



SAFETY
PROGRAM MANUAL
TEAM OTTO 1746

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Structure of Safety and its Management

Safety Captain

The role of the safety captain is to ensure that the team and the pit are up to safety codes provided by FIRST and Georgia FIRST. This person also serves as one of the team ambassadors, and is able to talk about safety, the team, and the robot. On top of this, they will formulate the safety manual for the team.

Responsibilities of the Safety Captain

- Continually making sure that the pit and the team are following the requirements set aside by the official FIRST Safety Checklist
- Ensuring that all team members and/or visitors are wearing safety glasses in the pits
- Maintaining a clean, organized workspace
- Inspect pit conditions at the end of every competition day
- Notify pit admin of any issues or emergencies that occur
- Maintain the Material Safety Data Sheets (MSDS) and know how to interpret them
- Ensure that everyone is constantly following safe measures when in the shop, the pits, or any other event where accidents may occur
- Aiding the team ambassador in any conversations with judges and visitors

Pit Chief

The role of the pit chief is to ensure that organization and cleanliness of the pit are maintained throughout the duration of the competition. They also ensure that all batteries are in a constant charging state, measuring the voltage, and replacing the old battery within the robot with a new, fully-charged one before the next match is played. On top of battery management, they will be the one in charge of going through the robot checklist (which was implemented at GRITS 2017) to make sure that both the robot and the drive team are prepared and ready for the next match. When the drive team is away from the pits, the pit chief also helps out in the cleaning of the pit as directed from the safety captain. They have the power to decide when there are too many people in the pit and may send away people if they are not being productive or actively working on a task. On top of this, during setup and teardown, the pit chief will manage the team as the pit and the pit display get organized to be packed away or set up.

Responsibilities of the Pit Chief

- Going through the robot checklist before every match
- Managing the batteries and ensuring that there are always fully-charged batteries readily available

- Cleaning up the pit area in between matches with the safety captain and team ambassador
- Deciding if there are too many unproductive people within the pit and knowing when to decrease the amount of people present
- Maintaining a state of organization within the pit
- Aiding the team ambassador in any conversations with judges and visitors

Team Ambassador

The role of the team ambassador is fairly straightforward: talk to judges, pit scouts, parents, invited guests, event personnel, and students from other teams. This individual knows both the team and this season's robot inside and out, and is able to talk to judges about what has been going on over the past season. Business cards will be on tap to hand out by these people. They will also answer any questions asked to them by pit scouts from other teams, as well as talk to members of other teams about Team OTTO. When the drive team is outside of the pit for matches, they will clean up and organize the pit.

Responsibilities of the Team Ambassador

- Talking with judges and answering questions about what the team does outside of the competition world
- Educate visitors about the team and what goes on within it
- Answer questions asked by other teams' scouts in the pit
- Being aware of what's going on both on the mechanical side and on the business side of the team
- Aiding the safety captain and pit chief in the cleanup of the pit in between matches

Safe Behaviors and Practices

Safety is the number one priority of Team OTTO 1746, as such there are certain practices that members should maintain at all times in the workshop and at all team oriented events in order to maintain a high level of safety and prevent injuries and accidents such as:

- No Horseplay is an situations
- Practice safe working practices
 - Proper Lifting
 - Proper Maintenance
 - Proper PPE
- Have general awareness of your area
- Know the safety protocols
- Be responsible for yourself
- Clean up your work spaces after you use them
- Stay Healthy
 - Sleep properly
 - Eat properly
 - Hygiene
 - Self Care
 - (Both at competitions and at home)
- Be focused on your task at hand
- Stay up to date with school
 - School is a job along with FRC
 - Maintain Grades
 - Turn in assignments
 - Don't get Stressed
- Communicate with the Team!
 - Stay up to date on meetings
 - Communicate needs and absences
 - Be an active member

General Safety Rules

Shop Safety and Training

FIRST Robotics Competition (FRC) has adopted safety as a core value and has established the framework for safety leadership in all aspects of the program. Team 1746: OTTO agrees and considers safety to be the single most important responsibility of each member of the team. To run any successful business or team, a high level of safety must be observed, practiced, and maintained. The following rules are designed to ensure the safety of students, mentors, and any visitors.

