Lesson Plan
General Industry Outreach Training Program (10-hour)

Topic: Machine Guarding

Overview of the OSHA Standard

One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Moving machine parts have the potential for causing severe workplace injuries, such as crushed fingers or hands, amputations, burns and blindness, just to name a few. Safeguards are essential for protecting workers from these needless and preventable injuries. Machine guarding and related machinery violations continuously rank among the top 10 of OSHA citations issued. Mechanical power presses have also become an area of increasing concern.

Step 1: Planning the Lesson

- **Instructional Materials.**
  1. PowerPoint presentation.
  2. Instructor notes.
  3. Other materials.

- **Instructional Objectives.**
  1. Complete the required topics for the OSHA 10-hour course.
  2. Complete the following optional topics.
     a.
     b.
     c.
  3. Present *Machine Guarding* to [number] participants.
  4. Incorporate active participation in each lesson.
  5. Provide a quiz or short evaluation at the end of the course.
  6. Ensure feedback from participants at various points in the training.

- **Guest Speakers/Presenters and Topics/Responsibilities**

Step 2: Presenting the Lesson

- **Lesson Introduction**
  Introductory remarks or transition from previous lesson.

- **Learning Objectives/Outcomes**
  Upon completion of the lesson, participants will be able to:

  1. Describe at least two of the main causes of machine accidents.

     Possible responses.
     - Reaching in to remove debris or loosen a jam
     - Not using lockout/tagout
     - Unauthorized persons doing maintenance or using the machines.
     - Missing or loose machine guards.

  2. List three of the requirements for safeguards.

     Possible responses.
     - Prevent contact with potential hazards
     - Secure the safeguard
     - Protect from falling objects
     - Create no new hazards
     - Create no interference
     - Allow safe lubrication

  3. List 5 machinery parts that pose hazards when unguarded or improperly guarded.

     Possible responses.
     - auxiliary parts
     - belts
     - chains
     - couplings
     - cranks
     - feed mechanisms
     - flywheels
     - gears
     - nip points

  4. List at least five types of machine guards.

     Possible responses.
     - Machine guarding methods.
       - fixed
       - interlocked
       - adjustable
       - self-adjusting

  5. List at least three types of devices used to safeguard machines.

     Possible responses.
     - Presence sensing
     - Pullback
     - Restraint
     - Safety controls (e.g. tripwire cable or two-hand controls)
     - Gates

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- **Learning Objectives/Outcomes (Continued)**

6. Describe a situation that warrants machine guarding and an appropriate method of guarding the machine or part in order to prevent injury or accident.

   Possible responses.

   - Situation : Power transmission apparatus (e.g. pulleys, shafting, belts, chain drives) less than 7 feet from the ground
     Method: Guard power transmission apparatus using fixed guards.

   - Situation: Periphery of fan blades less than 7 feet above the ground or working level.
     Method: Install a guard having openings no larger than ½inch.

   - Situation: Abrasive wheel machinery.
     Method: Adjust work rest to a maximum opening of 1/8 inch and adjust tongue to a maximum distance of ¼ inch from the wheel periphery.

- **Planned Activities, Discussion or Participant Interaction.**

Step 3: Evaluating Student Learning and Instruction

- **Lesson Evaluation and Comments.**

References

OSHA Standard

- 29 CFR 1910 Subpart O (1910.211 to 1910.219)
  - http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_O.html

Publications

- NIOSH Publication No. 87-107 (May 1987) 15 pages.
  Injuries and Amputations Resulting from Work with Mechanical Power Presses.
  Describes the hazards of mechanical power presses and provides safety recommendations.
  - http://www.cdc.gov/niosh/87107_49.html
- NIOSH Publication No. 94-105 (June 1994) 8 pages.
  NIOSH ALERT: Preventing Scalping & Other Severe Injuries from Farm Machinery.
  Includes case studies involving farm machinery injuries, discussions of machinery hazards, and prevention recommendations.
  - http://www.cdc.gov/niosh/pto.html
- OSHA Publication 3067.
  Concepts and Techniques of Machine Safeguarding. (1992)
  - http://www.osha-slc.gov/Publications/Mach_SafeGuard/

OSHA References/Resources

- LOTO Plus Expert Advisor
  - http://www.osha-slc.gov/dts/osta/oshasoft/lotoplus.html
- Machine Guarding Checklist
  - http://www.osha-slc.gov/Publications/Mach_SafeGuard/checklist.html
- Point-of-Operation Safeguarding – Mechanical Power Presses.
  Instruction guides, checklists and other information is provided to assist in identifying and eliminating hazards associated with mechanical power presses.
  - http://www.osha-slc.gov/SLTC/pdf_files/mpp2.pdf
- OSHA Technical Links – Control of Hazardous Energy (Lockout/Tagout)
  - http://www.osha-slc.gov/SLTC/controlhazardousenergy/index.html
- OSHA Technical Links – Machine Guarding
  - http://www.osha-slc.gov/SLTC/machineguarding/index.html
- OSHA Technical Links – Machine Guarding – Compliance
  - http://www.osha-slc.gov/SLTC/machineguarding/compliance.html
- Self-Inspection Checklists – Lockout/Tagout Procedures
  - http://www.osha-slc.gov/SLTC/smallbusiness/chklist.html#Lockout