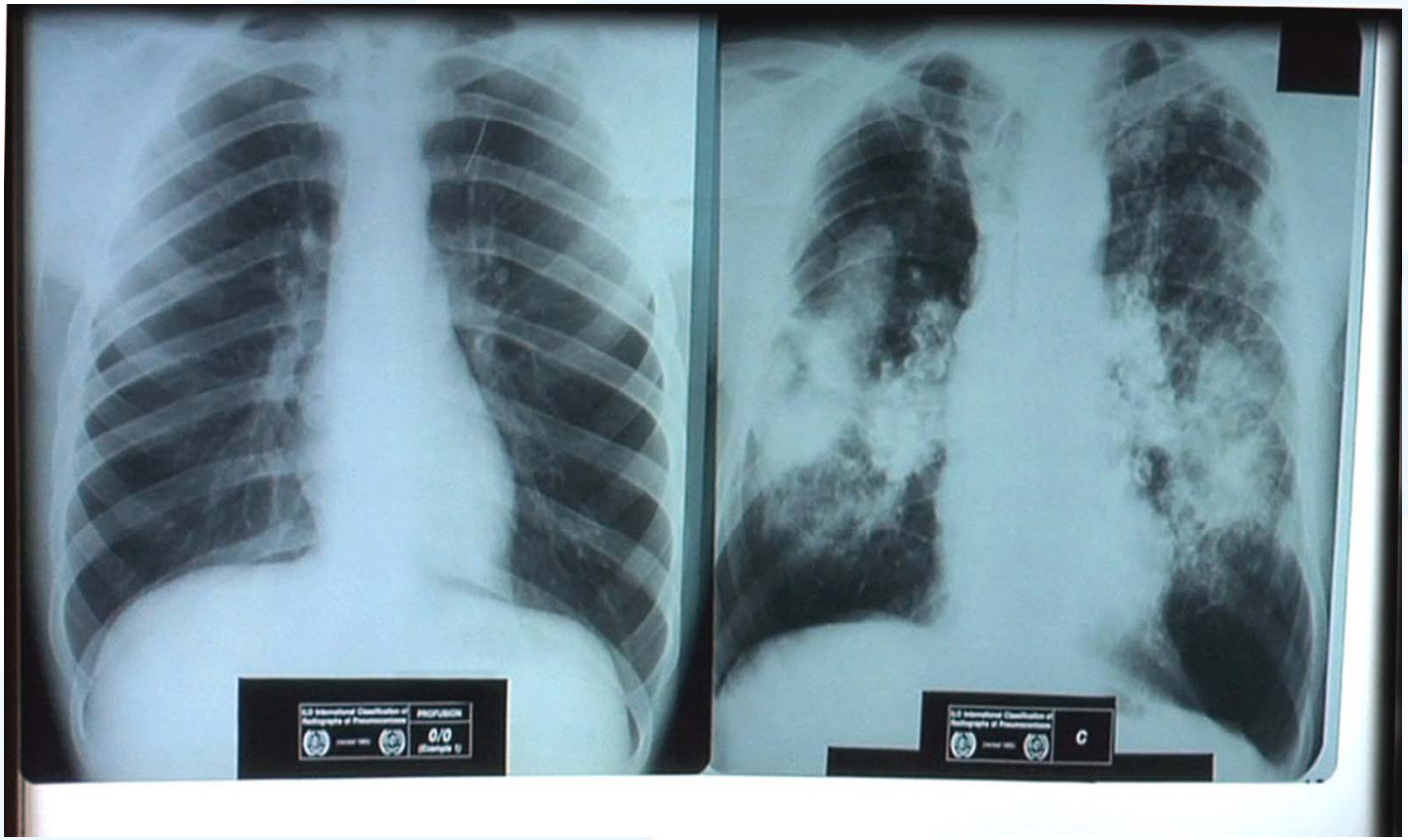
Protecting Workers Exposed to Respirable Crystalline Silica



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September 20, 2013

OSHA's Proposed Rule

- Two proposed standards:
  - One for **General Industry** and **Maritime**
  - One for **Construction**
- Offer common sense, flexible approaches for employers

