NYU SHOP SAFETY PROGRAM

Annual Refresher Training

This program was developed by:

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**New York University**
**OSHA Personal Protective Equipment Standard**
**Annual Refresher Training**

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**Instructions**

1. Review the Purpose and Objectives.
2. Review the reference materials, which are included in this packet.
3. Complete the Post-test and return the completed Post-test to your supervisor.

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**Overview**

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**Purpose**

This self-learning packet can be used to complete the annual refresher training Shop Safety. This packet DOES NOT substitute Hands On Training given by the shop supervisor. If you have questions about the materials or require additional information please contact Environmental Services at 998-1450. The packet requires completion of a Post-test that will be reviewed by your supervisor.

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**Objectives**

Personnel who complete this packet in conjunction with training from their supervisor in specific hands-on training in Shop Safety will be familiar with:

- The basics of shop safety;
- The OSHA Machinery and Machine Guarding Standard;
- The hazards associated with particular machines;
- How to use machine safeguards;
- NYU’s Machine Guarding Policy.
- Personal Protective Equipment (PPE) Use-(PPE Training required by OSHA is given as a separate training)
General Shop Safety Concepts And Requirements

General Shop Safety Rules

Many occupational injuries occur due to unsafe work practices or flawed procedures. Personnel injuries are rare in locations where equipment is maintained in good operating condition and operated correctly. Workers must be adequately trained, and all personnel must comply with safety rules and display a committed attitude toward safety. The shop rules listed below are intended to provide a safe environment in which to work. However, if a situation does not appear to be safe, the supervisor must be notified prior to conducting the work. A fundamental responsibility of a supervisor is to develop and establish the procedures to be used, and to enforce the use of those procedures. To be effective, shop procedures must be in writing, employees must be trained in the use of the procedures, and the procedures must be readily available for reference. Shop rules are a list of actions, or prohibition of actions, intended to ensure shop safety and product quality. Shop rules should be prominently displayed and adherence to such rules enforced.

The following general rules apply to shops at NYU:

- Shop areas must be free of housekeeping hazards and shall be clean and orderly.
- Proper Personal Protective Equipment (PPE) must be used in accordance with NYU’s PPE policy. (see policy [http://www.nyu.edu/environmental_services/pdfs/policies/PPE.pdf](http://www.nyu.edu/environmental_services/pdfs/policies/PPE.pdf))
- Never attempt to operate any machinery or equipment that is unfamiliar.
- Tools and equipment shall not be left unattended while parts are still in motion or machinery is in a "cocked" or mid-cycle status.
- When machines are not in use, the motor controller switch should be left in the “off” position.
- Operators must not wear jewelry, loose-fitting clothing, neckties, or other apparel that may become caught in machinery.
- While working at or near exposed rotating machinery with hair of length such that it could become caught in the machinery, a cap, or other restraint, that covers and/or contains the hair must be worn.
- Eye protection must be worn while operating machine tools and at all times in designated eye protection areas.
- Manual adjusting and gauging (callipering) of work must not be performed while a machine tool is in operation.
- Do not attempt to lift heavy work. Obtain assistance or use a lifting aid.
- Only the proper hand tools should be used. Tools should be kept in their proper location (such as a tool rack or rest).
- Safe work procedures must be developed, posted, and enforced. Safe shop practices do not permit taking chances.
- Safety shoes must be worn in designated areas. Metatarsal guards must be worn in designated areas and while performing specific tasks where injury potential to the top of the foot is high.
- Power to equipment must be shut off, disconnected, or locked out, while changing blades, drill bits, etc.
Hand Tool Safety

When using hand tools the following general rules should be followed in accordance with NYU’s Hand Held and Powered Hand Tools Safety Policy:

- Be cautious. Injuries can result from improper or careless use of hand tools. Eye injuries from tool chips, cuts from saws and puncture wounds can occur when tools are misused.
- Use the right tool for the job. Makeshift arrangements such as the use of a screwdriver as a chisel, a pair of pliers as a wrench, a wrench as a hammer, or overloading a wrench by using a pipe extension (cheater bar) on the handle is dangerous and shall not be used.
- Use only tools that are in good condition and free from broken or splintered parts. Be sure that hammer heads are secure on handles. Blades on chisels, etc. must be sharp and in good condition.
- Inspect tools and keep them clean. Repair or replace unsafe tools.
- When transporting tools, use standard tool belts, pouches, or boxes. DO NOT USE YOUR POCKETS AS A TOOL BELT – CARRY TOOLS CAREFULLY
- Use tools correctly. GET A GOOD GRIP. Files and similarly constructed tools should be equipped with handles.
- When cutting, always cut away from your body, not toward it.
- Wear safety goggles.
- Always store tools in their proper place. PREVENT TRIPPING HAZARDS - NEVER PLACE TOOLS ON THE FLOOR.

