

Team 3691
Northfield RoboRaiders
2017 Safety Manual



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1. Overview

Team 3691, the Roboraiders, is dedicated to safety and encourages safe practices at all times. Members of the team must always use common sense and follow the safety manual to remain safe at all times at build meetings and competitions. Though safety is a top priority, members must have fun at all times.

2. Responsibilities:

2.1 Safety Captain: The safety captain is responsible for reviewing the safety manual and updating it when necessary. The safety captain has the authority and responsibility to correct and point out any safety infractions they notice. The injury log and other documents like safety data sheets must also be managed by the safety captain. At the end of every build session the safety captain or other team member appointed by the captain will assist the mentors in inspecting the build areas. At any competitions the safety captain will inspect the pit to ensure that it will pass the official FIRST safety inspections. In addition to inspecting the pits the safety captain must ensure that all members are acting safely and responsibly at competitions.

2.2 Team Members: Members of the team are responsible for reading the safety manual and learning from the safety captain and mentors. The policies in this manual and what is taught by the captain and mentors must be followed at all time to ensure the safety of all participants. Everyone on the team has a responsibility to speak up and correct dangerous behavior that they see. In addition to monitoring others, all members must listen to the safety captain and mentor's orders about safety. If there is any emergency or safety issue the safety captain and mentors MUST be notified.

2.3 Mentors: The teams mentors must oversee safety training and all team members to ensure they are following the safety manual and guidelines. Guidance

must be given to the safety captain to make sure they understand their role, The mentors must also help manage attendance and emergency contact documents with the safety captain to ensure everyone is safe and accounted for. Mentors must assist team members if they have any questions or issues with tools or machinery. Mentors must help the safety captain make sure he/she has everything needed.

3. Common Sense

When at robotics build meetings, competitions, and other team events always use common sense when making decisions. Almost all dangerous situations and injuries can be prevented by exercising common sense.

4. First aid

4.1 Overview: Injuries and medical emergencies can happen no matter how safe and cautious you are. As a result of this it is important to be prepared for any emergency. It is very essential to know and understand the plan of how to deal with emergencies. When an emergency occurs it is vital to contact the safety captain and mentors immediately to ensure that it is dealt with in an appropriate manner.

4.2 Open wounds: If a team member has an open wound put on gloves and apply direct pressure until the bleeding stops. Use a band aid if the wound is small or minor. If there is significant bleeding apply gauze and wrap with a roller bandage. If bleeding still does not stop contact the event EMT if at a competition or 911 at NHS facilities.

4.3 Burns: Put affected area in water. Wrap injury with loose roller bandages. If the burns are electrical, on face, genitals, hands, or cover a significant area call 911 or contact event EMT.

4.4 Electrical Injuries: To help treat a severe electrical injury you must first ensure that the victim is moved away from the source and the source is turned off. Call 911 or the event EMT immediately. Treat any open wounds or burns and do CPR if the victim goes into cardiac arrest.

4.5 Bone Injuries: If the injury is bleeding use the open wound info before to treat it. Contact event EMT or 911 as soon as possible. Keep the victim still and immobilize the affected bones. Do this by using a splint or long solid objects and attach them to the undamaged bones around the break. Do not move the victim if necessary.

4.6 Poison/Toxic Incidents: Contact event EMT or 911 immediately. Keep victim under close watch until help arrives and note the symptoms.

4.7 Heart Attack/Cardiac arrest: Call 911 and contact the event EMT immediately. One person must run and get the nearest AED and bring it back Start hands only CPR on victim immediately and do not stop until help or an AED arrives. Only team members TRAINED AND CERTIFIED can help with CPR.

4.8 Seizures: If a person has a seizure in the pit or build area make sure everyone stays clear of the victim. If possible put pillows or soft objects under the victim to prevent further injuries. Call 911 or contact the event EMT as soon as possible. Be prepared to do CPR if victim goes into cardiac arrest.

***Doggo seizures:** If a dog, doggo, bork, or pupper has a seizure in the pit or the build area dim the lights, stay close and comfort him. Make sure you have water for the dog/doggo/bork/pupper when are done seizing.*

5. Safety inspections

5.1 NHS facilities: Always make sure the build space is as clean and organized as you found it! At the end of each build sessions the safety captain and mentors will inspect the build space. This is to ensure that all materials and tools are put away in the appropriate areas. All tools and used materials also must be returned in the metal shop and woodshop too. If the build areas are not sufficiently cleaned members make sure that everything is put away and the space will be inspected again.

5.2 Pit/competition space: At any FIRST competition the team's pit area must be sufficiently clean and orderly to pass inspector's standards. Due to the smaller and more compact area it is even more important for all items to put away in the appropriate places/containers. It is essential for all team members in the pit to know where all tools are located. Before leaving each day of the competition the safety captain and mentors will inspect the pit to make sure everything is put away before it is inspected by FIRST inspectors.

6. Personal Protective Equipment: Always wear safety glasses when using equipment. When welding always wear a welding jacket, welding helmet, and gloves. Close toed shoes are a must for working around power tools. If close toed shoes are not worn you will be asked to change shoes or work in another area. Proper safety glasses (ANSI approved, CE EN166, UL listed, AS/NZS certified, or CSA rated) are required at all times in pits or in a workspace (NHS metal shop and woodshop). Goggles or a helmet must be worn when plasma cutting or using a very bright tool to prevent eye injury.

7. Power Tool Safety: ONLY USE TOOL IF YOU ARE TRAINED AND PROFICIENT ON IT. Use all required Personal Protective Equipment. Keep hands clear of sharp moving parts to prevent injuries. If the tool is damaged or not functioning properly let the safety captain and mentors know and do not use the tool anymore until it is fixed.

