Lateral Rock Drill with Controls Reduces Exposure to Silica below NIOSH Limits

Evaluation and Control of Respirable Silica Exposure During Lateral Drilling of Concrete

Michael Cooper, Pam Susi, and David Rempel. Journal of Occupational and Environmental Hygiene, February 2012.

Overview

Laborers and other construction trades involved in horizontal rock or concrete drilling are frequently exposed to inhalation of dangerous levels of crystalline silica. Highway, bridge, and building foundation work frequently calls for extensive horizontal drilling in order to insert rebar dowels. Dr. David Rempel of University of California San Francisco has designed a horizontal drill jig to reduce ergonomic injuries to workers engaged in the heavy task. Rempel added a dust control device to the new tool then partnered with Pam Susi, MSPH, CIH and Michael Cooper, MPH, CIH, CSP to test the drill's efficacy in reducing workers' airborne silica exposure. The experiment assessed exposure levels both with and without a dust shroud and vacuum system for dust capture.

Key Findings

- The drill jig alone, presumably by distancing the worker from the surface, reduced airborne silica exposure by 55% over conventional pneumatic drilling. However, this level was still six times the NIOSH recommended exposure limit, so use of a respirator would still be necessary.
- When outfitted with the shroud and vacuum for dust control, the operator's exposure to airborne silica was reduced by 94% and to a level below the NIOSH recommended exposure limit of 0.05 milligrams per cubic meter.

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See abstract:
http://www.tandfonline.com/doi/full/10.1080/15459624.2011.640303

 This card was made possible by a cooperative agreement with the National Institute for Occupational Safety and Health, NIOSH (OH009762). The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH.

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