NASA Student Launch ARW
Safety in Reports

PRESENTED BY NASA Student Launch

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NASA STEM
Overview

Identify Safety Officer and their Roles
Facilities and Safety
Personal Protective Equipment
Procedures and Checklists
Formal Hazard Analysis
Safety Officer

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
Hazardous Condition Cause Effect

Exposure to toxic fumes due to working with epoxy resins results in respiratory injury, allergic reaction and/or asphyxiation.
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?