Portable Power Hand Tools

When using power hand tools the following general rules should be followed in accordance with NYU’s Hand Held and Powered Hand Tools Safety Policy:

- The employee must be trained on the equipment prior to beginning the work and follow the manufacturer’s instructions.
- Inspect the tool for missing parts and proper functionality.
- Ensure that all safety features are installed and functioning properly.
- Prior to start-up, ensure that all bits, blades, etc. are suited for the operation and adjusted properly.
- Prior to each use, check extension cords for proper rating and grounding and check cords for frays or cracks.
- Ensure that all work surfaces are properly backed, clamped and supported before beginning the operation.
- All moving parts must be clear before activating the tool.
- Wear safety goggles or glasses with side shields and DO NOT WEAR LOOSE CLOTHING, HAIR, GLOVES OR JEWELRY that could get caught in the operation of the tool.
- Observe appropriate safety zones when operating the tool.
- Ensure that all moving parts are stopped before releasing the tool.
- Keep cords off the floor and store all power tools properly when not in use.
Stationary Power Tools

Many of the safety practices used for portable power tools apply to stationary power tools. However, stationary power tools tend to be larger, more powerful, and more complex. The following general rules should be followed:

- Safety devices and guards must always be in place and operating properly.
- Always keep blades and cutting edges sharp.
- Perform maintenance, blade changes, and adjustments only when tool is unplugged or properly locked out.
- Make sure that blades, bits, and accessories are properly mounted. In addition, make sure all locking handles and clamps are tight before using the tool.

MACHINE GUARDING


Basics Of Machine Safeguarding

Crushed hands and arms, severed fingers, blindness -- the list of possible machinery-related injuries is as long as it is horrifying. There seem to be as many hazards created by moving machine parts as there are types of machines. Safeguards are essential for protecting workers from needless and preventable injuries.

A good rule to remember is: Any machine part, function, or process which many cause injury must be safeguarded. When the operation of a machine or accidental contact with it can injure the operator or others in the vicinity, the hazards must be either controlled or eliminated.

Where Mechanical Hazards Occur

Dangerous moving parts in three basic areas require safeguarding:

- **The point of operation:** that point where work is performed on the material, such as cutting, shaping, boring, or forming of stock.

- **Power transmission apparatus:** all components of the mechanical system that transmit energy to the part of the machine performing the work. These components include flywheels, pulleys, belts, connecting rods, couplings, cams, spindles, chains, cranks, and gears.

- **Other moving parts:** all parts of the machine that move while the machine is working. These can include reciprocating, rotating, and transverse moving parts, as well as feed mechanisms and auxiliary parts of the machine.

Hazardous Mechanical Motions and Actions

A wide variety of mechanical motions and actions may present hazards to the worker. These can include the movement of rotating members, reciprocating arms, moving belts, meshing gears, cutting teeth, and any parts that impact or shear. These different types of hazardous mechanical motions and actions are basic in varying combinations to nearly all machines, and recognizing them is the first step toward protecting workers from the danger they present. For a visual demonstration of motions and actions, please go to: http://www.osha.gov/SLTC/etools/machineguarding/motions_actions.html
Motions

The basic types of hazardous mechanical motions are:

- *Rotating* (including in-running nip points)
- *Reciprocating*
- *Transferring*

**Rotating motion** can be dangerous; even smooth, slowly rotating shafts can grip clothing, and through mere skin contact force an arm or hand into a dangerous position. Injuries due to contact with rotating parts can be severe. Collars, couplings, cams, clutches, flywheels, shaft ends, spindles, meshing gears, and horizontal or vertical shafting are some examples of common rotating mechanisms which may be hazardous. The danger increases when projections such as set screws, bolts, nicks and abrasions, projecting keys are exposed on rotating parts. Rotating motions create nip points such as: parts rotating in opposite directions, parts rotating tangentially and parts rotating close to a fixed point.

