

University of Maryland Baltimore County



UMBC

(Shop Name Here)

SHOP SAFETY PLAN

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1. Purpose Statement

The purpose of this Shop Safety Plan is to demonstrate the commitment of this Shop towards the safe completion of work and the safety of its employees, students, and the UMBC Community.

This plan has been prepared by Shop Supervision or the Shop Instructor in a collaboration with Department Leaders, employees, and other key stakeholders. Employees and students who use the Shop are required to review this plan prior to Shop authorization.

This plan is retained in the Shop and available for review. The plan will additionally be reviewed on an annual basis and updated when new or modified equipment, tools, machinery, or processes are introduced into the Shop.

Signature of Shop Supervisor or Instructor

Signature of Department Manager/Chair

Date Plan Established

Date of Last Review

2. Shop Information

Name of Shop: _____

Shop Type:

- Machine Shop Wood Shop Hot Work Printing/Printmaking
 Painting Glass Other (please
specify) _____

Location Information:

Responsible Department: _____

Building: _____

Room Number: _____

Shop Supervisor: _____

Contact Phone: _____

Email Address: _____

Primary Shop Use:

- Facilities Management
 Residential Life
 Teaching
 Research
 Other (please specify) _____

3. Emergency Procedures

Emergency Contacts:

Police, Fire, Medical Emergency: Campus Police - (410) 455-4555 or call 911

Chemical/Hazardous Material Incidents, Large Spills, etc.: Env Safety and Health – (410) 455-2918

Radiation Safety Incidents: UMB Radiation Safety Officer - (410) 706-7055

Shop Equipment Locations:

Nearest Fire Alarm Pull Station: _____

Nearest Emergency Exits: _____

Nearest Fire Extinguisher: _____

Spill Clean Up Kit (small spills only – for large spills or if you are uncertain how to proceed, contact ESH):

Nearest First Aid Kit: _____

Nearest Automated External Defibrillator (AED): _____

Eyewash Station: _____

Emergency Shower: _____

Injuries and Near-Misses:

Report all injuries and near-misses to ESH at esh@umbc.edu or at 5-2918 as soon as possible.

Serious Injuries:

Contact Campus Police or 911 immediately for all injuries requiring emergency medical attention (uncontrollable bleed, amputations, head injuries, loss of consciousness, etc.).

Render aid to the victim if possible and if you are comfortable with doing so until emergency medical response arrives.

4. General Shop Safety Rules

- Always ask if you are unsure about the safe operation of a tool or piece of equipment or need refresher training.
- All shop users have the authority to stop work if an unsafe condition or act occurs. If something is unsafe or doesn't seem right, stop work and report it to your supervisor.
- Do not operate Shop machinery, tools, or equipment without training. Review the operator's or owner's manual before operating any tool, machine, or equipment for the first time.
- Never work without proper eye protection. Safety glasses with side shields must be always worn. Eye protection must be ANSI Z87-rated.
 - Individuals that wear prescription glasses must use goggles or safety eyewear that can fit appropriately over corrective lenses, or wear safety prescription eyeglasses.
- Protect your feet. At a minimum, closed-toed shoes that cover the entire foot must be worn. Do not wear thin fabric shoes, sandals, open toed shoes, or high heeled shoes. Tools, equipment, fixtures, and chips/sparks can be heavy, sharp, or hot. Always follow your department's uniform, dress code, or footwear procedures.
- Remove or secure anything you are wearing that might get caught in moving machinery. Do not wear loose clothing, loose neckwear, lanyards, or exposed jewelry while operating machinery. Long sleeves on shirts must have snug-fitting sleeves and cuffs, or must be rolled back or otherwise secured at the elbow.
- Pull back and secure long hair or wear a hat that keeps hair secured but will not obstruct vision.
- Never wear gloves when using rotating equipment. Gloves can become entangled in rotating machine parts and cause serious injury.
- Avoid working alone whenever possible in the Shop.
- Never use a machine or equipment while fatigued, or while under the influence of drugs, alcohol, or while taking prescription drugs that may impair your ability to safely operate the equipment.

