SAFETY LEVEL 1

THE ATOMS FAMILY
TEAM 4405

WWW.FIRSTBADGES.COM

DEVELOPMENT STANDARDS

- **FRC Badge Development Standards**
- FIRST Badges include the following:
- Four levels around a topic / domain common in a FIRST Robotics Competition team. Defined performance-based activities illustrate skills and demonstrate competencies of an individual student.

    1. Requirements are appropriate for high school students 14-18 years old.
    2. Requirements are adaptable to any team's practice and procedures.
    3. Level 1 and Level 2 requirements are assessed by FRC team mentors using a binary rubric.
    4. Level 3 and Level 4 badge requirements culminate in complex projects. Projects are assessed and validated by experts outside of the student's FRC team. Level 3 and Level 4 badges may be eligible for project-based graduation credit.

    Requirements must be modeled on Bloom's Taxonomy of Educational Objectives. More details on these learning frameworks are available here and here.
- Note: The requirements must be activities within the participant's experience on an FRC team.

PRIVACY POLICY

Privacy Policy

FIRST Badges Privacy Policy

FIRST Badges is part of FIRST in Michigan, a 501(c)3 organization. FiM is not an educational entity, and does not receive any state or federal education funding.

Privacy Practices:

1. FIRSTBadges.com is secured via SSL encryption.
2. FIRSTBadges.com collects and maintains the following data on participants:

First Name
Last Name
Email address
Year of Graduation
FRC Team Affiliation

3. Site administrators will use data provided by team mentors to review and award participant achievements. Site administrators will access the site via secure networks and use secure passwords. A list of all site administrators can be requested using the Contact Form.
4. Reports provided to FIRST in Michigan are communicated in aggregate numbers, de-identifying the individual user data.
5. For Level 3 and 4 portfolio submissions, data is collected to identify a unique participants and is provided by the participant upon registration to the FIRSTBadges.com portal.
6. FIRST Badges system is designed to serve participants ages 13-18, who are active members of a FRC Team.
7. Participants earning achievements control the public display of the achievement data through the Credly portal.
8. Participation with FIRST Badges is not required to join or participate with a FIRST Robotics Team.
9. Participant data will not be sold.

GETTING STARTED

SHOP AND PIT SAFETY
TEAM 4405
THE ATOMS FAMILY

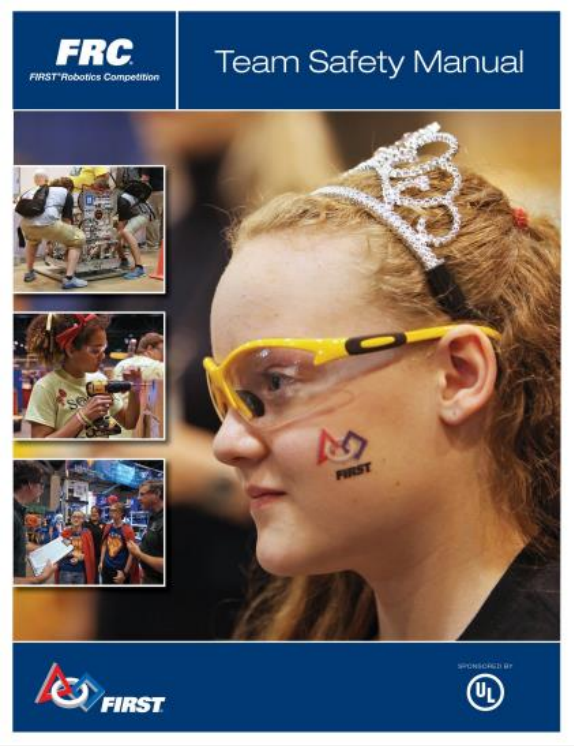
SHOP AND PIT SAFETY

- Instructor
  - Mr. Wash-OSHA30 Certified
    - Occupational Safety Hazard Administration

