

20 HAND AND PORTABLE POWER TOOLS

ANSWERS—QUIZ 1

1. b
 2. b
 3. a
 4. b
 5. a
 6. b
 7. d
 8. b
 9. d
 10. a
 11. b
 12. c
 13. To determine if tools should be changed, consider the following factors: employees' concerns about tool problems, the facility's injury and medical records that implicate tools and work methods, the setup of workstations, and trends for particular jobs.
 14. Disabilities resulting from misuse of tools or using damaged tools include loss of eyes and vision; puncture wounds from flying chips; severed fingers, tendons, and arteries; broken bones; contusions; infections from puncture wounds; ergonomic stress; as well as many other injuries.
 15. Student should mention at least four of the following questions that should be on a hand tool analysis checklist:
 - Are tools selected to limit or minimize exposure or excessive vibration?
 - Is excessive force being used?
 - Is there bending or twisting of the wrist?
 - Is a finger pinch grip used?
 - Are there problems associated with trigger finger?
 - Are tools powered where necessary and feasible?
 - Are tools evenly balanced?
 - Are heavy tools suspended or counterbalanced in ways to facilitate use?
 - Does the tool allow adequate visibility of the work?
 - Does the tool grip/handle prevent slipping during use?
 - Are tools equipped with handles of textured, non-conductive material?
 - Are different handle sizes available to fit a wide range of hand sizes?
 - Is the tool handle designed not to dig into the palm of the hand?
 - Can the tool be used safely with gloves?
 - Can the tool be used by either hand?
 - Is there a preventive maintenance program to keep tools operating as designed?
 - Have employees been trained in the proper use of tools?
 - When and how should problems with tools be reported?
 - Are tools maintained properly?
16. Student should mention the following general inspection checklist:
- Is low-voltage or battery-powered equipment used in tanks and wet areas?
 - Are tools well maintained?
 - Are motors in good condition?
 - Are approved tools used in explosive atmospheres?
 - Are tools left where they cannot fall?
- Student may also mention specific information, such as:
- Are insulation and plugs unbroken?
 - Are cords protected against trucks and oil?
 - Are cords secured out of aisles and walkways?
 - Are guards used on grinders and saws?
17. Types of toolboxes include the following: portable toolboxes, tool chests, mobile tool cabinets, gang boxes. Workers should carry tools in a toolbox or pouch. Individual tools should be carried with points and sharp edges away from body. Employees should never carry tools in any way that might interfere with the free use of both hands when climbing a ladder or other structure.
18. The basic rules involving the proper use of hammers include the following:
- Always wear eye protection.
 - Always strike a hammer blow squarely, with the hammer's striking face parallel with the surface being struck.
 - Always avoid glancing blows, overstrikes, and understrikes.
 - When striking another tool, the striking face of the

- hammer should have a diameter approximately (inch larger than the struck face of the tool.
- Always use a hammer of suitable size and weight for the job.
 - Do not use a tack hammer to drive a spike, nor a sledgehammer to drive a tack.
 - Never use a hammer to strike another hammer. Never use a hard-surfaced hammer to strike another harder surface. Never use a hammer with a loose or damaged handle.
 - Discard any hammer if it shows dents, cracks, chips, mushrooming, or excessive wear. Redressing is not recommended.
19. By observing the following six safety practices, most unintentional incidents with hand tools and portable power tools can be eliminated.
- Provide proper protective equipment and have employees wear it.
 - Select the right tool for the job.
 - Know if a tool is in good condition and keep it in good condition.
 - Properly ground power tools, using a ground-fault circuit interrupter protected circuit.
 - Use tools correctly.
 - Keep tools in a safe place.
20. Essay should mention the following points:
- The tool control attendant can help promote safety by recommending or issuing the right type of tool, encouraging employees to turn in damaged or worn tools, tagging and removing from service defective tools, and encouraging the safe use of tools.
 - A central control area and effective record keeping on tool failure and other causes of injuries help locate hazardous conditions.
 - A central area also assures better control than does scattered storage.
 - Tools are exposed to less damage and deterioration and are not as likely to fail or create other hazards.
3. b
4. b
5. a
6. a
7. b
8. d
9. b
10. a
11. a
12. c
13. Factors determining the selection of a cold chisel are the materials to be cut, the size and shape of the tool, and the depth of the cut to be made. The chisel should be heavy enough so that it will not buckle or spring when struck. Select a chisel just large enough for the job. Discard a chisel that is bent, cracked, or chipped.
14. Observe the following precautions when using an axe:
- Never strike an axe against metal, stone, or concrete.
 - Never use an axe as a wedge or maul.
 - Never strike with the side of axe.
 - Never use an axe with a loose or damaged handle.
 - Use steel wedges for splitting wood, such as splitting logs for fireplace wood. Use a sledgehammer or maul for driving the wedges.
 - If an axe is dull while chopping wood, it will often glance off the wood being cut and may strike the user in the foot or leg.
15. Pliers are meant for gripping and cutting operations. They are not recommended as a substitute for wrenches because their jaws are flexible and frequently slip when used for this work. Also, pliers tend to round the corners of bolts' heads and nuts and to leave jaw marks on the surface.
16. Soldering irons are the source of burns and of illnesses that result from inhaling the fumes. Fumes from soldering can be toxic and/or irritating.
17. Observe the following precautions when using portable power tools:
- Always disconnect the tool from the source of power before changing accessories.
 - Replace or put guards in correct adjustment before using the tool again.

