Construction Health Hazards Emphasis Program

- ***Silica and Lead***

Objectives

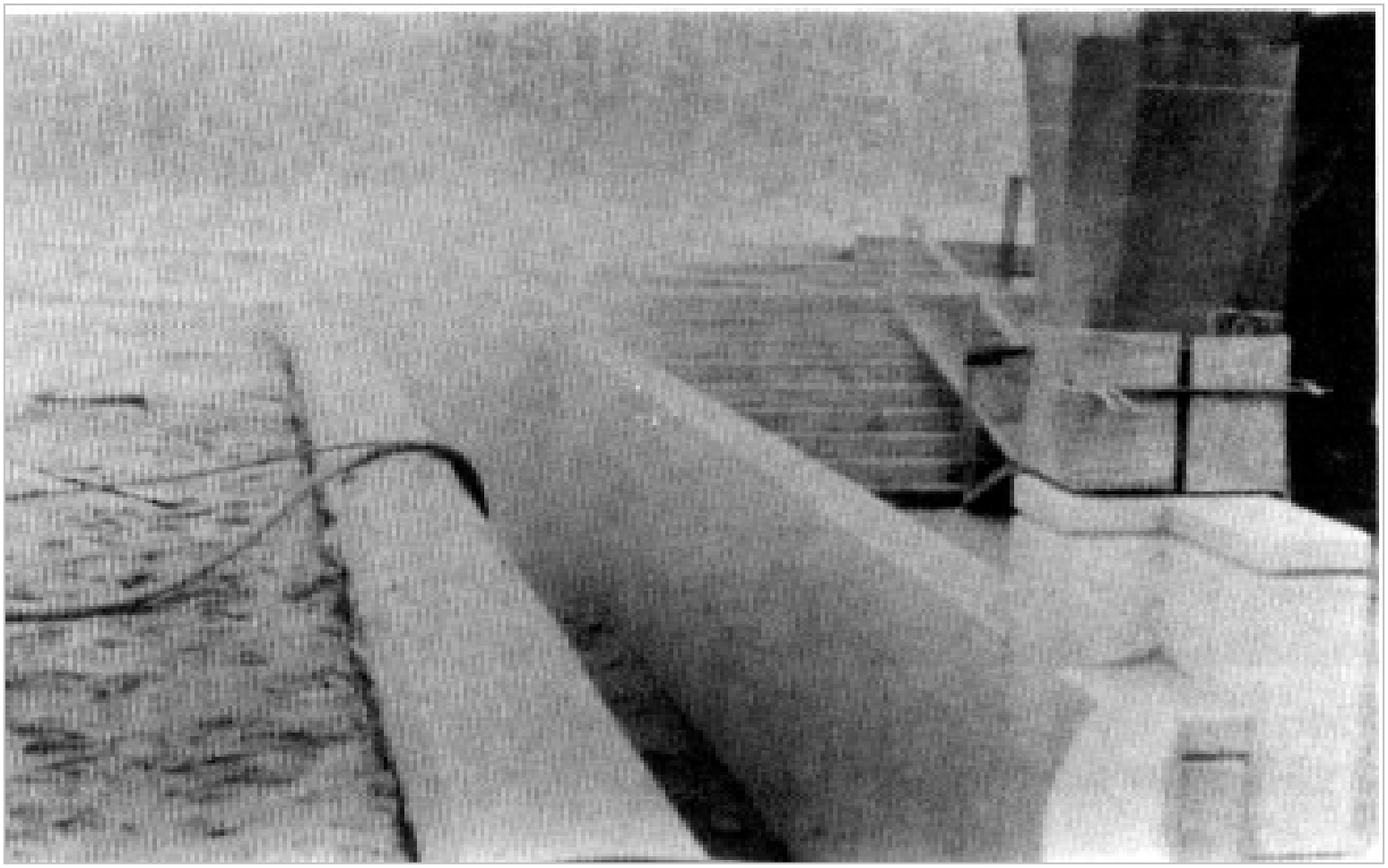
In this course, we will discuss the following:

- 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

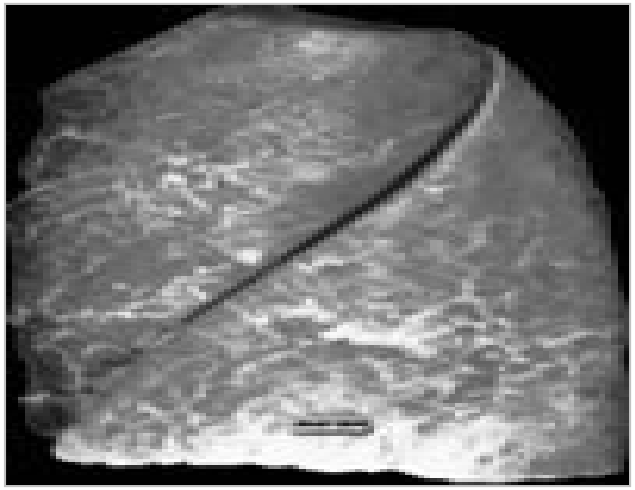
1910.1000 Table Z - 3

- 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/m^3) = (10 mg/m^3)/(2+%respirable quartz)

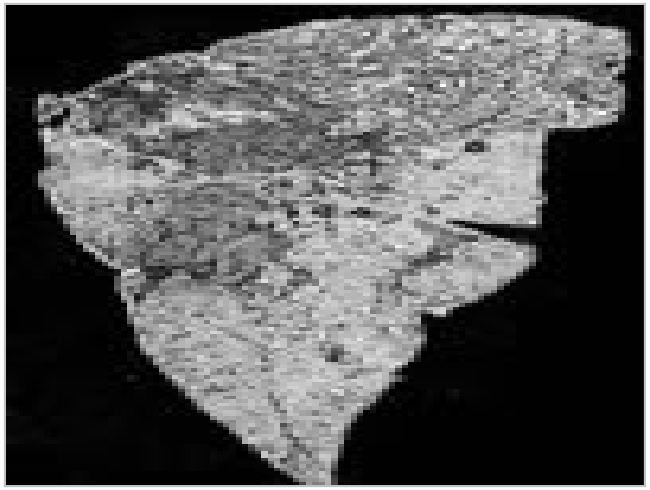
Silica

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

Healthy Lung

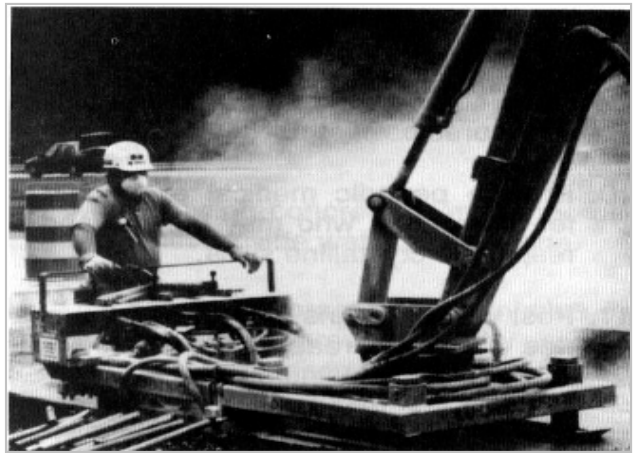


Sick Lung



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

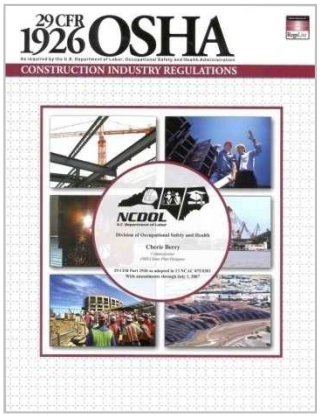
Lead

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

Lead Standard

29 CFR 1926.62

- 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

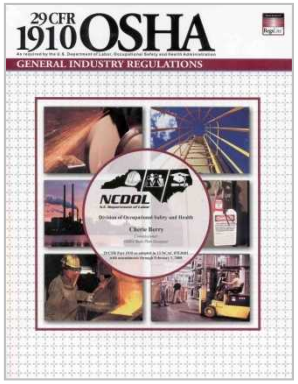


Lead Standard

29 CFR 1926.62

- 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

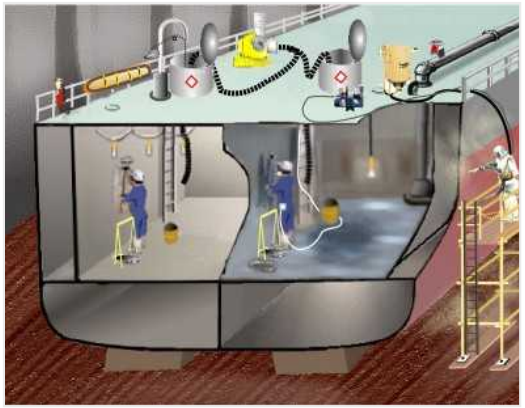
Photo courtesy of OSHA.
This picture shows actual disaster site work conditions and may not illustrate proper safety and health procedures.

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

Alumaglass™
Aluminum Oxide
Aluminum Shot
Ambient Polycarbonate
Armex™
Apricot Pits
Corn Cobs
Cryogenics Polycarbonate
Emery
Garnet
Glass Beads
Melamine Plastic
Novaculite
Polycarbonate
Silicon Carbide
Stainless Cast Shot
Stainless Cut Wire
Starblast XL™
Steel Grit and Steel Shot
Urea Plastic
Visigrit™
Walnut Shells
Wheat Grain
White Aluminum Oxide
Zircon