- What you will need:
  - Computer
  - Digital Portfolio
  - Binder

FIRST TEAM SAFETY MANUAL - CONTENTS

- Safety and the *FIRST* Robotics Competition® (FRC)
- Participant Responsibilities
- Youth Protection Program
- Injury Reporting Requirement
- Safety Inspections
- Personal Protective Equipment
- General Safety Requirements
- Soldering
- Hand Tools
- Stored Energy
- Battery Safety
- Chemical Safety
- Respect of Electricity
- At The Events
- Safe Robot Lifting, Handling, and
- Safety Awareness and Recognition Program



GENERAL SAFETY

TEAM AND PIT SAFETY
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GENERAL SAFETY REQUIREMENTS

- GENERAL SAFETY REQUIREMENTS The following are some areas, practices, and functions for which teams will be observed and monitored for safety conformity and innovation. This list is not all-inclusive. At events, Safety Advisors and your peers will observe and report any positive and negative safety practices. Running and horseplay is not permitted at any time.
  - Follow safe work practices, including safe use of all tools and protective equipment (safety glasses, shoes, gloves, hearing protection, etc.). Maintain a healthy attitude regarding safety.
  - Always walk and work in a controlled and thoughtful manner. Keep full control of robot at all times.
  - Be especially careful around high-speed rotating components, both on and off the robot. If you are putting a high-speed rotating component on the robot, make sure the component is designed to be used the way you are using it.
  - Take special care when working above normal height or ground level.
  - Always fully open a ladder and never stand on a non-approved step.

WHAT DOES GENERAL SAFETY INCLUDE?

- MSDS/SDS-Material Safety Data Sheets or Safety Data Sheets
- PPE – Personal Protective Equipment
- ELECTRICAL
- PEL'S

MSDS AND SDS

- What are they
  - Material Safety Data Sheets
  - Safety Data Sheet
  - What is the difference?
- Why is MSDS now SDS?
  - The main purpose of the switch from the Material **Safety Data Sheet** (**MSDS**) to the **SDS** is to create a simpler and more effective way to communicate the hazards of a chemical
  - Example
    - WD-40 SDS Sheet
  - Why are they important
    - What type of material
    - Dangerous?
    - PPE

Safety Services Company, https://www.safetyservicescompany.com › topic › osha › msds-vs-sds, November 12, 2013,

PERSONAL PROTECTION EQUIPMENT

- Also called PPE
  - Personal Protective Equipment includes:
    - Eye and face protection
    - Hand protection
    - Mechanical guards
    - Hearing protection
    - Foot protection
    - Other preventatives

EYE AND FACE PROTECTION

- Eye and face protection
  - Earplugs
  - Safety glasses
  - Goggles
  - Side shields
    - Inspect equipment for damage each time it is worn. They should be clean and functional with no damages or visible wear.
    - Prescription Glasses
      - If you wear non-safety rated prescription glasses, you must wear approved safety goggles over them to achieve adequate protection. If you wear safety rated glasses, you may use side shields.
    - Wear eye protection in the following situations:
      - ☐ When doing any work on the robot including grinding, drilling, soldering, cutting, welding, etc.
      - ☐ When there is risk of exposure to flying particles or chemical exposure (such as splashes, splatters, and sprays)

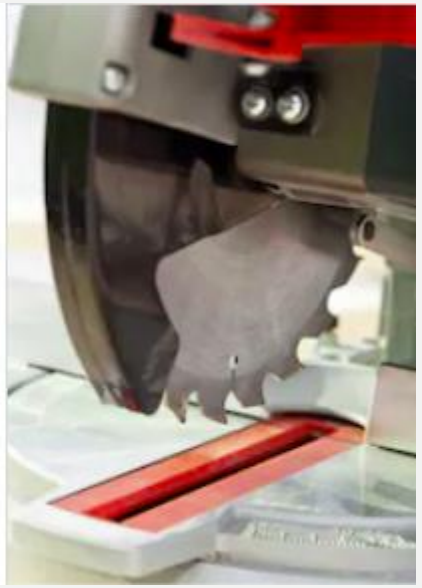
HAND PROTECTION

Hand Protection

- Gloves
  - Hand protection is designed to protect against heat, electrical, chemical and mechanical hazards. Use proper gloves and mechanical tool guards. FRC participants should work with their Mentor to ensure the selected glove is the correct one to use for each project. For example, wear chemical-resistant gloves when handling chemicals. Check your gloves for proper size, absence of cracks and holes, and good flexibility and grip before you wear them.

