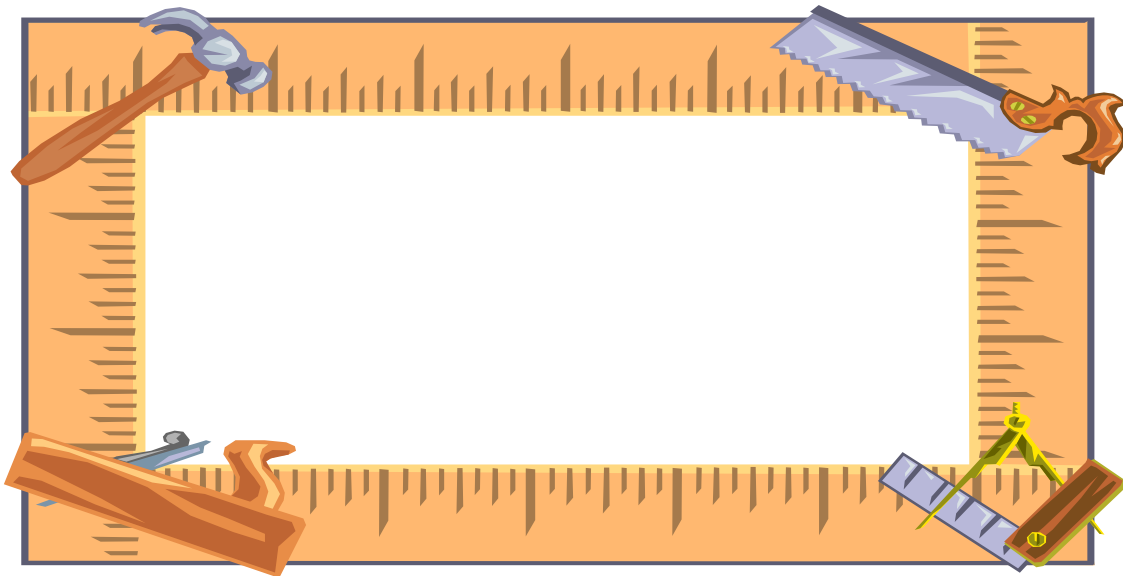


TECHNOLOGY AND INDUSTRY EDUCATION



SAFETY PRACTICES FOR INDUSTRIAL TECHNOLOGY EDUCATION

The following are further safety practices to consider in the technology education area.

Transportation

1. Close car doors, hood, and trunk lid, and make sure no one is inside before raising vehicles on a lift.
2. Know the load limits of lifts and jacks and do NOT overload them.
3. Vehicles are checked for proper positioning just before they leave the floor.
4. Do NOT lock the hoist controls of lift and jacks in the open or shut position.
5. On lifts not fitted with safety catches or provided with accommodations for the insertion of a safety bar, jack stands should be immediately placed under the front and rear of the vehicle.
6. In pulling operation, NEVER stand directly behind a jack. Stand to one side. Ensure that the area is cleared of all other personnel before starting the pull.
7. When a student is required to work under a jacked-up vehicle, no other person shall work on that vehicle.
8. Jacks are checked periodically to see that they are in good condition.
9. Vehicles on jacks are cribbed, blocked, or secured at once.
10. Support stands are used after the vehicle has been raised with a hydraulic jack.
11. NO internal combustion engine should be started and allowed to run in the shop area until the exhaust ventilation (tail pipe exhaust system) has been connected and operating.
12. Double-check to see that all controls are in proper starting position before attempting to start engine or motor.
13. All power-driven belts, chains, marine propellers, gears, and cutting blades should be guarded to prevent accidental contact during repairs that require operation of the equipment.
14. Do NOT leave running engine unattended.
15. NO riders are allowed on vehicles, crawlers, skidders, or other machinery.
16. Safe vehicle operations are taught to all operators.
17. Test engines should be securely mounted to the bench or test stand.
18. NEVER open a pressurized radiator or air-conditioning system while the engine is hot.
19. Proper procedures should be adhered to when fueling all engines.
20. Extreme care shall be taken with flames, heat, or sparks in operations or procedures that involve repairing, replacing, or coming in close contact with fuel systems and tanks.
21. Gas and liquid coolants used in automotive air conditioners must be handled with care, especially those stored under pressure.
22. Battery charging areas are ventilated and designated as NO SMOKING areas.
23. Where batteries are serviced, methods must be provided for:
 - a. Flushing and neutralizing spilled electrolyte.
 - b. Fire protection.
 - c. Adequate ventilation to prevent hydrogen gas buildup (hydrogen gas given off during battery charging is explosive).
 - d. Quick drenching of workers if acid is splashed or spilled.

