OREGON OSHA

AWARENESS TRAINING

AVOIDING SILICOSIS

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Confidential OR-OSHA Consultation
*Sampling * Site Assessments * Reports * Program Development*

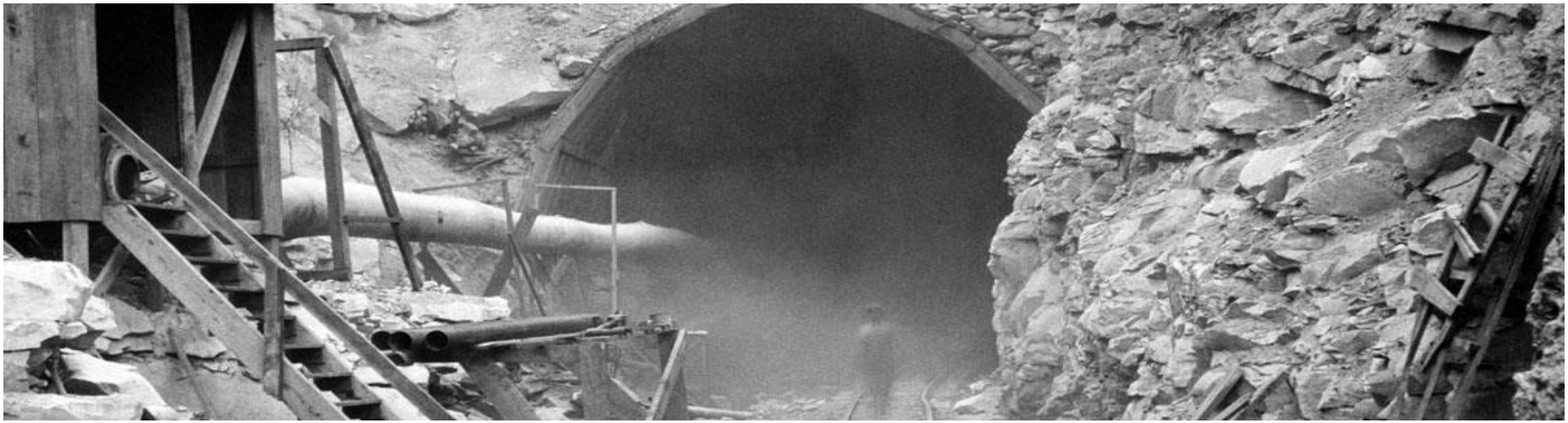
Who is OR-OSHA?

- ❑ Enforcement
- ❑ Consultation
  - *Health*
  - *Safety*
  - *Ergonomics*
  - *SHARP - VPP*
- ❑ Technical
- ❑ Statistics
- ❑ Education
- ❑ Conferences

- ❑ Website
- ❑ Online Training
- ❑ Publications
- ❑ Lending Library
- ❑ Video Library
- ❑ Laboratory
- ❑ Awards
- ❑ Booth

Today's Overview

- The New Rule
- Silica Health Hazards
- Silica Control
- Avoiding Exposure



Silicosis-Are you at risk?

Code Housekeeping

- Rules - Proposed
- July 22, 2016 Proposed Rules
  - Federal Register, Text, Changes and Corrections
- 437-002-1054 Definitions - 437-002-1064 Recordkeeping.

437-002-1053 Scope and application.

This subdivision applies to all occupational exposures to respirable crystalline silica in general industry **and** construction activities, except for the following:

(1) Exposures that result from the processing of sorptive clays.

(2) Operations where objective data demonstrates that employee exposures to respirable crystalline silica will remain below 25 µg/m^3 as an 8-hour time-weighted average (TWA-8) under any foreseeable conditions (*the code Action Limit, AL*).

Elements of the Rule

1. An Exposure Control Plan (ECP)
2. Workplace Exposure Assessment
3. Compliance to the new PEL (0.050 mg/m^3)
4. Restricted Access Areas
5. Engineering and Work Practice Controls
6. Table 1 for Construction
7. Respiratory Protection
8. Housekeeping
9. Medical Surveillance
10. Training
11. Recordkeeping

Exposure Limits

Respirable Quartz		
0.050 mg/m^3	PEL *	**Federal OSHA *NEW***
0.025 mg/m^3	AL	**Federal OSHA and Oregon OSHA**
0.100 mg/m^3	PEL	**Oregon OSHA ****
0.025 mg/m^3	TLV	**ACGIH (best practice)**
0.050 mg/m^3	REL	**NIOSH**
Respirable Crystobalite		
0.050 mg/m^3	PEL	**Oregon OSHA**
0.025 mg/m^3	TLV	**ACGIH (best practice)**
0.050 mg/m^3	REL	**NIOSH**

Construction employers do not need to conduct personnel sampling to assess exposure levels if they use one of the eighteen Table 1 options (T1-T18).

