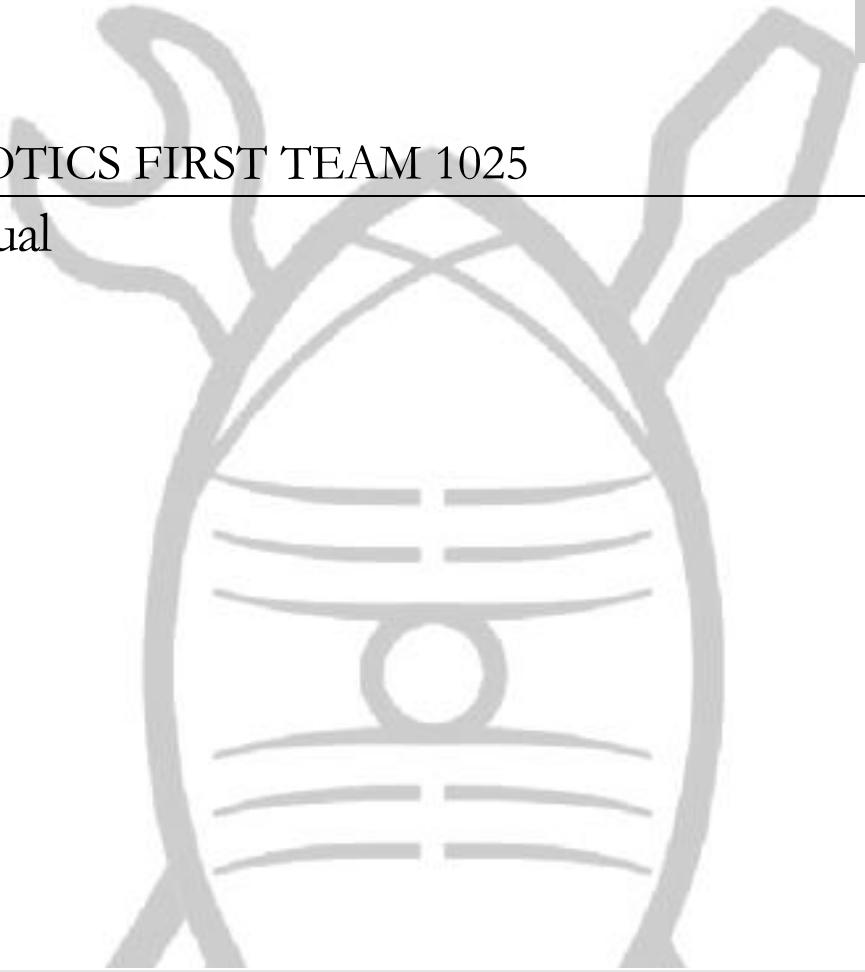
Volume

1

IMPI ROBOTICS FIRST TEAM 1025

Safety Manual



IMPI Robotics Safety Manual

IMPI ROBOTICS FIRST TEAM 1025

Safety Manual: Volume One

Ferndale High School
881 Pinecrest • Room 226
Ferndale, MI 48220

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Chapter 1

Personal Protective Equipment

Impi Robotics Personal Protective Equipment Guidelines

All Impi Robotics members are expected to abide by a certain dress and safety equipment code. Impis do not believe in penalization due to forgetfulness and only constant abuse of the code is punished. Members are warned and asked to abide by the code for their own safety.

Dress Code

The Impi Robotics has two dress codes: competition and build. The competition dress code is strict while the build code is more lax. The dress code is not meant to impede upon the students creativity, but to encourage team spirit and/or personal safety.

Rules

Competition dress code requires all students to wear the team provided shirt or sweatshirt and a pair of long pants. There should be no holes in either the shirt or pants. Closed top shoes are required.

Dress Code

Members are asked to abide by Ferndale High Schools dress code, both during the week, and on weekends. Exceptions are sometimes made for students regarding religion.

- No objects hanging further than 3 inches from the neck (jewelry, key chains, etc.)
- No excessively baggy clothing (we ask that students judge for themselves what is too baggy)
- Legs should be mostly covered with them hem being no higher than 3 inches above knee. No power tools should be used without pants.
- No spaghetti strap, or strapless tank tops.
- Closed top shoes with heels are required (no flats, crocs, sandals, etc.)
- Always wear shoes
- Long hair should always be pulled back
- No hats with protrusions (baseball caps, top hats with wide brims, etc.)

