

GEORGIA INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL HEALTH AND SAFETY
HAND TOOLS AND POWER TOOLS

PURPOSE

The purpose of this procedure is to protect employees from the hazards associated with using hand or powered tools at Georgia Tech.

SCOPE

To establish requirements, practices and procedures for safe tool selection, power tool guarding and safety precautions while using hand power tools.

RESPONSIBILITIES

General Safety Unit

The EHS Safety office is responsible for providing safety-related training, conducting inspections and monitoring the program.

Supervisors

All Supervisors must ensure their employees are using the hand and power tools in accordance with the manufacture's and general industry standards.

Supervisors and employees have a responsibility to work together to establish safe working procedures. If a hazardous situation is encountered, employees bring it to the attention of their supervisor immediately. If the supervisor cannot correct the situation, it should be brought to the next level of the supervision for action.

Employees

Employees have the responsibility to keep all tools in good condition; use the right tool for the job; examine each tool for damage before use; tag damaged tools out of service and operate tools in accordance to the manufacturers' instructions.

DEFINITIONS

Anti-Kickback Device:

Safety feature incorporated into power saws to minimize the possibility of the work piece being thrown back toward the worker when in contact with the saw blade.

Blade Guard:

A device that partially covers the power saw blade to prevent inadvertent contact.

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Chip Shield:

Plastic attachment to tool that prevents wood chips and sawdust from becoming projectiles or being widely dispersed into the air while cutting.

Clamp:

A restraining device used to secure work firmly in place.

Double-Insulated:

Electrical products featuring two separate insulation systems.

Respirator:

Personal Protective Equipment, used to protect the respiratory system when grinding, sanding, or using other tools that creates dust, or when working in areas where respiratory hazards are present.

Hearing Protection:

Ear muffs or ear plugs that help protect employee's ears from loud, impact and/or continuous noise.

Face Shield:

An impact-resistant plastic shield that helps to protect one's face from chips, sparks, wire wheel bristles or other projectile or splash hazards.

Fence:

A protective device mounted on a tool that helps locate and guide the work-piece through the tool's blade or cutter.

Goggles (Safety Goggles):

Special impact-resistant eyewear that must be worn whenever one operates a power tool to protect against eye hazards. All safety glasses/goggles must be stamped with the ANSI Z87.1 certification.

Ground Fault Circuit Interrupter (GFCI):

A safety device that senses hazardous electrical leakage to ground and quickly shuts off the circuit to help prevent electric shock.

Grounded Outlets (Receptacles):

Electrical outlets with two vertical slots and a third rounded hole for use with either two-or three-pronged plugs. Many power tools feature three-pronged plugs and require grounded outlets.

Note: Never remove the third prong to make the plug fit a two-holed receptacle.

Guard:

Protective devices that cover power tool blades, grinding heads or other hazardous points of contact. Never use a tool if the required guard has been removed or is not functioning properly.

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Vise:

Equipment used to hold or secure a work piece in one place.

SAFETY PRECAUTIONS

Powered Hand Tools

- Follow the Instruction Manual before attempting to use any power tool in any way.
- Always wear safety goggles or safety glasses with side shields. Use a respirator for dusty operations or where other respiratory hazards maybe present. Wear hearing protection where there are high levels of continuous or impact noise.
- No loose-fitting clothing, neckties, jewelry, dangling objects of any kind should be worn while using powered tools. Long hair must be tied back out of the way of operating tool parts.
- Training is required on the use of each tool prior to use
- Tools that have been damaged or are unsafe must be tagged out of service
- Avoid caring the tool by the electric cord
- Make sure your work area is neat and clean and free of any debris that might get in your way or be ignited by hot tools, chips or sparks.
- Before you plug in any power tool, make sure the power switch is off.
- Be sure all appropriate tool guards are in place and working.
- Keep cords away from sharp edges, heat and other hazards
- Properly clean and store tools that are not in use
- Follow good housekeeping practices to prevent slip and falls
- Secure all tools with sharp blades or edges
- Always turn off and unplug the tool before you make any adjustments or change accessories.
- Never use any unauthorized accessory. Only accessories specifically supplied or recommended by the manufacturer shall be used.
- Never use power tools in wet or damp conditions.
- Never use a tool that is damaged or malfunctioning in any way.
- If the tool has a three-pronged plug, make sure you use a three-pronged extension cord plugged into a three-pronged outlet.
- Make sure cutters or blades are clean, sharp and securely in place.
- Never use bent, broken, or warped blades or cutters.
- Stay focused while operating the power tools.
- When using hand-held power tools, always keep a firm grip with both hands. Losing control of the tool creates a hazardous situation.
- Ensure those working around you maintain a safe distance and are aware of your activities.