* *The previous OSHA PEL was based on substrate percent*.

** *The current Oregon OSHA code will meet the Federal code July 1, 2018*.

1 mg = 1000 ug
1 ug = 0.001 mg

The Percent Composition Method

$$\text{OSHA PEL} = \frac{10}{\%\ SiO_2 + 2} \quad \text{expressed in mg/m3}$$

10% =	**0.83 mg/m^3**	**concrete**
20% =	**0.45 mg/m^3**	**aggregate**
50% =	**0.19 mg/m^3**	**granite**
90% =	**0.11 mg/m^3**	**countertops**

1 mg = 1000 ug **1 ug = 0.001 mg**

Enforcement Updates

Both Federal standards - contained in the final rule take effect on June 23, 2016., after which industries have one to five years to comply with most requirements, based on the following schedule:

Construction

September 23, 2017. OSHA delayed enforcement in order to conduct additional outreach and provide educational materials and guidance for employer.

General Industry and Maritime

June 23, 2018, two years after the effective date.

Oregon OSHA

is July 1, 2018 effective, January 1, 2019 enforcement.

Why Upgrade the Code?

Potential Health Impact

- **There is no treatment or cure for silicosis…**
  - ***Doctors only treat the complications such as infections, COPD, rales, pleurisy, fibrosis, PMF***
- **Silica exposure can be lethal over time…**
  - ***Increased risk of Tuberculosis***
  - ***Emphysema often develops***
  - ***Increased risk of lung cancer***
  - ***Kidney disease***
  - ***Advanced cases can cause heart damage***

Are any of These Tasks Familiar to You?

They are Specifically Addressed in the SECG

Materials with Silica

- Coatings
- Concrete
- Hardi Plank
- Masonry
- Soil
- Solid Surfacing
- Stone
- Plaster
- Aggregate
- Blast Media
- Foundry

At-Risk Tasks

What activities are commonly affected?

- Abrasive blasting
- Brick and concrete cutting and sawing
- Concrete mixing
- Concrete roofing
- Foundries
- Jackhammering
- Masonry
- Power washing
- Quarry work
- Rock drilling
- Stonecutting
- Tunneling operation
- Well drilling

Predicting Site Silica Risk

What are the considerations?

Severity is Determined By

Substrate Concentration

- ***How much is there?***

Airborne Concentration of silica

- ***How much of the cloud is silica?***

Time of exposure (versus dose)

