



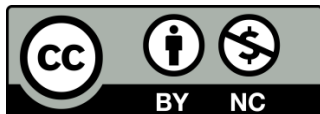
Decision Regulation Impact Statement

Managing the risks of respirable crystalline silica at work

FEBRUARY 2023

Safe Work Australia is an Australian Government statutory agency established in 2009. Safe Work Australia consists of representatives of the Commonwealth, state and territory governments, the Australian Council of Trade Unions, the Australian Chamber of Commerce and Industry and the Australian Industry Group.

Safe Work Australia works with the Commonwealth, state and territory governments to improve work health and safety and workers' compensation arrangements. Safe Work Australia is a national policy body, not a regulator of work health and safety. The Commonwealth, states and territories have responsibility for regulating and enforcing work health and safety laws in their jurisdiction.



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Abbreviations

Acronym or term	Meaning
ABS	Australian Bureau of Statistics
AIOH	Australian Institute of Occupational Hygienists
BEA	Breakeven analysis
CRIS	Consultation Regulation Impact Statement
DALY	Disability adjusted life year
DRIS	Decision Regulation Impact Statement
EY	Ernst and Young Pty Ltd
HRCT	High-resolution computed tomography
icare	Insurance and Care NSW
OIA	The Office of Impact Analysis
MCA	Multi-criteria analysis
PCBU	Person conducting a business or undertaking
PPE	Personal protective equipment
RCS	Respirable crystalline silica
RIS	Regulation Impact Statement
RPE	Respiratory protective equipment
SWMS	Safe work method statement
TWA	Time weighted average
VSL	Value of a statistical life year
WES	Workplace exposure standard
WHS	Work health and safety

Executive Summary

This Decision Regulatory Impact Statement (DRIS) provides an analysis of the regulatory impacts of options, under the model Work Health and Safety (WHS) laws, to manage the risks of respirable crystalline silica (RCS), to improve protection of the health and safety of workers. The DRIS provides recommendations to Ministers responsible for WHS (WHS ministers) for decision.

The DRIS is informed by stakeholder feedback on a Consultation Regulation Impact Statement (CRIS).

This DRIS has been prepared in accordance with the Regulatory Impact Analysis Guide for Ministers' Meeting and National Standard Setting Bodies (the Guide). The Office of Impact Analysis (OIA) has confirmed this DRIS meets the requirements set out in the Guide.

Statement of the problem

Workers in a broad range of industries including manufacturing, stonemasonry, construction, tunnelling, demolition, mining and quarrying are exposed to respirable crystalline silica (RCS). In 2011, an estimated 6.6 per cent of Australian workers were exposed, and 3.7 per cent of workers were heavily exposed, to RCS. There are also multiple reports of personal exposure above the current workplace exposure standard across industry sectors, where adequate engineering controls are not employed. There has been a recent focus on compliance in the engineered stone sector given the high prevalence of silicosis in stonemasons and engineered stone workers. However, workers in a broad range of industries outside of the engineered stone sector have also developed silicosis.

Stakeholder consultation highlighted that a lack of awareness of the risks associated with RCS and a lack of clarity on how to comply with the model WHS laws contributes to the number of cases of silicosis and silica-related diseases. Despite several awareness campaigns being undertaken since 2018, awareness of silica-related risks remains sub-optimal. Stakeholders also highlighted that requirements under the model WHS laws are difficult to understand for those without regulatory expertise and this may be associated with an inadequate level of compliance.

The following problem statement has been developed following preliminary consultation with stakeholders:

Workplace exposures to RCS have led to a substantial increase in the number of cases of silicosis and other silica-related diseases in Australian workers. Silicosis is an irreversible and debilitating disease which can be fatal. Workers exposed to RCS are also at risk of developing other serious and debilitating diseases, including lung cancer, COPD, chronic kidney disease and autoimmune diseases. A significant proportion of the increased cases of silicosis are in engineered stone workers. However, cases have also been identified in workers outside this industry. This includes workers exposed to RCS during mining, quarrying, tunnelling, as well as those working with natural stone. Silicosis and other silica-related diseases can be prevented by implementing effective controls to eliminate or minimise the generation of, and exposure to, RCS at the workplace.

Objectives of government action

Silicosis and silica-related diseases pose an unacceptable health risk to workers. There are significant financial and non-financial costs associated with diagnosis of silicosis and silica-related diseases, including significant physical and emotional harm, reduced ability to work, reduced quality of life and premature death of workers. There are

also significant costs to the public health system, including for health screening, diagnosis, treatment, and disease management.

The primary objective of government intervention is to reduce workplace exposure to RCS in Australia, with the ultimate aim of eliminating silicosis and other silica-related diseases.

What policy options are being considered?

Safe Work Australia sought public comment on five regulatory and non-regulatory options to reduce workplace exposures to RCS in Australia through publication of a CRIS in mid-2022. Following feedback received from public consultation, Option 3 has been removed and Option 5 has been refined to include elements of Option 3, which focused on clarifying the existing requirements under the model WHS laws.

- Option 1:** Base case
- Option 2:** National awareness and behaviour change initiatives
- Option 4:** National licensing framework for PCBUs working with engineered stone
- Option 5a:** Regulation of high risk crystalline silica processes for all materials, including engineered stone
- Option 5b:** Regulation of high risk crystalline silica processes for all materials other than engineered stone

Option 6 - Consideration of a prohibition on use of engineered stone

As part of the feedback on the CRIS, unions, peak health bodies, and professional organisations called for a prohibition on the use of engineered stone. As a result, a new option, Option 6, has been included in this DRIS for consideration by WHS ministers.

This Option describes a prohibition on the use of engineered stone and is modelled on the asbestos regulations in the model WHS Regulations. Option 6 would prohibit most uses of engineered stone, with a licensing scheme to ensure exempt uses (removal, repair and minor modifications of engineered stone already installed) are undertaken safely.

What is the likely impact of the options?

Impact analysis for the initial suite of options (options 2 – 5) uses a combination of multi-criteria analysis (MCA) and breakeven analysis (BEA). MCA is used to produce detailed estimates of the additional costs of each option, to industry and government, above the base case. BEA was used to quantify the economic cost of each case of silicosis and assesses the number of silicosis cases which would need to be avoided under each option for the benefits to outweigh the additional costs. The table below outlines the number of businesses potentially impacted by the option, the costs to industry and government for each option, and the required number of cases of silicosis that would need to be avoided for each option to breakeven from an economic perspective.

Table - Estimated economic impact and breakeven analysis, Options 2, 4, 5a and 5b

Option	Number of businesses covered	Estimated cost to industry (\$m)	Estimated cost to government (\$m)	Required avoided non-fatality over 10-year reporting period
Option 2	22,000	\$0	\$6.1	1

Option	Number of businesses covered	Estimated cost to industry (\$m)	Estimated cost to government (\$m)	Required avoided non-fatality over 10-year reporting period
Option 4	1,000	\$16.0	\$16.9	7
Option 5a	22,000	\$168.7	\$0.9	37
Option 5b	21,000	\$159.9	\$0.9	35

*Estimated number of cases required to break even rounded to the nearest whole number

A prohibition on the use of engineered stone (Option 6) would impact businesses in differing ways depending on the size of the business and whether a business decided to: gain a licence to continue to undertake exempt work with engineered stone, transition their business to non-engineered stone products; or cease operating.

This DRIS includes a preliminary analysis of two scenarios under this Option to provide indicative upper and lower bound costs for business and government. This preliminary analysis is presented to assist WHS ministers to understand the possible scope and impacts of a prohibition on use of engineered stone. This DRIS recommends that further analysis and consultation with industry be undertaken to determine the full impact of this option before any decision on a prohibition is taken.

What is the best option or combination of options?

Recommended options:

Option 2: National awareness and behaviour change initiatives, and

Option 5a: Regulation of high-risk crystalline silica processes for all materials (including engineered stone)

Option 6: Further analysis and consultation on the impacts of the prohibition of use of engineered stone should be undertaken.

All options were considered in the context of consultation feedback, impact analysis, and ability to meet the objective of reducing exposure to RCS at work.

Feedback on the CRIS showed that there was clear support for government action. Stakeholders agreed that there is a strong need to ensure that any action is protective of all workers who are exposed to RCS, and not limited to the engineered stone sector.

There was support from all stakeholder groups to undertake awareness and behaviour change initiatives (option 2), in combination with regulatory change. Option 5a would achieve the objective of reducing exposure to RCS through:

- regulation of high risk crystalline silica processes for all crystalline silica materials, not just engineered stone
- improved PCBU awareness of their duties under the model WHS legislative framework, including requirements to undertake air monitoring and provide health monitoring and training to workers, and
- implementation of appropriate risk control measures through development and implementation of silica risk control plans.

There was very little support for maintaining the status quo (Option 1) and a clear call for further government intervention to protect workers from exposure to RCS.

Options 4 and 5b are not recommended. Stakeholder feedback was clear that action must not be limited to the engineered stone sector, but that all workers exposed to RCS should be protected. Therefore, Option 4 (Licensing framework for engineered stone) would need to be considered in combination with Option 5b (Regulation of high risk crystalline silica processes for all materials other than engineered stone). This combination is not recommended for the following reasons:

- the implementation of Options 4 and 5b would provide little added benefit over Option 5a
- WHS regulators stated any benefit would be outweighed by the administrative and financial burden it would place on industry and government, and
- Option 4 would require significant lead time to implement following the necessary legislative changes in each jurisdiction. This would further delay improving health outcomes for engineered stone workers, thereby not addressing the policy problem.

With regard to Option 6, further analysis and consultation on the impacts of this option should be undertaken before any decision is taken on whether a prohibition is required.

In calling for a prohibition, stakeholders including the unions and peak health bodies have suggested an interim licensing framework (Option 4) be put in place prior to a prohibition on use of engineered stone. Should a prohibition on use of engineered stone be supported by WHS ministers, Option 4 is not recommended as an interim measure due to the significant lead time associated with the introduction of a licensing framework, meaning there would be a significant delay in implementing more effective protections for engineered stone workers, thereby not addressing the policy problem. If an interim option is required, the recommended option (Option 5a) would be more effective at reducing RCS exposure risks while the impacts of a prohibition are further assessed.

Acknowledgements

Safe Work Australia engaged Ernst and Young Australia Pty Ltd (EY) to support development of this Regulation Impact Statement. Safe Work Australia thanks EY for their input into the development of the problem statement and options chapters, for undertaking the impact analysis and supporting the preliminary consultation process. This analysis was conducted in April 2022 and updated in January 2023. Parameter assumptions were current at January 2023.

Safe Work Australia also thanks all stakeholders who participated in the consultation processes.

1 Introduction

1.1 About Safe Work Australia

Safe Work Australia is an independent Australian Government statutory agency jointly funded by the Commonwealth, state and territory governments through an Intergovernmental Agreement.

Safe Work Australia was established by the Safe Work Australia Act 2008 (Cth) with primary responsibility to lead the development of policy to improve work health and safety (WHS) and workers' compensation arrangements across Australia.

Safe Work Australia does not regulate WHS. The Commonwealth, states and territories retain responsibility for implementing WHS laws in their jurisdiction.

Safe Work Australia is governed by a tripartite body comprising 15 Members, including:

- an independent Chair
- nine Members representing the Commonwealth and each state and territory
- two Members representing the interests of workers
- two Members representing the interests of employers, and
- the Chief Executive Officer of Safe Work Australia, who is responsible for managing Safe Work Australia's administration and assisting it in the performance of its statutory functions.

Safe Work Australia's role includes:

- monitoring and evaluating the model WHS laws to improve safety outcomes and address issues that have the potential to impede the effective and efficient operation of the laws, and
- facilitating the development of accessible, effective and practical material to aid understanding and compliance; minimise regulatory cost; and support improved work health and safety outcomes, particularly for small business and individuals.

The model WHS laws (summarised in Section 1.3 and described further in Appendix A) have been implemented in the Commonwealth and all states and territories except Victoria.

1.2 Background

Crystalline silica dust is a significant human health hazard. Respirable crystalline silica (RCS) refers to particles of crystalline silica that are less than 10µm in diameter. RCS is released when materials containing silica are processed, particularly with power tools. Occupational exposure is the main source of RCS exposure and a variety of industrial operations, including mining, quarrying, sandblasting, rock drilling, road construction, stone masonry and tunnelling have long been associated with exposure to RCS (Bang, 2015). When airborne, workers can easily inhale RCS deep into their lungs where it can lead to a range of respiratory diseases, including:

- silicosis
- progressive massive fibrosis
- chronic obstructive pulmonary disease (COPD)
- chronic bronchitis, and
- lung cancer.

Exposure to RCS can also increase the risk of chronic kidney disease, autoimmune diseases (such as scleroderma and systemic lupus erythematosus), and other adverse health effects, including eye irritation, eye damage and an increased risk of activating latent tuberculosis.

In Australia, silicosis is a deemed disease. This means that cases of silicosis are deemed to be work related and a worker who has been exposed to RCS in the course of their work is assumed to have developed the disease because of that exposure unless there is strong evidence to the contrary.

Silicosis is a serious, irreversible lung disease that causes permanent disability and can be fatal. When RCS comes into prolonged contact with the lung tissue, it causes inflammation and scarring and reduces the lungs' ability to take in oxygen. Silicosis may continue to progress even after a worker is removed from exposure to silica dust and as the disease progresses, a worker may experience shortness of breath, a severe cough, chest pain or respiratory failure. The three types of silicosis are outlined in Table 1.

Table 1: Types of silicosis

Silicosis type	Exposure type	Respiratory impact of exposure
Acute	Can develop after short-term and very high levels of silica dust (for example less than one year, and after a few weeks).	Causes severe inflammation and protein in the lung.
Accelerated	Results from short-term exposure to large amounts of silica dust (1 to 10 years of exposure).	Causes inflammation, and protein and scarring in the lung (fibrotic nodules).
Chronic	Results from long-term exposure (over 10 years of exposure) to lower levels of silica dust.	Causes scarring of the lung and shortness of breath.

Symptoms of silicosis and other silica-related diseases (such as lung cancer, COPD and progressive massive fibrosis) may not appear for many years. The time between exposure and onset of symptoms, referred to as the latency period, for silicosis and silica-related diseases can be extended in some cases up to 10-30 years, although this can be shorter for workers repeatedly exposed to high quantities of RCS (Hoy & Chambers 2020). Some workers may not show any symptoms, even at the point of initial diagnosis (Nicol et al. 2015).

A silicosis diagnosis can have serious impacts on all aspects of a person's life and that of their families. A person diagnosed with silicosis will generally need to avoid any further exposure to RCS (Hoy & Chambers 2020). This often renders workers unable to work in their industry of choice and may force the person to retrain, work in a suboptimal job or even exit the workforce altogether. Depending on the severity of their disease, this may also mean a shortened lifespan or living with severe disability.

There is no proven treatment for silicosis other than a lung transplant. However, silicosis and silica-related diseases can be prevented, in all cases, by eliminating or minimising exposure to RCS at the workplace.

In 2019, the Commonwealth established the National Dust Disease Taskforce to develop a national approach for the prevention, early identification, control and management of occupational dust diseases in Australia. The National Dust Disease Taskforce presented its Final Report to the Australian Minister for Health and Aged Care in June 2021, which recommended that “... a regulatory impact analysis be undertaken to identify and decide implementation of measures that provide the highest protection to workers from the risks associated with [RCS] generating activities in the engineered stone industry” (Department of Health 2021). WHS ministers supported the Taskforce’s recommendations and referred the Final Report to Safe Work Australia for consideration in this Decision Regulation Impact Statement (DRIS).

Prior to the release of the National Dust Disease Taskforce Final Report, Safe Work Australia Members agreed to commence regulatory impact analysis on regulatory and non-regulatory options to minimise the risks of RCS in Australian workplaces.

1.3 Legislative and regulatory framework for crystalline silica under the model WHS laws

In 2011, Safe Work Australia developed the model WHS laws to be implemented across Australia. To become legally binding the Commonwealth, states and territories must separately implement them as their own laws.

The model WHS legislative framework includes:

- the model WHS Act
- the model WHS Regulations, and
- model Codes of Practice.

The model WHS laws have been implemented in all jurisdictions except Victoria. Commonwealth and state and territory WHS regulators oversee and enforce the laws in their jurisdictions.

Appendix A provides an extensive summary of the duties and responsibilities regarding exposure to RCS at the workplace as described in the model WHS Act, model WHS Regulations, and the following model Codes of Practice:

- Construction work (Safe Work Australia 2018a)
- Demolition work (Safe Work Australia 2018b)
- How to manage work health and safety risks (Safe Work Australia 2018c)
- Managing risks of hazardous chemicals in the workplace (Safe Work Australia 2020a)
- Managing the risks of respirable crystalline silica from engineered stone in the workplace (Safe Work Australia 2021a), and
- Work health and safety consultation, cooperation and coordination (Safe Work Australia 2022a).

