

End-of-Shift Respirable Crystalline Silica Monitoring in Construction

Application of End-of-Shift Respirable Crystalline Silica Monitoring to Construction Projects

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Overview

OSHA estimates that approximately two million construction workers are exposed to respirable crystalline silica (RCS) each year. Silica, especially quartz, is common in construction materials -- including concrete, cement, bricks, aggregates, granite, slate and limestone -- and exposure by inhalation can cause silicosis, lung cancer, other respiratory diseases, and kidney diseases. Current tests to assess RCS exposure and the effectiveness of controls require off-site, sophisticated laboratory analysis, which often means results only return after several weeks. Such lags can lead to unacceptable conditions persisting without being recognized or addressed. A method to quickly determine exposure, even if not accurate enough for compliance purposes, can be vitally important. Because miners are also exposed to silica, the NIOSH Mining Division has developed a method for on-site, end-of-shift analysis. This project studied the value of the NIOSH procedure for construction, examining how common construction dusts may interfere with determining silica exposure.

Key Findings

- When a new on-site, end-of-shift analytical method for quartz in respirable air samples developed by NIOSH for use in mines was tested on representative construction dusts, the results were encouraging, suggesting a value in further research.
- Plaster, drywall, cement, and brick were selected as common construction dusts that could potentially interfere with accurate silica measures. Encouraging results were obtained for quartz alone, quartz in the presence of each individual interfering dust, and all dusts together.
- Overall, 92% of the quartz measurements fell within 50% of expected over the typical range of air samples, with all nine mixed dust samples in this range giving quartz contents within 25% of expected.
- Brick dust contains an additional material, probably a silicate mineral, which interferes with the quartz peak. This would benefit from further evaluation. Since the analysis was non-destructive, spiked filters remain available for other studies.

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See abstract:

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