

Manage Your Team's Safety: Beyond Safety Glasses

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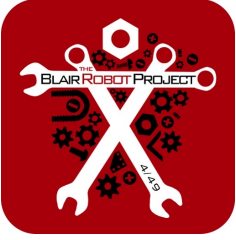
Mentor: Project Management and Safety

TEAM 449: the Blair Robot Project



How Do We Stay Safe at FIRST?

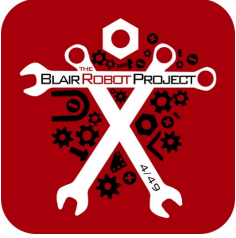




Purpose of Presentation

- To discuss an effective approach to MANAGING safety and creating a safety culture
- Will not give you a checklist of safety tips
- Intended to give you the tools to identify and develop that list
- Safety glasses ARE important and will help prevent eye injuries
- HOWEVER – they are not synonymous with safety
- To describe the principles of management systems and how they apply to safety
- **OUR ROBOTS ARE THE MOST HAZARDOUS POWER TOOL WE USE**





How Do We Stay Safe at FIRST?

Interactive Discussion

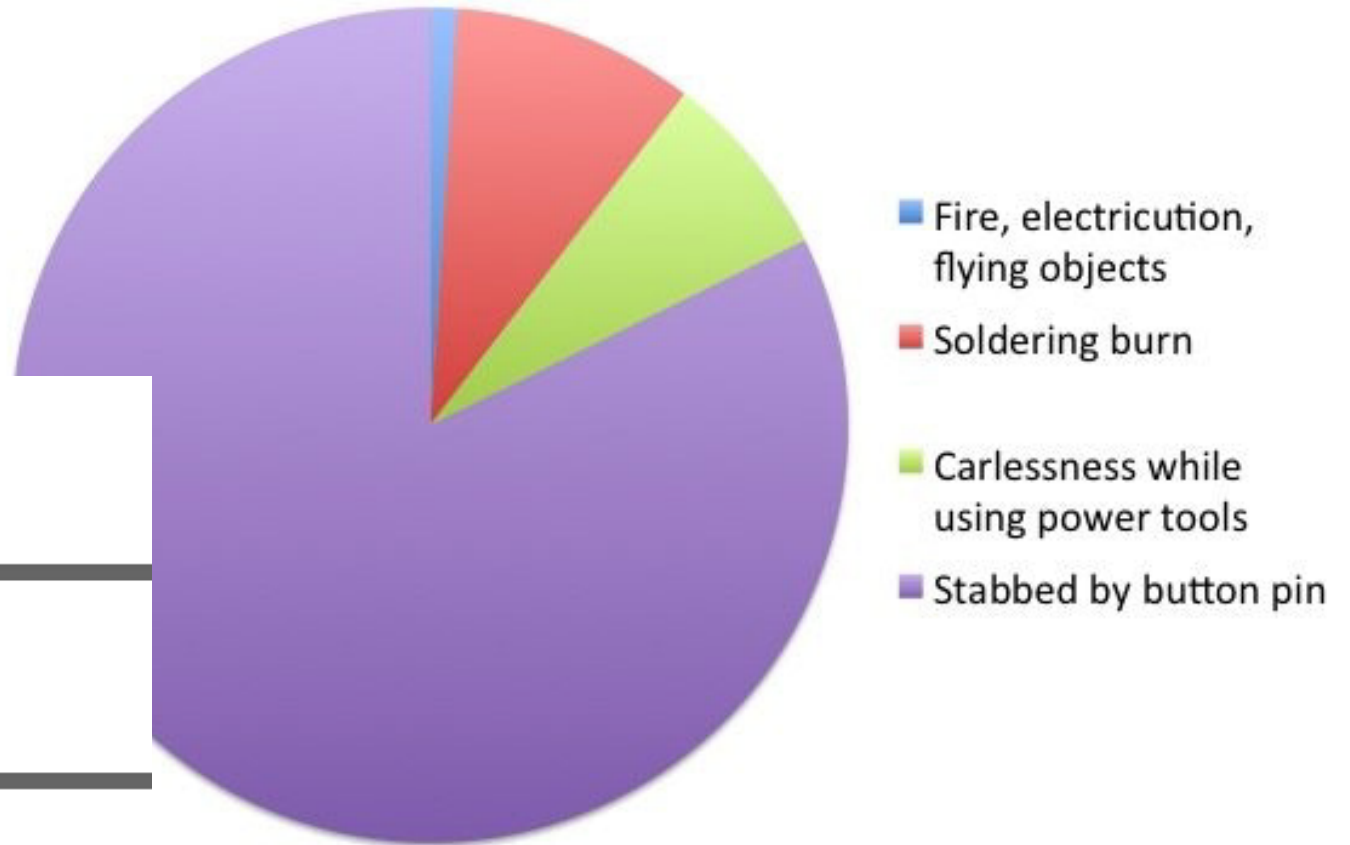
NOTE: what we do to stay safe should be the result of the analysis described in this session