8. Hand Tool Safety: Always make sure that you know what you are doing when using tool and understand how to operate it safely. In addition to that make sure you are using the right tool for the job so that you do not cause any harm. If the tool is damaged let someone know and avoid using it on the robot. Never cut toward yourself with a blade or keep a sharp object in your pocket. All sharp objects must be stored properly and safely.

9. Battery Safety:

9.1 Safety precautions: Before plugging in battery make sure that the battery is not damaged or leaking. When the battery is not being used always cover prongs and electrical parts. Always unplug when work is done on robot. Make sure to be always cautious when around the batteries and remember that there is dangerous acid inside.

9.2 Emergency procedures: If a leak or spill of battery acid occurs have team members move out of the pit so that the spill can be contained. Before dealing with the leak all responding team members must put on acid-resistant gloves. Baking soda must be used to neutralise any spilled acid. The battery must be placed in a plastic leak proof container.

10. Chemical Safety: Always be cautious while handling chemicals and assume that it can harm you. Be responsible and avoid letting it come into contact with your skin. If the chemical is spilled or comes into contact with your eyes refer to the Safety Data Sheets in the safety folder. To prevent misuse of chemicals become familiar with the characteristics of the chemical.

11. Pneumatic Safety: When using pneumatics always ensure that you are operating at a safe and legal pressure. Be very careful and assume that it can hurt you (surprise, it can). When working on the pneumatics system vent any compressed air into the atmosphere and check that all gauges read zero pressure.

12. Electrical Safety

Do not touch exposed wires. Always assume wires are charged with lethal voltage. Do not touch wires of opposite charge together. Current passing through your body can cause electric shock, resulting in 3 types of potential injuries:

1. Burns (arcs burn with heat & radiation)
2. Physical injuries (broken bones, falls, & muscle damage)
 - At 10 mA, the muscles clamp on to whatever the person is holding.

3. Nervous system effects (stop breathing at 30 to 75 mA alternating current at 60Hz, fibrillation at 75 to 100 mA)
(Fibrillation = heart is "twitching" and there is no blood flow to the body.)

In case of shock or electrical burns:

- **Do not touch the person if they are still in contact with the source of electricity**
- If possible turn off the source of electricity
- If not move the source away using a non conductive material
- Reference injury section for information on treating burns

Electrical devices are prone to lighting on fire. This could be due faulty wiring, external materials affecting the device, or other things.

These fires can be prevented by:

- keeping flammable materials away from electrical devices
- Not overloading equipment (Use the correct grade of wire, do not plug too many things into a power strip)
- Maintenance (keep electrical devices in good shape)

Even with these preventative measures, some fires cannot be avoided. In case of fire, use a **Class C** fire extinguisher. Only class C fire extinguishers are qualified for electrical fires.

13. Safety at FIRST events

13.1 Pits: Always turn off the robot while working on it. If you must work underneath the robot, make sure it is on a secure and stable surface. Always wear safety glasses in the pit area and do not over crowd your team's pit. Only have as many people as you need in the pit to avoid injuries. Children under age 12 must always have an adult with them in the pit area. Be aware of your surroundings at all times to avoid any injuries from any tools or chemicals. If a FIRST safety official, mentor, or safety captain tells you to change your behavior listen them to make sure you and all others around you stay safe. NEVER run or participate in

horseplay at the competition, this is not tolerated and you will be advised to stop. To prevent any tripping or falls make sure that the pit is neat and there are no large objects on the ground that would trip team members. The cart must stay in the pits so it does not clog walking areas.

13.2 Transportation of robots and materials to the event: Safely store all tools and strap down all pieces of the pit while it is being transported. Check and double check that all materials are present and properly secured.

13.3 Getting ready to compete: While moving the robot to the field use safe lifting techniques to get the robot onto an appropriate cart. Always have at least two people lift the robot. Use safe lifting techniques at all times (use legs, not back to lift and do not twist your body). Make sure that all people ahead of the robot are aware of the robot so that they can move out of the way in time.

13.4 Safety while at the competition: While at the competition always travel with at least one other person. Some teams go outside of the event area for lunch. When outside of the event area, always safely cross the street and travel with a group. If you need assistance FIRST volunteers and staff will always be wearing clearly marked shirts and name tags. They are always willing to help and answer questions. While at the event always practice safe behaviors in and outside the pits. When leaving the building for lunch or anything else always let a mentor know. If there is a medical emergency or injury let the safety captain and mentors know immediately and consult the first aid section of this manual. If the emergency is very serious contact 911 and the event EMT. Take extra care when working on ground or above the normal level.

14. Safe Robot Handling: Before working on the robot always make sure that the robot is turned off to avoid shock. When the robot is driving notify all people around so that they can avoid the robot and not be struck. If the robot is being lifted always use at least two people (more if possible) and have a plan (e.x. lift on 3, 1 2 3). Remember to use your legs and not your back to avoid back injury

and do not twist while lifting. When wiring make sure that the wires are neat and not a mess.

15. Work Space Safety: Be aware of your surroundings at all times to keep yourself and others away from danger. If there is a safety issue make sure everyone around is aware of it, especially the mentors and safety captain. Always wear the proper PPE and avoid wearing long jewelry or loose, baggy clothes around the robot and power tools. In addition to proper clothing, long hair should be tied back so that it does not get caught in machinery. Properly manage any power cords or power strips to avoid electrical damage. To prevent injury while using tools be cautious of fast moving parts in addition to very hot parts. Always make sure that the robot is turned and disabled so that no one is shocked or struck by the robot. All walking areas must be clear of any debris or objects that could possibly trip or injure team members. If the work area is dark turn on lights so that you can safely see what you are working on are not injured.

Have fun and be safe!!