MECHANICAL GUARDS

- Provide safety guards for power tools where required. Never use any equipment without safety guards in place. Notify your Safety Captain and Mentor of any broken or defective equipment, and take it out of service until repairs are made.



https://www.shutterstock.com/search/machine+guards

HEARING PROTECTION

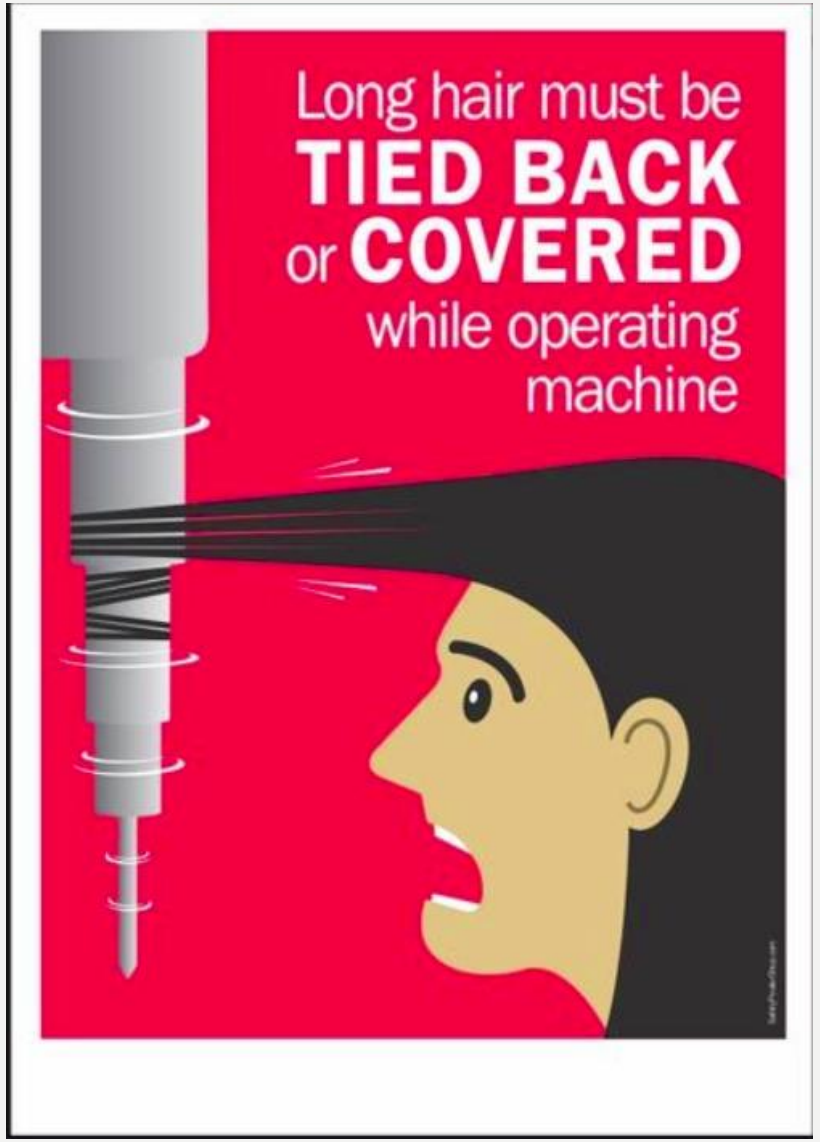
- Make hearing protection devices available, such as earplugs, where there are objectionable/questionable sound levels. A Mentor can provide assistance in evaluating high-noise tasks and determining appropriate hearing protection devices.