Appendix A also summarises the duties of the following duty holders related to the risks of RCS at work:

- persons conducting businesses or undertakings (PCBUs)

- officers
- designers, manufacturers, importers, suppliers, and those who commission plant or structures
- primary contractors
- workers, and
- other persons at the workplace.

This includes duties around not exposing a person to a level of RCS exceeding the workplace exposure standard (WES), duties to undertake air and health monitoring, and describes the need to include RCS risk controls in Safe Work Method Statements (SWMS) (where the work is high risk construction work) and consultation with workers and their representatives.

1.4 National WHS policy initiatives

Following the emergence of new cases of silicosis, there have been a range of additional policy measures implemented by both Safe Work Australia and the jurisdictions to address the risks of exposure to RCS in the workplace.

1.4.1 Review of the WES for RCS

In 2019, WHS ministers agreed to reduce the WES for RCS from 0.1 mg/m³ 8-hour time weighted average (TWA) to 0.05 mg/m³. A further reduction of the WES to 0.02 mg/m³ 8-hour TWA has been considered by Safe Work Australia Members (Safe Work Australia 2020b). However, due to the uncertainty in measuring levels of RCS below 0.05mg/m³ 8-hour TWA, a further reduction of the WES was not considered feasible at this time. As part of its Occupational Lung Diseases Workplan, Safe Work Australia will continue to monitor developments in the measurability of RCS to inform future reductions in the WES (Safe Work Australia 2022b).

1.4.2 Prohibition on uncontrolled processing of engineered stone

Safe Work Australia Members have also agreed to include a specific regulation in the model WHS Regulations to expressly prohibit the uncontrolled processing of engineered stone. This regulatory amendment is being drafted. It will cover the cutting, grinding, trimming, sanding, polishing, or drilling of engineered stone using power tools or another form of mechanical plant. If a PCBU is unable to eliminate, substitute or isolate the RCS exposure hazard, one or more of the following engineering controls are required: a water delivery system that supplies a continuous feed of water over the stone being processed to suppress the generation of dust, an on-tool dust extraction system, or a local exhaust ventilation system. In addition to engineering controls, the amendment regulation would require that each worker who is processing engineered stone is provided with respiratory protective equipment (RPE).

1.4.3 Incident notification provisions for long latency diseases under the model WHS laws

Recommendation 20 of the [DRIS](#) for the 2018 Review of the model WHS laws recommended that Safe Work Australia “review incident notification provisions in the model WHS Act to ensure the provisions meet the intention outlined in the [2008 National Review](#); the provisions capture relevant incidents, injuries and illnesses

that are emerging from new work practices, industries and work arrangements; and, WHS regulators have appropriate visibility of work-related psychological injuries and illnesses” (Safe Work Australia 2021b). The review explored options for improving WHS regulator visibility of long latency diseases due to exposure to substances. The review confirmed there are more appropriate mechanisms for capturing diagnoses than incident notification, mostly due to the often long period between exposure and diagnosis. It also recognised that there are other mechanisms in place or being established that provide, or will provide, WHS regulators with data on diagnoses including silicosis (e.g. jurisdictional mandatory notification arrangements and the National Occupational Respiratory Disease Registry). The review did identify support for further considering options to improve WHS regulator visibility of exposures to hazardous chemicals, including PCBU reporting of exceedances of workplace exposure standards. Further consultation will be undertaken as part of the incident notification review regulation impact analysis process and will be informed by the outcomes of this work on managing the risks of RCS.

1.4.4 Undertaking the Clean Air. Clear Lungs. national awareness campaign

The Clean Air. Clear Lungs. national education and awareness campaign concluded in December 2021. The campaign aimed to raise awareness of occupational lung diseases and provide practical information, in a range of languages, to eliminate or manage the risk of workers developing a lung disease (Safe Work Australia 2021c). The campaign was a key initiative of the occupational lung disease work plan agreed by Safe Work Australia Members in 2018 and targeted the construction, agriculture, manufacturing and engineered stone sectors. The campaign evaluation showed that the campaign was successful in increasing audience awareness of occupational lung diseases.

1.4.5 Publication of revised national guidance on RCS

In 2022, Safe Work Australia published a revised version of the national guide: Working with silica and silica containing products (Safe Work Australia 2022c), which has been translated into 6 additional languages. Safe Work Australia also recently revised its guidance on health monitoring, including publication of guides on Health monitoring: Guide for crystalline silica (Safe Work Australia 2020c), and Health monitoring: Guide for registered medical practitioners (Safe Work Australia 2020d).

1.4.6 State and territory initiatives to manage RCS risks

Table 2 below summarises state and territory initiatives to manage the risks of RCS.

Table 2: Overview of state and territory measures to manage RCS exposure in jurisdictions subject to the model WHS laws

Jurisdiction	Education and awareness	Health screening ¹ and registries	Other measures
ACT	Developed online materials (WorkSafe ACT 2020) Produced 2 guidance notes on the risks of RCS (WorkSafe ACT 2021, WorkSafe ACT 2022).		New silica dust regulations prohibiting dry cutting of engineered stone and specifying silica control measures that must be considered as a minimum for silica dust from 1 November 2022.

¹ Health screening refers to programs undertaken by state and territory regulators and health authorities to detect previously undetected cases of silicosis in workers. This is distinct from health monitoring, which is undertaken by PCBUs (as required of them under WHS laws) and carried out by or supervised by a registered medical practitioner with experience in health monitoring.

Jurisdiction	Education and awareness	Health screening ¹ and registries	Other measures
	Published research report by ThinkPlace on silica dust exposure attitudes, perceptions and practices within the ACT (WorkSafe ACT, 2022)		Introduction of mandatory training course for work with silica-containing materials (WorkSafe ACT, 2023)
NSW	Awareness campaigns ran in 2018, 2019 and 2020 including radio and online advertising, a Silica Symposium and regional roadshow event series, webinars and safety videos as well as 107 industry presentations (SafeWork NSW 2021).	Commenced the NSW Dust Disease Register which required all NSW medical practitioners to notify NSW Health upon diagnosing a silicosis case from 1 July 2020 (SafeWork NSW 2021).	Banned uncontrolled dry cutting of manufactured stone and offered rebates of up to \$1,000 to businesses for the purchase of necessary equipment (NSW Legislative Council Standing Committee on Law and Justice 2022). Implemented the model Code of Practice: Managing the risks of RCS from engineered stone in the workplace (SafeWork NSW 2022).
NT			NT WorkSafe conducted a compliance campaign in 2019 visiting 35 businesses in the engineered stone benchtop manufacturing industry (Australian Government 2022).
QLD	Issued a safety alert in September 2018 for uncontrolled dry cutting of engineered stone (Queensland Government 2018).	Diagnoses of silicosis are notifiable in Queensland, in the opinion of the prescribed medical practitioner (Queensland Health 2022).	Managing RCS dust exposure in the stone benchtop industry Code of Practice commenced on 31 October 2019 (Workplace Health and Safety Queensland 2019). Managing respirable crystalline silica dust exposure in construction and manufacturing of construction elements Code of Practice 2022 approved by WHS minister and will commence in Queensland on 1 May 2023.
SA		The Mining and Quarrying Occupational Health and Safety Committee (MAQOHSC) conducted a baseline finding screening program (Wellbeing SA 2020).	Silicosis database and compliance program from 2019 to 2021 (SafeWork SA 2019, SafeWork SA 2021).
TAS	A media campaign ran by WorkSafe Tasmania between November 2019 and January 2020 targeting tradespeople and others with the tagline: 'don't breathe dust' and 'be silica safe' (WorkSafe Tasmania 2019).		Implemented the model Code of Practice: Managing the risks of RCS from engineered stone in the workplace (WorkSafe Tasmania 2022).

Jurisdiction	Education and awareness	Health screening ¹ and registries	Other measures
WA	<p>WorkSafe Western Australia issued a safety alert in November 2018 for stone benchtop workers at risk of silicosis (WorkSafe Western Australia 2018).</p> <p>Guidance note developed for those working with stone (WorkSafe Western Australia 2021).</p>	<p>Between July 2018 and May 2021, workers participated in the WorkSafe Health Surveillance Recall Project or the WA Silicosis Screening Project (WorkSafe Western Australia 2021).</p> <p>In January 2021, amended the OHS regulations to require employers to provide a low-dose HRCT scan instead of previously required chest X-ray (Government of Western Australia 2021)</p>	

1.5 Other complementary policy initiatives

Several regulatory and non-regulatory initiatives are being progressed in parallel with this impact analysis process at the national level, which are intended to reduce the risks associated with RCS exposures at the workplace. These include Commonwealth initiatives in the All of Australian Governments' Response to the National Dust Disease Taskforce Report and development of a nationally accredited silica safety training package. These are summarised in Appendix B.

1.6 Purpose and scope of this Decision Regulation Impact Statement

The purpose of this Decision Regulation Impact Statement (DRIS) is to consider and make recommendations to WHS ministers on the preferred options for managing the risks of crystalline silica at work.

As explained in Section 2.2, workplace exposure to RCS occurs in a wide range of industries. The scope of this DRIS includes all workplaces subject to the model WHS laws and where workers may be exposed to hazardous levels of RCS.

Victoria has not adopted the model WHS laws, and therefore workplaces in Victoria are out of the scope of this DRIS. However, recent amendments to the Victorian Occupational Health and Safety Regulations 2017 were considered in developing the options. The Victorian amendments include the introduction of a licensing scheme for employers working with engineered stone, duties on manufacturers and suppliers of engineered stone, and additional regulatory oversight of high risk crystalline silica work outside of engineered stone across a broad range of industries (WorkSafe Victoria 2021).

The quarrying and mining industries in New South Wales, Queensland, and Tasmania are not regulated under the model WHS laws and are also out of scope. The Commonwealth does not regulate quarrying and mining; however, the Commonwealth WHS regulator, Comcare, regulates self-insured licensees, which includes businesses involved in the tunnelling sector. 5

1.7 Structure of this report

This DRIS was prepared in accordance with the Regulatory Impact Analysis Guide for Ministers' Meetings and National Standard Setting Bodies (Department of Prime Minister and Cabinet 2021a). It is structured as follows:

Chapter 1 – Introduction

Chapter 2 – Statement of the problem

Chapter 3 – Why is government action needed?

Chapter 4 – What policy options are being considered?

Chapter 5 – What is the likely impact of each option (options 1-5)?

Chapter 6 – What is the likely impact of option 6?

Chapter 7 – Who was consulted and how was their feedback incorporated?

Chapter 8 – What is the best option or combination of options?

Chapter 9 – Implementation and Evaluation

2 Statement of the problem

2.1 Defining the problem

The following problem statement has been developed following consultation with stakeholders:

Workplace exposures to RCS have led to a substantial increase in the number of cases of silicosis and other silica-related diseases in Australian workers. Silicosis is an irreversible and debilitating disease which can be fatal. Workers exposed to RCS are also at risk of developing other serious and debilitating diseases, including lung cancer, COPD, chronic kidney disease and autoimmune diseases. A significant proportion of the increased cases of silicosis are in engineered stone workers. However, cases have also been identified in workers outside this industry. This includes workers exposed to RCS during mining, quarrying, tunnelling, as well as those working with natural stone. Silicosis and other silica-related diseases can be prevented by implementing effective controls to eliminate or minimise the generation of, and exposure to, RCS at the workplace.

The National Dust Disease Taskforce noted that "... every case of silicosis affecting a stone benchtop worker is evidence that businesses, industry and governments need to do more to recognise and control the risks of working with engineered stone" (Department of Health 2021). Evidence to support the problem statement is presented in Table 3 below and discussed further in the following sections.

Table 3: Summary of problem statement

Problem definition	Evidence to support problem definition
Workers in a broad range of industries are at risk of silicosis and other silica-related diseases	<ul style="list-style-type: none">• Evidence that workers in a broad range of industries are exposed to RCS• The number of cases of silicosis• The number of cases of other silica-related diseases
Worker exposure to RCS is due to lack of understanding of the risks and the current regulatory requirements to ensure the health and safety of those working with silica-containing materials	<ul style="list-style-type: none">• Lack of awareness of silica-related risks• Lack of clarity around how to comply with the WHS laws
There are inadequate levels of compliance and enforcement with the current model WHS laws.	<ul style="list-style-type: none">• Lack of compliance with current regulatory requirements• Current regulations are insufficient to ensure workers are not exposed to RCS• WHS regulators may be unable to adequately ensure compliance with the model WHS laws

2.2 Workers in a broad range of industries are at risk of silicosis and silica-related diseases

2.2.1 The problem of RCS

Crystalline silica (silicon dioxide) is a common chemical in earth's crust and is found in many rocks and natural stones like granite, slate and sandstone, and is also present, often at high concentrations, in some manufactured products such as engineered stone, concrete, bricks and tiles. The dust generated from processing these materials that has the potential to cause harm. The silica containing material itself does not present a risk when undisturbed.

The crystalline silica content of common materials used across industries can vary significantly, ranging up to 97 per cent, as outlined in Table 4.

Table 4: Silica composition of common materials (Safe Work Australia 2021a)

Type	Amount of silica (per cent)
Marble	2
Limestone	2
Slate	25 to 40
Shale	22
Granite	20 to 45 (typically 30)
Natural sandstone	70 to 95
Composite (engineered or manufactured) stone	Up to 97
Aggregates, mortar and concrete	Various

It is well established that the main source of RCS exposure is occupational and that the accumulation of RCS in the lungs of exposed workers can lead to silicosis and other silica-related diseases (as outlined in Section 1.2). Health screening programs carried out by state and territory WHS regulators and health authorities since 2018 have determined that of the 4,743 stonemasons and engineered stone workers screened, approximately 11 per cent received a probable or confirmed diagnosis of silicosis because of workplace exposure to RCS (See Section 2.2.3.2).

Given the wide range of materials that contain crystalline silica, workers in many industries may be exposed to RCS at work. Examples of work activities that can generate RCS include:

- fabrication, cutting and installation of engineered stone countertops
- cutting and installation of natural stone countertops
- excavation, earth moving and drilling plant operations
- clay and stone processing machine operations
- concrete cutting

- mining, quarrying and mineral ore treating processes²
- tunnelling
- brick, concrete or stone cutting; especially using dry methods, and
- angle grinding, jack hammering and chiselling of concrete or masonry.

The first cases of silicosis in Australian engineered stone fabricators were reported in 2015 (Frankel et al. 2015). Subsequent health screening of stonemasons and other engineered stone workers has revealed a high prevalence of silicosis in this cohort of workers (see Section 2.2.3.2). Although this sector has been a focus of additional regulation, compliance and enforcement, workers in a broad range of industries outside of the engineered stone sector have also developed silicosis, as described in Section 2.2.3.1. Since 2018, a range of additional policy measures have been implemented by both Safe Work Australia and jurisdictional governments to address the risks of exposure to RCS in the workplace. However, due to the long latency period of up to 30 years (Hoy & Chambers 2020) and lack of comprehensive baseline data, it is not yet possible to measure the impact these measures have had on worker health. There is evidence of increased awareness of the risks of working with silica amongst workers and PCBUs as a result of awareness activities in recent years (WorkSafe ACT, 2022).

Risks associated with processing engineered stone

Engineered stone is an artificial product that is created by combining natural stone materials that contain crystalline silica with other chemical constituents (such as water, resins, or pigments). This mixture then undergoes a process to become hardened, resulting in a product that can be manipulated through mechanical processes to manufacture other products (such as benchtops). Engineered stone has been available in Australia since the late 1990s.

The crystalline silica content of engineered stone varies widely but can be greater than 90 per cent, which is significantly more than natural stone. The uncontrolled processing (i.e. cutting, grinding, trimming, drilling, sanding, and polishing) of engineered stone products can produce high concentrations of RCS.

Workers fabricating, processing, installing, maintaining, or removing engineered stone products without appropriate control measures in place may be exposed to high levels of RCS (for example through dust or mist clouds). Workers can also be exposed to RCS from poor cleaning and maintenance methods that disturb accumulated dust, including dry sweeping, using compressed air or high-pressure water cleaners and general-purpose vacuum cleaners that are not designed for use with hazardous dusts. The risks are much greater where the engineered stone contains high levels of crystalline silica.

One of the most common uses for engineered stone in Australia is in benchtops. Engineered stone is the most popular material used in benchtops as it is high quality, stylish and relatively cheap. Its popularity has been bolstered by recent booms in renovation and housing development, where its use has become common.

The installation of engineered stone benchtops involves several steps that may generate RCS. For example, workers are required to cut a kitchen benchtop to size, as well as create holes for positioning sinks, plumbing, stovetops, and appliances.

² As mentioned in Section 1.6, mining and quarrying is only considered in the scope of this impact analysis where it is covered by the model WHS laws.

As mentioned in Section 2.2.3.2, screening programs of stonemasons and engineered stone workers have shown that this cohort of workers has a high prevalence of silicosis, indicating that there have been widespread past exposures to RCS across the sector.