Public Participation

- OSHA welcomes and encourages public input on the proposed silica rule.
  - Written comments
  - Public hearings
  - Post-hearing comments
- Comments and testimony are carefully considered
- OSHA's final rules are based on evidence in the record as a whole

Dates

- November 12, 2013 – Notice of intention to appear due
- December 11, 2013 – Written comments due
- March 4, 2014 – Public Hearing

Silica Exposures of Concern

- Workers can become ill if they inhale respirable crystalline silica
  - Respirable particles are very small (1/100th the size of a grain of sand)
  - Can penetrate deeply into the lungs
  - Can't be seen or smelled and must be measured using air sampling equipment

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Exposure and Health Risks

- Exposure to respirable crystalline silica has been linked to:
  - Silicosis;
  - Lung cancer;
  - Chronic obstructive pulmonary disease; and
  - Kidney and immune system disease

Health Benefits of Rule

- Nearly 700 fatalities avoided annually
  - Lung cancer: 165
  - Silicosis and other non-cancer lung diseases: 381
  - End-stage kidney disease: 153
- Over 1,600 silicosis cases avoided annually

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Underreporting of Silica-Related Diseases

- Deaths and illnesses from diseases other than silicosis not attributed to silica exposure
- No comprehensive counting of new silicosis cases or deaths
- Under-recognition and under-reporting even where there is reporting
- Death certificate data flawed & limited

Underreporting of Silicosis Cases

- Goodwin et al. (2003) examined X-rays of deceased workers from New Jersey – 8.5% of them had silicosis not previously identified
- Rosenman et al. (2003) identified substantial underreporting of new silicosis cases − analyses indicated 3,600 to 7,300 new cases per year from 1987 to 1996

