Silica in Construction: Cal/OSHA Update

Patrick Corcoran, MPH, CIH
Senior Safety Engineer
Cal/OSHA Consultation Services

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Respirable Crystalline Silica: A View from the Grade

Cal/OSHA - Construction Silica Activities

Enforcement – Inspections by district offices, High-Hazard Unit, and Labor Enforcement Task Force (LETF) staff

Consultation – On-site evaluations, VPP – Construction visits, and outreach to employer groups

Outreach Team – Coordinated presentations to employee groups and OSH groups

Publications Unit – Working on respirable crystalline silica resources

Silica in Construction – Federal Enforcement

Most common 1926.1153 citations:

(d)(2)(A) – Exposure assessment – 53

(c)(1) – Table 1 control methods -- 51

(g)(1) – Exposure control plan -- 32

(i)(1) – Communication of silica hazards -- 12

(i)(2)(A) – EE information and training – 9

Data from 10/2017 to 5/2018

https://www.lhsfna.org/index.cfm/lifelines/december-2018/what-we-re-learning-about-osha-enforcement-of-the-silica-rule-in-construction/

Silica – CA Enforcement*

- Range of data available – 10/1/16 to 9/27/18
- Cases coded for SILICA = **39**
- Cases coded for SAMPLING = **7**

*All Industries

Cases with Silica Sampling Increasing Slightly

2017 = 6 cases

Air samples = 47

Bulk samples = 14

2018* = 9 cases

Air samples = 27

Bulk samples = 15

Construction, mining, and general industry employers covered.
*2018 partial data

Silica in Construction – CA Enforcement

SILICA, CRYSTALLINE, by XRD (filter redeposition) 7500

SiO_2 MW: 60.08 CAS: 14808-60-7 (quartz), 14464-46-1 (cristobalite), 15468-32-3 (tridymite) RTECS: VV7330000 (quartz), VV7325000 (cristobalite), VV7335000 (tridymite)

METHOD: 7500, Issue 4 **EVALUATION: FULL** **Issue 1: 15 August 1990** **Issue 4: 15 March 2003**

OSHA : quartz (respirable) 10 mg/m³/(%SiO_2+2); cristobalite and tridymite (respirable) ½ the above
NIOSH: 0.05 mg/m³; carcinogen
ACGIH: quartz (respirable) 0.1 mg/m³; cristobalite (respirable) 0.05 mg/m³; tridymite (respirable) 0.05 mg/m³

PROPERTIES: solid; d 2.65 g/cm³ @ 0 °C; crystalline transformations: quartz to tridymite @ 867 °C; tridymite to cristobalite @ 1470 °C; α-quartz to ß-quartz @ 573 °C

SYNONYMS: free crystalline silica; silicon dioxide

SAMPLING

SAMPLER: CYCLONE + FILTER (10-mm nylon cyclone, Higgins-Dewell (HD) cyclone, or aluminum cyclone + 5-µm PVC membrane) *see sampling section

FLOW RATE: Nylon cyclone: 1.7 L/min; HD cyclone: 2.2 L/min; aluminum cyclone: 2.5 L/min

MEASUREMENT

TECHNIQUE: X-RAY POWDER DIFFRACTION

ANALYTE: Crystalline SiO_2

ASH: Muffle furnace or RF plasma asher or dissolve in tetrahydrofuran

REDEPOSIT: On 0.45-µm Ag membrane filter

XRD: Cu target X-ray tube, graphite

Silica in Construction – Enforcement Visits

Most Common NAICS codes in construction:

238XXX – specialty trade contractors (17)

237XXX – heavy and civil engineering construction (4)

236XXX – construction of buildings (3)

Common non-construction NAICS codes:

327XXX – nonmetallic mineral product manufacturing (6)

212XXX – mining, not oil and gas (2)

Silica in Construction – Enforcement Overview

9 inspections resulting in 1532.3 citations – 4 Serious, 12 General

Most common 1532.3 citations:

