

# Machine Shop Safety Plan & Procedure

## Purpose

The purpose of the shop is threefold. First, it exists to support the daily activities of the department as a facility for the simple repair and construction of apparatus for research needs. Second, it is a research support facility to be used by both professors and their students in making and modifying scientific research equipment. Finally, it can be used as a teaching tool to improve the mechanical skills of graduate students, particularly those involved in experimental research within the department.

Machine shops are by nature hazardous environments. This could vary from the chemical hazards of solvents and paints used to finish or clean metal parts to the actual mechanical dangers of the equipment and large objects that can be encountered. Because of the dangers inherent in shop work, there is one classification for users – **authorized user**. Shop hours are limited to HRC business hours; 8 a.m. to 5 p.m. After-hours access requires 24 hour notice and approval (see access below).

## Definitions

*Research Lab Coordinator:* Responsible to oversee daily operations within the machine shop; maintains equipment, orders supplies, provides training & guidance, and approves access for authorized users.

*Faculty:* Those hired by the University into the College of Engineering, Architecture and Technology (CEAT) are responsible for students who become authorized users and may become authorized users themselves.

*Authorized Users:* This designation indicates the completion of department machine shop class or equivalent and requires the permission of department head, and the research lab coordinator.

*Guest:* A designee of faculty, staff, or advanced student users for the sole purpose of being present with authorized users as part of the “buddy-system”.

## Applicability

This policy applies to all faculty and students at all times.

## Plan

A list of currently active student users and their faculty advisors will be kept up-to-date by the lab manager. Students should not assume they are authorized users unless their name is on that list. The buddy system is required for anyone using the machine shop, someone must be in the machine shop and near enough to hear and respond in case of an accident.

The personnel categories defined above have the following privileges and responsibilities:

Faculty:

It is the responsibilities of faculty who have students that need to work in the machine shop to ensure that their students are properly trained on the equipment they need to use. To initiate that process, submit a request on the HRC access request form to the research lab coordinator. The research lab coordinator will assign the appropriate user authorization once training is verified for the use of tools in the machine shop. Faculty who train a student to use specific equipment will send notice to the research lab coordinator to indicate the additional training on specific tools that the user has achieved.

Faculty who are authorized users must follow the policy rules for use; requested access, completed machine shop training, and were approved to use the machine shop.

Authorized Users:

Authorized users must have completed machine shop training and submitted completed training documentation to the research lab coordinator for approval prior to use. The research lab coordinator will activate access for the authorized user. The authorized student user is someone who is extremely familiar with the equipment and its operation.

Guest:

Guests are allowed in the shop for buddy purposes only: such as when a faculty member or advanced student needs to complete work. There should never be more than **2** guests in the shop at any time. They should never distract the actual user from their work. Likewise, they should be shown from the first instant they enter the shop where the emergency shut-off controls are, where the first aid kit is, and where the telephone is. The guest is never allowed to operate any machinery except in emergency shut-down situations.

## **Procedures**

Access

Access to the machine shop is limited to normal working hours. After-hours access to the machine shop is limited to completing approved projects. Requests for after-hours access must be submitted to the Research Lab Coordinator **24 hours in advance**. Notice will then be provided to Campus Police regarding approved after-hours use. All users must use their ID to card swipe into the machine shop. A hard copy log is present to record time entered and time leaving. Card access log, hard copy sign-in sheet and surveillance cameras will be utilized to verify after-hour access/use.

If hand tools from the shop are required for after-hours use, then the research lab coordinator and faculty advisor should be notified during business hours and upon approval they should be taken to the faculty advisor's research lab for use there.

