CONSTRUCTION INDUSTRY SAFETY COALITION

Informal Public Hearings for the Proposed Rule on Occupational Exposure to Respirable Crystalline Silica (Docket No. OSHA 2010-0034)
Construction Industry Safety Coalition
Comprised of 25 trade associations representing virtually every aspect of the construction industry

- American Road and Transportation Builders Association
- American Society of Concrete Contractors
- American Subcontractors Association
- Associated Builders and Contractors
- Associated General Contractors
- Association of the Wall and Ceiling Industry
- Building Stone Institute
- Concrete Sawing & Drilling Association
Construction Industry Safety Coalition

Construction & Demolition Recycling Association

Distribution Contractors Association

Interlocking Concrete Pavement Institute

International Council of Employers of Bricklayers and Allied Craftworkers

Leading Builders of America

Marble Institute of America

Mason Contractors Association of America

Mechanical Contractors Association of America
Construction Industry Safety Coalition

- National Association of Homebuilders (NAHB)
- National Association of the Remodeling Industry (NARI)
- National Demolition Association (NDA)
- National Electrical Contractors Association (NECA)
- National Roofing Contractors Association (NRCA)
- National Utility Contractors Association (NUCA)
- Natural Stone Council (Natural Stone)
- The Association of Union Constructors (TAUC)
- Tile Roofing Institute (TRI)
Overview

- Process issues
  - SBREFA Panel
  - ACCSH

- OSHA has not demonstrated that a PEL of 50 can be reached in construction in most operations most of the time

- OSHA has not demonstrated that a PEL of 50 is economically feasible in construction

- OSHA’s proposed ancillary provisions are largely unworkable in the construction environment
Process Issues

- SBREFA panel
  - Initiated in 2003 – over ten years old
  - Table 1 very different from what was proposed
  - No indication of an action level of 25 for construction

- ACCSH
  - No firm indication of PEL given
  - No indication of an action level of 25
  - No explanatory “Notes” in Table 1
  - Very little time devoted to discussion
Technological Feasibility

- OSHA has not identified and evaluated all of the construction tasks that would be affected by the proposed rule.

- OSHA is incorrect and unjustified in assuming for all exposure samples of less than full-shift duration that there is no exposure after the sampling period ends.
  - Assumption is not the “best” available option.
  - Ignores information and data related to work patterns in different trades.
  - Fundamentally underestimates exposures and the effectiveness of controls.
  - Runs counter to OSHA’s theory of change in the construction industry.
Technological Feasibility (cont’d)

- OSHA’s analysis does not consider the broad scope of tasks and environments affected

“The construction industry presents several challenges that affect both exposure analysis and the task of controlling exposure. Important considerations include irregular schedules, variability in the silica content of work materials, different types of mechanical actions that generate silica-containing dusts, secondary exposure from adjacent activities, and the effect of weather (e.g., wind direction, rain, freezing temperatures) on work that is frequently performed outdoors.” ERG Report, p. v.
OSHA’s assumption about compliance on multi-employer worksites does not account for exposure effects

- OSHA assumes full control “eliminating secondary exposures”
- Adjacent sources may still influence exposure even if effectively controlled
- This will, as a practical matter, push down the PEL to a lower level, to account for these additive effects

OSHA’s Table 1 unequivocally shows that the proposed rule is infeasible

- Of the 13 operations in Table 1, eight provide for some form of respiratory protection

“These values suggest that workers would sometimes achieve levels below the proposed PEL with LEV. However, the Agency recognizes that elevated exposures occur even with the use of LEV in these operations based on the fact that 8 out of 13 samples collected exceed the proposed PEL.” 78 FR 56458
Technological Feasibility (cont’d)

- OSHA’s analysis includes *no* finding whatsoever that it is technologically feasible to reach the AL.

  - To ensure compliance with PEL given the variety of exposure conditions, construction employers would need to actually reach levels below the action level.

  - OSHA has made no finding – except for drywall finishing with silica-free joint compound – that any construction activity can reach below the action level.

- OSHA’s analysis of each individual construction activity is flawed.
OSHA broadly concluded it is technologically feasible to achieve proposed PEL of 50 µg/m³ with a combination of:

- Climate-controlled protective enclosure
- Effectively designed and maintained water spray system
- When “the operator” is able to spend at least 85% of his/her shift in the enclosure

PEA, IV-495

OSHA further states that respiratory protection in the form of a half-mask may also be needed at times.
Rock Crushing Machine Operators and Tenders

- Operators
  - OSHA relies on sample of stationary crusher, using fine mist water spray, with multiple water spray nozzles, which were checked frequently and replaced as needed
  - Sampling performed on a muddy day
  - Despite the above, exposures were still over the proposed PEL
  - OSHA also relies on an India study, but it is “unable to determine if similar water spray systems would be equally effective” on equipment used in the United States
  - OSHA has no data that LEV is effective at reducing exposures below 50
Rock Crushing Machine Operators and Tenders