- ***How long was the exposure?***

Route of exposure

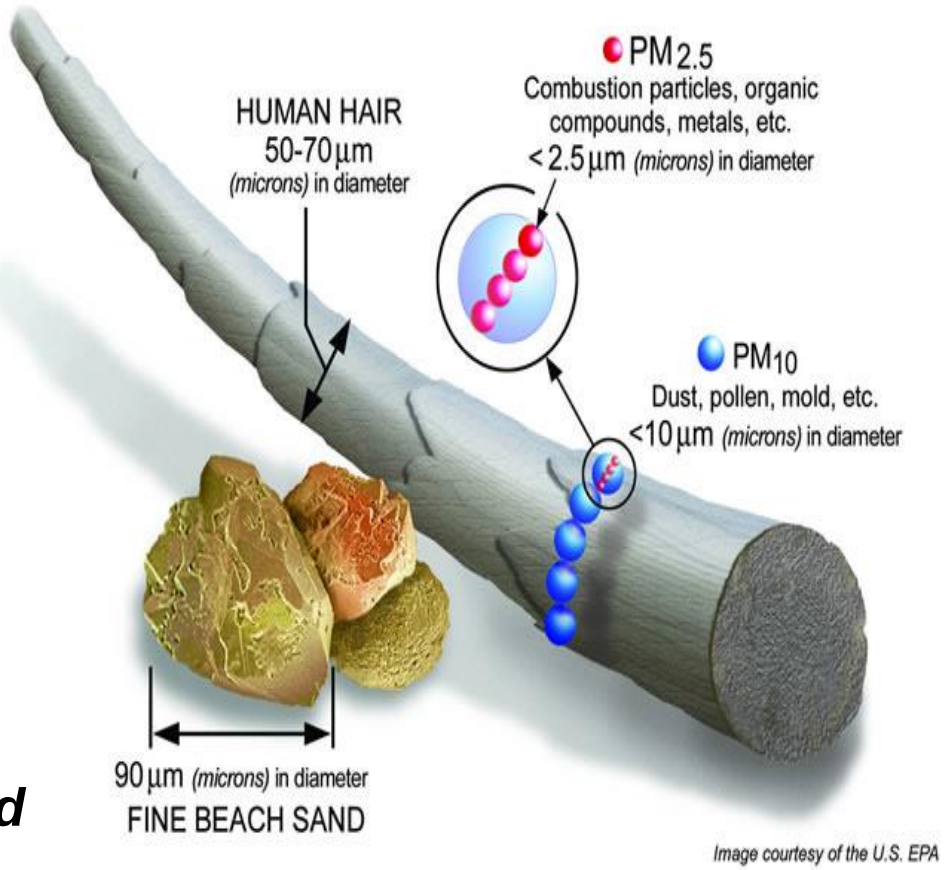
- ***Is the silica cloud inhaled?***

Airborne Hazard

Particle size is the hazard

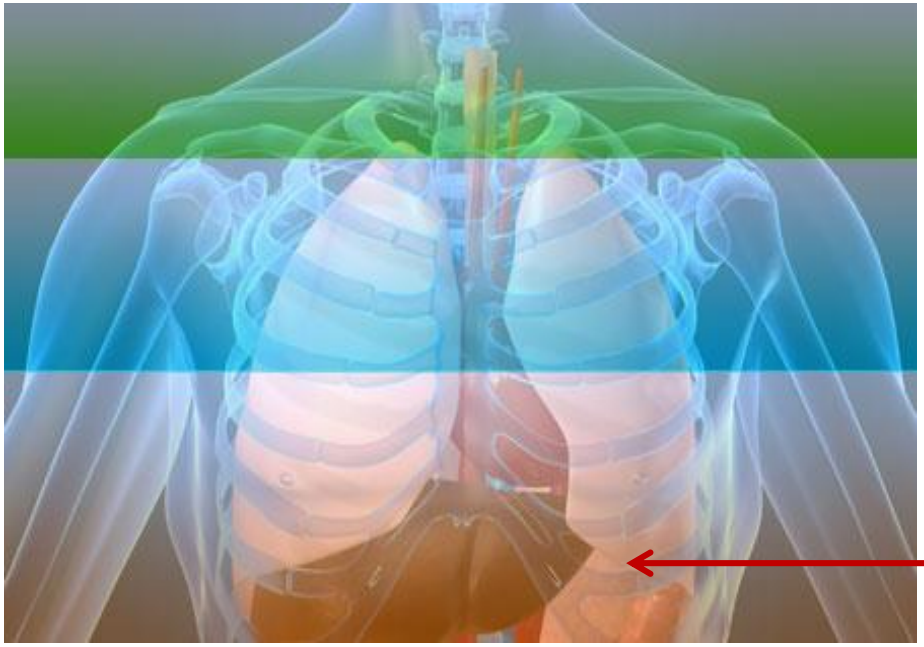
Particles < 5 microns (um) *("PM_5")*

- ***Small enough to enter deep into the lungs ("Respirable")***
- ***Detected by cyclone monitoring***
- ***Too small to see***
- ***Smaller than dust, pollen, mold***



Airborne Silica Hazard

What is a "Respirable" particulate?



Particle size < 5 microns (um)

- ***Small enough to enter deep into the lungs***
- ***Detected by x-rays***
- ***Creates lung and heart problems***

