

# PLAYING THE PREVENTION GAME FOR SILICOSIS

Tracey Bence is a certified occupational hygienist, fellow and current president of the Australian Institute of Occupational Hygienists. *Quarry* reached out to her to learn more about silicosis and what the quarrying industry needs to know about this occupational lung disease.

**S**ilicosis is an incurable lung disease caused by harmful levels of crystalline silica dust, usually over years. The main symptoms of silicosis are shortness of breath after exercising, chest pain, a harsh, dry cough and tiredness. But in the early stages of silicosis, there may be no symptoms.

While chronic silicosis often results from exposure to silica dust over periods longer than 10 years, other versions of the disease, known as accelerated or acute silicosis, can lead to severe symptoms over a shorter period. If workers in quarries are exposed to high and freshly ground dust containing quartz, the risk of developing silicosis and even lung cancer cannot be ignored.

Unfortunately, there's no cure for silicosis because once the lung is damaged, the damage cannot be reversed. But with enough awareness, the workers' exposure and hence the risk can be contained, as Tracey Bence, President of the Australian Institute of Occupational Hygienists (AIOH) told *Quarry*.

## How prevalent is silicosis in the quarrying industry in Australia?

The sad truth is that we just don't know. While laws have been changed in recent times to mandate the reporting of silicosis by medical practitioners, we know that not all workers who are at risk are being provided medical assessments and those assessments are not always of the highest quality. A study published by Curtin University predicted that 100,000 workers from various industries would be diagnosed with silicosis

and up to 10,000 Australian workers could develop lung cancer from exposure to silica dust. That's why AIOH and many other health and worker organisations are supporting the National Dust Diseases Strategy and the proposed National Occupational Respiratory Disease Register so there is an obligation on doctors to report diagnosed silicosis and any link made to the exposure to silica dust.

## What are the known causes of silicosis?

There are several illnesses caused by exposure to respirable crystalline silica dust, but silicosis is exclusively caused by breathing in very fine, mostly invisible respirable crystalline silica dust. Crystalline silica (SiO<sub>2</sub>) is found in natural sources like sand, stone, quartz, but also in manufactured products such as concrete, and engineered stone.

The crystalline forms of silica, sometime called free silica can release dust particles so small (less than 10 micro meter or micron) that they are able to penetrate deep into the lung. The body's inflammatory response to respirable crystalline silica is what causes lung cancer and silicosis.

## What are the early symptoms?

Some of the symptoms for people with silicosis are shortness of breath after exercising, chest pain, a harsh, dry cough and tiredness. The early symptoms of silicosis are still not early because even once diagnosed silicosis only gets worse, progressing even after the person is no longer exposed to



Tracey Bence, Fellow and President of the Australian Institute of Occupational Hygienists.

respirable crystalline silica dust. There is no cure for silicosis. So, where we find a risk of inhaling the fine respirable crystalline silica dust in mining and quarrying workers, we must prevent exposure to this toxic dust.

## Within the quarrying industry, who are at the highest risk of exposure?

Generally, occupational exposure risk is a factor of concentration and duration. In the case of silicosis risk, it is most associated with those tasks that involve high energy processes, mechanical equipment and freshly broken particles. Examples are crushing, screening, pulverising, blasting, drilling, dropping loads from heights, and even dry sweeping. In simple terms, the higher the amount of quartz in the material being disturbed, the higher the risk. So,

a focus on controlling silica dust levels is needed to keep people safe.

I would want people to learn more about the risks and how to control them through specific guidance from those in construction, mining and quarrying collated by occupational hygienists who are the people who go to sites all over Australia to measure silica dust and explain how to prevent silicosis. The advice can be found via [www.breathefreelyaustralia.org.au](http://www.breathefreelyaustralia.org.au) and is called Breathe Freely Australia.

**You mentioned silicosis is caused by the fine dust building up in one's lung. How long does it usually take before there's a risky level of build up?**

There are many forms of silicosis. Chronic silicosis results from more than 10 years of exposure, but we are seeing accelerated silicosis now from exposure over less than 10 years, which is typically from excessive exposures in very uncontrolled environments.

