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RISKmanager

INSIDE...

**HOT WORK:
PREVENTING
PROPERTY LOSS
AND INJURIES**

PAGE 1

**SHOULDER
INJURY
PREVENTION**

PAGE 3

**CORRECTLY
STORE
CHEMICALS
FOR A SAFER
CHEMISTRY DEPT.**

PAGE 9



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HOT WORK

PREVENTING PROPERTY LOSS AND INJURIES

By Kyle Stewart

Hot work activities can cause significant property loss and work-related injuries. This exposure risk applies to preventative maintenance on school buildings and within educational curriculums. Fortunately, the risk of property loss and injuries can be minimized through proper planning, work area set-up and use of work task controls. Hot work is any activity that involves open flames or produces heat and/or sparks capable of initiating fires or explosions; these activities may include welding, cutting, grinding, drilling, soldering or brazing.

POTENTIAL RISKS

For a fire to occur naturally, three elements must be present: fuel source, ignition source and oxygen. A single spark produced during hot work activities may complete the fire triangle; if controls are not in place, significant property loss or personnel injury may result. Removing any of these three elements can prevent a fire from occurring or extinguish a fire in progress. Specific hazards include fire damage, water damage, inhalation hazards, burn injuries or electrical hazards. Even in the absence of a fire, burn injuries may occur from handling hot materials being brazed, welded or cut and/or from sparks or molten materials.



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BEST PRACTICES/ACTIONABLE ITEMS

Below are best practices your organization can employ to reduce risk of fires/burns while conducting hot work activities:

Evaluate facility operations and educational curriculums to determine where hot work activities are conducted.

- Create a plan to ensure controls are in place and available prior to beginning hot work activities.

Fire Watch

- Throughout the duration and following completion of work activities, an individual should be designated responsible to monitor the immediate work area for smoldering/fires.
- The fire watch should remain in the area and monitor for fire at least 30 minutes following hot work activities.

Extinguishing Methods

- Equipment to extinguish a fire should be present, unobstructed and readily available should a fire occur.
- The proper type and appropriately sized fire extinguisher (i.e., ABC, Type K, Water, etc.) should be present; a fire blanket should also be available in the event an individual is engulfed in flames.

Personal Protective Equipment (PPE)/Attire

- All hot work should be conducted wearing flame-resistant apparel. Wool and leather clothing are preferred because they are more resistant to deterioration and flame than cotton or synthetic fibers. Synthetic fiber clothing should NEVER be worn unless it is specifically manufactured to be fire retardant.
- In general, PPE/attire may include an apron, coveralls, gauntlet gloves, face shield, shirt with sleeves of sufficient length and construction to protect from heat/sparks, and welding shades to protect against UV radiation.
- Clothing should be kept free of oil or grease.
- Front pockets and upturned sleeves or cuffs should be prohibited. Sleeves and collars should be kept buttoned and high boots worn under

pant legs to prevent hot metal slag or sparks contacting the shin(s).

- Personnel must wear respiratory protection when ventilation is not sufficient to prevent exposure above permissible limits.
- If metal alloys are welded, work uniforms, coveralls or similar full-body coverings should be worn and laundered separate of street clothing.
- When conducting welding, torch or brazing activities, individuals should wear the darkest protective shade possible to conduct task and afford greatest protection against light radiation.

Work Area

- Whenever feasible, use alternative methods to avoid hot work (i.e., cutting with blade verses using a grinding cut-off wheel or torch).
- Remove combustible materials and flammable liquids from the immediate area; this removes additional fuel sources that could ignite.
- If welding, torching or brazing activities are performed, welding screens should surround the hot work activities to protect others against light radiation. If welding screens are not provided, all personnel in the area must wear the appropriate shades glasses/helmet.

Ventilation

- To reduce toxic atmospheres and inhalation hazards, general and/or local exhaust ventilation (LEV) should be provided.
- In designated welding stations/tables, consider an adjustable LEV hood to capture fumes/gases at the point of operation.

Most losses attributed to hot work activities are preventable through proper planning and use of work task controls. Your organization should begin by identifying locations/tasks involving hot work activities and train personnel on hazards associated with hot work activities. Training should include work area set-up, effective methods to extinguish a fire, the minimum PPE to be worn and reducing inhalation hazards through mechanical ventilation. Even with proper planning and use of preventative measures, a fire may occur, but the severity of loss may be minimized by having a Fire Watch present during and after hot work activities have ceased.