☐ Tenders

- Feasibility finding based on no data

“The exposure information available to OSHA for rock crushers is limited to workers either controlling the machine, or alternately controlling and tending the equipment to clear foreign or impacted material; no construction industry data are available for workers strictly tending crushing machines without also spending time operating them.” PEA, IV-485
OSHA concluded not technologically feasible to meet the proposed PEL of 50

OSHA considered non-ideal conditions in concluding that it was not technologically feasible to reach the proposed PEL

OSHA identified a study that under ideal conditions suggested that a PEL of 50 could be met, but this was discounted by OSHA because “construction sites vary and generally include less-than-ideal conditions (e.g., overhead, curved surfaces, inner corners, substantial high or low spots, and outer edges where the shroud cannot be kept in full contact with the surface)”

Stuart Sessions
President, Environomics, Inc.
Bethesda, Maryland

OSHA Public Hearing,
March 24, 2014
Background on My Testimony

- I am Stuart Sessions, President of Environomics, Inc., a consulting firm located in Bethesda, Maryland

- I’m an economist with more than 35 years experience in analyzing economic impacts of regulatory and policy issues involving the environment, occupational health, and energy. I have done analytical work relating to OSHA’s standards or potential standards for crystalline silica, hexavalent chromium, beryllium and noise

- I am testifying on behalf of the Construction Industry Safety Coalition, which has supported my work

- My testimony addresses the costs and economic feasibility of the proposed standard for construction
Overview of My Testimony

My testimony represents an interim report on work for the Coalition. I have not yet completed all the economic analysis work the Coalition has requested. I will complete the work and provide a final report in post-hearing comments.

Today I will report on:

- 9 specific changes that I suggest OSHA should make in the Agency’s methodology for estimating the costs for the construction industry to comply with the proposed standard
- Our current draft estimate of compliance costs reflecting these 9 changes
- Suggestions about how OSHA should proceed in assessing economic feasibility for individual construction industries
- Initial report on comparison of compliance costs against revenues and profits for the affected industries
1. OSHA Omits 1.5 Million Construction Employees from the Cost Analysis

- Several large construction trades routinely perform dusty tasks on silica-containing materials, but OSHA omits them:
  - Plumbers and helpers
  - Roofers
  - Electricians and helpers
  - Plasterers and stucco masons
  - Tile and marble setters
  - Maybe HVAC installers also

- They drill, cut, grind, break and abrade concrete, brick, block, tile, plaster, stucco, stone, etc.

- Just like other trades that OSHA does include such as brick and stone masons, carpenters, concrete finishers, construction laborers
Evidence That These Omitted Trades Perform Construction Tasks That Generate Respirable Silica

- Discussions with these trades
- RS Means *Residential Cost Data* and RS Means *Repair & Remodeling Cost Data* cite silica-related jobs these trades perform. OSHA consulted only RS Means *Heavy Construction Cost Data* for representative jobs
- OSHA’s Silica-Safe web site
- More than 120 exposure data samples for these trades for respirable crystalline silica and/or dust are cited in the PEA and Beaudry, *et. al.* (2013)
Adding These Trades to the Cost Analysis Would Increase Affected FTE by 16%

<table>
<thead>
<tr>
<th>Employees</th>
<th>% of Time &quot;Key&quot; on Silica Tasks</th>
<th>FTE at Risk: Key + Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Some of OSHA's included occupations:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brickmasons and Blockmasons</td>
<td>111,585</td>
<td>22.5%</td>
</tr>
<tr>
<td>Cement Masons and Concrete Finishers</td>
<td>192,037</td>
<td>7.5%</td>
</tr>
<tr>
<td>Construction Laborers</td>
<td>823,733</td>
<td>3%</td>
</tr>
<tr>
<td>Drywall and Ceiling Tile Installers</td>
<td>119,489</td>
<td>25%</td>
</tr>
<tr>
<td>Construction Equipment Operators</td>
<td>295,758</td>
<td>75%</td>
</tr>
<tr>
<td>Carpenters (hole drilling for anchors)</td>
<td>783,255</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total for all included occupations</strong></td>
<td>3,237,406</td>
<td></td>
</tr>
<tr>
<td><strong>Our additions:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plumbers and helpers</td>
<td>467,110</td>
<td>3%</td>
</tr>
<tr>
<td>Roofers and helpers</td>
<td>205,768</td>
<td>2%</td>
</tr>
<tr>
<td>Electricians and helpers</td>
<td>723,038</td>
<td>4%</td>
</tr>
<tr>
<td>Plasterers and stucco masons</td>
<td>69,442</td>
<td>27%</td>
</tr>
<tr>
<td>Tile and marble setters</td>
<td>53,662</td>
<td>26%</td>
</tr>
<tr>
<td>Carpenters (sawing, deconstruction, other holes)</td>
<td></td>
<td>+3%</td>
</tr>
<tr>
<td><strong>Total for our additions</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. OSHA’s Cost Analysis Estimates Far Too Little Need for Engineering Control Equipment

- OSHA estimates costs for each engineering control for a length of time exactly equal to the estimated duration of the silica-generating activity requiring this control.