- If you are taking medication that may impair your ability to safely perform work in the Shop, notify your supervisor so that an alternative task can be arranged. You do not need to disclose what medication you are taking.
- Loose objects can become flying particles. Remove all loose items (wrenches, chucks, rags, etc.) from machinery before starting.
- Keep your work area clean and dry. Dispose of all debris and waste materials by placing them in the appropriate containers (e.g. oily rags in approved metal containers, trash in trash can). Remove chips, oil and obstacles that can cause someone to slip or trip. Shop equipment and/or materials must be placed in the proper storage location.
- Machines must be turned off when cleaning debris.
- Never lean on your machine. Stand away when the machine is running.
- Never remove safety guards from equipment. You must ensure that all safety guards are in place before using equipment.
- Always keep hands and other body parts a safe distance away from moving machine parts, work pieces, and cutters.
- Report broken, damaged, or improperly functioning tools, machinery, or equipment to the Shop Supervisor.
- Foods and drinks are only allowed in designated areas.
- Read and understand the Safety Data Sheets (SDS) for all of the chemicals you will use prior to using them for the first time.

5. UMBC Machine Guarding Reference Guide

The following is a general guide for machine guarding for the most common types of machines, tools, and equipment found in a shop environment. Contact Environmental Safety and Health (esh@umbc.edu or 5-2918) with specific questions regarding machine guarding requirements.

All Shop machinery, tools, and equipment must have the following points adequately guarded:

- **Point of Operation** - The area where the machine performs the work (i.e., where a saw blade meets the material being cut)
- **Power Transmission Devices** - The elements of a mechanical system that transmit energy, such as belts, chains, and pulleys.
- **Other moving parts** that move when the machine, tool, or equipment is in operation.



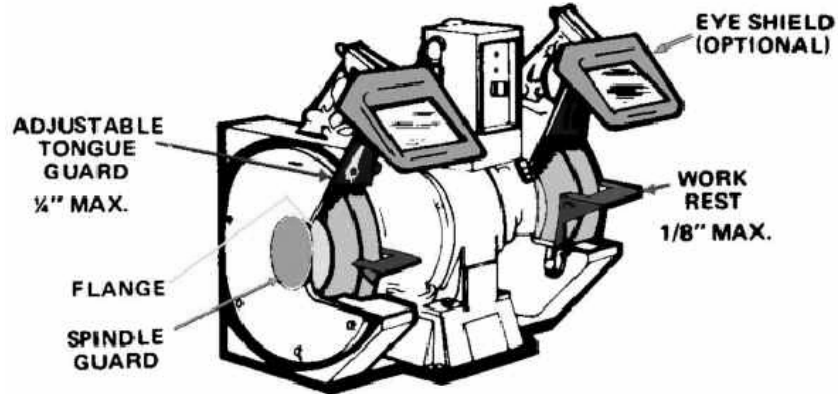
Unguarded 



Guarded 

Bench Grinders

- Side guards must cover the spindle, nut, flange, and 75 percent of the wheel diameter.
- The work rest must be adjusted to within $\frac{1}{8}$ inch of the wheel.
- Adjustable tongue guards must be kept to within $\frac{1}{4}$ inch of the wheel.
- Face shields shall be worn if eye-shields are not installed on bench grinders.
- The maximum RPM rating of the grinding wheel shall be compatible with the RPM rating of the bench grinder motor.
- All grinding wheels shall be inspected, installed, and replaced by competent persons. An inspection shall consist of a visual inspection and a ring test prior to first use and periodically thereafter.
- Do not use a grinding wheel if it is cracked or if the ring test produces a dull or flat sound.