ANSWERS—QUIZ 2

1. a
2. b

- Never leave a tool in an overhead place where there is a chance that the cord or hose, if pulled, will cause the tool to fall.
 - Store power-driven tools in secured places.
 - Keep work areas heated, clean, and well lit.
 - Secure workpieces.
 - When working on a ladder or other high place, do not reach out too far.
 - Wear proper clothing for the job.
 - Never use a power tool with a malfunctioning switch or part.
 - Only use accessories recommended by the manufacturer.
18. A GFCI provides a convenient way of safeguarding the operator. If there is a short circuit or defect inside the tool, the current is connected from the metal frame through a ground wire and does not pass through the operator's body. If a GFCI is used, the current is shut off before a serious shock can occur. Correctly grounded tools are as safe as double-insulated or low-voltage tools when used with a GFCI.
19. The following hazards are specific to chainsaws:
- falling while carrying a saw or when sawing
 - sprains and strains from carrying and working with a heavy saw
 - hand-arm vibration syndrome
 - being cut by a chain in motion
 - being cut by a chain when it is not in motion
 - injuries from starting the gasoline engine
 - inhaling exhaust fumes
 - being struck by wood from overhead because a tree is vibrating
 - sawdust in the eyes, especially when holding the tail stock end of a saw above the head
 - burns from contact with a hot muffler or cylinder head
 - injuries due to saws binding and kicking back at an operator
20. Student should mention the following points on portable electric drill safety:
- Be sure the trigger switch works properly.
 - Check carefully for loose power-cord connections and frays or damage to the cord.
 - Replace damaged tools and extension cords immediately.
 - Be sure the chuck is tightly secured to the spindle.
 - Tighten the drill bit securely, as prescribed by the owner/operator's manual if there is a chuck key.
 - Remove the chuck before starting the drill.
 - Check auxiliary handles, if they are part of the tool.
 - Always wear safety goggles, or safety glasses with side shields.
 - Use a dust mask when necessary and hearing protection when the portable electric drill is used for extended periods.
 - Always hold or brace the tool securely.
 - If the drill binds in the work, release the trigger immediately, unplug the drill from the power source, and then remove the bit from the workpiece.
 - Never attempt to free a jammed bit by starting and stopping the drill.
 - As the hole is about to be broken through, grip or brace the drill firmly, reduce the pressure, and allow the bit to pass easily through the hole.
 - Unplug the drill before changing bits, accessories, or attachments.
 - Do not raise or lower a drill by its power cord.

ANSWERS—CASE STUDY

1. Answer should include the following: provide proper protective equipment and have employees wear it; select the right tool for the job; know if a tool is in good condition and keep it in good condition; properly ground power tools; use tools correctly; and keep tools in a safe place.
2. From the standpoint of incident prevention, central tool control assures uniform inspection and maintenance of tools by a trained employee. This employee can also distribute the correct type of personal protective equipment when a tool is issued. A central control area and effective record keeping on tool failure and other causes of injuries help locate hazardous conditions. A central area also assures better control than does scattered storage. The attendant knows the location of each tool and can recall it for inspection at regular intervals. The attendant can help promote safety by the following safe practices: recommending

or issuing the right type of tool; encouraging employees to turn in damaged or worn tools; tagging and removing from service defective tools; and encouraging the safe use of tools.

3. The safe practices that mechanics should follow when using new portable power tools include the following:
 - Store power-driven tools in secured places.
 - Do not leave them in areas where they may be struck by passersby or be otherwise activated.
 - Keep work areas heated, clean, and well lit.
 - Secure, or clamp, workpieces.
 - Normal tool use does not require a great deal of force.
 - When working on a ladder, a scaffold, or in other high places, do not reach out too far. Keep the body in balance.
 - Wear proper clothing for the job.
 - Loose clothing, jewelry, and long hair may add risk to the job.
 - Never use a power tool with a malfunctioning switch or part.
 - Remove it from service, and repair or discard the tool.
 - Only use accessories recommended by the manufacturer.