Protective Equipment

All members are required to follow a safety equipment protocol. Protective measures must be taken when handling tools, robots, or in an active zone.

FIGURE 1.1 appropriate safety glasses have very little tint and wrap around to the side of the head

Safety Glasses: Safety Glasses are **required** for all members in an active build zone (in the workshop, members in the office, restrooms, or hallways are not required to wear safety glasses). Glasses should be clean and free of obstruction (stickers, add-ons, dark tint, etc.)

Gloves: When carrying the robot or handling hazardous materials, all members are required to wear protective gloves. Gloves are provided by robotics and can be retrieved from their labeled area in the materials closet or tool box.

Hearing Protection: Ear plugs or ear muffs are recommended when entering loud areas. Ear plugs are provided by the team and can be found in the materials closet or tool box.

Latex Gloves

When using chemicals that are hazardous to skin, latex (or non-latex) gloves are recommended.

Team Safety Is Our Number One Concern!

Proper Up-Keep of Safety Equipment

Safety glasses should be cleaned regularly, and extremely damaged glasses should be thrown out. Ear plugs should be thrown out after use or reused by only the original wearer. Ear muffs should be cleaned thoroughly before changing user. Latex gloves should be thrown out after use or if damaged. Work gloves should be retried from use if they are ripped or torn.

Chapter 2

Injury Care

Proper injury care is essential to a safe environment. Impis pride themselves on being prepared for everything.

Injuries should be handled quickly and carefully. All injuries should be reported to the school, mentors, and to the parents of the injured students. Injury care should be administered by the nearest adult. Students may take over this responsibility if the victim is in immediate danger and if an adult is too far away. An adult should take over as soon as possible. In severe cases, an emergency service should be contacted (Ambulance, fire department, etc.).

Tool Related Injuries

Tools should be handled carefully, but injuries may still occur. It is important to always turn off and unplug the machine, if a power tool, before assisting the victim.

Safe Care

Gloves should always be worn when fluids are involved (blood, saliva, etc.). A facial mask should be worn when handling infectious injuries. Hands should be washed carefully before and after administering care.

Lacerations

When handling a minor cut, emergency medical services do not need to be contacted. Use clean tissue or towel to contain the blood and have the injured party hold the injury tightly to slow down blood flow. Wash the laceration with soap or a cleaning solution. Avoid outside party contact with the wound, and cover the laceration with a bandage. The wounded party's parent or guardian should be contacted by an adult. Always be sure to document the procedure, wound type, victim, and caregiver on paper.

When handling a major or life-threatening laceration, an adult should immediately put on gloves and a facial mask, and begin administering treatment. Another adult (or student, if no adults are free) should contact an emergency medical service. The wounded party's parent should be contacted shortly after, along with the schools facility administrator (principle, dean, etc.). A sign should be hung by the phone regarding location of work zone and where emergency medical services should enter. The caregiver should apply pressure to the wounded area, until emergency services arrives. Continue talking to the victim and if the injured party loses consciousness document the time so you can tell emergency services the duration of unconsciousness. The caregiver should remain with the injured party until a parent or guardian arrives. The injury, procedure, injured party, and caregiver should be documented on paper.

Burns

For all burns, first determine the degree of the burn. If the burn involves more than 3 inches of a joint, the face, hands, feet, or explicit area, always call emergency medical services. First degree burns show symptoms of swelling, minor pain, and a reddish skin color. Second degree burns show symptoms of blisters, an intense red or splotchy color, and severe pain and swelling. First and Second degree burns should be treated as minor burns unless the burn involves more than 3 inches of a joint, the face, hands, feet, or explicit area. Third degree burns include symptoms of a charred black or dry white appearance of skin, difficulty of breathing, and a lack of pain (indicating nerves have been destroyed). Always call medical services in a case of a third degree burn. Treat large areas of minor burns or third degree burns as major burns.

