

**In this issue of the Environmental Health and Safety (EHS) Listserv, May 29, 2014:**

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## **1. Elevated Work Surfaces**

Do you work on or near elevated surfaces such as excavations, pits, unprotected edges, roofs, ramps, etc., or work at a height above dangerous equipment? If so, you may be at risk of injury or death from a fall. In fact, falls from elevated surfaces are one of the leading causes of occupational injury and death in the United States. In 2011, falls to a lower level were the second leading cause of occupational fatalities across all industries, claiming the lives of 541 workers. Over half of these involved falls of 20 feet or less.

The EHS Safe Operating Procedure (SOP), ***Elevated Work Surfaces***, summarizes applicable regulations and acceptable fall protection strategies, including structural integrity of walking-working surfaces, guardrails, personal fall arrest systems, limiting devices, etc.

The SOP also highlights that workers must be protected from falling objects that may originate from elevated work surfaces. Three options are presented for providing such protection, all of which must be supplemented with head protection/hard hats.

Before an employee is assigned a task that puts them at risk of injury from a fall from an elevated work surface, they must be appropriately trained. A list of definitions is provided within the SOP for clarity.

Resources:

- ***Elevated Work Surfaces*** SOP [http://ehs.unl.edu/sop/s-elevated\\_work\\_surfaces.pdf](http://ehs.unl.edu/sop/s-elevated_work_surfaces.pdf)
- ***Personal Fall Arrest Systems*** SOP [http://ehs.unl.edu/sop/s-personal\\_fall\\_arrest\\_systems.pdf](http://ehs.unl.edu/sop/s-personal_fall_arrest_systems.pdf)
- ***Personal Protective Equipment (PPE) – Head Protection*** SOP [http://ehs.unl.edu/sop/s-PPE-head\\_protection.pdf](http://ehs.unl.edu/sop/s-PPE-head_protection.pdf)
- OSHA web site (29 CFR 1926, Subpart M; 29 CFR 1910, Subpart D; 75 FR 28862 Proposed Rule) [www.osha.gov](http://www.osha.gov)
- OSHA Quick Card – Fall Protection [https://www.osha.gov/OshDoc/data\\_Hurricane\\_Facts/fall\\_protection\\_qc.pdf](https://www.osha.gov/OshDoc/data_Hurricane_Facts/fall_protection_qc.pdf)

## 2. Personal Fall Arrest Systems

Appropriate fall protection is critical to reducing the risk of falls. When guardrails are not feasible, it may be necessary to use a personal fall arrest system, which is designed to arrest or stop a person's fall from an elevated walking-working surface (roof, floor, platform, etc.). Such systems consist of an anchorage or point of attachment, body harness, and connectors. All components of the system must be carefully selected, matched, and meet certain standards.

Additionally, every employee must receive training before they are assigned to a task that puts them at risk of a fall, and taught how to properly use each specific fall arrest system that they will use.

All personal fall arrest systems must be inspected as follows:

- User inspection prior to each use.
- Periodic inspection by a competent person.
- Periodic factory-authorized inspection of self-retracting lifelines, with frequency dependent on use.

These requirements and others are discussed in the EHS SOP, ***Personal Fall Arrest System***.

Resources:

- **Personal Fall Arrest System SOP** [http://ehs.unl.edu/sop/s-personal\\_fall\\_arrest\\_systems.pdf](http://ehs.unl.edu/sop/s-personal_fall_arrest_systems.pdf)
- OSHA web site (29 CFR 1926, Subpart M & 75 FR 28862 Proposed Rule) [www.osha.gov](http://www.osha.gov)
- ANSI web site (Z359.1 Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components & Z359.2 Minimum Requirements for a Comprehensive Managed Fall Protection Program) [www.ansi.org](http://www.ansi.org)

## 3. Ladder Safety

In 2011, 113 workers died from ladder fall injuries, an estimated 15,460 suffered a nonfatal occupational injury resulting in lost work time, and an estimated 34,000 nonfatal injuries were treated in emergency departments. The main hazard associated with use of portable extension and step ladders is falls. Falls from ladders are preventable and occur for a number of reasons, including:

- The ladder is in poor condition or is improper for the task at hand.
- The ladder is poorly located and/or incorrectly positioned.
- The surface on which the ladder is located is slippery or uneven.

