Safety Slick Q1 2021

Quarterly Research Safety Update

In This Quarterly Slick:

- What's Wrong with the Picture -be the first to answer and you will win a gift card (Starbucks of Blenders in the Grass)
- "It does not do to leave a live dragon out of your calculations, if you live near one"- Practicing Risk Assessment
- A Guide for Shipping Hazardous Materials (Hazmat)
- Bio news
- Training Opportunities for Field Researchers
- April's fool day is fast approaching!

Training

Click here for details on upcoming EH&S courses.

What's Wrong with the Picture?

Many of you enjoyed solving the math puzzle from our previous issue. Dr. Dave Bothman, CNSI was the first to provide the correct answer: X=29, Y=30. Dave congratulations and thank you for participating!

Today's puzzle is to find what is wrong with the setting in the picture below. Submit your answer and if you are the first to detect all safety violations, you will be the winner this time! Remember, fume hood is an important engineering control and one of the most effective safety equipment in the lab if used correctly. Take 3 minutes to watch this informative video on proper use of a fume hood. It will also help you with the answer to today's question. Submit answers to ehs-

labsafe@ucsb.edu as soon as you are ready.


KEWAUNEE
Flame Hood Usage Guide
Chemistry Building
CAUTION
UCSB Scuba Club
Dive Now, Study Later
DUPONT
EHS-HOOD #1
CAUTION
MATCH ARROWS
TO ENSURE
MAXIMUM
SAFETY
FLAMMABLE
KEEP FIRE AWAY

More opportunities to win a gift card below - see the article on Risk Assessment!

"It does not do to leave alive dragon out of your calculations, if you live near him."
– J.R.R. Tolkien

Practicing Risk Assessment

Opportunities to win Starbucks or Blenders in the Grass gift cards at the end of the article!

Sources: Princeton University and Washington University

Risk Assessment is part of our everyday life. Consciously or not we assess the risks involved in all our actions: crossing the street, engaging in sports activities, choice of food, deciding on going to work by bike or by car if the weather forecast shows a 60% chance of rain. And let's not forget the helmet. We are natural at making decisions by imagining the worst possible outcome of the situation multiplied by the estimated probability. For example going by bike on a day with 60 % of chance for rain can result in getting wet and feeling cold at work, wearing wet clothes. There is a higher chance of an road accident and slip and falls as well. The likelihood of rain on that day is high, and the consequences are medium to high as well. It would

be wise to choose to go by car. If we decide to take the risk, however, we can prepare by taking with us another set of clothes, dressing to be notices and using bike lights when biking, being alert of our surroundings and slow our breaks. A helmet is a must.
If risk assessment is so important for our every day's life can we ignore it in the lab? That's a rhetorical question, of course. However, we have a lot of room to grow in this area since most of us have not been trained on how to perform a detailed risk analysis of lab experiments and procedures.
The benefit of risk assessment at the workplace is prevention of injury and illness, property damage and financial loss. Risk assessment should be conducted when introducing new equipment or procedures in your lab. It begins with identifying the hazards at each step of the process.

What is a hazard you might ask? A hazard is potential for harm. And risk? A risk is the probability that a hazard will cause harm. Risk has two components - likelihood of a hazard causing harm and the severity of that harm.

Risk Assessment in the lab can be broken into four phases:

Phase 1 of the assessment will identify the scope of work. What are the tasks that must be evaluated? A well-defined scope of work is a key starting point for all steps in the risk assessment, considering all aspects of health, safety and environmental hazards (e.g. chemical and biological spills and exposures, physical hazards such as high noise, moving parts, hot surfaces, etc.).
Phase 2 is associated with researching the potential hazards: Discuss with the team or the PI routine and infrequent tasks, near misses, and safety concerns; Learn more about the hazards of all materials and chemicals involved in the experiment. Your goal is to discover the following information before starting your experiment or project:

- What are the inherent hazards of the materials, equipment, and activity?

