

Respirable crystalline silica in the workplace

Cases of silicosis induced by respirable crystalline silica in the workplace are on the rise in Australia. In Queensland, 53 cases of silicosis have been identified between September and November 2018.¹ This spike in cases is linked to a rise in the manufacturing and use of engineered stone. So what is crystalline silica and how do we protect our workforce?

What is it?

Crystalline silica is a mineral compound found in soil, rock and sand. Respirable crystalline silica (RCS) is generated by the vigorous processing of compounds that contain crystalline silica in the form of dust. Examples of processing activities are, cutting, sawing, drilling, grinding and polishing materials that contain crystalline silica. RCS particles are very small, as such they are likely to remain airborne longer than larger dust particles and are invisible to the naked eye.

Compounds and the amount of RCS contained are outlined below²

Type	Amount
Granite	25 to 40%
Shale	22%
Natural sandstone	67%
Composite (engineered or manufactured) stone	> 90%
Aggregates, mortar and concrete	various

What does it do?

When generated, RCS may be inhaled, lodging deep within the lungs. A number of diseases have been associated with the inhalation of RCS with silicosis being the primary disease.

Silicosis is divided into three main types:

Acute silicosis may develop after exposure to very high levels of RCS over a short period of time, within a few weeks or years. Acute silicosis causes severe inflammation and an excess protein in the lung.

Accelerated silicosis may develop after exposure to moderate - high levels of RCS over the period of 3-10 years. Accelerated silicosis causes inflammation, protein in the lung and scarring of the lung.

Chronic silicosis may develop after exposure to lower levels of RCS long term and causes fibrotic nodules and shortness of breath. Chronic silicosis may include progressive massive fibrosis where the fibrotic nodules in the lung aggregate.

Additional diseases associated with RCS include:

- ▼ Chronic bronchitis
- ▼ Emphysema
- ▼ Kidney damage
- ▼ Lung cancer
- ▼ Scleroderma³

Who in particular is at risk?

Workplaces that manufacture, install or modify engineered stone have experienced a spate of instances of silicosis over the past few years, however it is expected that the number of cases recorded do not accurately reflect the number of instances occurring as it is not presently a reportable illness.

Additional workplaces and activities that may provide an exposure to RCS include:

Workplaces

- ▼ building, construction and demolition work
- ▼ preparing kitchen/laundry benchtops (manufactured stone)
- ▼ excavation work
- ▼ abrasive blasting
- ▼ mining, quarrying, crushing and tunneling work
- ▼ brick manufacturing
- ▼ road building
- ▼ stonework
- ▼ foundry work
- ▼ explosives and blasting work.

Activities

- ▼ brick cutting
- ▼ grinding of masonry
- ▼ concrete cutting, chiseling and jack hammering
- ▼ cleaning up of dust and debris created by the above activities

- ▼ cutting and working with manufactured stone.⁴

How can exposure be controlled?

As silica becomes respirable in dust form, it is important that exposure to dust is minimised to acceptable, safe levels. At the time of authoring Safe Work Australia's Workplace Exposure Standard requires that respirable silica dust not exceed 0.1 mg/m³ as an eight hour time weighted average. To achieve this, it is recommended that dust extraction, wet cutting practices, isolation of the process area and the use of appropriate personal protective equipment such as respiratory equipment, be implemented. Local exhaust ventilation and wet dust suppression practices have been shown to reduce dust by up to 99%.⁵

Important notes:

Health monitoring of employees engaged in activities that are exposed to RCS are included in relevant WHS/OHS legislation.

Abrasive blasting of material containing >1% crystalline silica has been banned in Victoria and dry cutting of engineered stone has been banned in Queensland.

Additional information:

Health Monitoring for Exposure to Hazardous Chemicals - Guide for persons conducting a business or undertaking
Health Monitoring for Exposure to Hazardous Chemicals - Guide for workers

Health Monitoring for Exposure to Hazardous Chemicals - Guide for medical practitioners

References

1. ABC, November 22 2018, Suppliers of stone benchtops facing questions over response to silicosis outbreak, 7:30 Report, viewed 09/12/2018 <<https://www.abc.net.au/730/suppliers-of-stonebenchtops-facing-questions-over/10546526>>
2. Safe Work Australia, 2018, Crystalline silica and silicosis, Safe Work Australia, viewed 09/12/2018 <<https://www.safeworkaustralia.gov.au/silica>>
3. *ibid.*
4. *ibid.*
5. WorkCover Queensland, 2018, Construction dust: respirable crystalline silica, WorkCover Queensland, viewed 09/12/2018 <<https://www.worksafe.qld.gov.au/construction/workplace-hazards/silica-exposure-a-serious-risk-for-construction-workers>>

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