

Silicosis Health Screening Program

Baseline findings – September 2020



Government
of South Australia

Wellbeing SA

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Context

In early 2019, Wellbeing SA were approached by The Silicosis Project Committee to assist in the preparation of a report about the baseline findings of a engineered stone and construction worker health screening program conducted by the Mining and Quarrying Occupational Health and Safety Committee (MAQOHSC).

Summary data were compiled by Return to Work SA and sent to Wellbeing SA in January 2020. However, to ensure correct entry of data and to standardise reporting, it was decided to develop an electronic Silicosis database.

The emergence of the COVID-19 pandemic meant this work was temporarily delayed due to capacity of Wellbeing SA staff who were occupied responding to the Public Health Emergency.

A Data Sharing Agreement between Wellbeing SA, SafeWork SA, ReturnToWork SA, and MAQOHSC was lodged to the Office of Data Analytics in May 2020 (reference: B561438) to allow the sharing of unit record data for the purposes of data entry and analysis.

A database was developed by Wellbeing SA, with coding staff and a volunteer university student commencing data entry in June 2020. The creation of coding rules and a data dictionary revealed inconsistencies in the collection and recording of data.

Therefore the data presented in this report are indicative only and should not be considered absolute. The results are based on information at hand, acknowledging that this is an active dataset and follow up of workers health assessments may be ongoing.



Acknowledgements

We acknowledge and respect the traditional custodians of country throughout South Australia and acknowledge the deep feelings of attachment and relationship they have to their ancestral lands.

This report has been prepared by the Prevention and Population Health Directorate, Wellbeing SA (WBSA) on behalf of the Mining and Quarrying Occupation Health and Safety Committee (the Committee).

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The Committee Confidentiality and Disclaimer

The Committee recognises and adheres to the strict Australian Privacy Laws, this includes how health information is collected, used and disclosed. Data was shared in compliance with the Data Sharing Agreement, for the sole purpose of the preparation of this report. Individual workers consent was provided to the Committee for specific purposes relating only to the activities of the health screening program. The data presented in this health outcome report is based on information provided by individual workers at the time of screening, findings are indicative only and should not be considered absolute.



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Acronyms

DLCO – Diffusing capacity of Lung for Carbon Monoxide

HRCT – High Resolution Computed Tomography

MAQOHSC – Mining and Quarrying Occupational Health and Safety Committee

PPE – Personal Protective Equipment

RPE – Respiratory Protective Equipment

SEG – Similar Exposure Groups

TWA – Time weighted average

WES – Workplace Exposure Standard



Executive Summary

The South Australian Government identified a collaborative response was required to address the National issue of artificial stone associated silicosis in engineered stone benchtop workers in South Australia. In January 2019, MAQOHSC initiated a health screening program for engineered stone benchtop workers in South Australia. The screening program was further extended by SafeWork SA to include workers in the construction industry with a likely high exposure to respirable crystalline silica.

The primary aim of the project was to provide baseline health screening measures to selected South Australian engineered stone benchtop and construction workers, to ultimately identify individuals with a probable or possible silicosis diagnosis.

The inclusion criteria for this screening program included any current or previous South Australian worker with an exposure history in the engineered stone bench-top industry, or a worker in selected construction businesses with high exposure to respirable crystalline silica. Recruitment of the sample was achieved through direct (targeted) and indirect (non-targeted) methods.

The sample presented in this baseline screening program is unlikely to represent all South Australians exposed to respirable crystalline silica through the engineered stone bench-top industry, or the construction industry. It should therefore not be considered a comprehensive sample.

Data collection comprised a chest x-ray coded to International Labour Organization classification, a health assessment with an Occupational Physician using a specially developed health screening tool, and where appropriate, a high-resolution computed tomography (HRCT) and review with a Respiratory Physician.

The results were based upon n=295 workers who consented to their data being included in a database and subsequent reports. Around 64% of all workers had been exposed to the cutting or fabrication of engineered stone, and 64% had been exposed to dry cutting processes of any kind. Of those who had ever been exposed to the cutting or fabrication of engineered stone, 73% of them had also been exposed to dry cutting of any kind.

Of those workers who consented for their information to be included in a database, there were n=18 cases of probable, possible or confirmed simple silicosis. Half of those reported being exposed to the cutting or fabrication of engineered stone, and nearly 90% had ever been exposed to dry cutting of any kind. Of the n=16 workers who had ever been exposed to dry cutting of any kind, n=14 provided information about the duration of dry cutting which for 100% of those workers was in excess of 3 years.

The key finding of the health screening program was that no single case of severe or accelerated silicosis was diagnosed.



Introduction

Silicosis is a group of occupational lung diseases caused by the inhalation of respirable crystalline silica. These fine particles, invisible to the naked eye, trigger inflammation and fibrosis in the lungs, leading to progressive, irreversible, and potentially disabling disease [1]. Mineral sources of silica are abundant and include quartz, granite, sandstone, slate and sand. Natural stone such as granite typically contains around 30 per cent silica, however artificial stone (also known as engineered, reconstituted or manufactured stone, and quartz conglomerate) can have silica concentrations of more than 90 per cent [2].

There are three types of silicosis; chronic, accelerated and acute:

- Chronic – the most common form of silicosis, of slower progression often not identified until one or more decades after first exposure.
- Accelerated – rapid onset occurring within a few years of the initial exposure
- Acute – can develop rapidly after the inhalation of high concentrations of silica particles

Chronic and accelerated silicosis are most likely a result from the same disease mechanism, differing only in their latency. Acute silicosis however may result from a different mechanism that being a rapidly progressing disease. All forms of silicosis may progress in the absence of continued exposure, while chronic and accelerated silicosis may appear after exposure ceases [3].

Early stage silicosis may be asymptomatic. Advanced symptoms of the disease may include a cough, breathlessness and tiredness. Currently, there is no known treatment which will arrest the progression of the disease once it becomes symptomatic. Rather, treatment focuses on avoidance of further silica exposure, smoking cessation, and minimising the risk of complications of lung infections which is the major cause of premature death. Some individuals may need oxygen supplementation or a lung transplant [2]. It has been suggested that the rate of change in lung function deterioration for workers with accelerated silicosis is on average, 10 times faster than the normal age-related deterioration [4].

The disease has been described as one of the oldest occupational diseases, when miners and stonecutters were exposed to dust containing the crystalline mineral [5]. More recently, occupations associated with increased risk of silicosis include glass and pottery making, mining and quarrying, sandblasting and any construction trades that generate silica dust through stone or concrete work [6]. Recently, it was estimated that around 6.6% of Australian adult workers were exposed to respirable crystalline silica through their occupation, with 3.7% being exposed at a high level [7].

Silica dust can be made when manufacturing or fabricating engineered stone, as well as cutting, grinding, trimming, removing, blasting or disposing of these products [8]. Workers who use hand tools to cut or grind composite stone (such as circular saws or grinders) can have some of the highest exposure to silica dust. Dry cutting, grinding or polishing engineered stone without water suppression and appropriate ventilation generates high levels of silica dust that far exceed the Workplace Exposure Standard (WES). Currently, the WES for respirable crystalline silica is 0.1mg/m³ on an 8-hr time weighted average (TWA), however these standards are currently being reviewed and may be revised in June 2020 [8].

