Machine Shop Policy

Carbon Neutral Energy Solutions Lab

Author: Kristopher Manion

Revised by: Tyler Pennel

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Introduction

The Carbon Neutral Energy Solutions (CNES) Laboratory is a multi-disciplinary research facility supporting members from Mechanical Engineering (ME), Aerospace Engineering (AE), Chemical & Biomolecular Engineering (ChBE), and the Strategic Energy Institute (SEI). The facility houses full-time SEI staff as well as faculty and staff from various research groups. The first floor contains three primary research areas: Wet Labs, the Open Lab High Bay, and High-Pressure Labs. The second floor is primarily office space, including both closed offices and open work areas. The CNES Machine Shop is located on the first floor within the Open Lab High Bay. CNES is committed to promoting safety and accountability for all individuals working in its laboratories, and violations of Machine Shop policies will result in loss of shop access.

Purpose

The Machine Shop serves three core functions. It supports daily operations by providing a facility for simple repairs and the construction of apparatus needed for research. It also serves as a research support resource, enabling faculty, staff, and students to build and modify equipment required for experimental work. Finally, it functions as a teaching and training space, helping graduate students improve their mechanical skills, particularly those engaged in experimental research.

Machine shops are, by nature, hazardous environments. Risks include chemical hazards associated with solvents and paints used to clean or finish parts, as well as mechanical hazards from rotating equipment and heavy objects. Because of these inherent risks, all users are classified as Authorized Users and must comply with the training, authorization, and safety requirements outlined in this policy.

Emergency Response

For any incident requiring professional medical attention, a report must be filed with the Department Head and Building Coordinator as soon as possible to ensure proper follow-up and corrective action.

1) Serious Injury
    a. Call GTPD at 404-894-2500
    b. Notify the Building Coordinator!

c. Request an ambulance, and give the location (Carbon Neutral Energy Solutions Lab, 495 Tech Way NW, High Bay)
d. Describe the nature of the problem and stay on the phone.
e. If alone, watch for emergency personnel and guide them to the victim. Otherwise, send someone.

2) Minor Injury
   a. Notify the Building Coordinator and Building Manager!
   b. Provide appropriate first aid.
   c. Help the victim to rest comfortably.
   d. Reassure the victim and encourage them to seek additional care if necessary.
3) Unknown Injury
   a. Notify the Building Coordinator and Building Manager!
   b. Follow these procedures if you are unsure of the severity of an injury (broken vs. sprained, etc...)
   c. If transportation is available, take the victim to the nearest hospital or care center See Appendix for list of nearby hospitals and care centers.
   d. If transportation is not available or additional injury might result from movement, follow the procedures for "Serious Injuries" above.

Responsibilities

Building Coordinator

The Building Coordinator is responsible for overseeing the safe and efficient operation of the machine shop. Responsibilities include:

- Ensure all shop activities comply with Georgia Tech EHS policies, OSHA standards, and internal safety protocols.
- Verify user training and maintain authorization records through the SUMS system.
- Inspect and maintain shop equipment and PPE.
- Manage consumables and shop organization.
- Respond to accidents and ensure incident reporting.

Authorized Users

Shop Users include students, staff, and researchers who have been granted access to the machine shop. They are expected to follow all rules and procedures to maintain a safe and productive work environment. Responsibilities include:

- Operate only the machines for which they have been authorized by the Building Coordinator.
- Always wear appropriate personal protective equipment (PPE), including safety glasses, closed-toe shoes, and any additional PPE required for specific tasks.
- Keep work areas clean and organized during and after use, including storing tools, materials, and equipment.
- Immediately report any injury, near-miss, or unsafe condition to the Building Coordinator.

Environmental Health & Safety (EHS)

Environmental Health & Safety provides institutional oversight to ensure the machine shop operates in compliance with Georgia Tech, state, and federal regulations. EHS serves as the primary authority on safety standards, training requirements, and compliance monitoring. Responsibilities include:

- Conducting safety inspections of all maker spaces and student machine shops
- Providing safety guidance and oversight for maker spaces and student machine shops
- Monitoring conformance with this program
- Providing technical support on all aspects of this program
- Ensure proper training is completed before in-house maintenance is completed
- Provide safety awareness training upon request
- Conducting program review semi-annually

Machine Shop Access

All users must be authorized before using any equipment in the machine shop. Authorization is managed through the SUMS system (sums.gatech.edu) and requires acknowledgement of shop policies, machine-specific SOPs, and specialized training. Access permissions are granted by the Building Coordinator and may be modified or revoked at any time for safety or policy violations. Authorized users must follow all posted safety rules and procedures without exception. Equipment may only be used if you have received the appropriate training and can operate it safely. Do not use any machine or tool if it is malfunctioning or if you are unsure of its operation. Any broken, damaged, or malfunctioning equipment must be reported immediately. At the end of each session, the shop and all tools must be left clean, organized, and ready for the next user. In the event of an emergency or accident, call Campus Emergency at 404-894-2500 and notify the Building Coordinator immediately.