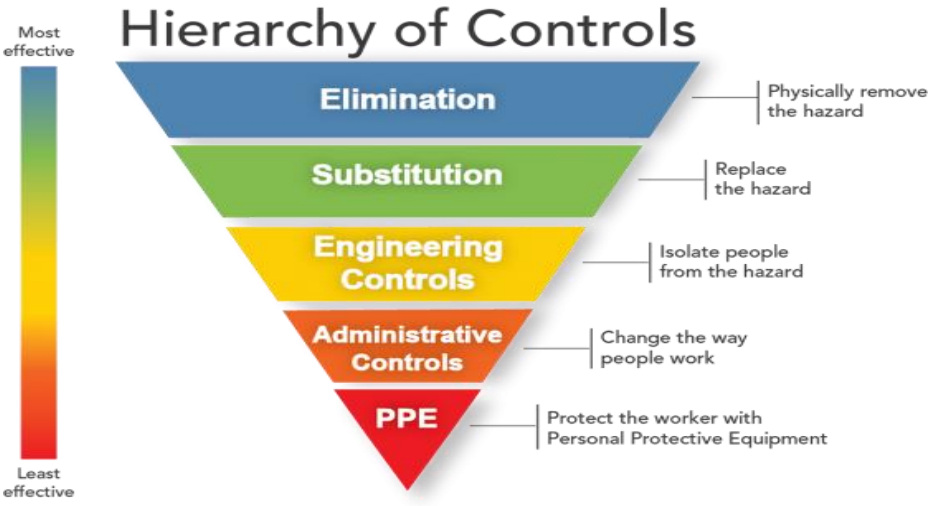
- What can go wrong?
- How could it happen?
- What are the worst-case scenarios?
- What are the contributing factors?
- Where it would happen (environment)
- Who or what it would happen to (exposure)

You can visualize the results of your risk analysis by utilizing a Probability and Severity **Risk Matrix** (see below). It will help you to minimize the probability of potential risk.

		Severity of Consequences – Personnel Safety			
Likelihood of Incident Occurrence		No injuries	Minor Injury	Significant Injury	Life threatening
	Very Likely	Low	High *	Unacceptable **	Unacceptable **
	Likely	Low	Medium	High *	Unacceptable **
	Possible	Low	Medium	High *	High *
	Rare	Low	Low	Medium	High *

Hazard Risk Level	Action
Unacceptable **	**STOP!** Additional controls needed to reduce risk. **Consult with PI.**
High *	Additional controls recommended to reduce risk. **Consult with PI.**
Medium	Ensure you are following best practices. Consult with peers, PI, and EH&S as needed.
Low	Perform work within controls

The results of the evaluation above should guide you in the selection of risk management techniques including elimination, substitution, engineering controls, administrative controls, and personal protective equipment. **This is known as the Hierarchy of Controls and defines Phase 3 of the risk assessment:**



The most preferred method of controlling risk is to <u>eliminate the hazard</u> altogether. In most cases, elimination is not feasible and when possible, **substitution** is the best approach to hazard mitigation. When possible, substitute less hazardous agents in place of their more hazardous counterparts. This also applies to conditions and activities. Examples include substituting toluene for benzene, non-lead-based paints for lead-based ones, or SawStop table saws for existing traditional table saws.

Engineering Controls consist of a variety of methods for minimizing hazards, including process control, enclosure and isolation, and ventilation (e.g. fume hoods, biosafety cabinets, glove boxes, etc.).

Administrative controls are controls which alter the way work is performed. They may consist of policies, training, standard operating procedures/guidelines, work scheduling, etc. These controls are meant to minimize the exposure to the hazard and should only be used when the exposure cannot be completely mitigated through elimination/substitution or engineering controls.

Personal Protective Equipment (PPE) should always be used as a last line of defense and is an acceptable control method when engineering or administrative controls cannot provide sufficient protection. PPE may also be used on a temporary basis while engineering controls are

being developed.

It is highly recommended to finalize the risk assessment with a test run of the newly designed experiment (**Phase 4**). Can you do a dry run of the procedure without hazardous chemicals/reagents/gases to familiarize yourself with equipment and demonstrate your ability to manipulate the experimental apparatus? Can you run the procedure with a less hazardous material? Can you test your experimental design at a smaller scale? If your procedure requires multiple people, would a tabletop exercise be useful?

Taking the time to perform risk analysis prior each new experiment and procedure will contribute not only to the health and safety of you and your peers but also will optimize the process and will lead to more productive research.

The University of Washington has developed a Risk Assessment Tool, which can help you through the process. As usual the EH&S Lab Safety division is here to support you and answer questions.

So now that we covered the theory, let's put our knowledge to practice!

An example of risk assessment can be found here.

We have a gift card available (Starbucks or Blenders in the Grass by your choice) for the most detailed risk assessment submitted in a response to this article. So think of a procedure in the lab that would benefit from a risk assessment. Submit your risk assessment to ehs-labsafe@ucsb.edu and you might be the winner.

If you are working in the field, we encourage you to develop a risk assessment for your job using the Field Safety Plan page 3. The hazard tables available on our webpage can help you with the process.

Please submit your ready risk assessments for the chance to win a gift card!

A Guide for Shipping Hazardous Materials

Sources: EHS website; ShipBob, Department of Transportation

Hazardous materials (HAZMAT) are among the most complicated, regulation-heavy, and expensive products to ship. Because they could pose a danger to people, property, or the environment, there are many rules and regulations required to transport them. Materials that are shipped to a lab for testing or analysis, sent to a colleague for collaborative research, shipped to another research facility, returned to the manufacturer, or sent to a field research site must follow all applicable shipping requirements.