General Shop Rules

- Safety glasses and closed toe shoes are MANDATORY in all areas.
- Respect the building and the tools provided.
- NO horseplay, running, climbing, or jumping on furniture or throwing anything.
- When students are working in the machine shop area, because of the increased risk of accident/injury, 1 mentor/experienced student will supervise that specific area at all times.
- All injuries, however minor, shall be reported to a mentor.
- If an injury is determined to be the result of a safety code violation, all work shall cease and all students and mentors present shall be brought together to review the safety rules before work continues.

Tool Safety

No student is allowed to use a power tool or machine without passing safety and machine training, tested and followed the safety protocol of that tool or machine. Training sessions will be tracked on hours on each machine, students will have the opportunity to begin machine training at the start of every school year.

Personal Protective Equipment

Appropriate Clothing

In order to work or be around machinery and tools in a workshop setting, appropriate clothing must be worn to prevent serious accidents from occurring.

- In order to operate machinery, one must wear pants (which is defined as an item of clothing that covers the legs and ankles while having a separate tubular piece for each of the legs) at all times. The wearing of dresses, skirts (both long and short), shorts, and capris may not be worn.



- Loose, baggy clothing, hooded sweatshirts, and any kind of apparel possessing dangling strings or cords are not permitted within ten (10) feet of a machine or tool.
- When working or observing within ten (10) feet of a machine or tool, jewelry of any kind is not allowed unless approved by the Safety Captain. Specifically jewelry, especially if they are on the wrist, fingers, or neck, have the potential to cause significant danger and cause harm to the wearer.

Eye Protection

Eye protection is crucial to maintaining safety when working in shop settings. It is easily one of the most important types of protection that one must have to ensure that eyesight can remain intact in the event of an emergency.

- Safety Glasses with side shields (meeting ANSI Z87.1) are required when one is near tools and machinery. They must always be worn when present in the pits during competitions as well.
- Clear and yellow tinted safety glasses are the only acceptable types allowed. If one wears prescription-level glasses, side shields may be worn as an alternative within the pits.
- When working on gas welding and burning, burning goggles with plastic plates on both sides are required and must have a density rating of a number three or higher
- Chemical splash goggles are required within ten (10) feet of exposed chemicals.
- Safety Glasses are also required within fifteen (15) feet of any soldering, wire cutting, or work involving power and electricity.



Emergency Eyewash – Based on Osha 29 CFR 1910.151(c)

Emergency eyewash stations must always be present when people are exposed to hazardous materials, such as battery acid, within a workspace. This should contain equipment that can easily flush out the eyes or wash off the skin of someone who has come in contact with chemicals that can harm them.

Face Protection

When working with power chipping, grinding, and sawing machines, full-face shields must be worn at all times. They are also required when handling metal, tar, caustics, molten plastic, and any other molten materials that have the potential to seriously harm the user.

Hearing Protection

When loud noises are present, especially if the noise level exceeds eight (80) dBA, hearing protection is required. Prolonged exposure to loud noises has the potential to leave a damaging impact on a person's hearing.

- If noise levels exceed eighty (80) dBA, hearing protection is required.
- However, if exposure of sounds upwards of 75-79 dBA exceeds eight (8) hours within a day, hearing protection is also required.
- Regardless of the amount of sound generated, hearing protection is required within twenty (20) feet of any chop, circular, or reciprocating saw.

Foot Protection

Closed-toed shoes must be worn by anyone within fifty (50) feet of tools and machinery.



Hand Protection

Hand protection must be used when hands are exposed to hazards that include (but are not constrained to) harmful chemicals and substances, lacerations or cuts, abrasions, punctures, high-intensity heat, and sharp objects. When working with an injured person or dealing with bodily fluids, one must also wear latex gloves.

Hair Protection

When working with power tools and around machinery, long hair must always be pulled back to prevent it catching and tangling.