Access Hours and Buddy Policy

The Machine Shop is open 24/7. Business hours are Monday through Friday, 8:00 a.m. to 5:00 p.m. Access outside these hours, including campus closed holidays, is considered after-hours.

- **Students**: A Buddy is always required for specialized training machines; No Buddy is required general-use machines during business hours.
- **Staff (Trained)**: May work alone during business hours; Buddy required after-hours.
- **After Hours**: All users, including staff and students, a Buddy is always required.

Steps to Access the Machine Shop:

1. Join the Equipment Group in SUMS (sums.gatech.edu)
    a. Log into the SUMS system.
    b. Search for Carbon Neutral Energy Solutions Laboratory (CNES) Equipment Group.
    c. Read and acknowledge the Machine Shop Policy.
    d. This automatically makes you eligible to be a Buddy.
2. Shop Orientation
    a. Schedule a walkthrough with the Building Coordinator.
    b. During the walkthrough, the Building Coordinator will review general shop rules, safety expectations, and emergency procedures.
3. Training Requirements
    a. General-Use Machines (Band Saw, Belt and Disc Sander, Chop Saws, Drill Press)
        i. Watch the tutorial video on each machine.
        ii. Acknowledge the SOP to confirm you understand the safe operation requirements.
    b. Specialized Machines (Mills, Lathes, CNC Machines)
        i. Acknowledge the SOP to confirm you understand the safe operation requirements.
        ii. Complete either ME or AE machine shop training/class.
        iii. Upload proof of training (screenshot of certificate or training record within SUMS) to the SUMS system.
        iv. Schedule and complete a machine-specific walkthrough with the Building Coordinator (this may be combined with the general walkthrough). You must demonstrate safe operation and basic proficiency.

Buddy System

A Buddy is an Institute-affiliated individual who signs into SUMS for the session and remains within verbal or visual range of the primary user. The Buddy must follow all safety protocols and wear required PPE. Their role is to assist in an emergency by safely shutting down equipment and calling GTPD 404-894-2500 / 911 as appropriate.

How to become a Buddy:

1. Join the Equipment Group in SUMS (sums.gatech.edu)
    a. Log into the SUMS system.
    b. Search for Carbon Neutral Energy Solutions Laboratory (CNES) Equipment Group.
    c. Read and acknowledge the Machine Shop Policy.
    d. This automatically makes you eligible to be a Buddy.

Guidelines and PPE

General Safety Rules

- Eye Protection:
    - Safety glasses must always be worn in the Machine Shop. Safety glasses are available upon entering the High Bay.
    - Face shields are recommended for certain machines and activities.
- Clothing and Accessories:
    - Remove jewelry such as rings, bracelets, and earrings before operating any equipment.
    - Avoid loose clothing (e.g., ties, scarves) that could become entangled in moving machinery.
    - Long sleeves are not permitted when operating machines, as fabric can be caught in rotating parts.
    - Individuals with long hair must use a hairnet or other suitable method to keep hair secure and away from machines.
- General Conduct:
    - Always follow general and machine-specific safety rules.
    - Do not use machines when tired or impaired.
    - Report damaged tools or unsafe conditions to the Building Coordinator immediately. This may keep the next user from getting hurt.
    - Never use a machine without proper authorization and training. Ask for instructions if you are not familiar with a particular machine, tool, or procedure.

Food and Headphones

- No food or drinks are permitted in the machine shop.
- Headphones and earbuds are prohibited — users must remain fully aware of equipment operation and the activities of others in the shop.

Clothing Requirements

- Wear clothing suitable for an oily, hazardous environment.
- A shirt (preferably with a pocket) and closed-toe shoes are always required.
- No sandals are permitted for users or guests.
- Short-sleeved shirts are required.
- Steel-toe shoes are recommended when handling large or heavy workpieces.