Engineering Controls

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

Local exhaust ventilation

Engineering Controls

- 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

HEPA filter

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

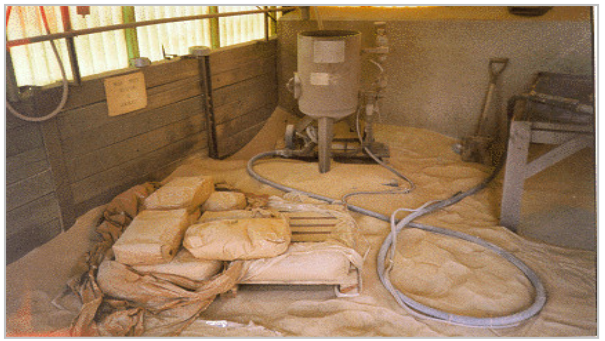
Engineering Controls

No engineering controls

Wet drilling technique

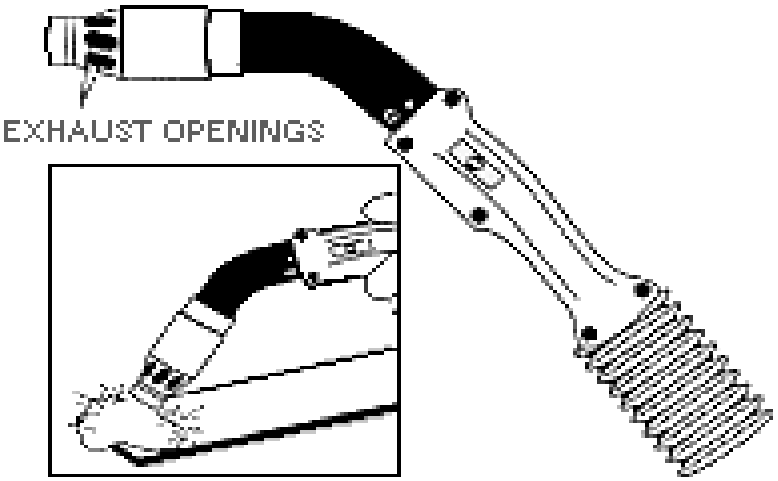
Engineering Controls

- 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

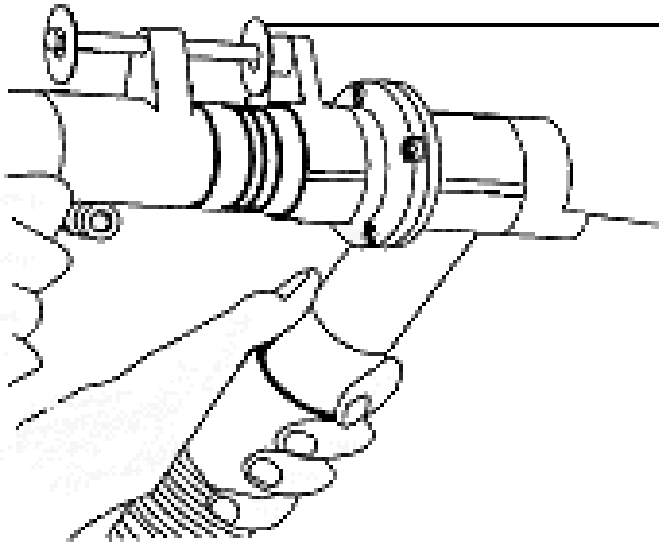


Engineering Controls

Lead



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

Work Practice 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

Vacuum to remove lead from clothing

Changing room

Work Practice Controls

Silica

Work Practice Controls

- Examples

Without controls

With scissors as the control

Work Practice Controls

- Examples

Lead paint remover

Personal Protective Equipment

Silica and Lead

- Examples
  - Vented goggles or face shields with protective spectacles or goggles
  - Coveralls
  - Gloves
  - Welding or blasting helmets
  - Respirators

