

# **Injury and Illness Prevention Program**

*Safety is Everyone's Business and Responsibility.*

It is hoped that other robotics teams will use this program as an example to safely compete in the *FIRST* Robotics Competition.

~Elizabeth Seger  
Safety Captain of Team 604  
2008-2009

## Safety Guidelines

### Personal Safety:

1. Always wear approved safety glasses or goggles in designated areas and/or when working with the robot and/or tools.
2. Only OSHA approved safety goggles may be worn with a minimum rating of Z87.
3. Never wear loose clothing around any power tools. Roll up sleeves to your elbows and hide sweatshirt hood-strings to avoid getting them caught in a machine.
4. Remove any accessories such as ties, watches, bracelets, or any other jewelry. These items can get stuck in a machine and cause serious injury.
5. Long hair must be pulled back at all times.
6. Close-toed shoes ONLY!
7. Never use compressed air to clean yourselves or your clothing. It can result in internal rupture.
8. Always know what the escape plan is in case of a fire, earthquake, etc.
9. Always wear long pants to avoid lacerations to your legs.

### Housekeeping:

1. Always make sure that machine is completely stopped before cleaning it.
2. Always keep the machine clean of metal chips and oils that may cause damage to the machine.
3. Use a brush and/or vacuum to remove any chips; NOT your hands. Clean oily surfaces with a cloth.
4. Make sure that there is no oil, grease, or chips on the floor to avoid slipping.
5. Clean up all metal chips on the floor with a broom or vacuum.
6. Do not leave tools or any other items lying around. Put everything back in its proper place once you are done.
7. Always keep a first-aid kit in the room.

### Robot Safety Procedures

1. Power up the robot once on its cart before setting it on the ground. Check that it will not move when placed on the ground and powered up. TURN THE ROBOT OFF and move it to the ground before restarting.
2. Always wear safety goggles when you are near the robot even if you are not working on it.
3. Always make sure that everyone knows that you are turning on the robot before you do so. Shout "clear" so that your teammates are aware.
4. Make sure that battery is unplugged and removed before working on the robot. Also cover all electronics before cutting or drilling to prevent shorts.
5. All wires need to be insulated to prevent electrical shorting.
6. Wear gloves when picking up the robot.

### Working With Machines

1. Make sure that you know how to operate the machine before using it.
2. Make sure that you have the permission of a mentor or teacher advisor before working with the machine.
3. Know how to stop the machine in an emergency situation.
4. Keep hands and other body parts away from moving parts at all times.
5. Never operate a machine unless all of the safety guards are in place.
6. Always make sure that a machine is at a complete stop before measuring, cleaning, or making any adjustments.
7. Never use a rag or cloth near any moving part of the machine. It could get caught and cause serious damage.
8. Never have more than one person operate the same machine at the same time. Not knowing what the other person might do can cause an accident.
9. Never disturb people who are working on machines. This could cause them to be distracted and not pay full attention to operating a machine.
10. Do not wear gloves when working with a machine. The gloves can get caught and cause someone's hand serious injury.

### General Safety Rules

1. Do not fool around or participate in any kind of horse play at any robotics-related function.
2. Do not throw things under any circumstances.
3. No running at places with hazardous objects that can cause injury, such as the competition, workshop, machine shop, etc.
4. Always stay with a buddy. Should one of you be injured, the other can provide assistance. It is also easier to notice when two people are missing rather than one.
5. Get help for lifting heavy objects (robot) and use your leg muscles, not your back.
6. Report all injuries to supervisor and/or safety captain and get immediate first aid care for any injury no matter how small. If cuts are not treated immediately they can get infected.
7. Keep a first aid kit nearby at all times in case of an injury.

### Securing The Work piece

1. Remove all burrs and sharp edges with a file and/or deburring knife.
2. Clean the vise with a rag to get all the chips out.
3. Be sure that work piece is securely fastened down in a vise or to a machine table.
4. Never start a machine until you are sure that the cutting tool and machine parts will clear the work piece.
5. Use proper wrenches for tightening and replace nuts with worn comers.