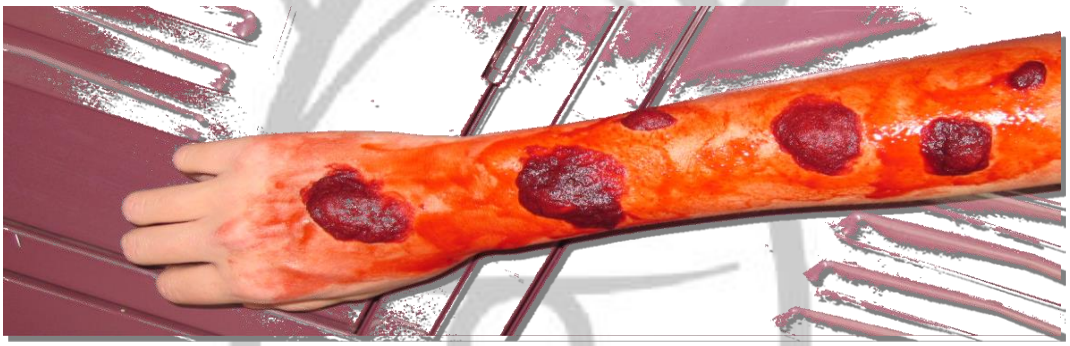


FIGURE 2.1 burn care should be administered quickly and by an adult

Minor Burns: The caregiver should avoid direct contact with the affected area of the injured party. The burn should be cooled with room temperature, **not cold**, water. Cover the burn with a sterile bandage. Contact the parent or guardian of the injured party as soon as possible. Document the inured party's name, the care procedure, the caregiver, and the injury on paper. **Over-the counter pain medication can be used, but not administered by another student or an unrelated adult.**

Major Burns: **Call and Emergency Medical Service immediately** and a parent or guardian of the injured party. Do **not** attempt to remove clothing or material around the burn, but be sure to extinguish smoldering materials**. Do not submerge the burn in cold water.** Use a cloth with room temperature water to extinguish materials. Check to make sure the victim is breathing, if not administer CPR. Elevate the burned area above heart level if possible. Cover the burned are with a sterile bandage dosed in cool or room-temperature water until emergency medical services arrives.

Do Not:

- Use cold water to cool the burn
- Administer an antibacterial ointment to the burn
- Administer ice
- Break blisters

Note

Burns are easily infected so always wear gloves and wash your hands before administering care

Dislocated Bones

A dislocated bone may present with all or little symptoms. The injury site will always be at a joint. The injury site may appear discolored or swollen. Often the area will be visibly deformed or completely or partially immovable. The wound can be incredibly painful or numbness will present around the joint. A tingling sensation is commonly reported. If the injury presents itself, do not attempt to move the joint and icing can help. Call the parent or guardian of the injured party and recommend seeing a doctor. The student should be sent home until symptoms disappear. Document the inured party's name, the care procedure, the caregiver, and the injury on paper.

Fractured Bones

Symptoms of a bone fracture include a visible deformation of the limb, swelling, redness, bleeding, pain, immobility, limited mobility, and numbness. In the case of a bone fracture, keep the person still and call the parent or guardians of the injured party. Do not administer care unless the bone penetrates the skin. In case of skin penetration, contain the blood and apply mild pressure the area. Cover with a sterile bandage and call emergency medical services immediately. Always try to immobilize the area if possible using a sling or splint. Ice can be administered to reduce pain. Document the inured party's name, the care procedure, the caregiver, and the injury on paper.

Eye Injuries:

Even if you are wearing safety glasses, injuries can occur. Small flying debris can enter your eye. When this happens, **do not** rub your eyes and seek medical attention immediately from an adult. The parent or guardian of the injured party should be contacted as soon as possible. Saline solution should be administered **if the parent or guardian approves**. An eye wash station, if available, can be used. The injured party should be sent home for the rest of the day, or until the injury is resolved. Document the inured party's name, the care procedure, the caregiver, and the injury on paper.