In Australia, silicosis was more common in the 1940s to 1960s particularly among construction and demolition workers, however a resurgence of the disease is currently being observed. One of the fastest growing occupational groups being diagnosed with silicosis are people who make and install engineered



stone products which have become increasingly popular in Australian households through benchtops and tiles used in kitchens, laundries and bathrooms.

In September 2018, health surveillance of workers cutting and polishing artificial stone benchtops in Queensland found that 12 out of 35 workers from just two businesses had accelerated silicosis [4]. Simultaneously, WorkCover Queensland confirmed another 10 cases from across the state, totalling 22 cases in a matter of weeks. Similar cases have been reported within New South Wales and Victoria since 2015, meaning there are potentially hundreds of similar workers affected across Australia [4]. This trend is not unique to Australia, with outbreaks monitored across Europe, Asia and North America [1, 6, 9].



Background

The South Australian Government identified a collaborative response was required to address the emerging issue of silicosis in engineered stone benchtop workers in South Australia. In January 2019, MAQOHSC, in conjunction with Safe Work SA and Return to Work SA, initiated a health screening program for engineered stone benchtop workers in South Australia. The screening program was further extended to include workers in the construction industry with a likely high exposure to respirable crystalline silica. The findings of this baseline screening are presented in this report.

Project Aims

The primary aim of the project was to provide baseline health screening measures to selected South Australian engineered stone benchtop and construction workers, to ultimately identify individuals with a probable or possible silicosis diagnosis.

Development of the Respirable Crystalline Silica Health Assessment tool

This project required the development of a health screening tool fit for the purpose of identifying adverse health outcomes of workers exposed to respirable crystalline silica. Several sources were used to develop the assessment tool used in this project:

- 2013 Safe Work Australia Health Screening Guideline material [10] (revised in 2019 however not released until after the commencement of the screening program)
- Expert consultation from leading Respiratory and Occupational and Environmental Physicians
- Existing occupational health assessments conducted in the mining and quarrying industries

It was determined that screening should include a summary of work/occupational history, medical history, physical examination and lung function investigation consisting of standardised respiratory function test, and chest x-ray. A copy of the Respirable Crystalline Silica Health Assessment tool for engineered stone workers is provided in Appendix A. The health assessment tool for construction workers differed only in regards to the Similar Exposure Groups (SEG) occupations in section 5. The list of SEG occupations relevant to the construction workers is provided in Appendix B.

It should be noted that upon coding of the unit record data, several versions of the health assessment were identified, indicating the assessment form may have been refined or adapted throughout the screening period.



Methodology

Sample selection

The inclusion criteria for this screening program included any current or previous South Australian worker with an exposure history in the engineered stone bench-top industry, or a worker in selected construction businesses with high exposure to respirable crystalline silica. Recruitment of the sample was achieved through direct (targeted) and indirect (non-targeted) methods.

Safe Work SA identified businesses who were the primary fabricators and installers of engineered stone in South Australia, as well as businesses in the construction industry likely to have high exposure to respirable crystalline silica. Selection of these businesses were in unison with a Respirable Crystalline Silica Compliance Program undertaken by Safe Work SA in 2019 whereby businesses were issued with Improvement Notices for the provision of health monitoring for workers [11].

A total of 26 businesses who fabricate and install engineered stone benchtops were identified and entered into the screening program. A further 10 construction businesses who cut, grind and shape concrete and likely to have higher levels of exposure to respirable crystalline silica due to the close proximity of hand tools were identified and entered into the screening program.

MAQOHSC engaged and consulted with workplaces to provide information about the screening program. Businesses were asked to nominate all workers with exposure to respirable crystalline silica (include previous employees from within the past 5-years).

It should be noted that individuals may have been nominated by several businesses in the case of contractors, or individuals moving companies within the previous 5-years. Nomination did not necessarily lead to participation in the screening program, as individuals may have elected not to participate, or their contact details were invalid (in the case of previous employees no longer affiliated with the business).

Recruitment of individual participants also occurred through attendance at information sessions hosted by SafeWork SA and through MAQOHSC metro and regional media advertisements, newsletters and other communications.

Written consent was sought from all participants which included the option to share their results with their doctor, a respiratory physician, Return to Work SA, their employer, a National Silica Disease register, a South Australian disease register, and entered onto a MAQOHSC database for further research or associated report.

Limitations of sample selection

The sample presented in this baseline screening program does not likely represent all South Australians exposed to respirable crystalline silica through the engineered stone bench-top industry, or the construction industry. It should therefore not be considered a comprehensive sample.

The targeted engineered stone bench-top (n=26) and construction businesses (n=9), while being inclusive of the major operators, do not represent a definitive list of all businesses with exposure to respirable crystalline silica. Furthermore, due to the reliance on these businesses to self-identify workers who may be/have been exposed to respirable crystalline silica, it must not be assumed that the nominated workers are a complete list of all workers who have been exposed.



Data collection

The data collection period for baseline screening was 1 March 2019 to 16 August 2019. The health screening comprised four stages described below.

Stage 1 – Chest x-rays

Full postero-anterior chest x-rays were taken and coded according to current International Labour Organization classifications [12], including technical quality and small opacities. A normal reading indicated an absence of small opacities.

Stage 2 – Health Assessment with Occupational Physician

Each participant had a 1:1 consultation with a Category 7 Occupational Physician to complete the health assessment tool (Appendix 1). Data collected included:

- Worker profile including contact details, demographics and current workplace
- Worker occupational history, inclusive of the past 20-30 years where possible
- Workplace questionnaire focusing on any previous Workplace Health Assessments and use of Personal Protective Equipment (PPE)
- Similar Exposure Group Occupations whereby participants were asked to identify what roles they engaged in within their employment
- Medical questionnaire comprising of personal medical history, respiratory questionnaire, K10 Psychological Distress Scale
- Exposure questionnaire focusing on the level of dust exposure in the workplace, and what dust controls are in use
- Health examination including accredited spirometry testing, cardiovascular, respiratory and skin examinations

The health assessment took approximately one hour to complete.

Stage 3 – Occupational Physician Case Review

A Category 7 Occupational Physician was then responsible for reviewing each individual case using the x-ray and health assessment results to determine if further assessment was required.

A determination was made for each worker as to whether they required further assessment in the form of a high-resolution computed tomography (HRCT). The Occupational Physician consulted with a Respiratory Physician as required prior to making one of two final recommendations:

- No additional testing required. Continue routine health surveillance of worker
- Refer worker to a Respiratory Physician for further assessment.

Stage 4 – Respiratory Physician Review (as required)

If it were deemed necessary that an individual required further assessment, a Respiratory Physician would review the individual's work history, x-ray and health assessment results, HRCT and case notes from the Occupational Physician before conducting secondary spirometry testing and ordering a lung function test (DLCO - diffusing capacity of lung for carbon monoxide). The Respiratory Physician was then able to make a diagnosis of silicosis where appropriate, including further examination as required.