Cleaning and Maintenance

The shop must always be left as clean or cleaner than you found it. This includes:

- Removing metal chips and debris from machines and floors
- Vacuuming or sweeping floors and work surfaces to keep the shop free of dust, shavings, and trip hazards
- Wiping down all machine and bench surfaces after use to remove oil, coolant, and residue
- Returning all tools and supplies to their proper storage locations

If you must leave a project unfinished, place a note at the workstation with your name and the time you intend to return.

Repairs

If any machine is not functioning properly, stop using it and report the issue immediately to the Building Coordinator.

Policy Violations

Shop access operates under a three-strike system. Three strikes, or any serious violation of shop policies, will result in removal from the SUMS system and loss of shop access.

Violations will be addressed at the discretion of the Building Coordinator, SEI Director, and/or the Building Safety Committee. Possible consequences include loss of user classification, temporary suspension of shop access, or permanent revocation of privileges and expulsion from the lab or building. Appeals must be submitted through the SEI Director, Building Safety Committee, and/or the Building Coordinator.

The following table provides examples of infractions and the strike values assigned to each:

Severity	Examples of Infractions	Strikes Assigned
Minor (1 Strike)	• Failure to properly clean the machine and area after use. • Minor dress code violation (e.g., open-toed shoes) • Failure to advise the Building Coordinator verbally and in writing to any non-working or damaged machine or tool.	1
Moderate (2 Strikes)	• Buddy signed off and left the area • Ignoring posted machine-specific safety rules	2
Severe (3 Strikes/ Immediate Removal	• Requesting an authorized user to log in for an unauthorized user • Requesting an authorized user to log in for an unauthorized user • Operating a machine without authorization • Reckless behavior endangering self or others • Tampering with emergency equipment or controls, including the SUMS System	3 (Immediate loss of access pending review)

Contacts

Title	Name	Phone	Email	Office
Building Coordinator	Tyler Pennel	720-442-6313	tpennel3@gmail.com	BTZ Rm 112
NARA Lab Manager	Kristopher Manion	678-596-697	kmanion3@gatech.edu	CNES Rm 108
SEI Executive Director	Christine Conwell	678-491-0059	cconwell@gatech.edu	CNES Room 210

Equipment Rules

Milling Machine (Mill)

Safe Use Practices

- Ensure the workpiece is securely clamped before starting the spindle.
- Verify the correct speed, feed, and tooling before engaging the cut.
- Use appropriate cutting fluid or coolant when required.
- Keep hands clear of the cutter and work area at all times.
- Always stop the spindle before making measurements or adjustments.

- Remove the chuck key immediately after adjusting.
- Keep the table and floor around the mill free of chips and tools.

Prohibited Actions

- Do not leave the machine unattended while running.
- Do not attempt to remove chips with your hands; use a brush or chip hook.
- Do not exceed machine limits or force the cutter.
- Do not attempt climb milling cuts unless instructed by the Building Coordinator.
- Do not operate the machine without required training and authorization.

Lathe

Safe Use Practices

- Ensure the workpiece is properly secured in the chuck, collet, or faceplate before starting.
- Remove the chuck key immediately after it tightens.
- Verify tool is sharp, correctly mounted, and properly adjusted in the tool holder.
- Stand to the side when starting the lathe to avoid potentially ejected material.
- Keep hands clear of the rotating chuck and cutting tool.
- Use a brush or tool to remove chips.
- Stop the spindle before making measurements, tool changes, or adjustments.
- Be aware of the rotating workpiece diameter and maintain a safe distance.

Prohibited Actions

- Do not leave the lathe running unattended.
- Do not attempt to file, sand, or polish while wearing gloves.
- Do not attempt to catch a workpiece if it comes loose.
- Do not use excessive feed or depth of cut that could overload the machine.
- Do not operate the lathe without proper training and authorization.

Vertical Band Saw

Safe Use Practices

- Adjust the blade guard to just above the workpiece before turning the machine on.
- Ensure the workpiece is properly supported and guided with both hands.
- Keep hands to the side of the blade path, never in line with it.
- Feed the workpiece steadily, do not force it into the blade.
- Use a push stick or jig for small or irregularly shaped parts.
- Allow the blade to come to a complete stop before removing scrap or adjusting.

- Keep the table and floor around the saw free of chips and obstructions.

Prohibited Actions

- Do not operate the band saw with the guard raised too high above the workpiece.
- Do not cut round stock without securing it in a proper jig or V-block.
- Do not back out of a cut while the blade is running unless necessary—if so, stop the saw first.
- Do not attempt to cut materials, the blade is not rated for (e.g., hardened steel, very thick stock).
- Do not leave the band saw running unattended.

