Construction Exposure Profiles

Crystalline Silica

PROVINCIAL BUILDING & CONSTRUCTION TRADES COUNCIL OF ONTARIO

Crystalline silica is a natural component of sand, rock, concrete, brick, stone, mortar, and many mineral ores. It is one of the most common health hazards in construction and building trades. CAREX Canada estimates that 380,000 Canadian workers have been exposed to crystalline silica at work.

Workers are exposed to crystalline silica when they breathe in silica dust. Respirable crystalline silica (RCS) is silica dust that is very small and can potentially reach the deepest part of the lungs.

Health Effects

- Silicosis
- Lung Cancer
- COPD (i.e., emphysema and chronic bronchitis)

Symptoms of silicosis include coughing, wheezing and difficulty breathing. Silicosis can be acute (i.e., high exposure over short period of time) or chronic (i.e., exposure over long period of time). Exposure may also increase the risk of developing end-stage kidney disease and an array of autoimmune diseases.

Exposure Sources and Construction Trades

There are many activities in construction that produce dust from silica-containing materials (SCM). Work activities in construction that may generate dust include excavating, cutting, drilling, chipping, sanding, or grinding of silica-containing materials.

Trades Exposed in Construction	Exposure Sources and Activities
Operating engineers, and heavy equipment mechanics and operators	• Excavating and road construction • Large trucks, motor vehicles and heavy equipment generating dust clouds • Crushing, loading, hauling, and dumping of SCM • Tunnelling, and earth moving of soils with high silica content
Operative plasterers, cement masons, bricklayers, and allied craft workers	• Mixing or cutting of concrete, aggregate, and cement • Breakdown down of SCM using abrasives or abrasive blasting
General and specialized construction labourers	• Demolition or blasting of structures • Regular maintenance and cleaning, such as dry sweeping, pressurized air blowing, or dismantling equipment

Breaking down rock, concrete, or other SCM during construction by chipping, hammering, sawing, drilling, or grinding also generates significant amounts of airborne dust, creating a possible exposure source for all workers in proximity.

Increased Risk

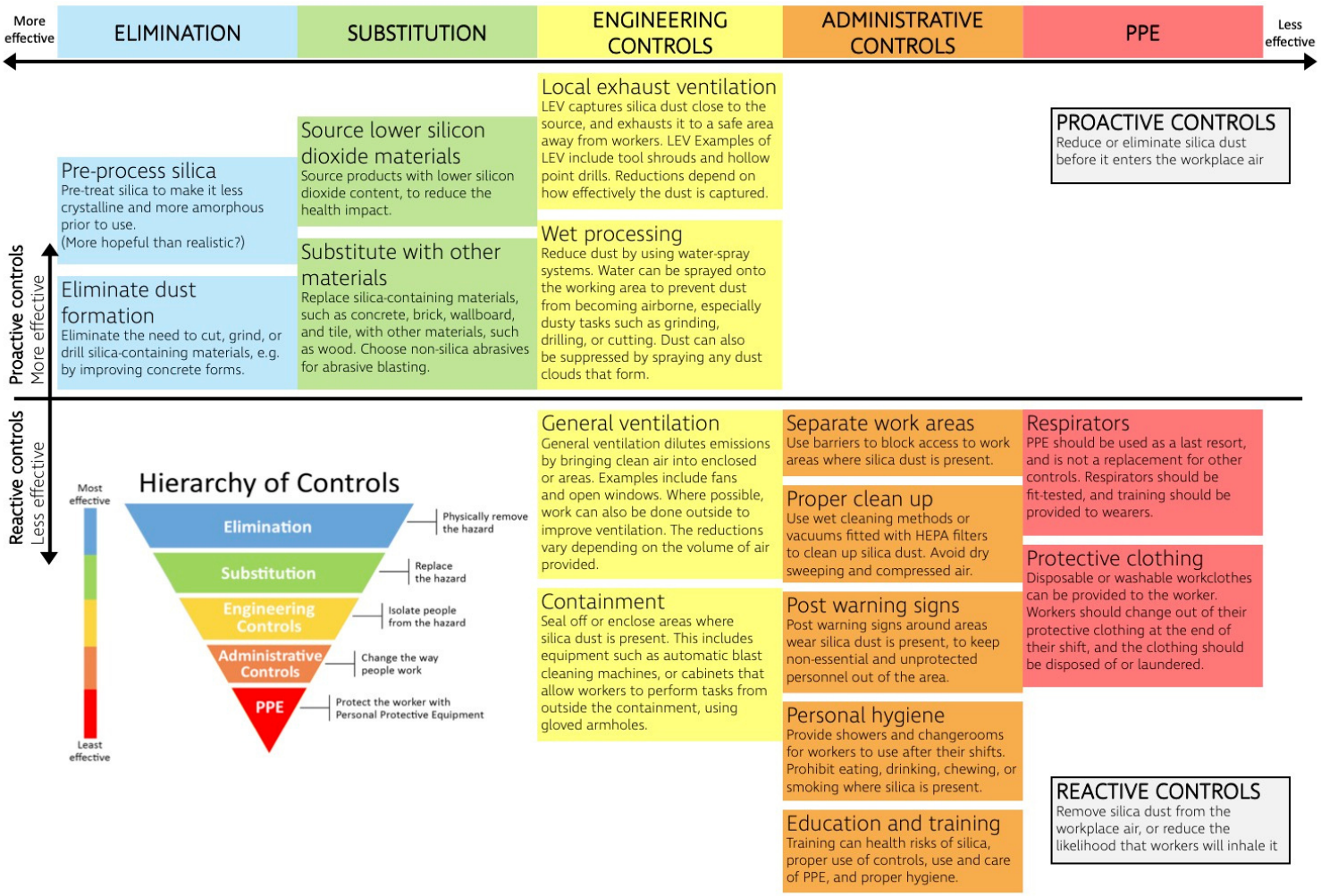
The Burden of Occupational Cancer Project estimates that almost 200 lung cancers diagnosed each year among Ontario construction workers are caused by exposure to crystalline silica. The risk of silicosis for workers in the construction industry is 1.20 times higher and the risk of lung cancer is 1.09 times higher when compared to the general population in Ontario. Also, labouring and other elemental occupations in the construction trades have a 1.45 times higher risk of COPD, compared to the general population in Ontario.

The Occupational Disease Surveillance System (ODSS) has identified specific construction trades in Ontario as having the highest risks for lung cancer and silicosis, when compared to all other workers in the ODSS, as shown in the following table.

Trade	Lung Cancer	COPD	Silicosis
Welding and flame cutting operations	13%	18%	26%
Other Construction Trades Occupations	14%	39%	124%
Labouring and other elemental work: excavating, grading, and paving	55%	75%	-
Excavating, grading and related occupations	37%	38%	-
Plasterers and related occupations	20%	7%	-
Brick and stone masons and tile setters	10%	16%	-
Paving, surfacing and related occupations	22%	33%	-
Foremen/women: Excavating, grading, paving and related occupations	36%	10%	-

Prevention

Ontario and Quebec have established RCS legal occupational exposure limit of 0.10 mg/m3. Control strategies that may be effective in construction include:



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Occupational Cancer Research Centre

Provincial Building & Construction Trades Council of Ontario