

FRC Team 2619 The Charge Robotics General Safety Guidelines

The single most important issue at FRC Team 2619's build site is safety. The primary objective of all people that use the build site must be to work safely. There is nothing that you can design or build using the build site that is worth trading for a permanent disability. This document will give you some guidelines for safely working at the build site and to familiarize yourself with some hazards of the build site.

Know the basics of the area you are working in, understand where the exits are, and how they work. Locate the fire extinguisher and first aid kit before starting work.

The build site is more hazardous than most people recognize. Every time you enter the build site you should adjust mentally and physically to the hazards around you. Consult the 10 rules below on how to adjust yourself to the shop environment. Learn how to safely operate all tools before you use them. Don't get complacent, familiarity leads to complacency. Everyone should be taught how to use and signed off on all machines before use. A mentor must unlock all machines before a meeting and lock them after. Also a mentor be present in every room while machines are being operated. Think of what you do before you do it, use common sense, the best way to stay safe is to think through your actions.

Mentors are here to help you learn and be safe, but they cannot be everywhere. All people using the facility must be fully committed to safety to keep a safe environment. If you have questions or are unsure, ask a mentor. If you notice something that isn't safe, tell a mentor. If someone else is being unsafe, suggest a safer alternative or tell a mentor.

General Safety Rules:

These rules are general safety guidelines, not all encompassing statements. All situations and equipment has specific safety rules to follow separate from these.

- 1. Never work alone.** When you are working there must always be a mentor present capable of giving assistance in case of an accident. They must be able to see you while you work and be able to get to you quickly if need be. If a mentor moves where they cannot see you, stop working immediately. Accidents can happen and you must have a mentor present so that if you can't help yourself, they can help you.
- 2. Never work while impaired in any way.** This includes when you are too tired, stressed, or otherwise inhibited from exercising appropriate caution in the shop. Do not enter the build site while under the influence of any intoxicants or medications that might make you drowsy or alter your ability to be alert. Do not use the shop when you are too

frantic or stressed to properly think and function. Avoid last minute work, instead focus on consistent weekly effort. Deadline driven work may lead to ruined projects and/or serious injury. Do not enter the shop if you are wearing a cast or bandage that limits mobility – in an emergency you must be able to react quickly to avoid injury.

- 3. Wear all necessary protective clothing and gear.** This includes, but is not limited to, safety glasses, closed toed shoes, hearing protection, and tight fitting clothing. Some activities will require additional gear. Eye protection must conform to ANSI standard Z87.1. Safety glasses should be available somewhere in or near the shop. Safety glasses that meet this standard will be marked with “Z87” somewhere on them. If you wear glasses already, they should conform to ANSI Z87.1 for frontal impact. To protect your eyes from side impact, side shields should be added to your glasses. There should be glasses available that can be placed over prescription glasses in the shop.

Closed toed shoes are required on the build site at all times.

Hearing Protection should be made available in the form of foam ear inserts or ear muffs, when needed. Ask a mentor for help locating any safety equipment.

- 4. Long hair must be tied up securely.** Most power tools in the shop are based off of a rapidly rotating shaft. Long loose hair can become caught in the shaft and pull the owner or the hair into the tool. Long hair must be kept out of harm’s way by tucking it into a hat, tying it up or knotting it in a way that prevents dangling. Be careful of the hair of visitors as well, you are responsible for the safety of those who visit while you are working in the shop.
- 5. Remove all personal accessories and loose clothing which may get caught in machinery.** This means all jewelry, watches, rings, headphones, ties, and open jackets. Long hair must be tied up. Loose garments must not be worn in the shop. Don’t keep shop rags in your pockets.
- 6. Never leave machinery running unattended.** Many of the tools in the show can cut automatically, pay close attention to machines while the run.
- 7. Never leave a chuck key in a chuck or drawbar wrench in a drawbar.** If the wrench or key is in use, your hand must be on it
- 8. Keep your hands clear of the point of contact between workpiece and cutter.** If you must be touching a workpiece on a mill or drill press or saw, your set up it unsafe and must be improved before you continue. NEVER have your hand on the workpiece while it is being cut.

Use a push stick to push the workpiece on a saw if you must but make sure your hand is well clear of the cutter.

Do not remove chips of metal or wood on the cutter with your hands, use a brush or pliers

9. Support work pieces as securely as possible. If your setup is vibrating and shaking it is not same and must be improved before you continue. The piece is not secure and will move when in contact with the cutter, possibly in a harmful way. Do not try to continue with a flimsy set up.

10. Have a mentor check you out the first time you use each machine or process in the shop. Do not operate any machinery with which you are unfamiliar. It is requirement to be checked out and signed of even on equipment that you have been taught to operate somewhere else.

Clean Up Procedure:

Clean up is crucial to the safe operations of the shop. If a person cannot find a needed tool in its regular place or if a person is required to work in someone else's mess, the result will be frustration. It is difficult to keep safety in mind when you are frustrated. So it is important, especially in times of heavy use, to keep the shop clean with everything returned to its correct place at the end of its use. You must keep safety in mind while cleaning up.

- 1. Shut off power to the machine.** Turn off the main power switch for the machine and unplug the machine.
- 2. Remove or cover all cutters.** Many people have sustained injuries from trying to clean around cutting tools. Remove or cover all cutting edges or drills.
- 3. Put away all measuring tools, hand tools material scraps, and drawings.** Put away all objects that do not belong permanently with the machine. If you do not know where stuff goes, ask a mentor or another student.
- 4. Clean chips and excess oil from machines.** Protect your hands from sharp chips with a brush or shop rag. Most machines can be wiped down completely with a shop rag. Don't use floor brooms on machine tools, the brooms will wear away at the machines for a negative effect.

