The Joint Safety Team at the University of Minnesota, Twin Cities: A Model for Student-Led Safety

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The Art and State of Safety Journal Club
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Safety Moment: Why Lab Coats Matter!

Lab Coat 50X

Lab Coat 200X

T-Shirt 50X

T-Shirt 200X
Features of a Good Lab Coat

- Knitted Cuffs
- Gripper Closures
- High Top Button

At least 35% Cotton (100% if working with open flames)
CHEM and CEMS Safety 2011 and Prior

<table>
<thead>
<tr>
<th>Compliance Oriented</th>
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<tr>
<td>EHS</td>
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<tr>
<td>Chemistry Safety Committee</td>
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<td>Research Safety Officers</td>
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<tr>
<th>Observations in Research Labs</th>
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<tr>
<td>Poor PPE compliance</td>
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<tr>
<td>Minimal training effort</td>
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<tr>
<td>Multiple spills and evacuations</td>
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<tr>
<td>Large amounts of clutter in laboratories</td>
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Culture gap on addressing safety in research labs
Starting the Initiative

Partnership: Dow

Offered suggestions and demonstrated industrial safety values
Setting the Groundwork

★ Lasting Changes

Joint Safety Team (JST)

Student-led initiative between CHEM and CEMS supported by departmental leaders and EHS

- Departmental Leadership
- EHS
- Researchers
Defining Goals

The mission of the JST is to increase safety awareness and improve the safety culture in the Departments of Chemistry (CHEM) and Chemical Engineering & Materials Sciences (CEMS) at the University of Minnesota

**Informal moto: Make safety cool!**

**C A R E**

<table>
<thead>
<tr>
<th>Compliance</th>
<th>Define and enforce standard roles and expectations through biannual lab audits</th>
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<tbody>
<tr>
<td>Awareness</td>
<td>Enhance safety through signage, safety moments, posters, and email communication</td>
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<td>Resources</td>
<td>Provide easy access to information and establish a system for maintaining records</td>
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<tr>
<td>Education</td>
<td>Provide frequent and relevant training</td>
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Safety Starts with U
JST is compiled of Lab Safety Officers (LSOs) from each research group (~ 90 people) as well as volunteer undergraduates, graduates, and postdocs.
Annual surveys are taken to access how:

- Graduate students and postdocs view safety in own lab
- Most common/recent safety concerns
- Improve the JST
- Data collection to compare results to previous years
Each research group post a **standardize** sign to provide contact information, PPE requirements, and hazards before entering the lab.

### Analysis & Compliance: Lab Signage

<table>
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<tr>
<th>Laboratory Information</th>
<th>Building &amp; Room</th>
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<tr>
<td></td>
<td>Principal Investigator, phone/email</td>
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<tr>
<td></td>
<td>Lab Safety Officer, phone/email</td>
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<tr>
<td>Description</td>
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| Minimum PPE Required    | |
| In an emergency, call 911. In non-emergency situations, contact the LSO or PI. |

| Hazards                 | |
| Flammable solvents, Pyrophoric chemicals |
| Acute Toxins, Corrosive chemicals |
| Long pants, Closed-toe shoes |
| Safety glasses, Lab coat |

In an emergency, call 911. In non-emergency situations, contact the LSO or PI.
Analysis & Compliance:
Biannual Student-led Lab Walkthroughs

Allows Lab Safety Officers (LSOs) to examine labs for:

- General safety concerns
- Proper lab signage
- Different safety practices
Education and Resources Committee

Education
• Bi-Monthly LSO Meetings
  • Special topic seminars (SOPs, Schleck lines, Lasers, Spills, first aid)
  • Annual LSO training

Resources
• LSO Guidebook
• Labeling system for samples
• Safe Operating Cards (SOCs)
• Clean-out events
LSO Guidebook