- To the contrary, the control must be available and provided at all times when the silica-generating tool is available, which must be whenever/wherever the silica-generating task may need to be performed. If the tool sits idle for long periods, the control must be available (but idle) also.

- Example: carpenter drilling into concrete or masonry to affix anchors. “Hole drilling using hand-held drills”
Too Little Cost is Estimated for Control Equipment – Example: Carpenters Drilling Holes for Anchors

How is this hole drilling work really performed?
- If 1% of all carpenters/helpers each spends 100% of his time doing this job and each has a drill, then OSHA’s estimate could be appropriate.
- If 100% of all carpenters/helpers each spends 1% of his time on this job and each has a drill, then OSHA’s estimate is 100 x too low.
- Or other possibilities in between. Information suggests toward 100%.
- Key questions: What % of carpenters/helpers ever perform this job in a year? How many of them have drills?
- Suggested assumption for estimating costs: Drills can be shared, but every drill that might need to be used must have control equipment available.

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Dust Shroud Vacuum System

<table>
<thead>
<tr>
<th>Purchase Cost</th>
<th>Cost/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust extractor kit for drill $215</td>
<td>$1.73</td>
</tr>
<tr>
<td>10-15 gallon vacuum w/HEPA $725</td>
<td>$3.23</td>
</tr>
<tr>
<td></td>
<td>$4.96/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Who Drills?</th>
<th># Employees</th>
<th>% of Time</th>
<th>FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpenter</td>
<td>783,255</td>
<td>1%</td>
<td>7,833</td>
</tr>
<tr>
<td>Carpenter helper</td>
<td>77,858</td>
<td>1%</td>
<td>779</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>861,113</td>
<td></td>
<td>8,611</td>
</tr>
</tbody>
</table>

OSHA's Estimated (sic) Equipment Costs/yr for These Controls:
8,611 FTE x 250 days/yr/FTE x $4.96/day = **$10,677,801**
Too Little Cost is Estimated for Control Equipment – Further Considerations in Estimating How Many Controls Are Needed

- Should think about the fraction of all employees in a given job classification who do the dusty job at least 1 x in a year

- Should think about the size of the crew that does the job that needs the tool that must be controlled

- Should consider whether the tool (with controls) can realistically be shared between crews. Our tentative assumptions -- frequency of sharing of tool and control is inversely related to the amount of time the tool and control is required by a crew:
  - If the fraction of time the key occupation spends on the at-risk task is less than 10%, then 3 crews can share the tool + control
  - If the fraction of time is between 10% and 50%, then 2 crews can share
  - If the fraction of time is > 50%, then tool + control will be used exclusively by 1 crew
3. Costs for Control Equipment Are Underestimated When OSHA Switches From RS Means Wage Rates to BLS Rates

- In estimating control equipment share of project costs, OSHA uses high RS Means wage rates (union rate + fringe + overhead + profit)
  - Makes costs for control equipment a relatively small % of representative job cost

- Then when estimating “total value of silica tasks” OSHA switches to much lower BLS wage rates but applies the too-low equipment cost percentages estimated previously based on RS Means rates
  - Example: For hole drilling (see p. 8), cost for “dust shroud vacuum system” ($4.96/day) is 0.988% of total job cost when using RS Means wages, but would be about 1.2% if using (lower) BLS wages
  - Result is that OSHA actually estimates total national costs for this control of $8.8 million/yr, not $10.7 million/yr as the Agency presumably intended to estimate. About 17% lower
  - The # of controls for hole drillers that OSHA actually costs out is enough for only 7,088 hole driller FTEs, not 8,611 as OSHA intended
4. Re-Thinking Productivity Penalty Impacts from Dust Controls Leads to Higher Estimated Costs

☐ OSHA estimates a productivity penalty for each combination of task and control method:
  - The penalty for each task/control combination is expressed as a simple percentage (ranging from 0 to 5%) reflecting total impact of the control considering setup, takedown, cleanup, operation, maintenance

☐ We did surveys and interviews. Results:
  - Instead of single percentage, think of productivity impact as both
    - Fixed cost – typically daily – for setup, takedown, cleanup. Plus
    - Variable cost reflecting the percentage increase in time spent doing the task when using the control vs. not using it
  - Should reflect in the estimated penalty the frequency of occasional circumstances when the control is quite difficult to use, e.g.,
    - For LEV: when electricity supply is unavailable, difficult to access or insufficient amperage
    - For wet methods: when water is unavailable or difficult to access, and outdoors in cold weather
# Changes we Suggest to OSHA’s Estimated Productivity Penalties