(c)(1) – Table 1

(d)(2)(A) – Exposure assessment

(d)(1) – Ensure exposure below PEL

(i)(2)(A) – EE information and training

(f)(1) -- Housekeeping

(g)(1) – Exposure control plan

(c)(2) – Table 1, add'l requirements

NAICS Codes of Cited Construction ERs:

- 236115 – single family homes
- 237110 – water and sewer lines
- 237130 – power/communication lines
- 238140 – masonry contractors
- 238220 – plumbing/HVAC
- 238340 – tile and terrazzo
- 238910 – demolition and grading
- 561730 – landscape services

Silica in Construction - Enforcement

Most common silica-related citations, **not 1532.3**:

- 5155(e)(1) – failure to monitor
- 5144(c) – Respiratory Protection Program
- 1530.1(c) – old silica standard, dust reduction system
- 1735(t) – dust suppression during demolition activities
- 5141(a) – Engineering controls

Enforcement Case Study #1 : Plumbing Company

- Jackhammer and chipping on concrete floor & tile indoors
- Bulk tile sampling performed; slab 40.9%, tile 73.6%
- 5 citations for 1532.2 proposed
  - 2 general
  - 3 serious

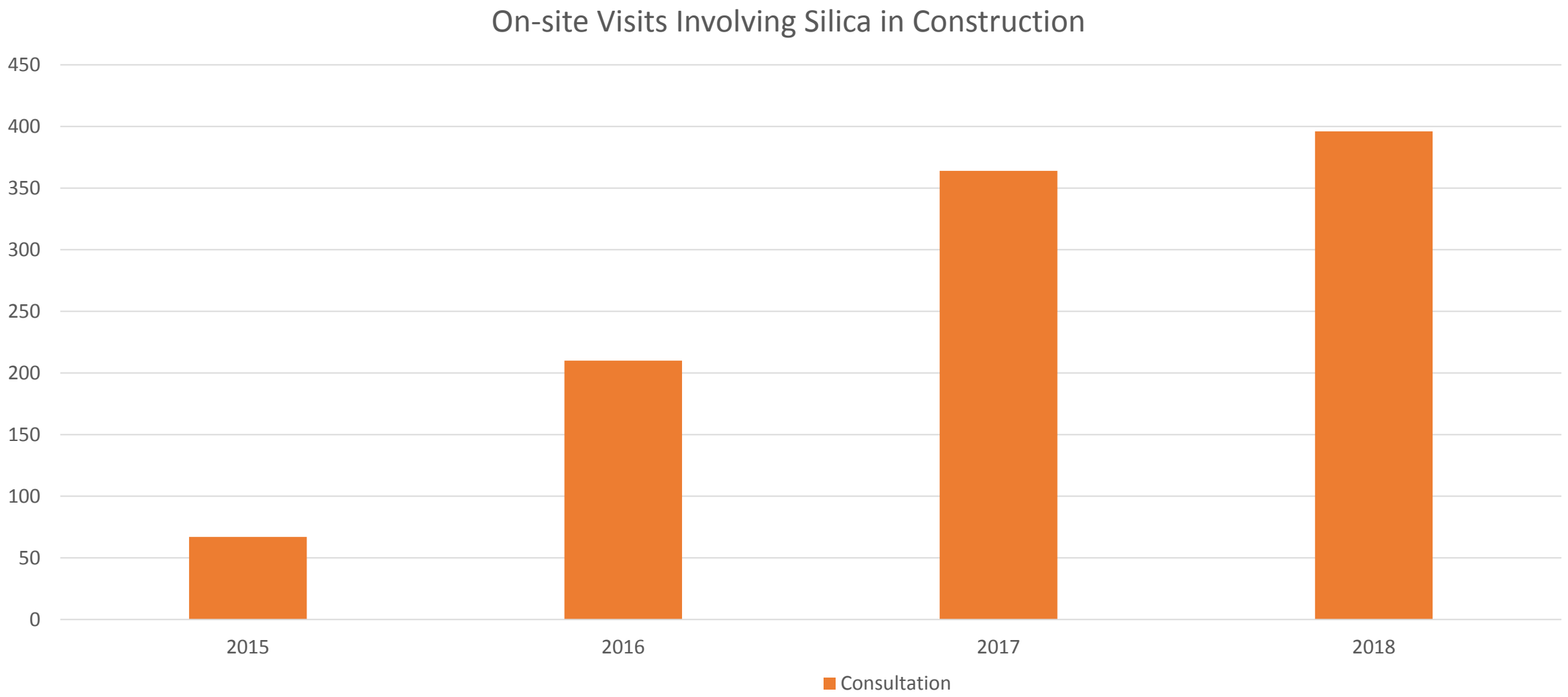
Class.	Section	Penalty
General	(d)(2)(A) – exposure assessment	$225
General	(f)(1) -- housekeeping	$225
Serious	(c)(1) – Not following T1	$2,025
Serious	(c)(2)(A) – No means of exhaust	$2,025
Serious	(i)(2)(A) – EE training	$2,025

