

Respirable Crystalline Silica Exposures During Tuck Pointing

Description of HAZARD

Silicosis is a deadly lung disease. Construction workers may get sick with silicosis if they breathe in too much respirable crystalline silica, a fine, sandy dust.

Silicosis may take 10 or more years to develop when workers are exposed daily to low concentrations of silica dust. However, when exposures to silica are very high, symptoms can occur after only a few weeks to 4–5 years.

To prevent silicosis, researchers from NIOSH (the National Institute for Occupational Safety and Health) urge construction workers to protect themselves from dust exposure when doing construction work, especially tuck pointing.

In tuck pointing, the worker grinds the mortar out from between the bricks—the first step to fixing up the outside of an older brick building. Mortar dust contains crystalline silica. During tuck pointing, workers hold power grinders, digging the mortar out to a depth of an inch or less. The grinders often have wheel diameters of 4 to 6 inches and rotate at speeds as high as 12,000 rpm. The grinding process breaks up the mortar and turns it into airborne dust. The rotating wheel creates wind that carries this airborne dust throughout the work place. When workers clean the mortar joints and their clothes, tools, and equipment with compressed air, the strong blast needlessly adds even more dust to the air (see Figures 1 and 2).

During a recent study of tuck pointing at a construction site, NIOSH researchers measured very high concentrations of respirable crystalline silica. At this site, the workers' exposures were up to 50 times the REL (recommended exposure limit). At another construction site, investigators from OSHA (Occupational Safety and Health Administration) found high exposures—up to 100 times the REL.



Figure 1. Tuck pointing.

Recommendations for Prevention

Because these construction studies showed such high concentrations of respirable crystalline silica, NIOSH is running more tests on commercial grinders. They want to see how much the built-in ventilation in the grinders cuts down on dust exposures during tuck pointing. Also, NIOSH researchers want to find out which engineering controls work best during this work. In the meantime, construction workers should follow the recommendations below to reduce their exposures.

Contractors and workers should use good work practices and respiratory protection.

Good Work Practices

- ◆ Use a grinder that has local exhaust ventilation when possible.
- ◆ Do not use the grinder near another worker. Restrict some work areas to cut down exposures to other workers.
- ◆ Stand so that the dusty air will not blow on you and other workers.
- ◆ In poorly ventilated areas such as a courtyard or the inside corners of a building, use fans to blow out dusty air.
- ◆ Do not use compressed air to clean yourself, your clothes, or your equipment. Make sure the vacuum cleaners used for dust control and clothes cleaning capture at least 99 percent of the small particles that could be inhaled (0.3 micrometer diameter).

Respiratory Protection (Respirators)

During tuck pointing, employers need to check respirable crystalline silica exposures from time to time to see how well the safeguards are working and if workers need respiratory protection. Because

ventilated grinders may not control the dust enough, NIOSH recommends the following respiratory protection:

- ◆ For exposures less than 1,000 times the REL (50 mg/m³—milligrams per cubic meter), use a supplied-air respirator that has a half-mask. Set the respirator on pressure-demand or one of the other positive-pressure settings. For example, run a Type CE abrasive-blasting respirator on a positive-pressure setting.
- ◆ For exposures less than 50 times the REL (2.5 mg/m³), use (a) an air-purifying, full-face respirator with a high-efficiency particulate air filter or a P100 filter, or (b) a powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate air filter or a P100 filter.
- ◆ For exposures less than 10 times the REL (0.5 mg/m³), use a half-mask, air-purifying respirator that has a P100 filter.

Equipment manufacturers are encouraged to do the following:

- ◆ Develop ventilated shrouds for grinders that give a clear view and good dust control.
- ◆ Develop the minimum exhaust volume needed for ventilated shrouds. This exhaust volume must be based on experimental and field data.

For more information about the health hazards of exposure to crystalline silica, respiratory protection for workers, and the four Type CE abrasive-blasting respirators that NIOSH certifies, order the NIOSH Alert *Preventing Silicosis and Deaths in Construction Workers*, DHHS (NIOSH) Publication No. 96-112. To get your free copy, call NIOSH.

For More Information

To obtain more free information about this hazard or other occupational safety and health issues,

Call NIOSH at 1-800-35-NIOSH
(1-800-356-4674)

or visit the NIOSH Web site at
www.cdc.gov/niosh

Acknowledgments

The principal contributors to this document were William A. Heitbrink, Ph.D., CIH, and Jerome P. Flesch, M.S., of NIOSH. Charlie Shields of OSHA provided much valuable information about tuck pointing exposures. Anne Votaw, M.A., of NIOSH, translated the text into easier-to-read prose. Desktop publishing was provided by Susan Kaelin and Kristina Wasmund.



Figure 2. Air blowing.

November 1999

DHHS (NIOSH) Publication No. 2000-113



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