5. **Sweep the floor in the vicinity of the machines you have used.** Collected debris should be thrown away or recycled. Aluminum, brass, bronze, and steel chips can all be recycled if they are pure and clean.
6. **Every shop user should spend five minutes of their time cleaning up some area of the shop.** Clean up time makes the shop enjoyable for everyone when it becomes time to work again. Clean up becomes faster when everyone helps so all around its more enjoyable.
7. **Report missing or broken tools to a mentor.** Almost everything in the build site shop can be repaired or replaced. But we must know about failures in order to correct them. The mentors would rather find out about broken or missing tools at the end of the day than the beginning of the next day.

Machinery Safety Rules

Band Saw Safety Rules

The following rules are in addition to the minimum Build Room Safety Rules (i.e. safety glasses; closed toed shoes; no loose clothing's, jewelry, hair, etc.)

- Have your setup and intended operation reviewed by a mentor before beginning
- Never start the machine with the blade against the workpiece
- Ensure all guards are in place and properly adjusted
- Keep all hands arms and fingers away from the moving blade
- Properly support long or wide workpieces
- In the event of a blade break, unplug the machine and contact a mentor
- Unplug the saw before changing belts
- Work must be secured by the vise in the horizontal mode
- Do not allow the blade to drop on the workpiece
- Always stay at the machine while its running
- Turn off saw before removing work or adjusting saw
- A mentor must be present whenever the equipment is in operation
- Report any machine or tooling issues to a mentor immediately
- Shut down equipment and clean area after using
- Any questions? Ask!

Drill Press Safety Rules

The following rules are in addition to the minimum Build Room Safety Rules (i.e. safety glasses; closed toed shoes; no loose clothing's, jewelry, hair, etc.)

- Have your setup and intended operation reviewed by a mentor before beginning
- Never start the machine before clearing the table of all objects (tools, scrap pieces, etc.)
- Never start the machine with the drill bit, cutting tool, or sanding drum against the work piece
- Maintain safe clearance to the cutter
- The drill chuck key should never be left in the chuck, remove it immediately
- Dull drills and cutters should be taken out of service (notify a mentor)
- Unplug the drill press before changing belts
- Work must be secured by the vise or clamps
- Always stay at the machine while it is running
- A mentor must be present whenever the equipment is in operation
- Report any machine or tooling issues to a mentor immediately
- Shut down equipment and clean area after using
- Any questions? Ask!

Belt Sander Safety Rules

The following rules are in addition to the minimum Build Room Safety Rules (i.e. safety glasses; closed toed shoes; no loose clothing's, jewelry, hair, etc.)

- Have your setup and intended operation reviewed by a mentor before beginning
- Never start the machine with the work piece against the abrasive belt
- Ensure all guards are in place and properly adjusted
- Use the tool rest to support the work piece
- Keep hands arms and fingers away from the moving belt
- Do not use gloves – they can get caught and pull you into the machine
- In the event of a belt sander break or rip, unplug the sander and contact a mentor
- Do not use the belt sander on very small or very thin workpieces that cannot be safely controlled
- Use the shop vacuum to control dust as needed
- Always stay at the machine while it is running
- A mentor must be present whenever the equipment is in operation
- Report any machine or tooling issues to a mentor immediately
- Shut down equipment and clean area after using
- Any questions? Ask!

Militer Saw Safety Rules

The following rules are in addition to the minimum Build Room Safety Rules (i.e. safety glasses; closed toed shoes; no loose clothing's, jewelry, hair, etc.)

- Have your setup and intended operation reviewed by a mentor before beginning
- This saw is for non-metallic materials only (e.g. wood/plastic)
- Use appropriate hearing protection
- Do not use gloves – they can get caught and pull you into the machine
- Ensure all guards are in place and properly adjusted
- Properly support long material
- Hold material securely during the cut
- Keep hands away from the blade
- Do not attempt to cut very small pieces
- Use the shop vacuum to control dust as needed
- Always stay at the machine while it is running
- A mentor must be present whenever the equipment is in operation
- Report any machine or tooling issues to a mentor immediately
- Shut down equipment and clean area after using
- Any questions? Ask!

Milling Machine Safety Rules

The following rules are in addition to the minimum Build Room Safety Rules (i.e. safety glasses; closed toed shoes; no loose clothing's, jewelry, hair, etc.)

- Have your setup and intended operation reviewed by a mentor before beginning
- Never start the machine with the blade against the work piece
- Ensure all guards are in place and properly adjusted
- Keep hands, arms, and fingers away from the moving blade
- Properly support long or wide work pieces
- Use push stick or vise on small pieces
- Adjust blade guide to just above the work to be cut
- In the event of a blade break, unplug the saw and contact a mentor
- Unplug the saw before changing the belts or blade
- Always stay at the machine while it is running
- Turn off the saw before removing work or adjusting the saw
- A mentor must be present whenever the equipment is in operation
- Report any machine or tooling issues to a mentor immediately
- Shut down equipment and clean area after using
- Any questions? Ask!

Safety with Hand Held Power Tools

Hand Drills:

- Wear safety glasses at all times while operating hand drills
- Wear hearing protection if needed
- When not in use remove drill bit and return it to its proper location
- When not in use leave laying down on a table or workbench – not standing up
- Make sure the right batteries are placed on the right drills and in the correct orientation – not backwards
- Keep your steadying hand clear of hole you are drilling – wear gloves if you have to get within 1-2 inches of the hole
- Make sure the drill is turning in the proper direction before drilling

Hand Saws:

- This would be for hacksaws/wood saws/electrical saws
- Wear safety glasses while operating hand saws
- Wear hearing protection if needed
- Keep hands clear of the cutting edge at all times
- Cover blade when you are done operating saw
- Learn how to operate saw before operating
- Get mentor supervision while operating saw
- Measure twice, cut once