Power and Battery Safety

Safe practices involving power and batteries can help you avoid many serious injuries. Safe power procedures help avoid electrocution which can lead to serious injury and/or death. Taking good care of batteries avoids acid spills. It is important to know how to take care of all of your electrical equipment properly.

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

Battery Spill Kit:

A battery spill kit is designed to clean up the battery acid that may leak out due to the cracking or breakage of robot batteries. This kit consists of a plastic tub with lid, baking soda to neutralize the acid, disposable

Electrical Cables, Power Surge Protectors, Extension Cords

1. If using extension cords outside, ensure that they are marked for outdoor use.
2. Insert power prongs fully. No part of the prongs should be exposed when the cord is in use.
3. Never cover any part of an extension cord with rugs or other objects that are not specifically designed to contain wires while in use.
4. Do not plug too many devices into one power cord. Disperse power sources by plugging different devices into different power cords.
5. 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 poses a tripping hazard if accidentally pulled down.
6. If a cord feels hot to the touch, discontinue its use and dispose of it.
7. Replace damaged, kinked, cracked, worn, and mangled cords with new, inspected, properly rated cords.
8. There should be no liquids around power strips, power outlets, power tools or other electrical components.

Battery and Power Rules

1. Know the location and path of all wires and power cords that carry electrical current.
2. Have a set location for robot batteries and create an organized battery charging station.
3. Keep batteries in the battery box while charging. This keeps them out of the way and eliminates tripping hazards.
4. Keep a record of which batteries are charged and which are not. Use this record when determining which battery to use on the robot during a competition.
5. Insert plugs into a battery's connector after the battery is fully charged. The battery plug serves as a flag to easily show which batteries are charged and stops any electrical leaks that can sometimes occur when a battery has remained off of a charger for a long period of time. It also prevents unwanted contact and discharge of the battery. When it is ready to be used, simply pull the plug out of the connector before installing the charged battery into the robot.
6. Keep unused battery plugs near the battery chargers
7. Make sure everyone carries the battery by the base and sides and are not carrying them by the lead wires or wire connectors. Carrying the battery improperly can result in loose connections.
8. Frequently inspect the batteries to check for loose connections at the battery posts and at the connector. Loose connections on battery lead wires lose FIRST matches and present an electrical danger to those handling the robot.

Handling Emergencies

Battery Spill

1. DO NOT TOUCH THE ACID! IT IS CORROSIVE AND VERY DANGEROUS!
2. Tell a Mentor or the Safety Captain.
3. Whoever cleans it up must wear rubber gloves and be educated in handling dangerous materials
4. Neutralize the battery acid with baking soda.
5. Notify a Mentor or Official. Remember Touching battery acids will burn you

Fire

1. All extra people should evacuate the area immediately a. Only a Mentor or Safety Captain should to extinguish the fire
2. Always use the correct type of fire extinguisher (see below), and if possible use an ABC fire extinguisher a. Tell pit admin or local authorities
3. Disconnect the power source.
4. After the fire is out, check for fire damage.
5. Be careful because some objects that survive the fire may be hot.

Types of Extinguishers

- A – ashes : used for wood fires
- B – boiling : used for oil fires
- C – circuits : used for electrical fires

Remember There are different sources of fire such as: Wood; electrical; oil; plastic; kitchen; etc.

There are three components that make up a fire: oxygen, heat and fuel. Remove oxygen by blocking the fire off (place a lid on a burning pan), remove heat by water or cold. And remove fuel by having the fire consume it all, or separating fuel source from mechanical/electrical fires. Water doesn't always extinguish fires. Trying to extinguish certain fires with water will propagate the flames.

For all Medical Emergencies, contact a team First Responder. 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. This is especially true

of electrical hazards. Always use personal protective equipment to prevent disease transmission.