Silicosis and other silica-related diseases can be prevented by implementing effective controls to eliminate or minimise the generation of, and exposure to, RCS at work. For example, through:

- eliminating the need to process silica-containing materials
- substitution of silica-containing products with alternative products that do not contain silica, or contain less silica
- isolating people from areas where they would be exposed to RCS
- implementing engineering controls such as on tool dust extraction, water suppression and/or local exhaust ventilation
- implementing administrative controls, such as policies for housekeeping and decontamination, and
- ensuring workers use appropriate RPE (Safe Work Australia 2022c).

Safe Work Australia’s national guide *Working with silica and silica containing products* (Safe Work Australia 2022c) and *model Code of Practice: Managing the risks of RCS from engineered stone in the workplace* (Safe Work Australia 2021a) contain further information on available controls.

2.2.2 Workers in a broad range of industries are exposed to RCS

Exposure to hazardous levels of RCS occurs in a broad range of in Australian workplaces. Workers in industries such as manufacturing, stonemasonry, construction, tunnelling, demolition, mining and quarrying are at an increased risk of exposure to RCS. One study estimated that in 2011, approximately 6.6 per cent of Australian workers were exposed to RCS, including 3.7 per cent of workers who were heavily exposed (Si et al. 2016). However, this estimate of workforce exposure was based on interviews of workers and not personal air monitoring data, so may not be an accurate estimate of the extent of workforce exposure. Using information in the Australian Bureau of Statistics Labour Force data for August 2021, it is estimated that up to 1.45 million workers are employed in industries where there may be exposures to RCS in the workplace (Table 5).

Table 5: Australian Bureau of Statistics Labour Force data for selected industries (Australian Bureau of Statistics 2021a)

Division	Subdivision	Employed total ('000)
B Mining	06 Coal Mining	41.7
	07 Oil and Gas Extraction	22.9
	08 Metal Ore Mining	112.8
	09 Non-Metallic Mineral Mining and Quarrying	14.9
	10 Exploration and Other Mining Support Services	76.7
C Manufacturing	20 Non-Metallic Mineral Product Manufacturing	38.9
E Construction	30 Building Construction	283.6
	31 Heavy and Civil Engineering Construction	116.9
	32 Construction Services	744.8

Division	Subdivision	Employed total ('000)
	Total	1,453.2

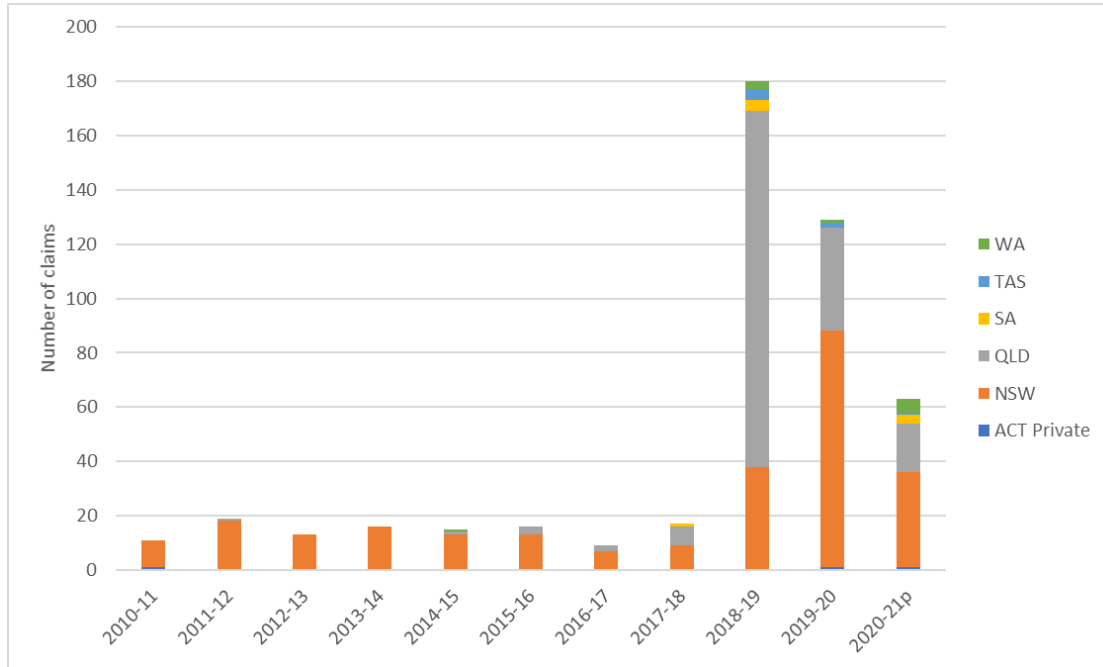
The Australian Institute of Occupational Hygienists (AIOH) has confirmed that common tasks in the manufacturing, demolition, construction, tunnelling and quarrying industries can result in exposure to RCS in excess of the WES (AIOH 2021). This is supported by historical data supplied to the Queensland inquiry into occupational respirable dust issues in 2017 showing exceedances of the WES in place at the time (0.1 mg/m³ 8-hour TWA) across a range of construction operations. This report also recorded WES exceedances in the tunnelling and ferrous foundry industries (Queensland Parliament Coal Workers' Pneumoconiosis Select Committee 2017). Personal air monitoring has also revealed that common tasks involved in engineered stone manufacturing (Gaskin et al. 2018) and stonemasonry (Alamango et al. 2015) can expose workers to RCS at levels above the current WES (0.05 mg/m³ 8-hour TWA) if effective engineering controls (e.g., water suppression and local exhaust ventilation) are not in place. Similarly, a study of 47 individual stone and quarry workers not using adequate engineering controls revealed that one in four workers were exposed to levels of RCS above the then WES (0.1mg/m³ 8-hour TWA), and more than one in ten were exposed to concentrations double that of the WES (Hedges 2016). A study of workers in the demolition sector also revealed exposures in some groups of workers were in excess of the then WES (0.1 mg/m³ 8-hour TWA), prior to the introduction of additional control measures including misting dust suppression, dust extraction, and greater management of respirator fit testing (Cole & Fisher 2019). Although there are few published studies about the Australian construction industry, uncontrolled cutting of concrete is relatively common. In one study, it was shown that six minutes of uncontrolled concrete cutting would greatly exceed the current WES even if it was the worker's only exposure to RCS in the workday (Brooks & Rae 2021). Workers who are not directly involved with tasks that produce RCS may still be exposed. This includes administrative staff, cleaning staff and other support staff who are located near sites where RCS is produced. Data taken from an engineered stone fabrication workshop showed that all areas of the premises, including areas that were not used for processing of engineered stone, had airborne concentration levels of RCS well in excess of the current WES. This indicates that any persons working near areas where engineered stone is processed may be exposed to hazardous levels of RCS, regardless of their role (Jennings 2021).

2.2.3 Number of cases of silicosis

The number of current silicosis cases in Australia has been estimated from results of state and territory health screening programs, data registries, and accepted workers' compensation claims. It is likely that this estimate is conservative, and the true number of cases may be higher. This is primarily a result of the time-lag between worker exposure to RCS and diagnosis of silicosis. This also presents significant challenges to estimating the future number of cases of silicosis.

2.2.3.1 Number of accepted workers' compensation claims for silicosis

Between 2010-11 and 2020-21p there were 488 accepted workers' compensation claims for silicosis in the jurisdictions covered by the model WHS laws (Figure 1). Approximately 79 per cent of the accepted claims were in the manufacturing, mining and construction sectors (Table 6).



Sources: Safe Work Australia's National Data Set for Compensation-based Statistics and icare.

Figure 1: Total number of accepted silicosis workers' compensation claims in jurisdictions subject to the model WHS laws, 2010-11 to 2020-21^p

Approximately 76 per cent of the claims were accepted after mid-2018, following the implementation of awareness and health screening programs for stonemasons and engineered stone workers.

Whilst many accepted cases have been in the engineered stone sector, workers in other industries have also developed silicosis. For example, of 284 pre-employment medical examinations for tunnelling workers undertaken between December 2019 and December 2020, silicosis was identified in 11 workers (3.87 per cent of the total cohort). This suggests that there may be a larger cohort of tunnelling workers who have yet to be diagnosed with silicosis.

Table 6: Number of accepted workers' compensation claims for silicosis by industry in jurisdictions subject to the model WHS laws, 2010-11 to 2020-21p

Industry	NDS	icare	Total
Manufacturing	180	82	262
Construction	19	60	79
Mining	31	15	46
Electricity, gas, water and waste services	np	7	10
Wholesale trade	9	0	9

^p denotes data are preliminary and subject to revision in future years as further claims are finalised

Industry	NDS	icare	Total
Administrative and support services	6	0	6
Transport, postal and warehousing	np	np	Np
Retail trade	np	0	Np
Education and training	np	0	Np
Health care and social assistance	np	0	Np
Other services	np	0	Np
Not stated/Unknown	np	62	67
Total	256	232	488

'np' data is suppressed where there are fewer than 5 serious claims.

Note 1: All accepted workers' compensation claims excluding journey claims.

Note 2: The 2020-21 data are preliminary (denoted by 'p'). They are likely to rise as revisions occur in future years.

Sources: Safe Work Australia's National Data Set for Compensation-based Statistics (NDS) and iCare.

2.2.3.2 Number of silicosis cases identified through health screening programs or reported to dust disease registers

Health screening refers to programs undertaken by state and territory WHS regulators and health authorities to detect previously undetected cases of silicosis in workers. This is distinct from the requirements under the model WHS laws for PCBUs to provide health monitoring to workers when there is a significant risk to the workers' health because of exposure to RCS.

The number of cases detected through health screening suggests that health monitoring, as required under the model WHS laws, is not occurring at the rates that it should be. Table 7 below sets out the outcomes of state and territory silicosis health screening programs for stonemasons and engineered stone workers, where 436 workers have been referred for further assessment or diagnosed with silicosis since 2017.

Table 7: Outcomes of state and territory silicosis health screening programs

Jurisdiction	Source	Period	Number of workers participating in screening programs	Number of people with probable or confirmed silicosis
QLD (Queensland Government 2020)	Regulator health screening program for stonemasons working with engineered stone	September 2018 - 30 November 2021	1,053	238 ³
NSW (2017 – 2020) (Golder Associates Pty Ltd 2021)	icare NSW screening of stonemasons working with engineered stone	Financial years 2017-18, 2018-19 and 2019-20	3,030	156

³ Figure includes 34 cases of progressive massive fibrosis.

Jurisdiction	Source	Period	Number of workers participating in screening programs	Number of people with probable or confirmed silicosis
SA (Mining and Quarrying Occupational Health and Safety Committee 2020)	Health screening program for stonemasons and construction workers	1 March to 16 August 2019	295	18 ⁴
WA (WorkSafe Western Australia 2021)	Regulator health screening program for engineered stone fabrication workers and installers	July 2018 to May 2021	365	24

Two states (NSW and Queensland) have recently introduced dust disease registers to capture and share data on the incidence of occupational lung diseases (e.g., silicosis), causative exposures and respiratory health data. Both registers mandate the reporting of specified dust diseases, including silicosis. The Commonwealth is also currently undertaking work to establish a National Occupational Respiratory Disease Registry (NORDR). As an interim measure to the implementation to the NORDR, South Australia implemented the South Australian Silicosis Registry in 2022 in four public hospitals. To date, no silicosis cases have been added to the registry.

Silicosis cases reported to the NSW and Queensland dust disease registries are presented in Table 8. In NSW a total of 277 cases have been reported to the registry, with 57 of these reported in 2021-22. Twenty-two per cent of reported cases in NSW in 2021-22 were from workers last exposed in an industry other than engineered stone (SafeWork NSW, 2022). In Queensland a total of 368 cases have been reported to the registry, with 40 of these reported in 2021-22. Forty per cent of new silicosis cases reported in Queensland in 2021-22 were from manufacturing (including engineered stone) workers; 33 per cent from workers in the mining, resources and quarrying industry and a further 22 per cent were reported in the construction industry (State of Queensland (Queensland Health), 2022). This highlights that the risk to workers of developing silicosis is broader than the engineered stone industry.

Table 8: Total number of silicosis cases reported to state dust disease registers

Jurisdiction	Source	Prior to 2019	2019-20	2020-21	2021-22	Total
NSW	NSW Dust Disease Register Annual Report 2021-22 (SafeWork NSW, 2022)	49 ⁵	107	64	57	277
QLD	Notifiable Dust Lung Disease Register annual report 2021-2022 (State of Queensland (Queensland Health), 2022)	192 ⁶	68	68	40 ⁷	368

⁴ Note 18 cases of probable, possible or confirmed simple silicosis.

⁵ For NSW, data is from 2017-18 and 2018-19

⁶ Confirmed cases diagnosed prior to 1 July 2019 but reported the registry in 2019-20 or later years

⁷ Not all cases of notifiable dust lung disease are given to the NDLD Register in the year that they are diagnosed, and the number of cases recorded for 2021-22 will likely be revised upwards in the next annual report.

2.2.3.3 Number of cases of other silica-related diseases

Exposure to RCS puts workers at risk of developing other serious diseases, including lung cancer, COPD, chronic kidney disease and autoimmune diseases. The Cancer Council of Australia has estimated that over 5,700 of the 587,000 Australian workers exposed to RCS in 2011 would develop lung cancer (Cancer Council 2021). However, Safe Work Australia is not aware of other estimates of the number of cases of the other silica-related diseases that could be attributed to exposure to RCS. These numbers cannot be estimated directly from existing data sets, as these diseases can also have long latency periods and may have other causes. It is important to note that many people suffering from other silica-related diseases will also have silicosis (Alif et al. 2020).

2.2.3.4 Predicted future cases of silicosis

A recent study by Curtin University predicted 10,390 future cases of lung cancer and between 83,090 and 103,860 future cases of silicosis resulting from occupational exposure to RCS in 2016 (Carey & Fritschi, 2022). This study used a novel future excess fraction (FEF) method to estimate the number of lung cancer cases and then applied a ratio of lung cancer to silicosis cases from past studies to extrapolate the number of future silicosis cases developed over a lifetime in workers who were exposed to RCS in 2016. This is the only known modelling performed to predict the future burden on lung cancer and silicosis due to occupational exposure to RCS in Australia.

2.3 Understanding of silica-related risks and current regulatory requirements

During consultations for this DRIS, stakeholders identified that a lack of awareness of the risks associated with RCS and a lack of clarity on how to comply with the model WHS laws contribute to the number of cases of silicosis and silica-related diseases.

These issues may be exacerbated by the structure of some industries, particularly the engineered stone sector, which is characterised by small- and micro-businesses. Market research commissioned by the Australian Government Department of Health in 2021 showed that 44 per cent of businesses operating as stonemasons were sole traders and a further 24 per cent had five employees or less, and 42 per cent of other trades employed 20 employees or less (Quantum Market Research 2021). This sector is also known to have a culturally and linguistically diverse workforce.

2.3.1 Lack of awareness of silica-related risks

Despite several awareness campaigns being undertaken since 2018 at the national and state and territory levels, awareness of silica-related risks remains sub-optimal in workers in some sectors. Market research in 2021 revealed that 94 per cent of stonemasons and 73 per cent of tradespeople interviewed had heard of silica dust (Quantum Market Research 2021). Stonemasons reported that they were very familiar with the risks of silica dust (73 per cent), with 94 per cent agreeing that exposure to silica dust should be avoided. However, only 24 per cent of other tradespeople employed in construction industry interviewed agreed they were 'very familiar' with the risks of silica dust and 76 per cent agreed that exposure to silica dust should be avoided (Quantum Market Research 2021).

It is likely that the different levels of awareness reflect the awareness campaigns and media attention that occurred in response to the emergence of silicosis in the engineered stone sector. The lower level of awareness of

the risks of silica amongst tradespeople outside of the engineered stone sector may reflect a lack of awareness activities in other industries, including manufacturing, demolition, quarrying and mining.

2.3.2 Lack of clarity on how to comply with the model WHS laws

The National Dust Disease Taskforce noted that in their consultations, stakeholders identified issues with the complexity of existing WHS regulations and a lack of clarity around regulatory requirements (Department of Health 2021).

Stakeholders consulted for this DRIS identified that the requirements of the model WHS laws are difficult to understand for those without regulatory expertise. In particular, workers and PCBU find the requirements regarding the WES, appropriate risk controls, air monitoring and health monitoring challenging. Although Safe Work Australia and state and territory WHS regulators have published relevant Codes of Practice, guides, and other information, further work could be undertaken to explain the requirements of model WHS laws, focussing on formats that are accessible and suitable for the range of different PCBU, workers and other duty holders working with silica.

In a 2021 submission to the NSW Dust Disease Scheme, the AIOH noted they “...believe that the sad cases of silicosis and progressive massive fibrosis seen in the engineered stone benchtop industry of recent times would not have occurred if the [current] RCS [WES] had been complied with by employers and enforced by WHS regulators, and workers had been made aware of the health hazard of RCS over exposure and complied with the relevant control strategies both in the factory manufacturing process and installation and fitting on customer premises” (AIOH 2021).

