



FOR INSPIRATION AND RECOGNITION OF SCIENCE AND TECHNOLOGY

# **The Red Hot Chili Bots**

## **FRC-4453**



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## Safety Manual Rules:

### Machine Shop Reminders:

- 1) Always wear safety goggles in the tool room
- 2) At least two people (one of which has to be a mentor) need to be present while machines are in use
- 3) Make sure a fire extinguisher is available at all times and know how to use it
- 4) Know where the First aid kit is
- 5) No loose jewelry or long hair
- 6) Don't use a tool unless it is in good working condition and you know how to use it
- 7) Wear closed-toed shoes
- 8) Report any and all injuries to the Safety Captain

### Pit Reminders:

- 1) *Always wear safety goggles while in the pits*
- 2) Clean up pits consistently, not leave tangled cables, loose papers, and aluminum shavings from the pit floor uncleaned
- 3) No loose jewelry
- 4) No open toed shoes

- 5) No running
- 6) Know where your team First Aid Kit is
- 7) Don't use a tool unless it is in good working condition and you know how to use it
- 8) At least one mentor should be present at all times.
- 9) Report any and all injuries to the Safety Captain
- 10) Don't leave charging batteries on the floor
- 11) Inform others around us about safety in simple ways (remind others about glasses, untied shoes, etc.)
- 12) Make sure all people are aware/out of the way of the robot before adding power.
- 13) Long hair must be tied up and out of the way.

#### From Pit to Field:

- 1) Robot lift teams (3 people)
  - One student on each side
  - One student presiding and timing.
  - Be sure to lift using your knees
- 2) Robot transport teams (4 people)
  - Two students guiding both sides of the robot on the cart,
  - One holding the cart's tether,
  - One up ahead to warn people in the robot's path.
  - Be extra careful when crossing bumps or running over cables
- 3) Move the cart out of the way when not in use

#### Shop Safety:

##### Personal Protective Equipment

- Always wear Personal Protective Equipment such as safety glasses, earplugs and a dust mask. (when appropriate)
- Before operating any power equipment, remove all loose clothing and roll up sleeves above the elbows and tie back long hair.
- DO NOT WEAR GLOVES when using rotating or reciprocating machines. (Mechanics gloves may be worn with permission in certain instances)
- Always wear closed toed shoes. Students with open toed shoes will be asked to leave.
- Think through the operation before performing it. Know what you're going to do, and what the machine will do.

### Slips, Trips and Fall Prevention Rules

- Keep the floor around power equipment clean and free of scrap material, sawdust, oil, wax and grease.
- Clean the floors often and pick up items to avoid slips, trips or falls.
- Place cords and vacuum hoses out of the path of travel.

### General Safety Tips

- Give work your undivided attention. Looking around, carrying on a conversation and “horseplay” are careless acts that can result in serious injury.
- Keep the machine guards in place at all times. If the guards are removed for maintenance or any special reasons make sure that you use extreme caution and replace the guards immediately.
- Certain operations may require guard removal-Permission of adult mentors required before machines may be used with guards removed.
- DO NOT overreach. Maintain a balanced stance at all times, so that you do not fall or lean against blades or other moving parts. Always position yourself with the kickback zone in mind.
- Be aware that each tool has a limitation. Use the correct tool. Do not cut smaller or larger material than the tool is designed for. Do not force a tool attachment, guard or hold down to do more than it was designed to do.
- Be aware of the kickback zones. Take every precaution to protect yourself and others around you.
- Always keep your hands and fingers away from blades, rotating parts, pinch points, electrical plugs.
- Maintain safe perimeter zones.
- Never remove small cut-offs, chips or scrap that lie next to any rotating blade or cutter until the blade or cutter has come to a COMPLETE stop.
- DO NOT overreach. Maintain a balanced stance at all times, so that you do not fall or lean against blades or other moving parts. Always position yourself with the kick back zone in mind.
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### Power Tool Rules

- Never leave a power tool or machine running and unattended.
- Make sure that the motor switch is in the OFF position on a power tool before connecting the tool to the power supply.
- Always unplug any tool before changing cutters and blades. Make sure all adjustments and changes are tightened properly.
- Always follow the manufacturer's recommended procedures for any maintenance.
- Always allow the tool to reach its full operating speed before starting the work. Feed the work carefully and only as fast as the machine will cut it easily.
- If a tool is not performing properly, or out of adjustment in some way, shut the power off immediately, unplug the tool and then troubleshoot the problem.