Head, Back, or Neck injuries

Always call Emergency Medical Services immediately if the back, head, or neck is severely injured. Injuries may include severe blows or falling on the areas. The person should not be moved and the parent or guardian of the injured party should be contacted. Cover the injured party with a blanket or coat. If the injured party loses consciousness document the time and inform the emergency medicine provider of how long the injured party has been unconscious. Document the inured party's name, the care procedure, the caregiver, and the injury on paper.

Pre-Existing Conditions

Pre-existing conditions such as epilepsy (seizures), asthma attack, allergic reaction, and diabetic shock may need treatment during the season.

- **Seizures:** Remove hard objects from around the injured party and cushion the head. Call the parent or guardian of the injured party. Contact Emergency Medical Services. After the seizure subsides, place the injured party on their side to aid breathing. Do not restrain or attempt to move the injured party. Do not give the injured party water or food until fully recovered from seizure. Document the inured party's name, the care procedure, the caregiver, and the injury on paper.

- **Asthma Attack:** If the injured party has an inhaler, locate and retrieve it for them immediately**.** If the sufferer does not have an inhaler, or the attack continues after treatment, call Emergency Medical Services immediately. Remain calm and have the sufferer sit down. Put a warm cloth on the outside of the throat, and offer a warm stimulant such as coffee if the sufferer it still able to drink safely. Call the parent or guardian of the sufferer as soon as possible. The student must be sent home for the rest of the day. Document the inured party's name, the care procedure, the caregiver, and the injury on paper.

- **Allergic Reaction:** Use an EpiPen according to instructions if the sufferer is carrying one. Drugs should never be administered if not brought by the sufferer or an immediate family member. Call Emergency Medical Services and the parent or guardian of the sufferer as soon as possible. Document the inured party's name, the care procedure, the caregiver, and the injury on paper.

- **Diabetic Shock:** Give the sufferer a form of sugar (fruit juice, candy, etc.) and call the parent or guardian of the sufferer as soon as possible. The student should return home for the rest of the day. If the sufferer's heart rate is severely accelerated, their pulse is weak and slow, or the sufferer loses consciousness, call Emergency medical services and a parent or guardian immediately. Document the inured party's name, the care procedure, the caregiver, and the injury on paper.

Chapter 3

Safety Inspection Guidelines

Guidelines for a Safety Captain Inspection

The Safety Captain should perform weekly inspections on the work area. Safety concerns should be noted on paper, and addressed immediately.

Tool Safety

The Safety Captain should inspect all the power tools for damage that could potentially pose a safety concern. All power cords should be in good condition without exposed wires. Safety posters reminding students of safety precautions should be in easily visible areas by tools. All tools should be stored in safe areas while not in use. Cases should be used for any tools with sharp edges. The cords for smaller power tools should be protected from sharp objects and small debris.

Battery Safety

Batteries should have no exposed wires. Battery chargers should only be operational during times when members are present. Batteries should have no severe damage, deep gashes, or cracks. Batteries should be disposed of safely.

Chemical Safety

Spray paint, coating and other airborne chemicals should be used in a well ventilated area. All chemicals should have a chemical safety sheet accompanying it. Gloves should be available for those handling chemicals, along with masks.

Electrical Safety

Outlets should only have one power strip, and power strips should only be turned on while members are present. All machines should be unplugged when members are not present. There should be no exposed wires. Battery chargers must be placed in well vented areas.

FIGURE 3.1 Did you do your safety check?

Pit Safety

Make sure all team equipment is within the designated team pit area. All the aisles should be clear. All power cables should be tapped down and the area should be free of tripping or slipping hazards. All materials should be stored in an orderly fashion. The pit should be no taller than 10 feet. Work surfaces should be neat and uncluttered.

Personal Protective Equipment

Personal protective equipment should be available to everyone in the active work zone. All members should be wearing safety glasses in active work zones. Gloves should be worn when lifting or moving the robot. Personal Protective Equipment should be stored in an area free of debris that could scratch or tear it. Broken or impedingly damaging equipment should be thrown out.

Stored Energy Dangers

Make sure pneumatic air pressure is released and the robot is turned off before moving. Unplug the battery before working on the robot.

Note

Checking for dangers before performing tasks every day is recommended.

Addressing Safety Issues

Safety Issues should be addressed quickly. Equipment must meet safety standards before used again. Everyone must have proper personal protective equipment before working.

