Construction Health Hazards
Emphasis Program

- Silica and Lead
Objectives

In this course, we will discuss the following:

- NCDOL Health Hazards Emphasis Program
- Silica and lead in the construction industry
  - Health effects
  - Exposures
  - Hazard controls
Health Hazards Emphasis Program

- Focuses on chemicals and other substances with serious health effects from overexposures.
  - Silica, lead, asbestos, isocyanates and hexavalent chromium

- Compliance inspections focus on industries that use these chemicals and substances.

- This presentation focuses on silica and lead.
Silica
Silica

- Basic component of soil, sand, granite, and many other minerals

- Exposure only when crystalline silica particles are in the air

- If materials containing silica do not generate dust, there is little chance of inhaling the silica

29 CFR 1910.1000 Table Z-3
- PEL (mg/m³) = (10 mg/m³) / (2+% respirable quartz)
Silica

Health effects
- Fibrotic condition of the lung called *silicosis*
  » Chronic – 10 or more years
  » Accelerated – 5-10 years
  » Acute – Weeks up to 5 years
Silica Exposure in Construction

- Cement handling, mixing
- Demolition
- Jackhammer operations
- Sandblasting
- Tunneling operations
- Steelwork
- Concrete tunneling
Silica Exposure in Construction

- Stone, brick, and concrete block cutting, blasting, chipping, grinding, and sawing

- Hand molding, casting, and forming
High Risk Occupations

- Sandblaster
- Roof bolter
- Rock driller
Lead
Lead

- Highly toxic metal found in small amounts in the earth’s crust
- Enters body through inhalation and ingestion
  - Not absorbed through the skin
Lead

- Health effects
  - Adversely affects body systems and causes health impairment and disease
    » Acute exposure
    » Chronic exposure
Lead Standard

- Lead exposures
  - *Permissible exposure level* (PEL) of 50 µg/m³
  - *Action level* (AL) of 30 µg/m³
  - Employees exposed to the AL or the PEL shall be enrolled in a medical surveillance program

29 CFR 1926.62
Lead Standard

- Employers shall implement engineering controls and safe work practices to prevent exposure.

- Employers shall provide protective clothing and, where necessary, respiratory protection accordance with 29 CFR 1910.134.
Lead Exposures in Construction

- Electrical work
- Carpentry, renovation, remodeling work
- Lead-based paint abatement
- Welding
Lead Exposures in Construction

- Iron work
- Demolition
- Heating, air conditioning maintenance/repair
- Plumbing
High Risk Occupations

- Plumbers
- Welders
- Painters
Hazard Controls

- Hazard elimination
- Substitutes
- Engineering controls
- Work practice controls
- Personal protective equipment
Hazard Elimination

- Most effective way to eliminate the hazard is to eliminate the use of silica or lead.
# Silica Substitutes

<table>
<thead>
<tr>
<th>Silica</th>
<th>Substitute</th>
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<tbody>
<tr>
<td>Alumaglass™</td>
<td>Novaculite</td>
</tr>
<tr>
<td>Aluminum Oxide</td>
<td>Polycarbonate</td>
</tr>
<tr>
<td>Aluminum Shot</td>
<td>Silicon Carbide</td>
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<tr>
<td>Ambient Polycarbonate</td>
<td>Stainless Cast Shot</td>
</tr>
<tr>
<td>Armex™</td>
<td>Stainless Cut Wire</td>
</tr>
<tr>
<td>Apricot Pits</td>
<td>Starblast XL™</td>
</tr>
<tr>
<td>Corn Cobs</td>
<td>Steel Grit and Steel Shot</td>
</tr>
<tr>
<td>Cryogenics Polycarbonate</td>
<td>Urea Plastic</td>
</tr>
<tr>
<td>Emery</td>
<td>Visigrit™</td>
</tr>
<tr>
<td>Garnet</td>
<td>Walnut Shells</td>
</tr>
<tr>
<td>Glass Beads</td>
<td>Wheat Grain</td>
</tr>
<tr>
<td>Melamine Plastic</td>
<td>White Aluminum Oxide</td>
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<td></td>
<td>Zircon</td>
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</table>
Engineering Controls

- Local and general exhaust ventilation
- Process and equipment modification
- Material substitution
- Component replacement
- Isolation or automation

Silica and Lead

Local exhaust ventilation
Examples

- Install local exhaust ventilation at/near the source
- Equip power tools with dust collection shrouds exhausted through a high-efficiency particulate air (HEPA) vacuum system
- Install dust collection systems onto machines or equipment that generates dust
Engineering Controls

Examples

- Substitute mobile hydraulic shears for torch cutting
- Use non-silica containing abrasive instead of sand in abrasive blasting operations
- Isolate abrasive blasting operations
- Use wet drilling or wet sawing
Engineering Controls

No engineering controls | Wet drilling technique
Engineering Controls

Examples

- Apply lead paints or other lead-containing coatings with brush or roller
- Encapsulate lead-based paint with epoxy or acrylic coating
- Cover floors coated with lead-based paint with vinyl tile or linoleum flooring
- Use wet drilling or wet sawing
- Use blast-cleaning machines and cabinets
Engineering Controls

Fume extractor gun

Shrouded tool
Work Practice Controls

- Involve performance of a task, such as:
  - Good housekeeping
  - Appropriate personal hygiene practices
  - Periodic inspection and maintenance
  - Proper procedures to perform a task
  - Supervision
  - Administrative controls
Examples

- Wash hands and face before eating, drinking, or smoking
- Know which work operations have exposure
- Job share to reduce dust exposure
- Use disposable work clothes at the worksite
- Shower (where available) and change into clean clothing before leaving the worksite
Work Practice Controls

Examples

- Use tools that reduce dust exposure
- Attend training events
  » To include reading labels and MSDS
- Participate in medical surveillance program/disease reporting
- Maintain good housekeeping practices
- Use water hose to wet down the dust at the source
Work Practice Controls

Examples

- Hand wash station
- Changing room
- Vacuum to remove lead from clothing
Work Practice Controls

Silica
Work Practice Controls

- Examples

Without controls

With scissors as the control
Work Practice Controls

Examples

Lead paint remover
Examples

- Vented goggles or face shields with protective spectacles or goggles
- Coveralls
- Gloves
- Welding or blasting helmets
- Respirators
Personal Protective Equipment

Examples

Silica and Lead
Summary

In this course, we discussed:

- NCDOL Health Hazards Emphasis Program
- Silica and lead
  - Health effects
  - Exposures
  - Hazard controls
Thank You For Attending!

Final Questions?