AIHS Submission to National Dust Disease Taskforce

Introduction

The Australian Institute of Health and Safety (AIHS) has a more than 70 year history as a professional member-based OHS/WHS association and is proud to have the Governor-General as our Patron. On 1 July 2019 we changed our name from the Safety Institute of Australia to better emphasise the importance of occupational health.

It is not the intention of this submission to go into detail on the aetiology of the pneumoconioses. The main mineral-based pneumoconioses, caused by scarring of the lungs by respirable dust entering the lungs include: Silicosis; Coal workers' pneumoconiosis and Asbestosis. Lung cancers have also been associated with these diseases, although the pneumoconiosis does not progress to cancer and the two diseases have different initiators. Silicosis and accelerated silicosis are the main focus of this submission.

The aetiology and control of the common dust diseases, particularly silicosis and coal workers pneumoconiosis, has been understood for more than a century. These diseases had been largely eliminated in the advanced economies, and their recurrence in Australia can be understood as:

- changes in market preferences and demand for granite and manufactured stone benchtops,
- a breach of employers' duty of care and high risk unprotected activity by some workers (such as drilling, cutting and polishing manufactured stone or granite), and
- employers' and workers' lack of understanding of the causes and risks of these diseases,
- a lack of research data on the causes of accelerated silicosis and to what extent it is a disease distinct from silicosis, and
- a failure of regulation by the jurisdictional WHS/OHS Regulators.

Coal dust is included in the relevant coal mining legislation in different states. However, as for silicosis, lack of regulatory attention over a long period has resulted in an increased incidence in coal workers pneumoconiosis (also known as black lung) that was the subject of a Parliamentary Inquiry in Queensland in 2017[1]. Silicosis may be following a similar trajectory to coal workers' pneumoconiosis.

Legislation

Currently silica dust and asbestos fibres are regulated under the Work Health and Safety Acts and Regulations in each Australian jurisdiction. However there are significant differences. Apart from the general duty of care within the Acts to reduce risk to as low as reasonably practicable, asbestos has detailed Regulations that have effectively controlled exposure. There are also extensive Codes of Practice covering every aspect of asbestos work - removalists have to be licensed, and there has been extensive communication and education on danger of asbestos. There have also been well publicised prosecutions for breaches of the Act. New asbestos products have been banned in Australia.

[1] Queensland Parliament, 2017 *Black lung White lies Inquiry into the re-identification of Coal Workers' Pneumoconiosis in Queensland,* https://www.parliament.qld.gov.au/documents/tableOffice/TabledPapers/2017/5517T815.pdf

Conversely, crystalline silica is not specifically mentioned within regulations, with the exception of the ban on using sand containing more than 1% free silica in abrasive blasting[2], and instead has to be understood as a hazardous chemical with exposure standards detailed within Safe Work Australia's Hazardous Chemicals Information System (HCIS). The WHS Regulations apply and should be enforced[3].

A lack of explicit regulation has contributed to the lack of understanding amongst employers, particularly those within small and medium enterprises, which would not be likely to access WHS/OHS expertise. Both they and their workers and contractors are unlikely to fully comprehend the medical issues associated with dust from cutting engineered stone, granite or similar materials.

Given the combination of sandstone underlying Sydney, and the Hunter coal mines, silicosis and coal workers pneumoconiosis were significant diseases in New South Wales that resulted in the Dust Diseases Board (currently the Dust Diseases Authority) being created some 90 years ago. The Authority has extensive knowledge of the causes, controls and compensation of dust diseases. Their expertise should be accessed by the Task Force to ensure the "wheel is not re-invented"[4].

Exposure Standard for Crystalline Silica

Crystalline silica, commonly known as quartz, is the most common mineral on earth and is the main ingredient of beach sand. From a health perspective, the harmful part is the very fine dust generated mechanically during processing of quartz bearing stone that penetrates into the lung, known as respirable dust, and is generally less than 10 micrometers (µm) in diameter[5]. Dust larger than this does not penetrate into the lung, and if breathed, gets caught in the bronchus mucous, swallowed and excreted normally and without harm to the individual.

