

Machine Shop Safety

- **The Machine Shop by its very nature is a dangerous environment. Many people have been injured and even killed in machine shops doing seemingly benign tasks.**
- **Safety must be YOUR primary concern when using the Machine Shop.**
- **Good safety practices will ensure a productive and safe project for everyone.**
- **In addition to the General Safety rules, there are many machine specific procedures that must be followed. (These procedures must be learned from the supervisor before a user starts operation of a particular machine)**
- **Knowing and following the Machine Shop Safety Rules will help to ensure your safety.**
- **No One is permitted to operate any machinery unless the Machine Shop Safety training is completed and approved by the Machine Shop Supervisor.**

There are many ways you can be injured. Almost everything in the shop is sharp, heavy, and/or hot. You will be working with extremely sharp objects and very powerful machinery. Often sharp and hot debris is airborne in your vicinity.

It is normal for a freshly machined edge to have burr, this can be extremely sharp. This burr can easily cut your hand as you attempt to brush away chips or coolant.

Your attitude, focus, and concentration are critical to your safety. You must be aware of the potential hazards in the machine shop, even the actions of other people in the shop can create a dangerous situation for you. *(for example: someone blowing chips off a neighboring machine).*

If you are not confident that you know how to operate the machinery safely, don't start the job. If you need advise or a review of how to set up or operate a machine, speak with the machine shop supervisor. Everyone here wants to support you in your efforts and help you complete your project safely.

Plan your project and make certain that you know how to accomplish the tasks required. Often, changing the order of the machine operations can improve the results and do so in a safer manner.

CAUTION!

- **Moving parts on machine shop equipment can snag, cut, dismember, and entrap, resulting in serious injury or death!**
- **Flying chips, sparks, coolant, fumes, or other particles can cause serious injury!**
- **Many things in the machine shop may be extremely sharp or hot. Handle carefully.**

Your training and concentration are the best things to avoid injuries.

Because of the power of the equipment you're operating, small oversights can quickly result in severe injury.

Do not come to the shop if you are not prepared to concentrate on the tasks. Avoid distractions, this includes cell phones

Access to machine shop

Users are allowed to work in machine shop only on working days, Monday-Friday, and only during regular working hours – 8 AM - 5 PM (regardless of the “two-buddy” system)

Before starting the work in machine shop, a user must "check-in" with the machine shop supervisor, currently Ed Munford, and inform him about the work to be done and its estimated duration. The supervisor then must periodically, within reasonably short time intervals, come to the shop and check if the user is OK. Once cameras are installed (with outputs both in the main office and the department professional machine shop), the supervisor can do these periodic checks remotely.

As an alternative procedure, a user may bring a buddy to the shop who stays with the user during entire time of the work in the machine shop. While working in machine shop between 3 PM and 5 PM, the user must ensure that there are two responsible adults in the shop.

Access to machine shop. Training

Once a year, all users of machine shop must take safety training. Currently, this is fulfilled by listening to a lecture given by the machine shop supervisor. If a user has questions regarding the safety, the user must ask them during the lecture. At the end of the training, the user must sign the participation form certifying that the user agrees to follow all machine shop safety rules. This is a mandatory step for getting access to the machine shop.

When the machine shop supervisor has administered the annual machine shop safety lecture and has the participants sign their participation forms (ideally this should be at the beginning of the academic year), he should scan these documents and upload these to a Ubox folder shared with the department secretary (currently Heidi Frank). The secretary will identify those users who have met their safety training requirements and let them get the shop access through their Ucard. Everyone who is not within this group will either lose or not get access. This procedure ensures that people who have access but do not participate in an updated safety training will lose access.

Potential users of the machine shop will always know, at any given time, whether or not they have access to the machine shop based on whether or not their U card will allow them entry. Users should note that, for safety, the machine shop doors will not be locked during the day, so anyone can enter the shop without the need for his or her U card in case of an emergency. However, users should check whether their U card is activated in order to know whether they are still allowed to use the shop.

