

NASA Student Launch ARW Safety in Reports

PRESENTED BY NASA Student Launch

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NASA STEM



Identify Safety Officer and their Roles

Facilities and Safety

Personal Protective Equipment

Procedures and Checklists

Formal Hazard Analysis



SAFETY FIRST



Student member of the team

- Not a parent
- Not a mentor

Identify their responsibilities

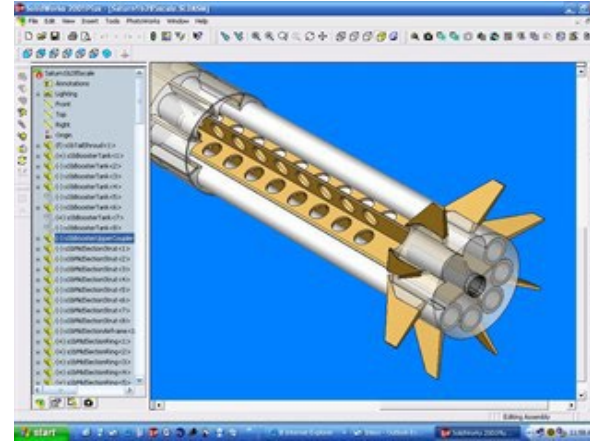
- Reasonable, no one person can “Ensure the safety of the team”
- Manage SDS, Hazard Analysis, Procedures and PPE
- Review Rocket and Payload designs with a “Safety Lens”



What safety rules do your machine shops, laboratories, and test areas have?

How are they enforced?

What safety equipment is available?



Personal Protective Equipment



Let us know what you have, and what is required.

When is it to be used?

What reminds your team members to use them?

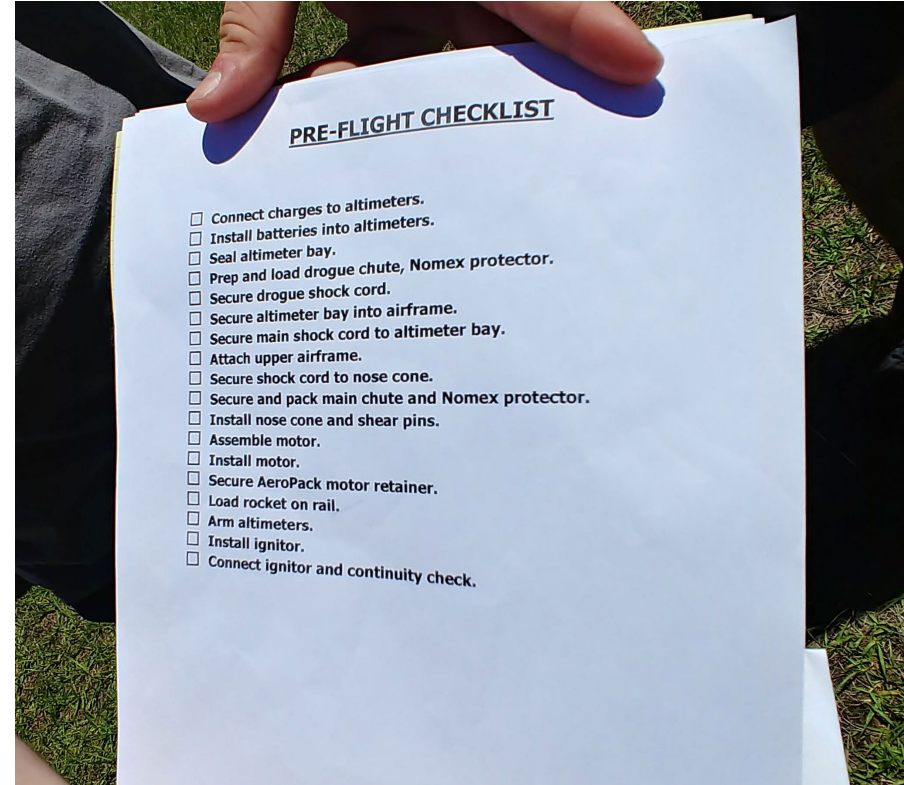
What happens if they don't?