Granite and manufactured stone benchtops have been a focus for current dust exposure given their increasing consumer popularity over the past decade or more. Granite is composed of varying combination of mica, feldspar and quartz, containing between 25-45% quartz[6]. The cutting, grinding or polishing of granite can release respirable fine quartz particles. Manufactured stone can contain more than 90% quartz[7] and its dust therefore provides a potentially higher risk than that from granite while typically being more affordable and therefore popular

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[2] See WorkSafe Victoria https://content.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Prohibition-on-crystalline-silica-for-abrasive-blasting-2017-06.pdf

[3] WHS r49 "*A person conducting a business or undertaking at a workplace must ensure that no person at the workplace is exposed to a substance or mixture in an airborne concentration that exceeds the exposure standard for the substance or mixture*." and r5 defines exposure standard as meaning an exposure standard in the Workplace Exposure Standard for Airborne Contaminants. See Safe Work Australia, 2018, *Workplace Exposure Standards For Airborne Contaminants*, https://www.safeworkaustralia.gov.au/system/files/documents/1804/workplace-exposure-standards-airborne-contaminants-2018_0.pdf

[4] See https://legislation.nsw.gov.au/#/view/act/1942/14/sec4 Relevant parts of the NSW compensation legislation may be helpful and NSW Coal Services (formerly the Joint Coal Board) has a long history and expertise beyond coal https://www.coalservices.com.au/mining/about-us/history/

[5] For a formal definition of respirable dust, see Table 3.2 of AS/NZS 1715:2009 Selection use and maintenance of respiratory protective equipment

[6] OSHA Hazard Alert, 2015, Worker Exposure to Silica during Countertop Manufacturing, Finishing and Installation, https://www.osha.gov/Publications/OSHA3768.pdf

[7] See Safe Work Australia, https://www.safeworkaustralia.gov.au/silica

Although beach sand is banned in abrasive blasting, if abrasive blasting is used to clean concrete, granite, sandstone or other quartz bearing material, then respirable quartz can be released from that parent material into the air. Concrete cutting, even though is usually undertaken wet, still produces a slurry containing fine dust that when dry and if airborne, has the same risk as dry cut quartz.

Other sources of silica dust include:

- operations of quarries mining quartz containing materials. Quarries may not be included within mining legislation in some jurisdictions;
- silica flour which is used as an abrasive additive in soaps, skin care products, toothpastes, and paints, and as a filler in a number of pharmaceuticals. It also is used in foundry work and in glass, ceramic, porcelain, tile, and clay production. A significant toxicological review of silica flour was undertaken in the USA in 2009.[8]

Safe Work Australia's HCIS lists the allowable exposure standard for quartz respirable fraction (and also the less common forms of silica - cristobalite and tridymite) as 0.1milligrams quartz/cubic metre of air (0.1mg/m^3), measured as an 8 hour time weighted average. If there is visible dust continuously during the processing of quartz-bearing stone over the shift, then it is likely the exposure exceeds 0.1mg/m^3 respirable quartz. Even if no dust is visible, the exposure standard may be breached if near pure quartz is involved[9].

The Australian exposure standard is the same as that of the UK[10] but double that of the USA. The Occupation Safety and Health Administration (OSHA) has set a Permissible Exposure Limit (PEL) of 0.05mg/m^3 and an Action Level of 0.025mg/m^3.[11] Employers are required to put processes in place to remain under the Action Level. The American Conference of Governmental Hygienists (ACGIH), a predominant professional association with a long history of recommending standards, has set a Threshold Limit Value (TLV) for crystalline silica (quartz and cristobalite) at 0.025mg/m^3 to account for its carcinogenic capability[12].

Safe Work Australia is currently reviewing the exposure standard for crystalline silica and coal containing >5% crystalline silica[13]. The Task Force should consider contacting Safe Work Australia (whose CEO is a Task Force member) to understand the direction the review is progressing. While a reduction to the American PELs or ACGIH TLVs would be better hygiene practice, if the current Australian exposure standard was rigidly adhered to and enforced by the WHS/OHS regulators, the incidence of silicosis would disappear. The primary problem is that it is not.

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[8] US Dept of Health & Human Services, 2009, Chemical Information Review Document for Silica Flour (Micronized α-Quartz), https://ntp.niehs.nih.gov/ntp/noms/support_docs/silicaflour_oct2009.pdf

[9] See the Hawk's Nest Tunnel disaster, where tunnelling through near pure quartz caused potentially fatal acute silicosis in workers in less than a year's exposure. https://www.nps.gov/neri/planyourvisit/the-hawks-nest-tunnel-disaster-summersville-wv.htm

[10] See Health & Safety Executive, Workplace Exposure Limits www.hse.gov.uk/coshh/basics/exposurelimits.htm

[11] See https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.1153

[12] See ACGIH Booklet TLVs and BEIs, 2017. Note the ACGIH does not set mandatory exposure standards, but recommends best practice for use by its members. Australia, through the National Health and Medical Research Council used to adopt the ACGIH TLVs as advisory standards prior to the advent of the modern OHS legislation in Australia.