Shoulder Injury

PREVENTION

By Mark Nease

Any job task that requires you to use your hands and arms can put you at risk for a shoulder injury. Keeping your shoulders in a static position for lengthy periods of time can cause injury—just like overuse can cause injury. Could you have been injuring your shoulders every day for the last several years and not known about it? Micro-injuries to your shoulders can have a cumulative damaging effect without symptoms, some leading to a sudden one-time incident that results in a debilitating shoulder injury. Although shoulder injury risks exist, there are best practices that can reduce these risks.

Risks/Best Practices

- **Poor health.** Dehydration, poor eating habits and a lack of rest can all impact the health of your body, including your shoulders. Sure, your employer is responsible to provide a safe and healthful workplace, but you are responsible for your own health so you can work safely. Follow your physician's direction for healthfulness. Practice good health habits, including physical conditioning, healthy eating habits and all-around good nutrition.
- **Stretch out.** A shoulder that is unprepared to operate is a shoulder that can more easily become injured. A prepared shoulder is a shoulder that has undergone pre-task stretching exercises. Stretch before physical activity. Performing shoulder stretches provides good circulation and elasticity of the muscles and tendons and preps the shoulders for physical activity so tearing of the muscles/tendons can be averted. A quick internet search can reveal various shoulder stretch techniques.
- **Micro-injuries over time.** Could you have been causing micro-injuries to your shoulders over the past several years due to various reasons—poor posture, poor body mechanics and lifting techniques, or poor positional use of keyboards and computer mice? These repetitive micro-injuries to your shoulders can accumulate micro-traumas that suddenly surface with a debilitating shoulder condition. Educate yourself on proper posture and body mechanics/lifting techniques, as well as working in static positions, such as with computer use.
- **Know your limitations.** Do you have limitations or other ailments in your shoulders that keep you from doing tasks you were able to do when you were younger? Communicate that information to your supervisor so adequate controls can be implemented. Certain one-off/non-routine tasks may just be too physically demanding for you to safely perform. Work with your supervisor regarding one-off tasks that may put you at risk for a shoulder injury based upon your limitations.

- **Avoid overdoing it.** Tasks that appear to be overwhelming can make you “overdo it” if followed through. That doesn’t mean you can’t alter the task to avoid overdoing it. If a box or trash liner full of garbage is too heavy, don’t try to heave it into a dumpster. First, take the time to break the load down into two containers to lighten the load to within your physical capabilities. Be sure to inform your safety committee of the need to reduce the size of the trash liners so you can safely wield the full trash liners into the dumpsters. Have your safety committee brainstorm other controls, such as choosing dumpsters with a lower opening height or placing open dumpsters next to a loading dock so you can drop the garbage into the dumpsters.
- **Shoulder Flexion.** This is when a person moves their arms from a resting position (arms by their side and parallel to the standing body) to where their arms are at 90 degrees (parallel to the floor) in front of them and up to 180 degrees with their hands above their head and elbows above their shoulders. A good rule of thumb is to limit your reach to an object to no more than 90 degrees (no higher than mid-chest level) with large intervals between cycles. Try to store frequently used items no higher than your mid-chest level. When you need to reach above your mid-chest level (which places your elbows above shoulders), you are at greater risk for an upper extremity injury. Perform frequent tasks, such as keyboard and computer mouse use



or bench work on equipment, to no more than 45 degrees flexion while allowing a periodic rest break by returning your arms to the resting position.

- **Shoulder Abduction.** This is when you raise your elbows out from the sides of your body. More stress is placed on the shoulders as you abduct or raise your upper arms farther away from the

at-rest position. Place a tennis ball in the pit of your arm and hold it there. This is the neutral/at-rest position of your shoulders. Abducting your shoulders would make you unable to naturally hold that tennis ball. If your task requires you to abduct your shoulder (causing the tennis ball to drop), then you are now approaching an unhealthy shoulder position. Try to perform tasks such as use of computer mouse, keyboards, performing bench work, etc., so you can naturally hold a tennis ball in the pit of your arm.

- **Avoid rushing** when performing strenuous maneuvers with your shoulders, such as when performing demolition or carpentry tasks, digging or lifting. Allow your shoulders frequent breaks by returning arms to the natural rest position.
- How do you know if a job task can elevate your risk of shoulder injuries? A good control to reduce the risk of a shoulder injury is to **perform a Job Safety Analysis** on job tasks. Identify the steps required to perform each task and then incorporate controls to reduce the risk of an injury.

Take some time to reflect on where you stand with the healthfulness of your shoulders. Can you improve your nutrition and physical condition? Do you think you are causing micro-injuries to your shoulders through poor posture or continually strenuous use of your shoulders? What are your limitations? Are you working like you did when you were a late teenager? Maybe you need to make some adjustments in your thinking to reverse your high risk to shoulder injuries. What better time is there than now? Work with your supervisor on work practice controls to reduce the risk of on-the-job shoulder injuries. Consider risks involving shoulder flexion and shoulder abduction. Perform stretching exercises and continue to adjust your posture.