<table>
<thead>
<tr>
<th>At-Risk Task</th>
<th>Control Equipment and OSHA’s Estimate of Percent of Time Used</th>
<th>OSHA’s Productivity Penalty Estimate (Applied daily to at-risk FTE)</th>
<th>Our Productivity Penalty Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drywall finishers (includes Plasterers)</td>
<td>Dust Collection System – 20%</td>
<td>4%</td>
<td>30 minutes = 6%</td>
</tr>
<tr>
<td>Earth drillers</td>
<td>Dust collection system –100%</td>
<td>zero</td>
<td>zero</td>
</tr>
<tr>
<td>Operators of tractors and other heavy construction vehicles and equipment</td>
<td>Enclosed cab with ventilation – 100%</td>
<td>zero</td>
<td>Maintain and replace HEPA filter 10 minutes – 2%</td>
</tr>
<tr>
<td>Grinders and tuckpointers using hand-held tools</td>
<td>Dust collection system – 100%</td>
<td>5%</td>
<td>30 minutes = 6%</td>
</tr>
<tr>
<td>Hole drillers using hand-held drills (includes Plumbers, Electricians and Roofers)</td>
<td>Dust shroud vacuum system – 100%</td>
<td>2%</td>
<td>30 minutes = 6%</td>
</tr>
</tbody>
</table>
## Changes we Suggest to OSHA’s Estimated Productivity Penalties -- Continued

<table>
<thead>
<tr>
<th>At-Risk Task</th>
<th>Control Equipment and OSHA’s Estimate of Percent of Time Used</th>
<th>OSHA’s Productivity Penalty Estimate (Applied daily to at-risk FTE)</th>
<th>Our Productivity Penalty Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millers using portable or mobile saws</td>
<td>Wet methods – 80%</td>
<td>2%</td>
<td>30 minutes = 6%</td>
</tr>
<tr>
<td>Masonry cutters using portable saws (includes Tilers and Marble Setters)</td>
<td>Wet methods – 33%</td>
<td>2%</td>
<td>30 minutes = 6%</td>
</tr>
<tr>
<td>Masonry cutters using stationary saws</td>
<td>Wet methods – 100%</td>
<td>2%</td>
<td>30 minutes = 6%</td>
</tr>
<tr>
<td>Rock crushing machine operators and tenders</td>
<td>Wet methods – 100%</td>
<td>zero</td>
<td>zero</td>
</tr>
<tr>
<td>Underground construction workers</td>
<td>Additional maintenance and dust suppression equipment – 100%</td>
<td>zero</td>
<td>zero</td>
</tr>
</tbody>
</table>
5. Any Productivity Penalties Should Be Applied to Both Labor and Equipment Costs

- OSHA applies the productivity penalties only to the labor portion of project costs.

- But a penalty that increases the time needed to complete a construction job will increase the duration for which control equipment is needed as well as increasing the amount of labor needed.

- Will result in 0 – 5% or more increase in costs for control equipment.
6. Employers Cannot Apply Controls for Dusty Tasks Only in Instances When Overexposures Would Occur

- OSHA estimates costs to apply controls in all instances when an at-risk task is performed, but then deletes the fraction of costs corresponding to exposures below the proposed PEL.

- Employers cannot plan work and provide controls in this selective, all-knowing manner:
  - If using Table 1, it requires the employer always to have the operation performed in the prescribed manner, not to have it performed in the prescribed manner only when the PEL would have been exceeded.
  - Potential exposure is so variable and so unpredictable for a particular worker who might perform a dusty task at a particular site that the employer cannot confidently determine beforehand whether an overexposure will occur and whether to provide controls. Exposure varies very widely with:
    - Fraction of the worker’s shift spent performing the task.
    - Silica content of the material being worked.
    - Indoors, outdoors, confined spaces.
    - Wind, weather, rain, worker technique, etc.
Employers Cannot Apply Controls for Dusty Tasks Only in Instances When Overexposures Would Occur -- continued

- The loss when an employer doesn’t provide controls and an overexposure does occur is far greater than the gain when an employer doesn’t provide controls and an overexposure doesn’t occur.

- The prudent employer will always provide controls not only when a task potentially resulting in overexposure is done, but even when there is a possibility that such a task will be done.

- OSHA estimates that at-risk tasks result in exposures below the proposed PEL for about 65% of workers performing such tasks. OSHA would estimate costs about three times larger if the Agency didn’t wrongly assume that employers will not provide engineering controls in these instances.
7. OSHA Should Estimate and Use for Assessing Economic Feasibility the “Full” Costs of the Proposed Standard, not the “Incremental” Costs

![# of Construction Industry FTEs Exposed at Different Levels](image)

- Group A: Exposed at $> 0 \text{ ug/m}^3$ and $< 50 \text{ ug/m}^3$ 454,696
- Group B: Exposed at $\geq 50 \text{ ug/m}^3$ and $< 250 \text{ ug/m}^3$ 137,770
- Group C: Exposed at $\geq 250 \text{ ug/m}^3$ 59,563

Total 652,029

- # exposed above current PEL (Group C) 59,563
- # exposed above proposed PEL (Groups B+C) 197,332

