

Chapter 8 – Workshops and Maintenance

General

1. Eye protection shall be worn at all times when operating power equipment and tools.
2. Report all equipment defects immediately. Do not use unsafe equipment until it is repaired.
3. When disconnecting equipment, pull on the plug, not the cord. Whenever the use of electrical extension cords is required, keep them clean, dry, and free from kinks. Protect them from oil, hot or sharp surfaces, and chemicals. Exterior cords should not be extended across aisles, through water, doors, or into areas where they are apt to be damaged.
4. Use equipment properly; do not overload the motor by forcing cutting tools into the work.
5. Do not leave power tools unattended while in operation.
6. Portable electric circular and band saws shall not be used unless the guard mechanism is functioning properly.
7. Oversized drill bits shall not be ground to fit smaller electric drills.
8. Long hair and loose clothes must be restrained in a manner that will not allow them to be caught in machines.

Woodworking Machines

9. Workers shall make sure that guards or other protective devices for woodworking machines are in place and properly adjusted before starting work. Workers shall not operate woodworking machines with cracked or defective blades or cutters.
10. Workers shall not install blades or cutters unless they are designed to run at the speed of the machine on which they are to be mounted.
11. Operators of woodworking machines SHALL NOT WEAR GLOVES unless the point of operation is completely guarded and contact with the blade, or moving parts, is not possible.
12. A push stick or block shall be used for any operation which requires the fingers to be within 2 inches of the blade. Dust or wood scrap should not be removed from the danger area by hand. Always use a brush.
13. Saw operators should not stand in line with material to be cut.
14. The operator's position should be kept clear of sawdust, blocks, etc., at all times.
15. Power saws shall not be stopped by thrusting a block of wood against the cutting edge or side of the blade.
16. Kickbacks on table saws are extremely hazardous. The following conditions may lead to injury:
 - a. Improper alignment of the rip fence.
 - b. Failure to use a spreader.
 - c. Crosscutting narrow stock while using the rip fence as a stop.
 - d. Attempting to rip or crosscut stock that is too large to control.

- e. Cutting warped, wet or twisted grain lumber that binds the blade.
- f. Failure to use anti-kickback dogs.
- g. Attempting to rip stock that does not have at least one straight edge for use against the fence.
- h. Failure to lock the fence securely in place.
- i. Using a dull or improperly set blade.
- j. Using a blade that is out of round, or improperly balanced.

Grinding Machines

- 17. Grinding wheels and wire brushes shall not be operated in excess of the speed recommended by the manufacturer. Check the recommended rpm against that of the shaft or motor before mounting a new wheel. Check all grinding wheels for chips and cracks before use.
- 18. Face shields, safety glasses, or chipper's goggles shall be worn at all times when grinding or using a wire brush.
- 19. Gloves shall not be worn while grinding, nor will cloth be used to hold work pieces.
- 20. Do not operate grinding machines unless metal wheel hoods are in place. Do not apply work too quickly to a cold wheel.
- 21. Tool rests shall be secured at all times and adjusted to within 1/8 inch of the wheel. Top wheel guards shall be adjusted to within 1/8 inch of the top of the wheel.
- 22. Disc grinder tables shall be adjusted to within 1/8 inch of the disc.
- 23. When a grinder is first turned on, do not stand in line with the grinding wheel. If any wobble or vibration is noticed, the machine must be turned off and repaired.
- 24. Except where specifically designed, one should not grind on the sides of the grinding wheel.
- 25. Do not grind wood, aluminum, copper, or other soft materials on wheels designed for steel and iron.

Metal Lathes

- 26. Chip guards should be used in operations that could endanger the operator or others nearby.
- 27. Chip breakers shall be used whenever practical. Tool ways must be kept clear and clean.
- 28. Tools should not be set or adjusted while the lathe is in operation. Tools and chucks must be checked for defects before use.
- 29. Brushes or chip pullers shall be used for removing chips. Operators shall not use their hands, or compressed air in excess of 30 psi, to remove chips.
- 30. Heavy chucks, face plates, or other heavy equipment should never be handled without proper lifting equipment.
- 31. Tools or other equipment shall not be stored on top of the head stock.
- 32. Rotating stock extending into aisles should be marked with a warning device (yellow tape, rag, tag) or contained by physical barrier.

33. Magnesium or similar metals shall not be machined unless appropriate fire protection is provided.
34. Do not stop lathe with tool bit in the cut, or with feed clutch engaged. Hand pressure should not be used to stop free spinning chucks.

Metal Cutting Band Saws

35. Before starting an operation, be sure the machine is set for the recommended speed, feed, and blade type for the material to be cut.
36. A complete face shield shall be worn when blades are electrically welded on the machine.
37. The portion of the blade between the upper wheel and the saw table should be completely enclosed except for the point at which the cut is made.
38. Inspect and adjust the table and blade guide to be sure that small parts cannot jam between the table and moving blade.
39. The length of the exposed blade should not be more than 3/8 inch greater than the thickness of the stock being cut.
40. Use pliers, tongs, jigs, or other hold-down devices when sawing small parts that could jam between the blade and saw guide.
41. Warn personnel or install barriers during sawing or welding operations that throw hot sparks onto nearby work stations.