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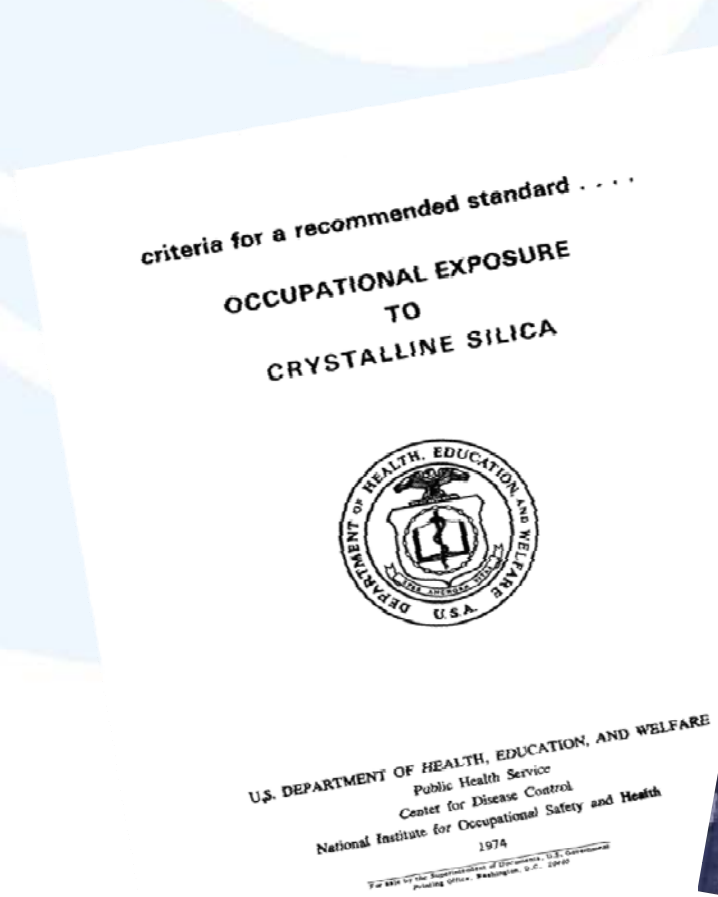
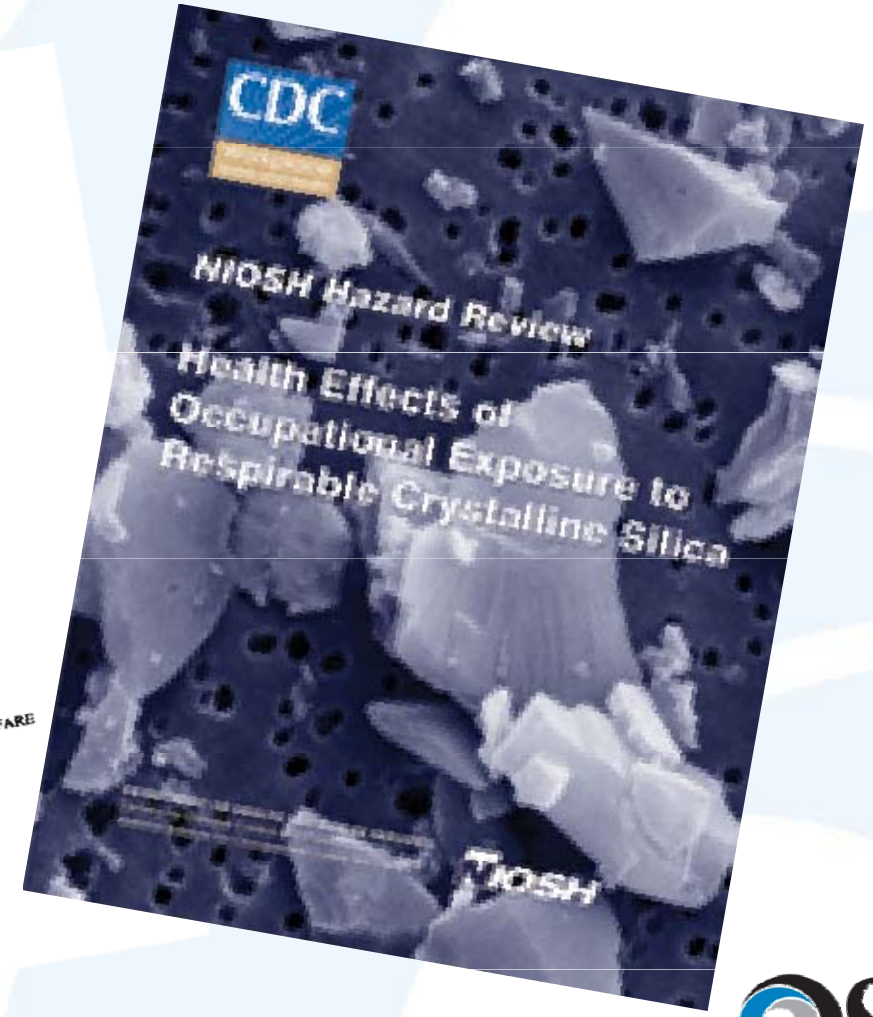
NIOSH Recommendations





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Some Reasons for the Proposed Rule

- Current Permissible Exposure Limits (PELs) are formulas that many find hard to understand
- Construction/shipyard PELs are obsolete particle count limits
- General industry formula PEL is about equal to 100 µg/m^3; construction/shipyard formulas are about 250 µg/m^3

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Most Important Reason for the Proposed Rule

- Current PELs do not adequately protect workers
- Extensive epidemiologic evidence that lung cancer and silicosis occur at exposure levels below 100 $\mu g/m^3$

Some International Silica OELs

- Canada
  - Alberta – 25 µg/m^3
  - Nova Scotia – 25 µg/m^3
  - Saskatchewan – 50 µg/m^3
- Italy – 25 µg/m^3
- Ireland – 50 µg/m^3
- Netherlands – 75 µg/m^3

OSHA's Proposed Rule

- Establishes new PEL of 50 µg/m^3
- Includes provisions for:
  - Measuring worker exposures to silica;
  - Limiting access to areas where workers could be exposed above the PEL;
  - Use of dust controls;
  - Use of respirators when necessary;
  - Medical exams for highly exposed workers;
  - Worker training; and
  - Recordkeeping.

