

# Machine Maintenance and Documentation

We ensure to have manuals for all of our machines so newer members can read and learn from them, as well as being taught by trained team members. When reading the manual it tells you what is needed to be done to ensure the machine is safe to be used. We also set at least 30 minutes every practice to ensure everything in the shop is clean and ready for the next day.



Bridgeport Milling Machine

Milling machine safety

1. Always wear safety glasses.
2. Keep area around machine clear of debris; wipe up any oil on the floor.
3. Clean and dry the table before setting up.
4. Secure any holding devices (e.g., vice, angle plate, dividing head, or tailstock).
5. Select the right kind of cutter for the job.
6. Check to make sure the machine is turned off before inserting the cutter.
7. Make sure that the arbor, cutter, and collars are clean before mounting them in the spindle.
8. Handle sharp cutters with a rag.
9. Securely set the work piece in the vise with a rubber hammer or mallet.
10. Be certain that the holding device clears the arbor and the over-arm supports.
11. Select the proper cutting speed, rpm, and the rate of feed for the job.
12. Disengage the control handles when using automatic feeds.
13. Keep hands away from the removing cutter at all times.
14. Never touch the metal chips with your fingers. Clear chips away from the cutter with a brush.
15. After cutting is finished, vacuum or sweep debris rather than blowing with an air hose.
16. Release any automatic feeds after the job is complete.
17. Clean and wipe the machine when finished.

Thank You to our Parents, Coaches, and Sponsors.

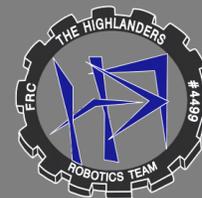


We Couldn't Do This Without You!

# Our Team



We are The Highlanders, Team 4499, a community-based team that began in 2013 through a 501(c)3 nonprofit, Neaera robotics in Fort Collins, CO. We are a team of 11 students from grades 8-12, from 6 different schools. We build a robot to meet a different challenge each year and compete in a robotics challenge put on by FIRST, an organization working to promote STEM education through cooperation — a combination of cooperation and competition — in students from ages 5 to 18. Our team's mission is to give children, from elementary through high school, the opportunity to experience STEM in real life, and to have fun building robots while we do.



**FIRST**  
ROBOTICS  
COMPETITION

# The Highlanders

FRC Team 4499

## The SPORRAN Safety Program

**Safety** -Follow the color code

**Preparation** -Have a plan or a kit to help you

**Observation** -Look for issues before they happen

**Report** -If something was wrong report what happened even if you fixed it

**Respond** -Help out when and if you can

**Awareness** - If you learn something new let others know

**Negotiation** - Work together to come up with new ideas

## Color Coded Safety Tools

We created a color coded safety program where each color represents different types of safety equipment used to run machines. Each machine has color coded electrical tape on it to give us an easy and simple way of knowing what is needed to run the machine safely. We use electrical tape because it has a variety of bright colors to choose from and is very durable so we won't have to replace them all the time.

The Highlanders color-coded safety

	<b>Safety Glasses</b>
	<b>Ear Protection</b>
	<b>Gloves</b>
	<b>No Loose Clothing/Hair</b>
	<b>Mask</b>
	<b>Chemical</b>
	<b>Expert</b>

## Training Program

Every Highlander has to start somewhere. We put safety first in all of our training. We start by having them learn and follow the color coded safety key as they work with us to learn. We start by having them choose out of 3 subsystems which they would like to explore first. Then we work together on everything until the "trainer" thinks that they are ready to use the machine or instrument alone. We require every person to read the owner's mule before even running a machine. While we are training we start with the basic skills that are needed all the time. For example every new mechanical member makes a cube on the manual mill.



## Tournament Safety

In our pit we have laminated posters with arrows pointing to our safety equipment so when we are in rush we will know where the equipment is. Also, we will print out extra posters for any team that asks.



We make safety kits to hand out to teams at every tournament we go to. Each kit has 1 bandage, 1 emergen-C packet, 1 pair of earplugs and a safety tips pamphlet made by us that include tips that every team can use to ensure they are safe. We make and bring these to tournaments to hand out and have extras if any team needs more.