Hazards and their Avoidance

The primary types of injuries that might occur in the machine shop involve the fingers, hands, and eyes/ears. While it is virtually impossible to 100% avoid numerous small cuts, bruises, or other injuries to the hands, it is possible to avoid the type of serious incident that leads to

stitches or, worse yet, the loss of all or part of a finger. The simplest thing is to avoid all contact with moving machine parts and to avoid sharp edges. The following are some general rules for the shop to follow to avoid serious injuries and apply to all users/guests:

- Always wear safety glasses when working in the machine shop.
- Never touch a cutting tool or rotating work piece while it is still in motion. This includes drills, end-mills, saws, and work pieces in the lathe.
- The moment before you turn a machine on, pause to make a mental check of where your hands are and any direction the cutter or parts of the machine may move. For instance, check to make sure that you don't rest your hand at some location that could be a pinch point. Stay very aware of where your hands are in relations to the machine parts.
- Try to only pick up cutting tools by the shank or while wrapped in a cloth or paper towel to avoid contact with the sharp cutting edge of the tool.
- Be aware that work pieces after machining can sometimes have edges as sharp or sharper than the tools themselves. Always try to pick up a work piece by its flattest, most stable faces and remove sharp edges as soon as possible after machining by filing or grinding.
- Make sure all work pieces are securely attached to the machine before starting and that intentionally loose pieces such as wrenches and chuck keys are removed.
- Do not wear large, loose fitting clothing that could be tangled in the machinery.
- **No open-toed shoes are allowed while working in the shop.**
- Remove all loose fitting rings, necklaces, bracelets, and wristwatches while working in the shop. Tie back long/loose hair.
- If the job you are doing will involve lifting of heavy objects, only do so by bending your knees and getting help if needed.
- Do not lean, stand, or sit on machines or the countertop where work is ongoing.
- Do not touch the controls of a machine someone else is operating.
- Do not allow yourself to be distracted by other users or guests in the shop.
- Do not work in the machine shop when tired or fatigued.

#### Food & Drink, Clothing, Headphones

No food or drinks are allowed in the machine shop.

Because it is important to be aware of the operation of the equipment and others in the shop, headphones are prohibited.

Clothing should be appropriate to an oily environment with the aforementioned hazards. This means that a shirt (preferably with a pocket for practical purposes) and closed toe shoes must be worn. No sandals are allowed by any user or guest. Short sleeve shirts are recommended, though long sleeve shirts are allowed so long as the cuffs are not baggy and loose fitting. Safety toe shoes are desirable if you will be working with large work pieces or other significantly heavy objects.

### Emergency Responses

All users and guests of the shop should be familiar with the location of the first aid kit, the phone, and the emergency shut off for each machine. If a significant injury or other incident occurs, the first response should be to **contact campus police (918-594-8123)** who will dispatch emergency medical personnel. Standard first aid procedures should be used such as keeping unconscious victims immobile and wrapping severe cuts with clean sterile cloths or wipes while applying pressure. See HRC Emergency Response Plan.

For all incidents involving professional medical attention, a report should be filed with the department head and safety officer, as soon as possible, so that appropriate action may be taken to ensure medical evaluation/treatment is provided.

### Cleaning and Maintenance

The shop should always be left in a condition that is as good as or better than you found it. This means in particular cleaning metal chips and other debris from the machines and floor and returning all tools and supplies to their proper location. If you must leave a job in process, you must leave a note close by telling who you are and when you intend to return. If you feel that any of the machines are not working properly, immediately report it to the HRC research lab coordinator or the department head.

### **Responsibilities**

It is the responsibility of all shop users to follow the procedures outlined above at all times and monitor the actions of others working in the shop. Failure to report unauthorized access or inappropriate usage of the facilities grounds for sanctions.

### **Sanctions**

Violations of any of these policies will be handled at the judgment of the HRC director, OSU-Tulsa academic affairs, department head, safety officer, and/or the lab manager. This could include loss of user classification, temporary loss of privileges, or permanent expulsion from the shop. Any appeal of this judgment will have to go through the department head or through the student grievance procedure outlined in the student handbook. Suspension or expulsion may result.

### **Exclusions**

None.