Hand and Portable Power Tools Safety Training Program

Goal

The goal of this program is to educate participants on safety procedures for using hand and power tools, thereby fostering a safer work environment.

Objective

The objective of this program is to help operators of hand and power tools learn safe operating techniques.

General Information

Employees can avoid injuries and fatalities by using hand tools, power tools, and powder-actuated tools properly. This includes properly:

- Adjusting guards on grinders.
- Using grinding wheels rated for the grinder's speed.
- Selecting tools equipped with protection from rotating parts.
- Properly guarding mortar mixers.
- Immediately remove any defective tool from service and notify a supervisor.

The Occupational Safety and Health Administration (OSHA) requires that employers maintain all tools in the workplace in a safe condition, including those furnished by employees. Employers must also perform regular maintenance following manufacturers' specifications. For best practice, employers should maintain a written preventive maintenance schedule.

OSHA's hand and power tool standards and regulations are outlined for:

- **General Industry** in 1910 Subpart P, Hand and Portable Power Tools and Other Hand-Held Equipment.

- **Construction Industry** in 1926, Subpart I, Tools – Hand and Power. This safety training program provides elements that employers should cover when training employees in the safe use of tools.

Safe Work Practices

Using Hand Tools

- Use the right tool for the job. Wrenches are not hammers. Knives are not screwdrivers.

- Do not use wrenches when jaws are sprung to the point that slippage occurs.

- Make sure impact tools do not have mushroomed heads.

- Keep tools' wooden handles free of splinters and cracks.

- Do not use tools with loose handles.

- Inspect tools before each use for damage or wear.

Using Power Tools

Electric Tools

- Only use electric tools that are double-insulated or grounded with a grounding prong. Do not use the tool if the prong is missing.

- Never use electric cords for hoisting or lowering tools.

- Replace cords that have damaged insulation. Do not tape over the damage.

Pneumatic Tools

- Secure all pneumatic tools to the air supply hose or whip to prevent disconnecting.

- Never carry tools by the hose.

- Use clips or retainers to secure all attachments used on pneumatic tools.

- Provide a safety tip or safety device on pneumatic nail guns or staplers when they operate at or above 100 pounds per square inch (psi) to prevent the tool from activating when they are not in contact with the work surface.

- Never use compressed air above 30 psi for cleaning purposes – and then, only with effective chip guarding and personal protective equipment (PPE).

Fuel-Powered Tools

- Follow proper fueling procedures, including equipment shutdown, when using fuel-powered tools.
- Use adequate ventilation and PPE to protect employees from the toxic fumes that this type of equipment emits.

Hydraulic Tools

- Use only fire-resistant fluids in hydraulic tools.
- Follow all manufacturer's operating procedures.

Powder-actuated (or Explosive actuated) Fastening Tools

- Train all operators on how to use these tools.
- Conduct daily tests to verify that all safety devices are working.
- Ensure that operators always use the correct shield or guard for the tool and that they wear the proper PPE.
- Never put fasteners into hard or brittle material that could chip or splinter – doing so could cause the fastener to ricochet. Such materials include cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, and hollow tile.
- Use a backing to avoid over-penetration when working with soft materials.
- Never load tools until just before they are used.
- Never point a powder-actuated fastening tool at someone.

- Never leave a loaded tool unattended.
- Never use powder-actuated tools in an explosive or flammable environment.
- Store tools and cartridges in a locked container when not in use.

Abrasive Wheel Tools

- Make sure proper guards are in place and correctly adjusted.
- Adjust tool work rests so that the maximum clearance between the rest and the wheel does not exceed 1/8 inch.
- Wear the correct eye protection for the job.
- Make sure the wheel's maximum operating speed is greater than or equal to the grinder's rated speed.

- Inspect wheels for defects using the ring test – hold the wheel with one finger through the center hole and strike it with a wooden or hard plastic screwdriver handle at a point 45 degrees from the vertical centerline and 1 to 2 inches from the outer rim. A wheel in good condition will give a clear, metallic ring. A damaged wheel will not.

Switches

The following hand-held tools may be equipped with only a positive on-off switch:

- Platen sanders.
- Disc sanders.
- Grinders with wheels 2 inches or less in diameter.
- Routers.
- Planers.
- Laminate trimmers.
- Reciprocating saws.
- Shears.
- Scroll, saber, or jig saws with blade shanks 1⁄4 inch wide or less.