Database development and coding

The Silicosis Register Version 1.0.0.18 (the database) is a bespoke C# Winforms database, back ended with a sequel 2016 server, developed by Wellbeing SA. Selected variables of interest were identified to be included in the database and a data dictionary was developed to determine coding rules. Data fields were categorised into the following subheadings:

- Worker details
- Worker authorisation (consent)
- Spirometry
- Employment history
- Similar Exposure Group
- Health and Wellbeing (smoking status, height and weight)
- K10 Psychological Distress scale
- Level of dust exposure and dust controls in current work environment
- RPE & PPE use
- Exposure to engineered stone
- Exposure to dry cutting
- Occupational silica exposure
- Summary Occupational Physician notes
- Diagnosis of respiratory condition (including silicosis)

Coding was undertaken over a 4-week period. Data cleaning was conducted by two senior Wellbeing SA staff. The creation of coding rules and a data dictionary revealed inconsistencies in the collection and recording of data. Coding was not completed on the basis of the JobFit Medical Report alone, but required review of all individual case notes. Many data were missing and in some cases illegible (hand written notes).

Therefore the data presented in this report are indicative only and should not be considered absolute. The results are based on information at hand, acknowledging that this is an active dataset and follow up of workers health assessments may be ongoing.

Data analysis

Data preparation and analysis were completed using Excel 2010 and SPSS 24 software. The data presented in this report are descriptive. Proportions are presented in tables along with the 95% confidence interval. A confidence interval is a range in which it is estimated that the true population lies. Means are presented where appropriate. All data are presented in a way that does not allow any individual's answers to be identified.



Results

A total of n=326 workers agreed to participate in the screening program, the majority of which had been exposed to engineered stone. The number of workplaces screened represent the n=26 engineered stone bench-top and n=10 construction businesses identified by SafeWork SA during recruitment, combined with the businesses of individuals who nominated themselves. A total of n=36 workers did not participate in the health assessment either through refusal, or they were uncontactable.

A total of n=295 workers consented to having their results entered to a database and used in MAQOHSC associated reports. There were n=26 workers who did not provide consent, and n=5 where consent was unable to be determined, and therefore are not included in the data below.

All workers completed the first stage of testing by having an ILO chest x-ray performed. It is believed one worker provided a recent ILO compliant chest x-ray however this cannot be confirmed from the data available. This particular worker completed all other aspects of the health screening process which included further assessment through a HRCT, and subsequent referral to a Respiratory Physician.

A total of n=177 workers had a HRCT. In most cases, this was recommended by the Occupational Physician, however there were n=7 workers who had a recent HRCT report from a previous referral which was provided for assessment. There was n=1 worker who requested a HRCT be performed, although not considered necessary by the Occupational Physician considering their exposure history. Despite being referred for a HRCT, there was n=1 worker who did not want to proceed with testing.

A total of n=62 workers were referred to a Respiratory Physician for further assessment. A multidisciplinary HRCT review of n=2 cases was undertaken by the Occupational Physician and Respiratory Physician, however these did not result in the worker requiring an appointment. A total of n=51 workers had an appointment with a Respiratory Physician, and these clinical notes have been included in the medical report indicating a diagnosis where appropriate. There were n=9 workers where the medical report stated the HRCT results required specialist referral, and that a referral letter was provided to the worker, however attendance is unknown.

It is important to note this report is based on all available information provided to Wellbeing SA at the time when the Data Sharing Agreement was enacted. It is recognised this is a live dataset and referrals and follow-up appointments may have been made, but not recorded on the medical reports used to enter data to the database.



A description of all workers

The majority of workers in the screening program were male (94%). The average age of all workers was nearly 39 years, ranging from 17 to 70 years (Table 1).

Table 1 – Age and sex of health screening participants (n=295)

	n	Mean age	SD	Range
All	295	38.8	12.05	17.0 - 70.0
Male	276	38.5	11.98	17.0 - 70.0
Female	19	43.2	12.55	19.0 - 65.0

Workers were asked information about their current and previous employers. The mean length of employment (with their current employer) was 5.5 years, ranging from <1 year to 48 years. Two participants in the screening program were retired.

The health and wellbeing of workers is summarised in Table 2. Nearly one third of workers were current smokers, with around 46% reporting they had no history of smoking. Smoking may include cigarette/tobacco, pipes, cigars, vaping, or other types such as cannabis. Around 12% reported having psychological distress, defined as high or very high on the Kessler 10 scale. Just over one quarter of workers reported coughing or spitting up dust in their phlegm during or after a shift, 41% reported dust blocking their nose in their nasal mucous, and nearly 70% reported having dust on their face at the end of a shift.

Table 2 – Health and wellbeing of health screening participants (n=295)

	n	%	95% CI
Smoking status*			
Never smoked	135	45.8	40.1 - 51.5
Current smoker	96	32.5	27.4 - 38.0
Ex-smoker	64	21.7	17.3 - 26.7
Psychological distress**			
Yes	36	12.3	8.9 - 16.4
No	257	87.7	83.6 - 91.1
Coughing or spitting up dust in phlegm during or after a shift			
Yes	77	26.1	21.4 - 31.4
No	202	68.5	63.0 - 73.5
Not stated	16	5.4	3.4 - 8.6
Dust blocking nose in nasal mucous during or after a shift			
Yes	121	41.0	35.6 - 46.7
No	158	53.6	47.9 - 59.2
Not stated	16	5.4	3.4 - 8.6
Dust on face after a shift			
Yes	201	68.1	62.6 - 73.2
No	77	26.1	21.4 - 31.4
Not stated	17	5.8	3.6 - 9.0

*smoking includes cigarette/tobacco, pipe, cigar, vaping, other **n=2 not complete



The standard exposure groups (SEGs) of all workers are reported in Table 3. Workers were able to select more than one exposure group. The most common SEGs were general labourer (44.7%), installer (35.9%) and polisher/finisher (35.3%).

Table 3 – Similar Exposure Groups (SEGs) of health screening participants (n=295)

	n	%	95% CI
General Labourer	132	44.7	39.1 - 50.4
Installer	106	35.9	30.7 – 41.6
Polisher/finisher	104	35.3	30.0 - 40.8
Benchtop Fabricator	95	32.2	27.1 - 37.7
Shaper	87	29.5	24.5 - 34.9
Saw Operator	83	28.1	23.2 - 33.5
Production Labourer	80	27.1	22.3 - 32.4
Supervision/team leader	78	26.4	21.7 - 31.7
Cleaning/housekeeping	68	23.1	18.5 - 28.1
Hand tools	68	23.1	18.5 - 28.1
CNC operator	65	22.0	17.6 - 27.0
Template maker	63	21.4	17.0 - 26.3
Concrete grinder	50	16.9	13.0 - 21.5
Patcher	41	13.9	10.3 - 18.2
Maintenance personnel	40	13.6	10.0 - 17.8
Concrete polisher/finisher	32	10.8	7.7 - 14.8
Form workers	26	8.8	6.0 - 12.5
PCBU Manager	24	8.1	5.4 - 11.7

Multiple responses allowed Note: Some workers selected 'other' which generally referred to Administration roles and are not included in this table. n=7 workers left the form blank



Dust controls in the CURRENT workplace

The data presented below are the workers responses to workplace dust levels, RPE, PPE and any dust controls currently used in the workplace. Some of this information was collected about previous workplaces; however this was inconsistent or missing for many workers, and therefore is not included in this report.