1) Estimate the engineering control costs to reduce exposures for all FTEs exposed above proposed PEL (197,332 in groups B and C) to below proposed PEL = “FULL” costs

2) However, the existing standard already requires exposure reduction for the 59,563 FTE in group C exposed $> \text{ current PEL}$

3) The “INCREMENTAL” engineering control costs attributable to the proposed new standard are the costs only for the 137,770 in group B. These are what OSHA shows as the engineering control costs of the Proposed Standard in the Preamble and PEA
“Full” vs. “Incremental” Costs for Engineering Controls – A Technical Note

- In my view, OSHA does not in fact estimate the incremental engineering control costs attributable to the proposed regulation because the Agency estimates and then excludes the costs for group C to reduce exposures all the way down below the proposed PEL. The existing regulation does not require this much exposure reduction for group C; instead the existing regulation requires only that exposure for group C be reduced to below the existing PEL, not to below the proposed PEL.

- Also, as discussed in Issue #6 previously, I believe under the proposed regulation including Table 1, that employers cannot effectively distinguish group A from group B. The proposed standard would induce employers to implement Table 1 controls for both groups A and B, and “full” engineering control costs should be estimated in a manner so as to address all of groups A, B and C.
“Full” Costs are Relevant in Assessing Economic Feasibility, not “Incremental” Costs

- Even if OSHA had accurately defined and estimated “incremental” costs, they represent only a hypothetical compliance burden, not the real burden that employers will face.

- The real economic feasibility question is whether employers can afford to get all the way from where exposures are now to exposures compliant with the proposed PEL.

- If an affected industry cannot afford to improve from the current situation to compliance with the proposed PEL and ancillary requirements, then the proposed standard is not economically feasible for that industry.

- So one should compare “full” compliance costs, not “incremental” compliance costs, against revenues and profits in assessing economic feasibility.
8. Improvements Needed in OSHA Cost Estimates for Respirators and Ancillary Requirements

- **Respirators:**
  - 56% current usage assumption far too high
  - Assumption that 56% of employers with at-risk employees have programs is too high
  - Cannot perform this analysis on FTE basis; need to address individual workers who may occasionally perform a task requiring respirator

- **Exposure assessment:**
  - Requirements for initial assessment “in each work area” and additional assessments “whenever a change” will necessitate much more monitoring

- Several unit cost assumptions for individual elements of the various program requirements are significantly lower than our survey responses

- We have not yet revised OSHA’s cost estimates to reflect changes regarding respirators and ancillary requirements. Will do so for post-hearing comments
9. Add the Costs to Construction Industry When Self-Employed Construction Workers Meet Table 1 Requirements

- The estimated 2.5 million self-employed construction workers ("nonemployers") will likely have to meet Table 1 requirements if OSHA promulgates the proposed standard.
  
  - Though they are not directly regulated by the standard, they will be induced to conduct silica-generating activities consistent with the control requirements in the standard.
  
  - Concerned, self-interested self-employed workers will recognize the standard as the safe way to perform work.
  
  - Construction general contractors will demand that anyone working for them do the job safely and in conformity with requirements.
  
  - Regulated construction trade contractors will demand a level playing field relative to their self-employed competitors.
  
  - Other (regulated) construction workers working nearby will demand that they not suffer increased silica exposures from inappropriate practices by self-employed workers.
  
- Self-employed workers will absorb some of their costs to meet requirements, and some will be passed on to general contractors. In either case, these should be counted as costs of the regulation.
Costs to Construction Industry When Self-Employed Construction Workers Meet Table 1 Requirements

- We have estimated engineering control costs for self-employed workers to meet Table 1 engineering control requirements similarly as we do for covered workers in the same construction occupations (e.g., carpenter, cement mason)
  - We’ve not yet estimated costs for self-employed to meet respirator requirements
  - We presume that self-employed will not be induced to meet other ancillary requirements

- We assume self-employed workers in a NAICS are distributed among construction occupations in the same percentages as employed workers are distributed
Impact of Adding Self-Employed Construction Workers to the Analysis