Enforcement Case Study #2 : Communications

- Jackhammering on a public sidewalk to run cable
- Bulk concrete sampling performed - 46% silica
- 3 citations for 1532.2 proposed
  - 2 general
  - 1 serious

Class.	Section	Penalty
General	(d)(2)(A) – exposure assessment	$0
General	(e)(1) – respiratory protection	$0
Serious	(c)(1) – Not following T1	$1,800

Silica in Construction - Consultation



1532.3 Hazards Written – Consultation (2018)

Hazard Written	Description	n = ?
(g)(1) – Written ECP	No or inadequate written program	122
(c)(1) – Table 1	Not following Table 1	16
(i) – EE information and Training	Lacking training on silica	15
(d)(2)(A) – Exposure Assessment	For non-Table 1 tasks or T1 task not using T1	8
(d)(1) – PEL overexposure	Exceeded PEL for RCS	5
(f)(1) – Housekeeping	Dry sweeping or blowing out holes	3
(d)(3)(A) – Methods of compliance	Lack of controls	1
(e)(1) – Respiratory Protection	Failure to provide or use respirator	1

Common Problems with the Written ECP - (g)(1)

- No program found
- Program does not ID tasks, missing tasks
- Program does not link tasks with controls
  - “A description of the engineering controls,… …for each task.”

- No limited access provisions – GCs look for this!

Compliance Problem Areas

- Tasks not found in Table 1
  - Stucco work
  - Drywall sanding
  - Mixing mortar/monokote
  - Powder-actuated tools
  - Conditioning surfaces
    - Bushing
    - Sack and patch
    - Scabbling
- Table 1 controls not preferred or difficult
  - Cementitious siding
  - Roofing tile
  - Soff-cut saw
  - Older mobile equipment

Tasks No Longer Exempt from Dust Reduction System Requirements. 1530.1 → 1532.3

- Cutting Roofing Tiles
- Stucco, plastering material, or other similar products.
- Wall cladding, siding, or other similar products.
- Downward drilling.
- Jack-hammering or chipping when that work is incidental to the scope of work or planned operations of a plumbing or landscaping activity.
- Work with powder-actuated tools.
- Work incidental to the installation of concrete and masonry materials such as the drilling of holes for plumbing fixtures.
- Tile backer board when cut with powered shears or a dust reduction blade having a dust containment device.

Construction Tasks of Interest - Roofers

- Most roofing tiles contain silica, range varies per material.
- Cuts made with handheld cut-off saws
- Number and duration of cuts depends on size and design of roof
- NIOSH studies of 4 roofers found exposures 2-3x old PEL

Hall, R. M., Achutan, C., Sollberger, R., McCleery, R. E., & Rodriguez, M. (2013). Exposure assessment for roofers exposed to silica during installation of roof tiles. Journal of occupational and environmental hygiene, 10(1), D6-10.