One of the reasons why it's tricky is that

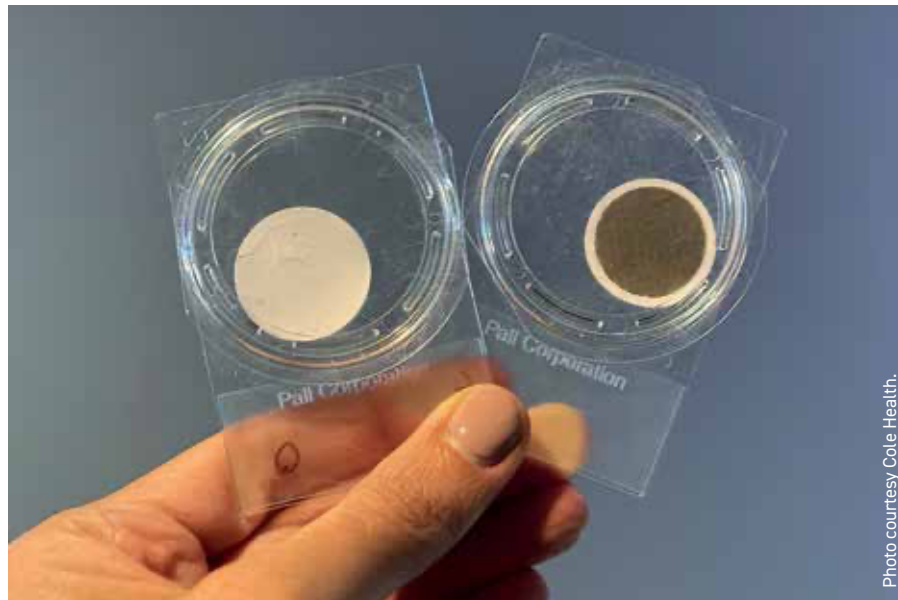


Photo courtesy Cole Health.

The filter paper used for measuring dust concentration before the sampling (left) and afterwards (right).

when particles are smaller than 10 microns, they can hang in the air anywhere between eight minutes to 41 hours.

So, if you are dozing, crushing, moving a dusty load or breaking rock or aggregate, it takes far longer than you imagine for the fine dust to fall on the ground and no longer be in your breathing zone.

There doesn't have to be a large cloud of dust for respirators to be recommended. It's best to ask a hygienist or specialist in respiratory protection, what PPE you need to wear at work and when.

**What are the recommended diagnostic tests and how frequently should they be done?**

The best tests are those that measure for harmful levels of silica dust in our workplaces – not once the dust is in our lungs. But, if you are offered health monitoring, which may be described as a 'silica medical', make sure the doctor knows your occupational history and take any records of personal exposure (these may be available from an occupational hygienist or the regulator). Silica health monitoring should be offered to all

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workers who are exposed to silica dust. Each state and territory has its own regulations for health monitoring for silica dust. For example in Western Australia, they have led the way for health by introducing five-yearly low dose, high resolution chest CT scan, which is known to give a much better picture of the damage caused by silica dust.

Measuring the dust concentration in air is the important first step to knowing risk to workers. Monitoring for respirable crystalline silica in air needs to be done by an occupational hygienist who is well trained in the equipment and method that must be used. It involves the worker wearing a small sampler around their breathing zone and attracting the dust onto a piece of filter paper using a battery-operated pump that runs for most of the shift.

Occupational hygienists measure the silica dust by capturing it on filter paper and that is how we know if harmful levels are getting into workers lungs. After the test, the filter paper is typically discoloured and dirty from the very fine silica dust. We then get the dusty filter weighed and analysed to get the concentration of silica dust and so quantify their personal exposure risk. If there is work in mines and quarries where there is risk of breathing in fine silica dust, the air should be monitored and the risk of life changing, irreversible harm from silicosis assessed and controlled.

### **What other measures are available to minimise risk for those working in the extractive industry?**

We know how to minimise silicosis risk and it is all about preventing harmful levels of silica dust being breathed in.

Control measures that are known to be effective are:

- Mechanical, extraction ventilation;
- Dust suppression with water/wetting agents;
- Having pressurised vehicle cabins for keeping the dust out or filtering the air if it is getting in.

Other preventive measures include enclosure of crushing and conveying equipment, reducing speed of heavy vehicles on dusty haul roads, wetting aggregates and ores before they are dumped and reducing heights from which they are dumped to as low as possible. Hygienists recommend the avoidance of dry sweeping or using compressed air on anything that contains quartz.

If elimination of creating the fine dust is not possible, then protect the lungs with respiratory protection. Sometimes that means using a tight-fitting filtering P2 respirator, known as dust mask. When sealing properly and worn for as long as the fine dust hangs in the air (up to several hours) respirators can protect us from dangerous levels of fine silica dust.

### **What are some messages that AIOH is working to get across to help prevent silicosis?**

This disease is preventable, we can control it, we need to measure it, then we need to move quickly to intervene. We don't need to wait for someone to get silicosis or lung cancer. We can prevent it. All these preventative measures are wrapped up in the AIOH position on silica. Hygienists are the scientists of workplace exposure, and because we measure sometimes harmful concentrations of silica dust and know that silicosis is incurable, it's clear to us what we have to do now – we've just got to be in the business of silicosis prevention.

My other key message is that there are always ways to work safely in mining and quarrying. We can certainly have healthy workers, with telling them about the hazards being step one. The workplace managers, engineers, people in charge of the resources and the policies should know enough about silica to make sure it gets measured.

The AIOH is so committed to preventing silicosis that we have compiled the best resources into a program called Breathe Freely Australia. I encourage all quarrying workers, managers, engineers, metallurgists, geologists and supervisors to learn how to breathe free of silica dust at: [www.aioh.org.au](http://www.aioh.org.au) •



Dust suppression is one of the known control measures to minimise risk of silicosis.



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