

SILICOSIS – AN AVOIDABLE DISEASE



SR100 Half Face Respirator

by Kim Martin

With the current global crisis of COVID-19, never has so much attention been focused on our lungs. Fortunately, particularly here in Australia, we have been given valuable advice and insights on how to protect them from being infiltrated by this new, invisible enemy.

With the rising popularity of pottery and the recent closing down of many accredited ceramics and pottery courses in our TAFEs and universities, now more than ever it is imperative that we also focus on an old and deadly invisible enemy: Crystalline Silica, the cause of much suffering and death brought about by the condition known as silicosis.

Most established potters, ceramicists and clay manufacturers are well informed of the dangers inherent in clay and glaze materials. Over the years, crucial information has been written about the hazards in arts highlighting the safety practices required to prevent disease. Formal education has also provided fundamental knowledge of the chemistry of raw materials and methods of production intended to support and complement creativity.

Unfortunately, in recent years, many formal courses have been closed or significantly reduced in capacity due to lack of government funding and campus closures. Private classes have sprung up to cater for a resurgence of interest in ceramics. New students, excited about trying out clay, need to be informed about the dangers of working with materials that can adversely affect their health. Unfortunately, unlike accredited training organisations, private studios (many of which are excellent) are not accountable to any professional body for safety and technical expertise. However all studios and teaching environments, from kindergartens to tertiary courses, have a responsibility to provide trained staff and a safe environment for everyone who enters the space.

On 27 February 2020, I attended the Silicosis Summit - A Preventative Approach, presented by WorkSafe Victoria. The summit was part of a national response to the serious problem of silicosis and considered why, in recent years, it has become so prevalent in the building industry, particularly amongst stonemasons. By comparison, established potters have been aware of silicosis for many years. However, there is no room for assumption or complacency.

As an artist with extensive experience in ceramics, I enrolled in the program after expressing an interest in attending the summit. As far as I am aware, there were only two other ceramicists present amongst an audience of approximately 500 people. The program was comprehensive and geared primarily towards the construction industry.

Richard Stubbs was Master of Ceremonies and The Hon. Jill Hennessy, Minister for Workplace Safety, gave the formal opening address. Colin Radford, Chief Executive of WorkSafe Victoria, as well as Professor Malcolm Sim and Dr Graeme Edwards led a formidable line-up of guest speakers from industry, health and business. Supplementing the talks program was a trade show facilitating discussion and demonstrations of Personal Protective Equipment (PPE), air monitoring systems and other safety equipment.

Work activities that may represent a high risk exposure

Silica is one of the most abundant minerals found in the earth's crust and is used in many products across a variety of industries and workplaces. Crystalline silica is most dangerous to health when dust is generated, becomes airborne and is then inhaled by a worker.

Examples of work activities that can generate respirable silica dust particles include:

- during fabrication and installation of composite (engineered or manufactured) stone countertops
- excavation, earth moving and drilling plant operations
- clay and stone processing machine operations
- paving and surfacing
- mining, quarrying and mineral ore treating processes
- tunnelling
- construction labouring activities
- brick, concrete or stone cutting; especially using dry methods
- abrasive blasting (blasting agent must not contain greater than 1 per cent of crystalline silica)
- foundry casting
- angle grinding, jack hammering and chiselling of concrete or masonry
- hydraulic fracturing of gas and oil wells, and
- **pottery making.**

Early in the presentation, an image was displayed showing a list of work activities, titled: 'Examples of work activities that can generate respirable silica dust particles'. On the list was 'pottery making'. Every activity listed was regarded as hazardous, even though the presence of crystalline silica can vary in percentage within the composition of different materials and compounds.

Silicosis is a disease that occurs when airborne crystalline silica particles infiltrate the lungs. Over time this causes irreparable damage and scarring to the tissues, makes it very hard to breathe, increases your risk of lung infections, and may lead to heart failure. Silicosis cannot be cured,

but its progression can be slowed if exposure to silica is avoided, especially at an early stage of the disease. In the past, silicosis was regarded as a chronic disease that developed slowly over many years after exposure. Now, with the prevalence of more finely engineered stone products and finer clays, there are different types of silicosis.

Information from the Silicosis Summit about the following different types of silicosis included the following:

Acute silicosis: can develop within weeks to a few years of very high exposure to silica.

Accelerated silicosis: also associated with high exposure levels. Rapid increase of scarring in the lung (fibrosis) within 5–10 years of first exposure.

Simple or complicated chronic silicosis: classic silicosis where fibrosis occurs more slowly with low to moderate exposure over 10–30 years, after first being exposed.

According to Cancer Council Australia, approximately 587,000 Australian workers were exposed to silica dust in 2011.



1 CGL-X-RAY CHEST ILO - Normal 0.0
Normal chest x-ray performed to ILO standards in a 27-year-old worker exposed to respirable crystalline silica through his work. This worker has no features to suggest silicosis. Normal lung tissue appears black on x-rays due to the air within the lung tissue.



2 CT Cor ILO 3.2
CT chest scan in a different 27-year-old man with a 4-year history of intense crystalline silica exposure in the artificial stone bench-top industry, followed by a 5-year period of no further exposure. The image shows extensive upper lobe scarring and nodularity on both sides (white round and irregular opacities), indicating that the lungs are unable to fully expand.



3 ILO-CHEST XRAY ILO 3.2
The chest x-ray corresponding to the worker in image 2, showing the scarring in the upper parts of both lungs.
Images and information: courtesy of I-MED

I was shocked to hear the current reports on young men in their early twenties being diagnosed with silicosis. Exposure to high levels of silica dust through cutting materials like engineered stone has created a crisis that cannot be ignored. The home improvement phenomenon has come at a steep price.

