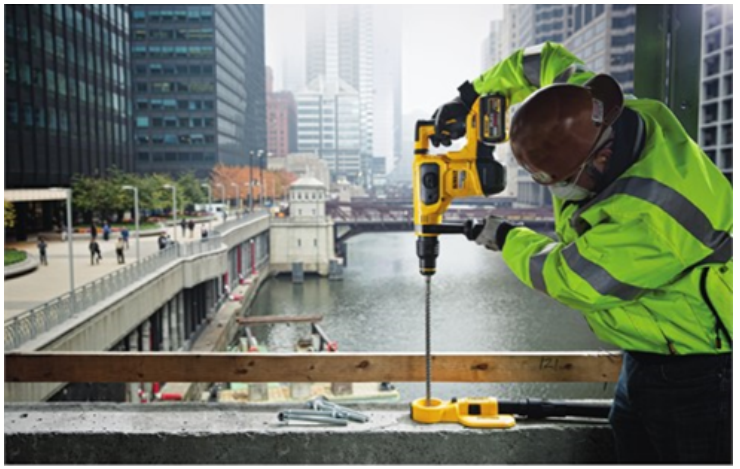
Silica Safety Training Presentation

Presented by Horst Insurance

Learning Objectives

- Review the definition of silica.
- Understand the hazards of silica.
- Review the most at-risk industries and tasks.
- Learn specific employer responsibilities.
- Know the role and responsibilities of the competent person.
- Understand the hierarchy of controls.



Definitions

What Is Silica?

- **Crystalline silica** is a mineral commonly found in natural materials like sand, rock and stone.
- It can also be found in man-made materials like concrete, tile, brick and mortar.
- When workers cut, grind, drill or crush materials that contain crystalline silica, very small dust particles are created (**respirable crystalline silica**).

Crystalline Silica

Respirable Crystalline Silica

The Permissible Exposure Limit (PEL)

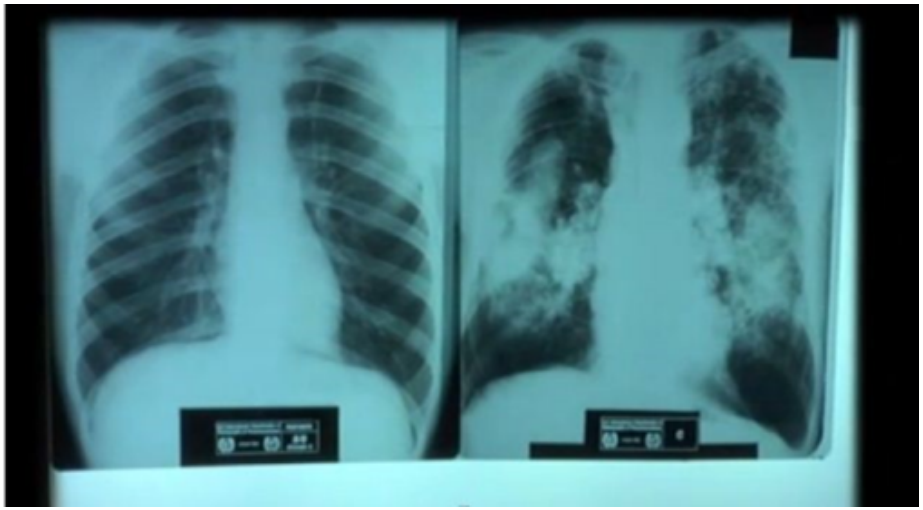
- The PEL is the legal limit for employee exposure to a chemical substance or physical agent.
- Employers must protect workers from respirable crystalline silica exposures above the PEL of 50 µg/m^3* (old limit was 250 µg/m^3).
- Employers must also determine the amount of silica that workers are exposed to if it is, or if it is expected to be, at or above 25 µg/m^3* (this is known as the action level).

**Averaged over an eight-hour day.*

Hazard Overview

The Dangers of Silica

- Dust created when working with crystalline silica contains harmful particles.
- Although respirable crystalline silica looks like dust, it's much more harmful to workers' lungs.
- Silica dust is a carcinogen, and breathing it in causes the formation of scar tissue, reducing the lungs' ability to take in oxygen.



