

## Shop Safety Procedure

	Equipment/Task Name:	WET ABRASIVE SAW
	Equipment/Task Hazard Class:	3 <a href="http://ehs.yale.edu/forms-tools/tool-classification-matrix">http://ehs.yale.edu/forms-tools/tool-classification-matrix</a>
	Shop Name:	
	Shop Hazard Class:	

### Purpose

Wet abrasive saws are used to cut ceramic, stone, cement, and some glass-based materials and objects. Water is used in the process to cool and lubricate the blade and workpiece, and also to minimize dust. These types of saws can range from small portable units used by homeowners for tile cutting, through large fixed machines for industrial materials cutting and shaping. At Yale, they are largely confined to geology and glassworking shops.

In general, the cutting blade on this type of saw is in a fixed position, and the workpiece is held secure on a sliding tray or table that is moved into the point of operation to make the cut. Cuts are typically limited to straight lines. Blades used in wet abrasive saws are composed of an alloy steel disk with an abrasive bonded to the outer rim of the disk. As these kinds of blades do not have teeth in the conventional sense of other circular blades, the severity of lacerations or amputations are much lower likely than with wood saws.

### Hazards

As with all shop tools there are many potential hazards associated with their use and exposure. Metal chop saws are Class 3 tools (<http://ehs.yale.edu/forms-tools/tool-classification-matrix>). There are a number of particular hazards associated with the operation and use of chop saws.

#### High speed rotating cutting wheels and shafts

- Large amounts of energy embodied in rotating wheels
- Wheel shatter hazard
- Potential for loose items to become entangled in rotating parts

#### Flying objects

- Cutting action can generate flying sparks if water is not used
- Work pieces can become disengaged and rotate or be flung across the room

#### Pinch point hazards

- Clothing, jewelry or body parts can be drawn into spinning wheels

#### Hot components

- Although water mist generally controls this, grinding without water coolant can generate significant heat, burn and/or fire hazards, including flying sparks

<b>Hazards (cont'd)</b>
<p><u>Dust Exposure</u></p> <ul style="list-style-type: none"> <li>Dust exposures are greatly reduced by use of the water mist.</li> </ul> <p><u>Noise Exposure</u></p> <ul style="list-style-type: none"> <li>Under some conditions and duration of use, noise generated by the use of this tool may contribute to hearing loss. Wear appropriate personal hearing protection during extended use.</li> </ul>
<b>Limitations</b>
<p>Wet abrasive saws are meant only for ceramic, stone, cement, and some glass-based materials and objects. They are not suited for cutting metals, plastics, or wood. Units designed for water cooling and lubrication must be operated with water. The size of a work piece is generally limited by the blade diameter and workpiece table.</p>
<b>Required Personal Protective Equipment</b>
<ul style="list-style-type: none"> <li>Refer to the Shop Safety Postings and instructions provided by the Shop Supervisor.</li> <li>Always wear safety glasses under a full face shield when operating a metal chop saw.</li> <li>As appropriate, wear suitable hearing protection.</li> </ul> <p><u>Shop specific required PPE:</u></p>
<b>Required Training</b>
<ul style="list-style-type: none"> <li>Applicable Shop Rules <ul style="list-style-type: none"> <li><b>Student Shop Rules</b> (<a href="http://ehs.yale.edu/forms-tools/shop-rules-student-accessible-shops">http://ehs.yale.edu/forms-tools/shop-rules-student-accessible-shops</a>)</li> <li><b>Professional Shop Rules</b> (<a href="http://ehs.yale.edu/forms-tools/guidelines-professional-shops">http://ehs.yale.edu/forms-tools/guidelines-professional-shops</a>)</li> </ul> </li> <li>For Class 2 through 5 <u>Student Shops</u>, review and signing of the <b>Yale University Shop/Tool Use Safety Agreement</b> (<a href="http://ehs.yale.edu/forms-tools/shoptool-use-safety-agreement">http://ehs.yale.edu/forms-tools/shoptool-use-safety-agreement</a>).</li> <li>Shop Supervisors or Instructors must evaluate the tool user based on successful demonstration of the Training Competencies listed below as applicable.</li> </ul> <p><u>Training Competencies:</u></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Identify and describe all controls, adjustments, and functions of the wet saw.</li> <li><input type="checkbox"/> Dress appropriately and wear appropriate personal protective equipment for the cutting operation.</li> <li><input type="checkbox"/> Correctly setup and adjust the saw for all types of required cuts.</li> <li><input type="checkbox"/> Apply good judgment in selecting clamping/securing method for work piece and accurately position work piece for cutting operation.</li> <li><input type="checkbox"/> Students must be able to reset all saw functions to square, perpendicular cuts and clean up saw in preparation for next user.</li> </ul> <p><u>Shop specific training requirements:</u></p>
<b>Authorized Tool Users</b>
<p>Shop Supervisor, Shop Monitors and those authorized by shop supervision to operate the tool.</p>
<b>Tool Safety Rules</b>
<ul style="list-style-type: none"> <li>Observe and follow all Yale Professional or Student Shop Rules as posted.</li> <li>Understand and follow manufacturer operating procedures.</li> <li>Inspect the tool for damage prior to use.</li> <li>Verify all guards are in place and adjusted properly.</li> <li>Do not bypass any safety devices.</li> </ul>