Angle Grinders

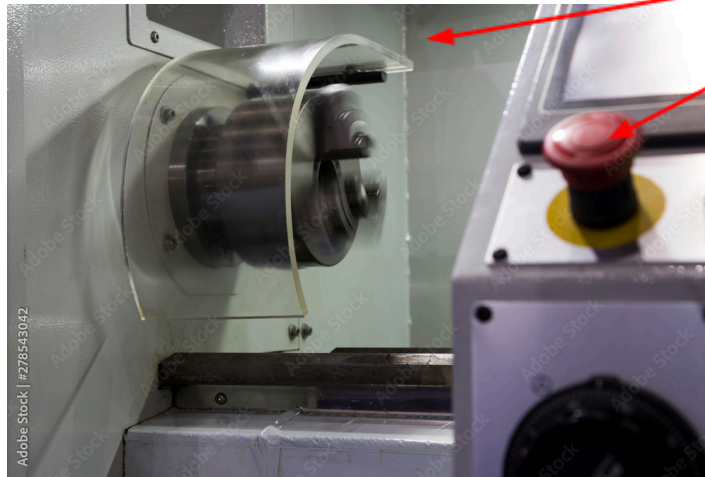
A fixed guard is required on the grinding wheel and must enclose one-half or 180 degrees of the grinding wheel.



An angle grinder with a fixed guard.

Metal and Wood Lathes

- Chucks shall be guarded to protect the user against pinch points, crushing, and entanglement. Lathes turning long stock must have a guard that covers the stock.
- Emergency stops should be equipped and be placed in easy to access locations that can be accessed within arms reach of the user.
- The machine shall be completely stopped prior to cleaning chips or measuring the workpiece.
- Do not leave the key in the chuck unattended.



A lathe with a clear chuck guard and emergency stop.

Band Saws

- Band saws shall have an adjustable guard set as close as possible to the stock.

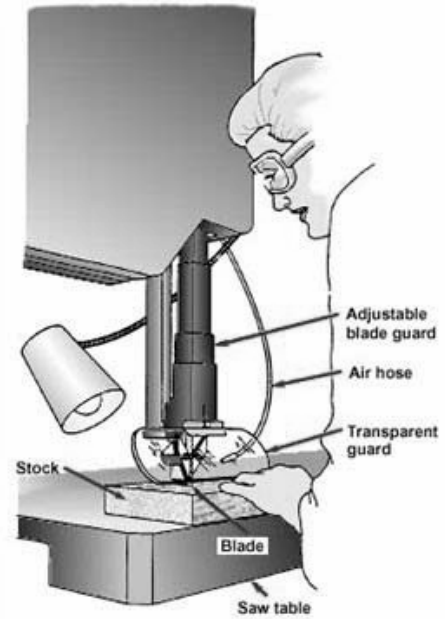
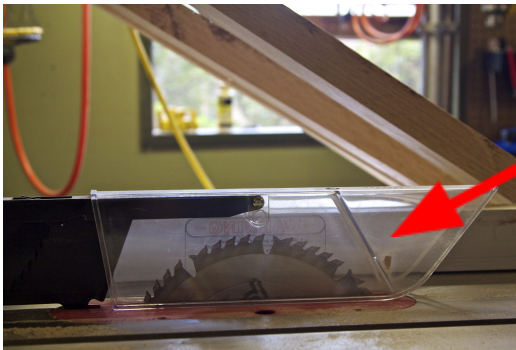
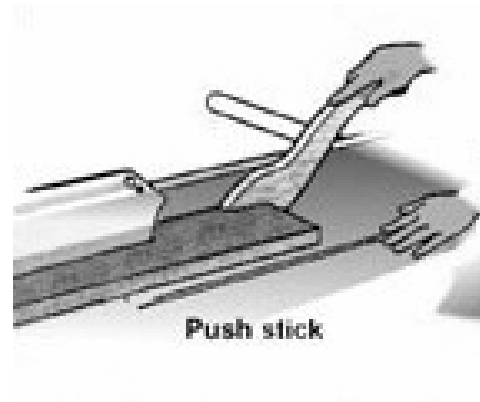


Table Saws

- Table saws shall have a wood spreader guard, a blade guard (self-adjusting) and an anti-kickback guard.
- Push sticks are to be used when cutting small material and for pushing material past the blade.
- Saw blade teeth may not extend $\frac{1}{4}$ of an inch above the material being cut.

