

HAZARDS OF CRYSTALLINE SILICA

By Mr. Fred Fanning

Silica, a common mineral in the earth's crust, is a major component of sand, rock, and mineral ores. Breathing dust that contains microscopic particles of crystalline silica is a serious health concern. It can cause scar tissue to form in the lungs, reducing the lungs' ability to extract oxygen from the air they take in and causing a disease known as silicosis.

There are three types of silicosis: chronic, accelerated, and acute. The most common type—chronic silicosis—is a uniquely occupational disease resulting from moderate exposure to crystalline silica over a long period of time (10 years or more). The disease can be progressive and disabling and can lead to death. According to the Occupational Safety and Health Administration (OSHA), 1,400 people died of silicosis from 1990 through 1996.

Exposure to crystalline silica also may increase the risk of developing tuberculosis and other nonmalignant respiratory diseases and contribute to renal and autoimmune respiratory diseases. In addition, the International Agency for Research on Cancer has designated crystalline silica as a known human carcinogen.

In spite of the dangers, OSHA reports that more than two million workers are regularly exposed to crystalline silica dust. For example, many construction activities—such as highway repair, masonry and concrete work, and rock drilling—expose workers to silica. For engineer soldiers, exposure to this hazard may occur when drilling rock, cutting concrete and other masonry products, and blasting.

Engineering controls for this hazard, such as exhaust ventilation and blasting cabinets, are very cumbersome and may not be feasible. So the next option available to Army engineer leaders to protect soldiers is to control their exposure by rotating them as much as possible. Leaders may also consider using a respirator program, as outlined in Title 29 Code of Federal Regulation 1910.134 (29 CFR 1910.134) and Army Regulation 11-34, *The Army Respiratory Protection Program*. Army engineer leaders also should ensure that soldiers are informed of the following items as they relate to working with silica:

- Hazards/illnesses that may be caused by exposure
- Proper conditions and precautions for safe use or exposure
- Nature of operations that could result in exposure
- Safe work practices for its handling, use, or release
- Proper housekeeping practices
- Purpose, proper use, and limitations of respirators
- Increased risks from combining smoking and exposure

When leaders cannot reduce exposure to silica by limiting the concentrations, they must use a program of respiratory protection to protect every soldier who is exposed. This process

begins with identifying soldiers who will need to use a respirator and getting them a physical to ensure that they can properly wear one. Soldiers are then fitted with an appropriate respirator and trained on its use and maintenance. A safety specialist assigned to the organization can assist in these steps.

When soldiers have been exposed to dust that contains silica, their battle dress uniforms or coveralls should be vacuumed. They should not clean their clothes by blowing or shaking them. In addition to clothing, exposed surfaces should be kept free of silica dust. If the dust on these surfaces is disturbed, it could become airborne and breathable. Dry sweeping and using compressed air for cleaning floors and other surfaces should be prohibited. When vacuuming is used, the exhaust air from the vacuum should be filtered. Gently washing the surfaces is preferred, when practical. All food, beverages, tobacco products, nonfood chewing products, and unapplied cosmetics should not be used in work areas with silica dust. Soldiers should also be able to wash their hands with soap and water after exposure.

In addition to the hazards associated with being soldiers, Army engineers face the many hazards of their civilian counterparts. This article provides leaders with the basic knowledge to make informed decisions concerning steps necessary to prevent or control exposure to one of the hazards—working with crystalline silica. Although engineer leaders cannot control all the hazards that soldiers face, controlling this one could prevent needless illness to the Regiment now and in the future.

Additional information may be obtained from <http://www.osha.gov/SLTC/constructionsilica/index.html>. There are also a number of products that can be downloaded from <http://www.osha.gov/SLTC/constructionsilica/recognition.html>.



Mr. Fanning is the Safety Director for the US Army Maneuver Support Center and Fort Leonard Wood. He may be contacted at <fred.fanning@us.army.mil>.

References

Occupational Safety and Health Administration Semiannual Regulatory Agenda, 68:73196-73228, Sequence Number 90 in part II, 1218-AB70-2103, "Occupational Exposure to Crystalline Silica," 22 December 2003.

Occupational Safety and Health Administration Instruction CPL 2-2.7, 30 October 1972.

Title 29 Code of Federal Regulation 1910, Section 134, "Respiratory Protection," 23 April 1998.

Army Regulation 11-34, *The Army Respiratory Protection Program*, 15 February 1990.