24. Open flames, spark producing apparatus, and electric arc must be excluded from the battery service area.
25. Tools and other metallic objects shall be kept away from the tops of uncovered batteries.
26. Prohibit the use of compressed air to clean clothing, equipment, and work area.
27. Air tank drain valve on compressor shall be opened frequently to prevent excessive accumulation of liquid.
28. Relief valves on compressor shall be maintained in good operating condition and tested at regular intervals.
29. Pressure control gauges on compressors shall be protected and maintained in good operating condition.
30. When working on small engines, disconnect spark plug wire to prevent accidental start.
31. NEVER place any part of the body under the blade enclosure or in grass discharge chute while lawn mower is running.
32. Safety racks (cage) or equivalent protection should be provided and used when inflating, mounting or dismounting tires with split rims or lock rings.
33. All paint should be in storage cabinet when NOT in use.
34. Low-flash paint thinners are used for equipment cleaning only under ventilated situation.
35. Portable lamps are removed during spray operations.
36. NO SMOKING signs are posted in spray area, paint room, paint booth, and paint storage area.
37. The spray is at least 20 feet from flame, sparks, electric motors, or other ignition sources.
38. Electric lamps in spray area are enclosed and guarded.
39. The spray area is kept clean of combustible residue.
40. Spray booth floors and baffles are noncombustible.
41. Spray booths have explosion-proof lights or are lighted through sealed, clear panels.
42. Mechanical ventilation is utilized during spraying and drying operations.
43. Spray booths have independent exhaust systems.
44. Exhaust rates meet minimum requirements.
45. Air exhausted from spray operation is removed from the ventilation system.
46. Ducts have access doors to allow cleaning.
47. Intake air is free of contaminants.
48. Make-up air heater is located outside the spray booth.
49. Over-spray filters have pressure gauges to indicate need for filter replacement.
50. The spray area used for drying with portable heaters or heat lamps is kept clean of over-spray deposits.
51. The infrared apparatus is kept out of the spray area during spraying operations.
52. The spray area is completely ventilated before using drying apparatus.

Communications

1. NEVER place fingers or hands in machinery while in operation.
2. Handle paper carefully to prevent cuts.
3. Stack materials properly.
4. Handle paper cutter knives (on or off the machine) very carefully.
5. Only one person must operate a machine at a time.
6. Watch for accidental double cycling on the cutter blade on electric cutters.
7. Make sure camera lights are disconnected before adjustment or maintenance.
8. Watch out for hot arcs and lights.
9. Do NOT move in darkroom until eyes adjust. Walk with arms extended.
10. Avoid handling electrical equipment with wet hands.
11. Do NOT talk to others while operating equipment.
12. Do NOT operate equipment at excessive speeds.
13. Do NOT overload pallets or tables.
14. NEVER work in the pressroom or darkroom alone. A second person must be present to assist in case of an accident.
15. Use and store pencils, pens, tacks, and other sharp objects properly.
16. Do NOT lean back on stools or chairs balancing weight on the rear legs.