FOOT PROTECTION

- When engaged in FIRST activities, FRC participants must wear shoes that completely cover the entire foot. Shoes must be substantial and have closed-toes and heels to protect against foot injuries, regardless of work location. Flip-flops, sandals, mules, lightweight slippers, etc. are not acceptable when working on or near the robot.
- Spectators attending FIRST competitions should follow these footwear rules. If substantial close-toed shoes are not available, they may enter the pit area as long as they remain in the pit aisles. Please note that loose sandals (like flip-flops) or bare feet are not permitted in the pit area under any circumstances. Spectators that do not meet the footwear requirement for participants, as described above, are not allowed inside individual team pit areas or where robots are being worked on.
- In some cases, safety shoes or toe guards are appropriate for areas where heavy objects can fall on your foot. Notify your team Mentor if you encounter such situations, and determine the safest way to perform the task.

OTHER PREVENTATIVES

Ensure that team members or Mentors are not wearing ties, loose clothing, jewelry, or hanging key chains when near or working on moving or rotating machinery. Tie hair back or cover it.



ELECTRICAL SAFETY

RESPECT OF ELECTRICITY

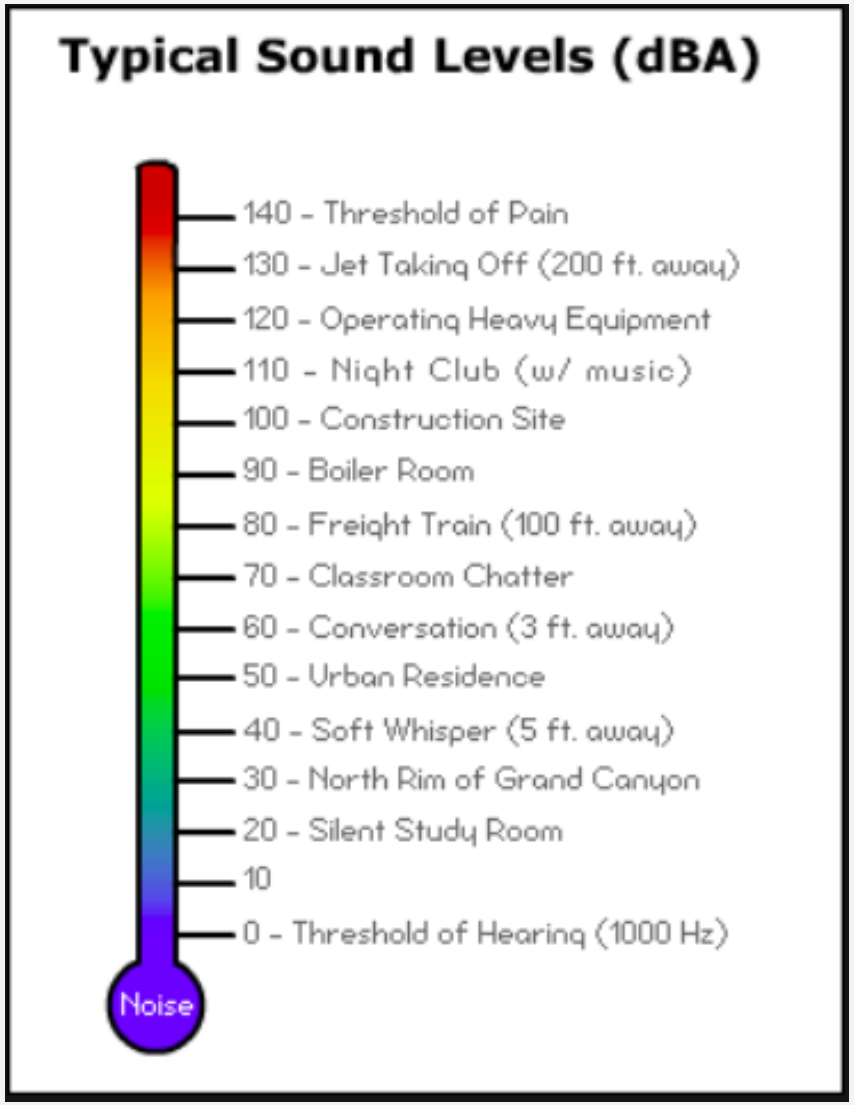
Proper use and respect for electricity is paramount. The following are general guidelines for ensuring basic electrical safety requirements are met:

- Inspect your equipment cords and extension cords routinely to ensure they are in good condition.
- DO NOT overload electrical fixtures and/or receptacles.
- DO NOT "daisy chain" – plug a power strip into another power strip.
- Avoid the following electrical power supply setups to prevent overloading:
  - Extension cord plugged into another extension cord.
  - Extension cord plugged into a power strip.
  - Multi-device receptacle plugged into a power strip or extension cord.

PERMISSABLE EXPOSURE LEVELS

- Sound intensity is measured in decibels
- Maximum safe sound intensity
- In general, **sounds** above 85 are harmful, depending on how long and how often you are exposed to them and whether you wear hearing protection, such as earplugs or earmuffs.
- With **noise**, **OSHA's** permissible exposure **limit** (PEL) is 90 dBA for all workers for an 8 hour day. The **OSHA** standard uses a 5 dBA exchange rate.
  - Normal conversation is about 60 dB
  - a lawn mower is about 90 dB
  - A loud rock concert is about 120 dB

www.osha.gov



TOOL SAFETY

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COMMON SHOP TOOLS

Constructing a robot will require the use of hand tools. Most people think of hand tools as wrenches, screwdrivers, chisels, and so forth, but the term also applies to any hand-held tool or implement used to accomplish a task. Always use the proper tool for the job. Example: DO NOT use a wrench for a hammer or a screwdriver as a chisel.

TOOL RULES

- 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 Safety Captain and Mentor so the tool can be replaced or sent for repair.
- When using a tool, place the work on a bench or hard surface rather than in the palm of your hand.
- When using knives/blades, direct your cutting strokes away from your hand and body and be aware of those around you. Wear gloves.

TOOL STORAGE

- Store sharp-edged or pointed tools in a safe place. When carrying tools, cover the point or any sharp edges with shields.
- NEVER carry unshielded tools in your pocket. Don't leave tools on overhead work surfaces. They may fall and strike someone below.
- Store equipment in a location where it will not create a safety hazard or get damaged.

FIRE EXTINGUISHERS

- Four classes of fire extinguishers
  - Class A extinguishers will put out fires in ordinary combustibles such as wood and paper.
  - Class B extinguishers are for use on flammable liquids like grease, gasoline and oil.
  - Class C extinguishers are suitable for use only on electrically energized fires.
  - Class D extinguishers are designed for use on flammable metals

- Multipurpose extinguishers can be used on different types of fires and will be labeled with more than one class, like A-B, B-C or A-B-C.
- For home and FIRST, you need an ABC Class Extinguisher

PROPER PROCEDURE TO EXTINGUISH A FIRE

- Typically, fire extinguishers are fairly easy to use in the case of a fire. Most of the types operate using the P.A.S.S. technique:
    - **P.** Pull the pin on the fire extinguisher in order to break the tamper seal.
    - **A.** Aim the fire extinguisher low, with the nozzle pointed at the base of the fire.
    - **S.** Squeeze the handle of the fire extinguisher to release the extinguishing agent.
    - **S.** Sweep the nozzle from side to side while pointed at the base of the fire until it is extinguished.
- If the fire re-ignites, repeat the last 3 steps.