Construction Tasks of Interest - Roofers

- 3-person crews, one cutter
- Table 1 allows wet methods
- Roofers resist wet methods on roof strongly – slips & discoloration
    - Wet cutting on ground: adds approx. 1 person-day per roof - $$

Construction Tasks of Interest - Roofers

Task: blowing dust away from cut to clean roof using a leaf blower.

(f) Housekeeping.

(1) The employer shall not allow dry sweeping or dry brushing…

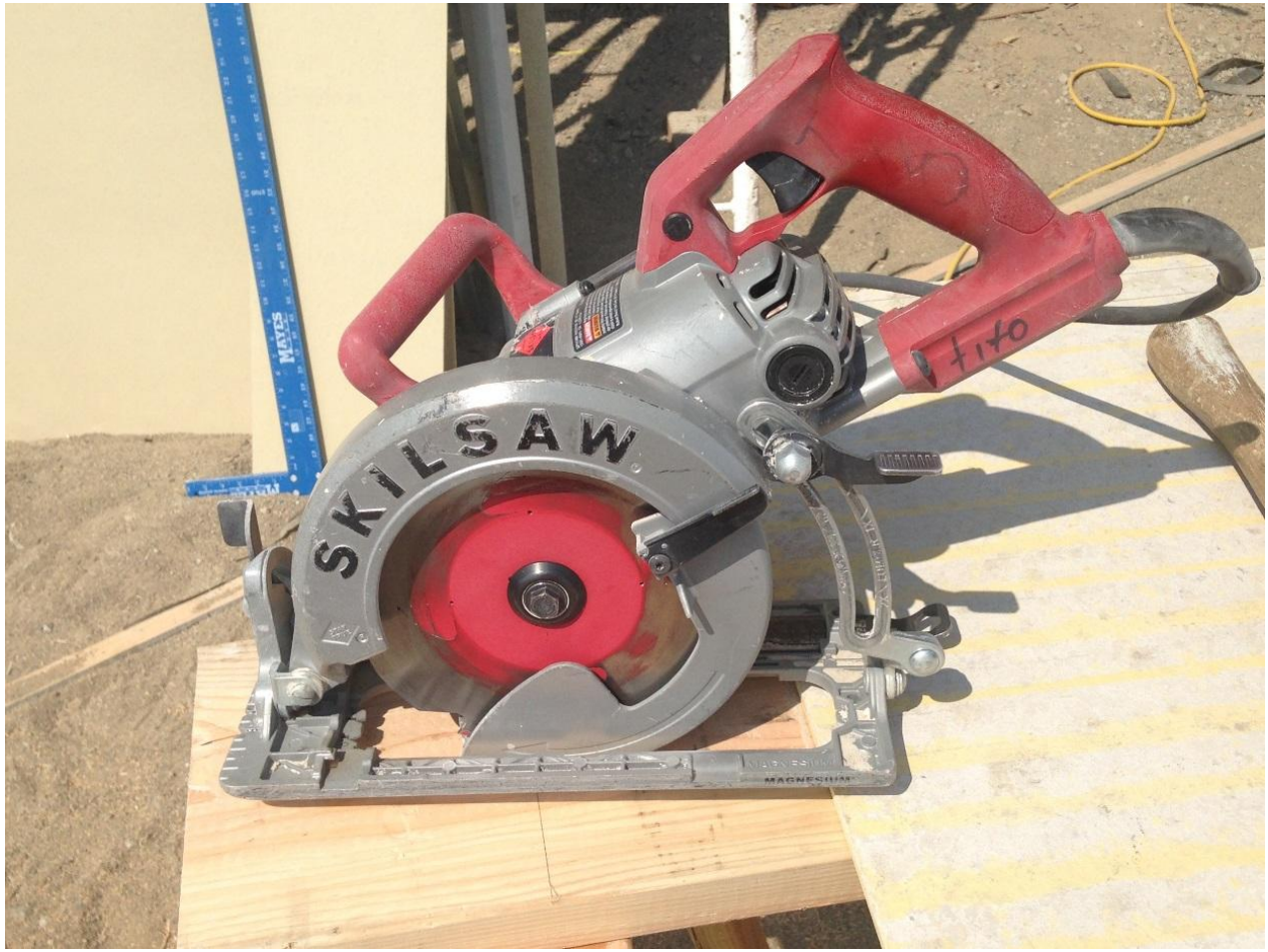
(2) The employer shall not allow compressed air to be used to…

