



CHILL OUT

FRC TEAM 1778
Safety Manual

1778

CHILL OUT

Preface

The 1778 Chill Out safety program is designed to create habitual safe practices for all team members, as well as create a safe environment and space for everyone involved. This includes not just physical safety but mental safety as well. Safety is one the most important things to consider as a robotics team, and something that needs to be understood and practiced by all of our members. The Safety Captain supervises the safety program and the shop during build season to make sure safety procedures are being followed. Other qualified members of the team can fill in for the Safety Captain if they are predisposed, absent, or need help. 'Qualified' means that they have read the full safety manual, is an advocate of safety in the shop, and has at least one year of experience in FRC.

Every year, all team members are required to pass multiple safety tests in order to use the basic shop machinery. In order for a team member to use specialty machines, however, they must have significant training and time on the machines, then be approved by the manufacturing lead. This is covered in Section 1 in *Acknowledge Any Dangers*, item c. This system is designed so that basic tools are easily accessible and are taught to all members and specialty tools can be used by people who have had practice with those tools and are consistently safe with them.

Chill Out's goal is to maintain safety through an understanding of the rules, an enforcement of safe practices, and proper preparation for any accidents or emergencies. If someone doesn't understand why they should roll up their sleeves when operating power tools, why would they? If safe practices are not enforced, they do not become habitual. Once students understand why the rules are in place, they're more likely to follow them. Safety is not about hindering progress, safety is about the way people conduct themselves while making progress.

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Section 1: Safety Program Overview

At Mountlake Terrace High School, we have a large sum of equipment in our shop. This equipment is used on a regular basis by many different groups, including FRC Robotics. While all tools are well maintained, there are still many situations that can be harmful. The unsafe practices in the MTHS Shop are caused by a lack of awareness to proper safety protocol, and enforcement of shop rules. The goal of our team is to ensure that all members can confidently enforce shop rules and be prepared for injuries ranging in severity. The goal of the **A.C.T.** Safety Program is to implement safety in the team at all levels. It teaches members about risks and how to be safe, how to prepare for when things go wrong, and how to treat accidents and emergencies calmly and effectively. [The yearly FIRST Team Safety Manual](#) contains official updated information about safety in FIRST.

A

Acknowledge Any Danger(s)

- Identify potentially dangerous activities
- Prepare for performing work safely (research & education)
- Ensure awareness of potentially dangerous activities through safety contract & permission forms

C

Construct a Safety Plan

- Prepare & present safety information
- Ensure training is conducted and learning is demonstrated (e.g. through tests)
- Follow up with observation (periodic checks) and reminders as needed

T

Treat Accidents or Emergencies

- Post emergency contacts
Provide first aid resources
Respond immediately to accidents or emergencies
- Afterwards, complete incident reports and identify Corrective Actions

Acknowledge Any Dangers

In order to be able to adequately prepare for emergencies, one must have a basic understanding of the dangers involved when building a robot or working in a shop. In order to educate not only members of Chill Out but all those who use the MTHS Shop, Chill Out uses a variety of methods. These include, but are not limited to, the following.

a. Safety Contract & Permission Form

All Chill Out members, in addition to passing the MTHS Shop Certification Test, must complete a “Permission Form” before using any power tools in the MTHS Shop. This form includes parent permission for the use of shop tools, student medical information, acknowledgement of risks involved, and the authorization to consent to the treatment of their child in the case of an injury; it is included in the [Chill Out membership packet](#).

b. Safety Presentations and Training

Each pre-season, Chill Out makes sure to train every member of the engineering team on all safety topics and most power tools offered in the Mountlake Terrace High School Shop. There is optional training for specialty machines such as the mill and lathe. The [team safety presentation](#) is given first to the team, which covers all parts of the safety program, including risks and proper precautions. The [machine safety presentations](#) are “show and tell” style where a certified instructor or student manufacturing lead shows a mixture of slideshows and time in the shop in front of the machines. This training includes demonstrating the dangers and safety, functions and usage, and maintenance of each power tool.

c. Safety Tests

After being trained, members must pass all sections of the Shop Certification Test, a test that overviews all concepts reviewed in the presentations, in order to use the power tools. In order to help students study for the certification test, members have access to presentations about machine and shop safety as well as shop safety videos created by Mr. Wilson on each machine in the shop. Each member has unlimited opportunities to retake sections of the certification test in order to ensure that they pass all sections.

d. Approval for Specialty Machines

Once the member has been properly trained for the specialty machines, the manufacturing lead can decide to approve them to use the machines (tracked using a [sheet](#)). The person being approved must have proven they follow safe practices. Before final approval, they must make a part within a certain tolerance safely while being supervised by the manufacturing lead or a related mentor. The specialty machines consist of the lathe, mill, CNC, ShopBot, panel saw, and the chop saw. The saws just have required safety training before approved use, parts do not need to be made.

e. Posters

In order to promote safety within the school community as well as remind team members that it's good to be safe (and how to be safe), Chill Out creates [posters](#) to hang around the MTHS shop that present safety in an engaging but serious manner.

Construct a Safety Plan

After acknowledging the dangers of being unsafe and the various ways to be safe, Chill Out wants students to get a chance to demonstrate that they know how to be safe without creating an emergency situation. This is part of being prepared for an emergency or being prepared to use shop power tools. These safety plans can be adapted to various environments such as homes, classrooms, or machine shops.

a. Safety Checks

The Safety Captain performs weekly (or bi-weekly during build season) safety and tidiness checks of the machine shop and robot room, including all of the machines and workspaces. This is done using the [shop safety checklist](#). If a safety check fails, the [corrective action form](#) must be filled out by the concerned party and the Safety Captain in order to prevent failure of a safety check in the future. Making sure that all of the equipment is maintained and clean is an essential part of having a safe shop.

b. First Aid

In the fall, our Safety Captain thoroughly examines the current robotics first aid kit. Supplies found to be expired or open and contaminated are safely disposed of. The items are documented and listed in the [safety inventory spreadsheet](#) in order to streamline the organization process and to allow for easy ordering. Some years it might be easier to buy new first aid kits, but they must be inventoried each time if so.

Depending on the year, Chill Out might also host a Basic First Aid, CPR, and AED training class at MTHS, taught by certified instructors. This class is open to all Chill Out students, or, depending on the discretion of the supervisors and leadership, a limited number of people from MTHS as a whole.

c. Competition Safety

For competitions, Chill Out creates a safety binder containing this safety manual, the official FIRST Safety Manual for the season, incident reports, and safety data sheets. At the competition, the safety binder and first aid kit are kept in clear view of everyone in the pit in case of medical emergencies. It is also important to remember that not only must our team members keep themselves safe, but other team's members as well. The safety resources in our pit are always free for another team to use in case of an emergency or just to check out for information.

d. Safety Data Sheets

Chill Out makes sure that safety data sheets, documents pertaining to the safety procedures materials and chemicals, are kept every year in a place known to everyone in the shop. Safety data sheets are used to learn proper safety procedures for the chemicals used by Chill Out, such as loctite or spray paint, and outline what not to do when using them and what to do if said chemicals get ingested or in a team member's eyes.