Grinder

Safe Use Practices

- A face shield in addition to safety glasses is strongly recommended.
- Inspect the grinding wheel for cracks or damage before use. Do not use a damaged wheel.
- Ensure tool rests are properly adjusted (within 1/8 inch of the wheel) and securely tightened.
- Ensure spark guards are in place and adjusted to within 1/4 inch of the wheel.
- Stand to the side of the wheel when starting the grinder, in case of wheel failure.
- Allow the grinder to reach full speed before beginning work.
- Hold workpieces firmly and move them smoothly across the wheel surface.
- Use the entire face of the wheel to prevent uneven wear.
- Allow the wheel to stop completely before adjusting or leaving the machine.

Prohibited Actions

- Do not grind on the side of the wheel unless it is specifically rated for side grinding.
- Do not use excessive force; let the wheel do the cutting.
- Do not wear gloves while grinding fabric can catch and pull hands into the wheel.
- Do not exceed the rated RPM of the wheel.
- Do not leave the grinder running unattended.

Belt and Disc Sander

Safe Use Practices

- Inspect the sanding belt or disc for wear, tears, or looseness before use.
- Adjust the table or rest to within 1/8 inch of the belt or disc.

- Hold workpieces firmly and apply light, even pressure—do not force into the abrasive surface.
- Sand on the downward-moving side of the disc to prevent the workpiece from being lifted.
- Keep hands and fingers clear of the abrasive surface.
- Allow the machine to reach full speed before beginning to sand.
- Let the abrasive surface stop completely before adjusting or cleaning.

Prohibited Actions

- Do not wear gloves while sanding—abrasive surfaces can catch fabric and pull hands in.
- Do not send small pieces that cannot be held securely. Use a jig or fixture if required.
- Do not use the sander for materials it is not designed for (e.g., soft plastics that may melt, magnesium, etc.).
- Do not leave the sander running unattended.
- Do not apply excessive pressure that can stall the motor or tear the belt/disc.

Wood Miter Saw

Safe Use Practices

- Inspect the blade for sharpness, cracks, or damage before use. Replace damaged blades immediately.
- Ensure all guards are in place and functioning properly.
- Secure the workpiece firmly against the fence before cutting.
- Always keep hands at least 6 inches away from the blade path.
- Allow the blade to reach full speed before beginning the cut.
- Use slow, steady pressure to bring the blade through the material.
- Wait for the blade to come to a complete stop before raising it after a cut or removing the workpiece.
- Keep the area around the saw clean and free of scrap material that may interfere with operation.

Prohibited Actions

- Do not operate the saw without the blade guard in place.
- Do not attempt to cut freehand, always use the fence to guide the workpiece.
- Do not cut pieces that are too small to hold securely.
- Do not force the blade through the material; let the saw do the work.
- Do not reach across the blade path at any time.

- Do not leave the saw running unattended.

Metal Chop Saw

Safe Use Practices

- Hearing protection is required.
- Inspect the cutting wheel for cracks, chips, or wear before use. Never use a damaged wheel.
- Ensure the workpiece is firmly clamped against the fence before cutting.
- Align the cutting wheel with the cut mark before powering on.
- Allow the wheel to reach full speed before contacting the material.
- Lower the saw slowly and steadily. Do not force the wheel into the workpiece.
- Stand slightly to the side of the blade path when cutting.
- Allow the wheel to stop completely before raising it after a cut or removing the workpiece.
- Keep sparks directed into the designated spark guard or containment area.

Prohibited Actions

- Do not operate without the blade guard in place.
- Do not cut materials the wheel is not rated for (e.g., wood, plastic, hardened steel).
- Do not hold workpieces by hand—always clamp securely.
- Do not attempt to stop the wheel by hand or with objects.
- Do not leave the saw running unattended.
- Do not exceed the manufacturer's rated RPM for the cutting wheel.

Resources

The following documents have been attached to this policy manual for reference:

1. Mill SOP
2. Lathe SOP
3. Vertical Bandsaw SOP
4. Grinder SOP
5. Belt and Disc Sander SOP
6. Wood Miter Saw SOP
7. Metal Chop Saw SOP

Appendices

Appendix A – Emergency Numbers

The following list contains important emergency telephone numbers and related information.