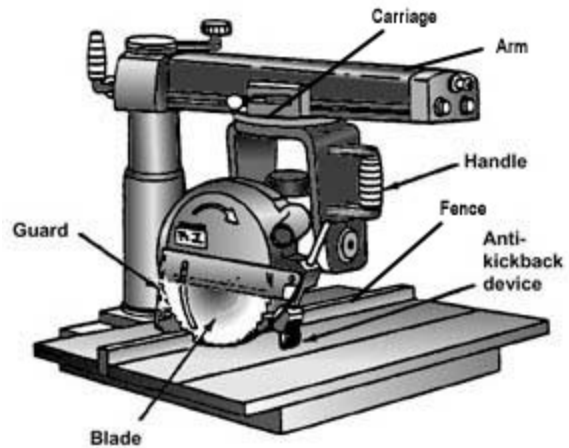


A table saw with a clear plastic blade guard.



Radial Arm Saws

- Radial arm saws must have a self-adjusting guard below the blade.
- Return the saw to its original position after finishing a cut.
- Radial arm saws configured for ripping (as opposed to cross-cutting) should have anti-kickback protection in place.



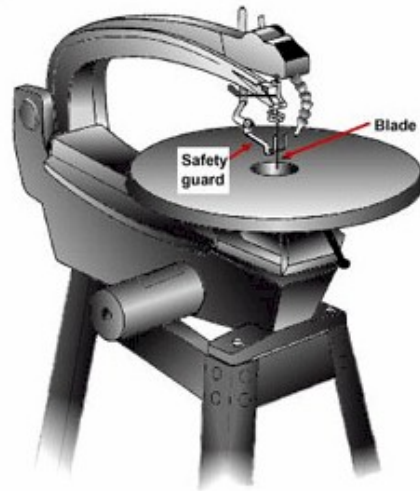
Circular Saw

- Circular saws must have a self-adjusting blade guard.
- Do not pull the saw out before the saw has come to a complete stop, otherwise kickback may occur.
- Turn the saw off before removing it if the cutting has not been completed.



Scroll Saw

- Scroll saws must have blade guards.



Routers

- Hand-held routers must have fixed guards.
- Benchtop routers must have self-adjusting guards above the cutting area.



Fixed guard on handheld router



Guarded benchtop router

Chop and Miter Saws

- Chop and Miter Saws must have self-adjusting blade guards.
- Use the appropriate blade based on size and RPM per manufacturer's specifications.



Reciprocating Saws

- Reciprocating saws (Saw Zalls) must have hand/finger guards.



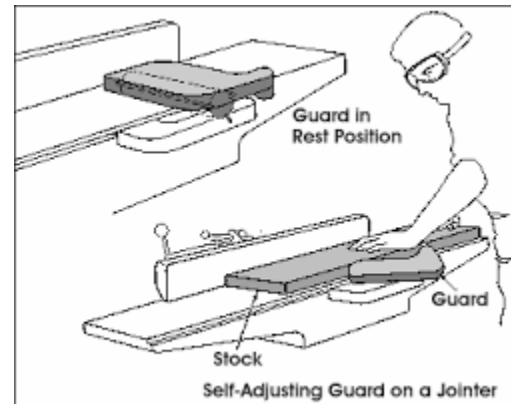
Jig Saws

- Jig saws must have blade guards for the upper portion of the blade above the tool rest.



Jointers

- Jointers must have a self-adjusting blade guard.
- Use a push stick to feed small stock.



Planers/Moulders

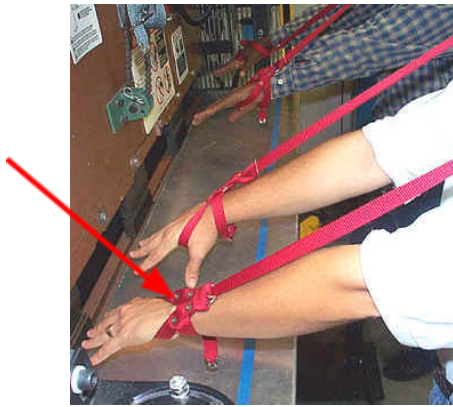
- Cutter heads must be completely enclosed except for an opening to feed the stock into the equipment.



Cutter head is enclosed with a metal guard or a cage.

