

SAFETY MANUAL FOR THE ENGINEERING SHOP

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Part I: PERSONAL PROTECTION

Employee's Personal Safety, Eye Protection, Fire Prevention & Safety, Protective Clothing & Equipment, Hearing Protection

Employee's Personal Safety

1. Wear only closed shoes of leather or semi-impervious (not canvas) material shall be worn. All shoes must have a non-skid sole. Preferably hard rubber sole or equal.
2. Do not wear jewelry, loose hair or clothing around equipment if it can become caught in moving parts.
3. Know and use the proper safety equipment and clothing for your particular work area.
4. Do not remove, alter, or make inoperable any guard, or safety device feature on equipment. If the safety devices on tools you are using have been tampered with, immediately call this to your supervisor's attention and do not use it until the guards or safety devices have been replaced.
5. Walk carefully. Report or clean up slippery spots as soon as possible. Proceed with caution around blind corners. Running on the job may be dangerous and is seldom called for. Don't run on stairways. Use handrailings.
6. Do not pass under suspended loads of machinery or material. When operating a lifting device, it is your responsibility to enforce this rule. Avoid striking overhead objects while walking below. Whenever possible, the area beneath a suspended load shall be made inaccessible.
7. Obey all warning signs. See that they are properly selected and placed on your job. Remove all signs when the job is done and the hazard no longer exists.
8. Be aware of all possible pinch points in your work area.
9. To avoid puncture wounds, do not carry sharp pointed tools in your pockets.

Remove or bend down all nails in used lumber, boxes, containers or other places where they present a hazard.

Close all drawers and doors when not in use.

If possible, use non-solvent based materials. If using industrial solvents follow manufacturer's directions and use only in well ventilated areas. Read and follow product labels and MSDS recommendations.

Minimize skin contact with machine cutting oil and avoid inhalation or exposure to oil mists by wearing an approved respirator and other appropriate protective equipment. Request an MSDS sheet if not available. Also request eye protection, gloves and / or a respirator when appropriate.

Lead Paints & Materials

It should be assumed all painted surfaces contain some level of lead. This level may vary according to the age of the paint. Lead paint only becomes a hazard when it is chipped, sanded, mechanically abraded or treated with heat and the dust or fumes are inhaled or ingested.

Lead or suspected lead-base paints should be reported to supervisor who will notify SE & H for an evaluation. Lead should be removed with methylene chloride free strippers or by mechanical devices (such as sanders and needle guns) with hepa shroud attachments.

Workers should be aware that lead can enter the body by breathing and eating chewing gum in a lead contaminated setting.

If workers are uncertain what levels of lead they may be exposed to, they can request SHE staff to conduct an air sampling or test any materials for the presence of lead.

If supervisors suspect or know that lead is present, they should require personal protection devices such as respirators and protective work clothing in lieu of HEPA shrouded equipment.

Workers who are exposed above the OSHA action level of 30 g/m³ for more than 30 days/year must be in a medical surveillance program lead levels in the blood and health conditions related to lead handling. Auburn University provides this service.

Hazard Communication & MSDS

Employees have the right to know every hazardous material in their workplace. For help in identifying hazardous materials, supervisors, and workers should consult the Material Safety Data Sheet (MSDS).

There is an employee right-to-know communication program, which includes Hazard Communication and MSDS information.

Open Flames

1. If at all possible DO NOT use an open flame on the job.
2. Absolutely no paint removal with open flames!
3. If you do use an open flame, for other reasons such as welding or sweating pipe joints take all precautions to prevent a fire. All combustibles must be removed within 35 ft. A fully charged fire extinguisher must be present for all jobs where a flame is used, or the potential for fire could occur like grinding.

When your work is done, inspect your work to make sure all sparks or smoldering materials are extinguished!

Equipment Care and Use

Supervisors and employees share the responsibility that equipment and tools are safe. Supervisors will promptly correct any unsafe items.