- Proper techniques are not observed when using a ladder.

Consult the EHS web-based Training, **Portable Ladder Safety**, for more information on the safe use of ladders. A newly available tool to assist in the prevention of ladder fall injuries is the NIOSH (National Institute for Occupational Safety and Health) Ladder Safety smart phone application (app). The new app uses visual and audio signals to make it easier for workers using extension ladders to check the angle at which the ladder is positioned, as well as access useful tips for selecting, inspecting, accessorizing, and using extension ladders safety. The app is a free download.

Resources:

- **Ladder Safety** SOP <http://ehs.unl.edu/sop/s-ladder.pdf>
- **Portable Ladder Safety** web-based training <http://ehs.unl.edu/onlinetraining#PortableLadder>
- NIOSH Ladder Safety Smartphone App <http://www.cdc.gov/niosh/updates/upd-06-17-13.html>
- OSHA Publication: Falling Off Ladders Can Kill (English & Spanish) <https://www.osha.gov/Publications/OSHA3625.pdf>
- American Ladder Institute (ALI) [www.laddersafety.org](http://www.laddersafety.org)
- ALI Multimedia Training [www.laddersafetytraining.org](http://www.laddersafetytraining.org)

## 4. Aerial Lift Safety

Mobile aerial lifts are used to position personnel so they can conduct work at elevated heights. Common activities at UNL include changing or adjusting theater or other lighting, painting, and other maintenance operations.

Aerial lift operators must complete training and demonstrate proficiency in the recognition and mitigation of hazards associated with the operation of aerial lifts. In addition, workers may be required to use a personal fall arrest system (depending on the type of aerial lift) and must:

- Read the manufacturer-provided operator's manual for each model of lift that will be operated.
- Complete hands-on training with a competent and experienced individual (designated by the responsible supervisor) and demonstrate proper operation under expected operating conditions before independently operating any lift.

The major causes of injury or death while using aerial lifts are falls, electrocutions, and collapses or tip-overs. The EHS SOP, **Aerial Lift Safety**, and companion on-line training module addresses these hazards as well as hazards associated with collision, entanglement, improper use, a hazardous atmosphere, and defective machines.

Resources:

- **Aerial Lift Safety** SOP [http://ehs.unl.edu/sop/s-aerial\\_lift\\_safety.pdf](http://ehs.unl.edu/sop/s-aerial_lift_safety.pdf)
- **Mobile Aerial Lift** web-based training <http://ehs.unl.edu/onlinetraining#MobileAerialLift>
- OSHA web site (29 CFR 1910.67 & 29 CFR 1926.453, 451, 452, 20, 21) [www.osha.gov](http://www.osha.gov)
- ANSI web site (A92.3, A92.6, A92.2 & A92.5) [www.ansi.org](http://www.ansi.org)

## 5. Prevent/Reduce Risk of Heat-Related Illness

We often associate heat-related illness with outdoor operations such as farm work, landscaping, and research “in the field.” However we routinely receive injury reports from employees working **INSIDE** an unconditioned building (e.g., warehouse, storeroom) or areas of a building prone to heat build-up (e.g., kitchens, laundry, autoclave rooms, etc.).

Working in the heat stresses the body and can lead to illness or even death in severe cases. Exposure to heat can also increase the risk of other injuries because of sweaty palms, fogged-up safety glasses, dizziness, and burns from hot surfaces. Every year thousands of workers become sick from heat exposure and a number of workers die. Most heat-related health problems can be prevented, or the risk of developing them can be reduced.

There are two main categories of risk factor the worker should evaluate when contemplating outdoor work:

- **Weather Conditions.** The risk of heat stress is relative to temperature, humidity, sunlight, and wind speed. High temperature, high humidity, direct sunlight and low wind speed make the worst combination. If possible, schedule strenuous work for the cooler parts of the day.
- **Personal Factors and Physical Demands.** The risk of heat stress increases with physical demands. For example, a worker who is walking is at higher risk than a worker who is riding in a vehicle. A worker who is lifting and carrying heavy items is at the greatest risk. Older workers, obese workers, and persons taking certain types of medication, such as antihistamines, are at a greater risk for heat illness.