In preliminary consultations, some government and industry stakeholders expressed concerns that campaigns focusing solely on awareness, without an explicit behavioural change element, have limited effectiveness in increasing worker safety. Stakeholders also raised that there are gaps in PCBU’s capabilities to undertake risk assessments in some industries.

2.3.3 The model WHS laws may be insufficient to manage exposure to silica dust

There are general duties under the model WHS laws for duty holders to manage health and safety risks by eliminating or minimising those risks so far as is reasonably practicable. However, some stakeholders (e.g. unions and peak health bodies) have indicated that the general duties are insufficient and targeted regulation of work involving materials containing crystalline silica is required to address the problem. For instance, the Australian Council of Trade Unions has called for specific regulation of RCS exposure, in a similar manner to lead, as has been implemented in the Victorian Occupational Health and Safety Regulations 2017 (Australian Council of Trade Unions 2021).

2.4 Inadequate levels of compliance and enforcement activities

2.4.1 Lack of compliance with current regulatory requirements

Commonwealth, state and territory WHS regulators are responsible for compliance and enforcement of WHS laws in their jurisdictions. If PCBUs contravene WHS laws, WHS regulators have a range of enforcement options, including:

- improvement notices – requires action to be taken to address a safety issue or if workers' compensation requirements are not being met
- prohibition notices – can be issued if an activity at work involves a more serious risk to health or safety, a prohibition notice requires the PCBU to stop work immediately until the risk is rectified, and
- penalty/infringement notices - can be issued for certain serious offences, for example failing to comply with a prohibition notice. These notices are accompanied by a monetary fine specified in legislation.

WHS regulators indicated in the preliminary consultations that they have observed a general improvement in compliance in the engineered stone sector since 2018, which aligns with the greater focus on workplace inspections. This is evidenced by the outcomes of consecutive South Australian compliance programs in Table 9, which demonstrated a 42 per cent reduction in improvement notices and 12 per cent reduction in prohibition notices issued in their 2020-21 compliance campaign compared to their 2019 campaign (SafeWork SA 2021). This was despite an over 500 per cent increase in the number of workplace visits as a result of their greater focus on workplace inspections. The South Australian report also noted “25 fabricators of engineered stone had increased compliance, with most maintaining safe systems of work that were implemented as a result of the 2019 campaign” (SafeWork SA 2021). However, as Table 9 shows, many notices are still being issued which indicates that employers may continue to find it difficult to comply or choose not to comply.

Other factors influencing the levels of compliance with the requirements of the model WHS laws include:

- financial costs of complying with the current regulations, such as providing health monitoring and undertaking air monitoring, may be driving the low levels of compliance seen amongst PCBUs, particularly for small and micro businesses.
- workplace culture - pressure to avoid delays, take on or finish a job can lead to the adoption of poor techniques and a lack of consideration for personal safety (ThinkPlace 2018). Non-compliant practices become embedded as a matter of workplace culture, with newer employees following the example of more established employees, leading to unsafe practices becoming more widespread.
- the lack of access to persons with specific competency for conducting health and air monitoring may result in inadequate assessments, and the costs of air monitoring undertaken by an expert - the majority of the cost comes from hiring an occupational hygienist to undertake the monitoring, and it can be \$10,000 to \$20,000 per experience (NSW Legislative Council Standing Committee on Law and Justice 2020).

Table 9: State and territory compliance program outcomes (excluding Victoria)

Jurisdiction	Industry	Period	Workplace visits	Improvement notices ⁸	Infringement notices	Prohibition notices	Immediate compliance	Penalty notices
Queensland ⁹	Natural and engineered stone benchtop industries	August 2020- May 2021	230	302	27	24	12	-
NT (Australian Government 2022)	Engineered stone workshops	2019-20	35	3		0		0
NSW (NSW Government 2022)	Engineered stone, construction, tunnelling, manufacturing, foundries and stonemason industries	2018 to 31 March 2022	2082	1271		47		2
SA (SafeWork SA 2019)	Fabricators and installers of engineered stone	From 25 February 2019 to 21 May 2019	26	103		8		0
SA (SafeWork SA 2019)	Construction industry	From 9 April 2019 to 14 May 2019	12	62		0		0
SA (SafeWork SA 2021)	Fabrication of stone benchtops, monumental stone, construction and mining industries	From 1 October 2020 to 1 April 2021	199 and 71 compliance audits	95		7		N/A
WA (WorkSafe Western Australia 2021)	Engineered stone benchtop fabrication and installation	July 2018 – May 2021	150	Over 1000				

⁸ Note in the case of WA these were enforcement notices

⁹ Data supplied by WHS Queensland

Case study: WorkSafe WA silica compliance project (WorkSafe Western Australia 2021)

Between July 2018 and May 2021, WorkSafe WA undertook a proactive compliance project into engineered stone benchtop fabrication and installation to investigate silica dust exposure risks and controls, and found that silica controls were inadequate in many WA workplaces.

150 workplaces were inspected with over 1,000 enforcement notices issued relating to inadequate controls, no risk assessment conducted, lack of health surveillance, inadequate respiratory protective equipment and poor hygiene practices.

Air monitoring was conducted at 38 workplaces with 75 per cent recording silica dust levels above half of the WES.

The results of air monitoring (117 samples) indicated that the current work practices of fabricating engineered stone benchtops generate elevated levels of silica dust in the workplace, i.e. current workplace engineering and process controls are not sufficiently effective. This presents a significant risk to worker health and places reliance on correct and consistent use of respiratory protective equipment to manage remaining risks.

Generally, stonemasons in fabrication workshops recorded higher silica dust exposure than benchtop installers.

2.4.2 WHS regulators may be unable to adequately ensure compliance with the model WHS laws

During the consultation process, industry stakeholders expressed the view that the current model WHS laws are appropriate to deal with the problem, but greater effort is required to ensure compliance with the WHS laws. Government and industry stakeholders indicated that there are differing levels of capability, resources and enforcement activity among WHS regulators. Some stakeholders also noted that a lack of in-house knowledge of relevant industries may hinder the ability of WHS regulators to determine compliance with the model WHS laws. This indicates that the problem of compliance exists to varying degrees across jurisdictions, and successful prosecutions in some jurisdictions do not necessarily indicate that enforcement has been adequate across all jurisdictions.

3 Why is Government action needed?

3.1 The case for government intervention

Silicosis and silica-related diseases pose an unacceptable health risk to workers. There are significant financial and non-financial costs associated with being diagnosed with silicosis and/or a silica-related disease, including significant physical and emotional harm, reduced ability to work, reduced quality of life and premature death of workers. There are also significant costs to the public health system, including for health screening, diagnosis, treatment and disease management.

The recent and significant increase in the number of cases of these preventable diseases and the impacts on workers, their families and communities present an urgent case for government intervention to reduce exposure to RCS at work and subsequently reduce the number of cases of these diseases.

Feedback received as part of the consultation showed clear and wide-spread support of the need for further government intervention.

3.1.1 Alternatives to government action

A range of non-government stakeholders, including unions and peak health bodies, have undertaken activities and initiatives in recent years to raise awareness of the risks of exposure to RCS, particularly in the engineered stone sector. These stakeholders may continue and even enhance these activities. However, they are unlikely on their own to result in the level of prevention of silicosis and silica-related diseases that is needed.

There is a diverse range of industries where workers are exposed to RCS. To have viable alternatives to government action, these industries would need to either adopt substitute products, develop new approaches to eliminate or minimise the risks, or incentivise a broad range of businesses to self-regulate. Given the range of industries utilising silica-containing materials, the large numbers of workers estimated to be exposed, and the broad range of silica-containing materials (including manufactured and natural materials), this is unlikely to occur in the short or medium term.

3.2 Objectives of government intervention

The primary objective of government intervention is to reduce workplace exposure to RCS in Australia, with the ultimate aim of eliminating silicosis and other silica-related diseases. This is consistent with the shared objective in the All of Australian Governments' response to the National Dust Disease Taskforce (NDDT) final report of eliminating silicosis amongst workers and increasing the quality of life for those already impacted and their families.

4 What policy options are being considered?

4.1 Overview

Five regulatory and non-regulatory options were initially developed to reduce workplace exposures to RCS in Australia (Table 10). Following feedback received from public consultation an additional regulatory option has been included for consideration and Option 3 has been removed. These options are consistent with the Regulatory Impact Analysis Guide for Ministers' Meetings and National Standard Setting Bodies, which advises that the base case and at least one non-regulatory option should be included (Department of Prime Minister and Cabinet 2021a).

Table 10: Regulatory and non-regulatory options

Number	Option	Option type	Description
1	Base case	N/A	This option includes the existing requirements of the model WHS laws, as well as several national regulatory initiatives that are underway.
2	Awareness and behaviour change initiatives	Non-regulatory	Awareness and behaviour change initiatives targeted to workers, PCBUs and other duty holders in the construction, manufacturing, demolition tunnelling, quarrying, and mining industries.
3	Clarification of existing requirements in the model WHS Regulations for defined high risk silica processes	Regulatory	Amendments to the model WHS Regulations to clarify how the existing requirements apply to defined "high risk silica processes". This would have no additional regulatory burden.
4	National licensing framework for PCBUs working with engineered stone	Regulatory	Implementation of a national licensing framework for PCBUs working with engineered stone through changes to the model WHS laws.
5a	Additional regulation of defined high risk crystalline silica processes, including engineered stone	Regulatory	Amendments to the model WHS Regulations for high risk silica processes (as per Option 3) with additional regulatory requirements.
5b	Additional regulation of defined high risk crystalline silica processes, excluding engineered stone	Regulatory	
6	Prohibition on the use of engineered stone	Regulatory	Amendments to the model WHS Regulations to prohibit the use of engineered stone with the exception of removal, repair and minor modifications of engineered stone already installed.

4.2 Option 1: Base case

The base case includes the existing duties under the model WHS Act, model WHS Regulations and relevant model Codes of Practice that are described in Section 1.3. It assumes compliance and enforcement activities of state and territory WHS regulators and education and awareness activities undertaken by Safe Work Australia, state and territory governments and industry groups will continue at current levels. It is anticipated that such activities will continue regardless of what option may be chosen by decision makers.

The base case also includes measures that have yet to be fully implemented, including:

- the implementation of the model Code of Practice: Managing the risks of respirable crystalline silica from engineered stone in the workplace (Safe Work Australia 2021a) in all jurisdictions covered by the model WHS laws apart from Queensland (which has already implemented a Code of Practice (Workplace Health and Safety Queensland 2019)), and
- amendments to the model WHS Regulations prohibiting uncontrolled processing of engineered stone, so clarifying existing duties under the model WHS laws and recognising arrangements already enforced by WHS regulators.

4.3 Option 2: National awareness and behaviour change initiatives to minimise the risks of RCS exposure

Safe Work Australia and state and territory WHS regulators have undertaken extensive education and awareness raising campaigns (see Section 1.4.6). However, preliminary consultation with state and territory WHS regulators indicated that additional awareness-raising and behavioural economics approaches would improve overall understanding of and compliance with WHS duties and reduce exposures to respirable crystalline silica.

Option 2 involves national awareness and behaviour change activities focussed on duty holders in the construction, manufacturing, tunnelling, quarrying, demolition and mining industries and compliance with the model WHS laws.

These initiatives would target the following groups across all industries where silica exposure is known to occur:

- workers
- PCBU's
- officers, designers, manufacturers, importers, suppliers, and those who commission plant or structures
- primary contractors, and
- officers.

The initiatives would seek to improve:

- duty holders' understanding of the risks associated with exposure to RCS
- knowledge of PCBUs on how and when to conduct a risk assessment, control risks and consult with workers, and
- awareness and compliance of workers, PCBUs, and other duty holders with the requirements of the model WHS laws, such as when air and health monitoring is required.

The Clean Air. Clear Lungs. campaign (discussed at Section 1.4.4) is an example of a successful national awareness campaign on occupational lung diseases, including silicosis.

The behaviour change component of Option 2 would move beyond simply clarifying or raising awareness of the requirements of the model WHS laws and take a behavioural economics approach to improving the compliance practices of duty holders. The design of such an initiative would be guided by behavioural economics experts, who would be engaged in the first year of the project to advise and develop appropriate strategies to improve compliance. Tactics that may be used include highlighting the extent of risks of RCS amongst workers, investigating incentives and disincentives to compliance and trialling different approaches amongst various industries and sectors. It is anticipated the initiatives would be repeated on an annual basis for a period of five years. This option would directly address the lack of understanding of silica-related risks and current regulatory requirements and is expected to improve compliance with existing requirements. This can be measured through compliance and enforcement data (e.g., non-compliance notices issued, outcomes of workplace audits) which is currently collected by state and territory WHS regulators.

4.4 Option 3: Clarifying the existing requirements of the model WHS laws for high risk silica processes

Based on preliminary consultation feedback, Option 3 was included in the CRIS to clarify the existing requirements of the model WHS laws into specific regulations covering high risk silica processes. No additional requirements for PCBUs were proposed under this option. However, as a result of feedback on the CRIS, changes have been made to Option 5a (which included all the elements of Option 3). As a result there is now very little difference between Option 3 and Options 5a and Option 3 has been removed as a separate option in this DRIS and the elements discussed under Option 5a.

4.5 Option 4: Implementation of a national licensing framework for PCBUs working with engineered stone

This option seeks to implement a national licensing framework for PCBUs working with engineered stone, under the model WHS laws. This option is based on the recent amendments related to licensing of employers working with engineered stone under the Victorian Occupational Health and

Safety Amendment (Crystalline Silica) Regulations 2021 (Victorian amendment regulations) and would require all PCBUs working with engineered stone to obtain a licence to do so.

The requirements would be as follows:

- *Engineered stone* would be as defined in the amendment model WHS Regulations that prohibit the uncontrolled processing of engineered stone.
- An *engineered stone process* would be defined, in line with the Victorian amendment regulations, as “a process involving engineered stone at a workplace that generates crystalline silica dust, including cutting, grinding or abrasive polishing of engineered stone”.
- PCBUs (not individual workers) undertaking *engineered stone processes* would be required to obtain and hold a licence with the state or territory WHS regulator. Licences would require renewal every 5 years.
- Suppliers of engineered stone would be prohibited from supplying engineered stone to a person who requires an engineered stone licence but does not have one. Suppliers would be required to retain records of PCBUs who have been supplied engineered stone.
- Licensees would be required to provide information to workers prior to commencing work with engineered stone. This includes instruction, information and training about the health risks associated with exposure to crystalline silica dust, the need for appropriate controls, and application of controls.
- Licensees would have a specific duty to provide and pay for health monitoring for all workers undertaking an engineered stone process. As per existing model WHS Regulations regs 369-378, licensees would have duties to provide information to the registered medical practitioner undertaking health monitoring, obtain health monitoring reports, provide health monitoring reports to workers, WHS regulators and other relevant PCBUs and retain health monitoring records.
- Licensees would have an explicit duty to undertake air monitoring for RCS. Licensees would also be required to provide air monitoring results to the WHS regulator where they indicate that the levels of RCS in the workplace exceed the WES.
- Licensees would be required to develop and implement an engineered stone control plan based on the outcomes of a risk assessment. This engineered stone control plan will be required to:
 - identify the specific tasks or processes required to be undertaken by the licence holder that requires an engineered stone licence
 - identify the proportion of crystalline silica contained in the engineered stone
 - identify the hazards and assesses the risks associated with that work, including the likely frequency and duration of exposure of workers to RCS
 - sufficiently describe measures to control those risks
 - describe how the risk control measure will be/are implemented
 - contain previous air monitoring and health monitoring results
 - contain any other information about previous incidents, illnesses or diseases associated with exposure to RCS, and

- be set out and expressed in a way that is readily accessible and comprehensible to all people who use it.
- Licensees would be required to implement specific control measures, including:
 - use of local exhaust ventilation, on tool dust extraction and/or water suppression when using a power tool or mechanical plant to process engineered stone
 - ensuring that workers are provided and use appropriate respiratory protective equipment
 - provision of information, instruction and training, and
 - ensuring compressed air is not used for cleaning.

It is also expected that WHS regulators would implement a program of scheduled and unscheduled audits of licensees to support the licensing scheme. This option would also be accompanied by a national awareness campaign and the development of supporting guidance material for PCBUs and workers.

If implemented, this licensing framework would be expected to:

- improve identification of PCBUs working with engineered stone
- clarify the duties related to air and health monitoring for PCBUs working with engineered stone, include when reports must be provided to the WHS regulator. This would allow identification of PCBUs who may not be effectively controlling RCS exposures at their workplaces
- improve PCBU's and workers' understanding of the risks and controls by requiring a risk assessment, engineered stone control plan and worker training, which is expected to improve compliance and reduce the risk of exposure to RCS
- improve uptake of engineering controls through specific regulation, noting that amendments to the model WHS regulations currently underway (see Option 1) will expressly require the use of engineering controls and RPE when processing of engineered stone, and
- improve compliance as a result of scheduled and unscheduled audits.