Lead abatement

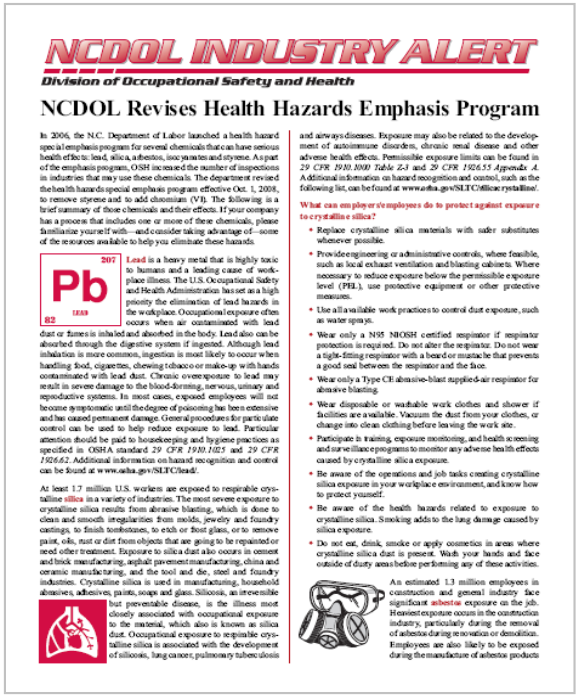
Personal Protective Equipment Silica and Lead

- Examples

Summary

In this course, we discussed:

- NCDOL Health Hazards Emphasis Program
- Silica and lead
  - Health effects
  - Exposures
  - Hazard controls



NCDOL INDUSTRY ALERT

Division of Occupational Safety and Health

NCDOL Revises Health Hazards Emphasis Program

In 2006, the N.C. Department of Labor launched a health hazard special emphasis program for several chemicals that can have serious health effects: lead, silica, asbestos, isocyanates and styrene. As part of the emphasis program, OSH increased the number of inspections in industries that may use these chemicals. The department revised the health hazards special emphasis program effective Oct. 1, 2008, to remove styrene and to add chromium (VI). The following is a brief summary of those chemicals and their effects. If your company has a process that includes one or more of these chemicals, please familiarize yourself with—and consider taking advantage of—some of the resources available to help you eliminate these hazards.