1. All tools and equipment are to be kept in a clean and repaired condition. No matter how slight, immediately report to your supervisor anything that needs repair. Inspect all equipment regularly to discover any possible safety defects before and after use.
2. Only appropriately trained employees should operate machinery.
3. Buffers, floor machines and wet-dry vacuums are to be grounded and the cords should be kept clear of water.
4. Never exceed the manufacturer's recommended RPM on any rotary equipment.
5. All rotary operating machines and all other possible pinch points must be protected by a proper guard or shield. Whenever safeguards are removed for repair or adjustment, the power for the equipment must be turned off and the main switch locked and tagged.
6. Electric tools shall be grounded or double insulated in an approved manner and control switches placed at a convenient point.
7. When using powder-activated or pneumatic driven equipment (e.g. nail guns, RAM SET, etc.) be extremely cautious. Only properly trained employees should use them because they can be extremely dangerous.
8. Use a tool only for the purposes for which it was designed.

9. Keep all tools sharp and properly lubricated.
10. Do not carry a tool by the cord or yank it to disconnect it from the receptacle.
11. Secure your work by using clamps or vise.
12. When sawing, never reach under or behind the material being cut.
13. When sawing, never reach under or behind the material being cut.
14. When cutting always cut away from your body.
15. It is the Supervisor's responsibility to periodically inspect and ensure all guards are in place and used appropriately.

Eye Protection

1. Eye protection is required for certain jobs and areas of work. It is the employee's responsibility to use and the supervisor's responsibility to provide eye protection and ensure it is being used during tasks where eye injuries could occur.
2. All employees exposed to such hazards as flying objects or particles of dirt, dust, wing, molten metal, gases, fumes, smoke, liquids, reflected light or glare in their normal work areas will be provided with appropriate eye protection, shields or goggles. Supervisors may designate jobs requiring eye protection.
3. An eyewash and deluge shower is required where chemical splashes are possible.
4. Only a person qualified to give such treatment such as a physician should remove foreign objects from an employee's eye. Report incident as required in the S & EH 101 Accident Report.
5. Eye protection equipment and prescription safety glasses are available through your department.

Various tasks require different eye protection, eye goggles or glasses.

Fire Protection and Safety

1. If a fire or explosion occurs in your presence, activate the building fire alarm and call the University Fire and Emergency number (911). Be sure to give the exact location including building and room number. Do not hang up until the operator tells you to. Send someone to

meet the Fire Department personnel outside the building to direct them to the scene. If you cannot account for every one on your crew, inform the Fire Department.

2. Do not use the elevators. Keep calm; shut off gas, open flames and your equipment before leaving if this does not endanger you. Move any obstructions to one side to allow passage. Close, but do not lock doors behind you. Proceed at a fast pace; do not run, to the nearest exit. Do not re-enter the building.
3. Be sure to stay between your escape route and the fire; do not let it trap you. If you are trapped by a fire, stay low to the floor. Crawl to an exit and try to breathe through a wet cloth. In high-rise buildings, get below the fire where you will be safer. If you cannot leave your room, hang something out of the window. Do not smash windows, but open them slightly at the bottom and top.
4. If your clothing catches fire, stop drop and roll. If a coat or blanket is within five or six steps, roll in it to help smother the flame.
5. Everyone should be familiar with the location and the use of the alarm stations, fire extinguishers and fire hoses. Your knowledge may be called upon to save someone's life or University property.
6. Do not use a fire extinguisher unless you have been trained to use it. You can request training by calling S&EH
7. Report to safety officer any empty, vandalized, or damaged fire extinguishers.
8. Flammable or combustible mixtures must be stored and transported only by approved methods and in approved containers. Do not smoke around flammable material or any other posted area.
9. Service workers see places that other workers do not generally come on contact with and should be alert to recognize potential fire hazards. If a danger exists notify the safety officer.
10. Each person should be familiar with building evacuation plans.

Protection Clothing and Equipment

It is the Supervisor's responsibility to provide safety equipment and ensure it being used.

1. It is the employee's responsibility to, use, maintain and clean protective equipment. It is both the employee's and supervisor's responsibility to keep equipment clean and usable. All equipment and clothing should be checked periodically to ensure that all safety features are intact.