### Hand Tool Safety Rules

- Start a hand saw cut with the dominant hand on the saw handle and position the saw against the thumb onto the mark. When the teeth bite, push downward (or upstroke depending on the saw) to complete the first cut and release pressure on the upward stroke.
- Screw drivers can account for puncture injuries, so do not attempt to hand-hold objects being screwed. If the work is unstable, use a vice, clamp or workbench.
- Razor knives must be closed when not in use
- Replace razor blades when dull or chipped. Never cut toward your body.
- When asked to hand a team member a tool, always hand the tool, never toss, throw or fling a tool.

### First Aid Rules

- The team has several First Aid Kits. Small cuts and punctures may be treated with band aid.
- Cuts should be cleaned with soap and water or alcohol wipes.
- When treating another student. Bodily fluid safety rules must be followed.
- Significant injuries must be reported to team mentors.

### Chop Saw Safety Rules:

- Never alter a guard or use the tool with a guard missing. Be sure all guards are in place and working properly before each use.
- Make sure the blade is clean and sound.

- Set the saw securely on a flat, level surface.
- Start with a Risk Assessment to ensure a safe work area:
- A safe perimeter around the miter saw should be kept clear of people, debris that
- impair traction or footing to avoid slips and falls.
- Safety glasses with side shields and hearing protection must be worn
- Remove loose fitting clothing, jewelry, and tie back long hair.
- Do not wear gloves when using chop saw
- Chop saw blade is for cutting metal. Do not cut wood with chop saw
- Give the work your undivided attention.

- Operational Safety Rules:

- Approach all work in the robot shop & on the miter saw with a safe attitude!
- Concentrate on what you are doing and be aware of kickback.
- Always place the workpiece securely in the clamps
- Remove hands from cutting area
- Depress trigger and gently pull downward to make cut.
- Cutting steel makes significant sparks. Warn other members in shop area when cutting steel
- Never make freehand cuts. Holding the workpiece by hand is unstable and may lead to loss of control and serious injury.
- Never cut small pieces that would require you to put fingers within 3" of the cutting blade without a clamping device.
- Never reach under the saw blade or perform "cross handed" operation.
- When starting saw, allow the blade to reach full speed before cutting; do not force the blade and always start the cut gently.
- Never try to remove or clamp the workpiece to the saw while the blade is rotating.
- Workpiece will be red hot after cutting. Do not touch until cooled down

### Drill Press Safety Rules:

- A two foot perimeter around the drill press should be kept clear of people, debris and sawdust that impair traction or footing to avoid slips and falls.
- Safety glasses with side shields or a face shield must be worn. Hearing protection should be worn.
- Remove loose fitting clothing, jewelry, and tie back long hair.
- Give the work your undivided attention.
- Do not wear gloves or anything that would allow a hand, fingers or clothing to be wrapped around the revolving bit.

- Operational Safety Rules:

- Approach your work in the robot shop and on the drill press with a safe attitude!

- Make all drill press adjustments with the power shut off.
- Keep all guards and covers on the machine when it is on and running.
- Make sure the size of the bit is equal to or less than the capacity of the drill press.
- Do not exceed the recommended speeds for the type and size of drill bit being used or composition of the stock being drilled.
- Center punch the drill-hole location into the stock.
- Insert bit into drill chuck and tighten with the chuck key. Remove chuck key from the drill chuck before starting the drill press.
- Use a clamp or vise to securely fasten the stock to the drill press table. Never attempt to handhold stock while drilling.
- Drill into cylindrical stock using a clamp.
- Support the underside of the stock to be drilled with a backer board secured to the drill press table.
- Make sure perimeter area is clear of obstructions.
- Keep hands and fingers at least 3" from rotating drill bits.
- When drilling deep holes, frequently raise the drill bit from the hole to remove cuttings and cool the bit.
- When you begin to break through the underneath side of the stock, ease up on the feed as to not tear the metal and bind the bit.
- If a drill bit binds, turn off the drill press and carefully turn drill chuck backwards by hand to free the drill bit.
- Never reach around or under a rotating drill bit or grab the chuck to stop a drill press. This can result in hand puncture or other serious injury.
- Turn the drill press off before looking up or walking away from the machine.
- Never stop the rotation of the drill chuck, spindle, or stock rotating on bit with your hands or fingers.
- Drill bit and shavings are hot immediately after drilling.