

In this issue of the Environmental Health and Safety (EHS) Listserv, November 5, 2014:

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1. Walking and Working: Ice and Cold

Both walking and working in snowy/icy/cold conditions are the focus of this article. Let's begin by reviewing suggestions for "walking." Walking around campus or from your vehicle/bus to your workplace during the winter can be hazardous. Every winter slip/trip/fall injuries at UNL attributed to snow and ice account for approximately 3% of the overall number of injuries in a given year. That may not sound like much...until YOU are one of the injured.

Just like winter driving, winter walking requires anticipation. Think "defensive walking." Follow these guidelines to help avoid injury:

- Use **appropriate footwear** for the surface/conditions. Avoid slick-soled shoes. Wear boots/shoes/overshoes with grip soles such as rubber or neoprene composite.
- Plan ahead to give yourself **sufficient time** to reach your destination.
- Plan your route and **watch where you walk**. Avoid routes that have not been cleared or appear glazed over.
- **Avoid carrying** large/heavy/awkward objects that can obstruct your view or affect your balance or center of gravity.
- Use special care in **parking lots**. Try to park in areas free of ice. When entering/exiting your vehicle, use your vehicle for support.
- Think about the **walking surface** whenever you move about campus, especially on days that are sunny. Some areas previously cleared may have partially thawed and refrozen, especially near the edges, leaving a glaze of ice.
- Use caution when **entering a building** as any snow left on your footwear will thaw with the building heat. Notice if the floor is wet from previous entrants. Avoid such indoor wet areas and if they cannot be avoided, traverse them the same as you would walk on ice. Contact Custodial Services to inquire about equipping areas prone to track-in with walk-off mats.
- **Pay complete attention** to your walking. Don't talk on the phone or text, search for items in your purse/briefcase, get distracted by greetings/conversation, think ahead to events of the upcoming day, etc.
- Always use "**defensive walking**" techniques. Watch for hazards like black ice.

If you must walk on slippery surfaces:

- Take short steps or shuffle your feet. Walk more slowly so you can react quickly to a change in traction.
- Bend slightly as you walk to keep your center of gravity over your feet. Curl your toes under and walk as “flat-footed” as possible.
- Test potentially slick areas by tapping your foot on them before proceeding.
- Avoid uneven areas and stepping up/down on icy areas such as curbs.
- Keep your hands out of your pockets. Use your arms for balance. Think “penguin.”

Resources Specific to Winter Walking:

- “Walk Like a Penguin Safety Campaign” video
<https://www.bing.com/videos/search?q=walk+like+a+penguin+safety+campaign&FORM=VIRE5&fromSSL=0#view=detail&mid=27D5A5BCB15D6E9725FA27D5A5BCB15D6E9725FA>
- Be Safe On Ice <http://bss.fnal.gov/fire/walking-safely-on-ice.pdf>
- Safe Winter Walking <http://www.ehs.iastate.edu/prep/weather/winter/safe-winter-walking>

Next let’s look at “working outdoors.” There are a number of hazards associated with working outside in cold weather. Be aware of potential hazards, their warning signs, and how to avoid the hazard so you can safely navigate this winter season.

- **Hypothermia.** In cold weather your body may lose heat faster than it is produced. Prolonged exposure will eventually use up all your body’s stored energy, resulting in an abnormally low body temperature. If low body temperature affects your brain, you may not be able to think clearly or realize you are in trouble. Warning signs include: shivering, fatigue, and loss of coordination.
- **Frostbite.** Frostbite is an injury caused by freezing, characterized by reduced blood flow, leading to lack of feeling and color in the affected body parts. Most often the body parts affected are nose, fingers, toes, ears, cheeks or chin. Warning signs include: numbness, aching, tingling or stinging, bluish or pale skin, and skin that feels unusually firm or waxy.
- **Chilblains.** Repeatedly exposing skin to cold temperatures can cause permanent damage to groups of small blood vessels in the skin, characterized by redness and itching that return with subsequent exposures. Body parts most often affected are cheeks, ears, fingers and toes. Warning signs include: redness, itching, blistering/ulcers, and inflammation.