^
39
v



Causes of FIRST injuries [i.imgur.com](#)
submitted 2 years ago by [_phospholipid_](#)
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Cause of FIRST injuries



^ [Nick_Lawrence](#) [FRC](#) [3940 / AndyMark](#) **44 points** 2 years ago

v You forgot 'Eye injuries while putting on safety glasses.'

[permalink](#) [embed](#)

^ [eatemuptigs](#) [3175 alum](#) **6 points** 2 years ago

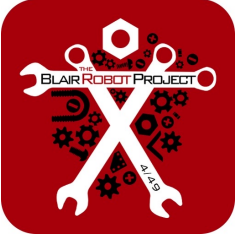
v Also the countless hangnails just from going in to tighten a bolt

[permalink](#) [embed](#)

^ [NIEZRECKAGE](#) **5 points** 2 years ago

v I probably cut myself on zip ties more than anything else.

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What's the Most Serious Injury You Know about at FIRST?

Why does this keep happening??!?!?

- during competition
- at home
- during team activity

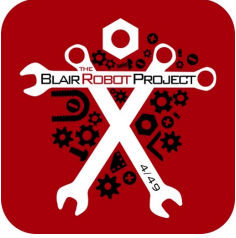
Many other injuries too!





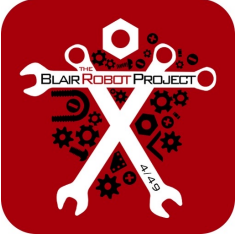
OUTLINE: Managing Safety Challenges

- FIRST activities are a real challenge in many ways – how can we do them safely?
- Principles of management – Plan Do Check Act
 - Interactive: identify safety hazards
- Prioritize: probabilities and consequences
 - Interactive: identify significant hazards for action
 - Interactive: develop policies and procedures
- Training and evaluation
 - Interactive: develop training program and checks
- Review: what's working/not? What needs improvement? How?



Principles of Management

- Based on international standards for management systems and OSHA regulations
- PDCA **Plan-Do-Check-Act** cycle, supported by continuous improvement
- **Plan**
 - Identify significant issues (in this case: safety hazards) in each area of activity
 - Establish procedures and policies (for safe activity)
- **Do**
 - Train all relevant people and carry out activities
- **Check**
 - Monitor to see that (whether) actions follow procedures
 - Monitor to see if they are effective (how many accidents or near-accidents); root cause?
- **Act**
 - Evaluate effectiveness of procedures and actions: change/improve where necessary



Safety Management : PLAN

Identify significant safety hazards in each area of activity

- areas of **activity**, and **processes** in each one
- **SAFETY HAZARDS** in each process
- Who may be affected by the issue and in what way – **never forget bystanders**
- **Significant hazards**: probability x consequences
 - Probability: how likely is an injury/event to happen?
 - Consequences: what are the outcomes from an event?
- **EXAMPLE: miter/chop saw**
- What are you **required** to do: law, school, insurance, team, parents...

Establish procedures and policies (for safe activity)

- **What needs to be done** in order to get things done safely?
- Include those affected and actually doing the work

Miter/Chop Saw - Hazards

- Blade/fingers interface
- Plane of action
- Loose materials
- Items thrown by blade
- Dust exposure
- Noise
- Hot workpieces



Miter/Chop Saw - Consequences

Injuries:

- Amputation
- Eye injury
- Head injury
- Cuts, Burns
- Impact from thrown pieces
- Hearing loss

Who's affected?