Electricity/Electronics

1. Turn power OFF and/or unplug before working on any circuit.
2. Use an isolation transformer when working with any AC line-operated item.
3. Discharge electrolytic capacitors.
4. Use only one hand inside of equipment or panels, even if power is removed.
5. Avoid touching grounded points with other parts of the body.
6. Be extra cautious around water, as it is an excellent conductor of electricity.
7. Use caution in handling or working near cathode ray tubes as they explode dangerously if broken.
8. Frames of electric motors, regardless of voltage, must be grounded.
9. Noncurrent-carrying metal parts of fixed equipment that may become energized must be grounded under any of the following circumstances:
 - a. In wet or damp locations.
 - b. If in electrical contact with metal.
 - c. When in a hazardous location.
10. Before repairs on electrically powered equipment are begun, the main switch should be locked in the OFF position.
11. Electrical installations, modifications, and alterations shall conform to federal, state, and local municipality standards, codes, and specifications.

Materials and Processes

1. All materials stored in tiers shall be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapsing.
2. Always check scaffolding ladders and temporary walkways before using.
3. NEVER carry tools with sharp points or edges in your pockets.
4. NEVER try to stop a machine with hands or other parts of the body after turning it off.
5. Used lumber shall have all nails withdrawn.
6. Manual adjusting and gauging (callipering) of work shall NOT be permitted while machine is running.
7. Remove chuck keys and other equipment before starting machine.
8. Do NOT throw refuse in machine coolant. This contaminates the coolant and can spread disease.
9. Use brush, vacuum, or special tools for removing chips.
10. Care shall be taken not to come in contact with projections on work or stock, faceplates, chucks, etc., while machine is operating.
11. Do NOT use wiping rag on revolving parts.
12. Using the machine power to start the faceplate or chuck onto the spindle shall NOT be permitted.
13. Splashguards, shields, and other means should be employed to minimize contact with cutting oils that may cause skin irritation.
14. A "stock tube" should be employed when long sections of stock extend beyond the machine. It is important that the bar stock fit completely inside the stock tube so that rotating ends are not exposed.
15. The work rests on offhand grinders are adjusted within a maximum of 1/8 inch from the wheel.
16. The tongue guards on offhand grinders are adjusted within a maximum of 1/4 inch from the wheel.
17. Safety set screws are provided on all lathe dogs and revolving accessories.
18. No saw, cutter head, or tool collar is placed or mounted on a machine or bar unless it is of proper size.
19. Where a standard guard cannot be used, a feather board or jig is used in place, as in grooving, jointing, etc.
20. To eliminate the hazard of impalement, people shall NOT be permitted to work above vertically protruding reinforcing steel unless it has been protected.
21. Bull float and vibrator handles shall be constructed of nonconductive materials or shall be insulated to protect operator when he/she might come in contact with energized electrical conductors.
22. Formwork and shoring shall be designed, erected, supported, braced, and maintained so that they will safely support all vertical and lateral loads that may be upon them during placement of concrete.
23. Powered and rotating type concrete troweling machines that are manually guided shall be equipped with a control switch that will automatically shut off the power whenever the operator removes his/her hands from the handles.