Type of Emergency:	Who to Call:	Phone Number and/or website:
General (Includes fire, police, emergency medical treatment, and off hour chemical spills)	**GTPD and EHS Emergency Phone**	**GTPD**: **911** from an on-campus phone Or **404-894-1491** from a cell phone **EHS Emergency Phone: 404-216-5237**
Emergency Repairs and Maintenance	**Facilities Management 24- hour Trouble Call**	Area 5: **404-385-5000**
GA Tech Pest Control	**Facilities-Utilities & Energy**	http://facilities.gatech.edu/pest-or-animal-control
Other Numbers		
Insurance and Risk Management		**404-894-3483**

In case of an emergency, call the Call the Georgia Tech Police Department at 404-894-2500 immediately if you are experiencing a life-threatening emergency or need a fire truck or ambulance.

For links to information about a campus-wide emergency, or to sign up for emergency alerts, go to Georgia Tech's main emergency page.

For emergency response for common incidents, visit https://www.ehs.gatech.edu/emergency

Appendix B – Post Injury /Illness Instruction

Faculty, Staff, & Employed Students:

Injuries must be reported to the Shop Supervisor.

- If no medical attention is required, do not call DOAS 24-hour injury report line.
- If medical attention is required, the Supervisor must call DOAS 24-hour injury report line at (877) 656-7475.

Please Note:

- Agency Unit Location # - Georgia Tech: #7202
- You **may** have to provide the injured employee Social Security Number (SSN)

Georgia Tech Students that are not employed:

The injury must be reported to the Shop Supervisor. In case of an injury, non-employed GA Tech students should visit Stamps Health Services.

Students requiring assistance after attention is sought for the injury/illness may contact the Georgia Tech student Affairs Office/Dean of Students:

- During regular work hours call: 404-894-6367 (choose Option 9)
- After Hours/Weekends call GT Police: 404-894-2500 and ask them to page the Dean on Duty

Supervisor must report injury to EHS:

After the injury is reported to DOAS (if applicable) and/or Student Affairs (if applicable), the supervisor must report the injury to EHS.

- The supervisor must investigate the injury.
- The supervisor must fill out the "Supervisor Accident Investigation" Webform on the EHS website.
- Link to the Webform: https://ehs.gatech.edu/content/supervisors-accident-investigation

For assistance contact: generalsafety@ehs.gatech.edu

Appendix C – Medical Resources

- Stamps Health Center
  - Located at 740 Ferst Dr. NW, Atlanta, GA 30332
  - Contact: 404-894-1420 - Mon-Fri 8:00 am – 5:00 pm
- Emory Midtown
  - Location: 550 Peachtree Street NW, Atlanta, GA 30308
  - Contact: 404-686-4411
- Grady Hospital
  - Location: 80 Jesse Hill Jr. Dr. SE, Atlanta, GA 30303
  - Contact: 404-616-1000
- Piedmont Hospital
  - Location: 1968 Peachtree Rd. NW, Atlanta, GA 30309
  - Contact: 404-605-5000, 404-605-3219 (ED)
- Northside Hospital
  - Location: 1000 Johnson Ferry Rd. NE, Atlanta, GA 30342
  - Contact: 404-851-8000

Appendix D – Equipment SOPs

- Mill SOP (full version)
- Lathe SOP (full version)
- Vertical Bandsaw SOP (full version)
- Drill Press SOP (full version)
- Belt and Disc Sander SOP (full version)
- Metal Chop Saw SOP (full version)
- Wood Miter Saw SOP (full version)
- Welder SOP (full version)

Appendix E – Forms and Posters

- General Shop Policies
- Machine Shop Map

Mill – Standard Operating Procedure

Purpose:
To provide safe and proper operating instructions for the use of the milling machine.

Personal Protective Equipment (PPE):

- **Safety glasses or face shield** (required)
- **Hearing protection** (recommended)
- **No gloves, loose clothing, or jewelry**
- **Tie back long hair**

Pre-Operation Checklist:

1. Inspect the mill for any damage or looseness.
2. Ensure the correct cutting tool is securely installed in the collet or holder.
3. Verify spindle speed and feed rate are set appropriately for the material and operation.
4. Secure the workpiece firmly using a vise or clamps.
5. Confirm the work table and surroundings are clean and free of obstructions.
6. Check that all guards and covers are in place and functional.

Operating Procedure:

1. Stand clear of the rotating spindle when starting the machine.
2. Power on the mill and allow it to reach full speed.
3. Keep hands and body away from the rotating cutter and moving table.
4. Use handwheels or power feed to engage the cutter with the material slowly.
5. Apply appropriate coolant or lubricant if required.
6. Avoid climb milling unless properly trained and setup is secure.
7. Never adjust the workpiece or tooling while the spindle is running.
8. Stop the spindle before making any changes or taking measurements.