Workers were asked in the Exposure Questionnaire about the levels of dust in the current workplace pertaining to the shed, onsite install, office, and other areas (not presented in Table 4). The amount of time per day the worker spent in these areas was also collected but was inconsistent and missing for many workers and therefore not presented in the table below. Blank or missing responses are not included in the totals.

Of those respondents who reported spending time in a shed environment, the majority (58%) indicated there was a light level of dust. Of those who reported being in an onsite install environment, nearly half (49%) indicated the levels of dust were light. Of those who reported being in an office environment, nearly 70% indicated there was no dust present.

Table 4 – Levels of dust in the CURRENT work environment

	None		Light		Moderate		Heavy	
	n	%	n	%	n	%	n	%
Shed (n=210)	40	19.0	122	58.1	44	21.0	4	1.9
Onsite install (n=177)	26	14.7	87	49.2	52	29.4	12	6.8
Office (n=130)	89	68.5	36	27.7	4	3.1	1	0.8

Workers were asked what type of respirator they currently use in their workplace and the results are presented in Table 5. It must be acknowledged this data is in relation to current workplace practices reported at the time of the health screening, and does not capture workers who may have historically used lesser forms of RPE, PPE or none at all. The most common type of RPE or PPE was a half-face respirator (46%). Nearly one quarter of respondents did not currently use any type of RPE or PPE.

Table 5 – Type of RPE or PPE currently used by workers (n=284)

	n	%	95% CI
Paper/disposable	88	31.0	25.8 - 36.5
Half-face	131	46.1	40.4 - 51.9
Full face	17	6.0	3.7 - 9.2
Half face powered air	4	1.4	0.5 - 3.3
Full face powered air	12	4.2	2.3 - 7.0
None	66	23.2	18.6 - 28.4

Note: multiple responses allowed. data not provided for n=11 workers

Additional information regarding RPE and PPE such as the type of filter, if the worker was clean shaven or if masks were fit tested were not collected.



Workers were asked to report the frequency of dust exposure controls used in their current workplace (Table 6). The most commonly reported type of dust control that workers said was used 100% of the time was wet cut processing (46%), wet cleaning of the workplace (36%) and respirator use (31%). The most commonly reported type of dust control that workers reported never happening were having their workwear laundered by their employer (83%), a clean shaven policy (72%), showering or changing clothing at the end of a shift (69%), and wearing overalls/coveralls (61%).

Table 6 – Frequency of dust controls in the current workplace (n=295)

	0% Never		25% Rarely		50% Sometimes		75% Often		100% Always		Not stated	
	n	%	n	%	n	%	n	%	n	%	n	%
Local exhaust ventilation	121	41.0	25	8.5	27	9.2	36	12.2	55	18.6	31	10.5
Overalls/ coverall	181	61.4	23	7.8	14	4.7	14	4.7	33	11.2	30	10.2
Wet cut processing	43	14.6	14	4.7	33	11.2	43	14.6	136	46.1	26	8.8
Wet cleaning of workplace	60	20.3	25	8.5	41	13.9	34	11.5	105	35.6	30	10.2
Shower clothing change at end of shift	204	69.2	21	7.1	8	2.7	5	1.7	29	9.8	28	9.5
Workwear laundered by employer	244	82.7	2	0.7	4	1.4	2	0.7	16	5.4	27	9.2
Clean shaven policy	211	71.5	16	5.4	8	2.7	6	2.0	23	7.8	31	10.5
Respirator Use	40	13.6	28	9.5	52	17.6	58	19.7	90	30.5	27	9.2



Occupational dust exposure

Through a supplementary questionnaire, the Occupational Physician was able to determine if a worker had ever been exposed to the cutting or fabrication of engineered stone, and dry cutting processes. The data are presented in Table 7.

Exposure to the cutting or fabrication of engineered stone relates to any exposure either in the current workplace, or previous workplace/s. It is also only relevant to those workers who were directly related to these processes, and therefore does not include office workers for example who would have never handled engineered stone. Dry cutting exposure is related to any exposure either in the current workplace, or previous workplace/s. It includes dry cutting processes of any material including engineered stone and natural stone.

Around 64% of workers reported being ever exposed to the cutting or fabrication of engineered stone, and 64% had also been exposed to dry cutting processes. Of those workers who had ever been exposed to the cutting or fabrication of engineered stone (n=188), n=137 (73%) of them had also been exposed to dry cutting of any kind.

Table 7 – Exposure to engineered stone and dry cutting

	n	%	95% CI
Ever been exposed to the cutting or fabrication of engineered stone (n=294)			
Yes	188	63.9	58.3 - 69.3
No	106	36.1	30.7 - 41.7
Ever been exposed to dry cutting of any kind (n=295)			
Yes	190	64.4	58.8 - 69.7
No	105	35.6	30.3 - 41.2



Possible, probable or confirmed cases of simple silicosis

There were no cases of accelerated silicosis identified through the screening program.

Of those workers who consented for their information to be included in a database, there were n=18 cases of probable, possible or confirmed simple silicosis. A summary of these workers is provided below:

- All were male
- They had a mean age of 44.5 ± 11.8 years, compared to the overall sample mean age of 38.8 years. The ages ranged from 22 to 70 years
- n=1 reported having psychological distress
- n=5 were current smokers (28% compared with 33% of all workers)
- n=8 were ex-smokers (44% compared with 22% of all workers)
- n=5 had never smoked (28% compared with 46% of all workers)
- One worker retired 3 years ago
- n=8 (44%) reported coughing or spitting up dust in phlegm during or after a shift
- n=16 (89%) reported dust blocking the nose in nasal mucous during or after a shift, which was significantly higher than all workers combined (41%)
- n=18 (100%) reported dust on their face after a shift which was significantly higher than all workers combined (68%)

A higher proportion of workers with possible, probable and confirmed simple silicosis identified being associated with the majority of SEGs compared with all workers (Table 9). This was to a level of significance for the following groups:

- Polisher/finisher (67% compared with 35%)
- Shaper (61% compared with 30%)
- Saw operator (56% compared with 28%)
- Production labourer (56% compared with 27%)

Table 9 compared the types of RPE or PPE used in the current work environment of those with possible, probable and confirmed simple silicosis with all workers participating in the health screening program. While there were no significant differences between groups, there were n=3 workers with possible, probable or confirmed simple silicosis who were currently not using any RPE or PPE in their workplace.