Prevention is always the best policy to avoid cold stress. Here are some precautions workers should take if they must work in extreme cold:

- Wear appropriate clothing. Layered clothing, loose and not too tight, provides insulation yet allows good blood circulation. Wear footwear designed for cold, wet conditions.

- Cover your head to reduce body heat loss. Protect ears, face, hands and feet.
- Try to schedule work for the warmest/driest/least windy part of the day. Take regular breaks in a warm, dry, and protected area. Limit the total amount of time outside during extremely cold weather.
- Do not touch cold metal surfaces with bare skin.
- Stay hydrated by drinking plenty of fluids, especially warm fluids. Avoid drinks with sugar and/or caffeine.
- Avoid exhaustion or fatigue, because energy is necessary to keep muscles warm.
- Be aware if any medications you are taking might make you more susceptible to cold stress. Certain medical conditions also increase your risk: diabetes, high blood pressure, or cardiovascular disease.
- Monitor your physical condition and that of your co-workers. You may not be aware of warning signs that a co-worker would be able to observe.

A National Weather Service Wind Chill Chart will help you evaluate temperature/wind combinations to work more safely outdoors when the weather is cold.

Other wintertime hazards, often related to snow cleanup, but also applicable in other outdoor work situations are:

- Lacerations or amputations from improperly attempting to clear jams in snow removal equipment. Make certain all powered equipment is properly guarded, isolated from power sources, and all parts have stopped moving before performing maintenance or attempting to clear a jam.
- Strains and sprains from prolonged or improper use of shovels or other snow removal equipment. Keep in mind body movement and positioning. Avoid overexertion.
- Carbon monoxide poisoning can result from idling vehicles or use of gasoline or kerosene-powered heaters or generators in an inadequately ventilated area. Avoid idling vehicles in garages or near buildings where the air-intake may allow exhaust to enter the building. Do not use gasoline/kerosene burning devices indoors without proper ventilation of exhaust fumes. NOTE: Carbon monoxide (CO) is a colorless, odorless, tasteless gas that can cause sudden illness or death. Seek prompt medical attention if you suspect CO poisoning and are feeling dizzy, light-headed, or nauseous.

Resources Specific to Working Outdoors:

- National Weather Service (NWS) Wind Chill Brochure and Chart <http://www.nws.noaa.gov/om/windchill/wind-chill-brochure.pdf>
- Occupational Safety & Health Administration (OSHA). “*Tips to Protect Workers in Cold Environments.*” http://www.osha.gov/as/opa/cold_weather_prep.html
- OSHA. “*Cold Stress Quick Card: Protecting Workers from Cold Stress*” <https://www.osha.gov/Publications/OSHA3156.pdf>

- OSHA “Winter Weather: Plan. Equip. Train.”
https://www.osha.gov/dts/weather/winter_weather/
- Centers for Disease Control (CDC) & Prevention. “Cold Stress.”
<http://www.cdc.gov/niosh/topics/coldstress/>
- CDC “Frequently Asked Questions: Carbon Monoxide”
<http://www.cdc.gov/co/faqs.htm>

2. Promoting an Academic Safety Culture, Recommendation #3

Recently the National Research Council (NRC), the principal operating arm of the National Academy of Sciences and the National Academy of Engineering, completed work on a publication titled “**Safe Science: Promoting a Culture of Safety in Academic Chemical Research.**” The recommendations within this report apply beyond chemical laboratories/research.

The shift away from mere compliance and toward promoting a strong, positive safety culture has already yielded benefits in other industries. The hope is that the NRC recommendations help move academic research in a similar fashion - toward the adoption of a culture of safety that goes beyond inspections, standard operating procedures, and safety plans, all with the ultimate goal of protecting the lives and health of the campus community.

Recommendations from this report will be reviewed one-by-one in each successive issue of the EHS listserv. The third recommendation is:

All institutions face a challenge of limited resources. Within this constraint, institutional head(s) of research and department chairs should consider the resources they have available for safety when considering or designing programs, and identify the types of research that can be done safely with available and projected resources and infrastructure.