Treat Accidents or Emergencies

In the case of an emergency (which we hope will never happen), students must be aware and prepared. They must know what to do both during and after the emergency.

a. Incident Report and Corrective Action

An [incident report & corrective action form](#) must be filled out each time a member of Chill Out injures themselves or does something dangerous (called a near-miss, when something bad could have happened but didn't).

Documenting and analyzing and preventing injuries and unsafe practices is one of the most crucial parts of being safe. Incident reports and corrective action must be done between the administrators/mentors, the safety captain, and the person who caused the injury or unsafe practice. At the next meeting, the incident report and corrective action will be reviewed with the team. The person that caused the incident must present about what corrective action will be taken. The ACT Safety Program is designed to follow up on safety. If unsafe practices continue to happen without follow up, unsafe habits form, which could lead to emergencies.

b. First Aid Resources

This safety manual and accompanying posters provide information and links on how to treat medical emergencies, minor or major. Links include apps and websites to help with CPR, chemical emergencies, and general first aid.

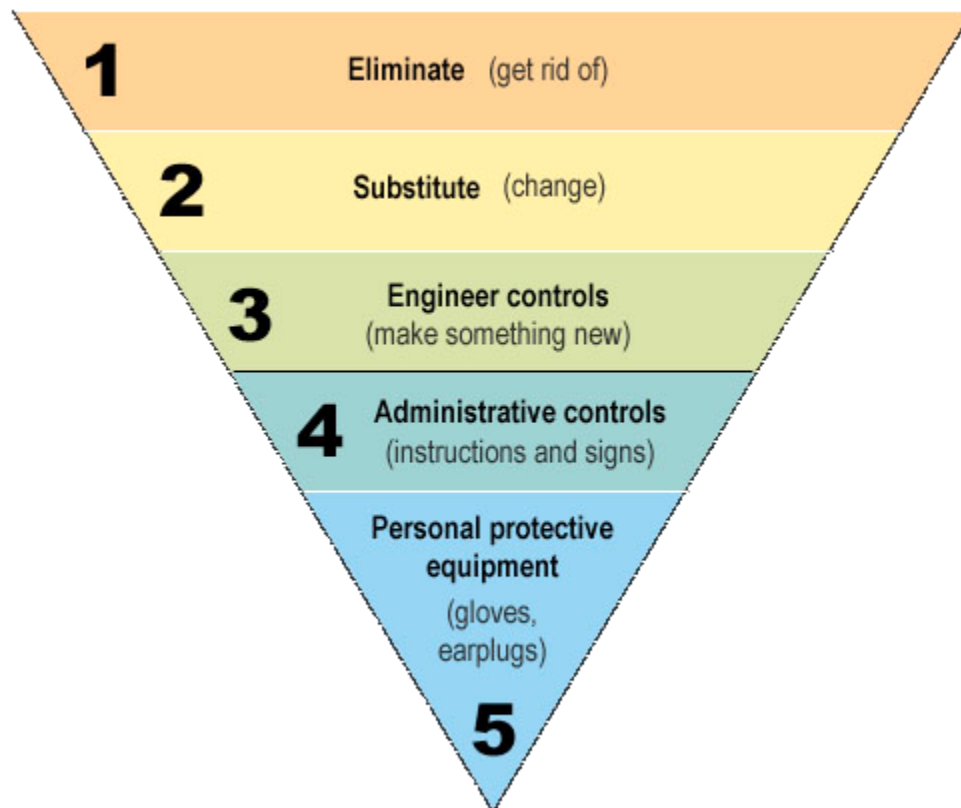
Information on the nearest hospital is included in the MTHS shop, as well as appropriate emergency contacts, and emergency contact information should be compiled for each competition or event by the Safety Captain.

c. Disciplinary Action

Multiple offenses after corrective action has been taken leads to disciplinary actions. These might include: a required apology, loss of privileges, loss of leadership positions, prohibition from participation in competitions, temporary or permanent expulsion from the team, or referral to MTHS administration for further action. This is handled by the mentors; parents are involved at the discretion of the mentors.

Alternate Safety Program/Perspective

This safety program is used by Team 358 The Robotic Eagles. Although worded differently and provided in different steps, it is essentially the same as our own safety program. However, it provides a different perspective that can help members understand the 'order of prevention and protection.'



a. Eliminate safety hazards

Cluttered work areas, out-of-date, pre-safety standard, broken, ill-repaired, jury-rigged, otherwise unsafe tools & equipment.

b. Substitute (change things that aren't currently safe)

Improve lighting around equipment, replace worn bits/blades/cutters/sanding belts/grinding wheels. Replace worn out equipment with newer, safer models. Inspect and repair/replace worn extension & tool electrical cords.

c. Engineer Controls

Maintain equipment, keeping it in good repair. Devise better workshop layouts, raw material storage organization, purchase new tools.

d. Administrative Controls

Devise new safety procedures, install warning signs, operating instructions, develop a maintenance schedule, train people, track training

e. Personal Protective Equipment

Safety glasses, ear plugs, hard hat, work clothing, foot gear, gloves, welding shields

Source: <http://www.team358.org/files/safety/>

Section 2: Safety Management

The safety team is the member or group of members focused on the maintenance and enforcement of safety procedures in the shop, at the practice field, and at competitions.

Safety Captain

The Safety Captain is responsible for:

- a. Supporting the team members in exhibiting safe behavior/practices during meetings and competitions
- b. Managing inventory of all safety and first aid supplies
- c. Maintaining the safety binder and safety manual each year with rules and protocol, as well as understanding all of it
- d. Keeping a cool head during emergencies and treating any injuries or being able to contact someone who can treat the injuries
- e. Conducting safety checks and filling out incident report forms and corrective action forms in the event of injury or unsafe actions
- f. Coordinating safety presentations (with engineering/manufacturing lead)

The Safety Captain, or qualified designee, acts as Pit Boss (AKA Pit Safety Manager) at competitions. 'Qualified' means that they have read the full safety manual, is an advocate of safety in the shop, and has at least one (1) year of experience in FRC.

Pit Boss (AKA Pit Safety Manager)

The pit boss is responsible for maintaining safety and order in the pit and at competitions, including:

- a. Maintaining safety practices and order in the pit
- b. Being in charge of the safety materials, including first aid kit and safety binder
- c. The distribution of safety media
- d. Promoting safety awareness to other teams and event onlookers
- e. Making sure there aren't too many people at a time in the pit
- f. Staying in the pit to keep track of property & answer questions
 - i. This may be delegated to other members of the team in shifts

Safety Captain and other competition roles are redefined in the [team handbook](#).

Section 3: General Safety Rules

Chill Out's objective is to keep its members safe and injury-free. General safety rules are those that are followed everywhere in the shop, regardless of which machine or tool is being used. To accomplish this objective, safe behaviors and practices must be established and followed by all members of the team.