- Operators
- Supervisors, Bystanders





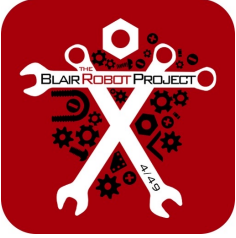
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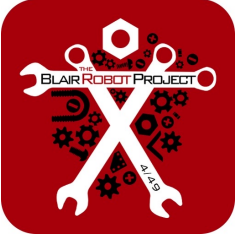
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Safety Management : PLAN

- Group discussion: identify areas of activity for FIRST teams
 - Build, competition, practice, away events, outreach ...
- Group discussion:
 - identify **processes** for one area – choose one process
 - Identify **safety hazards** for that process
- Group discussion:
 - Identify **significant** safety hazards – probability x consequences
 - These are the ones you will want to set policies/procedures for



Safety Management : PLAN/DO

ACTIONS: POLICIES AND PROCEDURES what needs to be done

- Group discussion: write a draft procedure for one process
 - Outline first, add if time permits

TRACKING AND MONITORING

- How will you evaluate what is actually going on? (Check)

TRAINING AND INSTRUCTION

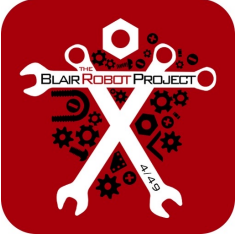
- Group discussion: create a training program for that process
 - Identify who will need to be trained (always more than you think)
 - What will they need to be trained on?
 - Include training on safety hazards as well as actions to take
 - Include any record keeping or reporting requirements



Safety Management : CHECK

TRACKING AND MONITORING

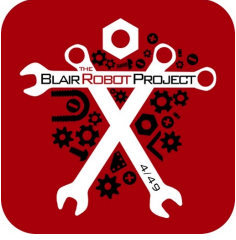
- How will you evaluate what is actually going on?
 - Set up system for tracking, what needs to be recorded and how?
 - Who will review and how often?
- What went well? What didn't go as planned?
 - Was there a procedure that wasn't followed?
 - Did an event happen that we didn't want?
 - **“NEAR MISS” TREATED THE SAME AS AN ACTUAL ACCIDENT.** Never depend on luck
 - For each of these – record event and ROOT CAUSE ANALYSIS (why, why, why?)
- Discuss scenario – fingertip @competition/home; practice crash



Safety Management : ACT

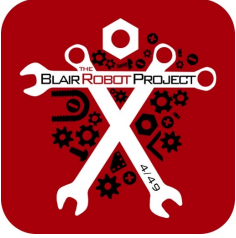
REVIEW

- Review records to identify trends, find important areas to address
- Are any continuing even though steps we taken to improve?
- **REMEMBER: NEAR MISSES ARE ALWAYS TREATED THE SAME AS ACTUAL ACCIDENTS.** Never depend on luck
- Determine what (if anything) needs to change in each PDCA stage
- [Track and evaluate continuous improvement - beyond our time]
- Discuss a scenario



Team 449 Significant Hazards

- Chop/Miter Saw (student operated under supervision)
 - No injuries or near misses (to date)
- Table Saw (mentor operated only)
 - No injuries or near misses (to date)
- Robot operation in practice
 - Injuries, plenty of near misses.
 - Flying pieces, collisions; driving w/o adult supervision
- **Outreach events – especially robot operation**
 - Many serious near misses
- Pneumatic systems, when pressurized

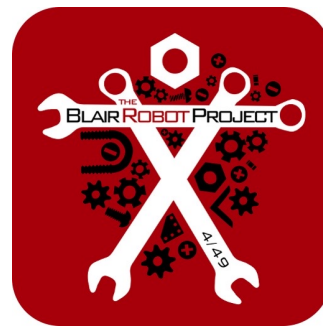


How Do We Stay Safe at FIRST?

In light of all we've discussed today

Interactive: Discuss

- List ALL areas of activity and the actions in each one
- Identify significant hazards and plan how to avoid them
- Include all team members in analysis and planning
- Train team members to identify hazards in each situation
- Report on injuries and near-misses with Root Cause Analysis
- Safety glasses ARE important – but everyone should understand why and what they don't protect you from
- **OUR ROBOTS ARE THE MOST HAZARDOUS POWER TOOL WE USE**



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