INJURIES AND ACCIDENTS

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BATTERY SAFETY

CAUTION: Batteries contain acid. This substance, H_2SO_4, is a corrosive, colorless liquid that will burn your eyes, skin, and clothing. The team Mentor and Safety Captain should post the Material Safety Data Sheet (MSDS, see example in Appendix C) for the battery in use and train all team members about battery safety. You can find emergency handling and first aid procedures on the MSDS, along with proper protection for handling cracked or damaged batteries, and information on disposal of the battery.

DAMAGED BATTERY

General Damaged Battery Information and Warnings

Any battery that is visibly damaged in any way is dangerous and unusable. Don't take a chance- don't use it!, Here are reasons you should not use a damaged battery:

1. It contains stored electrical energy that could cause the battery to rapidly heat up due to an internal electrical short circuit, and possibly explode.
2. 2. The 12V batteries FIRST provided in your Kit of Parts contain sulfuric acid that will burn human tissue on contact.

HOW TO HANDLE A DAMAGED BATTERY

- 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 MSDS.
  - Don’t take a chance- don’t use it!

HOW TO REMEDY A BATTERY ACID SPILL

Necessary Safety Materials

FIRST recommends that teams keep the following items readily available whenever working with batteries:

1. A box of sodium bicarbonate (baking soda) to neutralize any exposed acid electrolyte.
2. A pair of acid-resistant rubber or plastic leak-proof gloves to wear when handling a leaking battery.
3. A suitable non-metallic leak-proof container in which to place the defective battery. A plastic tote or bucket with a lid works best.

HOW TO REMEDY A BATTERY ACID SPILL

Procedure for Handling a Leaking Battery

When an electrolyte leak occurs:

- Neutralize it by pouring the sodium bicarbonate on all wetted surfaces. The bicarbonate of soda 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
- Follow emergency handling instructions of the MSDS and notify Mentor.
- Put on the gloves before handling the battery.
- Place the battery in a leak-proof container for removal
- Be sure to neutralize any acid on the gloves before removing and storing them
- Seek medical attention if skin came into contact with any chemicals
- Properly dispose of the battery, which is now a hazardous material

HOW TO REMEDY A BATTERY ACID SPILL

At a FIRST event:

1. Immediately send the person in contact with acid to the First Aid Station/EMTs.
2. Report incident to the Pit Administration Supervisor so that the individual can fill out a Medical Incident Report Form. Provide team number and available information.
3. Pit Administration will immediately contact Event Management for further instruction from Event and Venue Authorities.

BATTERY DISPOSAL

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

LOCATION OF TEAM FIRST AID KIT

COMPETITION SAFETY

Competition Safety

1. Use the buddy system when traveling and while at the event.
2. Note that FIRST Staff and Volunteers are distinguished by their name badges.
3. Travel safely and carefully between the pit and the playing field.
4. Demonstrate safe behaviors at all times, even in the heat of competition.
5. Establish a planned, safe lifting procedure of the robot, including cart removal after the lift.
6. Make sure the robot is properly secured if you must work underneath it. Never work on the robot on an unstable surface.
7. Assist and Mentor other teams with safety issues.

PIT AGE REQUIREMENT

Pit Age Requirement

- Children twelve and under must have a person eighteen or older with them at all times.
- There will be child safety glasses available to borrow and return.
- Child strollers and baby carriages are not allowed within the individual Pit Stations.

PIT STATION SAFETY

Pit Station Safety

Control access to your Pit Station; visitors are required to comply with PPE rules. Keep the aisle immediately outside your Pit Station clear for pedestrians and robot transit. When transporting your robot, politely keep pedestrians alert to your movement. Adhere to the specifics in the FRC Competition Manual, "At the Events" section:

1. Teams may not build any structure to support people or items for storage over the top of the work area in their team pit station.
2. Team structures, signs, banners, or displays cannot be higher than 10 feet above the floor.
3. Securely mount team Pit Station signs, banners, and displays. Be aware of your neighbors. Alert them if there is a hazard in your Pit or near theirs.
4. Maintain a clean, neat, and orderly Pit Station at all times. Remember, there are inspections after teams leave so be sure to do the following:
    1. Clean floor in and around your Pit Station
    2. Proper tool storage o Proper care of batteries and battery chargers
    3. Tidy storage of personal belongings and equipment

WORKING IN THE PIT

Working in the Pit

1. Properly use power strips (do not "daisy chain" – plug a power strip into another power strip)
2. Keep the work area neat and orderly
3. Participants should be wearing approved personal protective equipment, PPE, in the Pit at all times, including:
    a. ANSI-approved, UL Listed, or CSA rated, non-shaded safety glasses or safety rated prescription glasses with approved side shields must be worn at all times in the Pit area.
    b. Wear substantial shoes that completely cover the entire foot are required inside the Pit area. Lightweight shoes should not be worn to a competition.

TEAM SAFETY

TEAM 4405

THE ATOMS FAMILY

FIRE EXTINGUISHER LOCATION

- The fire extinguisher in our shop

TEAM SAFETY PLAN WHEN TRAVELING AWAY FROM THE NORMAL BUILD AREA

PCA's Policy:

BUILD SAFETY

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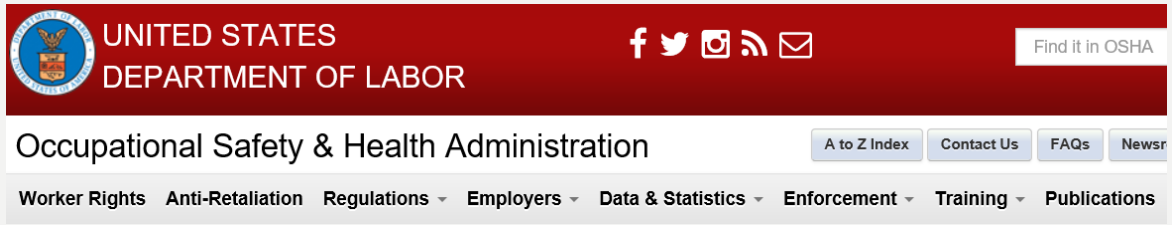
FIRST SAFETY ANIMATION CONTEST

- What?
  - Create a 40 second animation based on a theme provided by FIRST
- When?
  - Theme is normally announced in early Fall
  - Animation must be uploaded by a specific date in December
- How?
  - Software platform is open
  - Autodesk 3ds Max – available free to students
  - Can be a time-consuming activity – plan for 2-8 hours for every second
  - FIRST specifies a required format for the animation file

AWARDS FOR SAFETY AT EVENTS

- Safety Star of the Day
  - Awarded each Thursday and Friday
  - One person who impresses all Safety Advisors with knowledge of and commitment to safety
  - May or may not be the Safety Captain
  - Advisors consider input on the "Highlighting Safety" cards other teams submit
- Best Pit Safety of the Day
  - Awarded each Thursday and Friday
  - One pit that is recognized for being clean, organized, and working safely
  - Advisors consider input on the "Highlighting Safety" cards other teams submit
- UL Industrial Safety Awards
  - One team is selected by all the Safety Advisors on Saturday morning to win the trophy
  - Based on observations throughout the competition
  - Also 3 runners-up announced who will get hardhat pins, but no trophy

OSHA AND OTHER RESOURCES



- OSHA Resources
  - OSHA = Occupational Safety and Health Administration
  - General Link to publications and training:
    - https://www.osha.gov/
    - Especially note: Hand and Power Tools (OSHA 3080 - 2002)
- Other Resources
  - National Ag Safety Database
    - http://www.nasdonline.org/browse/215/hand-power-tools.html
    - Several documents and videos on safety
  - Material Safety Data Sheets (MSDSs) or Safety Data Sheets (SDSs)
    - Available from every supplier for almost everything you use, including aluminum
    - Search on-line