General Safety Rules

- a. Follow policy on PPE (detailed in the next section)
- b. Have a positive attitude towards safety, projects, team members, and tools
- c. Communicate ideas and actions thoroughly and accurately to nearby persons using three-way communication
 - i. The sender states his message to the receiver
 - ii. The receiver acknowledges the communication by repeating the critical information in the communication back to the sender
 1. If the receiver did not understand the communication, then he must ask the sender for clarification
 - iii. The last step is the sender confirms the message is correctly understood by the receiver or if it is not understood the sender has to indicate that the message is not understood, and the three-way communication process has to start over.
- d. Discourage horseplay, especially in a working or hazardous environment
- e. Listen to the Safety Captain
- f. Read and understand and follow all of the safety rules outlined in this manual
- g. Keep the workspace clean
- h. Only use machines if you've been trained and certified
- i. Know the name, location, and proper usage of hand tools, power tools, machines, and guides
- j. Use tools safely and properly and encourage others to do the same
- k. Be mindful of your actions, feelings, and attitude as well of those of others
- l. Think and plan ahead to avoid unsafe situations when transporting objects or moving materials in a working environment
- m. Assist other teams and other team members with safety concerns or issues
- n. Request visitors and observers to follow these rules
- o. Be graciously professional with other people - no foul language or slurs
- p. Use common sense

Appropriate Clothing

Baggy clothing, jewelry, and long hair can get caught in the machines. In addition to the specific safety precautions below, tie back long hair or wear a hat with long hair pulled back. More protective clothing, specifically legwear and shoes, should be worn in order to protect from materials (including chips and shavings) as well as sharp edges and power tools.

a. Torso

Loose, baggy clothing, hooded sweatshirts, and apparel with dangling strings or cords are not permitted when using or spectating a person using a machine or tool.

b. Legwear

When using or spectating a person using a machine or tool, the legs and ankles should be covered with appropriate pants and socks.

c. Shoes

When in the shop, pit, or practice field, close-toed shoes (defined as an outer covering of the foot with a stiff sole) must be worn at all times.

- i. Open-toed shoes, slippers, flip-flops, sandals, and high heeled shoes are not allowed
- ii. Steel-toed boots are a good idea, but are not required

d. Jewelry

When working or observing within ten feet of a machine or tool, jewelry of any kind is not allowed.

- i. Specifically jewelry such as items located around the wrist, fingers, and/or neck, can pose a significant danger and have the potential to cause harm to the wearer and others locally
- ii. Studded earrings and watches are an exception
- iii. Preferably leave jewelry at home before coming to FRC

Equipment (Including Machines & Power Tools)

a. Operation

- i. All equipment should be operated in accordance with specifications as stated in the owner's manual (if available)
- ii. Point of operation zones are properly identified and guarded

- iii. Permanent enclosure guards properly protect pulleys, gears, and belts
- iv. Guards are removed only for repair purposes and then replaced immediately
- v. Equipment control switches for each machine are easily accessible to the operator
- vi. Machines are turned off when the machine is unattended

b. Machine Safety

- i. Machines can only be operated by people who have been trained and have passed the shop safety quizzes with 100%
- ii. Specific safety rules and operation are detailed in:
 - 1. [MTHS Shop Safety videos](#)
 - 2. [Machine and Shop Safety Presentation](#)
 - 3. [Lathe Presentation](#)
 - 4. [Mill Presentation](#)

c. Maintenance and Environment

- i. Machines and apparatus are arranged so that operators are protected from hazards of other machines or passing individuals
- ii. Proper cleaning equipment is used (avoid compressed air for cleaning purposes)
- iii. Non-skid (no debris on the floor to slip on) areas are maintained around dangerous equipment
- iv. Cutting tools are kept sharp, clean, and in safe working order
- v. Machines that are defective or being repaired are clearly marked and made inoperable by unplugging the machine
- vi. Equipment cords and adapters are maintained in a safe working condition
- vii. Adjustment and repair of any machine is restricted to experienced persons
- viii. Machines designated for fixed location are securely anchored

d. Hand Tools

- i. Instruct students to select the right tools for each job
- ii. Before using any tool, check to see if it is in good condition. Don't use defective, dull, or broken tools. Don't put them back on the shelf;

- remove them from service and notify the mentor so the tool can be replaced or sent for repair.
- iii. When using a tool, place the work on a bench or hard surface rather than in the palm of your hand
 - iv. Wear cut resistant gloves when necessary
 - v. Instruct students in the correct use of tools for each job
 - vi. Tool Storage:
 - 1. Keep the sharp-edged or pointed tools, power tools, and any other hand tools in the proper storage (cabinets and carts)
 - 2. Do not lay tools on operating machinery or equipment
 - 3. Don't leave tools on overhead work surfaces. They may fall and strike someone below.
 - 4. Keep tools out of aisles and working spaces where they may become tripping hazards
 - 5. When carrying tools, cover the point or any sharp edges with shields.
 - 6. NEVER carry sharp objects or unshielded tools in your pocket. This could result in cuts or being stabbed
 - 7. Store equipment in a location where it will not create a safety hazard or get damaged.

Robot Repair Rules

- a. Always follow guidelines on appropriate clothing and PPE (see Section 4)
 - i. Safety glasses, gloves if lifting is required
- b. Communicate with everyone and inform them when the robot is on or about to move
 - i. Stay out of the path of the robot and its moving parts
 - ii. Keep fingers, hair, tools, and wires out moving parts and pinch points
- c. The robot should be lifted up off the table or surface with blocks or a suitable replacement, as long as it is stable
- d. Never work on the robot when it is powered on or activated; always de-energize the robot before working on it by opening the main circuit breaker ("re-set" lever is released) and unplugging batteries.
 - i. Consider placing the battery on a separate table or on the battery cart if cutting near it.

- e. Always vent any compressed air to the atmosphere (this applies to all parts of the pneumatic system)
 - i. Open the main vent valve and verify that all pressure gauges on the robot indicate zero pressure
- f. Relieve any compressed or stretched springs or tubing
- g. Lower all raised robot arms or devices that could drop down to a lower position on the robot
- h. Frequently check the robot for sharp edges and pinch points and ensure they are properly labeled or remedied

Section 4: Personal Protective Equipment

Personal Protective Equipment, abbreviated as PPE, must be worn by all team members to protect themselves when engaging in actions with risks involved. The required PPE is specific to the dangers associated with the task. The wearing of PPE is enforced by the Safety Captain primarily, but everyone is responsible for each other. If one person sees another without proper PPE, they must tell them to put it on or fill out a corrective action form with the Safety Captain if they do not comply when asked. PPE is meant to protect all parts of your body when using tools, machining, or even being in a work environment with risks around you. It is the most important part of keeping yourself and others safe when working. When dealing with chemicals, follow the related safety data sheets for information on proper use of PPE.

a. Eye Protection:

- i. Safety Glasses with side shields are required in the shop and the pits at competition. They must be ANSI-approved, UL-Listed, CE EN166 rated, AS/NZS certified or CSA rated. Reflective lenses are prohibited; your eyes must be clearly visible to others.
- ii. Safety Glasses are considered “worn” when they are located in a position in which projectiles will not cause damage to the eye from most angles
- iii. Safety Glasses must have no added tinting to the lens which would result in a loss of eye contact between the wearer and others
 1. Eye contact ensures that actions have been communicated and that the user is listening
 2. Only clear and yellow tinted (as long as approved by the Safety Captain) safety glasses are allowed
- iv. Chemical splash goggles are required within 10 feet of exposed chemicals
- v. Safety Glasses are also required within 10 feet of or when doing any work on the robot including grinding, drilling, soldering, cutting, welding, etc
 1. Also when there is a risk of exposure to flying particles or chemical exposure (such as splashes, splatters, and sprays)
- vi. Prescription Glasses:

1. If you wear prescription glasses that do not have a marked safety rating, you must wear rated safety goggles over them to achieve adequate protection
 2. If you wear marked safety rated glasses, you may use ANSI-approved, UL-Listed, CE EN166 rated, AS/NZS certified or CSA rated side shields
 3. Safety rated glasses, side shields and frames can be identified by markings stating the standard that they are rated to (ex. Z87.1).
- vii. At FIRST events, wear eye protection
1. Anywhere in the pit station including walkways and team pits
 2. Near the arena, including the playing field
 3. On the practice field
 4. Any area posted with signs requiring the use of eye protection (such as the machine shop).

b. Face Protection:

- i. Safety glasses and dust masks are required for all power chipping, grinding, and sawing
- ii. Safety glasses, masks, and when applicable, face shields are required when handling molten plastic, caustics, and other molten materials

c. Hearing Protection:

- i. Hearing protection includes earmuffs and disposable foam earplugs, available on the top of the red cart
- ii. In any area where noise levels exceed 80 dBA, hearing protection is required. If in doubt, use hearing protection.
- iii. In any area where exposure of 75-79 dBA exceeds 8 hours a day, hearing protection is required
- iv. Hearing protection is required within fifteen (15) feet of any chop saw, reciprocating saw, and circular saw

d. Hand Protection:

- i. Plastic or rubber gloves are required when handling solvents, acids, or chemically treated material
- ii. Latex gloves are required when working with an injured person or when working with bodily fluids

- iii. Different chemicals require different materials and procedures
 - 1. Before handling chemicals, check with a mentor or the Safety Captain to make sure the right equipment is being used
- iv. (See hand protection measures for carrying the robot in Section 5)

Section 5: Lifting Objects

Lifting objects can pose a great safety risk, both short term and long term. If not done properly, things can be dropped, which could cause injury or monetary loss to the team, and back problems may be developed in the future. To counter this risk, rules and tips for lifting correctly and safely have been outlined.

Rules of Lifting

1. Always plan ahead on what will be done with the robot or its carrier after it has been lifted; communicate with lift partners
2. Always use proper body mechanics when lifting the robot or any heavy object
3. When lifting objects with hard or sharp edges, wearing gloves is required
 - a. This prevents many types of finger and hand damages from occurring
4. Estimate the weight of the object by tilting it up slowly
 - a. If it is hard to move, it is too heavy to lift
 - b. Find someone to assist you in your lift, or use a lifting aid
 - c. Lift objects with two hands preferably
5. Two people carry long pieces of materials
6. Keep the object you are lifting as close to your body as possible
7. Avoid twisting your back as you lift. Instead, move your feet to turn.
8. Keep a firm footing and plan your route to avoid tripping hazards
9. When possible, attach handles and caster wheels to heavy or awkward objects
 - a. Objects with lifting handles and caster wheels can make the job easier and reduce the strain on your back

Body Mechanics

1. Use proper muscle groups and distribute the workload
2. Pushing is preferred to pulling
3. Leg muscles are used to lift heavy objects rather than back muscles
4. Bending and unnecessary twisting of the body for any length of time is avoided
5. Bend knees, *not* back when lifting up robot
6. Do not twist your body
7. Lift evenly with lift partner

Section 6: Electrical Safety & Batteries

Electrical safety is yet another extremely important thing to keep in mind when working in the shop and with robots we create. There are not only risks involved in the electrical preparation and operation of the robot, but also in using wires and power strips and really any electrical cables or components. To deal with these risks, the following safety procedures should be followed any time electronics are being used or dealt with.

General Electrical Safety

a. Tips

- i. Keep an eye out for electrical problems or symptoms of poor electrical management
 - Dimming of lights, blown fuses, frequent circuit breaker trips, etc.
- ii. When supplying additional light to an area, be sure to use light bulbs that are of the proper wattage for the fixture
 - Degraded wires in and around the fixture can be a tell tale sign that the bulb wattage is too high

b. Electrical Cables, Power Surge Protectors, Extension Cords

- i. Only use products that meet current industrial safety standards and have a certification label from an independent testing lab (Electrical Testing Laboratories, Underwriters Laboratories Inc.)
 - Inspect the underside of the casing and make certain that it is marked with the manufacturer's name and testing lab
- ii. Only use electrical products that have grounded three pronged plugs, or polarized plugs with one blade slightly wider than the other, as this feature is known to reduce the risk of electrical shock
- iii. Insert power prongs fully
 - No part of the prongs should be exposed when the cord is in use
- iv. If using extension cords outside, ensure that it has been intended to be used outside and is properly safeguarded to prevent shock
- v. Never cover any part of an extension cord with rugs or other objects that are not specifically designed to contain wires while in use

- Covering the wires prevents heat from flowing away from the wires and has been known to cause fires
- vi. Do not plug too many devices into one power cord
 - Disperse power sources by plugging different devices into different power cords
- vii. Make sure that cords do not hang loosely or dangle from shelves, counter tops, work benches, or table tops
 - The cord might come in contact with another metallic surface and increase risk of shock, or pose a tripping hazard if accidentally pulled down.
- viii. If a cord feels hot to the touch, discontinue its use and dispose of it
- ix. Replace damaged, kinked, cracked, worn, and mangled cords with new, inspected, properly rated cords
- x. Never assume that a power cord is electrically insulated and always use caution when in contact with a power cord
- xi. Be aware of the fact that electrocution can occur in other ways than by touching a power cord directly
 - Contacting a conductive material that is in contact with a power cord can also result in electrocution

c. Lithium-Ion Batteries

Lithium-ion batteries are used in a variety of equipment and require attention to minimize hazards. Lithium-ion batteries can be forced by misuse, physical abuse or improper handling into a failure mode called thermal runaway, which can cause fires or explosions.