Construction Tasks of Interest - Cementitious Siding

- Cementitious Siding may contain up to 40% silica
- Air sampling shows exposures at and above the PEL
- Paid piece work
- Free-hand cutting

Worker cutting fiber-cement board outdoors using a handheld power saw and dust collection system. The dust collection system consists of the shroud on the saw, hose, and dust collector positioned between the saw horses.

Photo courtesy of NIOSH.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Construction Task of Interest – Chipping/Jackhammering

- Table 1 → Wet or DRS (x)
- Problematic due to number of non-compliant trades
- Controls readily available
- Monitoring shows exposures at 5x PEL for chipping without controls

Jackhammer equipped with water spray delivery system to control dust. The water nozzle is mounted on the jackhammer frame just to the right of the chisel. Note the wet concrete on left from the water spray.

Photo courtesy of CPWR, Norman Zuckerman.

Construction Tasks of Interest -- Cutting CMU

Table 1 → Wet methods (i) or (ii)

Masons will not set block when wet

Concerns about discoloration

Dry methods not very effective

Construction Tasks of Interest – Sanding Drywall

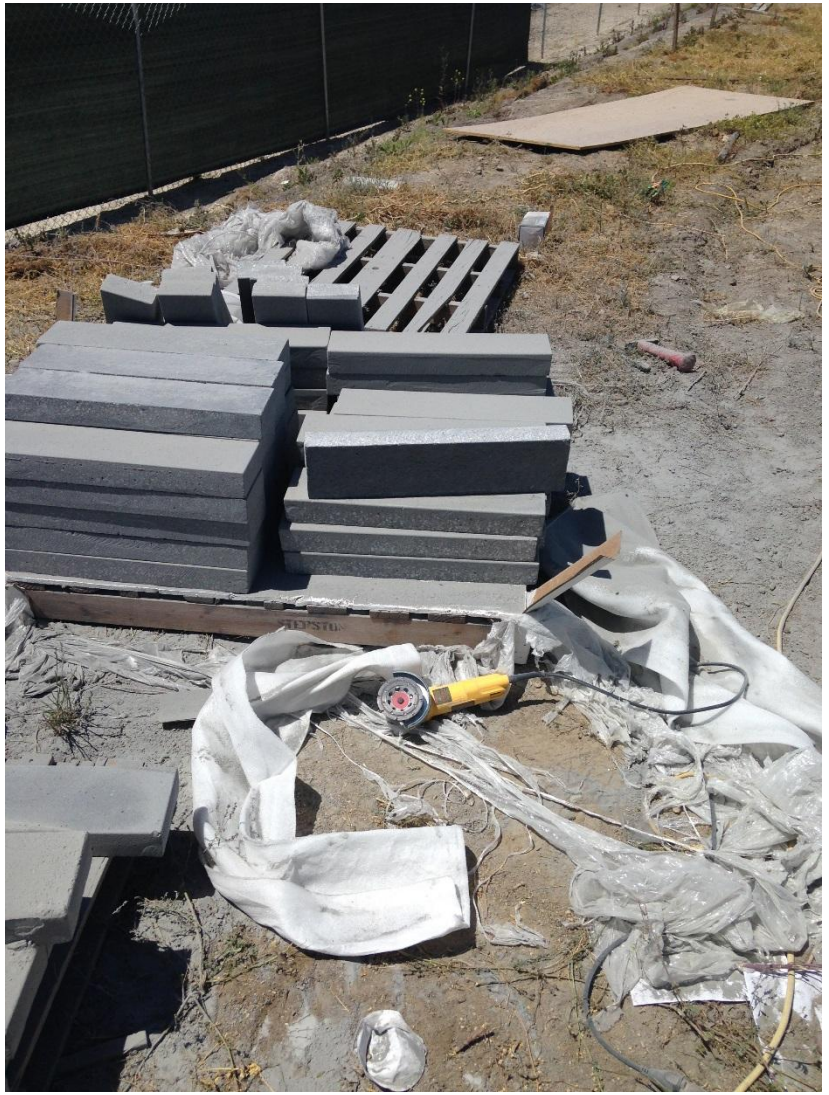
- Drywall joint compound, “mud” may contain 0.7-3.0% silica
- Sanding crews can be exposed above PEL for respirable dust – 5.0 mg/m3