2. Avoid loose fitting clothes and gloves. Gloves will be provided and must be carefully selected for each specific job. Uniforms are furnished and required by the University.
3. Head protection (hard hats) must be worn on jobs where there is danger of being struck by falling objects or in areas where headroom is limited or obstructed.
4. Respirators must be used in certain cases when adequate local exhaust or general ventilation cannot be provided.
5. All noise-hazard areas should be marked. All employees working in known noise-hazard will be provided with hearing protection (ear plugs).
6. Use ear protection when working around noisy equipment. Generally, hearing protection is required when ambient noise is above 85 decibels. If you have to talk loudly to be heard it is a good indication the sound is over 85db.

Lifting Procedures

1. Plan the move before lifting; ensure that you have an unobstructed pathway.
2. Test the weight of the load before lifting by pushing the load along its resting surface.
3. If the load is too heavy or bulky, use lifting and carrying aids such as hand trucks, dollies, pallet jacks and carts, or get assistance from a co-worker.
4. If assistance is required to perform a lift, coordinate and communicate your movements with those of your co-worker.
5. Position your feet 6 to 12 inches apart with one foot slightly in front of the other.
6. Face the load.
7. Bend at the knees, not at the back.
8. Get a firm grip on the object using your hands and fingers. Use handles when they are present.
9. Hold the object as close to your body as possible.
10. While keeping the weight of the load in your legs, stand to an erect position.
11. Perform lifting movements smoothly and gradually; do not jerk the load.

Machine Guarding

1. Replace the guards before starting machines, or after making adjustments or repairs to the machine.
2. Do not remove, alter or bypass any safety guards or devices when operating any piece of equipment or machinery.
3. Do not wear loose clothing or jewelry in the machine shop.
4. Long hair must be pulled back in a ponytail, contained under a hat or hair net, regardless of gender.
5. Read and obey safety warnings posted on or near any machinery.
6. Do not try to stop a work piece as it goes through any machine. If the machine becomes jammed, unplug it before cleaning the jam.

General Power Saw Safety

1. Wear the prescribed personal protective equipment such as goggles, gloves, dust masks, and hearing protection when operating the power saw.
2. Turn the power switch of the saw to "OFF" before making measurements, adjustments or repairs.
3. Keep your hands away from the exposed blade.
4. Operate the saw at full cutting speed, with a sharp blade, to prevent kickbacks.
5. If the saw becomes jammed, turn the power switch to the ""OFF"" position before pulling out the incomplete cut.
6. Do not alter the anti-kickback device or blade guard.
7. Routinely inspect and clean the dust collection system.

Ladders and Fall Protection

1. Any employee working on an unprotected edge with a 6-ft or more foot drop or working above unprotected dangerous equipment 6 ft or less must wear a safety harness.

2. The harness and lanyard shall be inspected for wear, tears, and abrasions each time it is used.
3. The lifeline shall be attached to a structure that can support 5000 lbs.
4. The lanyard or self-retracting lifeline should fall no more than 2 feet of free fall distance.
5. The attachment point of the harness shall be located in the center of the wears back, near shoulders level, or above the wearer's head.
6. Personal fall arrest systems that have been subjected to impact loading shall be immediately removed from service unless recertified by the manufacturer.
7. The lifeline shall be protected against being cut or abraded.
8. The lifeline shall have a minimum breaking point of 5000 lbs. All ropes, webbing and straps used shall be made from synthetic fibers.
9. Personal fall arrest systems shall not be attached to guard rails or hoists.

Housekeeping

1. Do not place materials such as boxes or trash in walkways and passageways.
2. Sweep up shavings from around equipment such as drill presses, lathes or planers by using a broom and a dustpan.
3. Do not store or leave items on stairways.
4. Do not block or obstruct stairwells, exits or accesses to safety and emergency equipment such as fire extinguishers or fire alarms.
5. Straighten or remove rugs and mats that do not lie flat on the floor.
6. Remove protruding nails or bend them down into the lumber by using a claw hammer.
7. Return tools to their storage places after using them.
8. Do not ever use gasoline for cleaning purposes.

