

Breathe easy

By Heather Prime

Silica dust is a common hazard in construction sites. Learn how to deal with it.

When you consider the many hazards workers face on a typical construction site, you probably wouldn't think that dust poses too much danger to health. Well, think again, says Geoff Clark, senior occupational hygienist with WorkSafeBC.

"A lot of people just don't understand how dust on a construction site can be more than a nuisance," says Clark. "But many construction activities generate silica dust, which can permanently damage your lungs over time." Short-term exposure to silica can be equally as dangerous if the levels are high.

Silicosis is a sometimes fatal – and entirely preventable – lung disease caused by overexposure to silica dust. Silica dust, which contains microscopic particles of crystalline silica, is also associated with lung cancer. Between 2001 and 2005, WorkSafeBC accepted 15 silica-related fatal claims. Silica dust can also lead to bronchitis and tuberculosis.

Sources of silica

Silica can be found in most rock and is a primary component of many construction materials, including:

- Concrete, concrete block, and cement
- Mortar
- Masonry bricks and tiles
- Sandstone and granite
- Asphalt containing rock or stone
- Abrasives used for blasting
- Plaster
- Shingles

"Its presence alone isn't enough to be hazardous," says Clark. "Silica only becomes dangerous when it's reduced to such a fine dust that you can't see individual particles, but you can breathe them in."

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Does this mean if you see airborne dust, silica isn't present? "No," Clark is quick to reply. "Fine silica particles are likely there, too. You just can't see them."

Construction work activities that generate silica dust include:

- Drilling, grinding, hammering, and sawing concrete or masonry
- Chipping, hammering, and drilling rock
- Abrasive blasting of concrete surfaces
- Crushing, loading, and hauling of concrete
- Drilling, grinding, hammering, and sawing concrete or masonry
- Sweeping, cleaning, and dismantling equipment
- Tunnelling, excavating, and moving soil with high silica content

Assessing the risk

The first step in determining whether silica is a hazard in your workplace is undertaking a thorough risk assessment, says Clark, "because everything that follows depends on a full understanding of what you're doing, how you're doing it, where you're doing it, and who's involved. For example, jackhammering concrete in an enclosed stairwell is very different from jackhammering in an open-air building with lots of natural ventilation."

Armed with information on the sources and types of exposure, employers can implement an exposure control plan to prevent silica dust from getting into the air and remove any that's already present.

Controlling exposure

Employers whose business puts workers at risk of exposure to silica are required to develop job-specific exposure control plans that protect workers (see Part 5 of the Occupational Health and Safety Regulation).

According to section 5.5 of the Regulation, if there is a risk to a worker from exposure to a hazardous substance, the employer must control it below harmful levels by the one of the following means, preferably in this order: elimination, substitution, engineering control, administrative control, and personal protective equipment.



From plan to action

Mark Pretty learned a lot more than he bargained for while apprenticing as a concrete finisher. He discovered that some employers value profit over safety. And, he learned that he could never do the same.

"I promised myself that I would never make money at the expense of someone's health," says Pretty.

Today, Pretty owns and operates Precise Concrete & Enterprises, based in West Vancouver. Specializing in concrete and cement finishing, the company has become an industry leader in silica dust control. Its silica exposure control plan is comprehensive, and it doesn't just sit on the shelf gathering dust. Ask Pretty for his secrets of success and he sums it up like this:

Training employees — All 30 Precise employees participated in a silica awareness seminar covering hazards and safe work practices from how to clean their assigned respirators to how to safely dispose of the slurry produced from wet grinding. A translator ensured Precise's many Spanish-speaking employees benefited fully from the seminar. This training is supplemented by weekly safety meetings.

Buying and maintaining equipment — Precise invests in high-quality equipment like water adapters for grinders and local exhaust systems to prevent silica dust exposure. More importantly, Precise maintains the equipment. HEPA vacuums attached to grinders and other equipment are checked monthly. Mask filters are replaced every week.

Standing his ground — When the pressure's on, workers can be tempted to cut corners, but Pretty isn't. Supervision is key and, if contractor expectations become unreasonable, Pretty's willing to find another contract and take his employees elsewhere.

"In the future," says Pretty, "I'll be able to look my daughter in the eye and tell her that no one sacrificed their health and future for me to pay her university tuition."

Elimination

Why not eliminate grinding altogether? Employers should be asking questions like: Do we really have to smooth that concrete surface? What could we do before the concrete sets so we don't have to grind it later to make it smooth?

Substitution

Substituting crystalline silica with less toxic materials is the first line of defence. Replace sandstone grinding wheels with ones using aluminum oxide, and furnace silica bricks with magnesite or aluminum oxide bricks. There are also several options for replacing silica sand used in abrasive blasting, including high-pressure water, metal shot, cereal husks, sawdust, and steel sand.

Engineering controls

Changing work practices is the next step to reducing exposure. Modifying abrasive blasting to produce a coarser dust is one example. Whenever possible, use wet methods for cutting, drilling, grinding, and sweeping to reduce dust. Selecting the right tools for the job, such as grinders and cutters with a water hose or HEPA vacuum attached, is important too.

When it isn't practical to change a work practice involving silica dust, employers will have to isolate or enclose it. This can be as simple as physically separating dusty operations from non-dusty areas by barriers or walls, and posting warning signs to keep workers not involved in the operation out of harm's way. However, when isolation isn't effective, you'll need to enclose the operation.

Where dust levels are low, partial enclosures like vertical or floor tarps are options. Otherwise, full enclosures are necessary. For example, there are automatic blast cleaning machines or cabinets that workers can operate from outside using gloved armholes.

Ensuring adequate ventilation provides the next level of protection, and the most effective ventilation options are local exhaust systems that remove silica dust at the source. The collecting hood should be located as close as possible to the emission source, and contaminated air must be replaced with fresh filtered air.

Administrative controls

Examples of administrative controls to reduce unintended exposure to silica dust include posting grinding schedules,

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working after hours, and restricting access to certain areas.

Personal protective equipment

Even if other control options have been exercised, workers may still be required to use proper respirators to protect themselves from exposure to silica and meet the current occupational exposure level.

“The bottom line,” concludes Clark, “is that we all need uncontaminated air to breathe as much as we need uncontaminated water to drink. You wouldn’t drink water that slowly poisons you over 20 to 30 years, would you? So why would you breathe air that does something similar?” **W**

Silica resources

For more information on protecting workers from exposure to silica, refer to the following online resources:

- WorkSafeBC.com – Injury Prevention Resources for Construction – Hazardous Materials
www2.worksafebc.com/Portals/Construction/HazardousMaterials.asp?ReportID=34096
- National Institute of Safety and Health (NIOSH) – Silica
www.cdc.gov/niosh/topics/silica/industry.html
- Ontario Ministry of Labour – Silica on Construction Projects
www.labour.gov.on.ca/english/hs/guidelines/silica/

If you have questions or concerns about protecting workers from exposure to silica, please talk to your WorkSafeBC safety or hygiene officer or call the WorkSafeBC Prevention Line at 604 276-3100, toll-free in B.C. at 1 888 621-7233.



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