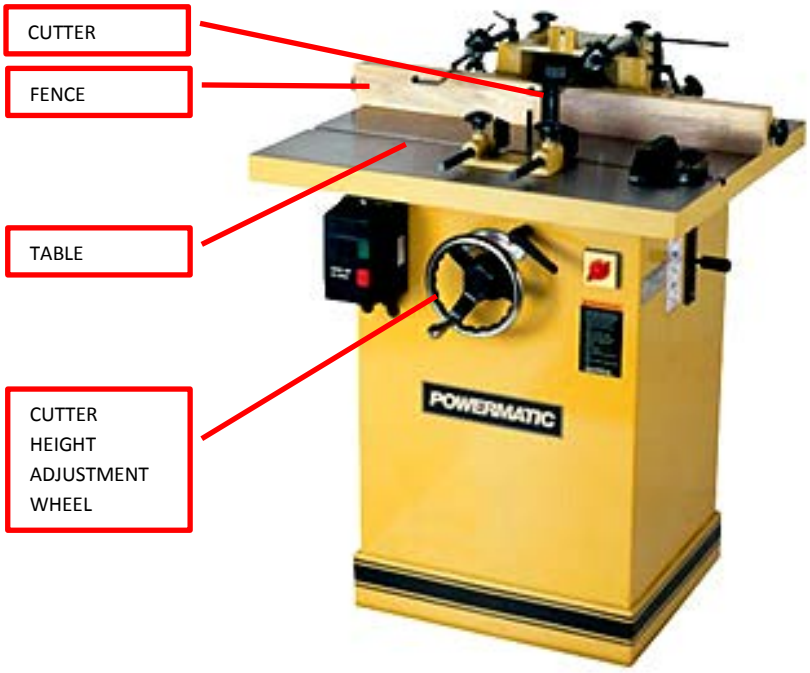
Example of Fingerboards

Diagrams/Illustrations (cont'd)

Illustration of Proper Orientation and Workpiece Feeding



Typical Shaper



Creation/Revision Dates:	April 23, 2014

Suggestions, questions, or comments? Please contact your shop supervisor or EHS.