Power Press Brakes

- Any of the following guarding methods shall be used for presses:
 - Presence-sensing device (such as safety light curtains)
 - Pullback device
 - Two-hand Trip/Control device
 - Restraint device
- Power transmission components and foot switches should be enclosed to prevent accidental operation.



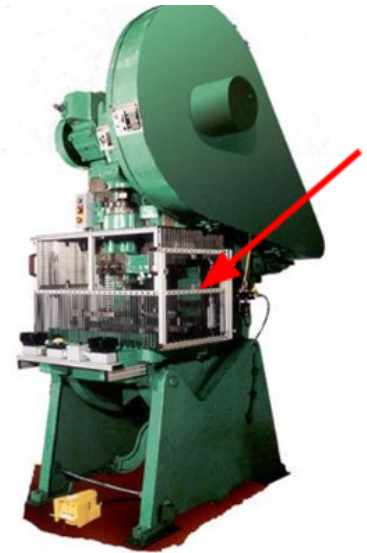
Example of a pullback device



Safety light curtain and two-hand controls

Power Presses (Hydraulic and Mechanical)

- For mechanical and hydraulic power presses, as with Power Press Brakes, a variety of guarding methods can be used. The equipment manufacturer should be consulted for recommendations or specific requirements. The following are types of acceptable guarding methods:
 - Presence-sensing devices (such as safety light curtains)
 - Pullback devices
 - Two-hand Trip/Control device
 - Restraint devices
- Never place hands inside of the point of operation.
- Use special hand tools for removing work or scrap pieces from the die area.



Drill Presses

- Chuck guards are required on drill presses.
- Clamp any smaller material to prevent spinning.
- Drill presses must be secured to their work station.
- Do not leave chuck keys in drill presses.



Hot Work (Welding, Cutting, Brazing, etc.)

- Wear appropriate PPE and hot work attire (i.e., coat, pants, gloves, apron)
- Welding helmets or tinted face shields shall use the appropriate shade number depending on the type of torch or welding being used (see Shade Selection Guide below).
- Safety glasses are required if a face shield is worn.
- Oxygen and acetylene cylinders must be secured to a cart using a chain or webbing strap.
- Valve caps must be secured on all cylinders that are not connected to a regulator.
- Shield/distance any combustibile or flammable materials.



1910.252(b)(2)(ii)(H) - OSHA Shade Selection Guide

| Welding operation | Shade No. |
|--|------------------|
| Shielded metal-arc welding - 1/16-, 3/32-, 1/8-, 5/32-inch electrodes | 10 |
| Gas-shielded arc welding (nonferrous) - 1/16-, 3/32-, 1/8-, 5/32-inch electrodes | 11 |
| Gas-shielded arc welding (ferrous) - 1/16-, 3/32-, 1/8-, 5/32-inch electrodes | 12 |
| Shielded metal-arc welding: | |
| 3/16-, 7/32-, 1/4-inch electrodes | 12 |
| 5/16-, 3/8-inch electrodes | 14 |
| Atomic hydrogen welding | 10-14 |
| Carbon arc welding | 14 |
| Soldering | 2 |
| Torch brazing | 3 or 4 |
| Light cutting, up to 1 inch | 3 or 4 |
| Medium cutting, 1 inch to 6 inches | 4 or 5 |

| | |
|---|--------|
| Heavy cutting, 6 inches and over | 5 or 6 |
| Gas welding (light) up to 1/8 inch | 4 or 5 |
| Gas welding (medium) 1/8 inch to 1/2 inch | 5 or 6 |
| Gas welding (heavy) 1/2 inch and over | 6 or 8 |

