

Researching a solution to the health hazard from removing stucco in the construction industry

Introduction

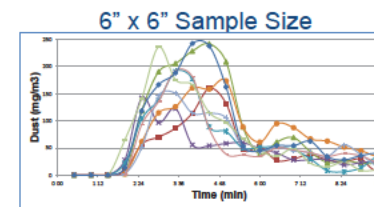
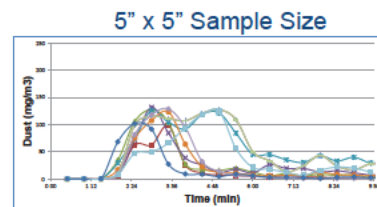
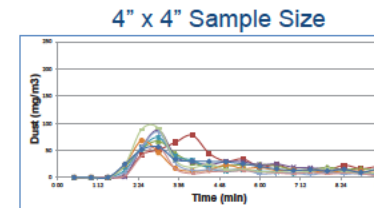
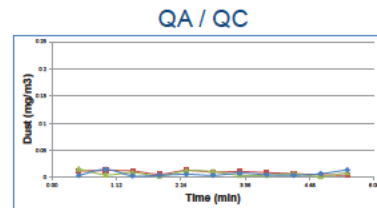
- Removing stucco is one of many ways that construction workers are exposed to fine particulate inhalation hazards on the job site. Current methods to remove stucco include air misting and/or negative pressure enclosures, but these are very cumbersome and cost inefficient procedures. They also often cannot be used for hard to reach areas. The goal of this research is to reduce this problematic issue for construction the workers when removing stucco facing from buildings.
- To that end, the minimum specimen size was determined to replicate this hazardous work environment. Samples of concrete stucco surfacing material (CSSM) of various sizes ranging from 1-in x 1-in. to 8-in. x 16-in. were applied to masonry blocks. These specimens were tested to determine the minimum size needed to produce 150-mg/m³ (one order of magnitude larger than the OSHA exposure limit of 15-mg/m³) of airborne particulate in a 1-m³ test chamber when removed with a chipping hammer.

Method

- Once the samples cured for 28 days, the experimental process began. Samples were placed into the chambers and air quality measurements were taken. To properly simulate working conditions, a chipping hammer was used, which is similar to worksite methods. A specific amount of material was removed from the specimen within a specific amount of time. Once the CSSM had been completely removed from the masonry block, the data from the PDR 1000, by Thermo Scientific, was analyzed and compared to the OSHA standard of 15 mg/m³.



Particulate Levels vs. Removal Time



Results

- The results of the experiment clearly showed a difference in particulate creation based on sample size..
 - The four inch by four inch sample yielded an average peak particulate of 73.311 mg/m³.
 - The five inch by five inch sample size yielded an average peak particulate of 124.211 mg/m³.
 - The six inch by six inch sample size yielded an average peak particulate of 192.233 mg/m³.

Discussion

- Our first hypothesis was that there would be no measurable difference between a stucco mix made to ASTM standards and a "Ready" mix available from the local hardware store. While many more attempts would be needed to prove this definitively, the data suggests that this was a correct assumption.
- Our second hypothesis was that a 6" x 6" sample size would be necessary to produce the 150 mg/m³ particulate that was our goal. It was found that this size produced far more particulate than was necessary and a sample size of 5" x 5" produced a sufficient amount of dust to move on to phase two of the research.

References

- Rego, G. (2008). High prevalence and advanced silicosis in active granite workers: A dose-response analysis including FEV1. J Occup Environ Med, 50(7), 827-833.
- EPA 560, (1985) Purple Book – Guidance for Controlling Asbestos-Containing Materials in Buildings, June 1985.