The National Dust Disease Taskforce considered a licensing scheme for PCBUs working with engineered stone would improve compliance in that sector by "... restricting access to the product to those businesses able to demonstrate that they can eliminate or minimise risks associated with engineered stone."¹⁰ (Australian Government 2022).

Of note, this option is only limited to engineered stone. As implementing this option would not address the significant risks of silicosis and silica-related diseases from other silica-containing materials, this option would be considered in combination with Option 5b.

¹⁰ National Dust Disease Taskforce (2021) National Dust Disease Taskforce Final Report. [https://www1.health.gov.au/internet/main/publishing.nsf/Content/562CF83B7AECFC8FCA2584420002B113/\\$File/NDDT-Final-Report-June-2021.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/Content/562CF83B7AECFC8FCA2584420002B113/$File/NDDT-Final-Report-June-2021.pdf), accessed 5 April 2022.

4.6 Option 5a: Regulation of high risk crystalline silica processes for all materials including engineered stone

Option 5a is based on the recent amendments to the Victorian Occupational Health and Safety Regulations 2017. It would specifically include definitions of *crystalline silica substance*, *crystalline silica process* and *high risk crystalline silica process*.

- The CRIS proposed the following definitions for consideration:
- A *crystalline silica substance* means materials containing over 1 per cent crystalline silica and would include engineered stone.
- A crystalline silica process means:
 - use of power tools and machinery involving material that is a crystalline silica substance
 - use of roadheaders¹¹ involving material that is a crystalline silica substance
 - quarrying involving material that is a crystalline silica substance
 - mechanical screening involving material that is a crystalline silica substance
 - tunnelling involving material that is a crystalline silica substance, or
 - a process that exposes or is reasonably likely to expose a person to crystalline silica dust during manufacture or handling of a crystalline silica substance.
- A high risk crystalline silica process means a crystalline silica process where:
 - it is reasonably likely that workplace exposure standard will be exceeded, or
 - the PCBU is not certain on reasonable grounds that workplace exposure standard will be exceeded, or
 - there is a health risk from exposure to silica dust.

Feedback on the CRIS was supportive of including definitions of crystalline silica substance, crystalline silica process and high risk crystalline silica process. There were some concerns with the definitions as proposed, however, no clear alternative definitions were proposed.

If this option is preferred, further work in consultation with Safe Work Australia Members would be undertaken to refine the definitions to minimise any unintended consequences.

This option would specify the following requirements for PCBUs undertaking *high risk crystalline silica processes*:

- PCBUs undertaking *high risk crystalline silica processes* would be required to develop a silica risk control plan based on the outcomes of a risk assessment. This would include identifying and documenting:

¹¹ A roadheader is a piece of excavation equipment that can be used in tunnelling and mining.

- the specific tasks or processes required to be undertaken with crystalline silica substances that are high risk crystalline silica processes
 - the form(s) of crystalline silica present in the crystalline silica substance(s)
 - the proportion of crystalline silica contained in the crystalline silica substance
 - the hazards and the risks associated with that work, including the likely frequency and duration of exposure of workers to RCS
 - measures to control those risks, and
 - how the risk control measures will be or are implemented.
- The silica risk control plan would also be required to:
 - contain previous air monitoring and health monitoring results
 - contain any other information about previous incidents, illnesses or diseases associated with exposure to RCS at the workplace, and
 - be set out and expressed in a way that is readily accessible and comprehensible to all people who use it.
 - Any construction work¹² that involves high risk crystalline silica processes would be considered high risk construction work and a Safe Work Method Statement must be produced, complied with, provided to the principal contractor (if any), reviewed and retained as per model WHS Regulations regs 299-303. Note for high risk crystalline silica processes that are high risk construction work, preparation of a SWMS may be sufficient to meet the requirement for a silica risk control plan.
 - PCBU's would also be required to provide information to workers prior to commencing work. This includes instruction, information and training about the health risks associated with exposure to crystalline silica dust, the need for appropriate controls, and application of controls
 - PCBU's would be required to undertake air monitoring when the work involves a high risk crystalline silica process and provide air monitoring results to the WHS regulator where they indicate that the levels of RCS in the workplace exceed the WES.
 - PCBU's would be required to provide and pay for health monitoring for all workers undertaking a high risk crystalline silica process. They would also be required to provide information to the registered medical practitioner undertaking health monitoring, obtain health monitoring reports, provide health monitoring reports to workers, WHS regulators (where required) and other relevant PCBU's, and retain health monitoring records as per model WHS Regulations regs 369-378.

This option would also be accompanied by a national awareness campaign and the development of supporting guidance material for PCBU's and workers.

If implemented Option 5a would be expected to:

¹² Chapter 6 of the model WHS Regulations defines construction work as “any work carried out in connection with the construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment, demolition, decommissioning or dismantling of a structure”. For a full definition, refer to r289.

- clarify the duties related to air and health monitoring for PCBU's undertaking *high risk crystalline silica processes*, including when reports must be provided to the WHS regulator. This would allow identification of PCBU's who may not be effectively controlling RCS exposures at their workplaces, and
- improve compliance and reduce the risk of exposure to RCS. PCBU's' and workers' understanding of the risks and controls would improve by requiring a risk assessment and silica risk control plan, and worker training. The requirement to develop a silica risk control plan would also ensure adequate control measures are implemented.

4.7 Option 5b: Additional regulation of high risk crystalline silica processes for all materials excluding engineered stone

Option 5b was developed so that it could operate in combination with Option 4 (a national licensing framework for PCBU's working with engineered stone). Option 5b is equivalent to Option 5a but would exclude engineered stone. This is because the proposed national licensing framework includes overlapping elements of Option 5a, such as requirements to undertake risk assessments, develop and implement risk control plans and undertake and report results of air and health monitoring.

4.8 Option 6: Prohibition on the use of engineered stone

A ban on the use of engineered stone was not included in the CRIS. However, a result of stakeholder feedback in the consultation process, a new option has been included in this DRIS for consideration by WHS ministers. A significant number of stakeholders (12 submissions, or 18 per cent) expressed support for a ban on engineered stone. Three submissions (4 per cent) opposed a ban on engineered stone.

Under this option the processing of engineered stone would be prohibited, except under specific circumstances.

This option is modelled on Chapter 8 (Asbestos) of the model WHS Regulations. A PCBU would be prohibited from carrying out, or directing or allowing a worker to carry out, work involving the processing of engineered stone, including manufacture, manipulation, fabrication or installation. Processing would include using power tools or other mechanical plant to cut, grind, trim, sand, abrasive polish or drill the engineered stone. The prohibition would apply to any product meeting the definition of engineered stone in the model WHS Regulations.

Similar to those that are in place for asbestos, exemptions would apply to PCBU's undertaking work with engineered stone for the purposes of:

- sampling and identification
- maintenance work on engineered stone surfaces installed before the date prohibition is enacted

- removal or disposal of engineered stone (including transport for disposal)
- demonstrations, education or practical training, and
- genuine research and analysis.

PCBUs wanting to undertake exempt work with engineered stone would require a licence as outlined in option 4, including:

- developing and implementing an engineered stone control plan
- ensuring appropriate controls are in place, and
- undertaking air monitoring and health monitoring.

As implementing this option would not address the significant risks of silicosis and silica-related diseases from other silica-containing materials, this option would be considered in combination with Option 5b.

5 What is the likely impact of options 2-5?

5.1 Approach to impact analysis

The DRIS process seeks to ensure that proposed regulatory and non-regulatory options are well-targeted, effective and appropriate, and any burden imposed on business and the community is comparatively appropriate to address the identified issue. A key part of this process is to compare the impact of the proposed options to industry and government.

Typically, costs imposed on business and government can be assessed quantitatively, while other costs and benefits can be more difficult to estimate in monetary terms. In this DRIS, efforts are made to identify the monetary costs to business and government for the proposed options that are additional to the base case option.

Following consultation with OIA, a combination of multi-criteria analysis (MCA) and breakeven analysis (BEA) has been used to measure the impact of options 2, 4, 5a and 5b.

MCA can be used when it may not be feasible to fully quantify the impacts of an option and allows qualitative information to be used in decision-making. The criteria used to assess each option are described in Section 6.2. This DRIS includes detailed estimates of the estimated additional costs of Options 2, 4, 5a and 5b each option above the base case (Option 1) which has been included to demonstrate the potential direct costs associated with the proposed regulatory/non-regulatory changes over and above the current state.

However, it was not feasible to quantify the benefits of the effectiveness of each of the proposed options to reduce exposures to RCS and reduce silicosis and silica-related diseases, in monetary terms. This is because there is insufficient data to estimate the benefits of a reduction in workplace exposure in RCS and a reduction in silicosis and silica-related disease for each of the regulatory and non-regulatory options.

This DRIS also includes a BEA, which quantifies the economic cost of each case of silicosis and assesses the number of silicosis cases which would need to be avoided under Options 2, 4, 5a and 5b for the benefits to outweigh the additional costs.

5.2 Criteria development for multicriteria analysis

In an MCA, it is important to clearly define the criteria when assessing options to integrate quantitative and qualitative information in a way that allows options to be compared on a transparent and consistent basis.

This MCA uses the following criteria to assess each option:

- the estimated additional costs to industry and government: quantitative estimates of the costs to industry of complying with the proposed regulations and the costs to government of implementing and administering the regulations above those of the base case (Option 1), and
- the effectiveness: qualitative assessment of the effectiveness of each option in reducing occupational exposures to RCS and the number of cases of silicosis and silica-related diseases.

5.3 Defining the additional costs to industry and government

Analysis of the estimated costs to industry and government for Options 2, 4 and 5 has been undertaken using information available at the time of drafting. The costs presented below are estimates only and do not include costs of controls associated with complying with the current requirements of the model WHS laws.

The following sections present the estimated costs to industry and government for the proposed options, with the methodology and assumptions presented in Appendix C.

5.3.1 Additional costs to industry

Table 11 summarises the additional costs to industry for Options 4 and 5 above the baseline option (Option 1). No additional costs to industry would be incurred for Option 2.

Table 11: Description of additional costs to industry of Options 4 and 5

Cost to industry	Description
Option 4*	
Licence application	Labour to prepare a licence application.
Licence fee	Licence fee paid by PCBU to work with engineered stone for a period of 5 years. Note that this would be set in jurisdictional legislation and not under the model WHS laws.
Risk assessment (initial assessment)	Additional labour costs for the preparation of a risk assessment in year 1. This includes costs of seeking advice from experts, and may include baseline analytical tests/analysis of source materials.
Risk assessment (annual assessment)	Additional labour costs for the annual review of risk assessment.
Engineered stone control plan	Labour to develop an engineered stone control plan based on the outcomes of the risk assessment.
Preparation for and participation in compliance audits	Labour to prepare for and participate in licence-specific compliance audits, additional to those currently in place for the sector.
Air monitoring – provision of report to regulators where WES exceedance detected	Labour to submit air monitoring report to regulators where RCS values exceed WES.

Cost to industry	Description
Option 5a and 5b	
Risk assessment (initial assessment)	Additional labour costs for the preparation of a risk assessment in year 1. This includes costs of seeking advice from experts, and may include baseline analytical tests/analysis of source materials.
Risk assessment (annual assessment)	Additional labour costs for annual review of risk assessment.
Silica risk control plan	Labour to develop a silica risk control plan based on the outcomes of the risk assessment. Note: For construction work involving high risk crystalline silica processes that meets the definition of high risk construction work, preparation of a Safe work method statement (SWMS) may be sufficient to meet the requirement for a silica risk control plan. The preparation of SWMS for high risk construction work is an existing requirement of the model WHS laws.
Air monitoring – provision of report to regulators where RCS WES exceedance detected	Labour to submit air monitoring report to regulators where RCS values exceed WES.

*Under Option 4, there would also be no additional cost to industry to provide instruction, information, and training to workers prior to commencing work with engineered stone, and to implement specific control measures as these are already required under the model WHS laws.

5.3.2 Additional costs to government

Table 12 summarises the additional costs to government for Options 2-5 above the baseline option (Option 1).

Table 12: Description of additional costs to government of Options 2-5

Cost to government	Description
Option 2	
Planning and design of awareness raising and behaviour change initiative	Labour to plan and design behaviour change initiatives.
Roll out across a range of industry sectors of awareness raising and behaviour change initiative	Roll out of awareness/behaviour change initiative across a range of industry sectors.
Option 4	
Implementation of a national awareness campaign to support the regulatory change	Cost of campaign to inform PCBUs and other relevant duty holders of regulatory changes.
Purchase of licencing software	Cost of developing of a licensing platform(s) and implementation across in each jurisdiction.
Development, implementation, and maintenance of a system for administration of licensing framework	Labour to develop the administration system to support the licensing framework and implement in each jurisdiction Note: the system could also be used to collate health and air monitoring data.
Processing of licences	Labour to assess licence applications

Cost to government	Description
Preparation for and participation in compliance audits	Labour to run compliance audit programs specific to engineered stone licensing scheme.
Options 5a and 5b	
Implementation of a national awareness campaign to support the regulatory changes	Cost of campaign to inform PCBUs and other relevant duty holders of additional requirements resulting from regulatory changes.

5.4 Cost of options 2, 4, 5a and 5b

5.4.1 Option 1: Base case

Option 1 has been included as a baseline option to demonstrate the direct costs of the proposed regulatory/non-regulatory changes over and above the status quo. While there are no direct costs associated with the drafting of regulatory and non-regulatory changes, there are a number of indirect costs that may result from an increase in silicosis and silicosis related illnesses such as:

- an increase in silicosis and silica-related health care costs, including hospitalisations and treatment
- social and psychological costs for the affected worker and family, and
- future worker's compensation payments.

The cost of inaction to business may also be realised as increasing insurance premiums resulting from increased cases of silicosis and silicosis related diseases, and staff turnover for those diagnosed with silicosis or silica-related diseases.

5.4.2 Option 2: National awareness and behaviour change initiatives

5.4.2.1 Costs to industry

Awareness campaigns and behaviour change initiatives would not present an additional cost to industry as the cost of development and distribution would be borne by government. While we acknowledge that workers will be required to interact and engage with materials produced for this purpose, we expect that workers would already interact with such materials as part of routine safety discussions in the workplace; and a specific costing is not required.

5.4.2.2 Costs to government

Compared to the base case, additional costs borne by government relate to the planning and design and the subsequent development and distribution of information for behaviour change and awareness initiatives on an annual basis.

The total estimated net present cost over a 10-year forecast period is presented in Table 13.

Table 13: Estimated net present cost to government of awareness and behaviour changes initiatives (Option 2) over 10 years

Cost	Estimated net present cost over 10-year period (\$m)
Awareness and behaviour change initiatives - planning and design	\$0.1
Awareness and behaviour change initiatives - roll out across all industry sectors	\$6.0
Total	\$6.1

5.4.3 Option 4: Implementation of a national licensing framework for PCBU's working with engineered stone

5.4.3.1 Costs to industry

Additional costs incurred by industry above the base case for Option 4 include the licensing fee and labour costs associated with preparation of a licence application every 5 years, the preparation and revision of risk assessments and control plans, preparation and participation in compliance audits, and submission of air monitoring reports to WHS regulators where WES exceedances have been detected.

The total estimated net present cost over a 10-year period is presented in Table 14.

Table 14: Estimated net present cost to industry of a national licensing framework for PCBU's working with engineered stone (Option 4) over 10 years

Cost	Estimated net present cost over 10-year period (\$m)
Licence application	\$1.6
Licence fee	\$0.6
Risk assessment (initial assessment)	\$4.2
Risk assessment (annual assessment)	\$1.9
Engineered stone control plan	\$1.3
Preparation for and participation in compliance audits	\$6.0
Air monitoring – provision of report to regulators where WES exceedance detected	\$0.4
Total	\$16.0

5.4.3.2 Costs to government

Additional costs incurred by government above the base case include labour costs associated establishing and implementing the national licensing framework, assessment of licence applications, and preparing for and conducting licence specific audits. Other costs include implementation of an awareness campaign to support implementation of the licensing scheme, and the development of a system for administering the licensing framework, which could also capture health and air monitoring data.

The total estimated net present cost over a 10-year period is presented in Table 15.

Table 15: Estimated net present cost to government of a national licensing framework for PCBUs working with engineered stone (Option 4) over 10 years

Cost	Estimated net present cost over 10-year period (\$m)
Implementation of a national awareness campaign to support the regulatory change	\$0.9
Purchasing of licensing software	\$4.9
Administration of licencing framework	\$0.4
Processing of licences	\$6.0
Compliance and enforcement	\$4.8
Total	\$16.9

5.4.4 Option 5a: Additional regulation of defined high risk crystalline silica processes

5.4.4.1 Costs to industry

Additional costs incurred by industry beyond the base case for Option 5a include labour for the preparation of risk assessments and a risk control plan, and submission of air monitoring reports to WHS regulators where results indicate the RCS WES has been exceeded.