BLOG

Find more injury prevention tips at cmregent.com/blog/.

EXTERIOR SIGNAGE

By Jake Ruziecki

In part one of our two-part series on safety signage planning and labeling, we discussed how recognizing visual cues is often the first step in responding to a potential hazard or emergency. We also covered how providing safety signage within your buildings not only helps decrease response time in emergencies, but also alerts staff and visitors to potential hazards within the building. In part two we will discuss safety signage outside your buildings, potential risks to consider and best practices to reduce the risk of accidents and improve readiness in an emergency.

Risks

Emergencies that result in the need for first responders are often unpredictable and can unfold quickly. With the large scale of school buildings or campus layouts, it can often be difficult upon arrival to find the appropriate area to access the building or campus. Not only is it critical for first responders, but proper signage and labeling can provide better direction for staff, students and visitors in your day-to-day operations. During planning for routine building inspections and emergency planning review, consider the signage and labeling necessary for areas such as:

- Emergency access.
- Fire department connections.
- School zones/traffic patterns.
- Playground safety.
- Pedestrian foot traffic.
- Other critical information.



Best Practices/Actionable Items

Once you've identified areas within your district that may require signage or labeling, whether to improve identification in an emergency or just direct foot traffic in your day-to-day operations, you can find which standard(s) may apply to these areas, and what your responsibilities are as the property owner.

- **Emergency access** to your facilities is critical for reducing response time in an emergency. Label or number each of your exterior doors so first responders can gain access to the area of a building where they are needed as quickly as possible.
- **Fire department connections** should be clearly marked with a sign or label (FDC). This signage helps lower response times for fire departments, reducing the severity of property damage and improving life safety. It's also important to ensure fire lanes and fire hydrants are kept clear of vehicles, dumpsters and other storage.
- **School zones and other traffic patterns** should include signage, speed limits and pavement markings to provide drivers with important safety information within the school zone. To ensure all traffic devices and markings are compliant, consult with your regional code office or department of transportation.
- **Playground safety signage** provided by the manufacturer is often found on a sign at the playground entrance or on information labels attached to the playground equipment itself. This signage provides specific safety information, including the appropriate age ranges for the equipment and risks/best practices associated with the equipment's use.
- **Pedestrian foot traffic** should be considered when developing signage around the building. Be sure to provide clear direction to visitor entrances or other points of interest to prevent wanderers. Pavement markings on crosswalks, curbs and accessibility ramps help pedestrians stay on a guided path to their destination.



- **Other informational signage** such as accessible hours, district policies, renovation changes and utilities should be provided near entrances to the building or property to notify visitors of what may be required of them.

Properly designed signage and labeling helps improve emergency preparedness. It also helps lower liability risk by encouraging adherence to school safety requirements and other district policies. When selecting new or replacement signage or labeling, be sure to consider low-vision staff, faculty, students and visitors to ensure everyone is provided with information on the hazards that may be present in their environment. During development of new or replacement signage, also refer to your local code office or state department of transportation for further requirements for your area.

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THE HIDDEN HAZARDS:

STORAGE LOFTS MEZZANINES AND CRAWL SPACES

By Edgar Boord

Heights, tight spaces, low lighting and cluttered storage are a few common hazards associated with storage lofts, mezzanines and crawl spaces. Though not everyone may encounter these areas in the workplace, most homes also have a small crawl space in the attic or under the house that you might need to begrudgingly navigate from time to time. If you have to work in or navigate one of these areas, here are some things to keep in mind to remain safe from the multiple hazards that may exist.

Risks

Although the hazards and safety issues associated with these different areas might vary, there are usually several hazards that can exist at any given time.

- **Falls from heights** – This includes ladder-only access and temporary openings in a railing system for moving materials in/out of storage.
- **Clutter and material storage** – Material and equipment storage, especially in vocational education areas, can often get out of hand in storage mezzanines/lofts.
- **Load bearing surfaces and shelves/racks** – Lofts, mezzanines and crawl spaces were often constructed in-house and well before safety concerns were even considered. This greatly increases potential for collapsing surfaces and storage shelves.
- **Low ceilings and tight spaces** – Many of these areas contain low ceiling heights, rafters or pipes that may lead to a head injury. Tight and cramped spaces are also common and can force individuals to work in awkward or uncomfortable positions.
- **Improper lighting** – Many of these areas do not have enough lights, if any, to allow you to navigate the space safely. Incident potential can be greatly increased due to poorly lit areas.
- **Proper housekeeping and reorganization** can make a substantial difference in not only maximizing storage space, but also preventing trips/falls and other incidents that can result from a cluttered work area.
- The **load bearing capabilities** of the floor and any storage shelves/racks should be calculated and posted to make sure they are not exceeded. Lofts/mezzanines/crawl spaces with wooden construction are especially prone to failure and should be inspected thoroughly for structural integrity.
- Any **low-hanging rafters, pipes and other items** should be made highly visible. Reflective and high-visibility tape/paint, along with warning signage, should be in place. Employees working in tight or cramped areas should be reminded to take breaks and stretch out to prevent strains and other similar injuries.
- **Ample lighting** in these areas can greatly reduce potential for various incidents. This includes slips/trips/falls, concussions and head injuries from low hanging items, among other hazards.