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- Safety guards must never be removed.
- Power tools with moving parts such as, belts, pulleys, chains, drums, spindles, gears, spindles and other rotating or moving equipment must be equipped with safety guards.

Basic Hand Tools

- If a wooden handle on a tool such as a hammer or an axe is loose, splintered, or cracked, the head of the tool may fly off and strike the user or another worker.
- A wrench must not be used if its jaws are sprung, because it might slip.
- Impact tools such as chisels, wedges, or drift pins are unsafe if they have mushroomed heads. The heads might shatter on impact, sending sharp fragments flying.
- Saw blades, knives, or other tools should be directed away from aisle areas and other employees working in close proximity.
- Knives and scissors must be sharp. Dull tools can be more hazardous than sharp ones.
- Appropriate personal protective equipment, e.g., safety goggles, gloves, etc., should be worn due to hazards that may be encountered while using portable power tools and hand tools.
- Safety requires that floors be kept as clean and dry as possible to prevent accidental slips with or around dangerous hand tools.
- Around flammable substances, sparks produced by iron and steel hand tools can be a dangerous ignition source. Where this hazard exists, spark-resistant tools made from brass, plastic, aluminum, or wood will provide for safety.
- Use the tool for its intended purpose.
- Keep your tools in good condition: sharp, clean, oiled, dressed and not abused.
- Do not force tools beyond their capacity.
- Secure your work in a vise whenever possible. Never hold small work in your hand when using a screwdriver.
- Chisels, screwdrivers or other pointed tools should never be carried in clothing pockets.
- Use tool belts designed for carrying tools.
- Cutting tools should be kept sharp to ensure good smooth cutting. Always use proper handles.
- Drill Bits should be kept sharp, not dull, chipped, rounded, or tapered.
- Screwdriver points should not be worn-out and/or handles should be in good condition.
- Wrenches, if adjustable, must work freely and adjust properly.
- Always wear the PPE required for the job. Protect your eyes, hands, ears and other body parts. Keep clothing out of your work.

Powered Abrasive Wheel Tools

- Powered abrasive grinding, cutting, and polishing wheels create special safety problems because they may throw off flying fragments.
- Always use face shields and eye protection.

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- Before an abrasive wheel is mounted, it should be inspected closely and should be sound or ring-tested to ensure that it is free from cracks or defects.
- To test, wheels should be tapped gently with a light non-metallic instrument. If they sound cracked or dead, they must not be used because they could fly apart in operation. A sound and undamaged wheel will give a clear metallic tone or "ring."
- To prevent the wheel from cracking, the user should be sure it fits freely on the spindle. The spindle nut must be tightened enough to hold the wheel in place, without distorting the flange.
- Follow the manufacturer's recommendations.
- Never clamp a hand-held grinder in a vise.
- Care must be taken to ensure that the spindle wheel will not exceed the abrasive wheel specifications.
- The wheel may disintegrate or explode during start-up.
- The employee should never stand directly in front of the wheel as it accelerates to full operating speed because portable grinding tools need to be equipped with safety guards to protect workers not only from the moving wheel surface, but also from flying fragments in case of breakage.
- The guard and its fastenings must be strong enough to retain fragments of the wheel in case of accidental breakage.
- Abrasive wheels tools must be equipped with guards that cover the spindle end and flange projections; that maintains the proper alignment with the wheel; and that do not exceed of strength of the fastenings.
- Turn off the power when not in use.