- Defining LSO roles and responsibilities
- Guidelines on writing and maintaining SOPs
- Record keeping
  - EHS training records
  - Lab specific training records
- Addition resources and templates
Public Relations Committee

Committee Mission:
– Maintain stall wall moments and safety posters
– Help implement and keep track of safety moments
– Maintain a social media presence
Goals of CC Committee

• Manage industrial patronships
  • Organize tours to Valspar
  • Establish safety themed luncheon series
• Help local PUIs establish safety teams closely related to ours, and invite their students to participate in our events
• Help local organizations establish safer SOPs for chemical

Received funding from ACS (Innovative Project Grant) and seeking industry funding
Growth of the JST

2012
- Initial DOW trip/launch of the UMN JST
- Administration Committee (AdCom) formed (7 members)
- Formation of E&R and A&C committees with members of the AdCom Committee

2014
- Committee members (up to 5) began to receive stipends
- Started collaboration with Valspar (now Sherwin Williams)

2016
- Began to reach out for external collaborations with academic and professional establishments

2018
- Attended and assisted in the launch of Research Safety Student Initiative (RSSI) at Northwestern U
- JST co-hosts ACS seminar titled “Developing Graduate Student Leadership Skills in Laboratory Safety”

Current
- The UMN JST is widely recognized as a leader in student-led safety

- Implemented ½ TA financial support for president
- Creation of the PR committee
- Each Committee Chair receives stipend
- Committee members reduced from 5 to 4 to maintain total amount of paid JST members
- 10 students visited DOW to discuss growth and helped U-Chicago and Northwestern U launch programs based on the “Minnesota Model”
JST Spending

Mean is $1500. Does not include stipends.
Measured Impact of the JST
Learning Experience Reports

Student-led, department wide initiative
Encourages open discussion of lab incidents & “near misses”
Develops safety awareness for future career opportunities

Incident Occurs

Accident Investigation

Was the incident serious?

FROI

Was someone injured?

LSO/Coworker

Departmental Supervision

Researcher

JST Distribution
- Stall Wall Moments
- Safety Moments
- Safety Alert Emails
- JST Safety Events
- All-LSO Meetings
- etc.

LER Submission

Safety Committee Review & Edit

Guideline Review
Elements That Were Key to Success

- Support from departmental leadership
- Support from DEHS
- Guidance from DOW
- Community of graduate students feeling unsafe in their work environment and wanting change
Current Challenges

- High turnover of members
- Key EHS staff members leaving UMN
- Departments not willing to pledge any more financial support
- LSOs becoming complacent, and partaking to improve resumes rather than safety culture
- Training of new LSOs
- Unattendance of JST events
Recent UMN Incident

- Fischer Esterification carried out on two new substrates (propargyl alcohol and alkyne) on 35 g scale in sulfuric acid at 70 °C. The mixture detonated after 30 minutes. The researcher was not wearing a lab coat, and the hood sash was raised due to another experiment being carried out simultaneously. The researcher suffered cuts and first-degree burns. Lab mates helped researcher to safety shower and contacted emergency services
  - Scale up sequentially
  - Recognize additional hazards associated with scale and high energy functional groups
  - Isolate high-risk reactions
  - Read several MSDS (only some listed that propargyl alcohols can be explosive with Bronsted acids)
  - Always wear lab coats!

- Report and lessons learned was shared with us 4 months after the fact. Several JST members were very unhappy about this (including myself)
  - EHS representee not attending AdCom meetings
  - No communication with safety committee
  - LER not submitted by LSO
Future Plans and Presidential Agenda

• Improve LSO appreciation
  • LSO open forums
  • LSO socials (when safe to do so)
  • Exclusive networking events
• Branch out to other colleges within UMN to help them establish their own LSTs
• Outreach to local PUIs and high schools
• Improve collaboration with other organizations
• Establish a more rigorous LSO training procedure
  • Short film
  • Yearly refresher training
  • LSO liaison program
• Establish more industry collaborations and improve funding