It may not always be possible to work only in cooler parts of the day. The risk of heat-related illness can be reduced by:

- **Acclimation.** Acclimation means “become accustomed to.” If possible build up tolerance to heat by short exposures before undertaking longer periods of work in a hot environment.
- **Appropriate clothing.** Light, loose clothing and a hat are the clothing of choice.
- **Hydration.** Drink 8-16 ounces of water *before* working in the heat. Drink 4-8 ounces of water or electrolytes every 15-20 minutes while working in the heat. AVOID alcohol, coffee, tea, or soda pop, which further dehydrate the body.

- **Adequate Rest Periods.** Work at a steady pace. Take breaks when your body signals you need one, preferably in shaded or cool areas.
- **Education.** Heat stress can manifest as a number of conditions, all to be taken seriously and some requiring medical assistance to avoid permanent aftereffects. Workers should be able to recognize the signs and symptoms of these conditions so they can take proper action if they or their co-workers are affected.

More in-depth information on the above five mitigation suggestions, including signs/symptoms and treatment information on six possible results of heat stress may be found within the EHS SOP, **Heat Stress**.

OSHA developed a Heat Safety smartphone app so workers and supervisors can calculate the heat index for their worksite and, based on the heat index, see a display of risk level associated with the particular heat index. The app also provides reminders about protective measures that should be taken at the indicated risk level to protect workers from heat-related illness, for example, reminders about drinking enough water, recognizing signs and symptoms of heat-related illness, planning for and knowing what to do in an emergency.

#### Resources:

- OSHA Health and Safety Topics: Occupational Heat Exposure <http://www.osha.gov/SLTC/heatstress/>
- OSHA Heat Safety Tool (phone app-English & Spanish) [http://www.osha.gov/SLTC/heatillness/heat\\_index/heat\\_app.html](http://www.osha.gov/SLTC/heatillness/heat_index/heat_app.html)
- OSHA Health and Safety Topics: Using the Heat Index [http://www.osha.gov/SLTC/heatillness/heat\\_index/index.html](http://www.osha.gov/SLTC/heatillness/heat_index/index.html)
- **Heat Stress** SOP <http://ehs.unl.edu/sop/s-heatstress.pdf>
- National Institute for Health & Safety (NIOSH) Safety & Health Topics: *Heat Stress* <http://www.cdc.gov/niosh/topics/heatstress/>
- National Weather Service, Office of Climate, Water and Weather Services - *Heat: A Major Killer* <http://www.nws.noaa.gov/om/heat/index.shtml>

## 6. Quarterly Review of Injury Incidents/Safety Audits

There were a number of injuries sustained by different worker types at UNL during material handling/lifting operations. These mainly involved moving large/awkward/heavy items (e.g., carpet extractor with water, tires, laboratory equipment, etc.). Workers should use mechanical assistance (e.g., cart or dolly) to move items and/or ask co-workers to assist, assuming the item is a reasonable weight/shape. One injury was sustained when several laboratory workers tried to move a piece of equipment weighing approximately 600 pounds. Such items need to be moved by professional moving services.

A number of injuries were sustained by workers going up or down stairs. Workers should always hold the hand rail when using stairs and not carry objects that require

use of both hands. Workers should maintain focus when navigating stairs and avoid multi-tasking such as talking on the phone/texting, etc. If employees notice wet spots, spills, or debris on the stairs or malfunctioning lighting, let the building BMR know so the issue may be resolved.

Personal Protective Equipment (PPE) used must be appropriate for the hazards/task. One worker using chemicals was wearing safety glasses, not goggles, and chemical splashed into their eyes. With the assistance of those working near, they rapidly navigated to the eyewash. The worker avoided permanent eye injury by using a properly-maintained eyewash located within 10-12 seconds of their work space.

Safety audits are conducted by EHS personnel on a regular basis. In office-type spaces, a few of the main deficiencies were:

- Power strips, typically designed to power items all together totaling 12 amps or less, were being used to power appliances/equipment that heat (microwaves, heat guns, etc.), refrigerators, large office copier/fax/printer machines, etc. Such items should be plugged directly into a permanently installed wall outlet.
- 18" of clearance was not being maintained in an arc around sprinkler heads and/or 24" of clearance maintained from the ceiling in non-sprinkled areas.
- An EHS soldering waste container must be available in a room where soldering occurs. When an activity not normally conducted in an office is contemplated, workers should check with EHS for possible regulatory implications.