General Safety Rules

- **Never Use a Machine If You Are NOT Trained – Always Get Training Before Operating Any Machinery.**
- **It's best not to work alone.**
- **Never Start Work If You Cannot Do The Job Safely- Just Don't Do It.**
- **Never Work Without Proper Eye Protection -Always Wear Appropriate Safety Glasses or Goggles When Working or Cleaning Tools.**
- **Never Wear Open Toe Shoes -Use Closed-Toe Shoes in the Shop.**
- **Never Work With Loose Hair, Jewelry, etc. –Always Remove or Secure Anything That Might Get Caught in Moving Machinery.**
- **Never Bring Hands Close to Sharp Objects – Always Keep Your Hands At a Safe Distance From Sharp Tools.**
- **Before starting work in the Machine Shop, the user must ensure that the entrance door to the shop is unlocked.**

A majority of accidents are the result of inattention or inadequate training.

Avoid distractions or inattention, your concentration on the task at hand is the best way to avoid injury.

If you aren't certain how to do a task safely, ask for help.

Allow yourself adequate time to complete your task, don't hurry. Take time to be safe.

Eye protection is required at all times in the machine shop. In the machine shop, eye injuries are most likely caused by flying metal fragments, projectiles, dust, and other debris kicked up by machinery. Additionally, there are coolants and other chemicals that can splash or be sprayed into the eyes.

A student blowing off a machine in your vicinity can inadvertently propel metal fragments or coolant into your eyes.

Prescription glasses must meet ANSI Standard Z87.1 for safety.

You will be given safety glasses when start machine shop training. These are yours and you are expected to bring them whenever you enter the shop. If you lose your safety glasses, contact the machine shop supervisor to obtain a replacement.

Closed toe shoes are required. Do not even enter the machine shop unless you are wearing proper footwear.

It is fairly certain that anything that is dropped in the machine shop can injure your feet.

There will be sharp, jagged chips, or sparks in the shop; sometimes propelled by air blasts. They can easily get into open toe shoes or sandals and cut or embed in your feet.

If you enter the shop wearing open toe shoes or sandals, this will be treated as a violation of the safety rules.

Secure long hair before entering the shop.

Do not wear loose clothing, jewelry, headphones, or neck lanyards when operating machinery. Wear short sleeve shirts, or roll up long sleeves before operating machinery.

Any loose clothing or hair can get caught in moving machinery. You will be working in close proximity to things that can entangle and wrap up hair, jewelry, ID badges, clothes, beards, piercings, etc.

Often the machinery creates air movements that can draw loose clothing into the machinery.

The machinery is very powerful and will not stop when you are pulled into it. Such incidents can result in severe injury or death.

There have been many people killed when clothing or hair becomes entangled in a turning lathe. There are many examples illustrated on the web.

In fact, a physics student working in a machine shop has died. - a Yale student, 2011; Look it up!

- **Never Use Gloves While Using Rotating Equipment – Remove Them Before Starting Work.**
- **Never Be Shy To Seek Help –Always Ask**
- **Never Remove Safety Guards – They are Present For a Reason.**
- **Avoid distractions and Don't Interfere with Other People**
- **Never Use Machine When Impaired - Be Alert and Smart.**
- **Never Leave Your Work Area in Mess – Always Clean Up After Yourself.**
- **Watch for Tripping Hazards.**
- **Report All Injuries or Accidents – for Life-Threatening Injures, dial 911**
 - **First Aid Kits are available in the shop for treatment of minor injuries such as cleaning and dressing small cuts or removal of slivers.**
 - **If the injury requires medical attention, go to the RedMed clinic (details below)**

DO NOT wear gloves when operating machinery. Although you may think gloves will “protect” your hands, this actually increases the likelihood of getting caught and pulled into moving machinery.

