



Machinery – Supervisors/Users

Description

Each shop must develop a policy regarding training requirements and oversight necessary for specific pieces of equipment, room and equipment access requirements, general rules and responsibilities of shop users and a process for student project review. This policy should be posted within the shop (for review or reference) or its location noted. A template is provided for an [Academic Machine Shop Safety Policy \(Appendix A\)](#) that can be modified to the specific shop's requirements.

Also refer to [OSEH's Machine Shop Guideline](#) for more information.

Equipment Setup

- Locate equipment in areas with adequate clearances, power, lighting & ventilation for safe operation.
- Equipment operating in wet areas must only be plugged into GFCI-protected outlets.
- Stationary machines are to be leveled and securely anchored to the floor.
- All attachments used with machining tools must be consistent with manufacturer's recommendations.
- Equipment controls must be protected from unexpected or accidental activation.

Potential Hazards

Shop users may encounter numerous potential hazards when working with (or in proximity to) hand tools and stationary machines, e.g., lathes, saws, drills, and grinders including:

- **Mechanical hazards:** points of operation, pinch points, shear points, power transmission points, etc.
- **Operational hazards:** heat, metal chips, noise, etc.
- **Chemical hazards:** coolants, cleaning solvents, lubricants, etc.
- **Electrical hazards:** exposed wiring, malfunctioning equipment, etc.

Engineering Controls

Engineering controls that eliminate the hazard at the source and do not rely on the worker's behavior for their effectiveness offer the best and most reliable means of safeguarding. Therefore, engineering controls must be the first choice for eliminating machine hazards. However, whenever engineering controls are not available or are not fully capable of protecting the employee (or an extra measure of protection is desired), Administrative (Work Practice) Controls and/or Personal Protective Equipment (PPE) must be employed.

Engineering controls include guards, barriers, restraints, gates, trip-wires, emergency stops, interlocks, optical sensors, two-handed controls, pressure sensors, proximity sensors/controls, radiofrequency & electromechanical devices, as applicable, for each device, tool or equipment.

Work Practice Controls

- Incorporate all applicable elements of [OSEH's Machine Shop Safety Guideline](#).
- Enforce the use of a "Buddy System" and develop [shop/equipment access rules](#).
- Conduct periodic & regular shop/equipment inspections using [OSEH's Shop Self-Inspections & Surveys Checklist](#) (or equivalent).

- Remove, lock-out (preferably) or tag-out, out-of-service, and promptly repair any malfunctioning or damaged equipment.
- Ensure all users are [properly trained](#) in the use of specific equipment as well as the [shop's rules](#).
- Enforce good housekeeping.

Personal Protective Equipment (PPE)

In order to select the appropriate PPE for the workplace, a Hazard Assessment is conducted. The Hazard Assessment determines the hazards and potential hazards associated with a task, machinery, or process. The appropriate PPE for the situation may be subsequently determined. Contact EHS at (810) 766-6763 to obtain a copy of the Hazard Assessment Form. The form may be completed by Environment, Health and Safety, workplace supervisor, or the Machine Shop Responsible Person (MSRP).

The appropriate PPE for the situation may be subsequently determined. Enforce the proper use of appropriate street clothing and use of Personal Protective Equipment (PPE) with all shop users.

Street Clothing:

- Wear long pants and closed toe shoes.
- Wear closely fitting clothing, i.e., no loose shirt sleeves, loose apron ties/straps, etc.
- Confine long hair/beards to prevent entanglement in machinery (hair long enough to be put up via bun, pinning-up ponytail, or hairnet).
- Do not wear jewelry (rings, necklaces, etc.).

In general, the following PPE is typically required or recommended for most machine shops:

Personal Protective Equipment (PPE):

- **Eye protection:** ANSI/ISEA Z87.1 safety glasses or goggles when working around machines or with hand tools.
 - **Face protection:** Face shields are required if flying fragments/particles are likely to be generated.
 - **Hand/body protection:** Properly selected gloves are required when using hazardous chemicals and handling scrap metal or wood, sharp-edged stock, and unfinished lumber, as well as protective sleeves, aprons, etc.
- IMPORTANT: Do not wear gloves while machining, as they can get caught in moving equipment.***
- **Foot protection:** ASTM F2412-05 approved steel-toed boots (ANSI Z41 approved if boots purchased on or before 1/26/07) may be required where potential dropping of heavy objects exists.
 - **Hearing/respiratory protection:** For loud work or operations with respiratory hazards, contact EHS at (810) 766-6763 for an assessment and recommendations.