- i. Use batteries or battery packs that are UL certified for safety
- ii. Purchase batteries (including replacement batteries) from the original equipment manufacturer or from a reputable source. Purchasing batteries over the Internet from unknown sources at exceptionally discounted prices can be an indication the product is not authentic. Avoid products with minimal packaging, no branding, or no documentation
- iii. Avoid crushing, bending or severe impact to lithium-ion batteries, battery packs and batteryoperated devices. Avoid excessive vibration of lithium-ion batteries
- iv. Do not expose lithium-ion batteries to high temperatures

- v. Always use the correct, compatible charger to safely charge your batteries
- vi. Avoid excessive or prolonged charging. Inappropriately charging a battery can lead to irreversible changes that may reduce life or possibly lead to failure. It is best to re-charge a battery only when it has a low state of charge and then fully charge it to 100 percent
- vii. Do not use or charge battery operated devices if they are surrounded by materials that prevent normal air flow
- viii. Special care should be taken with spare batteries during storage and transport. Loose batteries or the terminals on battery packs can contact metallic items such as spiral notebook binders and cause a short circuit
- ix. Keep batteries out of the reach of small children. Batteries can be a choking hazard. Button or coin cells can be ingested by small children and cause serious internal injuries from chemical burns
- x. Have a class "C" fire extinguisher on hand in case of lithium fires. Note that Lithium fires can include toxic smoke as a result as well and should not be attempted unless the fire is very small and the person is trained in the use of a fire extinguisher.

d. Soldering

Soldering can be dangerous because of the heat from the iron and the chemical fumes and vapors released from the solder and flux.

- i. Use lead-free solder only and solder with electrically heated soldering iron/gun only
- ii. No torches or open flames of any kind are allowed in event venues, except by authorized personnel in specified areas (such as the event machine shop)
- iii. Wear eye and face protection
- iv. Solder in well-ventilated areas
- v. Never touch the iron/gun. It heats to extreme temperatures that will cause severe burns
- vi. Prevent burns by wearing cotton clothing that covers your arms and legs
- vii. No food or drink should be present in the specific soldering area to prevent cross-contamination

- viii. Always wash your hands with soap and water after handling solder
- ix. Work on a fire-resistant surface
- x. Keep your soldering iron in its protective holder when not actually being used
- xi. Do not leave any hot tools where someone can accidentally contact the hot element
- xii. Dispose of solder waste appropriately, even if using lead free solder, it may contain other parts that are considered as hazardous waste.

Robot Battery & Electrical Safety

Batteries are some of the most dangerous and volatile objects we have, so safety procedures for proper storage and use are extremely important.

a. Proper Storage & Handling

- i. Have a set location for robot batteries and create an organized battery charging station/cart
- ii. Place your battery charger in an area where cooling air can freely circulate around the charger. Battery chargers can fail without proper ventilation.
- iii. Do not short out the battery terminals
 - o If metal tools/parts contact the terminals simultaneously, it will create a direct short circuit
 - o This may cause high heat to develop in the battery terminal/part/tool area and the battery could explode
 - o To avoid the possibility of shorting out the battery terminals and creating a hazardous situation it is required to cover all exposed battery terminals and connections with appropriate insulating material such as electrical tape or tubing.
- iv. Do not charge battery at greater than the manufacturer's maximum recommended rate
- v. Never attempt to disassemble batteries or battery housing to prevent accidental puncture
- vi. Never use tools to remove a stuck battery as they may puncture the battery.
- vii. Keep batteries on the battery cart when charging
 - o Keeps them out of the way and eliminates tripping hazards

- viii. Insert plugs into a battery's connector after the battery is fully charged
 - Flag to easily show which batteries are charged
 - Prevent unwanted contact and discharge of the battery
- ix. Keep unused battery plugs near or on the battery cart
- x. Batteries should be carried by the base and sides, not by the lead wires or wire connectors
 - Carrying the battery improperly can result in loose connections or dropping the battery
- xi. Periodically inspect your battery for any evidence of damage, such as a cracked case or leaking electrolyte, or loose connections at the battery posts and at the connector
 - Bent terminals can also be a potential leak source
 - Inspect the battery before and after each round of competition.
 - Loose connections on battery lead wires lose FIRST matches and present an electrical danger to those handling the robot

b. Damaged Batteries & Spills

- i. Team mentors and/or student leads should post the Safety Data Sheet for the battery in use and train all team members about battery safety. You can find emergency handling and first aid procedures on the SDS, along with proper protection for handling cracked or damaged batteries, and information on disposal of the battery.
- ii. Batteries contain acid. This substance, H_2SO_4 , is a corrosive, colorless liquid that will burn your eyes, skin, and clothing.
- iii. Any battery that is visibly damaged in any way is dangerous and unusable. Don't take a chance- don't use it!
- iv. Here are reasons you should not use a damaged battery:
 - It contains stored electrical energy that could cause the battery to rapidly heat up due to an internal electrical short circuit, and possibly explode.
 - The 12V batteries FIRST typically provides in the Kit of Parts contain sulfuric acid that will burn human tissue on contact.
- v. If a battery is damaged, set aside a damaged battery and handle accordingly:
 - Immediately flush any contacted skin with a large quantity of water

- Seek medical treatment
 - Periodically inspect your batteries for any signs of damage or leaking electrolyte
 - Remember that a dropped battery may be cracked, but the crack may not be visible and might eventually leak electrolyte
 - Treat it as a hazardous material and process it in accordance with the battery's Safety Data Sheets (SDS)
 - Don't take a chance- don't use it
- vi. Battery Spill Kit should include:
- A box of sodium bicarbonate (baking soda) to neutralize any exposed acid electrolyte
 - A pair of acid-resistant rubber or plastic leak-proof gloves to wear when handling a leaking battery
 - A suitable non-metallic leak-proof container in which to place the defective battery.
- vii. (Battery spill procedures covered in Section 10 and the SDS)

c. Battery Disposal

- i. Be sure to dispose of all batteries properly and safety
- ii. Most retailers of automotive batteries will accept and properly dispose of them at no cost.

d. Robot Electrical Safety

- i. Make sure the **power is off** on the robot and the **battery is unplugged**
- ii. Before plugging in the battery, make sure all connections have been made with the proper polarity
 - Ideally have someone that did not wire the robot check to make sure all connections are correct
- iii. Know the location and path of all wires and power cords that carry electrical current
- iv. Do not mix and match PWM wires, CAN wires, and power wires
- v. When drilling or doing anything that would produce metal shavings, cover any electronic components
- vi. Cover metal components of the breaker switch with electrical tape
- vii. Secure all components firmly with screws, bolts, or Zipties, and make sure there are no loose connections between wires and components

(Battery spill procedures covered in Section 10)

Section 7: Chemical Hazards

All chemicals in the shop are contained in a chemical cabinet that is kept sealed and locked besides to access those chemicals. Our shop also has a ventilation system which will suck out all harmful chemical gas. We also have proper PPE for usage of all chemicals (see section 4). Chemicals can be extremely dangerous, so all members are made to know what to do when something goes wrong; this includes at least reporting the incident to a mentor or the safety captain.