Total Particulate and Wood Dust are sampled at 10 mg/m^3

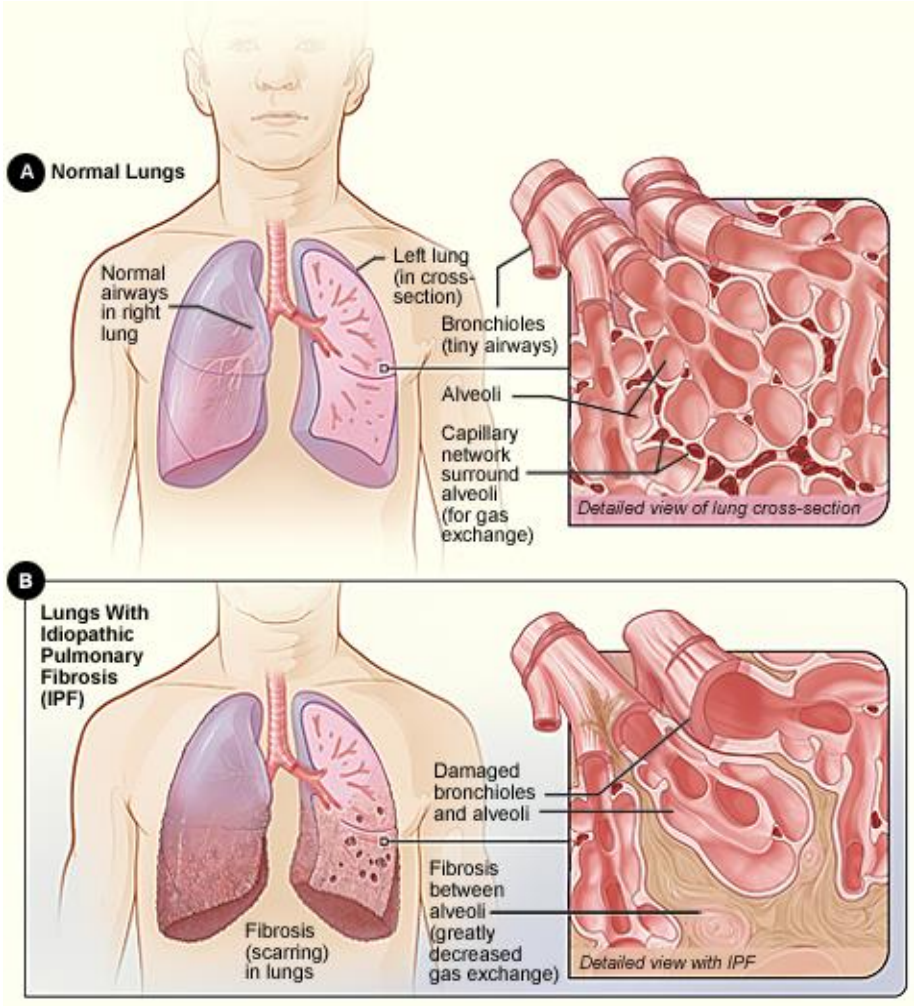
5 mg = 5000 ug
5 ug = 0.005 mg

Silicosis Defined

What is silicosis?

Pulmonary Fibrosis

- **Lungs + fibers**
- **Lung disease**
- **Progressive**
- **Lack of elasticity**
- **Leads to lung cancer**



Silicosis Symptoms

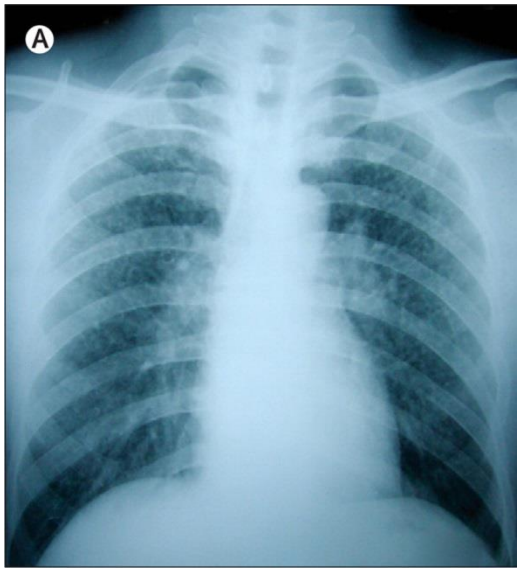
What are the symptoms?

- **Early stages may have no symptoms**
- **Shortness of breath an early sign**
- **Fever & night sweats common**
- **Bluish skin at ear lobes and lips**
- **Symptoms progress as disease progresses:**
  - **Fatigue, weakness, rales, chest pain, breathing difficulty, loss of appetite, weight loss, pleurisy**

Hawks Nest: 1927, 3 mile tunnel to divert the New River, WV
700 to ??? deaths, Walsh-Health Act 1938

Diagnosis & Detection

How is it diagnosed?