This recommendation is fairly straight-forward: conduct only those activities for which proper facilities and safety equipment are available. It is essential that safety concerns be elevated higher than financial restraints. All members of the campus community are encouraged to report safety deficiencies to their department leadership so appropriate actions can be initiated.

Safety is a priority at UNL. Make sure it is a priority in your individual work location, laboratory or otherwise. To this end, consider adopting the following as your personal ethic:

- **Value safety:** Safety is an integral part of what one does, its automatic, and it does not change its priorities- it is never questioned and never compromised.
- **Work safely:** One continues to learn about safety, learns to recognize hazards, assesses the risks of hazards, manages the risks of hazards, and prepares to handle emergencies.

- **Prevent at-risk behavior:** One does not cut corners or bypass safety measures and shares this information with others, as needed.
- **Promote safety:** One encourages and acknowledges others for working safely.
- **Accept responsibility for safety:** One takes steps to work safely, setting a positive example for others, and being accountable for safety.

Resources

- NRC free download/read online: “**Safe Science: Promoting a Culture of Safety in Academic Chemical Research (2014)**”
http://www.nap.edu/catalog.php?record_id=18706&utm_expid=4418042-5.krRTDpXJQISoXLpdo-1Ynw.0&utm_referrer=http%3A%2F%2Fwww8.nationalacademies.org%2Fonpinews%2Fnewsitem.aspx%3FRecordID%3D18706
- American Chemical Society, pages 3-6, “**Increasing Safety Awareness: An Academic Imperative**”:
<http://www.acs.org/content/dam/acsorg/about/governance/committees/training/cptnewsletter/committee-on-professional-training-summer-2014.pdf>
- American Chemical Society “**Identifying and Evaluating Hazards in Research Laboratories**”
<http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/identifying-and-evaluating-hazards-in-research-laboratories-draft.pdf>
- EHS **Job Safety Assessment** SOP <http://ehs.unl.edu/sop/s-JSA.pdf>
- EHS Virtual Manual: <https://scsapps.unl.edu/VirtualManual/>

3. Are You a Researcher at UNL?

If you conduct any type of research at UNL, regardless of your department or area of interest, view the October 29, 2015, colloquium, “**DISASTER! Protect Yourself & Your Research**” now available online. Presenter Mark Robertson is the UNL Emergency Preparedness Coordinator. Natural and man-made disasters can result in loss of property, life, data, and access to UNL facilities. Take the steps recommended in the colloquium to protect your research and optimize continuity.

Resources

- EHS Safety Colloquium Series site <http://ehs.unl.edu/training/Colloquium>
- Office of Research and Economic Development Safety Colloquium site <http://research.unl.edu/laboratorysafetycolloquium/>

4. Chemical Storage – The #1 Deficiency

One of the top ten deficiencies found university-wide during safety and compliance audits conducted by EHS personnel of laboratories and other areas with chemicals

is: *Chemicals are not stored in a safe & proper manner, e.g. segregated by compatibility, unnecessary compressed gas cylinders stored within the laboratory, flammable liquids outside of rated cabinets, flammable liquids in a regular refrigerator or freezer, a spill scenario of > 20 liters exists.*

The inherent hazards of chemicals, as well as likelihood of spills, can be reduced by minimizing the quantity of chemicals on hand, including compressed gas cylinders. Order and store chemicals in the smallest feasible quantity and container size to minimize associated hazards/risks. Review existing stocks prior to ordering to ensure that only needed quantities are on hand. Regularly inspect chemical storage areas for excess or unneeded stock.

Proper segregation of chemicals is necessary to prevent incompatible chemicals/compressed gases from inadvertently coming into contact with each other. Appropriate storage information can be obtained from the Safety Data Sheet (SDS) of the chemical(s) under review. Storing chemicals in alphabetical order provides ease of locating a particular chemical but may inadvertently locate incompatible chemicals in close proximity.