All other tools must be equipped with a spring-loaded switch that turns off when the operator releases finger pressure.

Using Bench and Floor-Mounted Power Tools

Guarding

- Guard all exposed belts, chains, gears, drums, flywheels, or other reciprocating or moving parts.
- Make sure barrier guards, proximity sensors, or two-handed tripping devices are in place before using any machine.
- Provide guards to protect employees from flying chips, sparks, abrasives, or splashes.
- Guard ventilation fans unless they are at least 7 feet above the floor. Make sure fan guards have maximum openings no larger than 1⁄2 inch.

- Guard the point of operation, where work is performed or material is processed, if it exposes an employee to injury. Examples of machines requiring this type of guarding include shears, alligator cutters, power presses, milling machines, forming rollers, and calendars.

- Securely anchor all machines in a fixed location to prevent their walking or moving upon contact.

Using Woodworking Tools

Disconnect Switches

Ensure that all woodworking tools have a disconnect switch that can be locked or tagged out in the OFF position.

Speeds

All circular saws more than 20 inches in diameter or operating at more than 10,000 peripheral feet per minute, must be etched or permanently marked with the correct operating speed.

Guarding

- Guard all circular saws above and below the base plate and the shoe.

- Immediately return guards to the covering position at the end of the cut.

- Completely enclose by a hood the upper portion of a radial saw's blade, including the saw arbor.

- Guard the full diameter of the lower exposed portion of the blade.

- Ensure that the guarding device will automatically adjust itself to the thickness of the stock and remain in contact with the stock during the cut.

- Completely enclose by a hood the portion of a circular, hand-fed ripsaw above the material being cut.

- Ensure that self-adjusting guards on table saws cover the blade to the depth of the teeth.

Review Questions

1. What requirement applies to all tools?

    a. Keep tools covered at all times.
    b. Keep tools in a safe condition.
    c. Do not use any tool without a permit.
    d. Keep tools outside.

2. What is the maximum distance allowed between a tool rest and abrasive wheels?

    a. 1/8 inch.
    b. 1/4 inch.
    c. 1/2 inch.
    d. 1 inch.

3. What is the maximum psi allowed when using compressed air for cleaning purposes?

    a. 10 pounds psi.
    b. 20 pounds psi.
    c. 30 pounds psi.
    d. 40 pounds psi.

4. Which of the following is not a rule for using powder-actuated fastening tools?

    a. Never load tools until just before they are used.
    b. Never leave a loaded tool unattended.
    c. Use only fire-resistant fluids.
    d. Never use tools in an explosive or flammable environment.

5. Which of the following techniques apply when using hand tools?

    a. Make sure impact tools do not have mushroomed heads.
    b. Do not use tools with loose handles and keep tools' wooden handles free of splinters and cracks.
    c. Always use the right tool for the job.
    d. All of the above.

6. When using fuel-powered tools, an important rule is to be sure to use adequate ventilation and PPE to protect against the toxic fumes that this type of equipment emits.

    a. True.
    b. False.

7. The test for inspecting the wheels of abrasive tools for defects is known as:

    a. The knock test.
    b. The tap test.
    c. The tone test.
    d. The ring test.

8. Fan guards for bench and floor-mounted power tools must be no larger than:

    a. 1/8 inch.
    b. 1/4 inch.
    c. 1/2 inch.
    d. 1 inch.

9. What must be etched or permanently marked on all circular saws more than 20 inches in diameter or operating at more than 10,000 peripheral feet per minute?

    a. The correct operating speed
    b. The date of manufacture
    c. The brand name
    d. The country of origin

10. Which of these hand-held tools may be equipped with only a positive on-off switch?

    a. Platen and disc sanders.
    b. Planers.
    c. Laminate trimmers.
    d. All of the above.

Answers

1. b. Keep tools in a safe condition. If any tool becomes defective, immediately remove it from service and notify a supervisor.
2. a. 1/8 inch.
3. c. 30 pounds psi.
4. c. Use only fire-resistant fluids.
5. d. All of the above.
6. a. True.
7. d. The ring test. A wheel in good condition will give a clear, metallic ring. a damaged wheel will not.
8. c. 1/2 inch.
9. a. The correct operating speed.
10. d. All of the above. All other tools must be equipped with a spring-loaded switch that turns off when the operator releases finger pressure.

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