Non-routine Equipment Servicing

- Equipment repair or special adjustment shall only be conducted by qualified service technicians. Consult equipment manufacturer for recommendation.
- To ensure personnel safety during non-routine cleaning or maintenance performed in-house, lock out and tag out procedures shall be followed as specified in the EHS's [Lock Out/Tag Out Safety Program](#). Contact EHS at (810) 766-6763 for assistance.

Waste Disposal

Because most spent, unused and expired chemicals/materials are considered hazardous wastes, they must be properly disposed of. **Do not dispose of chemical wastes by dumping them down a sink, flushing in a toilet or discarding in regular trash containers, unless authorized by UM Flint EHS.** Contact Environment, Health and Safety (EHS) at (810) 766-6763 for waste containers, labels, manifests, waste collection and for any questions regarding proper waste disposal. Also refer to UM-Flint Hazardous Waste Management Program and EHS webpage <http://www.umflint.edu/ehs/environment-health-and-safety> for more information.

Exposures/Unintended Contact



If the employee is in need of emergency medical attention, call 911 immediately.



In general, flush affected eyes or skin with water for at least 15 minutes, then seek medical attention (see below).

- **Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.
- **Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
- **Ingestion:** If swallowed, **do not induce vomiting unless directed to do so by medical personnel.** Never give anything by mouth to an unconscious person. Get medical aid.
- **Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.



If there is any doubt about the severity of the injury, seek immediate medical attention.



Contact EHS for advice on symptoms of chemical exposure, or assistance in performing an exposure assessment.

Report all work related accidents, injuries, illnesses or exposures to UM-Flint DPS. Additionally, employees and supervisors must be sure to report the injury to EHS and complete and submit the [Illness and Injury Report Form](#) to WorkConnections within 24 hours. Follow the directions on the WorkConnections website [Forms Instructions](#) to obtain proper medical treatment and follow-up.

Complete the [EHS Shop/Studio Incident and Near-Miss Report](#) form.

TREATMENT FACILITIES:

| <u>MAJOR INJURIES</u> | <u>MINOR INJURIES –During Business Hours</u> | <u>MINOR INJURIES –After Business Hours</u> |
|---|---|---|
| Genesys Hospital One Genesys Parkway Grand Blanc, MI 48439 (810) 606-5710 Hurley Medical Center One Hurley Plaza Flint, MI 48503 (810) 262-9000 McLaren Hospital Flint 401 South Ballenger Hwy Flint, MI 48532 (810) 342-2000 | Genesys Occupational Health Network 1460 Center Rd. Burton, MI 48509 (810) 715-4620 Mon. to Fri. 7:30 am to 10 pm Sat. & Sun. Noon to 8 pm McLaren Flint-Burton OCC Center 1459 S. Center Rd. Burton, MI 48509 (810) 496-0900 Mon. - Fri. 8 am to 8 pm Sat & Sun 10 am to 2 pm | Downtown Flint 420 S. Saginaw St. Flint, MI 48502 (810) 762-1550 Genesys East 1096 S. Belsay Rd, Suite F Burton, MI 48509 (810) 743-3351 Genesys North 4154 W. Vienna Rd Clio, MI 48420 (810) 686-7397 Genesys South 8447 N. Holly Rd Grand Blanc, MI 48439 (810) 603-0856 Mon. - Fri. 6 to 10pm / Sat. & Sun. 1-10pm |

Click [here](#) for more information on the UM – Flint Emergency Preparedness and Response Plan.

Spill Procedure

- When a spill occurs, **personal safety should always come first.**
- Alert and clear everyone in the immediate area where the spill occurred.
- Use proper personal protective equipment (PPE) as noted above.

A **minor (small) chemical spill** is one of a known chemical that staff is capable of handling safely without the assistance of safety and emergency personnel, i.e., (*less than 1 Gallon or 3.5 Liters*). A **major/large chemical spill** requires active assistance from emergency personnel.