The total estimated net present cost over a 10-year period is presented in Table 16.

Table 16: Estimated net present cost to industry of additional regulation of defined high risk crystalline silica processes for industry (Option 5a) over 10 years

Cost	Estimated net present cost over 10-year period (\$m)
Risk assessment - Initial assessment (Year 1)	\$94.0
Risk assessment - Annual assessment (Year 2 - 10)	\$47.7
Silica risk control plan - preparation (all industries excluding construction)	\$12.0
Air monitoring - provision of report to regulators where WES exceedance detected	\$15.0
Total	\$168.7

5.4.4.2 Costs to government

Additional costs incurred by government over and above the requirements under the WHS laws for this option include funding for an awareness campaign on amendments to the model WHS laws.

The total estimated net present cost over a 10-year period is presented in Table 17.

Table 17: Estimated net present cost to government of additional regulation of defined high risk crystalline silica processes for industry (Option 5a) over 10 years

Cost	Estimated net present cost over 10-year period (\$m)
Implementation of a national awareness campaign to support the regulatory change	\$0.9
Total	\$0.9

5.4.5 Option 5b: Additional regulation of defined high risk crystalline silica processes (excluding engineered stone)

5.4.5.1 Costs to industry

The costs to industry incurred under Option 5b are equivalent to Option 5a, with the exception that costs associated with PCBUs working with engineered stone are excluded from the analysis.

The estimated net present cost to industry over a 10-year period is presented in Table 18.

Table 18: Estimated net present cost to industry of additional regulation of defined high risk crystalline silica processes for industries (Option 5b) over 10 years

Cost	Estimated net present cost over 10-year period (\$m)
Risk assessment - Initial assessment (Year 1)	\$89.8
Risk assessment - Annual assessment (Year 2 - 10)	\$44.2
Silica risk control plan - preparation (all industries excluding construction)	\$11.6
Air monitoring - provision of report to regulators	\$14.3
Total	\$159.9

5.4.5.2 Cost to government

The estimated net present cost to government over a 10-year period is presented in Table 19.

Table 19: Estimated net present cost to government of additional regulation of defined high risk crystalline silica processes for government (Option 5b) over 10 years

Cost	Estimated net present cost over 10-year period (\$m)
Implementation of a national awareness campaign to support the regulatory change	\$0.9
Total	\$0.9

5.4.6 Summary assessment

Table 20 summarises the estimated net present cost to industry, government and total costs incurred for each option.

Table 20: Comparison of the estimated net present cost for Options 2-5 over 10-year period (\$m)

Criterion	Option 2	Option 4	Option 5a	Option 5b
Cost to industry	\$0	\$16.0	\$168.7	\$159.9
Cost to government	\$6.1	\$16.9	\$0.9	\$0.9
Total estimated cost	\$6.1	\$32.9	\$169.6	\$160.8

5.5 Effectiveness

5.5.1 Option 1: Base case

The base case describes the current regulatory and non-regulatory measures implemented to minimise the risks of RCS and consequently, reduce the number of cases of silicosis and other silica-related diseases (see Section 4.2). As outlined in Chapter 3, factors such as a lack of understanding of silica-related risks and current regulatory requirements, and levels of compliance and enforcement, have led to workplace exposure to RCS. As set out in Chapter 4, current experience indicates that due to the wide range of materials that contain crystalline silica, the range of affected industries, and the current levels of silicosis and silica-related diseases, it is unlikely that the market will effectively address this issue without government intervention. In many cases, it is not viable to substitute other materials (e.g., bricks and concrete) or alternative processes to minimise the risks of RCS.

While not considered an acceptable option, the base case has been included for comparison to demonstrate the incremental impact of regulatory/non-regulatory changes over and above the baseline option.

5.5.2 Option 2: National awareness and behaviour change initiatives

As described in Section 4.3, Option 2 includes additional awareness and behaviour change initiatives targeted at workers, PCBUs and other duty holders in the construction, manufacturing, demolition, tunnelling, quarrying and mining industries.

Targeted and accessible awareness and behaviour change initiatives are expected to lead to increased compliance, a reduction in workplace exposure to RCS and reduced instances of silicosis and silica-related diseases compared with base case as this option would:

- provide industry specific information to workers and PCBUs and other duty holders, targeting changing compliance behaviours, and
- aim to reach a broad audience across a wider range of industries.

Awareness and behaviour change initiatives are expected to improve compliance with the model WHS laws, particularly for those who are less aware of the risks of RCS and the appropriate control measures. Improved compliance is expected to result in a reduction in the risks to workers.

However, these initiatives may be less effective at improving compliance if they are not combined with regulatory options, all of which would provide greater additional clarity about what is specifically required to reduce the risk of exposure to RCS and reduce the number of cases of silicosis and silica-related diseases. The non-regulatory nature of awareness and behaviour change initiatives may create a sense that RCS exposure is not a serious issue and reduce effectiveness.

The initiatives would need to cover a broad range of industries and workers and may need to be tailored to be most effective. Ongoing and varied behaviour change strategies may be required for a long-lasting change.

5.5.3 Option 4: Implementation of a national licensing framework for PCBU's working with engineered stone

This option involves development and implementation of a national licensing framework for PCBU's working with engineered stone, based on the recent amendments related to licensing of employers working with engineered stone set out in the Victorian Occupational Health and Safety Amendment (Crystalline Silica) Regulations 2021.

Compared with the base case, Option 4 is likely to result in increased compliance, a reduction in workplace exposure to RCS and reduced number of cases of silicosis and silica-related diseases in the engineered stone sector as it would:

- provide an incentive for PCBU's working with engineered stone to become licensed as supply of engineered stone to unlicensed PCBU's will be prohibited
- provide an incentive for PCBU's who do not want to become licensed to work with alternative products with no crystalline silica content
- ensure that licensees assess the risk of processes involving engineered stone through risk assessments and the development of engineered stone control plans
- increase the likelihood of adoption of appropriate control measures, and implementation of air monitoring and health monitoring programs among PCBU's working with engineered stone
- result in greater compliance and enforcement of WHS laws through scheduled and unscheduled visits of licensees' workplaces and the imposition of financial penalties for non-compliance
- provide regulators with greater information on the number and location of workplaces where engineered stone is processed
- allow WHS regulators to analyse air monitoring exceedances and health monitoring data to:
 - draw insights into trends of RCS exposure for workers processing engineered stone
 - make an initial assessment into a PCBU's ability to manage RCS exposure, and
 - better target enforcement and compliance actions where required.

While initiatives under this policy option should reduce engineered stone workers exposure to RCS, they are unlikely to be effective in reducing the overall level of workplace exposure to RCS and the number of cases of silicosis and silica-related diseases. Unlike Option 5a and 5b, this option focuses solely on PCBU's working with engineered stone, which are small subset of the estimated number of workers exposed to RCS.

Another disadvantage of this option is that it would place a greater financial burden on small to medium size businesses (which form a large portion of the engineered stone industry) who may lack the economies of scale to absorb licensing costs. This may have negative effects on market competition.

It is also possible that some PCBUs, instead of seeking alternative products, could seek engineered stone from unregulated sources, such as repurposing engineered stone from the second-hand market. This could result in engineered stone workers still being exposed to the risks of RCS.

5.5.4 Option 5a: Additional regulation of defined high risk crystalline silica processes

Option 5a would include amendments to the model WHS Regulations applying to all *crystalline silica substances*, including engineered stone, and provide additional regulation for *high risk crystalline silica processes*.

Under this option, specific regulations would be developed to:

- define crystalline silica substances, crystalline silica processes, and high risk crystalline silica processes
- consolidate and clarify existing requirements as they apply to these definitions, and
- introduce additional regulation of high risk crystalline silica processes.

Clarification of existing requirements in the model WHS laws will lead to increased compliance, a reduction in workplace exposure to RCS and a reduced number of cases of silicosis and other silica-related diseases beyond the base case, as this option would:

- improve awareness of the risks of RCS and appropriate controls, if combined with an associated communication campaign
- provide greater certainty and understanding of the regulatory requirements for PCBUs and other duty holders regarding minimising RCS exposure, and
- address concerns among stakeholders about the subjective thresholds that are included in the model WHS Regulations. For example, this would clarify the circumstances under which air monitoring and health monitoring are required.

Additional regulation of defined *high risk crystalline silica processes* would lead to increased compliance, a reduction in workplace exposure to RCS and reduced instances of silicosis and other silica-related diseases over and above the base case (Option 1) as this option would:

- increase the likelihood of PCBUs being aware of the risks of *high risk crystalline silica processes* and the need to implement appropriate controls to eliminate or minimise these risks
- impose greater accountability on PCBUs undertaking *high risk crystalline silica processes* as they would be required to conduct risk assessments and develop silica risk control plans and report any air monitoring showing a WES exceedance, and
- allow WHS regulators to analyse air monitoring exceedance data and health monitoring data to:
 - draw insights into trends of RCS exposure

- make an initial assessment into a PCBU's ability to manage RCS exposure, and
- better target enforcement and compliance actions where required.

5.5.5 Option 5b: Additional regulation of defined high risk crystalline silica processes (excluding engineered stone)

As noted in Section 4.7, Option 5b is equivalent to Option 5a with the exclusion of PCBUs working with engineered stone.

This option would exclude engineered stone so that the costs and impacts of this option can be considered in combination with Option 4.

The effectiveness of this option is presented in Option 5a with key findings applicable to all industry sectors excluding engineered stone.

5.6 Benefits assessment

The qualitative assessment undertaken in Section 6.5 demonstrates that to varying extents, Options 2, 4 and 5 would be likely to lead to increased compliance, reduced workplace exposure to RCS and a reduction in silicosis and silica-related diseases. This will result in direct and indirect benefits including:

- reduction in premature death from silicosis and silica-related diseases
- reduced number of workers living with silicosis and silica-related diseases
- reduced health care costs, including hospitalisations and treatment, for silicosis and silica-related diseases
- improved worker productivity by extending working life, and
- avoided mental health and quality of life effects for workers, family and friends.

A further benefit of capturing and analysing outlined air and health monitoring data is that it will allow a national assessment on the effectiveness of initiatives to reduce exposure to RCS at the workplace and inform assessments about the ongoing risks to workers.

Due to uncertainty and insufficient data, it is not possible to assess effectiveness of each option in monetary terms.

5.6.1 Assessing the benefits of silicosis and silica-related disease prevention

The economic impact associated with a worker developing silicosis or a silica-related disease can occur across many years, from the time the disease is diagnosed through to the end of the worker's life. In most cases, silicosis and silica-related diseases will worsen over time. This means that workers who receive an early diagnosis are required to live with this burden and the increased likelihood of premature death.

These health benefits are typically estimated through the quantification of value of lives saved and illness avoided. This is an accepted economic method for analysing and comparing policy options for reducing fatalities and illness. The following section outlines the key concepts underpinning this analysis.

5.6.1.1 Value of lives saved and illness avoided

The value of lives saved and illness avoided is estimated by comparing the duration an individual life with silicosis or silica-related disease and the number of years lost due to premature death before the average life expectancy. These concepts are outlined below.

Value of a statistical life (VSL)

A key concept used to measure the value of lives saved is the value of a statistical life (VSL) which is an estimate of the value society places on reducing the risk of dying. The value of a statistical life is most appropriately measured by estimating how much society is willing to pay to reduce the risk of death. Based on empirical domestic and international research, Office of Impact Analysis (OIA) guidance indicates that the value of a statistical life is \$3.5 million in 2022 dollars and the value of a statistical life year (VSLY) is \$227,000.¹³

Value of a disability adjusted life year (DALY)

Regulatory and non-regulatory changes can have the benefit of reducing the risk of injury, disease or disability. A method to value these benefits is to adjust the value of statistical life year (which could be interpreted as the value of a year of life free of injury, disease and disability) by a factor that accounts for the type of injury, disease or disability.

The value of an individual living with the disease is measured using a disability adjusted life year (DALY) factor, representing the loss of one year of full health. Using the disability weighting for chronic obstructive lung disease (0.43) provided by the Australian Institute of Health and Welfare, the value of a DALY is \$94,338 per annum.¹⁴

Key assumptions used in the Victorian Occupational Health and Safety Amendment (Crystalline Silica) Regulations 2021 Regulatory Impact Statement commissioned by WorkSafe Victoria (Deloitte 2021) have been used to estimate average value of life saved and illness avoided per person as presented below.

5.6.1.2 Estimating the average value of life saved

The average value of life saved is calculated in three steps as presented below.

Step 1: Estimate the average age of death due to silicosis or silica-related disease

The approach used to estimate the average age of death due to silicosis or silica-related disease is presented below, with key assumptions underpinning the estimated outlined in Table 21.

$$\begin{aligned} & \textbf{Estimated average age of death due to silicosis or silica-related disease} \\ & \qquad \qquad \qquad = \\ & \qquad \qquad \text{Average age of diagnosis with silicosis or silica-related disease} \\ & \qquad \qquad \qquad + \\ & \qquad \qquad \text{Average time between diagnosis of silicosis or silica-related disease and death} \end{aligned}$$

¹³ Office of Impact Assessment, Best Practice Regulation Guidance Note – Value of statistical Life, August 2022.

¹⁴ Office of Impact Assessment, Best Practice Regulation Guidance Note – Value of statistical Life, August 2022.

Table 21: Estimated average age of death due to silicosis or silica-related disease

Assumption	Value
Average age of diagnosis with silicosis or silica-related disease	43.30 years (Deloitte 2021)
Average time between diagnosis of silicosis or silica-related disease and death	9.30 years (Deloitte 2021)
Estimated average age of death due to silicosis or silicate related disease	52.6 years

Step 2: Weighted average life expectancy of people with silicosis or silica-related disease

The approach used to estimate the weighted average life expectancy of people with silicosis or silica-related disease is presented below, with key assumptions underpinning the estimated outlined in Table 22 below.

$$\begin{aligned}
 & \text{Weighted average life expectancy of people with silicosis or silica-related disease} \\
 & = \\
 & (\text{Proportion of silica-related diagnoses that led to a fatality} \times \text{estimated average life expectancy of an} \\
 & \quad \text{Australian with silicosis or silica-related disease}) \\
 & + \\
 & (\text{Proportion of silicosis or silica-related diagnoses that did not lead to a fatality} \\
 & \quad \times \\
 & \quad \text{Average life expectancy of an Australian})
 \end{aligned}$$

Table 22: Weighted average life expectancy of people with silicosis or silica-related disease

Assumption	Value
Proportion of silicosis or silica-related diagnoses that led to a fatality	28% (Deloitte 2021)
Estimated average age of death due to silicosis or silica-related disease	52.6 years
Proportion of silicosis or silica-related diagnoses that do not lead to a fatality	72% (Deloitte 2021)
Average life expectancy of an Australian	82.30 years (Australian Institute of Health and Welfare 2022)
Weighted average life expectancy of people with a silicosis or silica-related disease	73.9 years

Step 3: Estimate the average value of life saved

The approach used to estimate the average value of life saved for people with silicosis or a silica-related disease is presented in the formula below, with key assumptions underpinning the estimated outlined in Table 23 below.

$$\begin{aligned}
 & \text{Estimated average value of life saved} \\
 & = \\
 & \text{Value of a statistical life year (VSLY)} \\
 & \times \\
 & (\text{Average life expectancy of an Australian} - \text{Weighted average life expectancy})
 \end{aligned}$$

Table 23: Average value of life saved

Assumption	Value
Value of a statistical life year (VSL)	\$222,000 (Department of Prime Minister and Cabinet 2021b)
Average life expectancy of an Australian	82.30 years (Australian Institute of Health and Welfare 2022)
Weighted average life expectancy of people with silicosis or a silica-related disease	73.9 years
Estimated average value of life saved	\$1.8 million

5.6.1.3 The average value of illness avoided from silicosis or silica-related disease

The approach used to estimate the average value of illness avoided due to silicosis or silica-related disease is presented in the formula below, with key assumptions underpinning the estimated outlined in Table 24 below.

$$\begin{aligned}
 & \text{Value of illness avoided} \\
 & = \\
 & \text{Disability adjusted life year (DALY)} \\
 & \times \\
 & (\text{Weighted average life expectancy of people with silicosis or silica-related disease} - \text{Average age of diagnosis with silica-related disease})
 \end{aligned}$$

Table 24: Average value of illness avoided from silica-related disease

Assumption	Value
Disability adjusted life year (DALY)	\$94,338 (Department of Prime Minister and Cabinet 2021b)
Weighted average life expectancy of people with silicosis or silica-related disease	73.9 years
Average age of diagnosis with silica-related disease	43.30 years (Deloitte 2021)
Estimated average value of illness avoided	\$2.8m

5.6.1.4 The estimated expected value of life saved and illness avoided

The approach used to estimate the expected value of life saved and illness avoided is presented in the formula below, with key assumptions underpinning the estimated outlined in Table 25 below.