Electrical

1. Do not use frayed, cut or cracked electrical cords.

2. Do not plug multiple electrical cords into a single outlet.
3. Do not use extension or power cords that have ground prong removed or broken off.
4. Use a cord cover or tape the cord down when running electrical cords across aisles, between desks, or across entrances or exits.
5. Turn the power switch to "OFF" and unplug office machines before adjusting, lubricating or cleaning them.
6. Use GFCI's (Ground Fault Circuit Interrupter) whenever using portable power equipment outside or in wet locations.
7. All live parts shall be deenergized before working on or near them (excluding utility employees who are qualified by training and education to work on live circuits). Live parts operating at less than 50 volts do not need to be deenergized if there is no increased exposure to electrical burns or explosions due to electrical arcs.
8. All deenergized parts shall be locked or tagged following the Lock Out Tag Out (LOTO) procedures.
9. Only qualified (trained) employees shall work within 10 ft of unguarded energized electrical equipment operating at more than 50 volts or more.
10. Before working on deenergized electrical equipment a "qualified" employee shall use test equipment to verify the circuits and equipment are deenergized.
11. Likewise before reenergizing equipment a "qualified" employee shall ensure all tools and equipment have been removed so the circuits can be safely energized.
12. Each tag and/or lock shall only be removed by the employee who installed it unless the employee is absent. In this case the supervisor may direct a qualified person to remove it provided the supervisor ensures the employee who placed it is absent and they are made aware it was removed before work is resumed by the employee.
13. When working on or near energized equipment employee shall use insulated tools.
14. Equipment installed in shop area using bus bar must have proper UL listed strain relief IAW NEC. ARTC. 400-10

Hazardous Materials

1. Follow the instructions on the label and in the corresponding Material Safety Data Sheet (MSDS) for each chemical product you will be using in your workplace.

2. Use personal protective clothing or equipment such as neoprene gloves, rubber boots, shoe covers, rubber aprons, and protective eyewear, when using chemicals labeled "Flammable", "Corrosive", "Caustic", or "Poisonous".
3. Always use your chemical goggles and the face shield when handling chemicals labeled "Corrosive", or "Caustic".
4. Do not use protective clothing or equipment that has split seams pinholes, cuts, tears, or other visible signs or damage.
5. Each time you use your gloves, wash them, before removing the gloves, using cold tap water and normal hand washing motion. Always wash your hands after removing the gloves.
6. Only dispense a liquid labeled "Flammable" from its bulk container located in areas posted "Flammable Liquid Storage".
7. Before using the chemical exhaust hood, flip the fan motor switch to the "ON" position.
8. Do not use chemicals from unlabeled containers or unmarked cylinders.
9. Do not perform "hot work", such as welding, metal grinding or other spark producing operations, within 50 feet of containers labeled "Flammable" or "Combustible".
10. Do not drag containers labeled "Flammable".
11. Use the rubber cradle when transporting unpackaged glass bottles of chemicals.
11. Do not store chemical containers labeled "Oxidizer" with containers labeled "Corrosive" or "Caustic".

PPE

1. Do not drill holes in or paint it if your job requires you to wear a hard hat.
2. Do not wear hard hats that are dented or cracked.
3. Wear your safety glasses, goggles, or the face shield while operating chippers, grinders, lathes or sanders.
4. Wear the face shield over your goggles or safety glasses during open furnace, hot dripping, metal plating or gas cutting operations.

5. Wear the chemical goggles when using, applying or handling chemical liquids or powders from containers labeled "Caustic", or "Corrosive".
6. Do not continue to work if your safety glasses become fogged. Stop work and clean the glasses until the lenses are clear and defogged.
7. Wear the welding helmet or welding goggles during welding operations.
8. Wear earplugs or earmuffs in areas posted "Hearing Protection Required".

Knives/Sharp Instruments

1. When handling knife blades and other cutting tools, direct sharp points and edges away from you.
2. Cut in the direction away from your body when using knives.
3. Use the knife that has been sharpened; do not use knives that have dull blades.
4. Use knives for the operations for which they are named.
5. Do not use knives that have broken or loose handles.
6. Do not leave knives in sinks full of water
7. Do not use knives as screwdrivers, pry bars, can openers or ice picks.
8. Do not pick up knives by their blade.
9. Carry knives with their tips pointed towards the floor.
9. Do not carry knives, scissors or other sharp tools in your pockets or an apron unless they are first placed in their sheath or holder.

Hand Tool Safety

1. Carry all sharp tools in sheath or holster.
2. Tag worn, damaged or defective tools "Out of Service" and do not use them.
3. Do not use a tool if its handle has splinters, burrs, cracks, splits or if head of the tool is loose.