Minor Medical Emergencies

1. Small Cuts

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

2. Bumps and Bruises

- a. Stop working if necessary
- b. Ice if necessary for no more than 15 minutes

3. Mild Burn

- a. Remove source of heat
- b. Run cool, NOT COLD, water over the burn
- c. Dry gently and apply Aloe Vera if necessary
- d. Take medicine to reduce pain

4. Stress

- a. Relaxation Breathing
- b. Muscle Relaxation
- c. Imagination
- d. Shoulder Shrugs and Squeezes
- e. Exercise
- f. Time Management

5. Strains, Sprains, Breaks

- a. Rest
- b. Splint
- c. Ice if necessary for no more than 10 minutes at a time
- d. Elevate injured area above heart level
- e. Seek further medical advice

6. Conscious Choking

- a. Give back blows
 - i. Lean the person forward
 - ii. Place the heel of the hand on the person's back between the shoulder blades
 - iii. Give 5 back blows
- b. Give abdominal thrusts
 - i. With one or two fingers of one hand, find the person's belly button
 - ii. Make a fist with other hand and place the thumb side of your fist against the person right above your fingers at the belly button
 - iii. Grasp your fist with your other hand
 - iv. Give 5 abdominal thrusts.

c. Repeat step a, then step b until the object is dislodged or the victim becomes unconscious

Major Medical Emergencies

1. Allergic Reaction

a. Contact local authorities and Pit Admin if at a FIRST event

b. Ask the person if they have known allergies

i. If they do, ask if they have an EpiPen[®]

1. If they need assistance with the EpiPen[®], contact a first responder

2. Shock – IMPORTANT! BE AWARE OF YOUR ENVIRONMENT. IF SOMEONE IS TOUCHING A LIVE POWER SOURCE YOU COULD ALSO BECOME ENERGIZED

a. Symptoms of shock

i. Restlessness or irritability

ii. Altered consciousness (e.g., drowsy, confused or dazed, or passing out)

iii. Nausea (sick to the stomach)

iv. Pale or ashen (gray), cool, moist skin v. Fast breathing vi. Fast pulse

b. If shock is indicated, contact local authorities and Pit Admin if at a FIRST event

i. Have the person lie down, as this is often the most comfortable position

ii. Control any external bleeding

iii. Calm and reassure the person

iv. Raise the person's legs about 12 inches unless you suspect head, neck or back injuries, or a broken hip or leg

v. Help the person maintain a normal body temperature; if the person is cold, cover him or her with a blanket or warm clothing

vi. Do not give the person anything to eat or drink, even though he or she may be thirsty

c. Keep the person warm

d. Try and keep them calm and awake e. Seek the source of shock. Use a non-conductive object such as a broom handle to remove the source of shock if that can be accomplished in a safe manner

3. Severe Bleeding

a. Follow standard precautions to prevent disease transmission (such as wearing non-latex disposable gloves and other personal protective equipment such as eyewear or masks, if available)

b. Cover the wound with a dressing and press firmly against the wound (this is called direct pressure) until the bleeding stops

c. Secure the dressing with a roller bandage. Tie knot directly over the wound

d. Check the fingers (or toes) for feeling, warmth and color to make sure the bandage is not too tight

e. If bleeding does not stop, apply additional dressings and bandages and continue to apply direct pressure

f. Contact local authorities and Pit Admin if at a FIRST event g. Care for shock and continue to monitor the person until help arrives

4. Moderate Burn

a. Remove the source of heat

b. Cool the burn

c. Cover the burn loosely with a sterile dressing and care for shock

d. Do not break blisters; loosely cover blisters with a sterile dressing

e. For a serious burn, contact local authorities and Pit Admin if at a FIRST event

5. Heart Attack/Stroke

a. Check for signs of a heart attack

i. Chest pain or discomfort lasting more than 3-5 minutes or that goes away and comes back