### Hand Tool Safety:

#### A) Screwdrivers:

1. Avoid holding the work piece in your hand because the screwdriver can slip and injure it.
2. Never use a hammer on a screw driver.
3. Use the proper screwdriver for the type and size of the given screw head.
4. Never grind the screwdriver to a sharp edge.

#### B) Wrenches:

1. Only use the properly fitting wrenches.
2. It is generally better to pull on the wrench than to push it.
3. Keep knuckles clear of any obstructions when turning a wrench.
4. Pull adjustable wrenches in the direction which applies the majority of the force on the fixed jaw.

#### C) Hammers:

1. Never use hammers that are chipped or cracked.
2. Never use hammers on tools or parts that are brittle due to hardening.
3. Never use a hammer that does not have a good, tight-fitting handle.
4. Keep the hammer free of grease.

#### D) Punches and Chisels:

1. Check the head to see if it is smooth.
2. Make sure the point is sharp.
3. Hold the chisel/punch firmly and keep it free of grease and burrs.

#### E) Files:

1. Always file in one direction, away from your body.
2. Keep handles in good condition and tight.

#### F) Hack Saw:

1. Use the correct blade for the job.
2. Make sure that the blade is secure within the frame.
3. When the cut is nearly complete, ease up to prevent the severed section from causing harm.
4. Be sure that the work is securely fastened in a vise.
5. Do not use excessive pressure.

#### G) Taps and Drill bits:

1. Keep you hands away from newly cut threads.
2. Always counter bore a hole before you tap it.
3. Avoid hand contact with broken taps.
4. Do not use taps under power unless a tapping head is used.

## *Machine Tool Safety:*

### A) Drill Press

1. Clean off vise before use. Make sure that there is nothing inside of it.
2. Make sure your part is securely fastened in the vise.
3. Clamp the vise to the drill press table.
4. When changing a drill bit, counter bore, etc. make sure that the drill press is off.
5. Loosen and tighten the chuck with your hand and a key, if needed.
6. Make sure that you have the right sized drill bit.
7. Make sure that the speed is calculated correctly for the size of the drill bit and the material being drilled.
8. After you put the bit in, turn the drill press on to make sure that the bit is straight.
9. If the workpiece slips from the vise or clamp then immediately turn off the drill press, and if it is safe, make the proper adjustments.
10. Deburr all drilled holes.
11. After removing the part, clean off the work area. Do not use your hands.
12. Do not place any tools or other items on a drill table. Use a bench or table near the drill press.

### B) Band Saw

1. Clean off the work surface with a rag or air pressure before working.
2. Make sure that the teeth on the blade are pointing down.
3. Rub band saw wax on the blade before using it.
4. Adjust the blade guide to the appropriate height.
5. Move the piece slowly through the blade. Keep your hands away from the blade.
6. If the piece gets too hot, stop the band saw and wait for it to cool.
7. After the piece is cut, clean off the table and deburr the piece.
8. Never cut round stock in a band saw, unless it is securely fastened in a clamp.

### C) Electric Drills

1. Turn off the drill and/or unplug it before changing the drill bit.
2. Tighten the chuck with your hand, do not turn it on.
3. When drilling, keep the drill as straight as possible.
4. When using a drill with a chuck key, make sure you remove the key before you turn the power on.
5. If using a drill with a cord, check to verify the cord's integrity (cracks, exposed wiring, etc.)

### **Traveling Safely**

1. Have a designated meeting area in case something happens.
2. Always make sure that somebody knows where you are. Use the buddy system.
3. Anyone with handicaps, allergies, or needs medication must inform the teacher advisor or the safety captain.
4. Do not leave the area you are supposed to be in. For example, do not leave the tournament building at a competition.
5. Always have a cell phone or walkie-talkie near you so that you can contact people if you need help.

