OSHA Health Hazards
Update for Construction

EST 8000: Construction Safety and Health Seminar
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Anticipation of Health Hazards

- Job review/hazard analysis – SCOPE OF WORK
- MSDS review/waste stream review
- Understand the process
- Look for signs of possible exposure
  - Emissions from task
  - Hazardous chemicals
  - Deposits/dust buildup on floors, equipment
  - Condition of controls
- Look for exposure routes:
  - Condition and use of PPE
  - Location of workers relative to contamination source

Outcome: Exposure determination

Agenda

- Isocyanates NEP
- Confined Spaces/Underground Blasting and Monitoring
- Heat Illness Prevention
- Temporary Worker Initiative
- Silica Reminders…
Isocyanate NEP

If you can smell it, you are typically overexposed!!!

Appendix A of CPL 03-00-017

Note: The following are not exhaustive lists. An area office may include an industry sector/code not listed if it falls within their area office’s jurisdiction.

Construction

<table>
<thead>
<tr>
<th>SIC</th>
<th>SIC TITLE</th>
<th>NAICS 2002</th>
<th>NAICS TITLE</th>
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<tr>
<td>1611</td>
<td>Painting and Related Auxiliary Activities, NAICS 2002: 238230</td>
<td>Painting and Wall Covering Contractors.</td>
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<td>1731</td>
<td>Roofing, Driveway, Decking, and Siding, NAICS 2002: 238220</td>
<td>Roofing and Insulation Contractors.</td>
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<td>1732</td>
<td>Insulation, Other Floor Work, NAICS 2002: 238230</td>
<td>Insulation Contractors.</td>
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June 2013 - NEP

- Typically looking at a CEILING LIMIT for MDI and or TDI
  - Methylene bisphenyl or diphenyl diisocyanate
  - Sensitizer
  - Skin and respiratory
- PPE Selection (App G)
- Respirator Selection (App G)
- Non-mandatory health surveillance form (Appendix C)

Additional Resources: CDC.gov/NIOSH and OSHA CPL 03-00-017
Case Example:
Confined Space Entry and Air Monitoring

Permit Required Confined Spaces

Permit Required Confined Spaces (PRCS)

PRCS? 
✓ Contains or has a potential to contain a hazardous atmosphere  
✓ Contains a material that has the potential for engulfing an entrant 
✓ Has an internal configuration that could trap or asphyxiate an entrant by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section 
✓ Contains any other serious safety or health hazard

PRCS Fatalities

✓ 47% Air (Oxygen, Gases, Vapors)  
✓ 21% Drowning (Engulfment)  
✓ 19% Toxic (Liquids, Vapors, etc above PEL)  
✓ 10% Blunt Force Trauma  
✓ 2% Electrocution (Mostly due to objects the victim took in with them)  
✓ 1% Burns
How is Construction CS different from General Industry CS?

- There are 5 key differences from the construction rule, and several areas where OSHA has clarified existing requirements.
- More detailed provisions requiring coordinated activities when there are multiple employers at the worksite. This will ensure hazards are not introduced into a confined space by workers performing tasks outside the space. An example would be a generator running near the entrance of a confined space causing a buildup of carbon monoxide within the space.
- Requiring a competent person to evaluate the work site and identify confined spaces, including permit spaces.
- Requiring continuous atmospheric monitoring whenever possible.
- Requiring continuous monitoring of engulfment hazards. For example, when workers are performing work in a storm sewer, a storm upstream from the workers could cause flash flooding. An electronic sensor or observer posted upstream from the work site could alert workers in the space at the first sign of the hazard, giving the workers time to evacuate the space safely.
- Allowing for the suspension of a permit, instead of cancellation, in the event of changes from the entry conditions list on the permit or an unexpected event requiring evacuation of the space. The space must be returned to the entry conditions listed on the permit before re-entry.

Frequently Asked Questions: PRCS Standard Clarification


- Are the results of the air sampling and exposure monitoring required by this standard considered exposure records for purposes of 29 C.F.R. 1910.1020 (c)(5) OSHA's Record Access rule?
  - Those results which show the composition of an atmosphere to which an employee is actually exposed (even if the employee is using a respirator) are exposure records under 29 C.F.R. 1910.1020(c)(5). Conversely, if the employer determines as the result of initial air sampling not to allow entry into a confined space until additional ventilation and purging of the atmosphere has occurred, the sample would not be considered as exposure record because no employee would ever have been exposed to the atmosphere sample. Once the employer takes corrective action so that an employee can enter, however, the results of subsequent air sampling that show the atmosphere the employee actually entered would be considered exposure records.

OSHA Letters of Interpretation

- "Does OSHA consider monitoring results for employees that show nondetectable levels for a potentially toxic or harmful physical agent to be an 'Employee exposure record' as defined in 29 CFR 1910.1020(c)(5) that employers must preserve and maintain for 30 years pursuant to 1910.1020(d)(1)(ii)?"
  - Yes, monitoring results that indicate that a particular exposure is nondetectable or below the limit of detection are employee exposure records that have to be preserved and maintained in accordance with 1910.1020(d)(1)(ii). A sampling result that is nondetectable or below the limit of detection does not necessarily mean no exposure or low exposure. Rather, a nondetect means that the agent was not detected by the particular sampling and analytical procedures the employer used.