A few other chemical storage considerations include:

- Are rated flammable liquid cabinets of sufficient capacity available? In general, try to limit storage of flammable liquids to a maximum of 60 gallons and store within a rated flammable liquid storage cabinet. Such cabinets should meet specific design criteria. Storage must be in a manner to not impede egress from the storage location, e.g. stored away from aisles and exit doors.
- Are refrigerators or freezers used to store flammable chemicals specifically designed for that purpose? Ordinary household refrigerators or freezers are not an appropriate choice.
- Are storage shelves and/or secondary containment devices compatible with the stored chemicals? For example, metal is degraded by corrosives such as acids and thus metal shelving/containers would not be a good choice for acid storage.
- Are chemical containers kept tightly closed when not in immediate use? If not, this presents a spill hazard and could cause worker exposures.
- Are all storage containers in good condition, labeled and intact? Regularly inspect storage areas for chemical leaks/spills, loss of container integrity, and intact labeling.
- Where are chemicals stored? Avoid storing chemicals above eye level, and never closer than 18" to the ceiling. Storing items close to the ceiling will impede the effectiveness of automatic fire suppression systems. Storing above eye level increases the risk of dropping a container.
- Are peroxide-forming chemicals stored in tightly closed, light-resistant containers, away from light, heat, direct sunlight, sources of ignition, oxidizers and oxidizing agents, with date of receipt, date of first opening, test date(s), and disposal date clearly indicated? If peroxide-forming chemicals are of

unknown age or history, crystals or solid masses are visible, chemical is discolored, string-like formations or liquid stratification exists, do not open the container and contact EHS for assistance.

- Are sources of ignition strictly controlled and observed in areas where there is use/storage of flammable chemicals? Workers must maintain awareness of research in their immediate area. For example, if one researcher is conducting an experiment including a flammable material, another researcher would not want to conduct their research requiring a heating torch/Bunsen burner in the same general area.
- Are chemicals stored in a fume hood? Remove unnecessary chemical containers from fume hoods when conducting operations within. The fume hood provides a certain amount of containment in the event of a fire or explosion, but extraneous chemicals within will greatly increase the resultant damage in an adverse event.

Review relevant EHS Safe Operating Procedures (SOPs) for further guidelines.

Resources

- **Chemical Safety SOPs** <http://ehs.unl.edu/sop/chemical-safety>
- **General Guidance for Chemical Ordering, Receipt, Distribution, Use & Storage SOP** http://ehs.unl.edu/sop/s-gen_chem_guidance_o_r_d_u_s.pdf
- **Hazards of Flammable Gases, Liquids & Aerosols & Risk Minimization SOP** http://ehs.unl.edu/sop/s-hazards_flam_gases_liq_aeros_risk_min.pdf

5. Revised Safe Operating Procedures & Training

Biosafety

- **Biosafety Guidelines** document http://ehs.unl.edu/Biosafety_Guidelines.pdf
Updated to reflect new policy on pathogen inventories, reiterate policy on protocol terminations, reference the EHS SOP on **Laboratory Decommissioning**, and update roles and responsibilities related to these policies
- **Biosafety Manual Table of Contents Form**
http://ehs.unl.edu/Biosafety_Manual_TOC_Form.pdf
Updated to address use of absorbent powder in spill clean-up procedure
- **Preparing a Laboratory Biosafety Manual** http://ehs.unl.edu/sop/s-bio-preparing_biosafety_manual.pdf
Revised online access information for “Biosafety Manual Table of Contents Form”

DOT/IATA

- **Shipping Biological Substances and Patient Specimens SOP**
http://ehs.unl.edu/sop/s-ship_biological_substances.pdf
- **Shipping Infectious Substances With or Without Dry Ice SOP**
http://ehs.unl.edu/sop/s-ship_infectious_substances.pdf

- **Shipping Items With Dry Ice That are Not Otherwise Dangerous Goods SOP**
http://ehs.unl.edu/sop/s-ship_nondanger_dry_ice.pdf
- **DOT/IATA Recurrent Training (Biological Substances)**
<http://ehs.unl.edu/web-based-training#DOTBio>
- **DOT/IATA Recurrent Training (Dry Ice)** <http://ehs.unl.edu/web-based-training#DOTDryice>
- **DOT/IATA Recurrent Training (Infectious Substances)**
<http://ehs.unl.edu/web-based-training#DOTInfectious>

Updated to reflect current Class 9 label with NO line under the black stripes:



Remember...SAFETY IS AN ATTITUDE!

Environmental Health and Safety

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