[13] Public comment closed April 2019. See https://www.safeworkaustralia.gov.au/silica

Prevention of Silicosis

1. Substitute quartz free stone in place of high quartz stone for benchtops

In the same way as asbestos has been banned for safety reasons, consideration has to be given to a long term strategy, say over five years, of eliminating the new installation of high quartz stone in kitchen construction, Fundamentally it is a fashion item, and certainly not worth sacrificing the health of workers. Engineering and other controls are discussed below, but the reality is that the industry has large numbers of small organisations that have limited WHS knowledge, and the literature shows that such organisations generally do not implement sophisticated controls such as ventilation, and rely more on oral procedures and personal protective equipment, which are generally acknowledged as ineffective as prime control measures[14]. Enforcement of regulations in small business is difficult and inefficient.

There are alternate options for high quartz stone. Given that much stone is 'manufactured' to be suitable for benchtops, then the 'recipe' for the stone may be able to be altered to provide a quartz-free substitute stone. Manufactured stone is made with a concrete mix that is moulded and coloured to simulate the colour and texture of natural stone. Research should be funded and undertaken in this field to produce a viable alternative to current manufactured stone which could become a source of local employment rather than relying on importation of high quartz stone.

Alternatively, natural stone should be able to be substituted, provided it does not have any quartz content. The regulatory standard applied to abrasive blasting material of <1% free silica should be used to identify suitable stone. Local sourcing and manufacture of suitable material should be able to be developed as an industry with the creation of jobs in regional areas, where such stone is likely to be sourced. Again research funding should be provided to achieve this end.

As alternate products become available, high quartz stone should be banned for kitchen use. There is no suggestion that existing benchtops should be removed. Once in place there is no hazard involved, unless it is subsequently cut or polished.

2. Engineering controls

WorkSafe Victoria recently changed the Victorian occupational health and safety regulations to prohibit the cutting, grinding and abrasive polishing of engineered stone with power tools, unless on-tool water suppression or dust extraction devices are in place and respiratory protection equipment is used[15]. This policy should become a national one.

Technology advances over the past few decades have provided dust control approaches that if implemented, should eliminate dust exposure in fixed installation processing (eg factories manufacturing benchtops), and eliminate or greatly reduce the dust risk in installation and field activity. This requires the use of water suppression or vacuum capture for fixed installation and advanced respiratory equipment for more

[14] See MacEachen E et al, 2010, Workplace Health Understandings and Processes in Small Businesses, *J Occ Rehab* 20:180-198
Masi D, Cagno E, 2015, Barriers to OHS Interventions in SMEs, *Safety Science,* 71, 226-241
[15] WorkSafe Victoria, August 2019, https://www.worksafe.vic.gov.au/news/2019-08/uncontrolled-dry-cutting-engineered-stone-banned

mobile/field situations such as abrasive blasting. As for concrete cutting, slurry from wet cutting needs to be disposed of appropriately to avoid it drying and becoming airborne.

Tools such as circular saws, drills, and sanders can be purchased with attachments that link to vacuum cleaners containing Grade 2 High Efficiency Particulate Air (HEPA) filters[16] that capture in excess of 99.99% of particulates. There are many commercial tools and vacuum systems on the market meeting these specifications.[17] Sanders have pads with holes through which the dust is extracted. Sandpaper for these tools come with pre-punched holes to fit the sander. These tools and associated vacuum cleaners can be portable so that they can be used in a client's home during installation, as well as in the factory. They are advertised as providing compliance with OSHA's Action Level for crystalline silica, which is one quarter of the current Australian exposure standard. However, this would depend on how they were used and maintained.

3. Personal protective equipment

Personal respiratory protective equipment should be used in conjunction with the dust collection devices noted above. Also, in situations where vacuum technology is not applicable, such as abrasive blasting of concrete or quartz bearing stone such as granite, personal respiratory protection needs to be used. If being worn for any prolonged period, such devices are extremely uncomfortable and can impact on breathing effort. This motivates people to not use them or use them appropriately, increasing the risk of exposure and subsequent disease.

For prolonged use, full face powered air purifying respirators[18] with a P2 or P3 filter[19] should be used as they are comfortable and there is no impediment on breathing. In a fixed location where clean compressed air is available, air-line respirators[20] can be used. Respirators should not be used as a sole or primary control measure.

Whether using vacuum assisted tools or respirators, there must be routine maintenance and testing to ensure that the equipment remains performing according to the manufacturer's requirements. Testing should cover the effectiveness of the filtering using dispersed oil particulate (DOP) technology. Employers also need to instruct and inform employees on the correct way to use and maintain the equipment and to supervise appropriately to ensure that this is done.

The above control measures are consistent with the requirements of S17 the Work Health and Safety Act:

"A duty imposed on a person to ensure health and safety requires the person:

(a) to eliminate risks to health and safety, so far as is reasonably practicable; and

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[16] See AS 4260:1997 (R2018) High Efficiency Particulate Air (HEPA) Filters – Classification, construction and performance.