Table 8 – Similar Exposure Groups (SEGs) of those with probable, possible and confirmed silicosis compared with all health screening participants

	Silicosis [^] n=18			All workers n=295		
	n	%	95% CI	n	%	95% CI
General Labourer	10	55.6	33.7 - 75.4	132	44.7	39.1 - 50.4
Installer	11	61.1	38.6 - 79.7	106	35.9	30.7 - 41.6
Polisher/finisher	12	66.7	43.7 - 83.7	104	35.3	30.0 - 40.8
Benchtop Fabricator	9	50.0	29.0 - 71.0	95	32.2	27.1 - 37.7
Shaper	11	61.1	38.6 - 79.7	87	29.5	24.5 - 34.9
Saw Operator	10	55.6	33.7 - 75.4	83	28.1	23.2 - 33.5
Production Labourer	10	55.6	33.7 - 75.4	80	27.1	22.3 - 32.4
Supervision/team leader	7	38.9	20.3 - 61.4	78	26.4	21.7 - 31.7
Cleaning/housekeeping	7	38.9	20.3 - 61.4	68	23.1	18.5 - 28.1
Hand tools	7	38.9	20.3 - 61.4	68	23.1	18.5 - 28.1
CNC operator	7	38.9	20.3 - 61.4	65	22.0	17.6 - 27.0
Template maker	4	22.2	9.0 - 45.2	63	21.4	17.0 - 26.3
Concrete grinder	3	16.7	5.8 - 39.2	50	16.9	13.0 - 21.5
Patcher	3	16.7	5.8 - 39.2	41	13.9	10.3 - 18.2
Maintenance personnel	4	22.2	9.0 - 45.2	40	13.6	10.0 - 17.8
Concrete polisher/finisher	3	16.7	5.8 - 39.2	32	10.8	7.7 - 14.8
Form workers	1	5.6	1.0 - 25.8	26	8.8	6.0 - 12.5
PCBU Manager	2	11.1	3.1 - 32.8	24	8.1	5.4 - 11.7

[^]possible, probable and confirmed simple silicosis. Multiple responses allowed

Note: Some workers selected 'other' which generally referred to Administration roles and are not included in this table.

Table 9 – Type of PPE currently used by those with probable, possible and confirmed silicosis compared with all health screening participants

	Silicosis ^{^*} n=17			All workers ^{**} n=284		
	n	%	95% CI	n	%	95% CI
Paper/disposable	8	47.1	26.2 - 69.0	88	31.0	25.8 - 36.5
Half-face	6	35.3	17.3 - 58.7	131	46.1	40.4 - 51.9
Full face	1	5.9	1.0 - 27.0	17	6.0	3.7 - 9.2
Half face powered air	0	0.0	0.0 - 0.0	4	1.4	0.5 - 3.3
Full face powered air	1	5.9	1.0 - 27.0	12	4.2	2.3 - 7.0
None	3	17.6	6.2 - 41.0	66	23.2	18.6 - 28.4

[^]possible, probable and confirmed simple silicosis *n=1 retired worker not included **n=11 not provided

Note: multiple responses allowed



Half of the workers with possible, probable or confirmed simple silicosis reporting being exposed to the cutting or fabrication of engineered stone, and nearly 90% had ever been exposed to dry cutting of any kind. All workers with exposure to the cutting or fabrication on engineered stone (n=9) had also been exposed to dry cutting of any kind.

Of the n=16 workers who had ever been exposed to dry cutting of any kind, n=14 provided information about the duration of dry cutting which for 100% of those workers was in excess of 3 years.

Table 10 – Ever been exposed to the cutting or fabrication of engineered stone

	Silicosis [^] n=18			All workers n=294		
	n	%	95% CI	n	%	95% CI
Yes	9	50.0	29.0 – 71.0	188	63.9	58.3 - 69.3
No	9	50.0	29.0 – 71.0	106	36.1	30.7 - 41.7

[^]possible, probable and confirmed simple silicosis

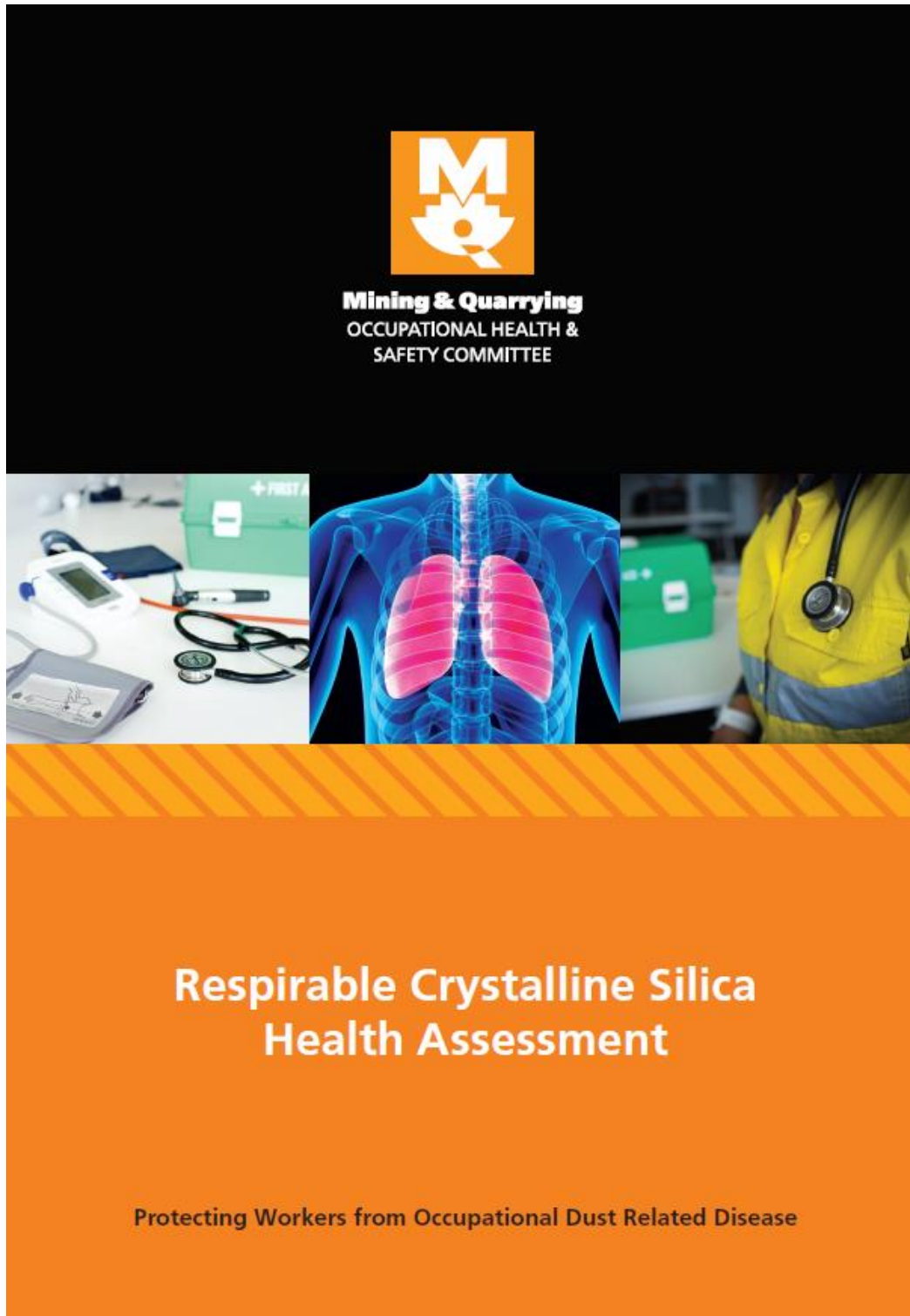
Table 11 – Ever been exposed to dry cutting of any kind (n=295)