Flexibility for Exposure Measurements

- Fixed schedule option
- Performance option – assess as necessary to adequately characterize exposures
- Exposure monitoring not required for construction employers who choose to implement dust controls listed in Table 1

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Measuring Silica Exposures

- Silica exposure can be accurately measured at proposed AL and PEL
- Proposed standard ensures reliability of measurements by specifying
  - Sampling and analysis methods to use
  - Laboratory qualifications

Flexibility for Dust Controls

- Employers can use any dust or work practice controls to protect workers, such as:
  - Water sprays
  - Enclosures
  - Vacuum dust collection systems
  - Prohibiting dry sweeping

Dust Controls

Grinding
without dust controls

Grinder with vacuum dust collector

Use of Respirators

- Allows for respirator use when
  - Dust or work practice controls cannot reduce exposures to the PEL
  - Dust controls are being installed

OSHA Listens to Small Business Concerns

- Small businesses asked OSHA to simplify compliance, while maintaining worker protection.
- OSHA proposes Table 1 which reduces employer burdens of having to determine:
  - Employee exposures
  - What types of controls are needed

Additional Flexibility for Construction Employers

- Table 1 in the construction standard matches tasks with effective dust control methods and respirators.
- If employers choose to follow Table 1:
  - They would not have to determine worker exposures to silica
  - They would have to offer medical exams to workers doing tasks that require respirators for more than 30 days a year

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Table 1 Example

Table 1. Exposure Control Methods for Selected Construction Operations			
Operation	Engineering and Work Practice Control Methods	Required Air-Purifying Respirator (Minimum Assigned Protection Factor)	
		≤ 4 hr/day	> 4 hr/day
Using Stationary Masonry Saws	Use saw equipped with integrated water delivery system. (Plus additional specifications)	None	Half-Mask (10)

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Medical Surveillance

- Covers workers exposed above PEL for 30 or more days per year
- Initial exam followed by periodic exam every 3 years
- Exam includes medical and work history, physical exam, chest X-ray, and pulmonary function test (TB test on initial exam only)

Distribution of Silica Exposures by Sector (Total Affected Employees)						
Sector	Silica Exposure Range					
	<25 µg/m3	25-50 µg/m3	50-100 µg/m3	100-250 µg/m3	>250 µg/m3	Total
Construction	998,485 54.0%	202,883 11.0%	227,529 12.3%	204,276 11.0%	216,003 11.7%	1,849,175 100.0%
General Industry/ Shipyards	123,274 38.5%	58,617 18.3%	45,840 14.3%	35,670 11.1%	56,924 17.8%	320,326 100.0%
Total	1,121,759 51.7%	261,500 12.0%	273,369 12.6%	239,946 11.1%	272,927 12.6%	2,169,501 100.0%

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Employer Obligations by Exposure Level

Provision	Exposure Level		
	≤AL	**≥AL but ≤PEL**	**>PEL**
(d) Exposure assessment	Initial assessment if employees reasonably expected to be exposed ≤AL OR Follow Table 1 (for	Initial assessment if employees reasonably expected to be exposed ≤AL Periodic monitoring every	Initial assessment if employees reasonably expected to be exposed ≤AL Periodic monitoring
	construction)	6 months OR Performance option OR Follow Table 1 (for construction)	every 3 months OR Performance option OR Follow Table 1 (for construction)
(e) Regulated areas and access control	None	None	Establish and implement regulated areas OR Establish and implement written access control plan

Employer Obligations by Exposure Level (cont.)

	Exposure Level		
Provision	**≤AL**	**≥AL but ≤PEL**	**>PEL**
(f) Methods of compliance	None	None	Use engineering and work practice controls where feasible OR Follow Table 1 (for construction)
(g) Respiratory protection	None	None	Provide respiratory protection to workers when exposures >PEL OR Follow Table 1 (for construction)

Employer Obligations by Exposure Level (cont.)

	Exposure Level		
Provision	**≤AL**	**≥AL but ≤PEL**	**>PEL**
(h) Medical surveillance	None	None	Provide initial exam within 30 days of assignment Provide periodic exams every three years
(i) Hazard communication	Provide information and training	Provide information and training	Provide information and training
(j) Recordkeeping	Maintain exposure assessment records	Maintain exposure assessment records	Maintain exposure assessment and medical records

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Changes to Proposed Rule based on Small Business Input

- Specific hygiene provisions removed (e.g., change rooms, shower facilities, lunchrooms).
- Prohibition of compressed air, brushing, and dry sweeping only when PEL can be exceeded.
- Access control plan permitted in lieu of regulated areas.
- Limited competent person requirement to access control plan use.