Chapter 4

Competition Safety

Competitions are an important time and a great place to show off our improved safety regulations.

Following safety procedures at competition is especially important. As an older team, we have an influence on rookie teams and we want to set a good example. Also, hundreds of people are in a small area, and not only could you be harmed, but due to cramped circumstances, many others could also be hurt.

Pit Safety

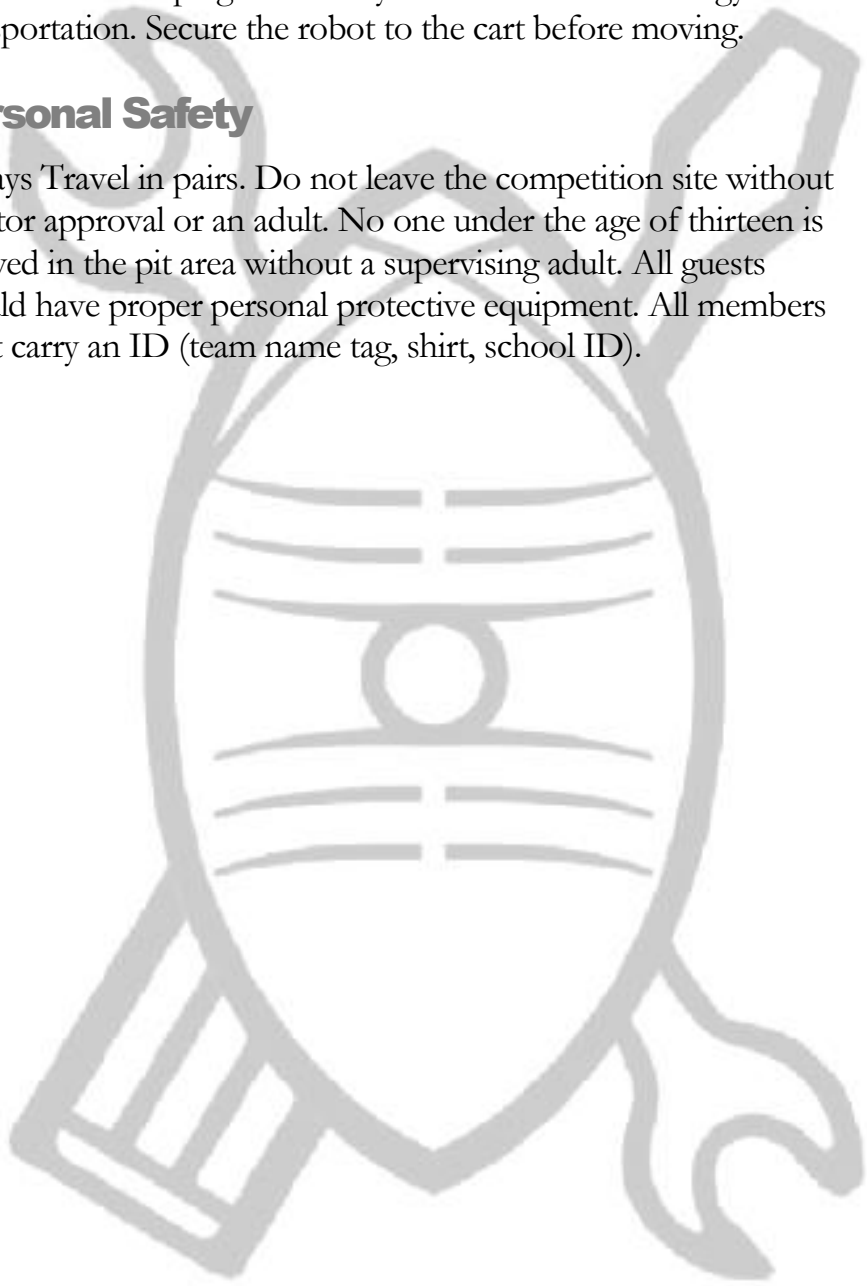
All cords in the pit should be taped down as to avoid tripping or tangling. Cords should be labeled. All cords should be unplugged at the end of the night. Only one power strip should be hooked up to each outlet. Pit decorations should not obstruct aisles or the work zone. All structures in the pit should be steady and not have dangling parts. Work surfaces in the pit should be neat and organized. No more than 6 people, including mentors, should be in the pit at any one time. Food and beverages should not be stored in the pit. Materials in the pit should be neat and organized. The center of the pit should be empty (this is the robot work space).