	Silicosis [^] n=18			All workers n=295		
	n	%	95% CI	n	%	95% CI
Yes	16	88.9	67.2 – 96.9	190	64.4	58.8 - 69.7
No	2	11.1	3.1 – 32.8	105	35.6	30.3 - 41.2

[^]possible, probable and confirmed simple silicosis



Appendix 1 - Health Assessment Tool



1. WORKERS EMPLOYMENT PROFILE

Worker Given Name:	Worker Family Name:
Home Address:	
Suburb:	Postcode:
Daytime Phone:	Mobile:
Email Address:	
Date of Birth: DD/MM/YYYY	Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female
Company:	Site Location:
Position:	Shift Start: <input type="checkbox"/> AM <input type="checkbox"/> PM Shift Finish: <input type="checkbox"/> AM <input type="checkbox"/> PM
How long have you been with their employment?	
How would you like to receive correspondence? <input type="checkbox"/> Text <input type="checkbox"/> Email <input type="checkbox"/> Phone <input type="checkbox"/> Post	
Name of General Practitioner:	Phone Number of General Practitioner:
Address of General Practitioner:	

2. AUTHORISATION

I Authorise:

	Yes	No
This RCS health assessment to be performed.	<input type="checkbox"/>	<input type="checkbox"/>
My results sent to my doctor (name and address above)	<input type="checkbox"/>	<input type="checkbox"/>
My results sent to a Respiratory Physician	<input type="checkbox"/>	<input type="checkbox"/>
My results released to Return to Work SA for Workcover claim purposes	<input type="checkbox"/>	<input type="checkbox"/>
My results provided to my employer	<input type="checkbox"/>	<input type="checkbox"/>
My record entered on a National Silica Disease Register	<input type="checkbox"/>	<input type="checkbox"/>
My results being used for MAQOHSC research and or MAQOHSC associated reports.	<input type="checkbox"/>	<input type="checkbox"/>
My results entered on a South Australian Disease Register	<input type="checkbox"/>	<input type="checkbox"/>
My results entered on to a MAQOHSC Data Base	<input type="checkbox"/>	<input type="checkbox"/>

Signature: _____ Date: _____

Medical Practitioner Signature: _____ Date: _____



1. WORKPLACE QUESTIONNAIRE

Is regular personal Workplace Health Assessments conducted by your workplace?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
How frequently are Health Assessments conducted?	<input type="checkbox"/> 1-2 yrs	<input type="checkbox"/> 3-4 yrs	<input type="checkbox"/> 5-6 yrs	Other: <input style="width: 50px;" type="text"/>
Does your workplace book your health assessment with the medical practitioner?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Have you ever been referred for a chest xray as part of a Workplace Health Assessment?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
If yes to above question, when?				
When was your last full medical assessment?	Date:	<input style="width: 100px;" type="text" value="DD/MM/YYYY"/>		
Are you provided a full report from the medical practitioner for each assessment?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Did you bring a copy of that with you today?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
If no, is there a reason why you did not bring the medical report?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
If no, medical release approval?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Has your workplace undertaken personal respirable dust monitoring? <i>(measuring exposure to Dust with a device that you have carried for a specified time)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Did the above monitoring identify Respirable Crystalline Silica?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Have you ever been required to wear personal dust monitoring equipment?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Was your workplace provided with the results of the dust monitoring?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		

Did you fully understand your results?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Were the findings discussed at your workplace?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Did your workplace provide respiratory PPE training as a result of the dust monitoring result?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Did your workplace review and or revise a job safety assessment and procedure as a result of dust monitoring results?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have you ever been referred to a medical practitioner based on any workplace dust monitoring results?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Has your workplace conducted fit testing of Respiratory Protection equipment? <i>(testing the seal for leakage)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Have you been fit tested?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Comments:



5. SIMILAR EXPOSURE GROUP OCCUPATIONS

Reconstituted stone has been identified as containing over 90 percent silica and is created through a blend of quartz with a specialized compound to create non-porous durable engineered products for a range of residential and commercial uses. The below SEG list aims to identify high risk workers exposed to respirable crystalline silica in the man-made, engineered and reconstituted stone industry.

SEG Titles	SEG Description
<input type="checkbox"/> Template Maker	Liaises with customers, production and factory staff, measures in residences and onsite for product requirements, examines plans, lays out, marks and prepares surfaces or product according to required order specification. Undertakes housekeeping in and around operating and production areas.
<input type="checkbox"/> Saw Operator	Sets up and operates power saws to cut, slot, groove, mitre and trim work pieces according to plans and specifications. Undertakes housekeeping in and around operating and production areas.
<input type="checkbox"/> CNC Operator	Controls CNC machine used for precise drilling, cutting of solid reconstituted product and associated products such as 12mm – 25mm product overlay. Feeds product to the machine, changes cutting inserts, checks production quality, cleans and lubricates the machine. Undertakes housekeeping in and around CNC machine and production areas.
<input type="checkbox"/> PCBU Manager	Responsible to ensure that all workplace business and safety systems are implemented within all operations. Monitors workplace, delegates and coordinates all areas of production. Development/training for workplace and all workers.
<input type="checkbox"/> Polisher/Finisher	Operates polish/profiling machines. Cut and polish sink holes to template requirements. Associated production can include the use of portable tools, power tools, air tools, hand tools, and various types of duties for product fabrication. Undertakes housekeeping in and around operating and production areas.
<input type="checkbox"/> Shaper	Grind and polish edges to required product specifications, associated task can include the use of portable tools, power tools, air tools, hand tools, and various types of duties for product fabrication. Undertakes housekeeping in and around operating and production areas.
<input type="checkbox"/> Maintenance Personnel	Directs or is responsible to complete maintenance worker or group of maintenance workers on maintenance activities associated with machinery such as CNC, cutting saws, portable tools, power tools, air tools, hand tools and various types of fabrication machinery. Undertakes housekeeping in and around operating and production areas.
<input type="checkbox"/> Production Labourer	Assists with all areas of production and onsite installation as required. Associated task can include operating saws, filling small chips and performing touch up this can include the use of portable tools, power tools, air tools, hand tools and various types of duties for product fabrication. Undertakes housekeeping in and around operating and production areas
<input type="checkbox"/> Benchtop Fabricator	Cut, glue shape and polish reconstituted stone products. Using a range of equipment including the use of portable tools, power tools, air tools, hand tools and various types of fabrication machinery. Undertakes housekeeping in and around operating and production areas