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Changes to Proposed Rule based on Small Business Input (cont.)

- Both fixed and performance option for exposure determination
- Initial medical surveillance can be offered within 30 days instead of pre-placement.
- Specific methods for laboratory analysis included
- Table 1 limits respirator use for tasks performed <4 hours/day

Consistency with Consensus Standards

- Industry has recognized the need for comprehensive standards addressing the hazards of crystalline silica.
- Voluntary consensus standards have been adopted for general industry (ASTM E 1132 – 06) and construction (ASTM E 2626 – 09).
- These voluntary standards include provisions for exposure measurement, use of dust controls, respiratory protection, medical surveillance, and training.

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California Rule for Silica

- Cal/OSHA silica rule for construction - effective October 22, 2008.
- Concerns the cutting, grinding, coring and drilling of concrete and masonry materials.
- Requires the use of water or local exhaust dust controls to reduce dust generated by cutting, grinding, coring and drilling concrete and masonry materials when performed with powered tools or equipment.

Estimates of Those Affected by Proposed Rule

- 2.2 million workers
  - Total of 1.85 million in construction and 320,000 in GI and maritime
  - **1.3 million in small establishments**
  - **580,000 in very small establishments**
- 534,000 establishments
  - Total 477,000 in construction and 57,000 in GI and maritime
  - **470,000 small establishments**
  - **356,000 very small establishments**

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Monetized Benefits and Costs Per Year

- Costs: $ 663 million annually
  - Construction – $495 million
  - General industry – $168 million
- Net Benefits: $2.8 to $4.7 billion annually over the next 60 years

Annualized Compliance Costs in GI, Maritime, and Construction (2009 dollars)

Industry	Engineering Controls (includes Abrasive Blasting)	Respirators	Exposure Assessment	Medical Surveillance	Training	Regulated Areas or Access Control	Total
General Industry	$88,442,480	$6,914,225	$29,197,633	$2,410,253	$2,952,035	$2,580,728	$132,497,353
Maritime	$12,797,027	N/A	$671,175	$646,824	$43,865	$70,352	$14,229,242
Construction	$242,579,193	$84,004,516	$44,552,948	$76,012,451	$47,270,844	$16,745,663	$511,165,616
Total	$343,818,700	$90,918,741	$74,421,757	$79,069,527	$50,266,744	$19,396,743	$657,892,211

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Annualized Compliance Costs in GI, Maritime, and Construction (Percentages by Sector and Provision)

Industry	Engineering Controls (includes Abrasive Blasting)	Respirators	Exposure Assessment	Medical Surveillance	Training	Regulated Areas or Access Control	Total
General Industry/ Maritime	69%	5%	20%	2%	2%	2%	100%
Construction	47%	16%	9%	15%	9%	3	100%
Total	52%	14%	11%	12%	8%	3%	100%

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Average Annualized Compliance Costs per Affected Establishment (2009 dollars)

Industry	All Establishments	SBA Small Entities	Very Small Entities (< 20 Employees)
General Industry/ Maritime	$2,571	$2,103	$616
Construction	$1,022	$798	$533
All	$1,185	$912	$539

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Cost Revisions Based on Small Business Input (Analytic Modifications)

- Unit Costs Disaggregated by Firm Size
  - Training
  - Exposure Monitoring
  - Medical Surveillance
- Current Compliance Rates Adjusted
  - Training (56% to 25%)
  - Exposure Monitoring (33% to 0%)
  - X-Rays (35% to 0%)
- Other
  - Adjusted Costs to Reflect Rule Changes
  - Updated Unit Cost Estimates

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Updates to Respirator Costs based on Small Business Input

- Updated costs associated with respirators
  - The respirator itself
  - Accessories (e.g., filters)
  - Training
  - Fit testing
  - Cleaning
- Added costs for respirator program

Expanded Economic and Feasibility Analyses Based on Small Business Input

- Added data on normal year-to year variations in prices and profit rates
- Estimated potential international trade impacts