If silica content is 1%, and respirable dust levels are at the PEL, then:

5.0 mg/m3 x 0.01 = **50µg/m3**

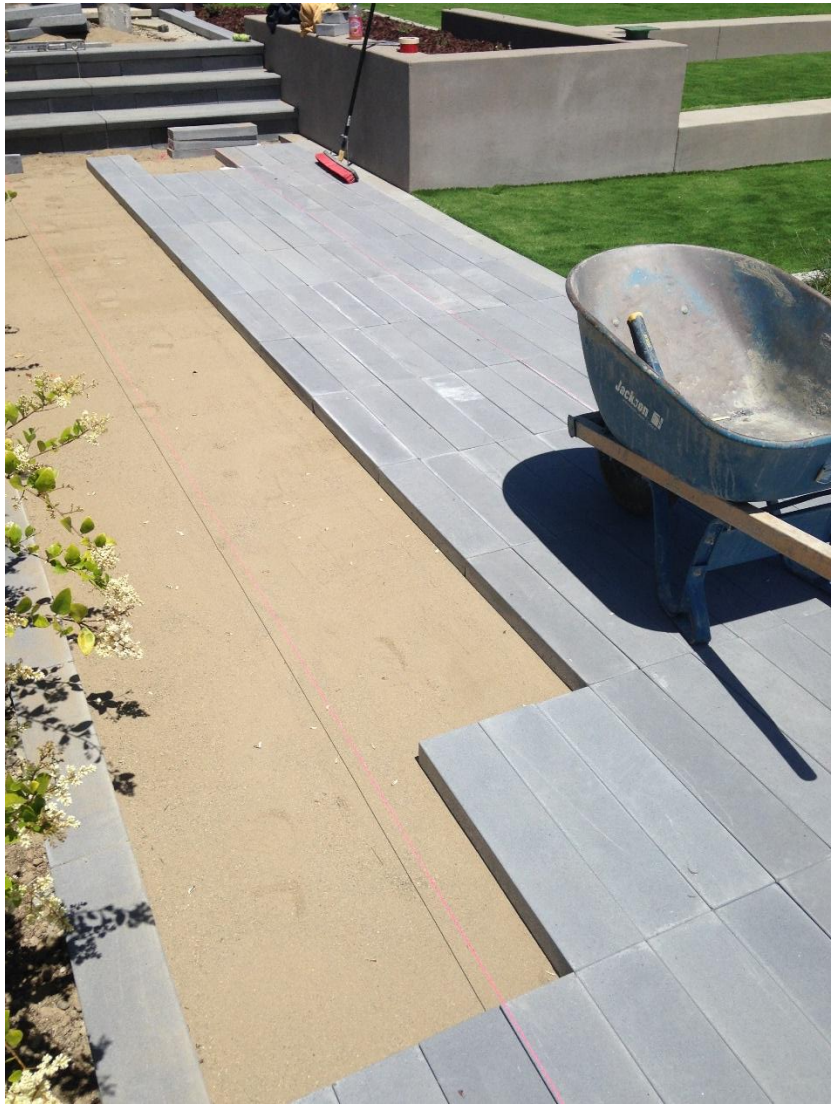
https://www.cdc.gov/niosh/docs/99-113/default.html