<input type="checkbox"/> Installer	Preparing wall, vanity and bench tops and floor surfaces, filling holes and cracks, and cleaning, resurfacing and polishing and sealing marble, granite and other stone surfaces. Undertakes housekeeping in and around operating and production and installation areas.
<input type="checkbox"/> General Labourer	Assists with all areas of production and onsite installation as required. Associated task can include operation saws, filling small hips and performing touch ups this can include the use of portable tools power tools, air tools, hand tools, and barous types of duties for product fabrication. Undertakes housekeeping in and around operating and production areas.
<input type="checkbox"/> Supervisor/Team Leader	Oversees day to day operations, monitors workplace, delegates and coordinates all areas of production, Development/training for workplace and team coordinates and monitors housekeeping in and around all operating and production areas
<input type="checkbox"/> Hand Tools	
<input type="checkbox"/> Cleaning/Housekeeping	
<input type="checkbox"/> Other	



6. MEDICAL QUESTIONNAIRE

Personal Medical Questionnaire

	Question	Please tick	Assessor's comments (all yes answers)
1	Have you been treated by a doctor for any illness?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Have you taken any regular medication?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Do you suffer from or have you ever suffered from:			
3	Lung problems – including bronchitis, pneumonia, Pleurisy, asthma, pulmonary tuberculosis	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Heart problems	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Shortness of breath or chest pain on exertion?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Other chest problems?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Skin or eye irritation at work?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Allergies / Hayfever?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	Do you now smoke or have you ever smoked?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	If yes, when did you start?		
11	When did you stop?		
12	What did/do you smoke?		
13	How many/how much per day did you smoke?		



Respiratory Questionnaire

Cough:

	Question	Please tick	Assessor's comments (all yes answers)
1	Do you cough on most days?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Do you usually cough first thing in the morning in winter?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Do you usually cough during the day or at night in the winter?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	If yes to question 2 or 3, do you cough like this on most days for as much as three months each year?	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Phlegm:

	Question	Please tick	Assessor's comments (all yes answers)
5	Do you usually bring up phlegm from your chest first thing in the morning in winter?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Do you usually bring up any phlegm from your chest during the day or at night in winter?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	If yes to question 5 or 6, do you bring up phlegm like this on most days for as much as 3 months each year	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Periods of Cough and Phlegm:

	Question	Please tick	Assessor's comments (all yes answers)
8	In the past 3 years have you had a period of increased cough or phlegm lasting for 3 weeks or more?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	If yes, have you had more than one such period?	<input type="checkbox"/> Yes <input type="checkbox"/> No	



Breathlessness:

	Question	Please tick	Assessor's comments (all yes answers)
10	Are you troubled by shortness of breath when hurrying on level ground or walking up a slight hill?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	If yes, do you get shortness of breath walking with other people around your own age on level ground?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	If yes, do you have to stop for breath when walking at your own pace on level ground?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13	Do you experience shortness of breath during sporting activities?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14	Do you experience shortness of breath during family activities?	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Wheezing:

	Question	Please tick	Assessor's comments (all yes answers)
15	Have you had attacks of wheezing or whistling in your chest at any time in the last 12 months?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16	Have you ever had attacks of shortness of breath with wheezing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
17	If yes, is/was your breathing absolutely normal between attacks?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
18	Have you at any time in the last 12 months been woken at night by an attack of shortness of breath?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
19	If yes, please indicate – a few times per year or a few times per month?	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Chest Illnesses:

	Question	Please tick	Assessor's comments (all yes answers)
20	During the past 3 years have you had any chest illness which has kept you from your usual activities for as much as a week?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
21	If yes, did you bring up more phlegm than usual in any of these illnesses?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
22	If yes, have you had more than one illness like this in the past 3 years?	<input type="checkbox"/> Yes <input type="checkbox"/> No	



Other:

	Question	Please tick	Assessor's comments (all yes answers)
23	Are you currently suffering from any cold and flu symptoms?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
24	Have you ever suffered from hayfever, hives or Childhood eczema?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
25	If yes to question 22, please tick correct answer: <input type="checkbox"/> Past history or mild current symptoms <input type="checkbox"/> Current severe symptoms		
26	Have your parents or siblings ever had asthma?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
27	Have you ever used an inhaler, puffer or medication?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
28	Has a doctor ever told you that you had asthma? If yes, then please tick which answer is the closest: <input type="checkbox"/> No <input type="checkbox"/> Yes but recovered before 15 years of age <input type="checkbox"/> Yes but recovered after 15 years of age <input type="checkbox"/> Yes and have had symptoms in the past 2 years		
29	Have you ever suffered from occupational asthma whilst working in the mining and or quarrying industry? If yes, then please tick which answer is the closest: <input type="checkbox"/> No <input type="checkbox"/> Yes but recovered 3 months after treatment <input type="checkbox"/> Yes but recovered after 3-6 months of treatment <input type="checkbox"/> Yes but recovered after more than 6 months of treatment <input type="checkbox"/> Still have symptoms		
30	Do you have any other chest or breathing problems? If yes, then please tick which answer is the closest: <input type="checkbox"/> No <input type="checkbox"/> In the past <input type="checkbox"/> Currently		



Health and Wellbeing Questionnaire

For all questions, please tick the appropriate response:

	In the past 4 weeks:	None of the time	A little of the time	Some of the time	Most of the time	All of the time
1	About how often did you feel tired out for no good reason?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	About how often did you feel nervous?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	About how often did you feel so nervous that nothing could calm you down?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	About how often did you feel hopeless?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	About how often did you feel restless or fidgety?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	About how often did you feel so restless you could not sit still?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	About how often did you feel depressed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	About how often did you feel like everything is an effort?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	About how often did you feel so sad that nothing could cheer you up?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	About how often did you feel worthless?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Exposure Questionnaire

1. What level of dust is in your CURRENT work environment?:

Duties	Time per day	Dust Level
Shed		<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy
Onsite install		<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy
Office		<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy
Other (specify):		<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy

2. What percentage of your CURRENT work involves the use of Engineered Stone Products?

3. What sort of respirator do you CURRENTLY use?

Paper/disposable Half-face Full-face Half-face Powered Air Full-face Powered Air None

4. How often are the following dust controls used in your CURRENT workplace?

PPE Type	Usage				
	Never (0%)	Rarely (25%)	Sometimes (50%)	Often (75%)	Always (100%)
Local Exhaust Extraction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overalls/Coveralls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wet cut/Processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wet cleaning of workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shower/clothing change at end of shift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workwear laundered by employer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean shaven policy enforced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Respirator use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



5. Have you ever noticed?

Coughing or spitting up dust in your phlegm during or after a shift?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Dust blocking your nose or in your nasal mucous during or after a shift?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Dust on your face and clothing when you went home?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Examiner Comments

6. How would you describe the levels of dust in your PREVIOUS work environments?

For example: Heavy: Shed labourer, 6 months, dust mask used 30% of the time.

