

Silica

Old, New and Emerging

Uses result in Worker Exposures

2013. Hydraulic Fracturing

- Energy extraction
 - Oil
 - Gas
- Drill
- Fracture
- Stabilize

NIOSH Sampling

- 11 sampling sites
- 5 states
 - Colorado, North Dakota
- 110 samples
 - Pennsylvania
 - Texas, Arkansas
- 15 jobs

Silica as a proppant

- Delivered by truck
- Driver/operator connects to sand mover
 - Compressed air
 - Belt delivery to blender truck
- Sand mover operator
 - Monitors operation
 - Transfer to blending station
 - Wet at end of blender

PEL exceeded 51% of samples

- Blender operator
 - Chem truck driver
 - Hydration unit op
 - Sand coord
 - Sand mover op
 - Belt op
- 50% of 16 samples
 - 67% of 3 samples
 - 40% of 5 samples
 - 10% of 10 samples
 - 74% of 50 samples
 - 83% of 6 samples

Maximum TWAs

- Blend • 0.49
- Chem truck driver • 0.32
- Hydration unit op • 0.75
- Sand coordinator • 0.33
- Sand mover op • 2.76
- Belt op • 2.57

- Growing industry
- Uncontrolled transfer points
- Site of work not a determinant
- Proppant is a determinant

2014. Stone Restoration Work

- Stone masons and stone cutters
 - Sandstone, limestone, lime mortar, granite
 - 35 workers employed by government
 - 740 national monument
 - Stone mason
 - On site cutting to fit
 - Stone cutter
 - Shop, first cuts
- Historic building
 - restoration
 - Maintenance

Range of TWAs

- Sandstone

– Cut w angle grinder	• 0.26	1.30
– Cut water-cool saw	• <lod	0.13
– Grind w angle grind	• <lod	6.00
– Hand/pneum chisel	• <lod	0.07

- Limestone

- Cut, angle grind
 - <lod
- Grind, angle grind
 - <lod
- Hand/pneum chisel
 - <lod
 - 0.03

- Granite

- Water-cool saw
 - <lod
 - 0.21
- Grind, angle grind
 - <lod
 - 0.03

Determinants

- Task (tool)
- Material

- Reduced by task in mixed effects models
 - Between site
 - Between worker
 - Within worker

2014. Microbeads replacement

- Microbead exfoliates in face/body scrubs
 - Polyethylene, polythene, polypropylene
 - Polyethylene terephthalate (PET)
 - 85% < 1mm diameter in US Great Lakes
 - Not filtered in waste water treatment
- Possible environment-friendly alternatives
 - Anise seed
 - Sand
 - Salt
 - Coconut

- No measurements
 - Possible exposure points where
 - Mined
 - Milled
 - Transported
 - Transferred
 - Compounded

If it is silica, it is not just dust

OSHA 1996

References

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