Anyone working with clay, stone and related materials in the arts and industry needs to be aware of the dangers of crystalline silica and understand that it is a hazardous mineral often present within many other minerals. Hence, it is vital to always be informed about the composition of your materials and the need to adopt strict safety precautions and work practices. For potters, the mixing of glazes from raw materials is equally as hazardous as is dealing with dry clay particles.

I believe that education and laws relating to workplace practices need to be mandatory, reviewed, and continuously updated. This will help prevent people slipping through the net and professing ignorance about the nature of the materials they are working with.

Some years ago, I had the privilege of hearing a lecture by Monona Rossol, the American chemist and artist. She was touring in Melbourne and lecturing on safety in the arts. During the presentation she spoke about the dangers inherent in many materials that artists use. Regarding ceramics, two key points from her lecture stood out to me:

1. Airborne silica sinks at the rate of only one foot (30cm) per hour (and that is in a stable atmosphere). This is very slow and means that you can breathe in silica even if you think the environment is dust-free after cleaning.
2. Last century, in an English commercial pottery, throwers were dying from silicosis. No one could understand how this was possible as they were working with wet clay. Eventually it was established that the wet clay dried on their leather aprons and their body heat caused the microscopic particles of silica to rise high enough to be inhaled.

In this modern world, we should not have to reinvent the wheel but, alas, current and future generations of potters and ceramicists will suffer from a lack of knowledge of the dangers of silica if knowledge is not shared.

It is important to articulate and follow the vital principles and best safety practices. With industry support and state-of-the-art equipment, safety principles and methods will continue to be developed. Attending important forums such as the Silicosis Summit, will help people engaging with raw materials and products, whether natural or refined, to become acutely aware of the need to protect themselves and others.

In the meantime, here are some important, simple and useful facts that ceramicists, potters, artists and teachers should be aware of and steps to follow to prevent silica exposure:

1. Know your raw materials!

- Access Safety Data Sheets (SDSs) available from your suppliers. These are also often available online.
- Raw materials come from natural sources but that doesn't necessarily make them good for you. Conduct risk assessments to identify and manage different dangers and vulnerabilities.

2. PPE is vital for anyone working with crystalline silica

- Respirators and/or P2-grade disposable masks are essential to prevent inhalation of airborne dust. A good example is Sundstrom's Respirators.
- Correct fitting of face masks and respirators is essential. Beards and facial hair inhibit correct fitting.
- Training on the correct fitting of respirators and face masks is available from suppliers.

3. Always wear clean, protective clothing

- All care should be taken to prevent silica dust contaminating your clothing.
- Wear an apron, preferably plastic and wiped down frequently. Tie your hair back and roll sleeves back past your elbows
- Contaminated clothing should be changed at the end of each use.
- Contaminated shoes should be changed on leaving work spaces to prevent contamination of vehicles and personal living spaces.
- Fabrics/towels must be soaked after use in a bucket of water and rinsed to remove particles before putting through the washing machine. After cleaning contaminated fabrics, washing machines should be put through a rinse cycle prior to laundering of personal clothing.

Note: teachers in schools and kindergartens must never allow the reuse of clay-covered art smocks. They must provide clean smocks for each student every session and prevent face painting with clay.

4. Never 'dry-sand' or fettle any clay body. Incorporate good finishing practices into wet/leather-hard clay bodies to prevent the need to dry fettle

- Use a damp sponge to smooth/refine greenware when needed.
- If needed, use wet/dry silicon carbide sandpaper sheets, soaked in water on dampened bisque ware.

5. Never sweep up dry clay

- Use low-pressure water, wet sweeping or a 'Dust Class H' vacuum cleaner to clean floors, walls and other surfaces. Studio floors can also be hosed down, and when dry, vacuumed with a Dust Class H vacuum cleaner.
- Wet mopping and dusting should be used where vacuuming is not practicable.

6. Spraying of glazes must take place in a properly extracted spray booth

7. Wash tools and clean all wheel and table surfaces after each use

- Keep the studio/workshop environment spotless.
- In a home studio it is important to have a dedicated working space to prevent the transmission of dust to living areas.

8. Add dry materials to water when mixing glazes or clay/slip bodies

- This will limit airborne dust. This is called slaking down.
- Remember to always wear a respirator that fits properly and also to cover your hair.

9. Do not leave dried clay or broken pots sitting around uncovered

- Remember that dust can become airborne through drafts and mishandling.
- It is best to put all fragments in a bucket and cover with water and a lid.
- Do not use heating or cooling with fans that may disturb dust.

BE INFORMED, BE MINDFUL, AND STAY SAFE!

I would like to commend WorkSafe Victoria for presenting a straightforward program on a difficult topic. Education is the most powerful tool we have in the prevention of a disease that continues to rear its ugly head. This is a problem that will not go away if people remain unaware of, and ignore, valuable safety advice. In short, silicosis *can and must* be prevented. By understanding and adopting sound protective methods, everyone working with materials that contain crystalline silica will avoid exposure and its long-term health implications.

NOTE – From WorkSafe Victoria:

Silicosis is a proclaimed disease and if diagnosed, workers have the right to lodge a claim against their previous employer.



Recommended reading:

Artist Beware by Michael McCann, The Lyons Press, 1992

The Artist's Complete Health and Safety Guide by Monona Rossol, Allworth Press, U.S., 2001

The Potter's Dictionary of Materials and Techniques by Frank and Janet Hamer, A&C Black Publishers Ltd, Fifth Edition, 2004

Websites:

worksafe.vic.gov.au/worksafe

cancer.org.au/preventing-cancer/silica-dust.html

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Disclaimer

All information presented in this article is current at the time of publication. The advice contained is not exhaustive; it is indicative only. The author bears no responsibility should anyone contract silicosis despite following the preventative measures put forward. People are encouraged to do their own research.