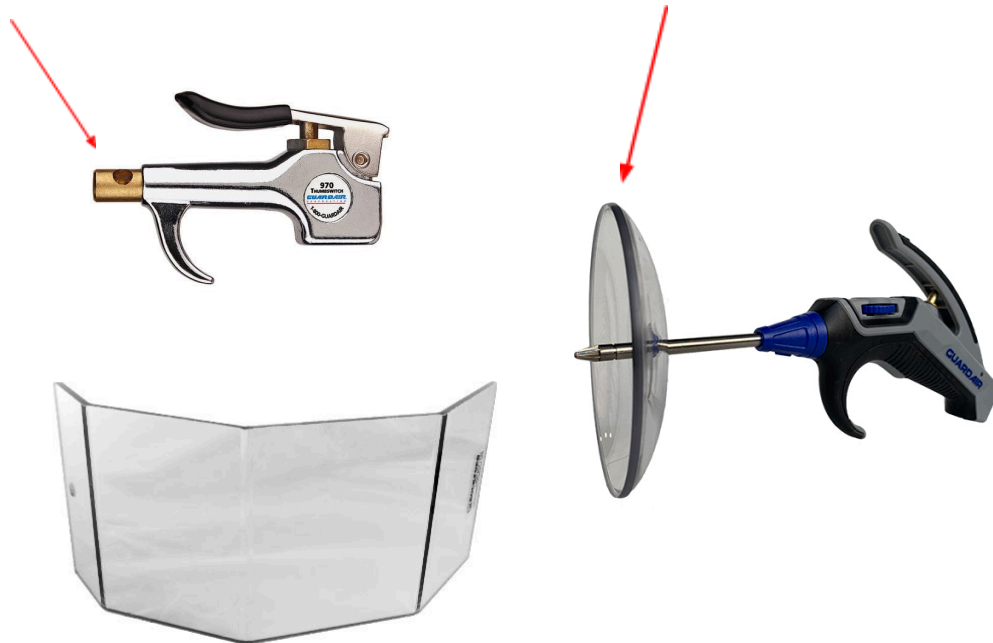
Cranes and Hoists

- Cranes and hoists may only be operated by trained and authorized users.
- All cranes and hoists must have their load capacity clearly marked.
- Cranes have specific inspection requirements - refer to the UMBC Crane and Hoist procedure for inspection requirements.



Compressed Air

- Do not use compressed air to clean off a person's body, hair, or clothing.
- Safety air nozzles shall be installed on compressed air hoses to relieve pressure to below 30 psi when "dead-ended", such as when the tip is placed against someone's skin. Typically these are ported to allow for air to escape. Air pressure may also be adjusted at the regulator to below 30 psi if feasible.
- Chip guarding must be in place (such as a plastic shield or protective air cone) to deflect any dirt, debris, or chips away from the operator. Chip guarding may also be separate from the air nozzle in the form of barriers or screens and may be necessary to ensure chips are not deflected onto any persons nearby.



Clockwise from top: A ported safety air nozzle, air nozzle with protective chip barrier, and a standalone chip guarding shield.

Shop Safety Inspection Form (Appendix A)

Use this form to document a comprehensive periodic shop safety inspection. Inspections can be performed at any level of frequency, but must be done at least annually. Shop Supervisors may complete this inspection or designate a shop employee or student to perform the inspection. Retain completed forms on file with the Shop's department management.

| | |
|-------------------------|----------------------|
| Inspection Date: | Inspected By: |
| Department | Shop Name: |

| Section A - Housekeeping | | Yes | No | N/A |
|--|---|-----|----|-----|
| 1. | Does the shop area have a clean and orderly appearance? | | | |
| 2. | Is the shop free from any apparent slip/trip/fall hazards? | | | |
| Section B - Chemical Safety | | | | |
| 1. | Do chemical containers and cylinders have their contents clearly labeled? | | | |
| 2. | Are chemical containers and cylinders in good condition? | | | |
| 3. | Are incompatible materials segregated? | | | |
| Section C - Personal Protective Equipment | | | | |
| 1. | Is appropriate PPE available for use and being used where required? | | | |
| 1a. | Eye protection | | | |
| 1b. | Hand Protection (Gloves) | | | |
| 1c. | Hearing Protection | | | |
| 1d. | Appropriate footwear (No open toed shoes, safety/steel-toes where required - refer to your department's uniform/dress code/footwear requirements) | | | |
| 2. | Are emergency showers and eyewash stations readily accessible? | | | |
| 3. | Do emergency showers and eyewash stations have a current inspection record/tag? | | | |