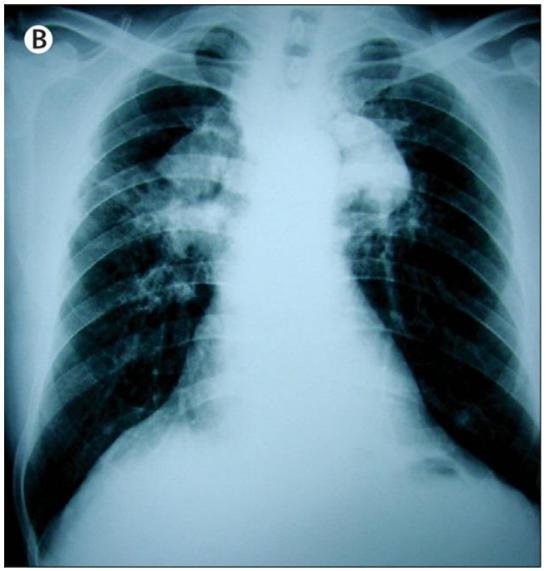


X-Ray

- ***Start with a baseline chest x-ray***
- ***Use caution for excessive x-ray exposure***

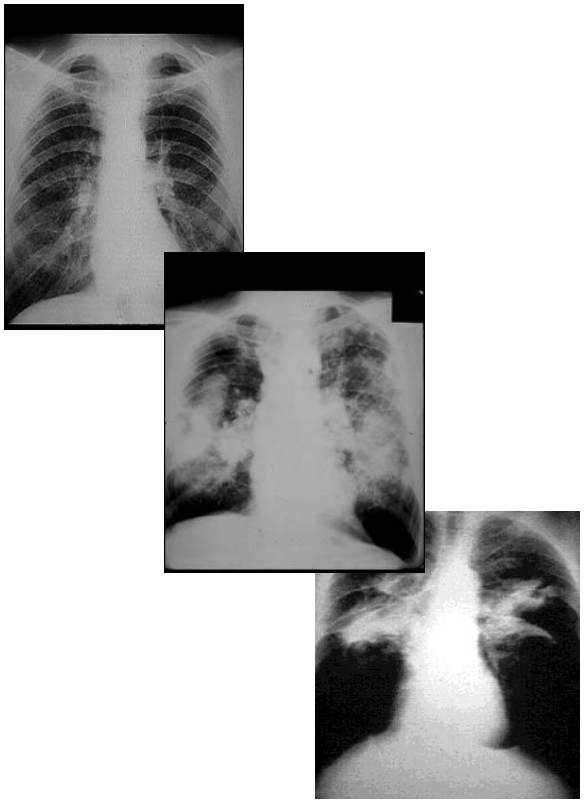
Physician

- ***Must be a "B" reading physician***
- ***Certified to classify radiographs of pneumoconiosis***



Silicosis Defined

What are the three types of silicosis?



Chronic

- **Lower exposures**
- **Longer time**

Acute

- **Higher exposures**
- **Shorter time**

Progressive Massive Fibrosis (*"PMF"*)

- **Damage continues after exposure stops**

Avoiding Exposure

The Hierarchy of Controls…

Engineering Controls

- ***Wet methods***
- ***Ventilation***
- ***Supplied air***
- ***Captured air***
- ***Dust collection***

Avoiding Exposure

What is easy to manage on site?

Administrative controls

- **Personal hygiene**
- **Avoid smoking, eating or drinking**
- **Wash your hands**
- **Change clothes before you go home**
- **Enforce housekeeping**
- **Clothing and gear maintenance**
- **Observe demarcation**
- **Site inspection**
- **Employee accountability**

Avoiding Exposure

Last Line of Defense - PPE

Respirators in Particular

- **Concentration of particulates determines respirator type**
- **Respirator must seal**
- **Positive & negative pressure checks**
- **Disposable respirators**
- **PPE use and care**
- **Cartridge change-out schedule**
- **Respirator care and maintenance**

Table Exposure Control

Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica Table 1 (ii)			
Equipment/Task	**Engineering and work practice control methods**	**Required respiratory protection and minimum assigned protection factor (APF)**	
		≤ 4 hours/shift	**> 4 hours/shift**
(ii) Handheld power **saws** (Any blade diameter) 	Use saw equipment with integrated water delivery system that **continuously feeds water** to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • When used outdoors. • When used indoors or in an enclosed area.	**None** APF 10	APF 10 APR 10

Table Exposure Control

Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica Table 1 (iii)			
Equipment/Task	**Engineering and work practice control methods**	**Required respiratory protection and minimum assigned protection factor (APF)**	
		≤ 4 hours/shift	**> 4 hours/shift**
(iii) Handheld power saws for cutting **fiber-cement board** *(with blade diameter of 8 inches or less)* 	For tasks performed outdoors only: • Use saw equipped with commercially available dust collection system. • Operate and maintain tool in accordance with **manufacturer's instructions** to minimize dust emissions. • Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None **None** **None**	None **None** **None**