Employment Effects Analysis

- Background
  - Analysis conducted by Inforum, a well-recognized macroeconomics modeling firm
  - Costs of OSHA rule by type of cost and by industry fed into model; model run for 10-year period, from 2014-2023
  - Inforum ran model twice: once without OSHA costs (to establish baseline) and once with silica rule costs included; the difference determined the employment impacts

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Employment Effects Analysis

- Results
  - Negligible impact on employment, but positive (about 860 “job-years” gained per year, on average, over the 10-year period)
  - Results vary by year
  - Results vary by industry (positive in construction; negative in general industry)
  - But negligible in all cases, from a macroeconomics perspective

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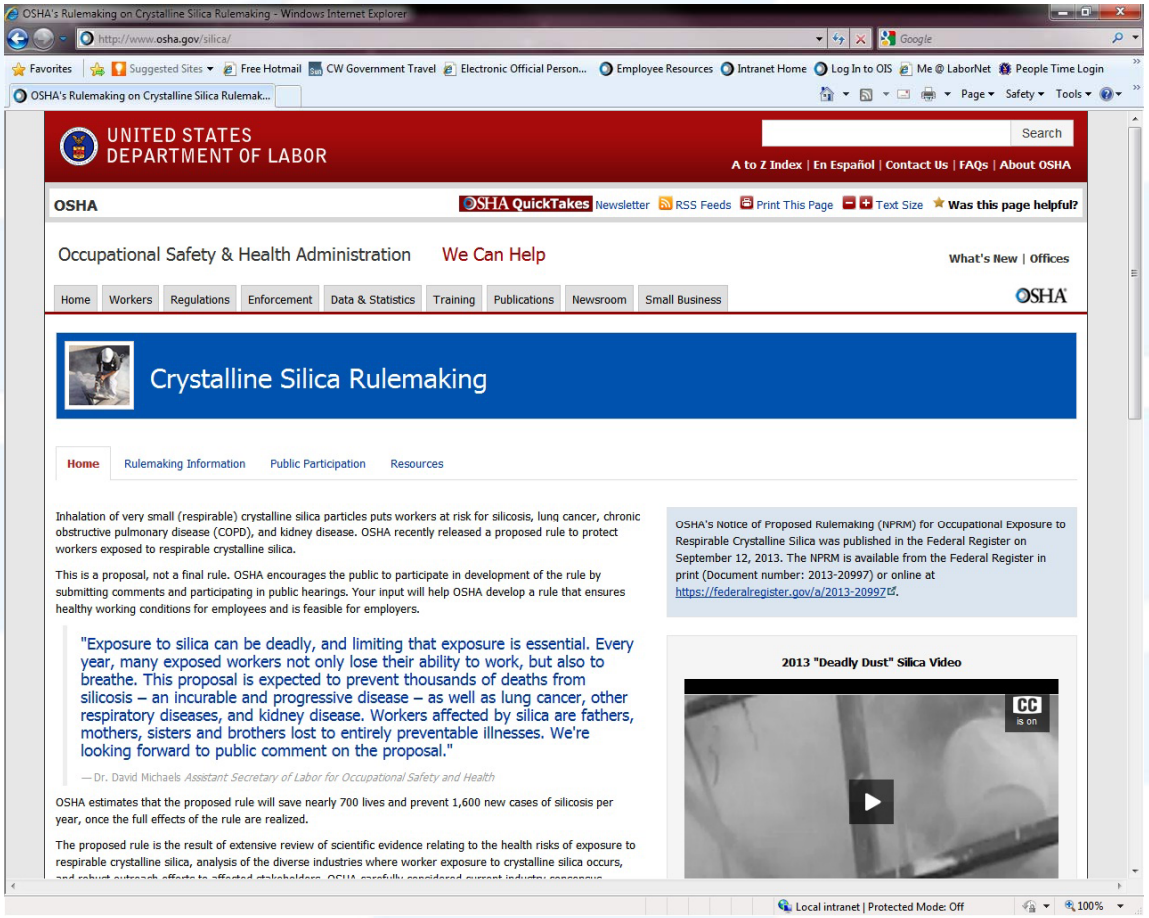
Silica Web Page
http://www.osha.gov/silica



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