The Dangers of Silica (Continued)

- Breathing in silica dust can lead to a variety of health complications:
  - Silicosis
  - Lung cancer
  - Chronic obstructive pulmonary disease (COPD)
  - Kidney diseases
  - Autoimmune diseases

Silicosis

1. **Chronic/classic silicosis—**Occurs after 15 to 20 years of moderate to low exposure. Initially, the symptoms may not be obvious. As the disease progresses, workers experience fatigue, extreme shortness of breath, chest pain and respiratory failure.
2. **Accelerated silicosis—**Occurs after 5 to 10 years of high exposure. Symptoms include severe shortness of breath, weakness and weight loss.
3. **Acute silicosis—**Occurs only a few months and up to two years following extremely high exposure. Symptoms include severe disabling shortness of breath, weakness and weight loss. This form of silicosis typically leads to death.

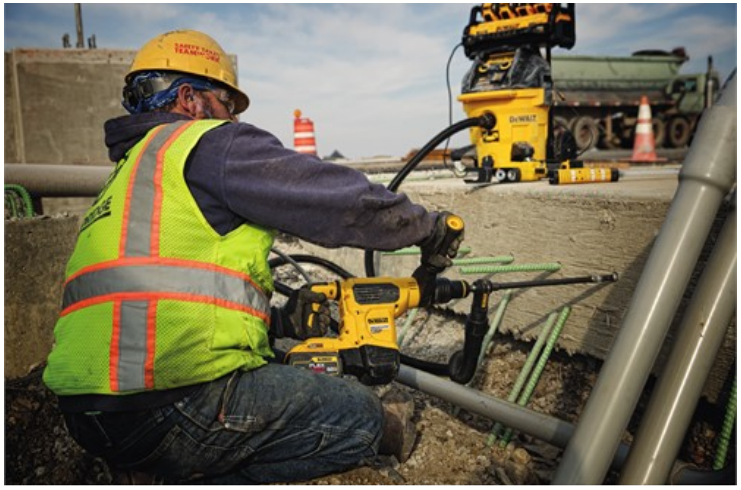
What This Means for Employers

- Silica dust can be life-threatening and debilitating.
- Employers must protect workers from silica dust exposures to keep employees safe and avoid significant workplace fines.
- To help manage silica exposures, employers need to understand the most at-risk industries and tasks.

At-risk Industries and Tasks

Industries of Interest

- According to OSHA, silica exposure is a major threat to nearly 2 million U.S. workers, including more than 100,000 workers in high-risk jobs.
- While silica dust is present in a variety of workplaces, the construction, manufacturing, mining and maritime industries carry some of the most significant exposures.