4. Do not use impact tools such as hammers, chisels, punches or steel stakes that mushroomed heads.
5. When handing a tool to another person, direct sharp points and cutting edges away from yourself and the other person.
6. When using knives, shears or other cutting tools, cut in a direction away from your body.
7. Do not chop at heights above your head when you are working with a hand ax.
8. Do not carry sharp or pointed hand tools such as screwdrivers, scribes, aviation snips, scrapers, chisels, or files in your pocket unless the tool or your pocket is sheathed.
9. Do not perform "make-shift" repairs to tools.
10. Do not use "cheaters" on load binders or "boomers".
11. Do not carry tools in your hand when you are climbing. Carry tools in tool belts or hoist the tools to the work area using a hand line.
12. Do not throw tools from one location to another, from one employee to another, from scaffold to other elevated platforms.
12. Transport hand tools only in toolboxes or tool belts. Do not carry tools in your clothing.

Files/Rasps

1. Do not use a file as a pry bar, hammer, screwdriver or chisel.
2. When using a file or a rasp, grasp the handle in one hand and the toe of the file in the other.
3. Do not hammer on a file.

Chisels

1. Use the chisel that has been sharpened; do not use a chisel that has a dull cutting edge.
2. Do not use chisels that have "mushroomed" striking heads.
3. Hold a chisel by using a tool holder if possible.
4. Clamp small work pieces in the vice and chip towards the stationary jaw when you are working with a chisel.

Hammers

1. Use a claw hammer for pulling nails.
2. Do not strike nails or other objects with the "cheek" of the hammer.
3. Do not strike a hardened steel surface, such as a cold chisel, with a claw hammer.
4. Do not strike one hammer against another hammer.
5. Do not use a hammer if your hands are oily, greasy, or wet.

Saws

1. Keep control of saws by releasing downward pressure at the end of the stroke.
2. Do not use an adjustable blade saw such as a hacksaw, coping saw, keyhole saw or bow saw, if the blade is not taut.
3. Do not use a saw that has dull saw blades.
4. Oil saw blades after each use of the saw.
5. Keep your hands and fingers away from the saw blade while you are using the saw
6. Do not carry a saw by the blade.
7. When using a hand saw, hold the work piece firmly against the worktable.
8. Use the circular saw guard when using the circular saw.

Screwdrivers

1. Always match the size and type screwdriver blade to fit the head of the screw.
2. Do not hold the work piece against your body while using a screwdriver.
3. Do not put your fingers near the blade of the screwdriver when tightening a screw.
4. Use a drill, nail, or an awl to make a starting hole for screws.

5. Do not force a screwdriver by using a hammer or pliers on it.
6. Do not use a screwdriver as a punch, chisel, pry bar or nail puller.
7. When performing electrical work, use a screwdriver that has a blue handle (an insulated screwdriver).
8. Do not carry a screwdriver in your pocket.
9. Do not use a screwdriver if your hands are wet, oily or greasy.
10. Do not use a screwdriver to test the charge of a battery.
11. When using the spiral ratchet screwdriver, push down firmly and slowly.

Wrenches

1. Do not use wrenches that are bent, cracked or badly chipped or have loose or broken handles.
2. Do not slip a pipe over a single head wrench handle for increased leverage.
3. Do not use a shim to make a wrench fit.
4. Use a split box wrench on flare nuts.
5. Do not use a wrench that has a broken or battered point.
6. Use a hammer on striking face wrenches.
7. Discard any wrench that has spread, nicked or battered jaws or if the handle is bent.
8. Use box or socket wrenches on hexagon nuts and bolts as a first choice, and open end wrenches as a second choice.

Pliers

1. Do not use pliers as a wrench or a hammer.
2. Do not attempt to force pliers by using a hammer on them.

3. Do not slip a pipe over the handles of pliers to gain extra leverage.
4. When performing electrical work, use the pliers that have the blue rubber sleeve (insulated pliers).
5. Do not use pliers that are cracked, broken or sprung.
6. When using the diagonal cutting pliers, shield the loose pieces of cut material from flying into the air by using a cloth or your gloved hand.