Although these areas may not be occupied by school employees on a routine basis, the associated risks should certainly raise the priority of any applicable safety efforts and controls. This would include a dedicated inspection by knowledgeable staff, and even the safety committee during their routine hazard inspections. With enough attention, safety controls and best practices in place, storage lofts, mezzanines and crawl spaces can continue serving their intended purpose without sacrificing an individual's safety or causing damage to property.

Best Practices/Actionable Items

Identifying potential safety issues and hazards is the first step. A dedicated assessment of these types of areas could be incredibly beneficial to flushing out potential issues before a major incident has a chance to occur.

- To prevent falls from heights, assure **proper handrail systems** and any other fall protection measures are in place and used properly. This includes signage and controls to discourage/prevent unauthorized individuals (i.e., students or visitors) from accessing these areas or climbing an access ladder.



Storage space question?

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cmregent.com/risk-control/ask/

Correctly Store Chemicals

FOR A SAFER CHEMISTRY DEPARTMENT

By Derek Neubauer

A chemistry program has certain potential dangers. With proper chemical storage, most dangers can be avoided in an activity-oriented chemistry program. Along with keeping students safe when performing chemistry experiments, ensuring chemicals are stored correctly is another important step for overall safety of the chemistry department.

Risks involved with chemical storage are:

- **Fire.**
- **Explosion** or sudden releases of pressure.
- **Reactivity** – Fire, explosion or release of dangerous gases that can result from contact between chemicals or from certain chemicals combining with air or water.
- **Health Hazards** – can result from over-exposure to a hazardous substance, ranging from minor inconveniences to much more serious afflictions such as skin burns, organ damage, allergic-type reactions, and even death.
- **Environmental Risks** – when hazardous substances are spilled or released into the air or water supplies.

Below are general rules to help with the storage of chemicals:

Storage Area

- Store chemicals inside a closable cabinet or on a sturdy shelf with at least a ¾-inch lip to prevent spills.
- Secure shelving to the wall or floor.
- Ensure the storage areas have doors with locks, labeled for authorized personnel only.
- Chemical storage areas should be accessed only by the instructor.
- Ventilate storage areas appropriately.

Organization

- Take an inventory of all chemicals currently being stored.
- Store chemicals by COMPATIBILITY first, not alphabetically.
- Any unused or old chemicals should be removed and properly disposed.

Chemical Segregation

- Store acids in an acid cabinet.
- Nitric acid should be stored in a separate compartment inside an acid cabinet.
- Store toxic chemicals in a lockable poison cabinet with a highly visible sign.
- Store flammable and combustible liquids in an approved flammable liquids cabinet.

Don'ts

- Don't expose stored chemicals to direct heat or sunlight.
- Don't store chemicals on shelves above eye level.
- Don't store chemicals on the floor.
- Don't store chemicals in refrigerators that are used to store food for human consumption.
- Don't eat or prepare food/drink in the chemical storage room.
- Don't store chemicals in chemical hoods except when in use.

Chemical Storage Containers

- Never use food containers for chemical storage.
- Make sure all containers are properly closed.
- Wipe down containers with paper towel after use. Ensure the paper towel is disposed of properly.
- If a chemical begins to react, the chemicals involved should be disposed of properly.

Globally Harmonized System (GHS)

- Became effective May 26, 2012.
- Material Safety Data Sheet (MSDS) are now Safety Data Sheets (SDS).
- The goal is to have uniform rules for classifying chemicals. Previously, chemicals manufactured by different companies could be classified differently.
- Will improve consistent hazard information.
- Training should be completed.
- Make sure any SDS received from chemical suppliers meet the new requirements.

Proper storage of chemicals will help to provide a safe chemistry lab environment and allow only approved chemicals to be used in class experiments and labs.



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300 Sterling Parkway, Suite 100
Mechanicsburg, PA 17050
Toll-free 844-480-0709

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