

SECTION	III.	Occupational Safety
Chapter	4.	Academic Shop Safety
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# ACADEMIC SHOP SAFETY

## INTRODUCTION

### PURPOSE

This policy addresses employee and student safety when working in academic shops or with fixed or bench top machine tools in laboratories or other academic environments. This policy also offers basic rules for use of portable power tools by students and staff in the course of research, teaching, and related activities. This policy defines requirements that must be addressed by each work area locally and provides some basic rules for all users of this type of equipment.

### DEFINITIONS

A *shop* is a room or set of rooms with machine tools or other fabrication equipment, including equipment for woodworking, metal machining, metal forming, sand blasting, and/or welding.

*Academic shops* include shops that directly support the teaching and research functions of the University or Medical Center and/or which are housed within an academic department. Shops related to maintenance and service activities or reporting to maintenance or service departments are not covered by this policy but are expected to develop internal written safety procedures in consultation with the Occupational and Environmental Safety Office (OESO).

*Machine tools* include fixed and bench top powered equipment used for cutting, drilling, milling, sanding, blasting, shearing, punching, or otherwise forming solid materials such as metal, plastic, and wood. Examples include but are not limited to table saws, band saws, drill presses, lathes, belt sanders, bench grinders, pedestal grinders, and metal shearing equipment.

*Portable power tools* include circular saws, routers, drills, nail guns, and other powered tools that are typically held in place by the operator rather than being fixed in place or positioned on a bench top.

### RESPONSIBILITIES – MACHINE TOOLS

Departments with academic shops or with employees and/or students using machine tools in labs or classrooms shall ensure that each shop or work area is implementing the Basic Safety Rules in the Procedures section of this policy, and has developed additional safety rules as described below.

Each academic shop or work area with machine tools must:

- Develop General Safety Rules for the shop or work area. These must address:
  - Restrictions on working alone. (Rules may differ for staff versus students and may be machine-specific.)
  - Appropriate clothing and shoes. (In most cases, appropriate clothing will include long pants and closed-toed shoes.)
  - Specific areas requiring personal protective equipment (including eye and hearing protection).
  - Use of buddy system or presence of professional staff in shop or work area during use by students.
- Establish shop (or equipment-specific) hours (in writing) and communicate hours to users.
- Establish qualifications for professional staff.
- Establish a training program and competency measure to qualify independent users, including students (if applicable). At least some portion of the training and competency measure must be machine-specific. For experienced users, the training may be shortened or waived but a demonstration of competence would still be required. Note: In classrooms where the only student use of machine tools will be closely supervised by an instructor, the requirement for student competency may be waived under the following conditions:
  - The class must have a written policy indicating the circumstances under which students may use equipment,
  - Equipment must otherwise be locked out to prevent use by untrained persons,
  - Training on the basic rules (in the procedures section) has been provided
- Establish a period for review of safety training (no less frequently than every four years). If there are other circumstances (such as new equipment or infraction of safety rules) that may warrant review of training, this should be indicated.
- Ensure that untrained persons do not use equipment (except in closely supervised classroom settings as mentioned above).
- Develop a mechanism for corrective reinforcement of safety rules & write down how this will be accomplished.
- Maintain written safety procedures for each machine. (This may be a document prepared by the manufacturer.) These written procedures should address safety precautions for routine risks such as changing cutters, as well as more significant risks that may require full lock-out tag-out.
- Ensure that all machine tools and other equipment are in good working order and are equipped with effective guards. Equipment with unrepairable damage or that cannot be properly guarded must be replaced. When acquiring new equipment, consideration should be given to items with state-of-the-art safety designs.
- Ensure that users have safety glasses and other required personal protective equipment.

- Schedule an audit with the Occupational Hygiene and Safety Office at least every three years.
- Investigate all incidents.
- Notify OESO of all injuries requiring medical treatment beyond first aid, and collaborate with OESO on these investigations.

Employees and students using machine tools/equipment must:

- Comply with any shop-, work area-, and/or machine- specific procedures.
- Comply with the “Basic Rules for Academic Shops and Users of Machine Tools”, as defined in the Procedures section of this policy.
- Report any incidents or problems to the shop supervisor.