Pneumatic Tools

- Pneumatic tools are powered by compressed air and can include chippers, drills, hammers, and sanders.
- There are several dangers encountered in the use of pneumatic tools. The main one is the danger of getting hit by one of the tool's attachments or by some kind of fastener the worker is using with the tool.
- Safety check valves are recommended to automatically shut air supply if a crack or leak occurs,
- Pneumatic tools that shoot nails, rivets, or staples and operate at pressures more than 100 pounds per square inch must be equipped with a special device to keep fasteners from being ejected unless the muzzle is pressed against the work surface.
- Eye protection is required and face protection is recommended for employees working with pneumatic tools.
- Noise is another hazard. Working with noisy tools such as jack-hammers requires proper, effective use of appropriate ear protection.
- When using pneumatic tools, employees must check to see that they are fastened securely to the air hose to prevent them from becoming disconnected.

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- A safety clip or retainer must be installed to prevent attachments, such as chisels on a chipping hammer, from being unintentionally shot from the barrel.
- Screens should be set up to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.
- Compressed air guns should never be pointed toward anyone. Users should never "dead-end" them against themselves or anyone else.
- Heavy jackhammers can cause fatigue and strains; heavy rubber grips reduce these effects by providing a secure handhold.
- Workers operating a jackhammer must wear safety glasses and safety shoes, which protect against injury if the hammer slips or falls. A face shield also should be used.

Fuel Powered Tools

- The worker must be careful to handle, transport, and store the gas or fuel only in approved flammable liquid containers, according to proper procedures for flammable liquids.
- Before the tank for a fuel-powered tool is refilled, the user must shut down the engine and allow it to cool to prevent accidental ignition of hazardous vapors.

Hydraulic Power Tools

- The fluid used in hydraulic power tools must be an approved fire-resistant fluid and must retain its operating characteristics at the most extreme temperatures to which it will be exposed.
- The manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters, and other fittings must not be exceeded.
- If a fuel-powered tool is used inside a closed area, effective ventilation and/or personal protective equipment is necessary to avoid breathing carbon monoxide. Fire extinguishers must be available in the area.

Powder Actuated Tools

- Powder-actuated tools operate like a loaded gun and should be treated with the same respect and precautions.
- They must be operated only by specially trained employees.
- These tools should not be used in an explosive or flammable atmosphere.
- Before using the tool, the worker should inspect it to determine that it is clean, that all moving parts operate freely, and that the barrel is free from obstructions.
- The tool should never be pointed at anybody.
- The tool should not be loaded unless it is to be used immediately. A loaded tool should not be left unattended, especially where it would be available to unauthorized persons.

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- Hands should be kept clear of the barrel end. To prevent the tool from firing accidentally, two separate motions are required for firing: one to bring the tool into position, and another to pull the trigger. The tools must not be able to operate until they are pressed against the work surface with a force of at least 5 pounds greater than the total weight of the tool.
- If a powder-actuated tool misfires, the employee should wait at least 30 seconds, and then try firing it again. If it still will not fire, the user should wait another 30 seconds so that the faulty cartridge is less likely to explode, than carefully remove the load. The bad cartridge should be put in water.
- Suitable eye and face protection are essential when using a powder-actuated tool.
- The muzzle end of the tool must have a protective shield or guard centered perpendicularly on the barrel to confine any flying fragments or particles that might otherwise create a hazard when the tool is fired. The tool must be designed so that it will not fire unless it has this kind of safety device.
- All powder-actuated tools must be designed for varying powder charges so that the user can select a powder level necessary to do the work without excessive force.
- If the tool develops a defect during use it should be tagged and taken out of service immediately until it is properly repaired.

GENERAL SAFETY PRECAUTIONS

Employees who use hand and power tools and who are exposed to the hazards of falling, flying, abrasive and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases must be provided with the particular personal equipment necessary to protect them from the hazard.

All hazards involved in the use of hand and power tools can be prevented by following five basic safety rules:

- Keep all tools in good condition with regular maintenance.
- Use the right tool for the job.
- Examine each tool for damage before use.
- Operate according to the manufacturer's instructions.
- Provide and use the proper protective equipment.

TRAINING

Supervisor(s) must provide training and observe their employees' work activities to verify that the user understands the proper way to safely use hand tools and power tools.