Two particularly dangerous deficiencies relating to chemicals were:

- Chemicals were not stored in a safe and proper manner, e.g. segregated by compatibility; unnecessary compressed gas cylinders were being stored in the laboratory; compressed gas cylinders were not properly restrained; flammables were stored outside of rated cabinets/stored in household refrigerators; etc.
- Chemical containers in laboratories, shops, kitchens and custodial areas were not properly labeled. A large number of these chemicals were cleaning/maintenance products, labels for which are available from the product manufacturer.

Labeling is important to prevent accidental misuse or inadvertent mixing of incompatible chemicals, and to facilitate use of appropriate personal protective equipment along with other hazard mitigation strategies.

In shop-type spaces audited this past quarter, a deficiency with high potential for serious injury, and implications for workers in other areas was:

- Guards for power equipment were missing or damaged; abrasive wheels were improperly adjusted (1/8" from wheel for work rest; 1/4" adjustable tongue); equipment and machinery designed to be fixed in place were not securely

anchored; effective guards were not in place over belts, pulleys, chains, sprockets, and other moving parts of machinery/tools/equipment.

Use this information to learn from the experiences of others. Review your work place and work habits. Remedy any deficiencies in your area so you don't repeat an injury or audit deficiency!

Resources:

- **General Material Handling / Safe Lifting** SOP [http://ehs.unl.edu/sop/s-gen\\_safe\\_lifting.pdf](http://ehs.unl.edu/sop/s-gen_safe_lifting.pdf)
- **Slips, Trips, Falls-Reducing Risk and Avoiding Injury** [http://ehs.unl.edu/sop/s-slips\\_trips\\_falls.pdf](http://ehs.unl.edu/sop/s-slips_trips_falls.pdf)
- **General Electrical Safety** SOP <http://ehs.unl.edu/sop/s-electricalsafety.pdf>
- **Items/Materials Prohibited from Trash Cans and Dumpsters** SOP [http://ehs.unl.edu/sop/s-dumpster\\_ban.pdf](http://ehs.unl.edu/sop/s-dumpster_ban.pdf)
- **Chemical Container Labeling** SOP <http://ehs.unl.edu/sop/s-chemlabelguideline.pdf>
- **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](http://ehs.unl.edu/sop/s-gen_chem_guidance_o_r_d_u_s.pdf)
- **Personal Protective Equipment** Web-Based Training <http://ehs.unl.edu/onlinetraining#PPE>

## 7. Elements of Creating Safety Cultures in Academic Institutions: Moving Forward

Over the past 17 months the listserv has highlighted each of the specific, numbered recommendations within the American Chemical Society (ACS), **Creating Safety Cultures in Academic Institutions** report. Creating vibrant, strong safety cultures in academic institutions is so important that an emphasis on creating safety cultures will be a continued.

Critical elements in strengthening safety cultures, as identified through ongoing work of the ACS Safety Culture Task Force are:

- Leadership;
- Teaching basic laboratory and chemical safety (shop safety included);
- Safety ethic, attitude and safety awareness;
- Learning lessons from incidents, including near-misses, as well as injury/property damage incidents;
- Collaborative interactions;
- Promoting and communicating safety; and
- Encouraging institutional support of safety by budgeting for safety programs and supplies.

How does your work area measure up to these crucial elements? You can make a difference and foster these crucial elements by personally adopting the "Safety

Ethic,” espoused by the Safety Culture Task Force of the ACS Committee on Chemical Safety:

- **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 risk of hazards, and prepares to handle emergencies.
- **Prevent at-risk behavior:** One does not cut corners or bypass safety measures in the laboratory (or other work environment) and shares this information with others, as needed.
- **Promote safety:** One encourages and acknowledges others in working safely.
- **Accept responsibility for safety:** One takes steps to work safely, setting a positive example for others, and being accountable for safety.

Resources:

- Creating Safety Cultures in Academic Institutions  
[http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/CNBP\\_029720](http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/CNBP_029720)

**Remember...SAFETY IS AN ATTITUDE!**

### **Environmental Health and Safety**

University of Nebraska-Lincoln  
3630 East Campus Loop  
Lincoln, NE 68583-0824  
(402) 472-4925  
<http://ehs.unl.edu>