Chemical Safety

Unless handled and used with rigorous care, all chemicals have the potential to cause injury and illness. For safe, effective use of chemicals, the following guidelines are suggested:

1. Become familiar with every chemical before you use it
 - a. Know what it does and how it does it
 - b. Find out about the specific safety precautions, what protective equipment to wear, signs of illness associated with use, and what to do with empty containers and leftovers
 - c. The label on the chemical container will provide most of the information you need
 - d. All of this will be on the safety data sheets kept by the team
2. Use the least toxic chemical that will still be effective
3. Make sure that everyone in the work area knows the chemical is being used
4. When using a chemical that could harm you if it came in contact with your body, wear personal protective equipment
 - a. Unlined liquid-proof gloves, liquid-proof hat with brim, boots, clothing, chemical goggles, face shields, and an appropriate respirator for the chemical being used
 - b. Dry chemical dust can irritate your lungs and throat
 - i. Handling dry chemicals can dry out and irritate your hands
5. To protect groundwater, be careful of spills when mixing and loading
 - a. If a spill occurs, clean it up and report it promptly
6. Consult the Washington State Department of Ecology for steps on how to safely dispose of empty containers and leftover chemicals
 - a. Don't dump them into any unapproved places where they could pollute groundwater, wells, streams, or harm people and animals

7. With lower toxicity chemicals, less stringent measures will usually suffice, but they must still be adequate
 - a. Follow label recommendations, and limit exposure to any chemical you're using
 - b. If possible, avoid breathing dust, vapors, or spray. Avoid splashes and spills when handling. Don't eat until you've washed thoroughly.
8. If someone is splashed or doused with a toxic chemical or inhales or ingests a toxic chemical, use water to flush immediately, then call the poison control center
 - a. Be ready to tell them what the chemical was and the suspected level of exposure the victim suffered
9. Store chemicals in their original labeled containers and in their proper storage location

Safety Data Sheets & Pictograms

Whenever chemicals are handled, used or stored on the school premises, the mentors and team members should be familiar with the Federal Hazard Communication Standard. Safety data sheets and pictograms are used to communicate the hazards and safety precautions associated with chemicals and materials, and should be followed to protect the team from adverse effects of said chemicals and materials.










- a. **Safety Data Sheets (MSDS or SDS)**
 - i. Includes information such as the properties of each chemical; the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, and transporting the chemical
 - ii. Sections 1 through 8 contain general information about the chemical, identification, hazards, composition, safe handling practices, and emergency control measures (e.g., fire fighting)
 - iii. The shop is required to have a readily accessible file containing safety data sheets for all hazardous chemicals and materials used
 - iv. Safety data sheets can be obtained from the supplier or manufacturer.
 1. <https://chemicalsafety.com/sds-search/>
 - v. OSHA guide to safety data sheets:
www.osha.gov/sites/default/files/publications/OSHA3514.pdf

- vi. Should be kept in the shop and in the safety binder at competitions

b. Pictograms and other Hazard Communication

- i. Used to communicate with simple pictures about the hazards of a certain chemical or material on the label
- ii. OSHA guide to labels and pictograms:

www.osha.gov/sites/default/files/publications/OSHA3636.pdf

<p>Health Hazard</p>  <ul style="list-style-type: none"> • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides 	<p>Exclamation Mark</p>  <ul style="list-style-type: none"> • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> • Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals 	<p>Exploding Bomb</p>  <ul style="list-style-type: none"> • Explosives • Self-Reactives • Organic Peroxides
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> • Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> • Aquatic Toxicity 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> • Acute Toxicity (fatal or toxic)

Flammable & Combustible Liquids

1. Read the manufacturer's label information and SDS before using a product
2. Withdraw only as much material as you will need to complete the immediate operation
3. Always wear proper PPE
4. Wear rubber gloves to minimize chances of skin irritation
5. Wash hands and other exposed skin areas before leaving the classroom
6. Dispose of waste materials in approved containers
7. Use a funnel when pouring into a smaller container

8. Follow instructions for handling and mixing catalysts with resins and finishes
 - a. Never pour catalyst back into the container
 - b. Always add catalyst to resin, not resin to catalyst; add acid to water, not water to acid
 - c. Do not apply resin, paint, or other finishing material near areas used for flame cutting, welding, grinding, soldering, or other high temperature operations
9. Store materials in original containers or approved containers that are properly labeled
10. Store volatile materials in approved fireproof cabinets or specially designed areas
11. Remove clothing that may have become accidentally soaked with epoxy, polyester resins, and other potentially dangerous substances
12. Be certain the fire extinguisher located in the work area is suited for application to a fire caused by the materials being used in the work area
13. If you are unsure of materials or procedures to complete an operation, ask a mentor for help

Some of the more hazardous flammable liquids are listed below in approximate order of hazard.

- Starting fluid
- Gasoline
- Aerosol cans
- Catalysts
- Carburetor
- cleaner
- Acetone
- Lacquer thinner
- Adhering liquid
- Alcohol
- Shellac
- Japan dryer
- Kerosene
- Paint, oil
- Resin
- (polyester)



- Stain/varnish
- Danish oil

Section 8: The Work Environment

The maintenance of a safe and clean shop environment must be strictly enforced by the Safety Captain, team leadership, and the mentors. The last 10-15 minutes of build season meetings or any meetings that have people working in the shop should be dedicated to the cleanup of the shop, led by the Safety Captain. A shop, or any place in which our team is working, must have proper safety materials and be a generally safe environment free of things that might cause unintentional harm.

Facility/Shop Environment

1. Aisles, machines, benches, and other equipment are arranged to conform to good safety practices
2. Stairways, aisles, and floors are maintained, clean, dry, and unobstructed with no protruding objects
3. Walls, windows, and ceilings are clean, maintained in good repair, and free of protrusions
4. Illumination is safe, sufficient, and well placed
5. Exits are properly identified and illuminated
6. Lockers and drawers are clean, free of hazards, and doors kept closed
7. Personnel know the procedures for notification of fire and evaluation of premises
8. Utility lines and shut offs are properly identified
9. Stairways, floor openings, and overhead storage areas are properly guarded with rails and toe boards and have the proper clearances
10. Laboratories and workplaces are free from excessive dust, smoke, and airborne toxic materials
 - a. Ventilation and temperature controls are proper for conditions
11. Fire extinguishers and other necessary fire equipment are properly selected, adequately supplied, properly located, inspected, and periodically recharged as required

Housekeeping/Cleanup Practices

1. Provide for the storage and daily removal of all sawdust, metal cuttings, rags, and other waste materials

2. Provide properly marked boxes, bins, or containers for various kinds of scrap stock and rags
3. Utilize sturdy racks and bins for material storage, arranged to keep material from falling on students and to avoid injuries from protruding objects
4. Employ a standard procedure to keep floors free of oil, water, and foreign material
5. Clean equipment and facilities after each use
6. Prohibit the use of compressed air to clean clothing, equipment, and work areas
7. Keep walkways and work areas free of all obstructions
8. Floor surfaces must be maintained in a "nonskid" condition
9. Tools and materials are stored orderly and safely
10. File cabinets and other tall cabinets are required to be anchored

Harassment

- Any form of harassment will not be tolerated
- Should harassment happen, leadership and/or a mentor should be informed immediately
- Leadership and/or mentors will decide what to do with the student depending on the situation
- Multiple offenses will lead to disciplinary actions
 - These might include: a required apology, loss of privileges, loss of leadership positions, prohibition from participation in competitions, temporary or permanent expulsion from the team, or referral to MTHS administration for further action

Section 9: Event Safety

Safety at events is incredibly important; both for our team and for other teams. Chill Out Robotics makes sure that at any event we go to, safety and professional etiquette is a priority.