Per United States Federal Law, anyone involved with shipping hazardous substances is required to receive a special training. Log into the UCSB Learning Center **and search the course catalog using the keyword "HazMat Shipping".** Shippers are directly responsible for the correct and legal transport of dangerous or hazardous materials by ground, air, or sea. **Warning:** Failure to comply with federal and international transportation regulations when shipping hazardous materials can result in a civil penalty of $77,114 for each violation, except the maximum civil penalty is $179,933 if the violation results in death, serious illness or severe injury to any person or substantial destruction of property. Criminal penalties including five years imprisonment are possible outcomes as well.

So let's get it right!

There are four major steps for shipping hazardous materials: 1. Get Trained 2.Identify the Hazard; 3. Proper packaging; 4. Communicate the Hazard

1. Required Training. The learning Center offers several training courses on shipping hazardous materials. Check the EH&S website for a detailed list of available training, including

specialized topics such as shipping dry ice, excepted quantities, etc.

2. **Identify the hazard**. What materials are HAZMAT? HAZMAT products are classified into nine classes, ranging from the most extreme materials like explosives, toxic and radioactive materials, to more seemingly minor products like pesticides, lithium batteries and first aid kits that still pose a shipping and handling risk. Each of these classes have a specific-sub class that also provides more details on the classification.

To identify your hazardous material look up the product's Safety Data Sheet (SDS), which includes a transportation hazard classification for the product. This classification provides a four-digit ID number, a proper shipping name, the hazard class, and the packing group for the product. Use this information to identify the correct entry on the Hazardous Materials Table.

The Hazardous Materials Table contains references to the appropriate packaging sections, certain quantity limitations, and any special provisions or exceptions. The table also contains the label codes and basic description for the hazmat. Obtaining the correct hazard classification is the most important part of getting started with shipping hazmat. All other requirements, including packaging, marks, labels, and shipping paper requirements, will be based on the hazard classification of a product.

Important: Prior to shipping items internationally, contact the campus Export Control Office(exportcontrol@research.ucsb.edu) for assistance in determining whether an export license is required for your shipment.

The University of California has a contract with AMERICAN CARGOSERVICE for help with freight forwarding, customs clearance or commercial invoices.

3. Proper Packaging.

After properly Identifying the Hazard, you need to determine proper packaging based on the quantity and nature of the material. The material to be shipped will fall under a particular packing group (PG) with specific packing requirements.

4. Communicate the Hazard.

Marking and labeling the package with appropriate hazard communication is an important next step. This can include, but is not limited to, orientation arrows, shipper's information, identification number and proper shipping name markings, and hazard class labels. Be sure to follow the correct regulations when it comes to marking, labeling, and placarding. Even the orientation of your arrows can prevent a product from being shipped. **Important:** Contact Bruce Carter, EH&S at bruce.carter@ucsb.edu to obtain a 24/7 Emergency Response Phone Number for the shipping papers. EH&S can also provide you with some of the required hazardous labels.

Some carriers require additional paperwork in order to ship HAZMAT items depending on the material to be transported (e.g., the UN identification number, proper shipping name, hazard class, and packing group, as well as the quantity, number, and type of packages, emergency contact information, and shipper's certification). Depending on the carrier you work with, ask them about all of the HAZMAT shipping requirements before you start shipping dangerous goods. FedEx requires the use of FedEx approved software to prepare the shipping declaration.

For advise on shipping contact:

Chemical materials: bruce.carter@ucsb.edu

Biological materials: bishop@ucsb.edu

Radioactive materials: robert.brown@ucsb.edu

Bio News-Jamie

TBD

Fieldwork Toolkit Leadership Training Series

Improve your leadership and communication skills! This training series will feature timely, challenging topics lead by subject matter experts, presented online in workshop format with opportunities to discuss scenarios, practice skills, and plan for your specific field projects and settings. The training series is free and will be hosted by the UC Field Research Safety Center of Excellence online Wednesdays in March. Space is limited. Participants are expected to attend all four workshops and will earn a leadership training certificate. Any questions may be directed to the planning team: Claudia Alli (UCLA), Sara Souza (UC Berkeley), or Jason Herum (UC Davis). For more information and resources, visit the UC Field Research Safety Center of Excellence website or view the 2020 Fieldwork Toolkit Webinar Series.

Register Now

Workshop Details and Speakers Bios

April Fool's Day

Prank Ideas

If you need a quick prank idea for April Fool's day here is one: dip brussels sprouts in melted chocolate. Chill them in the fridge and offer them to your victims as home made chocolates. Enjoy the funny faces and reactions they will have. For this prank choose some of your more

forgiving friends and family members! Milk chocolate makes for the worst combination (in comparison to dark chocolate).

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