### Tool Safety Rules (cont'd)

- Only use the tool when it is secured to the floor via a pedestal or work bench.
- 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".
- Always disconnect the plug from the power source before making any adjustments, changing, or physically inspecting the cutting wheel.
- Use only cutting wheels meeting the saw manufacturer specifications and limitations to RPM and size.
- After installing a new cutting wheel, never start the tool with a person in line with the wheel. Always run the tool for approximately one minute before cutting. If the wheel has an undetected crack or flaw, it could burst in less than one minute.
- When mounting a cutting wheel, care should be taken to tighten the arbor screw only enough to hold the wheel firmly and to prevent slippage. Excessive tightening may result in damaging the wheel and springing the wheel flanges.
- Never operate the saw in an area with flammable liquids or gases.
- Never use another person as a substitute for a table extension or as additional support. Long work pieces must be supported by a block or material support stand so it will be level with top of base. The cutting end should be free (not supported).
- Always clamp/secure the work piece to avoid movement and pinching.
- Never make free-hand cuts by raising the work piece into the cutting wheel.
- Never feed the saw into the work piece at a rate faster than it can accept.

Shop specific rules:

### Proper Setup and Use

Prior to use:

- Evaluate the work piece material type and appropriateness of the saw and cutting wheel.
- Determine the location and angle(s) of cuts required.
- Determine the required fixturing/tooling/clamping/supports needed.
- 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 chop saw:

- Electric equipment with water such as the wet abrasive saw may only be powered by an electrical outlet with GFCI protection. Verify presence of such protection before use.
- With the tool off, inspect the tool. Look for damage, missing guards, and cutting wheel condition. Inspect the cutting wheel for cracks or flaws before use. If a crack or flaw is evident, the wheel must be discarded. Verify the inside surfaces of the wheel flange and wheel are free from any foreign matter.
- Inspect the work area and remove any obstructions and trip hazards.
- Adjust and set cutting angle(s) for work piece.
- Set up fixturing/supports and stops to make required cuts.
- With cutting wheel stationary move saw through entire range of motion to ensure that there is no interference with wheel, machine parts or guards/fences.
- Ensure that if stops and clamps are used together that they are both on the same side of the cutting wheel cut so that the potential for jamming and kickback are minimized.
- Check the water reservoir / supply source and then turn on the water cooling / lubrication system. Verify it is working with sufficient supply for the work.

## Proper Setup and Use (cont'd)

### Cutting process:

- Locate work piece on moving tray or table. Ensure that it is placed firmly against the back fence of the tray or table.
- Be sure that any additional clamping of the work piece is on the same side of the cut as the stop so that potential for jamming /kickback against stop is minimized.
- Let the cutting wheel reach full speed before attempting the cut.
- It is usually good practice on the first setup to make a sacrificial cut in the work piece material to ensure that fixturing and angle setup is performing as expected and that the saw is capable of cutting thru the entire work piece.
- If trial cut is satisfactory – setup and make required cuts to work piece(s).
- Allow wheel to come to a complete stop before releasing the handle or locking off the power and prior to adjusting the work piece.

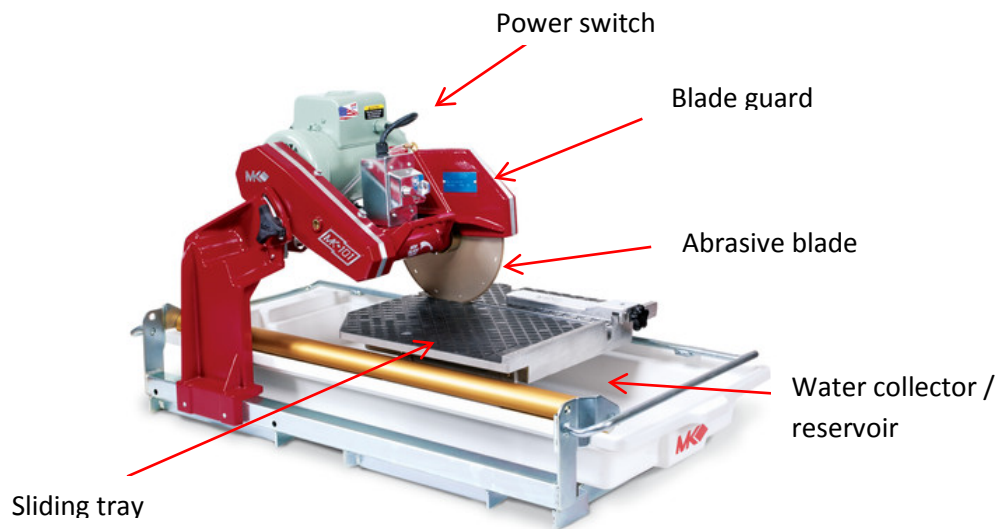
### Completion:

- Allow cutting wheel to come to a complete stop before releasing the handle and carrying out completion tasks.
- Turn off the water cooling / lubrication system. Turn off water supply if applicable.
- Clean up saw, water pan, and work area for the next user.
- Report any issues to the shop supervisor.

### Shop specific procedures:

## Diagrams/Illustrations

### Typical Metal Chop Saw and Components



**Creation/Revision Dates:**

March 28, 2014

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