Procedures

Step-by-step instructions for things like: Assembly of the Rocket/Payload, Setup on Launch Pad, Launching, Retrieving the Rocket

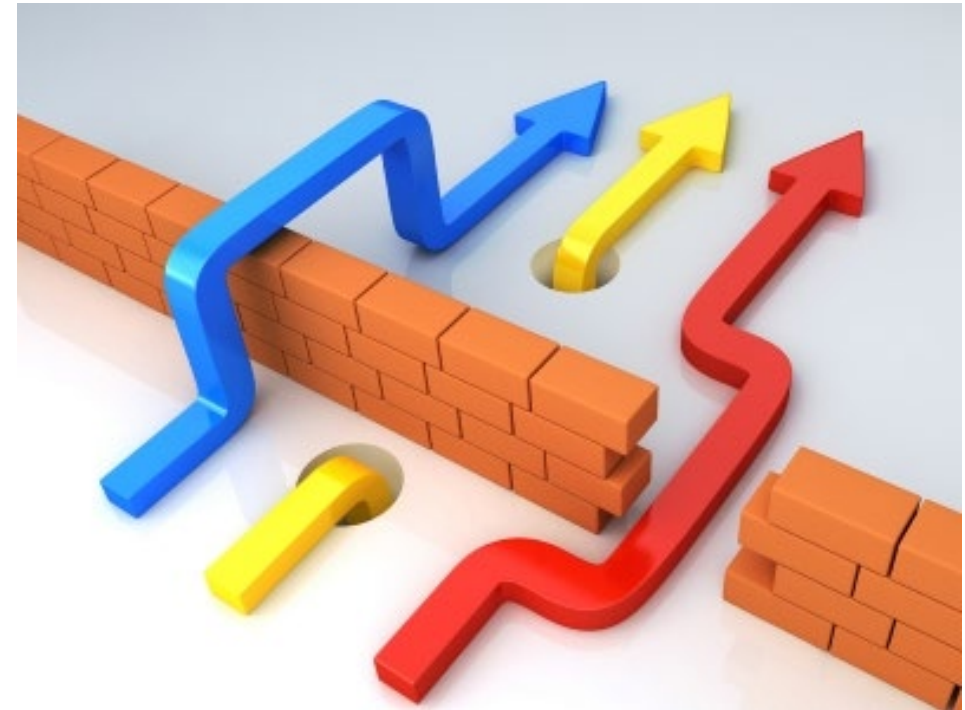
Often requires multiple people to “sign off,” helping ensure nothing is skipped or omitted



Hazard Analysis: an organized method of identifying, tracking, and mitigating hazardous conditions that can occur during a project or program.

3 main parts to a hazard analysis:

1. Description of Hazard
2. Identify controls and mitigations
3. Verification



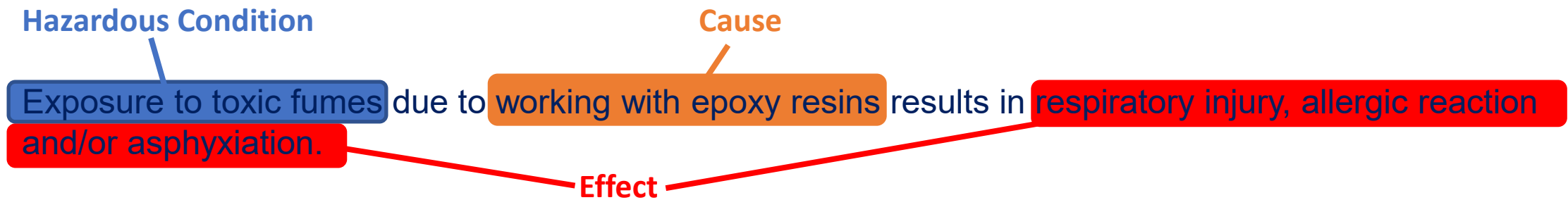
Hazards Analysis – Hazard Description



This identifies the hazard uniquely. There are many hazards in a project, so it is important to be able to describe them well and understand their implications.