Construction Tasks of Interest – Grinding Pavers



Construction Tasks of Interest – Grinding Pavers

- ERs often in the landscaping NAICS 561730
- Handheld grinders found in Table 1 → wet or DRS (xii)



Construction Tasks of Interest – Cleaning Drilled Holes

(f) Housekeeping. (2) The employer shall not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:(A) The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air;

8 CCR §1532.3 – How is it being enforced?

October 19, 2017

MEMORANDUM FOR: REGIONAL ADMINISTRATORS

THROUGH: THOMAS GALASSI
Acting Deputy Assistant Secretary

FROM: PATRICK J. KAPUST, Acting Director
Directorate of Enforcement Programs

SUBJECT Interim Enforcement Guidance for the Respirable Crystalline Silica in Construction Standard, 29 CFR 1926.1153

This memorandum provides interim enforcement guidance to Compliance Safety and Health Officers (CSHOs) for enforcing 29 CFR 1926.1153, *Respirable Crystalline Silica*. The Respirable Crystalline Silica in Construction standard establishes a new 8-hour time weighted average (TWA) permissible exposure limit (PEL) of 50 µg/m^3, and an action level (AL) of 25 µg/m^3.

As you know, OSHA has been enforcing the Respirable Crystalline Silica in Construction standard since September 23, 2017. However, for the first 30 days, OSHA offered compliance assistance in lieu of enforcement for those employers who were making good faith efforts to comply with the new construction standard. Effective October 23, 2017, OSHA will fully enforce all appropriate provisions of the Silica in Construction standard. This memorandum will serve as interim enforcement guidance while the standard's companion compliance directive is proceeding through the review process. It will expire when the compliance directive becomes effective and available to the field.

Not with this memo!

8 CCR §1532.3 – How is it being enforced?

- Like any other vertical health standard
  - No OSHAB rulings at this time
- 2008 Silica NEP revoked
- Look out for dust clouds visible from the street!
- Division is increasing its sampling capacity

The Road From Here

- Improved engineering controls could lead employers from (c) → (d)
  (and away from respiratory protection)

- Spread of objective data & shared resources
  - Trade groups developing ECPs
- Expand Table 1?
- 4th Circuit Court of Appeals – MRP & Medical Surveillance
- Potential targeting for programmed inspections