Table Exposure Control

Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica Table 1 (x)(part 1)			
Equipment/Task	**Engineering and work practice control methods**	**Required respiratory protection and minimum assigned protection factor (APF)**	
		≤ 4 hours/shift	**> 4 hours/shift**
(x) Jackhammers and handheld powered chipping tools 	-Use tool with **water delivery system** that supplies a continuous stream or spray of water at the point of impact. • Use When used outdoors • When used indoors or in an enclosed area	**None** APF 10	APF 10 APF 10

Table Exposure Control

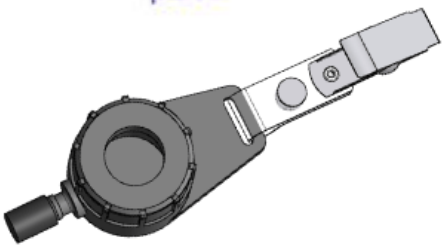
Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

Table 1 (x)*(continued)*

Equipment/Task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	**> 4 hours/shift**
(x) Jackhammers and handheld powered chipping tools 	-Use tool with commercially available **shroud and dust collection system** -Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. -Dust collector must provide the air flow recommended by the tool manufacturer or greater, and have a filter with 99% or greater efficiency and a filter cleaning mechanism. • Use When used outdoors • When used indoors or in an enclosed area	None APF 10	APF 10 APF 10

Site Management

Maintain an exposure assessment



Why use a Cyclone when sampling?

1 mg = 1000 ug
1 ug = 0.001 mg

Site Management

What to remember about cleanup

Housekeeping

- **Use water-not air-for cleanup**
- **Clean up while wet**
- **Wash dust off of tools**

Site Management: Regulated Areas

DANGER

RESPIRABLE CRYSTALLINE SILICA

MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS

WEAR RESPIRATORY
PROTECTION IN THIS AREA

AUTHORIZED PERSONNEL ONLY

WARNING!

Crystalline Silica
Work Area

Improper handling or exposure
to the dust may cause silicosis
(a serious lung disease) and death.

RESPIRATOR
REQUIRED

Site Management: Multi-trade Exposures


PRO-EDGE


EMERGENCY
STOPPING
ONLY

Prevention is the Key

What can you do now?

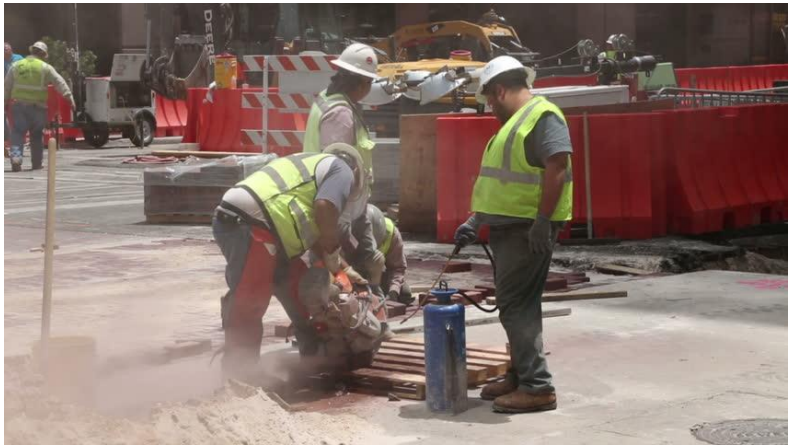
- **Consult the site-specific silica management plan (ECP)**
- **Consult engineering control guidelines from Table 1**
- **Consult administrative control guidelines**
- **Determine the exposure level**
- **Use proper PPE such as respirators**
- **Focus on prevention of dust**
- **Controlling dust that is generated**
- **Maintain housekeeping**
- **Follow good hygiene practices**
- **Follow medical monitoring (30 day rule)**

Additional Resources

- **Oregon OSHA Fact Sheets**
- **Federal OSHA Small Entity Compliance Guide Table 1 (18 tasks)**
- **Federal OSHA Crystalline Silica page**
- **http://plan.silica-safe.org/ (to create an ECP)**
- **Sandia labs template for an ECP**
- **Solid surface hazard alert: https://www.osha.gov/Publications/OSHA3768.pdf**
- **Washington Labor and Industries**

Take Home

- Use wet methods
- Demarcate the work area
- Have a strong respiratory protection plan
- Consult the 18 control options in Table 1
- Routinely inspect job sites
  - Housekeeping
  - Effective controls
  - Respirator use and care
  - Check employee knowledge



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