Robot Transportation

When picking up the robot always use protective gloves. At least two people should lift the robot. Never attempt to lift the robot on your own. Unplug the battery and release stored energy before transportation. Secure the robot to the cart before moving.

Personal Safety

Always Travel in pairs. Do not leave the competition site without mentor approval or an adult. No one under the age of thirteen is allowed in the pit area without a supervising adult. All guests should have proper personal protective equipment. All members must carry an ID (team name tag, shirt, school ID).



Chapter 5

Hand Tool Safety

Hand tools, though not powered, can cause harm when not used properly.

Hammers and Mallets

When using a hammer always make sure that you are wearing the proper personal protective equipment. Make sure all body parts are out of the contact zone. Hold the hammer/mallet at a straight angle and make sure others are out of the swing zone.

Screwdrivers

When using a screwdriver always make sure that you are wearing the proper personal protective equipment. Make sure all body parts are out of the contact zone. Hold the screwdriver at a vertical angle. Do not force the object to turn.

Punches

When using a punch always make sure that you are wearing the proper personal protective equipment. Make sure all body parts are out of the contact zone. Hold the punch at a vertical angle and solidly whack the punch with a hammer.

Wrenches/Ratchet

When using a punch always make sure that you are wearing the proper personal protective equipment. Make sure all body parts are out of the contact zone to avoid pinching the skin. Make sure the wrench is the proper fit. Hold it horizontally to the object you are tightening and turn steadily.

FIGURE 5.1 Wrenches

Ruler

When using a ruler, be sure to wear the proper personal protective equipment. Hold the ruler against the object being measured and mark your spot/line.

Allen Keys

When using an Allen key, be sure to wear the proper personal protective equipment. Always find the properly sized Allen key, to avoid stripping the bolt/screw/etc. Hold the allen key securely in the appropriate opening and turn steadily. Do not attempt to force the object to turn.

Tape Measure

When using a tape measure, always wear the proper personal protective equipment. Secure the hooked end to one side of the object and pull the dispenser slowly to the other side. Mark your spots, and then move the dispenser back towards the hooked end.

Caliper

When using a caliper, always wear the proper personal protective equipment. Set the caliper to zero, and place the bit being measured between the clasp and tighten.

Hacksaw

When using a hacksaw, always wear the proper personal protective equipment. Place one hand on each handle and make sure all body parts are away from the sharp edge, and all others are at least 3 feet from the work space. Tighten the blade and move the saw back and forth steadily along the area requiring cutting. Be sure to cover the sharp edge before returning to storage.

Files

When using a file, always wear the proper personal protective equipment. Properly secure the object that is being filed and hold the file to the precise angle that is desired. Make sure to hold the object and the file itself away from other for others protection.

Scissors

When using scissors, always wear the proper personal protective equipment provided. Make sure not to not put your fingers or other body parts between the blades, for they are rather sharp. Make sure also not to run around or rough housing while having scissors in your possession.

Side Cutter

When using side cutters, always wear the proper personal protective equipment provided. When cutting wires or any substance, make sure that you cut the object away from your face because debris can come flying from any direction.

Wire Strippers

When using the wire strippers, make sure to wear the proper personal protective equipment. When stripping the wires. Secure the wires between the desired nooks in the blade. Close the blades and pull the strippers away from your hand while holding the wire.

Rivet Gun

When using a rivet gun, make sure to wear the proper safety attire. When riveting, make sure that the hole(s) are pre-drilled and that you are holding the rivet gun away from you and others that may in the area of which the tool is being used.

Chapter

6

Power Tool Safety

Power tools are extremely dangerous and should be handled carefully, and only by certified students.

To ensure the safety of all our members, students must go through a six week fall teaching class. Students must show they can safely use all tools before being certified for the season. Students under the age of 12 are not permitted to use power tools.