**Reciprocating motions** may be hazardous because, during the back-and-forth or up-and-down motion, a worker may be struck by or caught between a moving and a stationary part.

**Transverse motion** (movement in a straight, continuous line) creates a hazard because a worker may be struck or caught in a pinch or shear point by the moving part. Example: two pulleys and a belt.

Actions

The basic types of hazardous mechanical actions are:

- *Cutting*
- *Punching*
- *Shearing*
- *Bending*

**Cutting action** may involve rotating, reciprocating, or transverse motion. The danger of cutting action exists at the point of operation where finger, arm and body injuries can occur and where flying chips or scrap material can strike the head, particularly in the area of the eyes or face. Such hazards are present at the point of operation in cutting wood, metal, or other materials. Examples of mechanisms involving cutting hazards include band saws, circular saws, boring or drilling machines, turning machines (lathes), or milling machines.

**Punching action** results when power is applied to a slide (ram) for the purpose of blanking, drawing, or stamping metal or other materials. The danger of this type of action occurs at the point of operation where stock is inserted, held, and withdrawn by hand. Examples: power presses and iron working equipment.

**Shearing action** involves applying power to a slide or knife in order to trim or shear metal or other materials. A hazard occurs at the point of operation where stock is actually inserted, held, and withdrawn. Types of shearing equipment can be operated hydraulically, mechanically or pneumatically (air).

**Bending action** results when power is applied to a slide in order to draw or stamp metal or other materials. A hazard occurs at the point of operation where stock is inserted, held, and withdrawn. Types of bending equipment: power presses, press brakes and tubing benders.

Requirements for Safeguards

Safeguards must meet these minimum general requirements:
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- **Prevent contact:** The safeguard must prevent hands, arms, and any other part of a worker's body from making contact with dangerous moving parts. A good safeguarding system eliminates the possibility of the operator or another worker placing parts of their bodies near hazardous moving parts.

- **Secure:** Workers should not be able to easily remove or tamper with the safeguard, because a safeguard that can easily be made ineffective is no safeguard at all. Guards and safety devices should be made of durable material that will withstand the conditions of normal use. They must be firmly secured to the machine.

- **Protect from falling objects:** The safeguard should ensure that no objects could fall into moving parts. A small tool, which is dropped into a cycling machine, could easily become a projectile that could strike and injure someone.

- **Create no new hazards:** A safeguard defeats its own purpose if it creates a hazard of its own such as a shear point, a jagged edge, or an unfinished surface which can cause a laceration. The edges of guards, for instance, should be rolled or bolted in such a way that they eliminate sharp edges.

- **Create no interference:** Any safeguard that impedes a worker from performing the job quickly and comfortably might soon be overridden or disregarded. Proper safeguarding can actually enhance efficiency since it can relieve the worker's apprehensions about injury.

- **Allow safe lubrication:** If possible, one should be able to lubricate the machine without removing the safeguards. Locating oil reservoirs outside the guard, with a line leading to the lubrication point, will reduce the need for the operator or maintenance worker to enter the hazardous area.

**Non-Mechanical Hazards**

While this training packet concentrates attention on concepts and techniques for safeguarding mechanical motion, machines obviously present a variety of other hazards that cannot be ignored. Some non-mechanical hazards are briefly mentioned below to remind the reader of things other than safeguarding moving parts that can affect the safe operation of machines.

**All power sources for machines are potential sources of danger.** When using electrically powered or controlled machines, for instance, the equipment as well as the electrical system itself must be properly grounded. Replacing frayed, exposed, or old wiring will also help to protect the operator and others from electrical shocks or electrocution. Replacement cords must be the appropriate cord for the equipment (be able to handle the required voltage). High-pressure systems, too, need careful inspection and maintenance to prevent possible failure from pulsation, vibration, or leaks. Such a failure could cause, among other things, explosions or flying objects.

**Machines often produce noise (unwanted sound) that can result in a number of hazards to workers.** Noise can startle and disrupt concentration, and can interfere with communications, thus hindering the worker's safe job performance. Research has linked noise to a whole range of harmful health effects, from hearing loss and aural pain to nausea, fatigue, reduced muscle control, and emotional disturbance. Engineering controls such as the use of sound-dampening materials, and personal protective equipment, such as earplugs and muffs, can help control the harmful effects of noise. Also, administrative controls that involve removing the worker from the noise source can be an effective measure when feasible.