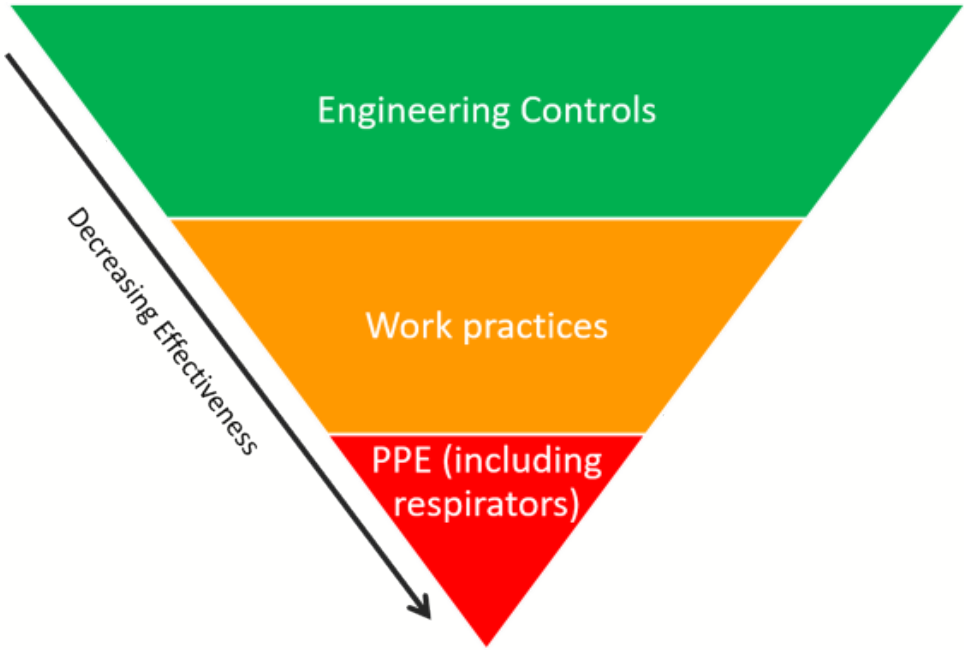
Hazardous Tasks

- Abrasive blasting, foundry work, stonecutting, rock drilling, quarry work and tunneling create significant silica dust risks.
- Specifically, work involving these kinds of equipment can expose workers to dangerous levels of silica:
  - Masonry saws
  - Grinders
  - Drills
  - Jackhammers
  - Handheld powered chipping tools
  - Vehicle-mounted drilling rigs
  - Milling equipment
  - Crushing machines
  - Heavy demolition equipment

Control Methods

Protecting Employees

- Employers must protect workers when they are exposed to silica dust above certain levels (PEL).
- There are three main control methods that decrease in effectiveness as you dive deeper:
  - Engineering controls
  - Work practices
  - Personal protective equipment (PPE)



Engineering Controls

- Engineering controls are the most effective types of controls, as they remove or isolate silica dust at the point where it is made.
- The three major types of engineering controls for silica dust are:
    1. **Wet methods**—These methods involve using water or a foam to keep dust down and out of the air.
    2. **Vacuum dust collection systems**—These systems remove dust at the point where it is made.
    3. **Isolation**—Isolation separates the employee from silica dust (e.g., an employee is protected from dust by the cab of an excavator).

Work Practices

- Second on the hierarchy is work practice controls. These involve doing tasks in ways that reduce dust exposure.
- Practices can include reviewing engineering controls for effectiveness and establishing work procedures to limit silica dust:
    - Limiting worker exposure to silica dust
    - Ensuring nozzles on a tool with wet controls are not clogged
    - Using cleaning methods, such as wet sweeping, to decrease the amount of dust that gets into the air

PPE

- Third on the hierarchy of controls is personal protective equipment.
- Employers must provide respirators if engineering controls and work practices are not enough to control exposures down to the PEL.
- Select PPE based on exposure assessment.

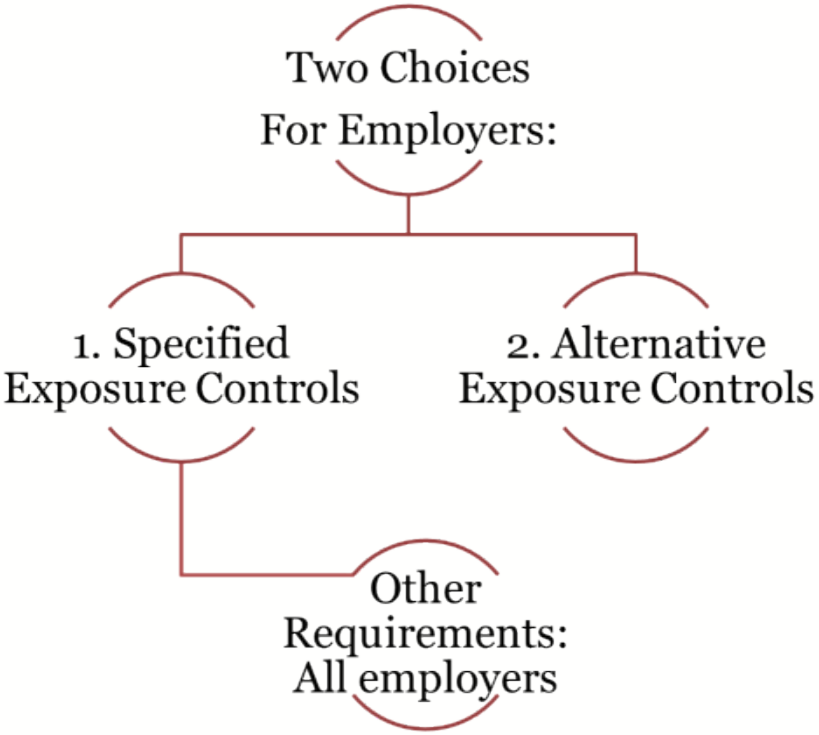
Housekeeping Considerations

- Certain cleaning methods can increase employee exposures to silica by releasing dust into the air.
- When cleaning silica dust, workers should avoid:
  - Dry sweeping/brushing
  - Using compressed air without a ventilation system to capture the dust
- Use a HEPA vacuum when possible.