Hot Glue Gun

When using the hot glue gun, be sure to wear all safety attire that is required. Be sure not to place hand near or on the tip of the hot glue gun for the glue gun may cause up to a second degree burn.

Miter saw

When using the miter saw, be sure to wear all safety attire that is required. Be sure to equip the saw with the proper blade before use. Turn the miter saw on with the hand closest to the power switch and place your left hand behind your back. Lower the blade slowly, and if it doesn't sound right or sparks fly (unless using steel) turn off the miter saw immediately. Do not force the blade down. Metal may be hot after cutting so handle carefully.

Band Saw

When using the band saw, be sure to wear the proper personal protective equipment. Make sure the blade is tight and place the steadier approximately half an inch from the highest point of the material being cut. Make sure your fingers are not in front of the blade. Fingers should be at least 3 inches from the blade at any time. A block of wood can be placed behind a smaller material to accomplish this. Turn on and off the saw with the hand closest to the power switch. Materials may be hot after cutting.

Circular Saw

When using the circular saw, always be sure to wear the proper personal protective. Secure the wood being cut to a stable surface (bench, table, etc.) with clamps. Make sure no appendages are within 6 inches of the blade. Cut the material using a steady pace and amount of force.

Chop Saw

When using the chop saw, be sure to wear all safety attire that is required. Be sure to equip the saw with the proper blade before use. Turn the chop saw on with the hand closest to the power switch and place your left hand behind your back. Lower the blade slowly, and if it doesn't sound right turn off the chop saw immediately. Do not force the blade down. Metal may be hot after cutting so handle carefully.

Heat Gun

Always be sure to wear the proper personal protective equipment. Make sure the plastic being heated is secured to an area where the heat will not affect the surface. Make sure to keep the heat gun pointed away from others and you. Hold the heat gun at the proper angle and use minor pressure to pull the plastic into the desired position. Make sure to keep the heat gun far enough away from the plastic to avoid melting; approximately 8 inches away is the best length.

Jack-Hammer Drill

When using the jack hammer drill, always wear the proper personal protective equipment. Using the jack hammer drill is similar to using a hand drill, but one must use two hands to control the drill. Since one is using both hands on the drill another must hold the piece or pieces that are being drilled.

FIGURE 6.1 JACK-HAMMER DRILL

Soldering Iron

When using the soldering iron, always wear the proper personal protective equipment. When using the soldering iron make sure to heat the area being soldered before applying the solder. Make sure not to hold your hands too close to the area that is being heated for you might end up burning yourself. Do not touch the soldering metal until it is completely cooled.

Hand Drill

When using the hand drill, always wear the proper personal protective equipment. The hand drill is used by holding the drill with one hand on the handle and the other on the back of the drill. The object should be clamped down if necessary. Make sure that others are clear of the area that is being drilled. Cover up all things that may be affected by the shards of metal or other material.

Steel Grinder

When using the steel grinder, always wear the proper personal protective equipment. When using the steel grinder make sure that the area is clear due to the sparks that occur. Do not use aluminum on the steel grinder for it might melt. Make sure the sheild is in place and he material rest is used.

Belt Sander

When using the belt sander, always wear the proper personal protective equipment. Hold the piece that is being sanded with vice grips if necessary. Make sure that what you are sanding is not made out of steel, for sparks will occur which is not only dangerous to you and your peers but also could cause damage to the belt sander.

Drill Press

When using the drill press, always wear the proper personal protective equipment. Make sure before drilling that the object is secured to a stable surface. Make sure your hand is away from the drill bit when the drill is turned on. Make sure the bit is tightly secured in the drill press. In the smaller drill press, do not use bits over 1/4 inch. Turn on and off the drill with the hand closest to the switch.

Chapter 7

Practice Field

The practice field is a courtesy extended by FIRST and should be treated with respect.

The practice field is an area provided by first with practice equipment that can be used by any team.

Robot Safety

The robot must always be tethered and wireless information may not be transmitted at risk of interfering with competitions. The robot must always be monitored by a team member and a mentor. The robot must be turned off before leaving the practice field.

