

## 8.1: Introduction to Hand and Power Tools

### Tools and Equipment

Hand and power tools are an integral part of work performance in the construction industry. Because workers who use hand and power tools are exposed to hazards, they must be trained in the safe use of each tool they are required to use. They also must be trained to understand the associated hazards and how to take necessary precautions.

#### Note

A significant requirement of working with tools is that workers must maintain all hand tools, power tools, and similar equipment in a safe condition, whether such equipment is furnished by the employer or the employee.

### Hazards Associated with the Use of Hand and Power Tools

#### Understanding the hazards

Hazards are the conditions related to tools or equipment that could cause a worker to be injured. Hazards are associated with such factors as energy sources, including the rotating or reciprocating elements of tools and equipment, electric or pneumatic energy, and user's misuse of equipment. Hazards are not related to the user's business, such as the construction business. Hazards are present in any business.

#### Minimizing exposure to hazards

Thinking about the hazard and how the worker can be exposed, and then modifying the mechanism by which the exposure occurs can minimize exposure to hazards. For example, flying parts and pieces can result from using grinders and side grinders. Wearing appropriately rated face shields and appropriate clothing provides some protection from the momentum of flying parts and pieces. Insuring that tools are appropriately selected by the ratings of specific parts (such as grinding wheel and saw blade ratings), performing physical inspections, using and maintaining necessary guards, and making sure the operator has been appropriately trained to help minimize exposure to hazards.

#### Personal Protective Equipment (PPE)

PPE should always be selected based on the hazard. For instance, face shields and eye protection that are used to protect from possible flying parts and pieces must be rated to provide the necessary protection from impact. In some instances, wearing PPE might *not* be appropriate, such as wearing gloves when using a drill press. However, in other instances, wearing gloves can protect from abrasions and cuts. Understanding how to select appropriate PPE for the task is important and part of the job hazard analysis.

#### OSHA Requirements

Subpart I of OSHA 29 CFR 1926, Construction Standards, contains safety requirements for hand tools, power-operated tools, abrasive wheels and tools, and some other specialized tools, such as jacks, air receivers, woodworking tools, and power transmission apparatus.

To provide a higher degree of safety, OSHA 29 CFR 1926.300 incorporates some of the general requirements of 29 CFR 1910, Subpart O, Machinery and Machine Guarding, to help protect workers from hazards. The hazards arise from use of the equipment, not from the classification of work.

#### Requirements for tools and machines that require guarding

When working with tools, employers must make sure that the tools are appropriately guarded, as follows:

- Ensure that power-operated tools that are designed to accommodate guards are equipped with such guards before use.
- Ensure that all belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or moving parts of equipment are guarded if such parts are exposed to contact by employees, or if they otherwise create a hazard.

"Point of operation" refers to the area on a machine where work actually is performed upon the material being processed. The following are examples of machines and tools that usually require point of operation guarding:

- Guillotine cutters
- Shears

- Alligator shears
- Powered presses
- Milling machines
- Power saws
- Jointers
- Portable power tools
- Forming rolls and calendars
- Provide one or more methods of machine guarding 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, or sparks.

#### Note

Examples of guarding methods are barrier guards, two-hand tripping devices, and electronic safety devices.

- Guard all points of operation of machines whose operation exposes an employee to injury.

#### Note

The guarding device shall conform with all applicable standards or in the absence of specific applicable standards, shall be designed and constructed to prevent the operator from having any part of his or her body in the danger zone during the operating cycle.

- Ensure that special hand tools used to place and remove material permit easy handling of material without the operator placing a hand in the danger zone. Ensure that such tools are not used in lieu of other guarding required by this section and that they can be used only to supplement protection provided.
- Guard the blades of fans when the periphery of the blades is less than 7ft. (2.128m) above the floor or working level. Ensure that the fan guard does not have openings larger than 0.5 inch (1.27 cm).

### General requirements

The following requirements are general rules that must be followed for safe operation of tools and equipment:

- Ensure that machines designed for a fixed location are anchored securely to prevent them from walking or moving.
- Provide specific PPE necessary to protect employees using hand and power tools from the hazards of falling, flying, abrasive, and splashing objects and also from harmful dusts, fumes, mists, vapors, or gases. All PPE shall meet the requirements and be maintained according to OSHA 29 CFR 1926 Subparts D and E.
- Use the following tools only with a positive "on-off" control: hand-held powered platen sanders, grinders with wheels 2-inch diameter or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jigsaws with blade shanks 1/4-inch wide or less.
- Ensure that all of the following tools are equipped with a momentary contact "on- off control: all hand-held powered drills; tappers; fastener drivers; horizontal, vertical, and angle grinders with wheels greater than 2 inches in diameter; disc sanders; belt sanders; reciprocating saws; saber saws; and other similar operating powered tools. Such equipment also may have a lock-on control, provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.
- Ensure that all other hand-held powered tools, such as circular saws, chain saws, and percussion tools without positive accessory holding means are equipped with a constant pressure switch that will shut off the power when the pressure is released.

### Hand tools

The greatest hazards posed by hand tools result from misuse and improper maintenance. Employers must not issue or permit the use of unsafe hand tools. The employer is responsible for the safe condition of the tools and equipment used by the employees, but the employees are responsible for using and maintaining the tools properly. These requirements must be followed for use of hand tools:

- Do not use wrenches, including adjustable, pipe, end and socket wrenches, when the jaws are sprung to the point that slippage occurs.
- Keep impact tools, such as drift pins, wedges, and chisels, free of mushroomed heads.

- Keep the wooden handles of tools free of splinters or cracks and ensure that they are kept tight in the tool.
- Wear appropriate PPE, such as safety goggles and gloves, due to the hazards that might be encountered while using portable tools.
- Keep knives and scissors sharp. Dull tools can be more hazardous than sharp ones.

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