**Because some machines require the use of cutting fluids, coolants, and other potentially harmful substances, operators, maintenance workers, and others in the vicinity may need protection.** These
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substances can cause ailments ranging from dermatitis to serious illnesses and disease. Specially
constructed safeguards, ventilation, and protective equipment and clothing are possible temporary solutions
to the problem of machinery-related chemical hazards until these hazards can be better controlled or
eliminated from the workplace. Material Safety Data Sheets (MSDSs) for all chemicals and/or lubricants
must be available and should be reviewed prior to working with the material.

The supervisor must train the Employee in the following:

• A description and identification of the hazards associated with the particular machine.
• The safeguard themselves, how they provide protection, and the hazards for which they are intended.
• How to use safeguards and why.
• How and under what circumstances safeguards can be removed, and by whom (repair or maintenance
  person).
• NYU safeguard policy: All safeguards are to be installed, properly functioning, and provide adequate
  protection. If the safeguard does not meet these requirements, the employee must immediately notify
  their supervisor and discontinue using the equipment until it is properly repaired.

SUMMARY

All personnel working in a shop at NYU must be trained in proper shop safety procedures. Hands-on
training is critical to the safety of people working in the shop. Please follow all safety procedures in your
shop and do not operate equipment that you have not been properly trained to operate. Always wear the
appropriate personal protective equipment (PPE) when working in the shop. If you need advice on PPE
selection or use, please contact Environmental Services
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Post Test
Name: ___________________________ Date: ______________
Department ___________________________ Job Title: ______________
______________________________ Bldg/Room: ______________

Hand Tool Safety

1. It is appropriate to use a hand chisel to extract a nail from a board if:
   a. You are only pulling out one nail.
   b. The chisel is very sturdy.
   c. Your supervisor told you it was okay.
   d. It is never appropriate to use a chisel to pull nails out of a board.

2. The safest way to hand a tool to another person, is to:
   a. Toss it to the person
   b. Hand it to the person sharp point first.
   c. Hand it to the person handle first.
   d. Roll or push it on the floor toward the person.

3. Personal protective equipment is not necessary when working with hand tools.
   a. True
   b. False

Portable Power Tool Safety

4. Electrical cords should be checked for fraying or exposed wiring?
   a. Yearly
   b. Before each use
   c. When the supervisor requests that you check
   d. Every third Tuesday of the month

5. The most important PPE to use when working with portable power tools is usually:
   a. Gloves
   b. Hard hat
   c. Safety glass with side shields or goggles
   d. Steel-toed shoes

6. Before you start a job with any portable power tool, you should:
   a. Pull on the cord to make sure it’s plugged in.
   b. Inspect the tool to see that all parts are in place and in working order.
   c. Check to see if it’s OSHA certified.

7. The main reason to avoid wearing loose clothing when working with power tools is that they could:
   a. Get torn
   b. Get pulled into the tool’s point of operation
   c. Block your working view
   d. Get dirty
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Machine Guarding

8. The basic types of hazardous mechanical motions are:
   a. Rotating
   b. Reciprocating
   c. Transferring
   d. All of the above

9. Describe the types of PPE that should be used in your shop:

10. A good safeguarding system eliminates the possibility of what?
    a. Getting the job done quickly.
    b. An untrained person operating the equipment.
    c. Of the operator or another worker placing parts of their body near hazardous moving parts.
    d. Overriding the safeguarding system.

11. If a safeguard is missing you should:
    a. Notify your supervisor immediately.
    b. Finish the work and then contact your supervisor.
    c. Use a different machine.
    d. Be very careful while working with the equipment.

12. Rotating motions create ____________ such as parts rotating in opposite directions.

I have supplied ________________________ with the Shop Safety Self-Training Packet. I certify that he/she has completed the post-test and I have reviewed the answers.

__________________________________________________________________________  ____________
Supervisor’s Signature                                          Date

I have been adequately trained in Shop Safety. My supervisor has answered all questions to my satisfaction and I understand he/she will be available for follow-up training if needed.

__________________________________________________________________________  ____________
Employee’s Signature                                          Date