The Occupational and Environmental Safety Office (OESO) shall:

- Audit academic shops and other work areas with machine tools at least every three years.
- Conduct periodic reviews of the machine shop safety program.
- Coordinate Duke-wide policy changes with input from academic shop representatives.
- Participate in investigation or review of injuries requiring medical treatment beyond first aid.

## **RESPONSIBILITIES – PORTABLE POWER TOOLS**

Each academic shop or work area using portable power tools must:

- Ensure that the tools are not damaged and in good operating condition.
- Ensure that users are familiar with tool operation and appropriate safety procedures.
- Ensure that users follow the Basic Rules for Use of Portable Power Tools in the Procedures section.

Employees and students using portable power tools must comply with the Basic Rules for Use of Portable Power Tools in the Procedures section.

## **PROCEDURES**

### **BASIC RULES FOR ACADEMIC SHOPS AND USERS OF MACHINE TOOLS**

When any machine tool or other fabrication equipment is in use, everyone in the shop or work area must follow these rules:

- No loose hair or clothing – tie up long hair! Roll up sleeves when working near rotating equipment.
- No jewelry (watches, rings, necklaces, dangly earrings).

- No food or drink in vicinity of machinery or equipment.
- No alcohol or drugs in the shop.
- No horseplay.
- No use of shop (or equipment) outside of established hours (to be determined for each shop or work area).
- Wear appropriate clothing (with few exceptions, long pants and closed-toed shoes).
- Wear safety glasses in the vicinity of operating equipment!
- Wear other appropriate PPE based on work area- and machine-specific rules.
- If untrained persons are in the shop or work area, they must be informed of these basic safety rules before observing use of machinery/equipment.
- Keep aisles, exits and access to emergency equipment clear at all times.

In addition, people using machine tools or other fabrication equipment must follow these rules:

- Only use machinery/equipment on which you have been trained!
- Remain near equipment while it is running.
- No use of headphones/earphones.
- No use of cell phones.
- Ensure that all machine guards are in place when equipment is in use.
- Do not use damaged equipment, or equipment that does not appear to be operating normally.
- No use of machinery/equipment when under the influence of alcohol, drugs, or prescription/over-the-counter medications that may make it difficult for you to concentrate.

## **WORKING WITH TOXIC METALS**

Machining or welding of uranium is strictly forbidden.

Cadmium-containing filler metals for brazing should not be used.

If there is a need to machine, cut, or weld toxic metals (including galvanized metal, stainless steel, leaded brass/bronze, and beryllium), first consult with the Occupational Hygiene and Safety Division of OESO (919-684-5996) to ensure that personnel exposure and shop contamination will be minimized.

## **BASIC RULES FOR USERS OF PORTABLE POWER TOOLS**

Employees and students using portable power tools must:

- Inspect the tool for damage before use. If damage is discovered, users will not use the tool but will report the damage to the shop supervisor or other responsible person.
- Use the tools for their intended purpose.
- NOT make improvised modifications that may affect the safe operation of the tool.
- Comply with manufacturer's safety guidelines.
- Wear safety glasses.
- Wear other appropriate Personal Protective Equipment (such as hearing protection), as recommended by the manufacturer.

## **TRAINING**

Initial training will be provided by each shop or work area with machine tools to any employees or students using its equipment, and training records will be maintained by the shop, work area, or department, as appropriate. Departments without a professional on staff will arrange for training by a competent person.

Users must demonstrate competency on the machine tools they will use, and records of the competency demonstration must be maintained by the shop, work area, or department. For experienced users, the training may be shortened or waived but a demonstration of competence would still be required. Users of portable power tools must demonstrate competency in use of those power tools.

Refresher training will be required for all users of machine tools at least every four years. Refresher training may be tailored to the needs of specific users but must at least include a review of the Basic Rules for Academic Shops and Users of Machine Tools, shop hours, and the General Safety Rules for that shop or work area.

## **REFERENCES**

Code of Federal Regulations, Title 29, Part 1910, Subpart I, *Personal Protective Equipment*

Code of Federal Regulations, Title 29, Part 1910, Subpart O, *Machinery and Machine Guarding*