### **Food and Drink:**

1. Never bring any food or drinks into the work area.
2. Always wash your hands thoroughly before eating.
3. Label all your drinks so that you don't get them mixed up with someone else's.
4. Always clean up any mess you make.

### **Consequences (for Breaking Rules)**

1. Verbal warning.
2. 10 push-ups and/or a written warning.
3. Call to parent and/or 20 push-ups.
4. Suspension from team and call to parents.
5. Expulsion from team.

## **In Case of an Emergency:**

### ***Earthquake:***

1. If you are indoors, then quickly get under a stable surface like a table and cover your head and neck
2. Stay away from dangerous object that could fall, like tools, drill presses, etc.
3. If you are outside, move away from buildings, poles, etc.
4. After initial shock, evaluate the situation. If necessary call 911.
5. Be prepared for aftershocks.
6. If necessary, evacuate the building and go to the designated safe spot. This spot must be at least 50 feet away from buildings, poles, or other structures.
7. Do not return to the building unless instructed to do so.

### ***Explosion or similar incident:***

1. Immediately take cover under tables, desks, or other object that give protection from broken glass and/or debris.
2. After the effects of the explosion subside, call 911.
3. Evacuate the immediate area of the explosion and go to a safe spot that is at least 300 ft away from the affected area.
4. Do not touch anything that looks suspicious.
5. Stay away from anything made of glass or other breakable materials.
6. Do not re-enter the building unless instructed to do so.

### ***Fire:***

1. Know the location of all fire extinguishers and how to use them.
2. Activate the building alarm or call the fire department.
3. for minor fires that appear controllable, promptly direct the fire extinguisher at the base of the flames. Get help if necessary. Do not take any unnecessary risks.
4. for larger fires that are not controllable, after trying the fire extinguisher, close all doors to confine the fire. Do not lock them.
5. Evacuate the building by quickly walking. Assist people who need help.
6. Once outside, move to a clear area at least 50 feet (or more) away from the fire.
7. Do not re-enter the building unless instructed to do so.

### ***Medical Emergency:***

1. Ask the victim “are you okay?” and “what’s wrong?”
2. Check breathing and pulse. Give artificial respiration or CPR if necessary and if you are certified by the Red Cross. Call 9-11.
3. Control serious bleeding by applying direct pressure to the wound.
4. Keep the victim still and comfortable. Have him/her lie down if necessary.
5. Try to determine the extent of the injury or the probable cause of illness.
6. Protect the victim from disturbances.
7. Look for emergency ID, gather information from witnesses and give all information to emergency response personnel.

***Violent or Criminal Behavior:***

1. Do not take any unnecessary chances.
2. notify the police immediately and supply them with the following information:
  - a. your name
  - b. the nature of the incident
  - c. location of the incident
  - d. description of the person(s) and property involved
3. Assist the police officers involved when they arrive by supplying them with any additional information.

***Utility Failure:***

1. Keep yourself and others calm.
2. Make sure that there is a flashlight in the room in case the electricity goes out.
3. If there is potential damage to the building, occupants, or if the utility failure occurs after hours, on weekends, or holidays notify the police at 911.
4. Notify the teacher advisor, mentor, and or safety captain and if necessary evacuate the building.
5. If there is a flood, stop using all electrical equipment and evacuate the area. Notify any maintenance people available. If it is serious, call 911.

**When traveling and an emergency occurs, make sure that everyone is accounted for and they are at the designated meeting spot.**

### *Safety captain responsibilities:*

1. Collect Materials Safety Data Sheet logs.
2. Give out warnings and consequences for safety violations.
3. Set up the meeting point when traveling in case of an emergency.
4. Give out copies of the safety manual.
5. Give test on safety procedures and manual.
6. Collect list of names and cell phone numbers.
7. Bring all materials on the competition safety checklist.

### *Competition Safety Checklist:*

1. First Aid Kit
2. waterless hand cleaner
3. extra OSHA Z87+ approved safety goggles
4. Safety Manual
5. Hair ties
6. list of people's cell phone numbers
7. gloves
8. Paper towels
9. Small broom