[17] While not recommending any particular brand, the following sites are noted as being **indicative** of the tools and equipment available for working with stone without releasing dust: https://www.boschtools.com/ca/en/boschtools-ocs/dust-extractor-vacuum-cleaner-attachments-36007-c/
https://www.dustlesstools.com/
https://www.eurovac.com/products/eurovac-source-capture-hand-tools/

[18] As an example of what is available on the market see https://www.3m.com/3M/en_US/company-us/all-3m-products/~/All-3M-Products/Safety/Worker-Health-Safety/Personal-Protective-Equipment/Powered-Supplied-Air-Respirators/?N=5002385+8709322+8711017+8711405+8720539+8720547+3294857497&rt=r3

[19] See AS/NZS 1715:2009 Selection, use and maintenance of respiratory protective devices for effectiveness of respirators when worn properly.

[20] As an example of what is on the market, see https://us.msasafety.com/Supplied-Air-Respirators-%28SCBA%29/Airline-Respirators/c/11707

(b) if it is not reasonably practicable to eliminate risks to health and safety, to minimise those risks so far as is reasonably practicable."

Notification and Regulation

The national strategy noted above for the eventual prohibition of importation of high quartz manufactured stone and replacement with alternate materials may require Commonwealth legislation.

Compulsory notification of silicosis as occurs in Queensland should be required by all jurisdictions. A national register for workers and others who get exposed should be established with diagnosing doctors and employers having the responsibility to add those affected to the register.

WHS/OHS regulators in all jurisdictions need to improve regulatory compliance to ensure that silicosis is reduced or eliminated. There are three main steps that need to be taken.

1. There needs to be explicit mention of crystalline silica in regulations and a code of practice to:
   (a) highlight that employers need to be aware of the dangers of respirable silica and how to control it while emphasising substitution or engineering controls, and
   (b) to provide regulatory teeth to Inspectors having to deal with compliance on the ground. Such regulation should also require anyone working in silica-defined jobs where crystalline silica dust is a risk, to have initial and five yearly x-rays or lung function tests to ensure that they are not contracting silicosis, or that such disease is caught at an early stage when there is a minimal detriment, and the disease is unlikely to progress once exposure is stopped. This is consistent with regulations for asbestos and lead workers.
2. There needs to be a comprehensive education process, which may include exemplary prosecution, to ensure that employers and workers are clear on their duties and the requirements for controlling dust exposure.
3. Inspectors need to be provided with training and tools to allow them to assess whether a breach of the Regulations from respirable dust is likely to occur[21].

Summary and Recommendations

The AIHS believes that there is no good reason why an advanced economy such as Australia should have workers suffering from silicosis and accelerated silicosis. The current situation results from a failure of regulation in learning from the past and responding to new consumer demands, and a lack of understanding by employers and workers of the risks associated with exposure to respirable silica dust including in new forms combined with resins and plastics in manufactured stone.

[21] If there is visible dust over a continuous period from stone containing significant proportions of quartz, this should be taken as *prima facie* grounds to assume that the respirable quartz levels are in excess of the exposure standard. Given that it is the employer's duty to control dust to below the exposure standard, it would be reasonable for the Inspector to ask the employer if they have any evidence, such as air monitoring results, to show that there is no breach of the legislation. In addition, regulators can procure portable real time dust testing instruments (eg DustTrak[21] or similar monitors) which can give a good indication of the actual dust levels experienced in a similar way as alcohol breath testing is used to detect potential breaches of the road traffic laws. If the monitor shows elevated readings, an Occupational Hygienist from the Regulator can be called upon to give a definitive determination consistent with AS 2985:2009 Workplace atmospheres – Method for sampling and gravimetric determination of respirable dust. Monitors would have to be routinely calibrated in a similar way as breath testing devices.

The AIHS therefore recommends:

- Specific inclusion of respirable silica dust within WHS/OHS Regulations and an associated Code of Practice outlining responsibilities and control methods;
- WHS/OHS Regulators implement appropriate education campaigns with the support of major industry operators specifically aimed at manufactured and other stone benchtop manufacturing and installation, and abrasive blasting, so that employers and workers are made aware of the risks of respirable silica dust;
- WHS/OHS Inspectors are trained and provided with appropriate tools to allow them during workplace inspections to better assess the risks of processes breaching the respirable silica exposure standards and so enforce the Regulations;
- Consideration be given to a national strategy of replacing manufactured and other high silica content stone in kitchen installations with lower or even silica free stone through research for alternate products and eventual prohibition of high risk materials;
- Further research and surveillance of accelerated silicosis is required but should not delay education and enforcement of known prevention controls.