Vises

1. When clamping a long work piece in a vise, support the far end of the work piece by using an adjustable pipe stand, saw horse or box.
2. Position the work piece in the vise so that the entire face of the jaw supports the work piece.
3. Do not use a vise that has worn or broken jaw inserts, or has cracks or fractures in the body of the vise.
4. Do not slip a pipe over the handle of a vise to gain extra leverage.

Clamps

1. Do not use the C-clamp for hoisting materials
2. Do not use the C-clamp as a permanent fastening device

Snips

1. Wear your safety glasses or safety goggles when using snips to cut materials.
2. Wear your work gloves when cutting materials with snips.
3. Do not use straight cut snips to cut curves.
4. Keep blade aligned by tightening the nut and bolt on the snips.
5. Do not use snips as a hammer, screwdriver or pry bar.

6. Use the locking clip on the snips after you have finished using them.

Tool Boxes/Chests/Cabinets

1. Use the handle when opening and closing a drawer or door of a tool box, chest, or cabinet.
2. Tape over or file off sharp edges on toolboxes, chests or cabinets.
3. Do not stand on toolboxes, chests or cabinets to gain extra height.
4. Lock the wheels on large toolboxes, chests or cabinets to prevent them from rolling.
5. Push large chests, cabinets, and toolboxes; do not pull them.
6. Do not open more than one drawer of a toolbox at a time.
7. Close and lock all drawers and doors before moving the chest to a new location.
8. Do not use a toolbox or chest as a workbench.
9. Do not move a toolbox, chest, or cabinet if it has loose tools or parts on top.

Ladders and Step Ladders

1. Read and follow the manufacturer's instructions Level affixed to the ladder if you are unsure how to use the ladder.
2. Do not use ladders that have loose rungs, cracked or split side rails, missing rubber footpads, or are otherwise visibly damaged.
3. Keep ladder rungs clean and free of grease. Remove buildup of material such as dirt and mud.
4. Do not use a metal ladder on rooftops or within 50 feet of electrical power lines.
5. Do not place ladders in a passageway or doorway without posting warning signs or cones that detour pedestrian traffic away from the ladder. Lock the doorway that you are blocking with the ladder and post signs that will detour traffic away from your work.
6. Do not place a ladder at a blind corner or doorway without diverting foot traffic by blocking or roping off the area.

7. Allow only one person on the ladder at a time.
8. Face the ladder when climbing up or down it.
9. Maintain a three-point contact by keeping both hands and one foot or both feet and one hand on the ladder at all times when climbing up or down the ladder.
10. When performing work from a ladder, face the ladder and do not lean backward or sideways from the ladder.
11. Do not stand on tables, chairs, boxes, or concrete blocks to other improvised climbing devices to reach high places. Use the ladder or stepstool.
12. Do not stand on the top two rungs of any ladder.
13. Do not stand on a ladder that wobbles, or that leans to the left or right of center.
14. When using a ladder, extend the top of the ladder at least 3 feet above the edge of the landing.
15. Secure the ladder in place by having another employee hold it.
16. Do not move a rolling ladder while someone is on it.
17. Do not place ladders on barrels, boxes, loose bricks, pails, concrete blocks or other unstable bases.
18. Do not carry items in your hands while climbing up or down a ladder.
19. Do not try to "walk" a ladder by rocking it. Climb down the ladder, and then move it.
20. Do not use a ladder as a horizontal platform.

Portable Welding Equipment

1. Do not use personal or employee-owned power tools and portable appliances while at work.
2. Do not perform welding tasks while wearing cotton gloves. You should wear insulated gloves when using welding equipment.
3. Use insulated work gloves when using welding equipment.

4. Do not use the welding apparatus if the power cord is cut, frayed, split or otherwise visibly damaged or modified.
5. When replacing power plugs and cords of the welding apparatus, always check to ensure that the ground wire is connected and the notches on the power plug prongs are not worn off, allowing the plug to be inserted backward.