Event Protocol

1. Be respectful to other teams at the event
2. Be ready to help other teams if needed
3. Keep focused on the task at hand and do their best to make the event a success
4. Do their best to cooperate with the rest of the teams so that things run as smooth as possible
5. In the case of a fight...
 - a. Call over help and mentors immediately
 - b. Separate the fight if it is safe to do so
 - c. Make sure no robot or equipment was damaged in the process
 - d. Mentors will take necessary disciplinary action

Pit Safety

a. Safety Binder and Supplies

For competitions, Chill Out creates a safety binder containing this safety manual, the official FIRST Safety Manual for the season, at least 5 [incident report forms](#), the [pit safety checklist](#), safety data sheets for chemicals brought to the competition, and an event map.

Safety resources (first aid kit, battery spill kit, masks, PPE, etc.) will be brought in a box to every event. This box is put together by the Safety Captain before the event and contains supplies taken inventory of in the fall.

At the competition, the safety binder and resources are kept in clear view of everyone in the pit in case of medical emergencies. It is also important to remember that not only must our team members keep themselves safe, but other team's members as well. The safety resources in our pit are always free for another team to use in case of an emergency or just to check out for information.

b. Safety Measures and Precautions

- i. Be mindful of tools and robot inside the pit
- ii. The only people in the pit should be members of the safety team, the drive team, and the maintenance crew (members of engineering team that are designated to do checks and maintenance on the robot in the pit after every match)
 - The number of people in the pit should not exceed seven
 - Unless you are specifically needed in the pit, stay out of the way of those working on the robot.
 - An exception is if one of the allowed members lets another person in to be a part of maintenance or to learn a specific thing
- iii. Electrical safety regarding power cords and battery safety is covered in Section 6
- iv. Chemical safety regarding the safety of team members around hazardous chemicals, the use of safety data sheets, and flammable and combustible materials is covered in Section 7
- v. Safety emergencies at the shop or at events, is covered in Section 10

c. Pit Environment

The pit area is the 10 ft x 10 ft space that F.I.R.S.T. provides the team in which to fix their robot. To ensure maximum safety and efficiency, certain rules and requirements are in place. A pit must have a positive and comfortable atmosphere to eliminate as many stressful conditions as possible. A proper pit should include:

- i. Multi-positional lights
- ii. A fan or similar air movement device
- iii. An organized tool box
- iv. An organized parts bin container
- v. An event map
 - At each event try to acquire a map to keep in the pit so that students and mentors can easily navigate

d. Pit Setup and General Display Safety (Mostly Indoor):

- i. Ensure that the display does not block emergency exits, limit evacuation efficiency
 - o The display should create a safe and enjoyable working atmosphere
- ii. Verify that the display is stable on its own
- iii. Anchor the display to the floor or attach it to a wall or support structure using appropriate hardware whenever possible
- iv. Shelving and display edges should have no sharp corners or edges and must be rated to support the amount of weight intended for them
- v. Place objects, particularly heavy objects, as far back as possible from the front end and make sure that they are properly secured
- vi. Place electrical cords in a safe and organized manner so that they will not cause tripping hazards, be accidentally snagged, and that they are out of the reach of children
- vii. If leaving the display unattended, remove items that might tempt children to climb or tamper with the display
- viii. All flammable or combustible items should not be in contact or close range of hot devices
- ix. Make sure the display follows all rules under power and battery rules
- x. Tri-fold and banner will be set up at our team's designated section
- xi. The robot will be there for showcase and demonstration

e. Outdoor Displays:

- i. Keep all objects (banners, masts, poles, ladders, tools, flags, robots, vehicles) at a reasonable distance away from power lines at all times
- ii. Never assume that an overhead power line, power cable, or extension cord is electrically insulated
 - o It is safer to assume that coming in contact with any power carrying device could be lethal
- iii. Properly ground all metallic poles, masts, and support structures in accordance with electrical codes
- iv. Tri-fold and banner will be set up at our team's designated section
- v. Tarp will be set up over designated section so no team supplies/tools are ruined by weather

Section 10: Safety Emergencies

This section is to prepare the team in case of safety emergencies, be it medical or chemical. For minor medical emergencies, an incident report and corrective action form should be filled out and first aid should be performed with the materials we have. For major medical emergencies, 911 should be called first or by someone else while treatment is being provided. Preference for the person giving treatment is first to a medical professional, next to someone officially certified in first aid or CPR, next to a person that is responsible and knowledgeable about first aid treatment, including CPR and use of the AED.

For all medical emergencies:

- Always ask the victim if they would like your assistance before assisting unless they are unconscious
 - If the victim is unconscious, you can assist them without their consent
- Always check the area that the victim is in to be sure that you or the victim will not be further injured
- Always use personal protective equipment to prevent disease transmission

Battery Spills

- a. Team mentors and/or student leads should post the Safety Data Sheet for the battery in use and train all team members about battery safety. You can find emergency handling and first aid procedures on the SDS, along with proper protection for handling cracked or damaged batteries, and information on disposal of the battery.
- b. Batteries contain acid. This substance, H_2SO_4 , is a corrosive, colorless liquid that will burn your eyes, skin, and clothing.
- c. DO NOT TOUCH THE ACID! IT IS CORROSIVE AND VERY DANGEROUS!
- d. Assess the situation and get all team members clear of spill
 - i. Tell a Mentor or the Safety Captain
 - ii. Get somebody to stay at the spill site to keep others away
- e. Get battery spill kit
- f. Once you have the battery spill kit, follow the instructions and clean up the spill
- g. When an electrolyte leak (battery spill) occurs:

- i. Neutralize it by pouring the sodium bicarbonate (baking soda) on all wetted surfaces. The sodium bicarbonate itself is not dangerous and will react with the acid in the electrolyte leaving a safe residue that can be disposed of in a conventional manner such as rinsing with water.
- ii. Follow emergency handling instructions of the SDS and notify a mentor
- iii. Put on gloves before handling the battery
- iv. Place the battery in a leak-proof container for removal
- v. Be sure to neutralize any acid on the gloves before removing and storing them
- vi. Seek medical attention if skin met any chemicals
- vii. Properly dispose of the battery, which is now a hazardous material (covered in the SDS)
- h. Battery spill at a FIRST event:
 - i. Immediately send the person in contact with acid to the First Aid Station/EMTs
 - ii. Report incident to the pit administration supervisor so that the individual can fill out a Medical Incident
 - iii. Provide team number and available information
 - iv. Pit Administration will immediately contact Event Management for further instruction from event and venue authorities.