Spill Response Steps:

MINOR CHEMICAL SPILL

- Alert people in immediate area of spill.
- If spilled material is flammable, turn off ignition and heat sources. Don't light Bunsen burners or turn on other switches.
- Open outside windows, if possible.
- Use proper personal protective equipment as indicated above.
- Avoid breathing vapors from spill.
- Confine spill to as small an area as possible.
- **Do not wash spill down the drain.**
- Use appropriate spill kits/sorbents to neutralize corrosives and/or absorb spill. Collect contaminated materials and residues and place in container. For powdered chemicals sweep carefully to avoid generation of dust or, if appropriate, use moist sorbent pads or wet the powder with a suitable solvent and then wipe with a dry cloth. Contact EHS at (810) 766-6763 for proper disposal.
- Clean spill area with water.

MAJOR CHEMICAL SPILL

Report large spills (*greater than 1 Gallon or 3.5 Liters*) in corridors or common areas, e.g., hallways, elevators, eating areas, rest rooms, offices, etc., to UM-Flint's Department of Public Safety (DPS) at (810) 762-3333 (*or 911*).

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the shop to evacuate.
- If spilled material is flammable, turn off ignition and heat sources. Don't turn on other switches.
- **Call UM-Flint DPS at 911 immediately for assistance.**
- Close doors to affected area.
- Post warnings to keep people from entering the area.
- Have person available that has knowledge of incident and shop to assist emergency personnel.

Additional Spill Links:

- www.oseh.umich.edu/pdf/chemspil.pdf
- <http://www.oseh.umich.edu/emer-chemical.shtml>

Report all emergencies, suspicious activity, injuries, spills, and fires to the UM-Flint Department of Public Safety (DPS) at 911 from any university telephone or (810) 762-3333 from cell phone or non-university telephone. Register with the [University of Michigan Emergency Alert System](#) via Wolverine Access. Also, preprogram the UM-Flint DPS telephone number (810) 762-3333 into your cell phone for quick, easy use.

Training of Personnel

- Each shop's Responsible Person/Monitor must complete the online OSEH Machine Shop Responsible Person Training. Go to OSEH's [My LINC training website](#) and log-in, in order to access this training module (**IHS070w**).
- Only authorized machine tool users as defined by this Guideline are permitted to operate machining tools in U-M facilities.
- Training of authorized machine tool users shall be performed by the Responsible Person or Monitor who has thorough knowledge and experience of how individual machining tools and equipment are operated, the **safety** hazards associated with those machining tools and equipment, and specific actions to take in case of an emergency.
- All users of a machine shop should attend "**Basic machine shop safety training**" developed and provided by the Responsible Person/Monitor for a specific shop. The training should include the following topics at a minimum: Unit-specific Machine Shop Policy, use of personal protective equipment (PPE), applicable prohibitions, e.g., loose clothing, hair, gloves and jewelry, etc., guard use/positioning, machining tool and bit maintenance, as well as hand tool and facility safety. Machine shop general safety rules and equipment specific guidelines ([Appendix C](#)) should also be included in the basic training program.

The length and type of training for specific machines shall be determined by the designated Responsible Person or Monitor as delineated in the site shop policy per the [Classification System Matrix](#). Shop equipment will require Tool Specific Training which should include instruction and hands-on demonstration of the following:

- Description and identification of the hazards associated with a particular machine;
- Proper safety precautions when working with a particular machine;
- Limitations of the tools/equipment/materials and when and what not to use;
- Safeguards, protection they provide, and ensuring their presence before using a machine;
- What to do if a damaged guard, missing part, unusual noise, etc., is noticed;
- How to use the emergency buttons and other measures, when necessary;
- Maintenance (as applicable) and cleaning procedures.

Based on the unit-specific Machine Shop Policy, **certain tools** or **machines** may also require proficiency testing prior to being deemed an "authorized machine tool user." Proficiency determinations may be evaluated through completion of a shop project or through extensive hands-on training/oversight as determined by the Responsible Person.

Certification

I have read and understand the above SOP. I agree to contact my Supervisor or Shop Manager if I plan to modify this procedure.

| Name | Signature | UM ID # | Date |
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Prior Approval required – Is this procedure hazardous enough to warrant prior approval from the laboratory/shop director? YES NO

Principal Investigator/Shop Manager _____ **Revision Date** _____