<table>
<thead>
<tr>
<th>NAICS</th>
<th>Industry</th>
<th>Employees</th>
<th>Self-Employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>236100</td>
<td>Residential Building Construction</td>
<td>966,198</td>
<td>571,240</td>
</tr>
<tr>
<td>236200</td>
<td>Nonresidential Building Construction</td>
<td>741,978</td>
<td>87,066</td>
</tr>
<tr>
<td>237100</td>
<td>Utility System Construction</td>
<td>496,628</td>
<td>8,460</td>
</tr>
<tr>
<td>237200</td>
<td>Land Subdivision</td>
<td>77,406</td>
<td>15,606</td>
</tr>
<tr>
<td>237300</td>
<td>Highway, Street, and Bridge Construction</td>
<td>325,182</td>
<td>7,375</td>
</tr>
<tr>
<td>237900</td>
<td>Other Heavy and Civil Engineering Construction</td>
<td>90,167</td>
<td>20,209</td>
</tr>
<tr>
<td>238100</td>
<td>Foundation, Structure, and Building Exterior Contractors</td>
<td>1,167,986</td>
<td>289,917</td>
</tr>
<tr>
<td>238200</td>
<td>Building Equipment Contractors</td>
<td>1,940,281</td>
<td>277,395</td>
</tr>
<tr>
<td>238300</td>
<td>Building Finishing Contractors</td>
<td>975,335</td>
<td>701,529</td>
</tr>
<tr>
<td>238900</td>
<td>Other Specialty Trade Contractors</td>
<td>557,638</td>
<td>549,217</td>
</tr>
<tr>
<td>999000</td>
<td>State and Local Governments</td>
<td>5,762,939</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><strong>Totals</strong></td>
<td><strong>13,101,738</strong></td>
<td><strong>2,528,014</strong></td>
</tr>
</tbody>
</table>

- Results in adding about 19% more workers beyond those directly covered by the OSH Act and proposed standard
Comparison of Compliance Cost Estimates – OSHA’s vs. Ours Including Most of the 9 Changes

Estimated Compliance Costs for Proposed Silica Regulation for Construction Industry
(in Millions of Dollars Annually)

<table>
<thead>
<tr>
<th></th>
<th>OSHA Estimate</th>
<th>Our Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Controls</td>
<td>242.6</td>
<td>2,193.0</td>
</tr>
<tr>
<td>Program Requirements</td>
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</tr>
<tr>
<td>Respirators</td>
<td>84.0</td>
<td>489.8</td>
</tr>
<tr>
<td>Exposure Assessment</td>
<td>44.6</td>
<td>105.6</td>
</tr>
<tr>
<td>Medical Surveillance</td>
<td>76.0</td>
<td>188.3</td>
</tr>
<tr>
<td>Training</td>
<td>47.3</td>
<td>123.7</td>
</tr>
<tr>
<td>Regulated Areas</td>
<td>16.7</td>
<td>69.2</td>
</tr>
<tr>
<td><strong>Program Subtotal</strong></td>
<td><strong>268.6</strong></td>
<td><strong>976.6</strong></td>
</tr>
<tr>
<td>Total</td>
<td>511.2</td>
<td>3,169.5</td>
</tr>
</tbody>
</table>
## Comparison of Compliance Cost Estimates – Detail by Industry

### Total Estimated Costs by Industry ($ per year)

<table>
<thead>
<tr>
<th>Industry</th>
<th>OSHA Estimate</th>
<th>Our Estimate</th>
<th>Controls</th>
<th>Program Req'ts</th>
<th>Total</th>
<th>Controls</th>
<th>Program Req'ts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Building Construction</td>
<td>14,610,121</td>
<td>205,285,500</td>
<td>121,513,591</td>
<td>326,799,091</td>
<td></td>
<td>8,678,760</td>
<td>32,443,164</td>
<td>244,483,146</td>
</tr>
<tr>
<td>Utility System Construction</td>
<td>30,877,799</td>
<td>212,039,982</td>
<td>244,483,146</td>
<td></td>
<td></td>
<td>15,840,363</td>
<td>32,443,164</td>
<td></td>
</tr>
<tr>
<td>Land Subdivision</td>
<td>676,046</td>
<td>8,520,981</td>
<td>10,911,740</td>
<td></td>
<td></td>
<td>434,743</td>
<td>2,390,759</td>
<td></td>
</tr>
<tr>
<td>Highway, Street, and Bridge Construction</td>
<td>16,771,688</td>
<td>153,184,973</td>
<td>191,981,336</td>
<td></td>
<td></td>
<td>14,036,174</td>
<td>38,796,363</td>
<td></td>
</tr>
<tr>
<td>Other Heavy and Civil Engineering Construction</td>
<td>4,247,372</td>
<td>51,914,640</td>
<td>58,443,235</td>
<td></td>
<td></td>
<td>2,916,838</td>
<td>6,528,595</td>
<td></td>
</tr>
<tr>
<td>Foundation, Structure, and Building Exterior Contractors</td>
<td>66,484,670</td>
<td>259,546,887</td>
<td>298,601,216</td>
<td>558,148,102</td>
<td></td>
<td>149,422,541</td>
<td>298,601,216</td>
<td></td>
</tr>
<tr>
<td>Building Equipment Contractors</td>
<td>3,165,237</td>
<td>153,783,328</td>
<td>166,948,561</td>
<td></td>
<td></td>
<td>1,736,902</td>
<td>113,181,454</td>
<td></td>
</tr>
<tr>
<td>Building Finishing Contractors</td>
<td>34,628,392</td>
<td>325,498,580</td>
<td>360,126,972</td>
<td></td>
<td></td>
<td>15,630,847</td>
<td>266,964,781</td>
<td></td>
</tr>
<tr>
<td>Other Specialty Trade Contractors</td>
<td>43,159,424</td>
<td>580,352,283</td>
<td>638,511,707</td>
<td></td>
<td></td>
<td>24,844,554</td>
<td>651,477,804</td>
<td></td>
</tr>
<tr>
<td>State and Local Governments</td>
<td>11,361,299</td>
<td>130,041,107</td>
<td>141,402,397</td>
<td></td>
<td></td>
<td>11,976,934</td>
<td>68,446,225</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>242,579,194</strong></td>
<td><strong>2,192,992,167</strong></td>
<td><strong>2,435,571,361</strong></td>
<td></td>
<td></td>
<td><strong>268,586,424</strong></td>
<td><strong>976,556,073</strong></td>
<td></td>
</tr>
</tbody>
</table>