Fire

- a. All extra people should evacuate the area immediately
 - i. Only a Mentor or Safety Captain should extinguish the fire
- b. If possible, use a CO2 fire extinguisher, to put the fire out
 - i. If a fire extinguisher will not put out the fire, tell pit admin or local authorities
- c. Disconnect the power source
- d. After the fire is out, check for fire damage
- e. Be careful because some objects that survive the fire may be hot

Minor Medical Emergencies

In case of a minor medical emergency (small injury), first alert the Safety Captain or a mentor. The Safety Captain or mentor will give care to the best of their ability or find someone who can give the best possible care (certified people nearby or on the team). After the incident is over, an incident report and corrective action form must be filled out and reported to the team.

a. Small Cuts

- i. Clean the area and use a band-aid if necessary
- ii. Apply triple antibiotic ointment only if there is no chance of allergy

b. Bumps and Bruises

- i. Stop working if necessary
- ii. Ice if necessary for no more than 15 minutes

c. Mild Burn

- i. Remove source of heat
- ii. Run cool, NOT COLD, water over the burn
- iii. Dry gently and apply Aloe Vera if necessary
- iv. Take pain medicine (Ibuprofen, Tylenol, Advil, etc.) to reduce pain
 - o To be taken at home, will not be provided to you

d. Strains, Sprains, Breaks

- i. Rest
- ii. Ice if necessary for no more than 10 minutes at a time
- iii. Elevate injured area above heart level
- iv. Seek further medical advice

e. Conscious Choking

- i. Follow the diagram and procedure below

Back Blows and Abdominal Thrusts for Choking



1. Stand behind the person and wrap one arm around their chest. Firmly strike the person on the back between the shoulder blades 5 times.



2. If the back blows do not dislodge the object, wrap both your arms around the abdomen. Make a fist with one of your hands and place it thumb side in the center of the abdomen. Grasp your fist with the other hand.



3. Give 5 abdominal thrusts by making a quick hard movement inward and upward 5 times. Keep giving 5 back blows and 5 abdominal thrusts until the object is coughed up or the person loses consciousness.

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Major Medical Emergencies

For major medical emergencies, call EMS (emergency medical services, 911) first or have someone else call while treatment is being given. Provide the best care

possible until EMS arrives. In the Pacific Northwest, the Good Samaritan law protects you from legal consequences while trying to save somebody. In Texas, this law does not protect you. Do not stop providing care until EMS tells you to stop. Try to find people who know the victim if you do not know them.

a. Allergic Reactions

- Know before competitions who has allergies and what they are
 - Ask people if they have an EpiPen
- If they need help using their EpiPen, contact a first responder
- Contact local authorities (911), and Pit Admin at event

b. Shock

- Shock Symptoms
 - Anxiety & Agitation
 - Altered consciousness (ex. Confused or dazed, drowsy, passing out)
 - Nausea
 - Pale or ashen (gray) skin
 - Clammy
 - Fast pulse or breathing
- If shock symptoms are present, contact local authorities (911) and Pit Admin at event
 - Help the person lie down
 - Control external bleeding
 - Try and make the person calm and keep them awake
 - Raise the persons leg about 1 foot in the air unless head, neck, or back injuries are suspected
 - Assist the person with keeping a normal body temperature (If cold, cover, if warm, uncover)
 - Do not let the person eat or drink under any circumstances

c. Severe Bleeding

- Contact authorities and a Pit Admin if at the event
- Use measures to prevent disease transmission (non-latex disposable gloves, eye, nose, and mouth protection)
- Dress wound and apply steady, even pressure to stop bleeding

- Cover wound and dressing with bandages, tie knot directly over the wound
- Check toes and fingers for feeling, warmth, and color to confirm that the bandage is not too tight
- If bleeding continues, apply more bandages and more pressure
- Continue to monitor patients behavior and check for shock until help arrives

d. Moderate Burn

- Removed any clothes covering and surrounding the burn
- Cool off the burn by submersion in cool water
 - Don't apply ointments or salves which can cause infection
- Loosely cover the burn with a sterile dressing and care for the shock
- Do not break any blisters; loosely cover blisters with a sterile covering
- Treat for Shock
- If there is a serious burn, contract authorities and Pit Admin if at the event

e. Heart Attack/Stroke

- Check for signs of heart attack
 - Chest pain that is longer than 3-5 minutes or chest pains that keep recurring
 - Resting, changing position, and medication doesn't stop the pain
 - Pain spreads to shoulder, arm, back, stomach, neck, or jaw
 - Struggling to breath
 - Breathing rate is above normal
 - Nausea
 - Profuse sweating
 - Skin changing colors
 - Becoming dizzy or unconscious
- If someone is having a heart attack, call authorities and the Pit Admin if they are at a FIRST event
 - Have them stop moving
 - Gain more information on the person's condition
 - Help with administering medication
 - Check condition

- Prepare to administer CPR or operate an AED should they go into cardiac arrest
- Check for stroke symptoms
 - Sudden weakness or numbness, usually on one side of the body
 - Face muscles relax on one side
 - Trouble understanding their speech
 - Worsened eyesight in 1-2 eyes
 - Sudden headache
 - Becomes dizzy
 - Looks ill, odd behavior seems confused
- If it seems they are having a stroke, call emergency responders and Pit Admin if at FIRST event
 - If the person has fluid in their mouth, lay them on one side to let the fluid drain out
 - If the person is still conscious, try to console them
 - Get the person to rest
 - Do not let them drink or eat
 - Care for the symptoms as you can

f. Head, Neck, or Back Injuries

- Call emergency responders and Pit Admin if at FIRST event
 - Keep the victim still unless staying in place will cause more injury
 - Stabilize the head and neck
 - If they are still conscious, keep them calm and still

g. Poison

- Ingested Poison
 - Call the Poison Control Center (1-800-222-1222)
 - Contact Pit Admin at FIRST event
- Inhaled Poison
 - Move them into an open area with good airflow.
 - Treat any life-threatening symptoms as possible
 - Check the person's breathing and pulse
 - Call Pit Admin at FIRST event
- Poisonous Plants

- Remove any exposed clothing and wash any exposed skin with soap and water ASAP
- If a rash or wet blisters start to develop, have the victim talk to their healthcare provider
- If the poison is affecting large amounts of the body or the face, get medical professional ASAP

h. Seizure

- If the victim has a history of periodic seizures, know ahead of time so that proper help and medication can be administered
- If the victim has any of the following, then contact a medical professional
 - The seizure lasts upwards of 30 seconds
 - The person has more than 1 seizure
 - The person seems to be injured
 - The person is diabetic
 - The person loses consciousness
- Take away any objects near the victim so they do not hurt themselves
- When the seizure ends, check that they are not injured
- Stay with the person until they are fully conscious and become fully aware of their surrounding

i. Unconscious Choking

- Follow the diagram and procedure below (from the Canadian Red Cross)



- 1** Perform a scene survey.
- 2** Determine unresponsiveness.
- 3** Open Airway
- 4** Check Breathing and Circulation for a maximum of 5 to 10 seconds



- 5** Start chest compressions (30 compressions).

- 6** Open patient's airway and give 1 ventilation.
- 7** If air does not go in, reposition head and attempt to ventilate again. If air still does not go in, repeat cycle of 30 compressions.

- 8** Look in mouth for an object (using a tongue-jaw lift); remove object if seen.



- 9** Attempt to ventilate.
- 10** If air does not go in, continue CPR sequence of 30 compressions and 2 ventilations. If first ventilation is successful, give another ventilation.
- 11** Check pulse. If there is no pulse, follow CPR sequence.
- 12** If there is a pulse, follow rescue breathing sequence.
- 13** If there is any change in patient's condition, stop CPR and check ABCs.