1. Pain is not relieved by rest, changing position or medication

2. May spread to shoulder, arm, back, stomach, neck or jaw

ii. Trouble breathing

1. Breathing is often faster than normal

2. Person feels short of breath

iii. Nausea

iv. Sweating or changes in skin appearance

v. Dizziness or unconsciousness

vi. May complain of heartburn or indigestion

vii. Denial that anything serious is wrong

b. If heart attack is indicated, contact local authorities and Pit Admin if at a FIRST event

i. Convince the person to stop activity and rest

ii. Try to obtain additional information about the person's condition

iii. Comfort the person

iv. Assist with medication, if prescribed

v. Monitor the person's condition

vi. Be prepared to give CPR and to use an AED

c. Check for signs of a stroke

i. Sudden body weakness or numbness, often on one side

ii. Sudden facial drooping or weakness on one side of the face

iii. Trouble speaking or being understood when speaking

iv. Trouble seeing in one or both eyes

v. Sudden severe headache

vi. Dizziness, loss of balance

- vii. Looking or feeling ill, abnormal behavior or confusion
 - d. If stroke is indicated, contact local authorities and Pit Admin if at a FIRST event
 - i. If there is fluid or vomit in an unconscious person's mouth, position him or her on one side to allow any fluid to drain out of the mouth. (You may need to remove material from the person's mouth.)
 - ii. If the person is conscious, offer comfort and reassurance
 - iii. Have the person rest in a comfortable position
 - iv. Do not give the person anything to eat or drink
 - v. Care for the specific conditions you find
- 6. Head, Neck, or Back Injury
 - a. Contact local authorities and Pit Admin if at a FIRST event
 - b. Do not move the victim unless further injury will occur
 - c. Hold the victim's head and neck still
 - d. If the victim is conscious, encourage them to remain calm and still
- 7. Poisoning
 - a. Ingested Poison
 - i. Contact the Poison Control Center at 1-800-222-1222. ii. If the person is unconscious, or there is a change in the level of consciousness, or if another life threatening injury is present, contact local authorities and Pit Admin if at a FIRST event
 - b. Inhaled Poison
 - i. Move the victim to fresh air
 - ii. Care for life threatening conditions
 - iii. Monitor the victim's airway, breathing and circulation
 - iv. If conscious, keep the victim comfortable
 - c. Poisonous Plants
 - i. Remove exposed clothing and wash the exposed area thoroughly with soap and water as soon as possible after contact
 - i. If rash or wet blisters develop, advise the victim to see his or her health care professional
 - iii. If the condition spreads to large areas of the body or face, have the victim seek medical attention
- 8. Seizure
 - a. If the victim is known to have periodic seizures, there is no need to summon EMS.
 - b. You do need to summon EMS personnel if –
 - i. The seizure lasts more than 5 minutes
 - ii. The victim has multiple seizures
 - iii. The victim appears to be injured
 - iv. The victim is pregnant. v. The victim is a diabetic

- vi. The victim fails to regain consciousness
- vii. The seizure occurs in the water
- c. Remove any objects from near the victim so they cannot harm themselves
- d. When the seizure is over, check to be sure they have not injured themselves
- e. Stay with the victim until he or she is fully conscious and aware of his or her surroundings

Pit Safety

Pit Setup and teardown

Make sure that when setting up the pit you do so in a manner that minimizes risks to both yourself and other teams. This would include:

- Using proper PPE to set up and put together pit and pit materials
- Using proper tooling to assemble pit
 - (Ladders, Hex Keys, Screwdrivers, etc.)
- Wear proper clothing for set up and tear down
- Make sure to stay within the 10 foot height limit

Pit Safety

During competition, the pit is often a bed of busyness and activity. This means that there is lots of movement and lots of ways for something to go wrong. Be sure to reduce the risks by following safe procedures such as:

- Keep access to the pit limited to
- Maintain cleanliness and order in your pit
- NO DAISY CHAINING
- Wear proper PPE in the pits at all times
- Keep pit out of the aisle and keep the aisle clear

Neighbors

You're not alone in the pits, most times you're surrounded by other teams just as excited and hard working as you. Be the best neighbor you can be and make sure to show proper GP by:

- Being respectful of other Teams and Teammates
- Keeping your items out of other pits
- Keeping your pit clean
- Staying out of the way of other teams and robots
- Being helpful not hazardous.