| | | | | |
|--|--|--|--|--|
| | | | | |
| Section D - Fire and Life Safety | | | | |
| 1. | Are emergency exits visible and free from obstructions? | | | |
| 2. | Are fire extinguishers available and readily accessible? | | | |
| 3. | Are fire extinguishers mounted to the wall? | | | |
| 4. | Do fire extinguishers have a current inspection tag (serviced within the past 12 months)? | | | |
| 5. | Are fire pull stations visible and readily accessible? | | | |
| 6. | Are oily rags and combustible wastes kept in the appropriate safety containers? | | | |
| 7. | Are flammable/combustible liquids stored in an appropriate storage cabinet? | | | |
| 8. | Do sprinkler heads have at least 18 inches of clearance? | | | |
| Section E - Electrical Safety | | | | |
| 1. | Are all electrical cords free from any exposed wiring or damaged/fraying cords? | | | |
| 2. | Are all electrical panels unobstructed (36 inches of clearance)? | | | |
| 3. | Are all electrical junction boxes, panels, switches, and outlets appropriately covered/enclosed? | | | |
| 4. | Are all extension cords grounded? | | | |
| 5. | Are portable tools grounded or double-insulated? | | | |
| Section F - Equipment and Machinery | | | | |
| 1. | Is machine guarding in place where required and properly functioning? | | | |
| 2. | Are equipment controls clearly labeled? | | | |
| 3. | Are warning and hazard stickers and labels legible? | | | |
| 4. | Are emergency stops in good condition and clearly visible on machinery? | | | |
| 5. | Is equipment appropriately secured to prevent walking/moving? | | | |

| | | | | |
|---|---|--|--|--|
| 6. | Are hand tools in good condition (free of broken parts, chips, cracks, etc.) | | | |
| 7. | Are bench and pedestal grinders adequately guarded and equipped with a work rest (adjusted to within 1/8 " of the grinding wheel)? | | | |
| 8. | Are adjustable tongues on grinders adjusted to within 1/4 " of the wheel? | | | |
| 9. | Is compressed air appropriately controlled (safety air nozzle - below 30 psi if dead-ended, chip guarding in place) | | | |
| Section G - Safe Material Storage and Handling | | | | |
| 1. | Is material stacked in a safe and stable manner? | | | |
| 2. | Are compressed gas cylinders appropriately secured with valve caps on cylinders not in use? | | | |
| 3. | Are assistive/mechanical devices in place for heavy materials (such as carts, dollies, hand trucks, etc.) | | | |
| 4. | Are load ratings clearly marked on cranes and hoisting equipment? | | | |
| Section H - Occupational Safety and Health | | | | |
| 1. | Is ventilation adequate with good flow (no excessive fumes or dust accumulation)? | | | |
| 2. | Are exhaust fans and ducts in good condition? | | | |
| 3. | Is localized ventilation used where necessary? | | | |
| 4. | Is lighting in the shop adequate? | | | |
| 5. | Are noise levels at an acceptable level, and not excessive? | | | |
| 6. | Are there any ergonomic hazards that aren't being addressed (repetitive motion, awkward postures, heavy lifting, vibration from equipment)? | | | |
| Section I - Hazardous Waste Management | | | | |
| 1. | Are all waste materials placed in proper receptacles? | | | |
| 2. | Are waste containers appropriately labeled? | | | |
| 3. | Is a spill clean up kit available for use? | | | |
| 4. | Is there an excessive accumulation of hazardous waste? | | | |

Shop Training Acknowledgement for Authorized Users

(Appendix B)

By signing this acknowledgement, I attest that I have been given the opportunity to read and have read this Shop Safety Plan and have completed all required training and orientation prior to performing work in the Shop.

I will report any unsafe or unsanitary conditions promptly to supervision, as well as all injuries, incidents, or near-misses.

If I am unsure how to proceed with a task, or if I am uncertain with any aspect of work in the Shop, I will stop and consult with supervision before proceeding.

I understand that failure to follow these directives may result in disciplinary action or removal of Shop authorization.

Signature of Shop User

Today's Date