Metal Planers, Shapers, drilling and Boring Machines

42. Always use brushes or chip pullers to clean the work area. Operators shall not use their hands or compressed air in excess of 30 psi to remove chips.
43. Always clamp the work securely before starting the cut. Do not measure the job while the machine is in operation.
44. Always remove the stroke-change screw handle before starting the shaper.
45. Do not place heavy parts or tools on the machine without the use of approved lifting equipment.
46. Only soft metal or plastic hammers should be used when setting up jobs on a drill press or boring mill.
47. Adjustable wrenches should not be used on the machine parts or equipment. Properly sized box or open-end wrenches should be used.
48. Do not operate drill presses with dull tools.
49. Never make adjustments on the chuck when the machine is in motion.
50. Boring mill operators should never attempt to make measurements near the tool, reach across the table, or adjust the work while the spindle is turning.
51. When deep holes are being drilled beyond the flutes of the drill, the drill should be withdrawn frequently to keep it free of chips.
52. Stop the machine before attempting to clear work that has been jammed.

Power Presses and Forming Equipment

53. Do not operate power punch presses without “point of operation guarding.” Do not remove or modify guards.
54. Power presses shall not be operated in the continuous tripping cycle unless the point of operation is guarded on all sides by approved barrier guards.
55. Safety tongs shall be used whenever it is necessary to reach into the point of operation of any machine.

Explosive Actuated Tools

56. Explosive actuated tool operators must be trained and certified for this work.
57. Always wear safety goggles to avoid the possibility of flying chips, etc.
58. Never, under any conditions, attempt to discharge a stud or pin into free flight.
59. Use only the appropriate boosters, studs, and pins designed for the tool.
60. Never drive a stud or pin into extremely hard surfaces such as glazed tile, glazed brick, glass, tool steel, etc. Such surfaces may cause a ricochet.
61. Do not drive fasteners closer than 3 inches from the edge of concrete, brick, or other like materials.
62. Do not drive fasteners closer than 1/2 inch from the edge of steel.
63. In the event of misfire the tool is to be held in operating position for a minimum of 30 seconds before disassembly.

Handling Chemicals

64. Do not wash hands in cleaning solvents. Absorption of these liquids through the skin can cause serious illness.
65. Do not handle chemicals of any type unless you are aware of the potential skin and inhalation hazards. Consult the appropriate MSDS.
66. Wear appropriate skin, face, eye, and hand protection when moving or handling bulk chemicals.
67. Always wear chemical resistant gloves, aprons, and complete eye protection when handling corrosive chemicals. If chemicals contact skin, wash with large amounts of water immediately.
68. Do not open chemical containers that have been stored in the sun unless proper care is taken. Many chemicals will build up pressure in the container when exposed to heat.
69. Clean up small chemical spills immediately if you can do it safely; otherwise, notify supervisor.

Key Points and Supporting Information

1. **Wear approved eye protection.** Industrial-quality eye protection should be worn at all times. Safety glasses should have the Z87.1 logo on them to assure they are industrial quality.
2. **Wear proper clothing.** This varies depending on the type of hand tool you are working with. Work clothing should not be loose, baggy, or highly flammable. To protect against burns, wear clothing such as coveralls, high-top shoes, leather aprons and leather gloves. Remove all paper from pockets and wear cuffless pants. When working with heavy metals wear hard-toed shoes with non-skid soles. Avoid wearing synthetic clothing because it has a low flashpoint, which can result in severe burns. Do not wear jewelry. It can get caught in moving parts.
3. **Protect your hair, scalp, and head.** Pull back long hair in a band or a cap to keep it from getting caught in tools. Be extremely careful with long hair when using a drill or drill press. When handling carpentry materials wear a hard hat or bump cap to protect your head.
4. **Watch your fingers.** Take special care when hammering so that you strike the object, not your fingers.
5. **Keep your mind on your work.** Avoid horseplay and loud talk. Loud talking as well as pushing, running, and scuffling while working with hand tools can cause serious accidents. Be alert and work defensively.
6. **Keep work area and tools clean.** Dirty, greasy, and oily tools and floors can cause accidents. Clean and put away all unneeded tools and materials. Clean up spills and scraps from the floor and equipment. Keep paths to exits clear. If conditions are dusty, use a respirator.
7. **Use tools properly.** Always use proper-sized tools and equipment for the job. Use each tool only for the job for which it was intended. Forcing a small tool to do the job of a large one may result in injury or tool damage. Never use a screwdriver to see if electrical circuits are hot. Never use a machinist's hammer in place of a carpenter's hammer. Do not strike a hardened steel surface, such as an anvil, with a steel hammer because a small piece of steel may break off and injure someone. Be sure wrenches fit properly. Never use pliers in place of a wrench. Never strike wrenches with hammers. Pull on wrenches, do not push. When sawing secure the material in the saw vise.
8. **Keep cutting-edge tools sharp.** Dull cutting-edge tools are dangerous, as they require excessive pressure and hammering to make them cut. When cutting always cut away from the body. Before using any cutting tool, remove nails or other objects that might destroy the tool's cutting edge.
9. **Carry and store tools properly.** All sharp-edge tools and chisels should be carried with the cutting edge down. Never carry sharp tools in a pocket. Store all sharp-edge cutting tools with the sharp edges down.
10. **Inspect tools before using.** Avoid using damaged tools. Tools that appear to be damaged or have broken handles should be marked unsafe. Do not use them until they have been repaired.
11. **Grip tools firmly.** Hold hand tools securely so that they do not slip and hit someone. Do not wear gloves--they are bulky and make gripping tools difficult.