Table 25: Estimated expected value of life saved and illness avoided (\$m)

Assumption	Value (\$m)
Estimated average value of life saved	\$1.8m
Estimated average value of illness avoided	\$2.8m
Estimated expected value of life saved and illness avoided	\$4.6m

5.6.2 Breakeven analysis

Breakeven analysis measures how effective an option needs to be so that the benefits outweigh the costs. In this analysis, the breakeven point expresses how many cases of silicosis would need to be prevented to justify the cost of each of the proposed options.

Table 26 lists the net present cost of each of the options over the ten-year reporting period. The number of cases of silicosis that would need to be prevented for each option to breakeven is determined by dividing the net present cost of each option by the costs of illness and death due to silicosis.

Table 26: Estimated breakeven analysis results over ten years

Option	Net present cost (\$m)	Estimated number of cases prevented required to breakeven*
Option 2	\$6.1	1
Option 4	\$32.9	7
Option 5a	\$169.5	37
Option 5b	\$160.8	35

*Estimated number of cases required to break even rounded to the nearest whole number

It is difficult to forecast the effectiveness of each option. Options 4 and 5 have been developed based on the Victorian Occupational Health and Safety Amendment (Crystalline Silica) Regulations 2021, which were implemented in May 2022. The licensing scheme for employers working with engineered stone only commenced in November 2022. There has not been sufficient time to assess the effectiveness of these options.

Limitations

This analysis is conservative and is likely to underestimate the full costs of silicosis to the Australian economy. It does not assess the costs associated with other silica-related diseases (such as lung cancer, silicosis, and progressive massive fibrosis), nor the difference in the progression of acute or accelerated silicosis that is associated with higher exposures to RCS. It does not consider the significant burden placed on the health system by avoidable diseases. It also does not consider other significant benefits that are associated with not having silicosis such as:

- improved mental health and wellbeing benefits for affected workers and their families
- reduced costs to the public health and workers' compensation systems, and
- improved productivity and efficiency resulting from reduced absenteeism.

6 What is the likely impact of Option 6

6.1 Approach

Following stakeholder feedback on the options presented in the CRIS, an additional option that considers a prohibition on the use of engineered stone (with specific exemptions for removal, repair and minor modifications of engineered stone already installed) has been developed for consideration in this DRIS.

A high level assessment of the costs associated with a prohibition on working with engineered stone has been developed to assist with the evaluation of this option. However, this assessment is preliminary only and further analysis and consultation is required. A summary of the methodology used to define these costs, undertake scenario analysis and define the next steps required to estimate the cost to government and industry is presented in Table 27.

Table 27: Cost analysis methodology

Step	Description
Step 1: Define the market	Conduct desktop analysis to estimate the total number of sole traders, small and medium sized businesses working with engineered stone
Step 2: Impact of a ban on engineered stone	Determine the impact a prohibition on working with engineered stone will have on businesses
Step 3: Identify costs to industry	Identify the types of costs that will be incurred by sole traders, small and medium sized businesses resulting from a prohibition on working with engineered stone and identify opportunities for potential government compensation packages.
Step 4: Identify costs to government resulting from worker displacement	Identify the types of costs that may be incurred by government to address worker displacement resulting from a prohibition on working with engineered stone
Step 5: Scenario analysis	Undertake scenario analysis in order to understand the potential cost to government and industry. Two scenarios have been analysed to provide an indicative lower and upper bound of costs for business and government. This also includes reference to historical government compensation packages provided in the form of business support grants for consideration.

A qualitative assessment of the potential health and economic benefits associated with a prohibition on working with engineered stone has also been included to assist with the evaluation of this option in the DRIS.

6.2 Step 1: Define the market

The Australian Engineered Stone Advisory Group (AESAG) estimates that there are between 750 and 1,000 fabrication and installation businesses working with engineered stone in Australia¹⁵. While data limitations prevent an accurate estimation on the size of the industry, feedback provided during consultation confirmed that 1,000 was a realistic estimation of the number of sole traders, small and medium sized businesses working with engineered stone in Australia.

Size of businesses working with engineered stone

Market research commissioned by the National Dust Disease Taskforce indicates that sole traders (44 per cent) and businesses that employ between 1 – 20 employees (42 per cent) are overly represented in the sector¹⁶ (Table 28). The key findings from the market research were supported by Caesarstone in their submission to the CRIS¹⁷.

For the purposes of this assessment, businesses have been classified into the categories shown in Table 28, consistent with those used for the analysis for options 1-5.

Table 28: Size of fabrication business/ companies

Business size	Proportion of total fabrication businesses / companies
Sole trader	44%
Small (1 – 20 employees)	42%
Medium (21 – 200 employees)	14%
Total	100%

Research undertaken by AESAG estimates that there are between 8,000 and 10,000 people working with engineered stone in Australia.¹⁸

6.3 Step 2: Determine the impact a prohibition on working with engineered stone will have on businesses

The impact of a prohibition on working with engineered stone will vary according to whether a PCBU is able to:

- continue working with engineered stone for exempt activities, or

¹⁵ Australian Engineered Stone Advisory Group (AESAG), Application for authorisation to the Australian Competition and Consumer Competition (ACCC), 2019.

¹⁶ Quantum Market Research (prepared for Department of Health, National Dust Disease Taskforce), Dust Disease Research Update – Final Report, May 2021

¹⁷ Consultation Regulation Impact Statement: Managing the risks of respirable crystalline silica at work – Caesarstone submission, 2022.

¹⁸ Australian Engineered Stone Advisory Group (AESAG), Application for authorisation to the Australian Competition and Consumer Competition (ACCC), 2019.

- absorb the costs associated with a switch to an alternative product.

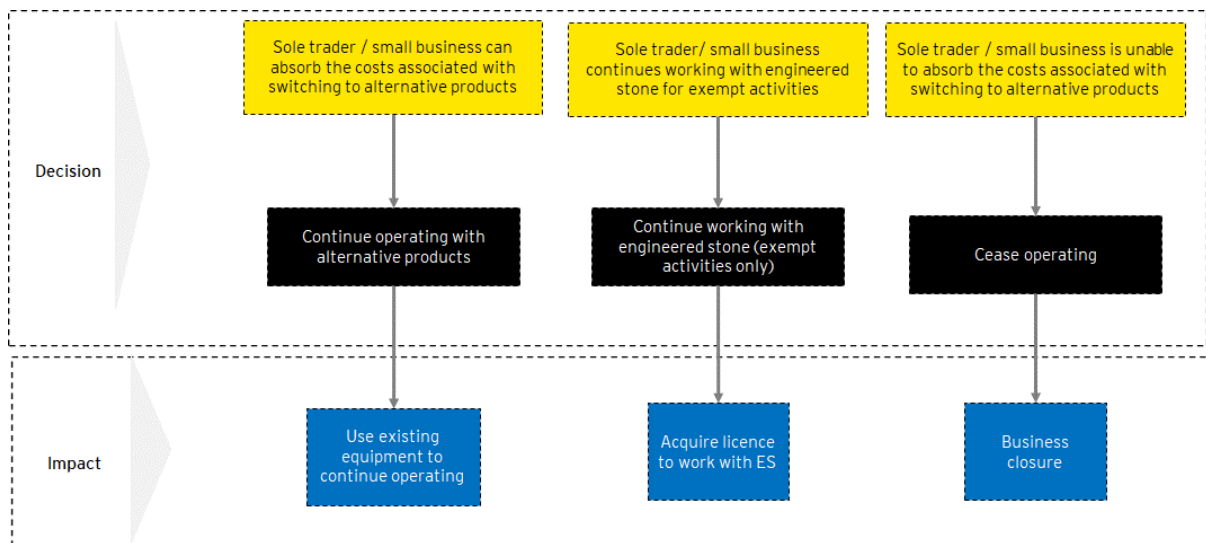
As presented in the following sections, the impact of this decision will differ between sole traders and small businesses, and medium sized businesses.

Sole traders and small businesses

As the vast majority of work with engineered stone is fabrication and/or installation of new benchtops, it is anticipated that only a small proportion of sole traders and small businesses would continue to work with engineered stone for exempt activities on an ongoing basis.

All remaining sole traders and small businesses must determine whether they can absorb the costs required to switch to an alternative product. Feedback from stakeholders in response to the options presented in the CRIS confirmed that the majority of sole traders and small businesses face significant financial pressure and would struggle to absorb the financial burden of additional regulation. It is therefore expected that sole traders and small businesses would only continue operating if they could switch to an alternative product that does not require the purchase of new equipment. If this is not possible, then it is likely they would cease operating. The decision matrix and likely impact of the ban on sole traders and small businesses is presented in Figure 2 below.

Figure 2: Impact of a prohibition on working with engineered stone – Sole traders and small businesses

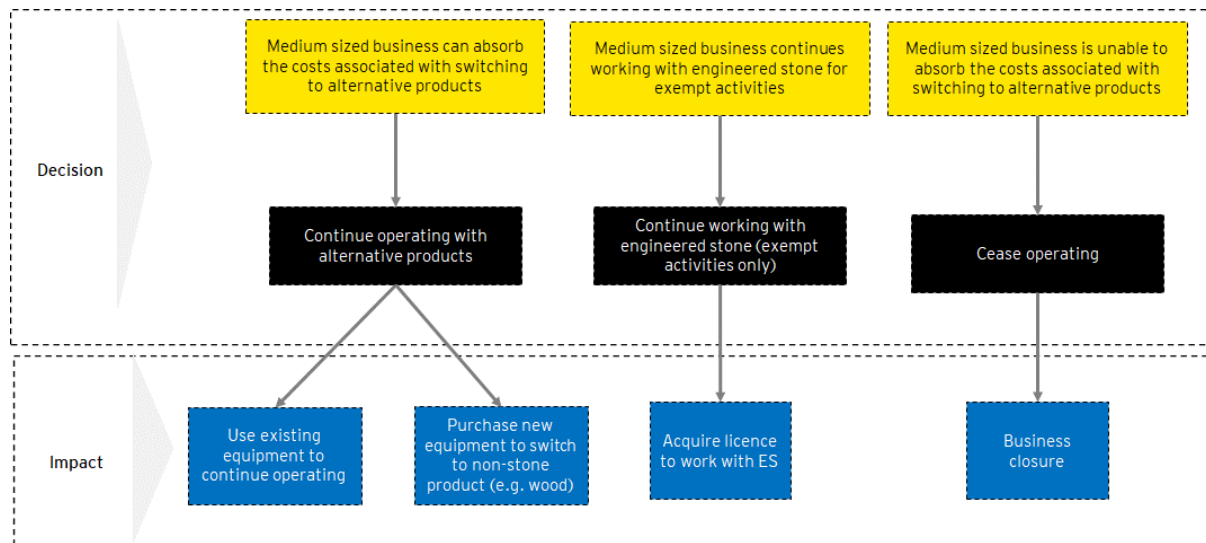


Medium sized businesses

As the vast majority of work with engineered stone is fabrication and/or installation of new benchtops, it is anticipated that only a small proportion of medium sized businesses would continue to work with engineered stone for exempt activities on an ongoing basis.

Unlike sole traders and small businesses, it is anticipated that a proportion of medium sized businesses would be able to purchase new equipment to switch to alternative products (e.g. wood), and would not have to cease operating. The decision matrix and likely impacts for medium sized businesses is presented in Figure 3.

Figure 3: Impact of a prohibition on working with engineered stone – medium sized businesses



6.4 Step 3: Identify costs to industry

The costs to sole traders, small and medium sized businesses resulting from a prohibition on working with engineered stone would differ according to their ability to pivot to an alternative product. The costs incurred as a result of a prohibition are likely to include:

- capital costs to purchase new equipment to switch to a non-stone product (e.g. wood)
- training costs associated with:
 - a switch to an alternative product
 - ensuring employees can work safely with engineered stone for exempt activities
- lost revenue during the transition period to an alternative product
- payment of redundancy packages resulting from business closure
- lost revenue as a result of business closure
- cost to acquire a licence to work with engineered stone for exempt activities.

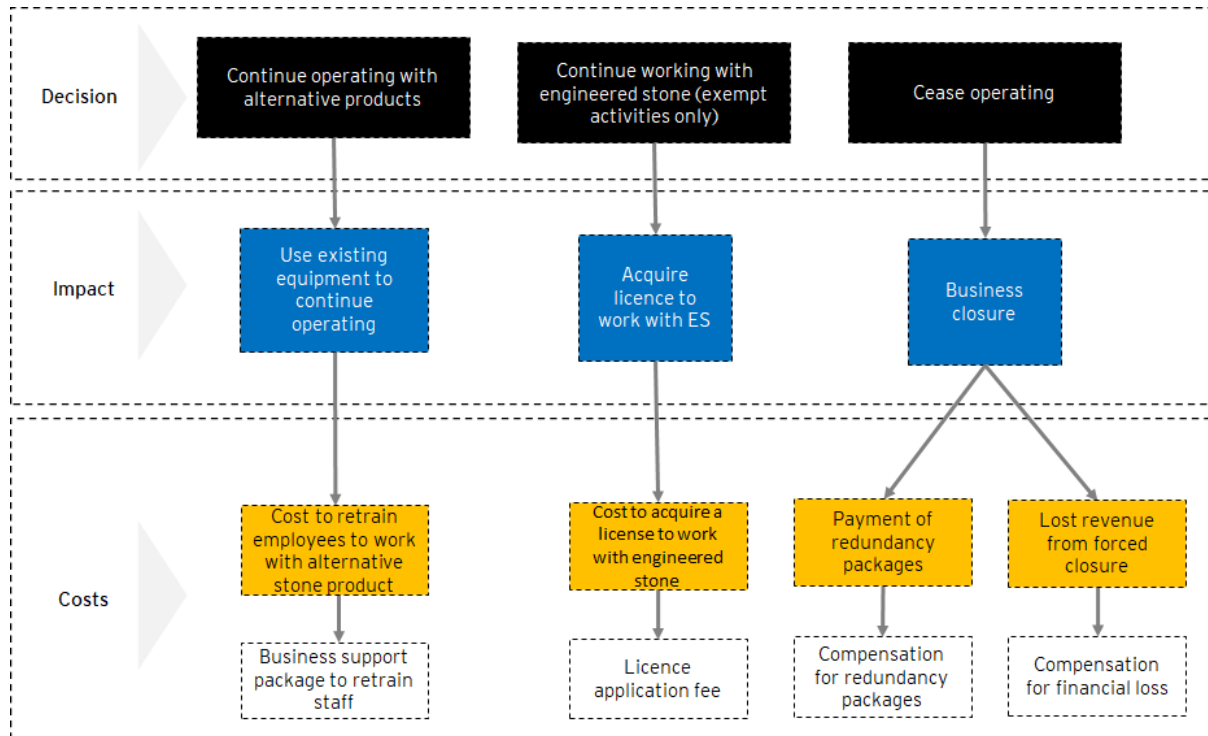
While a number of these costs will be immediately borne by industry, government compensation may be required under circumstance where sole traders and businesses working with engineered stone have suffered financial loss as a consequence of the prohibition.

The costs to industry will differ between sole traders and small businesses, and medium sized businesses, as presented in the following sections.

Sole traders and small businesses

The likely cost to industry resulting from a prohibition on working with engineered stone for sole traders and small businesses under the three scenarios identified in Step 2 are presented in Figure 4 below.