Sometimes a long chip will form around the cutting tool on a lathe. If you try to clear the chip sometimes it will wrap around the spinning work piece. If you are wearing gloves, they can snap on the chip and your hand and arm will be drawn into and wrapped around the work piece.

If You’re Unsure About The Safe Operation of a Tool or Any Aspect of a Job – Ask the Shop Supervisor for assistance.

You are not expected to perform tasks that you are not properly trained to perform.

Proper training means that you recognize your abilities and limits.

Ask for help whenever you are uncertain about a task.

If you are clamping a small or unusually shaped piece in the milling vise, there may be an increased risk of the piece moving or flying out of the vise. If you are not certain if the vise will hold the part sufficiently, as the machine shop supervisor to check if your setup is safe.

You must ensure that safety guards are in place on moving parts before you start working.

Never modify the machinery.

If you think something is wrong, or needs adjustment; contact the machine shop supervisor.

There are many things in the machine shop that can distract you and lead to a dangerous situation.

When you work in the machine shop, eliminate any distractions that may effect the operation of the machinery.

The operation of machinery requires your full attention, if there are other things on your mind that effect your concentration; don’t try to operate machinery.

If you need to answer your cell phone or look up something – turn the machine off and step away.

Loud noises occur frequently in the machine shop, try to condition yourself not to jump or flinch to such distractions while operating machinery.

Foam ear plugs are available to mitigate loud noises, absolutely DO NOT WEAR HEADPHONES OR EAR BUDS! (even if they are wireless)

Do not try to carry on a conversation while operating machinery. Likewise, do not distract or start a conversation with someone operating machinery.

Using machine shop equipment when you are impaired is obviously dangerous.

This includes when you are sick, tired, stressed, distracted, or hurried.

Be aware that some non-prescription medications can impair your abilities to operate machinery.

Before you leave your work site all tools must be returned, the machine cleaned and wiped down and the floor swept. Leave 10-15 minutes for cleanup at the end of your project. Do not use fingers or hands to clear chips, use a brush to clear chips. You may use an air hose, but only in short bursts, try to avoid scattering chips across the shop.

Blowing chips and cuttings with the full force of an air line can travel across the shop and injure your colleagues working in the shop.

It is your responsibility to clean up any mess you create. Try to leave the area as clean or cleaner than when you started.

Remove cutting tools from the machine and return all hand tools to the proper place.

If you don't know where something is stored, ask the machine shop supervisor.

If you fail to clean up after your task is finished, your machine shop access can be denied.

Keep the areas around the machines and pathways clear of obstructions.

Because of the tight quarters in the shop, any fall can result in serious injury. There are many knobs and handles protruding from the machinery and these can compound what would be a simple fall and do more harm than just falling to the floor.

Vises and lathe chucks should be stored in the proper place. If you don't know where something is stored, ask the machine shop supervisor.

If there is something that is a trip hazard, please take steps to eliminate the hazard; even if you did not put it there.

Seek immediate treatment for any injuries.

Minor injuries can occur in the machine shop. The most common injuries are minor cuts and pinched fingers.

If you are hurt in the machine shop, there are first aid supplies available for small cuts. If you need help dressing a wound, the machine shop supervisor can help.

After treatment, notify the machine shop supervisor of any injuries. Although the injury may seem insignificant at the time, reporting the injury allows the machine shop supervisor to evaluate if there is something inherently dangerous about how you are working. He may offer guidance to minimize the risk of injury.

If you are injured and need medical attention (stitches, sprains, etc.) do not attempt to transport yourself. Contact the machine shop supervisor or any staff member.

If a serious injury occurs, Dial 911

- RedMed Employee Health Clinic
 - Monday through Thursday, 8:00 am - 5:00 pm
 - Friday, 9:00 am - 3:30 pm
 - University Union Building, Ground Floor
 - Phone: (801) 213-3303
- For other hours, go to the nearest emergency room