29 CFR 1910.1020 defines an employee exposure record as "a record containing ... (i) Environmental (workplace) monitoring or measuring of a toxic substance or harmful physical agent, including personal, area, grab, wipe, or other form of sampling..." Therefore the information contained in the printouts is therefore to be considered a record of employee exposures, which must be preserved and maintained under the regulation. Further, all sampling results, including nondetectable sampling results, together with supporting documentation about the sampling and analytical method used to get that result, is part of the employee exposure record that must be preserved. Regarding the retention time for employee exposure records, 29 CFR 1910.1020 provides that each employee exposure record be preserved and maintained for at least thirty years..."
Case Study: “Silent Killer in a Newly Constructed Manhole”
https://www.osha.gov/confinedspaces/index.html

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• Outcome/Findings:
  • No confined space entry program
  • No monitoring during entry
  • Monitoring conducted after recovery:
    • 16.3-17% for oxygen (3 hours after)
    • No CO2 monitoring conducted by Haz Mat Division
    • 12-14% oxygen (9 days later)
    • CO2 monitoring: 17,000-24,000 ppm (9 days later)
  • CO2 is colorless, odorless, and displaces oxygen.
  • Limestone rock + acidic topsoil = CO2 generation

Case Study: CO Exposures in Blasting Operations
OSHA CSHO Unique Cases: Pennsylvania Area Office

Photo: OSHA
Abatement

Excavate a trench to intercept migration pathway for blasting gases
Create vent holes
Use of CO meter during trench entry

Do you know the facts?

- Heat stress may result from the buildup of muscle generated heat in the body.
  - True or False?

- The time to drink water is when you are thirsty?
  - True or False?

- What is the most important thing you should know about preventing heat stress?
  - A. Water B. Shade C. Rest D. All Three are Important

- The evaporation of sweat is the most important way our bodies get rid of heat?
  - True or False?
Management Strategies

1) Acclimatization
   - Building tolerance to heat
   - Requires gradual increase in workload
   - New employees
   - Temporary employees
   - Absent employees returning to work
   - ALL employees during a heat wave

ANYONE gone for more than a week

2) Hydration
   - Frequency
   - Amount
   - Training
   - Feedback

Self-reported Daily Average Water Consumption:
2.57 L or 5.14 bottles

1 bottle = 16.9 fl oz

OSHA Daily Recommendation for Moderate HI (91-103 °F):
7.50 L or 15 bottles
OSHA Daily Recommendation for Moderate HI (91-103 F):
7.5 L or 64 cones

1 cone = ½ cup

Remember:
Full sunlight increases the Heat Index value by 15 °F.

Management Strategies
3) Engineering
- Cool-down Area, providing shade where possible
- Personal Protective Equipment (PPE) selection
Resources

- Free training resources:
  - Field employee
  - Supervisor
  - Management
  - www.oshainfo.gatech.edu

- OSHA’s “Heat App”
- OSHA's Heat Illness Prevention Webpage

Temporary Staffing

OSHA’s Temporary Worker Initiative

- Growth of Temporary Workforce
  - 861,100 temp jobs added to the economy since August 2009

- Increased Likelihood of Injury
  - New workers are at increased risk of injuries.
  - Temporary workers are often “new” to a jobsite several times a year.
  - Host employers are less likely to devote resources to fully train temporary workers.
Shared Responsibility for Worker Safety and Health

- ALL workers must receive equal protection
- Expectation: Host and the staffing companies will contractually assign responsibilities
- Consider which employer can best prevent hazards and fulfill compliance with OSHA
- Due diligence must be exercised to inquire and verify that full compliance has been achieved

Recommended Safety and Health Practices

- Staffing agency & host employer should both:
  - Have a written safety and health program
  - Perform a hazard assessment of the worksite
  - Define scope of work in the contract
  - Conduct new project orientation and safety training that addresses hazards to which temporary workers may be potentially exposed.

Case Example: Silica Exposure Foundation Pier Drilling & Entry

Hazards?
What is Silica?
- Composes 15% of Earth’s Crust
- Crystalline Silica (regulated)
- Sand, Granite, other “Hard” rocks
- Quartz, most common
- Cristobalite, Tridymite
- Much less common, but more toxic than quartz

“Regular Dust” vs “Respirable Dust”

Respirable dust: <10 microns (µm)


100 times smaller than ordinary beach sand
Classes of Silicosis
• Acute (weeks-5 years)
• Accelerated (5-15 years)
• Chronic (15 years+)

Exposure Levels
• Proposed PEL: 50 ug/m³ (0.05 mg/m³)
• Proposed AL: 25 ug/m³ (0.025 mg/m³)

(Currently ~100 ug/m³)

You are at risk if the dust you breathe in over a full shift contains more RCS than the amount shown next to the penny.

1 gram = 1,000,000 ug

RCS: Respirable Crystalline Silica

From UK HSE Time to Clear the Air: Protect Your Lungs When Using Cut-off Saws
http://www.pavingexpert.com/pdf/KerbCutting_PDF.pdf
After

Additional Resources
- OSHA DOL Susan Harwood Grantee Produced Training Materials
- https://www.osha.gov/dte/grant_materials/material_listing_topic.html