39
Key Step in Assessing Economic Feasibility: Compare Estimated Compliance Costs Against Revenues and Profits for the Affected Industries

- OSHA’s benchmarks: if estimated compliance costs for an industry are less than:
  - 1% of that industry’s revenues; and
  - 10% of that industry’s profits, then
- If costs exceed either of these thresholds, then the proposed standard may not be feasible for the industry, and further analysis is needed
- Costs are typically estimated as annualized costs, recurring each year forever
- Revenues and profits are typically estimated as annual figures, for a representative recent year or an average across several recent years
Faults in OSHA’s Comparisons of Compliance Costs Against Revenues and Profits for the Affected Industries

- Compliance costs are greatly underestimated.
- “Full” costs (to get all the way from current status to compliance with Proposed Standard) should be considered in assessing economic impacts, not “incremental” costs as OSHA has done.
- OSHA’s revenue and profits estimates are old and not representative of these industries’ current abilities to bear compliance costs.
  - Revenue data are for 2006.
  - Profits data are averages across 2000 - 2006.
- These data miss the impact of the recession and the continuing construction downturn. 2000 – 2006 were unusually good years for most of these industries.
- There are additional shortcomings in OSHA’s choice of particular data sources and procedures for estimating revenues and profits. I will discuss these in further testimony on OSHA’s Preliminary Economic Analysis scheduled for March 26.
2006 Was Not a Representative Year for the Construction Industry

Chart 20A. Value of New Construction
$Billion, Jan.2000-Nov.2013, SAAR

Source: U.S. Census Bureau
Faults in OSHA’s Comparisons of Compliance Costs Against Revenues and Profits for the Affected Industries -- Continued

- OSHA conducts this analysis only for large, aggregated 4-digit NAICS construction industries
  - Aggregated 4-digit industries lump unaffected activities with highly affected activities, thus diluting perceived impact
  - Example: OSHA analyzes 4-digit “Foundation, Structure and Building Exterior Contractors”, missing much more significant impact on the underlying 6-digit industry “Masonry Contractors”
  - Other more precisely defined and highly affected industries could include: demolition contractors, segmented pavers, concrete sawing and drilling, tile roofing, etc.

- OSHA fails to estimate all costs for the construction industry that will result from the proposed rule. In addition to direct costs, there will be:
  - Costs to comply with General Industry standard passed on to construction industry
  - More pass-through costs if MSHA adopts OSHA silica standard
  - Costs for self-employed construction workers
Our Progress To-Date in Comparing Compliance Costs Against Revenues and Profits – Better Estimates for Costs and Profits

<table>
<thead>
<tr>
<th>NAICS</th>
<th>Industry</th>
<th>Full Annualized Costs; Ours</th>
<th>Incremental Annualized Costs; OSHA</th>
<th>Estimated Profitability; OSHA</th>
<th>Estimated Profitability, Revised*</th>
</tr>
</thead>
<tbody>
<tr>
<td>236100</td>
<td>Residential Building Construction</td>
<td>$326,799,091</td>
<td>$23,288,881</td>
<td>4.87%</td>
<td>2.37%</td>
</tr>
<tr>
<td>236200</td>
<td>Nonresidential Building Construction</td>
<td>$219,012,081</td>
<td>$39,664,914</td>
<td>4.87%</td>
<td>2.37%</td>
</tr>
<tr>
<td>237100</td>
<td>Utility System Construction</td>
<td>$244,483,146</td>
<td>$46,718,162</td>
<td>5.36%</td>
<td>3.25%</td>
</tr>
<tr>
<td>237200</td>
<td>Land Subdivision</td>
<td>$10,911,740</td>
<td>$1,110,789</td>
<td>11.04%</td>
<td>-0.38%</td>
</tr>
<tr>
<td>237300</td>
<td>Highway, Street, and Bridge Construction</td>
<td>$191,981,336</td>
<td>$30,807,862</td>
<td>5.36%</td>
<td>3.25%</td>
</tr>
<tr>
<td>237900</td>
<td>Other Heavy and Civil Engineering Construction</td>
<td>$58,443,235</td>
<td>$7,164,210</td>
<td>5.36%</td>
<td>3.25%</td>
</tr>
<tr>
<td>238100</td>
<td>Foundation, Structure, and Building Exterior Contractors</td>
<td>$558,148,102</td>
<td>$215,907,211</td>
<td>4.34%</td>
<td>3.35%</td>
</tr>
<tr>
<td>238200</td>
<td>Building Equipment Contractors</td>
<td>$266,964,781</td>
<td>$4,902,139</td>
<td>4.34%</td>
<td>3.35%</td>
</tr>
<tr>
<td>238300</td>
<td>Building Finishing Contractors</td>
<td>$442,839,591</td>
<td>$50,259,239</td>
<td>4.34%</td>
<td>3.35%</td>
</tr>
<tr>
<td>238900</td>
<td>Other Specialty Trade Contractors</td>
<td>$651,477,804</td>
<td>$68,003,978</td>
<td>4.48%</td>
<td>3.36%</td>
</tr>
<tr>
<td>999000</td>
<td>State and Local Governments</td>
<td>$198,487,333</td>
<td>$23,338,233</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Total or weighted average:</td>
<td>$3,169,548,240</td>
<td>$511,165,618</td>
<td>4.48%</td>
<td>3.36%</td>
</tr>
</tbody>
</table>