Resources

OSHA.gov Safety & Health Topics page

- https://www.osha.gov/dsg/topics/silicacrystalline/

OSHA.gov Small Entity Compliance Guide

- https://www.osha.gov/Publications/OSHA3902.pdf

OSHA.gov FAQs

- https://www.osha.gov/dsg/topics/silicacrystalline/additional_info_silica.html

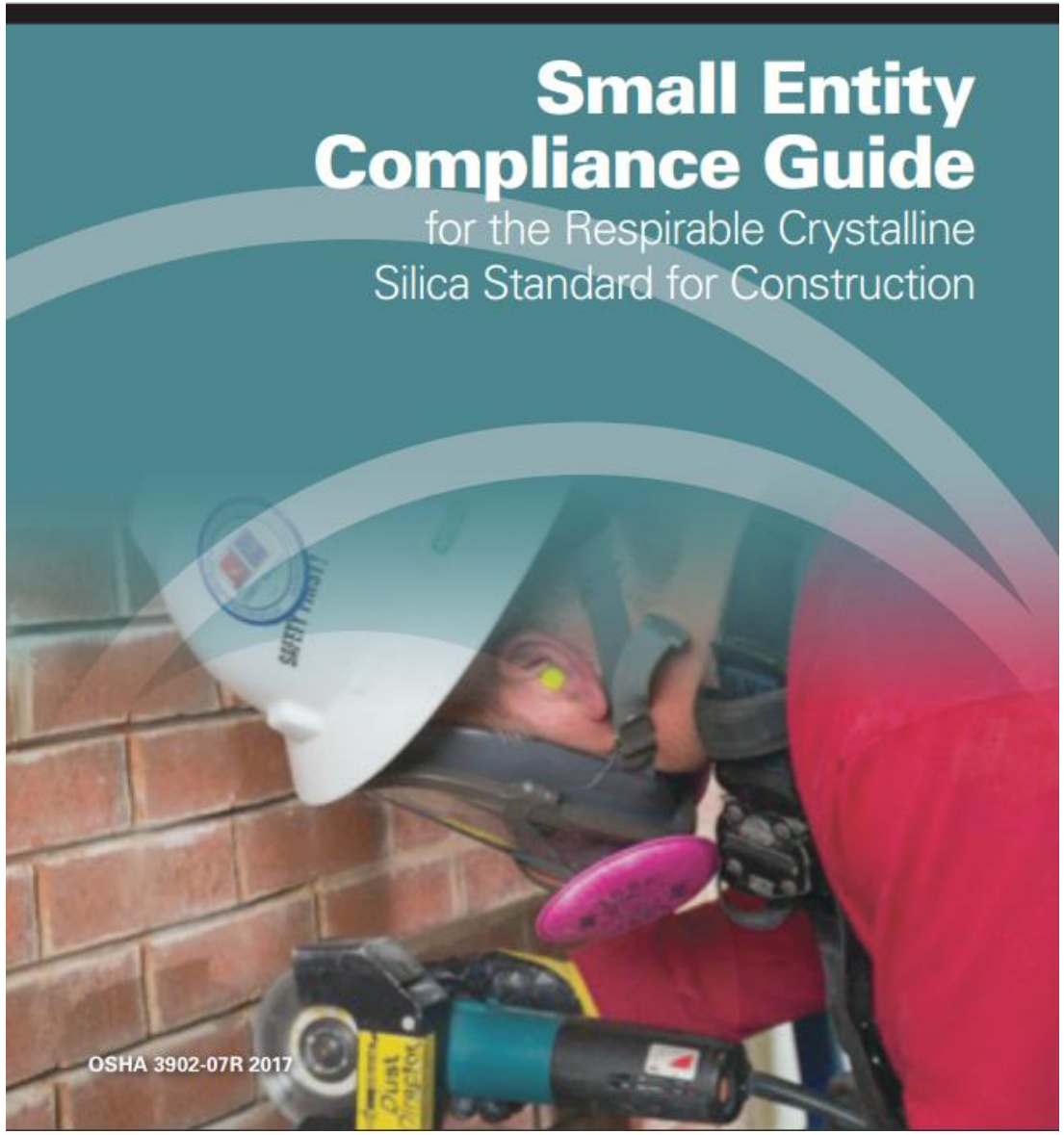
- Center for Construction Research & Training (CPWR)
  - Create your own exposure control plan at www.silica-safe.org
- Cal/OSHA Consultation Service
  - Office locator - https://www.dir.ca.gov/dosh/consultation_offices.html

OSHA® Occupational Safety and Health Administration

www.osha.gov

Small Entity Compliance Guide

for the Respirable Crystalline Silica Standard for Construction



OSHA 3902-07R 2017

Take steps now to ensure the requirements can be met by the compliance dates.

1. Implement specified exposure control methods in Table 1.
2. Complete exposure assessments needed to select appropriate engineering controls and respiratory protection for tasks not in Table 1.
3. Set up respiratory protection programs where required.
4. Get appropriate equipment, controls, and respirators.
5. Arrange for medical surveillance.
6. Take actions such as the following to meet all other requirements:
   a. Determine appropriate housekeeping methods.
   b. Prepare a written exposure control plan.
   c. Set up a training program.
   d. Set up a recordkeeping system.

Questions?

Patrick Corcoran MPH, CIH

Senior Safety Engineer

Cal/OSHA Consultation Service

pcorcoran@dir.ca.gov