207 Pb 82 LEAD

Lead is a heavy metal that is highly toxic to humans and a leading cause of workplace illness. The U.S. Occupational Safety and Health Administration has set as a high priority the elimination of lead hazards in the workplace. Occupational exposure often occurs when air contaminated with lead dust or fumes is inhaled and absorbed in the body. Lead also can be absorbed through the digestive system if ingested. Although lead inhalation is more common, ingestion is most likely to occur when handling food, cigarettes, chewing tobacco or make-up with hands contaminated with lead dust. Chronic overexposure to lead may result in severe damage to the blood-forming, nervous, urinary and reproductive systems. In most cases, exposed employees will not become symptomatic until the degree of poisoning has been extensive and has caused permanent damage. General procedures for particulate control can be used to help reduce exposure to lead. Particular attention should be paid to housekeeping and hygiene practices as specified in OSHA standard *29 CFR 1910.1025* and *29 CFR 1926.62*. Additional information on hazard recognition and control can be found at www.osha.gov/SLTC/lead/.

At least 1.7 million U.S. workers are exposed to respirable crystalline **silica** in a variety of industries. The most severe exposure to crystalline silica results from abrasive blasting, which is done to clean and smooth irregularities from molds, jewelry and foundry castings, to finish tombstones, to etch or frost glass, or to remove paint, oils, rust or dirt from objects that are going to be repainted or need other treatment. Exposure to silica dust also occurs in cement and brick manufacturing, asphalt pavement manufacturing, china and ceramic manufacturing, and the tool and die, steel and foundry industries. Crystalline silica is used in manufacturing, household abrasives, adhesives, paints, soaps and glass. Silicosis, an irreversible but preventable disease, is the illness most closely associated with occupational exposure to the material, which also is known as silica dust. Occupational exposure to respirable crystalline silica is associated with the development of silicosis, lung cancer, pulmonary tuberculosis and airways diseases. Exposure may also be related to the development of autoimmune disorders, chronic renal disease and other adverse health effects. Permissible exposure limits can be found in *29 CFR 1910.1000 Table Z-3* and *29 CFR 1926.55 Appendix A*. Additional information on hazard recognition and control, such as the following list, can be found at www.osha.gov/SLTC/silicacrystalline/.

What can employer's/employees do to protect against exposure to crystalline silica?

- Replace crystalline silica materials with safer substitutes whenever possible.
- Provide engineering or administrative controls, where feasible, such as local exhaust ventilation and blasting cabinets. Where necessary to reduce exposure below the permissible exposure level (PEL), use protective equipment or other protective measures.
- Use all available work practices to control dust exposure, such as water sprays.
- Wear only a N95 NIOSH certified respirator if respirator protection is required. Do not alter the respirator. Do not wear a tight-fitting respirator with a beard or mustache that prevents a good seal between the respirator and the face.
- Wear only a Type CE abrasive-blast supplied-air respirator for abrasive blasting.
- Wear disposable or washable work clothes and shower if facilities are available. Vacuum the dust from your clothes, or change into clean clothing before leaving the work site.
- Participate in training, exposure monitoring, and health screening and surveillance programs to monitor any adverse health effects caused by crystalline silica exposure.
- Be aware of the operations and job tasks creating crystalline silica exposure in your workplace environment, and know how to protect yourself.
- Be aware of the health hazards related to exposure to crystalline silica. Smoking adds to the lung damage caused by silica exposure.
- Do not eat, drink, smoke or apply cosmetics in areas where crystalline silica dust is present. Wash your hands and face outside of dusty areas before performing any of these activities.

An estimated 1.3 million employees in construction and general industry face significant **asbestos** exposure on the job. Heaviest exposure occurs in the construction industry, particularly during the removal of asbestos during renovation or demolition. Employees are also likely to be exposed during the manufacture of asbestos products

Thank You For Attending!

Final Questions?