

## LESSON PLAN

### Machine Guarding and Safeguarding Overview 1-Hour Refresher Module

#### Overview

There are a variety of potential machine hazards present in a poultry or meat processing plant. Sound machine guarding and safeguarding practices, together with an effective energy control program (lockout/tagout), can help employers to control these hazards. This overview is meant to cover the fundamental principles of machine guarding and safeguarding, along with the relevant OSHA General Industry Standards related to machine guarding.

#### Topics to be covered

- a. General Machine Guarding Principles and Regulations – *29 CFR 1910.212*
- b. Woodworking and Abrasive Grinder Requirements (Maintenance Shop Applications) – *29 CFR 1910.213 and 29 CFR 1910.215*
- c. Mechanical Power Transmission Guarding – *29 CFR 1910.219*
- d. Lockout/Tagout – *29 CFR 1910.147*

#### Objectives

Upon completion of this topic students should be able to:

- a. Explain general machine guarding and safeguarding principles and the relevant contents and implications of *29 CFR 1910.212, 1910.213, 1910.215, 1910.219, and 1910.147.*

#### Training Resources

- a. PowerPoint Presentation with instructor notes (Black and White)

#### Hour 1

- I. Review of lesson objectives
- II. Fundamentals of machine guarding and safeguarding, including:
  - a. Enclosure guarding such as fixed, interlocked, adjustable, and self-adjusting guards
  - b. Safeguarding methods including presence sensing devices (e.g. light curtains), two-hand controls and trips, pullbacks and restraints (limited), and safeguarding by distance
  - c. Outline of *29 CFR 1910.212* – General Machine Guarding requirements.

- III. Outline of *29 CFR 1910.213 and 215* – Woodworking and abrasive grinder requirements:
  - a. Outline the requirements for guarding/safeguarding woodworking and abrasive-wheel grinders as they relate to maintenance operations in a poultry or meat processing plant.
- IV. Outline of *29 CFR 1910.219* – Mechanical Power Transmission:
  - a. Outline the requirements for guarding/safeguarding mechanical power transmission and show examples in poultry or meat processing operations.
- V. OSHA e-Tools
  - a. Machine Guarding e-Tools demonstration
- VI. Lockout/Tagout
  - a. Review of major requirements in *29 CFR 1910.147*.

### **Pictures, Diagrams, Charts (By Slide Number)**

- 2. Picture shows sample sign warning of machine guarding (exaggerated). This slide meant to initiate class discussion on challenges students have at their facilities.
- 6. Animations taken from OSHA E-Tool on Machine Guarding illustrate a variety of hazards that require machine guarding including rotating parts, in-running nip points, hazardous points of operation, shear points, exploding grinding wheels, and reciprocating motion.
- 7. Illustrations show more hazards including cutting, shearing, bending, and punching.
- 8. Illustrations show samples of guarding, devices (2 hand control), and distance.
- 10. Pictures show sample fixed guards for a milling machine and belt/pulley.
- 11. Picture shows an interlocked guard on a revolving drum.
- 12. Picture shows bandsaw blade adjustable guard.
- 13. Picture shows self-adjusting guard on table saw.
- 14. Illustration of “Gotcha Stick”. Meant to depict the allowable guard size openings given the distance from the guard to the hazard. Stress need for guard to prevent access to hazard by reaching over, under, around, or through the guard.
- 15. Table representing allowable guard size openings given the distance to the hazard.
- 17. Illustrations of a variety of guards and safeguarding devices, as well as press brake operation. Stress that testing of light curtains (bottom center) should be done with test rods and not with your hand.
- 18. Illustration of light curtain.
- 19. Pictures/illustrations of pullbacks and restraints.
- 20. Close up pictures of pull backs.
- 21. Pictures of 2-hand controls.
- 22. Pictures of moveable gates.

23. Picture of a safety tripwire cable.
24. Picture of safeguarding by location example.
25. Illustrations of pressure-sensitive mats used as part of safeguarding by location.
27. Illustration of robot work cell. Stress need to reference ANSI/RIA R15.06-2012 on robot safety.
28. Pictures show shields on drill press and lathe.
33. Picture shows shear. Stress guarding of “hold-downs” as well as shear blade.
34. Picture of back of shear. Stress guarding back and using top and mid-rail with sign.
35. Picture of person using hand-tool with machine. Stress that hand tools are to be used in conjunction with other guarding/safeguarding, not as their own method of safeguarding.
36. Picture of guarded fan.
41. Picture of unguarded table saw.
43. Picture of guarded table saw.
45. Picture of spreader and non-kickback fingers.
46. Picture of unguarded radial arm saw.
48. Picture of partially guarded (top covered) radial arm saw. Stress that it must return to home when released and not go past table.
49. Picture of better guarding on radial arm saw.
51. Picture of band saw.
52. Picture of metal cutting bandsaw. Still need to guard non-working portions of blade.
54. Picture of grinder showing work rest and tongue guards.
55. Picture of tongue guard.
57. Picture of unguarded grinder. Need side guard and tongue guard. Electrical is also a serious issue.
58. Picture of unguarded grinder. Needs work rest, tongue guard. Also needs to be bolted down.
59. Illustration of Georgia Tech Technical Guide on Grinders. Available at [www.oshainfo.gatech.edu](http://www.oshainfo.gatech.edu).
61. Picture of v-belt and pulley that needs to be guarded at back.
62. Picture of missing guard on belt/pulley.
65. Picture of unguarded coupling.
66. Picture of unguarded coupling with wire wrapped up in it.
67. Picture of person who’s hair was caught in rotating parts.
68. Picture of person standing very close to unguarded belt/pulley.
69. Picture of gears that need additional guarding.
70. Picture of unguarded chain/sprocket.

71. Picture of many mechanical power transmission elements unguarded including belt/pulley, gear, shaft, chain/sprocket.

74. Picture of person in situation that requires lockout.

85. Illustration of machine guarding e-tool page. [www.osha.gov](http://www.osha.gov).

### **Activities and Classroom Procedures**

a. Training Techniques

- Show examples of good and bad machine guarding in poultry or meat processing operations
- Ask for examples from students
- Use PowerPoint slides with OSHA e-Tools to overview the machine guarding standards
- Review lockout/tagout principles

### **Evaluation and Assessment**

a. Interactive conversations

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