Post-Operation:

1. Turn off the mill and wait for the spindle to fully stop.
2. Remove the workpiece and clean the table.
3. Brush away chips — **never use hands** — and clean the machine thoroughly.
4. Inspect and return tooling to storage.
5. Wipe down machine surfaces and report any issues or maintenance needs.

Report Any Issues To:

Tyler Pennel
tpennel3@gatech.edu | Microsoft Teams: Tyler Pennel

Lathe – Standard Operating Procedure

Purpose:
To provide safe and proper operating instructions for the use of a lathe.

Personal Protective Equipment (PPE):

- **Safety glasses or face shield** (required)
- **Closed-toe shoes** (required)
- **No gloves, loose clothing, jewelry, or long sleeves**
- **Tie back long hair**

Pre-Operation Checklist:

1. Inspect the lathe and chuck for damage, wear, or looseness.
2. Ensure the workpiece is securely clamped in the chuck or between centers.
3. Check that the tool is sharp, properly set, and tightly fastened.
4. Adjust tool rest (wood lathe) or carriage/tool post (metal lathe) to proper position and clearance.
5. Set the correct speed and feed rate for the material.
6. Ensure all guards are in place and the area is free of obstructions.

Operating Procedure:

1. Stand clear of the rotating workpiece and start the machine.
2. Let the lathe reach full speed before engaging with the workpiece.
3. Keep hands and tools away from rotating components.
4. Make smooth and controlled cuts; never force the tool into the material.
5. Use appropriate coolant or lubrication (for metal lathes).
6. Stop the lathe before making measurements, adjustments, or clearing chips.
7. Use a brush or tool to remove chips — **never use your hands**.

Post-Operation:

1. Turn off the lathe and wait for all motion to stop before cleaning.
2. Remove the workpiece and tools carefully.
3. Clean chips, dust, and oil from the machine and floor.
4. Inspect and store tools properly.
5. Report any damage, unusual vibration, or maintenance needs.

Report Any Issues To:

Tyler Pennel
📧 tpennel3@gatech.edu | 💬 Microsoft Teams: Tyler Pennel

Band Saw – Standard Operating Procedure

Purpose:
To provide safe and proper operating instructions for the use of the band saw.

Personal Protective Equipment (PPE):

- Safety glasses (required)
- Hearing protection (recommended for extended use)
- No gloves, loose clothing, or dangling jewelry
- Tie back long hair

Pre-Operation Checklist:

1. Inspect the blade for cracks, dullness, or damage.
2. Ensure blade tension and tracking are properly adjusted.
3. Set the blade guard approximately ¼" above the material.
4. Confirm the table is clean, secure, and free of obstructions.
5. Use a push stick for small or narrow pieces.
6. Make sure all guards are in place and functioning.

Operating Procedure:

1. Turn on the band saw using the main power switch.
2. Allow the blade to reach full speed before cutting.
3. Keep hands clear of the blade path at all times.
4. Feed the material into the blade slowly and steadily — **do not force**.
5. Make relief cuts on tight curves to prevent blade binding.
6. Do not back out of a cut while the saw is running.

Post-Operation:

1. Turn off the saw and wait for the blade to come to a complete stop.
2. Unplug or power down if required by your shop's safety protocol.
3. Clean sawdust from the table, guides, and floor.
4. Remove scraps and return tools to their proper place.
5. Inspect the blade and note any needed maintenance.

Report Any Issues To:

Tyler Pennel
tpennel3@gatech.edu | Microsoft Teams: Tyler Pennel

Drill Press – Standard Operating Procedure

Purpose:
To provide safe and proper operating instructions for the use of the drill press.

Personal Protective Equipment (PPE):

- Safety glasses (required)
- Hearing protection (recommended for extended use)
- No gloves, loose clothing, or dangling jewelry
- Tie back long hair

Pre-Operation Checklist:

1. Inspect the drill press for any damage or loose parts.
2. Ensure work area is clean and well-lit.
3. Confirm the drill bit is sharp and properly secured in the chuck.
4. Adjust table height and secure it firmly.
5. Set the correct speed for the material and drill bit.
6. Secure workpiece with a clamp or vise – never drill freehand.