Table 1

OSHA Standard

- OSHA standard 29 CFR 1926.1153 requires employers to limit worker exposures to respirable crystalline silica and to take steps to protect workers.
- Employers can independently decide which dust controls work best to limit exposures in their workplaces or use a control method laid out in Table 1 of the construction standard.



Specified Exposure Controls (Table 1)

- Table 1 matches common construction tasks with dust control methods.
- The dust control measures listed in the table include methods known to be effective, such as using water to keep dust from getting into the air or using ventilation to capture dust.

Specified Exposure Controls (Continued)

- Table 1 uses a combination of engineering controls, work practices and PPE to protect the employee.
- Table 1 is the preferred method of control.
- Inability to comply with Table 1 will require air monitoring and alternative protection.
- The next two slides will highlight examples of Table 1. The full table goes into more detail and highlights several common construction activities and protection strategies.

Table 1 Example: Handheld Power Saws

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain the tool in accordance with manufacturer's instructions to minimize dust emissions.		
	• When used outdoors	None	APF 10
	• When used indoors or in an enclosed area	APF 10	APF 10

Table 1 Example: Stationary Masonry Saws

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
Stationary masonry saws	Use a saw equipped with an integrated water delivery system that continuously feeds water to the blade. Operate and maintain the tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None

Alternative Exposure Control Methods

- Employers who do implement the control methods on Table 1 are subject to the permissible exposure limit (PEL) and must:
  - Use dust controls and safer work methods to protect workers from silica exposures above the PEL.
  - Provide respirators to workers when dust controls and safer work methods cannot limit exposures to the PEL.
- Again, Table 1 is the preferred method of control.

Other OSHA Requirements

OSHA Standard Requirements for All Workplaces

Regardless of which exposure control method is used, all employers covered by the standard are required to follow these requirements:

- Establish and implement a written exposure control plan that:
  - Is tailored to each employer's needs
  - Identifies silica dust exposures
  - Highlights methods for protecting workers
- Restrict housekeeping practices that expose workers to silica where feasible alternatives are available

OSHA Standard Requirements for All Workplaces (Continued)

- Train workers on work operations that result in silica exposure as well as on ways to limit exposure. Employers should also keep records of workers' silica exposure and medical exams.
- Designate a competent person to implement the written exposure control plan.

Competent Person

- Per the standard, employers must designate a competent person to inspect job sites, materials and equipment to implement the written exposure control plan.
- The competent person must be able to identify silica hazards and must be authorized to quickly eliminate or minimize those hazards.
- Who is our designated competent person?

Competent Person (Continued)

- The competent person's responsibilities include identifying any situations in which bystanders could be exposed to silica and taking action to notify them (or restrict their access to the hazardous areas).
- The competent person is also responsible for recognizing and evaluating situations where overexposure may occur, evaluating the exposure potential and making initial recommendations on how to control that exposure.

Medical Surveillance

- Employers must offer medical exams every three years (at no cost) for workers who are required to wear a respirator for 30 or more days per year.
- Why it's important:
  - Exams determine if employees have a disease related to silica exposure. This allows workers to take actions to protect their health.
  - Exams determine whether workers have any condition, such as a lung disease, that is not caused by silica exposure but that might make them more sensitive to silica exposure.

Medical Surveillance (Continued)

- Medical exams will include:
  - A medical and work history review
  - A physical exam
  - A chest X-ray to help evaluate the health of the lungs.
- Reports given to employers and employees are different.

Employee Reports Include	Employer Reports Include

• Medical conditions
• Recommended limitations on respirator use and exposure to silica
• Recommendations for specialist exam
	• Recommended respirator limitations
	• The following, with employee consent:
	  ○ Recommended exposure limitations
	  ○ Recommendations for specialist exam

Summary of Key Points

Takeaways

- Breathing in silica dust can lead to a variety of health complications, including death.
- Employers must protect workers from silica dust exposures to keep employees safe and avoid significant workplace fines.
- Employers can independently decide which dust controls work best to limit exposures in their workplaces or use a control method laid out in Table 1 of the construction standard. **Table 1 is the preferred control method.**
- Employers must protect workers when they are exposed to silica dust above certain levels (PEL).

Additional Information

- View OSHA's resources on silica safety at:
- https://www.osha.gov/Publications/OSHA3681.pdf
- https://www.osha.gov/Publications/OSHA3902.pdf
- Contact a trusted advisor at Horst Insurance.