CPWR **KEY FINDINGS FROM RESEARCH**

A field test of N95 respirators for controlling nanoparticle exposure on construction sites

Field Evaluation of N95 Filtering Facepiece Respirators on Construction Jobsites for Protection against Airborne Ultrafine Particles

Atin Adhikari, Aniruddha Mitra, Abbas Rashidi, Imaobong Ekpo, Jacob Schwartz, and Jefferson Doehling, International Journal of Environmental Research and Public Health. September 2018.

A pilot study on nanoparticle levels and field evaluation of N95 filtering facepiece respirators on construction sites

Atin Adhikari, Abbas Rashidi, and Aniruddha Mitra. CPWR Report, April 2018.

Overview

Submicron ultrafine particles and nanoparticles found in construction dust can be inhaled deeply into the lungs and retained in the lower airways. However, we lack field test data establishing nanoparticle exposure levels on construction sites, and the filtration efficiency of N95 respirators commonly worn by construction workers on the job. Researchers positioned a manikin wearing an N95 respirator on multiple construction sites and used a commercially available nanoparticle counter to measure exposures and respirator efficiency by collecting samples from inside and outside the mask. The team tested two respirators (one pleated and one foldable) on construction sites near concrete drilling and grinding activities, earthmoving operations, and wood cutting during frame carpentry.

Key Findings

- Different construction tasks can release different levels of airborne nanoparticles and ultrafine particles of 11.5 – 365.2 nm sizes ranging from 103 to 105 particles/cm3 (number concentration) and 1.41 to 99.96 µg/m3 (mass concentrations).
- The field experiments in this study showed that concrete blasting and grinding activities can release more nanoparticles than wood building framework construction and soil moving activities on construction sites.
- N95 respirators may not provide 95% protection for all categories of nanoparticles and generally 95% protection is achievable for particles of 11.5 to 20.5 nm sizes.
- Morphology of nanoparticles differed by task. Porous silicious nanoparticles, however, were not as prevalent in the outdoor concrete blasting and grinding site as anticipated.

For more information, contact:
Atin Adhikari: aadhikari@georgiasouthern.edu

Read the published article
https://bit.ly/2N5wtGA

Read the CPWR report:
http://bit.ly/2JObGkG

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