Operating Procedure:

1. Turn on the machine using the power switch.
2. Keep hands and fingers clear of rotating parts.
3. Use the feed handle to slowly lower the drill bit into the material.
4. Apply consistent, moderate pressure – do not force the bit.
5. Back off periodically when drilling deep holes to clear chips.
6. Once complete, raise the bit and wait for it to stop spinning before removing the workpiece.

Post-Operation:

1. Turn off the machine and wait for all motion to stop.
2. Unplug or power down if required by your shop's safety protocol.
3. Remove drill bit if switching users or storing the tool.
4. Clean off chips and debris from the table, base, and floor.
5. Return tools and accessories to their proper place.

Report Any Issues To:

Tyler Pennel
📧 **tpennel3@gatech.edu |** 💬 **Microsoft Teams: Tyler Pennel**

Belt & Disc Sander – Standard Operating Procedure

Purpose:
To provide safe and proper operating instructions for the use of the belt and disc sander.

Personal Protective Equipment (PPE):

- Safety glasses **(required)**
- Dust mask or respirator **(recommended)**
- No gloves, loose clothing, or dangling jewelry
- Tie back long hair

Pre-Operation Checklist:

1. Inspect sanding surfaces for wear, damage, or loading.
2. Ensure the sanding belt and disc are properly installed and secure.
3. Adjust belt tracking if needed.
4. Confirm table angles and fences are properly set and locked.
5. Check dust collection is connected and operational (if available).
6. Ensure work area is clean and clear of obstructions.

Operating Procedure:

1. Turn on the sander and let it reach full speed.
2. Hold the workpiece firmly with both hands.
3. Always sand on the **downward-moving side** of the disc to avoid kickback.
4. Keep hands and fingers at a safe distance from sanding surfaces.
5. Apply **light, even pressure** — do not force material into the sander.
6. Move the workpiece smoothly across the belt/disc to avoid gouging.

Post-Operation:

1. Turn off the sander and wait for all movement to stop.
2. Unplug or power down if required by your shop's safety protocol.
3. Clean dust from the table, belt/disc, and surrounding area.
4. Remove any leftover material or scraps.
5. Inspect abrasive surfaces for replacement or cleaning.

Report Any Issues To:

Tyler Pennel
tpennel3@gatech.edu | Microsoft Teams: Tyler Pennel

Metal Chop Saw – Standard Operating Procedure

Purpose:
To provide safe and proper operating instructions for the use of the metal chop saw.

Personal Protective Equipment (PPE):

- **Safety glasses with side shields or face shield** (required)
- **Hearing protection** (required)
- **Heat-resistant gloves** (recommended)
- **No loose clothing, jewelry, or flammable materials**
- **Tie back long hair**

Pre-Operation Checklist:

1. Inspect the abrasive or carbide blade for wear, cracks, or damage.
2. Ensure the blade is appropriate for the material being cut and securely installed.
3. Check all guards are in place and functioning.
4. Verify the work clamp is operational and adjusted to secure the workpiece.
5. Ensure the work area is free of combustible materials and flammable liquids.

Operating Procedure:

1. Secure the metal workpiece tightly against the fence and base using the clamp.
2. Keep hands and body parts clear of the blade path.
3. Start the saw and allow the blade to reach full speed before beginning the cut.
4. Lower the blade slowly and steadily through the material — **do not force it**.
5. Maintain a firm grip throughout the cut and watch for movement or kickback.
6. Allow the blade to stop completely before lifting it or removing the cut material.
7. Be cautious of hot edges and sparks; do not touch freshly cut metal.

Post-Operation:

1. Allow blade and material to cool before handling.
2. Clean up metal shavings, burrs, and debris from the work area.
3. Inspect the blade and machine for wear or damage.
4. Store clamps and accessories in their proper location.

Report Any Issues To:

Tyler Pennel
tpennel3@gatech.edu | Microsoft Teams: Tyler Pennel

Compound / Miter Saw – Standard Operating Procedure
For wood and non-metallic materials only

Purpose:
To provide safe and proper operating instructions for the use of the miter saw.

Personal Protective Equipment (PPE):

- **Safety glasses** (required)
- **Hearing protection** (recommended)
- **No gloves, loose clothing, or dangling jewelry**
- **Tie back long hair**

Pre-Operation Checklist:

1. Inspect the blade for damage or dullness.
2. Ensure the blade is appropriate for wood and securely fastened.
3. Confirm all guards are in place and functioning.
4. Check that the work area is clean and well-lit.
5. Measure and mark the material before cutting — avoid cutting freehand.
6. Use clamps or supports for long or small pieces.