* "Revised" profits extend the averaging period for profits from 2000 - 2006 (OSHA) to 2000 - 2010 (revised) and calculate profitability for an industry across all corporations in that industry, not only those that were profitable in the year in question (as OSHA did)

- OSHA’s incremental compliance cost estimate vs. our full cost estimate reflecting 9 changes
  - Still the same aggregated industries; haven’t yet added costs from Gen’l Industry
- Still using OSHA’s inappropriate revenue estimates, but have compiled better profits data
Results in Comparing Compliance Costs Against Profits Using This Better Data

- Compliance costs exceed 10% of revised profits for 5 of the 10 aggregated construction industries
- Further work on costs, revenues and profits will show larger impacts
- The proposed standard raises significant economical feasibility issues for many construction industries

<table>
<thead>
<tr>
<th>NAICS</th>
<th>Industry</th>
<th>Our Costs as a Percentage of Profits</th>
<th>Our Costs as a Percentage of Revised* Profits</th>
<th>OSHA Costs as a Percentage of Profits</th>
<th>OSHA Costs as a Percentage of Revised* Profits</th>
</tr>
</thead>
<tbody>
<tr>
<td>236100</td>
<td>Residential Building Construction</td>
<td>6.06%</td>
<td>12.44%</td>
<td>0.43%</td>
<td>0.89%</td>
</tr>
<tr>
<td>236200</td>
<td>Nonresidential Building Construction</td>
<td>1.35%</td>
<td>2.77%</td>
<td>0.24%</td>
<td>0.50%</td>
</tr>
<tr>
<td>237100</td>
<td>Utility System Construction</td>
<td>4.37%</td>
<td>7.22%</td>
<td>0.84%</td>
<td>1.38%</td>
</tr>
<tr>
<td>237200</td>
<td>Land Subdivision</td>
<td>0.73%</td>
<td>-21.06%</td>
<td>0.07%</td>
<td>-2.14%</td>
</tr>
<tr>
<td>237300</td>
<td>Highway, Street, and Bridge Construction</td>
<td>3.49%</td>
<td>5.76%</td>
<td>0.56%</td>
<td>0.92%</td>
</tr>
<tr>
<td>237900</td>
<td>Other Heavy and Civil Engineering Construction</td>
<td>5.27%</td>
<td>8.71%</td>
<td>0.65%</td>
<td>1.07%</td>
</tr>
<tr>
<td>238100</td>
<td>Foundation, Structure, and Building Exterior Contractors</td>
<td>7.68%</td>
<td>9.94%</td>
<td>2.97%</td>
<td>3.84%</td>
</tr>
<tr>
<td>238200</td>
<td>Building Equipment Contractors</td>
<td>19.38%</td>
<td>25.07%</td>
<td>0.36%</td>
<td>0.46%</td>
</tr>
<tr>
<td>238300</td>
<td>Building Finishing Contractors</td>
<td>9.52%</td>
<td>12.32%</td>
<td>1.08%</td>
<td>1.40%</td>
</tr>
<tr>
<td>238900</td>
<td>Other Specialty Trade Contractors</td>
<td>16.25%</td>
<td>21.66%</td>
<td>1.70%</td>
<td>2.26%</td>
</tr>
<tr>
<td>999000</td>
<td>State and Local Governments</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Total or weighted average:</td>
<td>6.02%</td>
<td>10.17%</td>
<td>0.97%</td>
<td>1.64%</td>
</tr>
</tbody>
</table>

* "Revised" profits extend the averaging period for profits from 2000 - 2006 (OSHA) to 2000 - 2010 (revised) and calculate profitability for an industry across all corporations in that industry, not only those that were profitable in the year in question (as OSHA did)
Kellie Vazquez