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Procedure
for

Mechanical Safety Program

REVISION

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1	DCN0161	Initial Release	7-13-06	J. Quint	R. Segura

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1. PURPOSE AND SCOPE

1.1 Provide a program for controlling the mechanical hazards of industrial machinery in the workplace.

1.2 This program is applicable to CNSE, tenant, contractor, or vendor employees, professors and students operating and or servicing industrial machinery classified as building/facilities or tool/die/model/machine shop or commercial laboratory or Cleanroom or research equipment.

2. DEFINITIONS

2.1 **CNSE** – College of Nanoscale Science and Engineering

2.2 **Employee(s)** – CNSE employees, tenant employees, vendors, contractors, subcontractors, field service engineers/technicians, students, professors and visitors.

2.3 **Fail-safe** - designed so that a failure does not result in an increased risk.

2.4 **Industrial Machinery** - as defined in the purpose and scope may have mechanical, electrical, kinetic, hydraulic, pneumatic or thermal hazards

2.4 **Management** – supervisors of employees working on the CNSE property.

3. RESPONSIBILITIES

3.1 **Environmental Health and Safety** is responsible for program development and advice and counsel to management and employees, professors, students, tenant, contractor, and vendor employees.

3.2 **Employees** are responsible for following this program.

3.3 **Management** is responsible for the implementation and oversight of this program.

4. ASSOCIATED DOCUMENTS

4.1 OSHA eTools: Machine Guarding eTool.

4.2 OSHA 1910 Subpart O - Machinery and Machine Guarding

4.3 American National Standard for Industrial Robots and Robot Systems – Safety Requirements, ANSI/RIA15.06-1999 or most current version

available at: http://www.roboticsonline.com/

5. PROGRAM REQUIREMENTS

5.1 Training and Information

5.1.1 Warning signs and labels must be used in accordance with regulatory or consensus standard requirements.

5.1.2 Employees are responsible for completing all relevant training prior to operating or servicing machines; inspecting all functional aspects of the machines before each use or after servicing; addressing any hazards associated with continued safe operation.

5.1.3 Employees must receive training for unfamiliar machines or equipment.

5.1.4 New machinery training must include:

- An explanation of the potential hazards associated with the operation or servicing of the machine.
- Safe operation or servicing procedures.
- Use of PPE.
- Emergency procedures.

5.2 Specific Safe Work Practices

5.2.1 All activities must be conducted in accordance with the applicable parts of Occupational Safety and Health Administration (OSHA) 1910 Subpart O - Machinery and Machine Guarding

5.3 Common Safe Work Practices

5.3.1 Service and Maintenance activities having the potential for unexpected energization or start-up of the machine or equipment must comply with the Lockout/Tagout procedure.

5.3.2 Service and Maintenance activities must be conducted in accordance with the equipment manufacturer's instructions.

5.3.3 No machine safeguard may be modified or removed for operation.

5.3.4 Jewelry, loose-fitting clothing, shirt sleeves below the elbow, neckties or chains are prohibited around machinery with exposed moving parts.

5.3.5 Long hair must be contained by a protective cap or net.

5.3.6 Safe conditions at work stations (includes floors clear of slip/trip hazards; parts, tools, and accessories safely located) must be maintained.

5.3.7 Compressed gas (air, nitrogen, argon, etc.) used for particle removal in or on machines, or parts (not to be used to clean clothing, skin or hair) shall be controlled at less than 30 pounds per square inch (p.s.i., 207 kPa). The recommended control method is the use of nozzles designed with back flow vents that reduce the available pressure to less than 30 pounds per square inch (p.s.i., 207 kPa) if the tip is dead ended. Nozzles/bypass slots etc. must not be modified in any way.

5.3.8 Machines designed for a fixed location must be securely anchored.

5.3.9 Grinding machine work rests shall be adjusted closely to the wheel to maintain a maximum opening of one-eighth inch (3.2mm) and the spark arrester (AKA tongue) clearance shall never exceed one-fourth inch (6.3mm).

5.3.10 Maintain required exit access space and clearances to electrical boxes while servicing machines.

5.3.11 The basic types of hazardous mechanical motions and actions requiring protection are:

a. **Motion**:
- Rotating
- Reciprocating
- Transverse
- Automation (robotics, etc.)

b. **Actions**:
- Cutting
- Bending
- Punching
- Pinching
- Shearing

5.3.12 Mechanical Hazard Protection is required at:

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

b. **Power transmission apparatus**: all components of the mechanical system which 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.

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

5.3.13. Mechanical Hazard Safeguards must be designed to:

- Prevent contact
- Be secure (not easily removed)
- Protect from falling or flying objects or sparks
- Create no new hazards
- Create no interference
- Electrical/electronic safeguards are of a fail-safe design

5.3.14. Safeguards (shields, covers, interlocks, etc.) removed or disabled for servicing or repair must be restored upon completion of the task.

5.3.15. Robotic and Automated Systems must be installed and certified to the applicable parts of the American National Standard for Industrial Robots and Robot Systems – Safety Requirements, ANSI/RIA15.06-1999 or most current version.

6. RECORDS

6.1 Written training and program records must be maintained in accordance with Federal, State and Local governmental regulations.