Time Limit

Teams should spend a maximum of ten minutes on the practice field. If a long line has formed, teams are asked to only spend as long as needed on the field. Do not perform maintenance while on the field.

Chapter 8

Robot Transportation

Robots must follow a set of rules while being transported to and from the field.

Robots must be transported on a rolling cart to and from the field. All stored energy must be released before transport. The cart must be no bigger than 40 inches by 40 inches. It must be able to support the robot from the frame. During transport, warn others to avoid hitting them. Typically "Robot" is yelled. Transport must be done by a mentor and at least one student.

Chapter 9

Safety Issue Recognition

Safety issues can be pointed out by any members or mentors.

Safety issues should be addressed quickly. If an issue is recognized, the proper form should be filled out and submitted to a mentor or safety captain.

Safety Issue Recognition Timeline

Any forms filled will be read each Thursday and addressed in the next ten days. Forms should be reviewed at least once a week. All forms should be kept on record. All problems should be addressed within ten days. If the problem has not yet been addressed, remind the safety captain AND inform a mentor.

Chapter 10

Safety Captain Responsibilities

The nominated Safety Captain has a set of eight responsibilities.

A Safety Captain will be nominated pre-season each year by mentors. Nomination will be based purely off ability and knowledge. All team members should be aware of who the Safety Captain is. Safety Captain's are expected to complete his weekly responsibilities. If the Safety Captain fails to perform multiple times, mentors can replace the Safety Captain. The Safety Captain has nine weekly responsibilities.

Weekly Responsibilities

1. The Safety Captain should complete all Medical Record forms.
2. The Safety Captain should address all recently submitted Safety Issue forms.
3. The Safety Captain should complete a weekly safety check.
4. The Safety Captain should update the Impi Robotics Safety Manual
5. The Safety Captain should clean all Personal Protective Equipment.
6. The Safety Captain should check that all members are wearing their personal protective equipment.
7. The Safety Captain should teach new members, and members needing a refresher, all safety rules.
8. The Safety Captain should check that all health care and safety items (bandages, eye wash stations, fire extinguishers, etc.) are available and clean.
9. The Safety Captain should file all submitted Medical Record, completed Safety Issue, and Weekly Safety Check forms

Chapter 11

Fire Safety

All members should know what to do in case of a fire

There are three stages of fire, and all members should know how to act accordingly for each stage. A sign marks the location of the fire extinguisher. If anyone is burned, please refer to the injury guide.

Stage One Fire

Stage one refers to a small fire that can be extinguished by a mentor or older high school student. A stage one fire usually covers less than 2 feet of area. A stage one fire also includes smoldering surfaces. In case of a stage 2 fire, pull the fire alarm and a responsible adult or someone over the age of 16 may put out the fire, all others should leave the immediate area.

Stage Two Fire

A stage two fire is a fire that covers more than two feet of area and is producing immense heat and an abundance of smoke. During a stage two fire, pull the fire alarm and only adults may use a fire extinguisher (unless it is unsafe). All students must exit the building.

Stage Three Fire

A stage three fire produces an unsafe amount of smoke (making the entire room hazy and breathing difficult) and a dangerous level of heat. During a stage three fire, pull the alarm and adults and students should exit the building.

**Mentors should use the PASS rules for the fire extinguisher: Pull, Aim, Squeeze, Sweep.*

Chapter

12

Material Safety

Metals, Wood, and Chemical Safety

Materials can present their own safety issues. Wood, Metal and Chemicals all have their own set of dangers.

Metals

All metals should have sharp edges sanded down. Metals may be hot after handling with power tools. Metal Shavings can puncture the skin. Metal shavings should be swept up and disposed of at the end of each night.

Wood

Wood should be sanded down. Splinters can occur. In the case of a splinter (in a non-vital area), give the injured party the option to remove at home. If the injured party wishes to remove it immediately, use tweezers to pull out. If the splinter is too deep, soak the injured area in water before attempting to remove. Small chunks of wood and saw dust can get in your eyes.

Chemicals

With all chemicals, be sure to use in a well ventilated area. Be sure to address safety issues relevant to the specific chemical being used. With all chemicals, use a mask to prevent inhalation and avoid direct contact with the skin.