Electrical Powered Tools

1. Do not use power equipment or tools on which you have not been trained.
2. Keep power cords away from the path of drills, saws, vacuum cleaners, floor polishers, mowers, slicers, grinders, irons, and presses.
3. Do not use cords that have splices, exposed wires, or cracked or frayed ends.
4. Do not carry plugged in equipment or tools with your finger on the switch.
5. Do not carry equipment or tools by the cord.
6. Disconnect the tool from the outlet by pulling on the plug, not the cord.
7. Turn the tool off before plugging or unplugging.
8. Do not leave tools that are "ON" unattended.
9. Do not handle or operate electrical tools when your hands are wet or when you are standing on a wet floor.
10. Do not operate spark-inducing tools such as grinders, drills or saws near containers labeled "Flammable" or in an explosive atmosphere such as a paint spray booth.
11. Turn off the electrical tool and unplug it from the outlet before attempting repairs or service work. Tag the tool "Out of Service".
12. Do not use extension cords or other three pronged power cords that have a missing prong.
13. Do not remove the ground prong from electrical cords.
14. Do not use an adapter such as a cheater plug that eliminates the ground.
15. Do not plug multiple electrical cords into a single outlet.

16. Do not run extension cords through doorways, through holes in ceilings, walls or floors where someone could trip.
17. Do not drive over, drag and step on or place objects on a cord.
18. Do not stand in water or on where surfaces when operating power hand tools or portable electrical appliances.
19. Do not use a power hand tool to cut wire or water soaked building materials or to repair pipe leaks.
20. Do not use a power or hand tool while wearing cotton gloves or wet leather gloves.
21. Never operate a power hand tool or portable appliance that has a frayed, worn, cut, improperly spliced or damaged power cord.
22. Never operate electrical equipment barefooted. Wear rubber-soled or insulated work boots.
23. Do not operate a power hand tool or portable appliance that has a two-pronged adapter or a two-plug conductor extension cord.
24. Do not operated a power hand tool or portable appliance while holding a part of the metal casing or while holding the extension cord in your hand.
25. Hold all portable power tools by the plastic handgrips or other nonconductive areas designed for gripping purposes.

Carts

1. Do not exceed the rated load capacity noted on the manufacturer's label on the cart.
2. Ask a spotter to help guide carts around corners and through narrow aisles.
3. Do not stand on a cart or float or use it as a work platform.

Compressed Gas Cylinders (storing and handling)

1. Do not handle oxygen cylinders if your gloves are greasy or oily.
2. Store all compressed gas cylinders in the upright position.

3. Place valve protection caps on compressed gas cylinders that are in storage and are not being used.
4. Do not lift compressed gas cylinders by the valve protection cap.
5. Do not store compressed gas cylinders in areas where they can come in contact with chemicals labeled "Corrosive".
6. Hoist compressed gas cylinders on the cradle, slingboard, pallet or compressed gas cylinder basket.
7. Do not place compressed gas cylinders against electrical panels or live electrical cords where the cylinder can become part of the circuit.

Use of Compressed Gas Cylinders

1. Do not use dented, cracked or other visibly damaged cylinders.
2. Use only an open ended or adjustable wrench when connecting or disconnecting regulators and fittings.
3. Do not transport cylinders without first removing the regulators and replacing the valve protection caps.
4. Close the cylinder valve when work is finished, when the cylinder is empty or at any time the cylinder is moved.
5. Do not store oxygen cylinders near fuel gas cylinders such as propane or acetylene, or near combustible material such as oil or grease.
6. Stand to the side of the regulator when opening the valve.
7. If a cylinder is leaking around a valve or a fuse plug, move it to an outside area away from where work is performed, and tag it to indicate the defect.
8. Do not hoist or transport cylinders by means of magnets or choker slings.
9. Do not use compressed gas to clean yourself, equipment or work area.
10. Do not remove the valve wrench from acetylene cylinders while the cylinder is being used.
11. Open cylinder valves slowly. Open valves fully when the compressed gas cylinder is being used, in order to eliminate possible leakage around the cylinder valve stem.