Operating Procedure:

1. Position the material flat against the fence and table.
2. Keep hands at least 6 inches from the blade.
3. Hold the handle firmly and start the saw — let it reach full speed.
4. Bring the blade down slowly through the material — **do not force the cut**.
5. Once the cut is complete, release the trigger and wait for the blade to stop before raising it.
6. Do not remove cut pieces until the blade has completely stopped.

Post-Operation:

1. Clean up sawdust and scrap from the table and floor.
2. Inspect the blade and report any needed maintenance.
3. Return the saw to its resting position and lock it down.
4. Store any clamps or accessories properly.

Report Any Issues To:

Tyler Pennel
tpennel3@gatech.edu | Microsoft Teams: Tyler Pennel

Welder – Standard Operating Procedure

Purpose:
To provide safe and proper operating instructions for the use of welding equipment.

Personal Protective Equipment (PPE):

- **Welding helmet with appropriate shade** (required)
- **Flame-resistant long sleeves and pants** (required)
- **Welding gloves** (required)
- **Safety glasses under helmet** (required)
- **Closed-toe, leather boots or shoes** (required)
- **Hearing protection** (recommended in noisy environments)

Pre-Operation Checklist:

1. Inspect all cables, leads, and connections for wear or damage.
2. Ensure the machine is set up correctly for the welding process and material.
3. Confirm proper ventilation or turn on the fume extraction system.
4. Check fire extinguisher is nearby and accessible.
5. Remove flammable materials from the welding area.
6. Ground the workpiece properly and secure it in position.
7. Set the correct voltage, amperage, and gas flow (if applicable).

Operating Procedure:

1. Turn on the welding machine and adjust settings for the material and electrode/filler wire.
2. Strike an arc only when ready and in position.
3. Maintain proper distance, angle, and travel speed for a consistent weld.
4. Watch for overheating, burn-through, or spatter.
5. **Do not weld near compressed gas cylinders or flammable materials.**
6. Avoid looking directly at the arc without proper eye protection.
7. Use caution when handling hot workpieces and tools.

Post-Operation:

1. Turn off the machine and close the shielding gas valve (if applicable).
2. Let workpieces cool before handling.
3. Coil cables neatly and store PPE properly.
4. Check for signs of heat damage or fire risk.
5. Report any damaged equipment or issues immediately.

Report Any Issues To:

Tyler Pennel
tpennel3@gatech.edu | Microsoft Teams: Tyler Pennel

CNES Machine Shop Rules

1)Authorized users only

2)Safety glasses, long pants, and closed toed shoes required

3)No loose clothing or jewelry

4)Clean up and return tools after use

5)Training required for mills and lathes

6)Ask before using unfamiliar tools

7)Report damaged equipment

8)Violations may result in loss of access

In case of emergency
Call 911
Your Location:
CNES High Bay
495 Tech Way

Building Contact:
Tyler Pennel

Email: tpennel3@gatech.edu
Teams: Message via Microsoft Teams
Phone : 720-442-6313

Georgia Tech

CNES Machine Shop

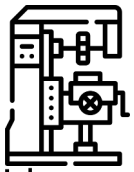

Band Saw


Welding Table

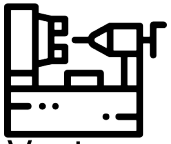

E-Stop (on Pole)


PPE (in Hallway)

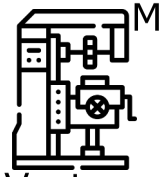

Belt Sander

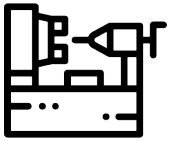

Drill Press

Bridgeport Mill


Vectrax Lathe


E-Stop (on Pole)

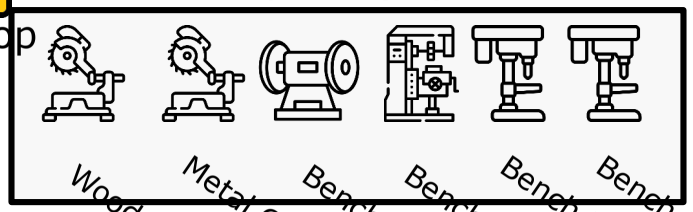

Vectrax Mill


MSC Mill

Contact Details:
Tyler Pennel
tpennel3@gatech.edu
720-442-6313


E-Stop

Work Bench




Tool Box


First Aid (Across the High Bay)


First Aid (on Wall)


PPE (in Lobby)