Dust Level				Role	Time In Role	PPE Used
None	Light	Moderate	Heavy			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

7. Please describe any dusty hobbies or exposure you have outside of work

For example, woodworking, pottery, DIY renovation

Examiner Comments



Medical history

1. Please cross if you have ever experienced:

- | | | | |
|-----------------------------------------|-------------------------------------|--------------------------------------------|------------------------------------------------|
| <input type="checkbox"/> Heart problems | <input type="checkbox"/> Rashes | <input type="checkbox"/> Asthma | <input type="checkbox"/> Gut upset or bleeding |
| <input type="checkbox"/> Anxiety | <input type="checkbox"/> Depression | <input type="checkbox"/> Swollen joints | <input type="checkbox"/> Lung problems |
| <input type="checkbox"/> Arthritis | <input type="checkbox"/> Other | <input style="width: 400px;" type="text"/> | |

2. What medications and supplements do you take on a regular basis? (please list all)

3. Do you have any allergies? (please list all)

Examiner Comments

Examiner details or stamp

Examiner signature:



7. HEALTH ASSESSMENT EXAMINATION

Spirometry Results

	Observed	Lower Limit of Normal (LLN)	Predicted	<
FEV 1 (litres)	(a)		(d)	(g)
FVC (litres)	(b)		(e)	(h)
FEV1 / FVC (%)	(c)		(f)	

(i) Is FVC<LLN	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(j) Is FEV1<LLN	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(k) Is FEV1/FVC<LLN	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(l) Overall Spirometry result	<input type="checkbox"/> Normal	<input type="checkbox"/> Abnormal

Cardiovascular

SystolicBP DiastolicBP Pulse

Heart Rhythm	<input type="checkbox"/> Normal	<input type="checkbox"/> AF	Ectopics	<input type="checkbox"/> Occ	<input type="checkbox"/> Freq
Heart Sounds	<input type="checkbox"/> Normal	<input type="checkbox"/> Abnormal			
Pacemaker	<input type="checkbox"/> Yes	<input type="checkbox"/> No			

Respiratory

Chest expansion	<input type="checkbox"/> Normal	<input type="checkbox"/> Reduced (<5cm)				
Air Entry:						
Upper Zones	<input type="checkbox"/> Normal	<input type="checkbox"/> Reduced				
Lower Zones	<input type="checkbox"/> Normal	<input type="checkbox"/> Reduced				
Added Sounds	<input type="checkbox"/> Nil	<input type="checkbox"/> Widespread	<input type="checkbox"/> Crackles	<input type="checkbox"/> Rub	<input type="checkbox"/> Basal Crackles	<input type="checkbox"/> Wheezes



Skin

Eczema/Dermatitis	<input type="checkbox"/> Nil	<input type="checkbox"/> Mild	<input type="checkbox"/> Moderate	<input type="checkbox"/> Severe
Psoriasis	<input type="checkbox"/> Nil	<input type="checkbox"/> Mild	<input type="checkbox"/> Moderate	<input type="checkbox"/> Severe
Tinea	<input type="checkbox"/> Nil	<input type="checkbox"/> Mild	<input type="checkbox"/> Moderate	<input type="checkbox"/> Severe
Solar damage	<input type="checkbox"/> Nil	<input type="checkbox"/> Mild	<input type="checkbox"/> Moderate	<input type="checkbox"/> Severe
Does Skin Condition involve hands	<input type="checkbox"/> Yes	<input type="checkbox"/> No		

Comments/Notes



Mining and Quarrying
Occupational Health and
Safety Committee
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Appendix 2 - Similar Exposure Groups (SEG) occupations for Construction Workers



5. Similar Exposure Group Occupations

SEG Titles (please tick applicable)	SEG Description
<input type="checkbox"/> Patcher	Breaks up and repairs concrete surfaces. Removes rough or defective spots from concrete surfaces and patches holes
<input type="checkbox"/> Form Workers	Setting up the forms which concrete is poured to create walkways, walls pillars and other structures use trowel and other tools to spread and smooth concrete
<input type="checkbox"/> Concrete Grinders	Operates the grinding machines to assemble products and parts to established specifications. Repair damaged surfaces and level uneven joints as well as polishing and smoothing surfaces.
<input type="checkbox"/> PCBU Manager	Responsible to ensure that all workplace business and safety systems are implemented within all operations. Monitors workplace, delegates and coordinates all areas of production. Development/training for workplace and all workers.
<input type="checkbox"/> Concrete Polisher/Finisher	Smoothes and finishes surfaces of poured concrete, such as floors, sidewalks, roads or curbs using a variety of hand and power tools
<input type="checkbox"/> General Labourer	Tasks can include operation and the use of portable tools power tools, air tools, hand tools, Undertakes housekeeping in and around operating and production areas.
<input type="checkbox"/> Supervisor/Team Leader	Oversees day to day operations, monitors workplace, delegates and coordinates all areas of production, Development/training for workplace and team coordinates and monitors housekeeping in and around all operating and production areas
<input type="checkbox"/> Hand Tools	
<input type="checkbox"/> Cleaning/Housekeeping	

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References

1. Rose, C., et al., *Severe silicosis in engineered stone fabrication workers - California, Colorado, Texas and Washington, 2017-2019*. Centres for Disease Control and Prevention: Morbidity and Mortality Weekly Report, 2019. **68**(38): p. 813-818.
2. Department of Health, *National Dust Disease Taskforce Consultation Paper*. 2019, Commonwealth of Australia: Canberra.
3. Wagner, G., *Screening and surveillance of workers exposed to mineral dust*, World Health Organization, Editor. 1996, WHO: Geneva.
4. Royal Australasian College of Physicians. *Frequently asked questions: Accelerated Silicosis*. 2019; Available from: <https://www.racp.edu.au/advocacy/division-faculty-and-chapter-priorities/faculty-of-occupational-environmental-medicine/accelerated-silicosis/faqs>.
5. Miles, S., *Explainer: What is silicosis? And why is this old lung disease making a comeback?*, in *Royal Australian College of General Practitioners: News GP*. 2019, RACGP.
6. Kramer, M., et al., *Artificial stone silicosis: disease resurgence among artificial stone workers*. *Chest*, 2012. **142**(2): p. 419-424.
7. Si, S., et al., *The Australian Work Exposures Study: prevalence of occupational exposure to respirable crystalline silica*. *Annals of Work Exposure and Health*, 2016. **60**(5): p. 631-637.
8. Safe Work Australia, *Working with silica and silica containing products: national guidance material*. 2019, Safe Work Australia: Canberra.
9. Perez-Alonso, A., et al., *Outbreak of silicosis in Spanish quartz conglomerate workers*. *International Journal of Occupational and Environmental Health*, 2014. **20**(1): p. 26-32.
10. Safe Work Australia, *Hazardous chemicals requiring health monitoring*. 2013, Safe Work Australia: Canberra.
11. SafeWork SA, *Respirable Crystalline Silica Compliance Program: 2019 Audit Report*. 2019, SafeWork SA: Adelaide.
12. International Labour Office. *Guidelines for the use of the ILO International classification of radiographs of pneumoconioses*. Occupational Safety and Health Series No. 22 2000; Available from: http://www.ilo.org/wcmsp5/groups/public/@ed_protect/@protrav/@safework/documents/publication/wcms_108568.pdf.