The Hazard Description consists of 3 main parts:

1. Hazardous Condition – The source of injury, loss, or failure
2. Cause – How the Hazardous Condition occurs
3. Effect – The result if the Hazardous Condition occurs



Hazards Analysis – Controls and Mitigation



Controls can approach the hazard in two ways.

- Reduce the likelihood that a hazard will occur
- Reduce how severe the hazard will be if it does occur

The preferred hierarchy of controls is:

- Design – Alter the design of your system such that the hazard no longer exists.
Ex: Replace Epoxy with a non-volatile adhesive or bonding method
- Guards/barriers – Equipment in the system which prevents the hazard from occurring.
Ex: Oxygen monitors which alert users if the O₂ in the air becomes too low.
- Personal Protective Equipment – Worn equipment that protects the individual from the hazard.
Ex: Respirators or other breathing apparatus
- Procedures – Rules and steps to follow that, if followed correctly, will prevent the hazard.
Ex: Shop rules requiring the ventilation fan be turned on when using Epoxy.

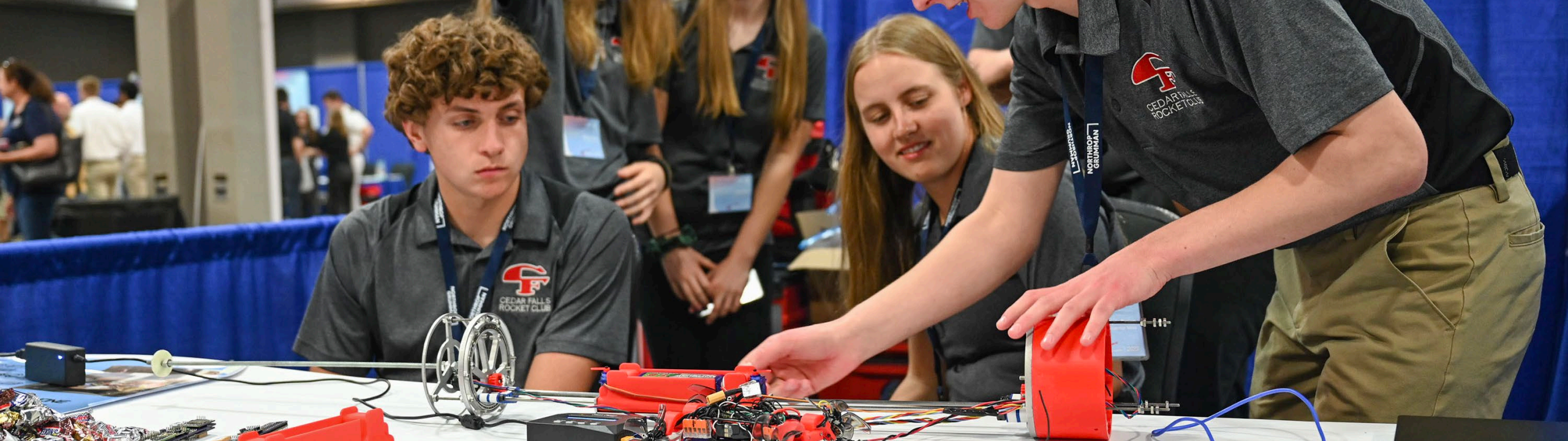


Verifications are how you ensure that the controls you describe will work or be used.

Examples include:

- Checklists with sign offs from multiple persons
- Testing done to prove that a design is robust and does not fail
- Documented inspection of equipment, tools, etc.
- Analysis and modeling (especially important early on in model rocketry)





Questions?



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