Welding/Cutting/Brazing

1. Obey all signs posted in the welding area.
2. Do not leave oily rags, paper or other combustible materials in the welding, cutting, or brazing area.
3. Use the red hose for gas fuel and the green hose for oxygen.
4. Do not use worn or cracked hoses.
5. Do not use oil, grease or other lubricants on the regulator.
6. "Blow Out" hoses before attaching the torch.
7. "Blow Out" the cylinder valve before attaching or reattaching a hose to the cylinder.
8. Do not use a cigarette lighter to ignite torches; use friction lighters only.
9. Do not wear contact lenses when you are welding.
10. When welding, wear welding gloves, a long sleeve shirt, long pants, a welding apron and the welding helmet that has filter plated and lenses.
11. Do not change electrodes using your bare hands; use the dry rubber gloves.
12. "Bleed" oxygen and fuel lines at the end of the work shift.
13. Use the welding cart that has a safety chain or cable when transporting cylinders used for welding.

Jacks

1. Do not exceed the jack's rated lifting capacity as noted on the label of the jack.
2. Clear all tools, equipment and any other obstructions from under the vehicle before lowering the jack.

Grinders

1. Do not use grinding wheels that have chips, cracks or grooves.
2. Do not use the grinding wheel if it wobbles. Tag it "Out of Service".

3. Do not try to stop the wheel using your hand, even if you are wearing gloves. To prevent your gloves from getting caught by the grinding wheel, hold the work-piece by using vice grip pliers, clamps, or a jig.
4. Adjust the tongue guard so that it is no more than 1/8 inch from the grinding wheel.

Forklift Safety

1. Personnel using forklift must be qualified to operate equipment.
2. Operator must perform before operation safety checks, i.e. lights, brakes seatbelts, etc.
3. Seatbelt must be worn at all times.
4. Always know lifting capacity of forklift and don't exceed.
5. Never jump off of forklift if rolling over, lean forward, hold on to steering wheel and support self.
6. Always observe who and what is around you.
7. Always use parking brake while parked.

Students Working in Shop

1. All students working with equipment in shop must receive the proper safety and equipment demo given by shop staff before any project work can be started. This demo will be documented and filed.
2. Students will not be allowed to work in shop without shop staff present.
3. Students will not be allowed to work alone in shop or any lab must have at least two students (Buddy System).
4. Students working in shop area must follow all safety procedures and will be held liable for any unsafe acts.
5. Students will be required to follow all shop policies as shop staff.

First Aid Instructions

In all cases requiring emergency medical treatment take the employee to Drake Health Center. If the injury is life threatening or the employee can not be safely moved, immediately call, or have a co-worker call 911, to request emergency medical assistance. The shop provides a first aid kit.

Wounds:

Minor: Cuts, lacerations, abrasions, or punctures

Wash the wound using soap and water; rinse it well.
Cover the wound using clean dressing.

Major: Large, deep and bleeding

Stop bleeding by pressing directly on the wound, using a bandage or cloth.
Call 911
Keep pressure on the wound until medical help arrives.

Broken Bones:

Do not move the victim unless it is absolutely necessary. Call 911.

Burns:

Thermal (Heat)

For first-degree burns (ex. extremely bad sunburn with possible blisters) rinse the burned area, without scrubbing it, and immerse it in cold water; do not use ice water. Blot dry the area and cover it using sterile gauze or a clean cloth. Take employee to Drake Health Center. For more severe burns call 911.

Chemical

Flush the exposed area with cool water immediately for 20 minutes. At a minimum review the MSDS for specific instructions. Take the employee to the Drake Health Center or call 911 depending on the severity.

Eye Injury:

Small particles

1. Do not rub your eyes.

2. Use the corner of a soft clean cloth to draw particles out, or hold the eyelids open and flush the eyes continuously with water. Take the employee to Drake Health Center to ensure complete removal.

Large particles or stuck particles

If a particle is stuck in the eye, do not attempt to remove it, call 911.

Chemical

Immediately irrigate the eyes and under the eyelids, with water, for 30 minutes. Refer to the MSDS for specific instructions.

Neck and Spine Injury:

If the victim appears to have injured his or her neck or spine, or is unable to move his or her arm or leg, call 911. Do not attempt to move victim unless he or she will die if not moved from scene.

Heat Exhaustion:

Loosen the victim's tight clothing.

Give the victim "sips" of cool water.

Make the victim lie down in a cooler place with the feet raised.

Take the employee to Drake Health Center.

Accident Reporting:

Supervisors must ensure an accident report is completed for every on-the-job injury, illness or incident. A copy of the completed report including the corrective actions must be forwarded to Safety and Environmental Health and Risk Management.