CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING TOOLBOX TALK

Airborne Exposures When Working with Nano-Enabled Concrete

Materials that contain engineered nanomaterials are called nano-enabled. Carbon nanotubes, graphene, nanocellulose, silica nanoparticles, and titanium dioxide are added to cement and concrete to increase their strength, reduce cracking, and improve resistance to water damage. Workers can breathe in the nanomaterials when they cut, grind, drill, or disturb nano-enabled concrete and the dust gets in the air. The National Institute for Occupational Safety and Health (NIOSH) has recommended exposure limits for multi-walled carbon nanotubes and nano-sized titanium dioxide because they cause lung damage and cancer in lab animals. The Occupational Safety and Health Administration (OSHA) has a standard that has exposure limits for dust containing silica, however, it has no specific standards addressing nanomaterials.

Fred's Story

Fred is cutting a concrete road with a walk-behind masonry saw. His supervisor told him that a new nano-enabled concrete was used to build the road. Since this work creates a lot of dust, Fred is concerned that breathing in the dust may make him sick.

- **Have you or someone you know ever worked around hazardous dust? If so, what was done to protect workers from breathing the hazardous dust?**
- **What could be done to prevent the dust from getting into the air?**
- **How could you find out more information about the nano-enabled concrete?**

Remember This

Your employer is required to prevent dust containing silica and other hazards from getting into the air.

- Use a vacuum with a high-efficiency particulate air (HEPA) filter and/or water to reduce the dust at the source, before it becomes airborne. Keep dust control systems in good working order and check vacuum filters and hoses regularly to make sure they are not clogged.
- Use a respirator if the vacuum system or water spray does not capture all the dust. Your employer is responsible for providing you with the right type of respirator as part of a full respiratory protection program required by OSHA. N95 or P100 filters effectively capture nanomaterials.
- Wear goggles or a face shield to protect your eyes from the dust and hearing protection to protect your hearing.
- Vacuum the dust from your clothes or change into clean clothing before leaving the work site. Do not brush or blow dust off.
- Ask your employer if the product you are working with is nano-enabled. Check the product label or the Safety Data Sheet (SDS). Be aware information on the nano content may not be reported. Check http://nano.elcosh.org.

How can we stay safe today?

What will we do at this worksite to prevent exposure to the dust from the nano-enabled concrete?

1. _____
   _____
2. _____
   _____

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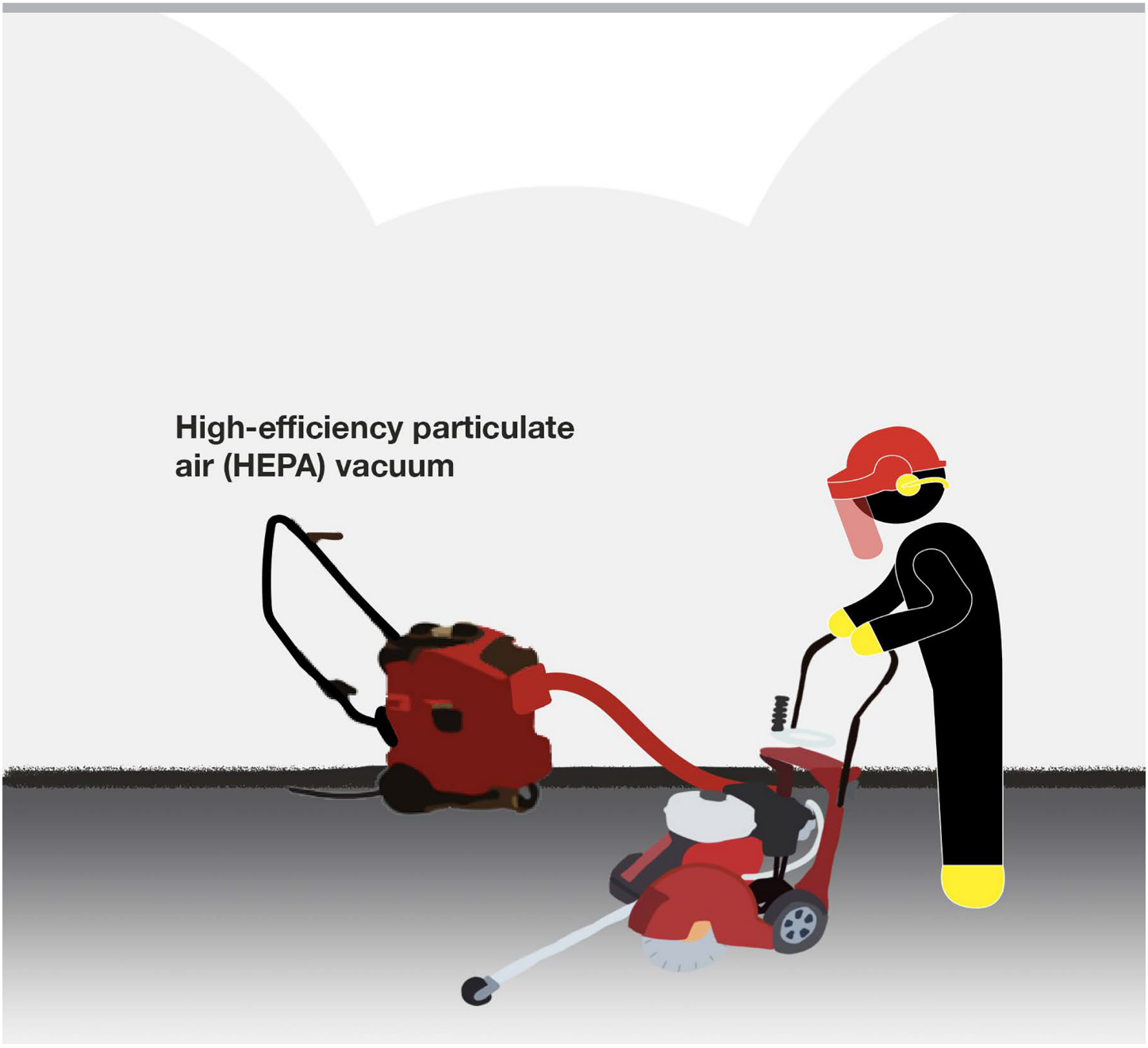

- Use a walk-behind masonry saw with water and/ or a vacuum system with a HEPA filter to capture dust before it gets into the air.
- Use a respirator when cutting concrete if the wet method or vacuum system alone does not capture enough of the dust.