24. Knife blades or blades of jointers shall be installed and adjusted so that they do not protrude more than 1/8 inch beyond the cylindrical body of the head.
25. NEVER place the tool rest below the center of the piece being turned on the lathe.
26. NEVER let the cutting edge of a lathe tool get under the wood being turned.
27. Don't attempt too heavy a cut with the machine. Take several light cuts.
28. NEVER attempt to plane or joint very short stock. (See manufacturer's specifications.)
29. NEVER attempt to make an adjustment while the machine is running.
30. Always turn the power OFF immediately after using the machine.
31. Saw blade should project through the table just far enough to cut the stock.
32. When pushing material over table saw, the operator should stand to the side.
33. NEVER attempt to clear saw table of chips or dust by hand while the machine is running. Use a stick to push it off.
34. When using a band saw, stand in front of it, and NEVER step around to the side, in line with the direction of the travel of the band saw wheel. This is to prevent injury should the blade break.
35. Always use as heavy a blade as possible for the work to be done.
36. Make sure band saw blade guides are set properly; if not properly set, the blade will strain, kink, and break.
37. The practice of inserting wedges between the saw disc and the collar to form what is commonly known, as a "wobble saw" shall NOT be permitted.
38. Push sticks or push blocks shall be provided at each machine requiring their use and the operator, when required by the work being done, must use them.
39. No device or attachment facilitating mixture of air or oxygen with flammable gases should be used prior to consumption except at the burner or in a standard torch.
40. All welding equipment and apparatus for gas and arc welding, cutting, and brazing meet American Welding Society Standards.
41. Under NO condition shall acetylene be generated, piped, or utilized at a pressure in excess of 15 p.s.i. gauge pressure.
42. All compressed gas cylinders are legibly marked as to gas content with either the chemical or trade name. Such marking shall be by means of stenciling, stamping, or labeling not readily removable.
43. All gas cylinders are kept away from radiator and other sources of heat.
44. Inside of building, cylinders are stored in a well-protected, well-ventilated, dry location at least 20 feet from highly combustible materials such as oil, excelsior, or other substances likely to cause or accelerate fire.
45. Cylinders are stored in specifically assigned places away from elevators, stairs, or gangways.
46. Cylinders are stored or located where they will not be knocked over or tampered with by unauthorized persons. A chain or other suitable device should secure them.
47. Cylinders are NOT kept in unventilated enclosures.
48. Empty cylinders have their valves closed and protective caps on.
49. Cylinder valve protective caps are in place, hand-tight except when cylinder is in use.

50. Acetylene cylinders are stored valve end up.
51. Oxygen cylinders in storage are separated from fuel-gas cylinders or combustible materials a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one half hour.
52. Cylinders, cylinder valves, couplings, regulators, hoses, and apparatus are kept free from oily or greasy substances.
53. Oxygen cylinders or apparatus are NOT handled with oily hands or gloves.
54. A jet of oxygen is NOT permitted to strike an oily surface or greasy clothes, and it is not permitted to enter a fuel oil or other storage tank.
55. Cylinders are NOT dropped or struck or permitted to strike each other violently.
56. Unless cylinders are secured on a special truck, regulators are removed and valve protection caps are in place before cylinders are moved.
57. Cylinders are NOT placed where they might become part of an electric circuit.
58. Cylinders are NOT dropped or used as rollers or supports.
59. Before connecting regulator or cylinder valve, the valve is opened slightly for an instant and then closed.
60. The cylinder valve is always opened slowly.
61. An acetylene cylinder valve is NOT opened more than one and one-half turns of a spindle and preferably no more than three-fourths of a turn.
62. The acetylene-opening wrench is left in position on the cylinder valve while in use so that it can be shut off quickly if needed.
63. For a manifold system, one acetylene wrench is available for immediate use at each station.
64. When work is finished, cylinder valves are closed, and torch and regulator valves are opened, then closed, to bleed remaining pressurized gas from regulator and lines.
65. Acetylene cylinders in a manifold system are installed with flash arresters.
66. Each oxyacetylene cylinder lead is equipped with a backflow check valve.
67. Piping for manifolds for acetylene is steel or wrought iron.
68. The generally recognized colors are red for acetylene and other fuel-gas hoses, green for oxygen hoses, and black for inert gas and air hoses.
69. Hoses showing leaks, burns, worn places, or other defects rendering them unfit for service are repaired or replaced.
70. Gauges or oxygen regulators are marked "USE NO OIL."
71. Tilting and rolling on their bottom edges move cylinders.
72. Cylinders containing oxygen, acetylene, or other fuel gases are NOT taken into confined spaces.
73. Torches are lit by friction lighters or other approved devices and NOT by matches.
74. When welding under wet or other conditions causing perspiration, steps are taken to reduce shock hazard.
75. On all types of arc welding machines, control apparatus are enclosed except for the operating wheels, levers, or handles.
76. Terminals for welding leads are protected from accidental electrical contact by personnel or by metal objects.