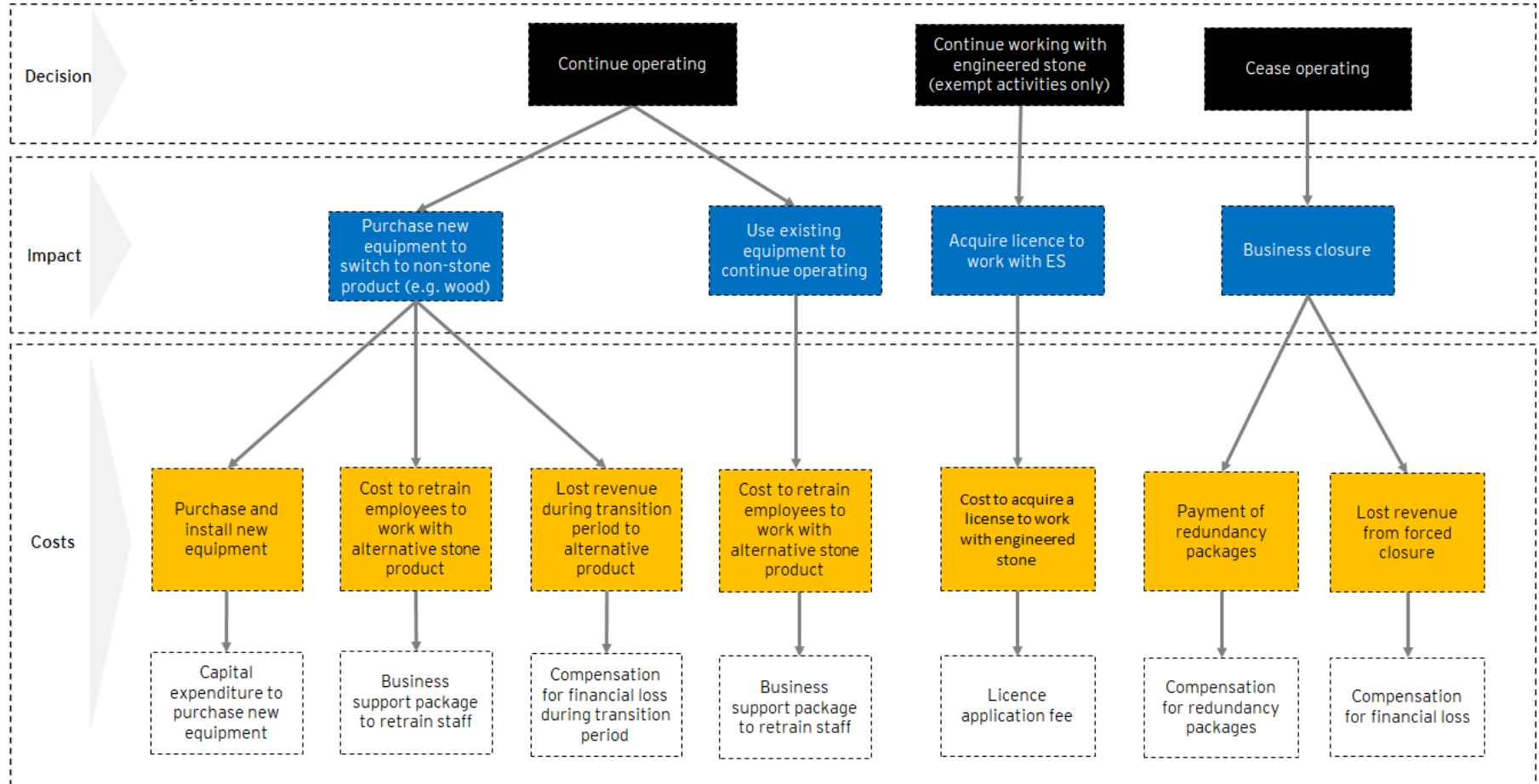
Figure 4: Cost to industry – Sole traders and small business



Medium sized businesses

The likely cost to industry resulting from a prohibition on working with engineered stone for medium sized businesses under the three scenarios identified in Step 2 are presented in Figure 5 below.

Figure 5: Cost to industry – medium sized businesses



6.5 Step 4: Identify costs to government resulting from worker displacement

A prohibition on working with engineered stone may result in the closure of a significant number of sole traders, small and medium sized businesses. As a consequence of the prohibition, displaced workers may follow one of three pathways:

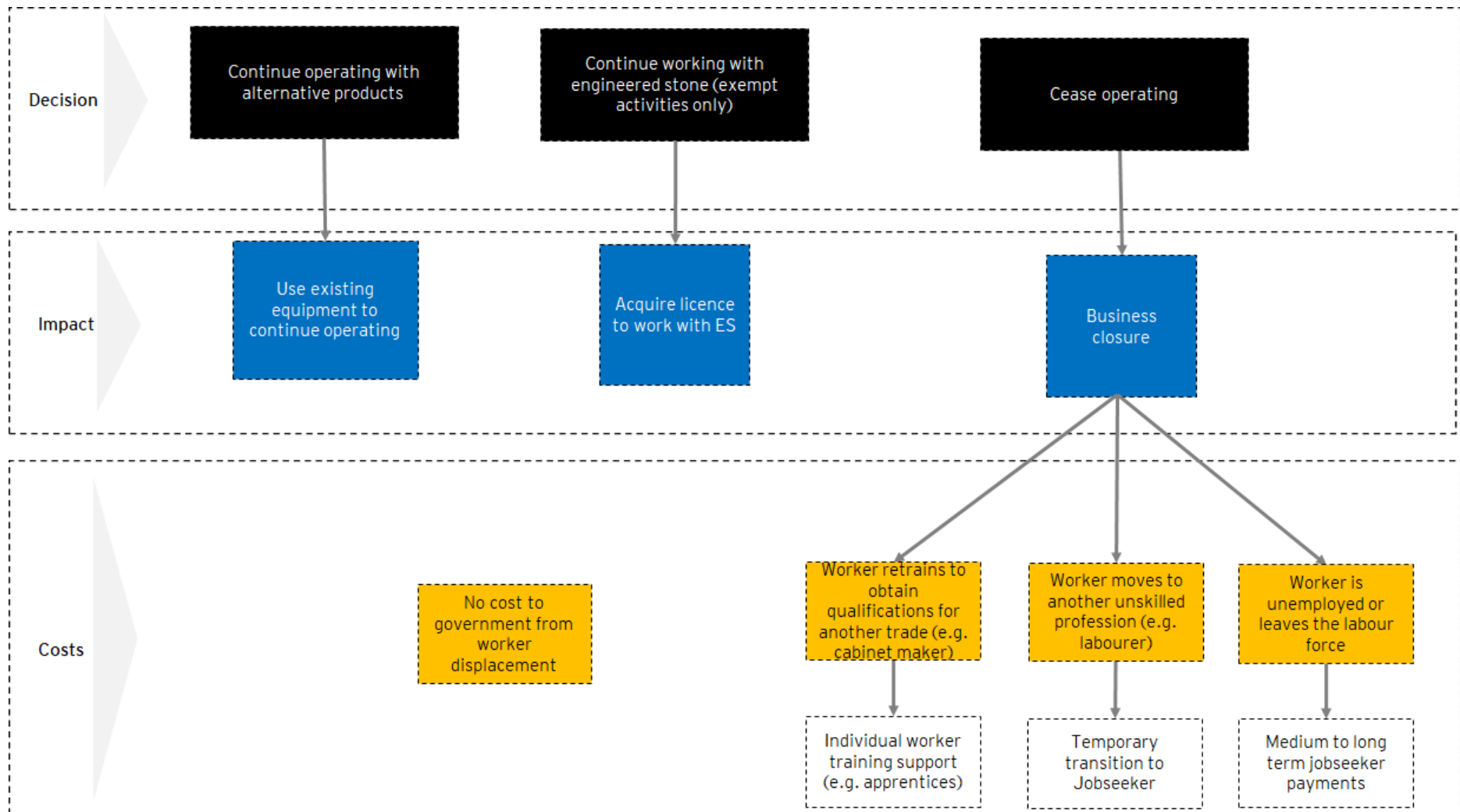
- retrain / upskill to obtain qualifications for another trade (e.g. cabinet making)
- move to another unskilled profession (e.g. labourer)
- remain unemployed in the medium to long term.

These displaced workers may seek government support through:

- individual training support (e.g. apprenticeships and traineeships)
- Jobseeker payments during temporary transition to new employment
- income support payments for the duration of unemployment.

The types of costs likely to arise as a result of worker displacement from a prohibition on working with engineered stone under each scenario for sole traders, small and medium sized businesses are presented in Figure 6 below.

Figure 6: Cost to government resulting from worker displacement



6.6 Step 5: Scenario analysis

Given this option was developed as a result of consultation feedback, further engagement with stakeholders would be required to gather data and understand the decisions businesses would make if a prohibition on working with engineered stone was implemented. This means it is not possible in this DRIS to provide an estimate on the likely cost to businesses and government for all the potential scenarios presented.

Two scenarios have been developed to provide an indication of the likely cost to individual businesses, the cost to retrain displaced workers (presented on a per worker basis) and potential industry support package payments that may be made to businesses impacted by the prohibition. These scenarios are presented in Table 29 below.

Table 29: Scenario description

Scenario	Description
Scenario 1	<p>Under this scenario, a prohibition on working with engineered stone will result in a business either:</p> <ul style="list-style-type: none"> switching to an alternative product and continue operating using existing equipment, or continuing to work with engineered stone for exempt activities (removal, repair, minor modifications). <p>Evidence provided by stakeholders indicates that the vast majority of work with engineered stone is for the fabrication and installation of new benchtops and that the proportion of sole traders, small and medium sized businesses that would continue to work with engineered stone for the exempt activities would be quite low.</p>
Scenario 2	<p>Under this scenario, sole traders, small and medium sized businesses are unable to absorb the costs required to switch to an alternative product and will therefore cease operating. As a consequence, workers may retrain and obtain qualifications for another trade (e.g. cabinet making).</p> <p>Government may provide compensation to businesses. Compensation may be for worker redundancy packages and/or lost revenue due to business closure resulting from a prohibition on working with engineered stone.</p> <p>While examples of industry support packages have been included in the scenario, further analysis will be required to understand the potential cost to government to implement these initiatives.</p>

The methodology used to estimate the costs associated with each scenario is presented in the following sections:

6.6.1 Define cost model key inputs and assumptions

A summary of the key inputs and assumptions in the model, and their respective sources, are detailed in Table 30 below.

Table 30: Cost model key inputs and assumptions

	Assumption	Source
Total number of fabrication and installation businesses working with engineered stone	1,000	Australian Engineered Stone Advisory Group (AESAG), Application for authorisation to the Australian Competition and Consumer Competition (ACCC), 2019
Total number of workers	10,000	Australian Competition and Consumer Competition (ACCC), 2019
Evaluation period	1 July 2023 – June 30, 2025 (12 month transition period)	Model assumption
Inflation	3.5%	ABS CPI

6.6.2 Estimate the cost to business under each scenario

6.6.2.1 Scenario 1: Sole traders, small and medium sized businesses switch to natural stone products or continue working with engineered stone for exempt activities (minimal impact scenario)

Desktop research has been conducted to determine the estimated cost to business under Scenario 1 as presented in Table 31 below. The proposed licence fee for PCBUs to work with engineered stone under Option 4 in the DRIS has been used as a proxy to determine the cost implications for sole traders, small and medium sized business to continue working with engineered stone following the prohibition.

It is to be noted that this scenario assumes that there are no material costs to business to switch to an alternative natural stone product and continue operating using existing equipment.

Table 31: Cost to business – Scenario 1

Impact	Cost	Cost per PCBU (\$)
Cost to acquire a licence to continue working with engineered stone	Cost to acquire a licence to work with engineered stone	\$302

Should a prohibition on working with engineered stone be considered in combination with other options, businesses will also incur additional costs associated with those options.

6.6.2.2 Scenario 2: Sole traders, small and medium sized businesses cease operating, workers retrain and obtain formal qualifications for another trade (significant impact scenario)

In the event that a business cannot absorb the costs associated with a switch to an alternative product, they will cease operating. As a consequence, they will suffer a financial loss through lost revenue and/or redundancy payments to staff.

While a number of these costs will be immediately borne by industry, government may make a policy decision to compensate businesses working with engineered stone that have suffered financial loss as a consequence of the prohibition.

Further analysis would be required to estimate the likely cost to business which will inform the size, scale and scope of a potential industry support package. It is to be noted that these costs would be subject to a government policy decision to compensate workers/businesses who are impacted by the prohibition on working with engineered stone.

6.6.3 Estimate the cost to government for worker displacement under each scenario

6.6.3.1 Scenario 1: Sole traders, small and medium sized businesses switch to natural stone products or continue working with engineered stone for exempt activities

In the event that businesses switch to working with an alternative natural stone product and continue operating using existing equipment, or focus on engineered stone exempt activities, it is assumed there will be no worker displacement that is directly attributable to a prohibition on working with engineered stone.

6.6.3.2 Scenario 2: Sole traders, small and medium sized businesses cease operating, workers retrain and obtain formal qualifications for another trade

Desktop research has been conducted to determine the estimated cost to government for a worker to gain formal qualifications to undertake another trade. These costs are as presented in Table 32 below.

Table 32: Estimated cost to government of worker displacement (\$)

Impact	Assumption	Cost per worker (\$)
Training costs: Certificate III	Average cost of Cert III for: Civil construction, cabinet making, tiling, fabrication trade.	Average cost of \$12,691 (\$4,835 per annum over 3 years) ¹⁹
Training costs: Support payments to workers	Australian Apprentice Training Support Payment.	\$5,000 (\$2,500 per annum for first 2 years of apprenticeship) ²⁰
Training costs: Support payments to businesses	Similar to Australian Apprentice Priority Wage Subsidy ²¹	Maximum \$15,000 (\$6,000 per annum for year 1 and 2 and \$3,000 per annum for year 3) ²²

It is to be noted that these costs would be subject to a government policy decision to compensate workers/businesses who are impacted by the prohibition on working with engineered stone.

6.6.4 Industry support packages

Scenario 2 presents a situation whereby a business cannot absorb the costs associated with a switch to an alternative product. Under this scenario, PCBUs will face significant financial pressure and will face the prospect of closure without support.

One form of financial support is through government funding that may:

- assist with the transition to an alternative product
- be used to recover lost revenue in the short to medium term
- be used to purchase new equipment, or
- be used for staff training.

COVID-19 business grants and support programs made available by Australian states and territories could be used as a basis for estimating the size of industry support packages in this scenario. Examples of eligibility criteria and

¹⁹ My Skills Australia, Department of Employment and Workplace Relations, 2022

²⁰ Support for Australian Apprentices, Australian Apprenticeships - Australian Government, 2022

²⁰ Cert III for: Civil construction, cabinet making, tiling, fabrication trade are all currently listed on the Australian Apprenticeship Priority List as at 12 January 2023

²⁰ Employer Incentives, Australian Apprenticeships - Australian Government, 2022

grant funding provided for COVID-19 business support programs for select jurisdictions are presented in Table 33 below.

Table 33: COVID-19 business support programs

Jurisdiction	Fund	Eligibility criteria	Grant funding for eligible businesses (\$)
New South Wales	2021 COVID-19 business grant	Eligible businesses (including non-employing businesses such as non-employing sole traders) and not-for-profit organisations can apply for a one-off grant of \$7,500 (decline in turnover of 30% or more) or \$10,500 (decline in turnover of 50% or more) or \$15,000 (decline in turnover of 70% or more) via one application.	\$7,500 – \$15,000
Victoria	Small Business COVID Hardship Fund	The Fund was established to assist eligible small and medium businesses: <ul style="list-style-type: none"> • whose operations have been severely impacted by COVID-19 restrictions that have been in place since 27 May 2021 • that have experienced at least a 70% reduction in turnover as a result of the COVID-19 restrictions • that are ineligible for other key COVID-19 Victorian Government business grant programs that have been announced since 27 May 2021. 	The program offers grants of \$20,000 to eligible small and medium businesses, including employing and non-employing businesses
Queensland	2021 COVID-19 Business Support Grants	Employing Queensland small businesses and not-for-profit organisations: Payroll size of less than \$1.3 million Employing Queensland medium sized businesses and not-for-profit organisations: Payroll size between 1.3 million and \$10 million Employing Queensland large sized tourism and hospitality focused businesses and not-for-profit organisations: Payroll size greater than \$10 million.	\$10,000 - \$30,000

While examples of industry support packages have been included in the scenario, further analysis would be required to understand the potential cost to government to implement these initiatives.

6.6.5 Estimated cost to government and industry under each scenario

Table 34 provides a summary of the estimated cost that may be incurred by individual businesses under the two scenarios.

Table 34: Estimated cost to industry (\$)

Scenario	Cost	Estimated total cost to business
Scenario 1: Businesses switch to natural stone products or continue working with engineered stone for exempt activities	Cost to acquire a licence to continue working with engineered stone	\$302
Scenario 2: Businesses cease operating, workers retrain and obtain formal qualifications for another trade	Lost revenue as a result of business closure Payment of redundancy packages resulting from business closure	Further analysis is required to estimate the potential financial loss through lost revenue and/or redundancy payments to staff

Table 35 provides a summary of the estimated cost incurred by government to fund the retraining of displaced workers (presented on a per worker basis) and average industry support package payment per business.

It is to be noted that these costs will be subject to a government policy decision to compensate workers/businesses who are impacted by the prohibition on working with engineered stone.

Table 35: Estimated cost to government (\$)

Scenario	Cost	Estimated total cost to government
Scenario 1: Businesses switch to natural stone products or continue working with engineered stone for exempt activities	N/A	N/A
Scenario 2: Businesses cease operating, workers retrain and obtain formal qualifications for another trade	Cost of workers retraining and obtaining formal qualifications	[Average cost of Cert III in related trade \$4,835 per annum) + Australian Apprentice Training Support Payment (\$2,500)]
	Industry support package	Average cost of industry support package (\$15,000)

6.6.6 Limitations and data required to estimate the cost to government and industry

To develop a more complete cost analysis, we will require an understanding of:

- the proportion of business that may:
 - absorb the costs associated with a pivot to an alternative product
 - continue to work with engineered stone for exempt activities
 - cease operating

- for those businesses that would cease operating, the total lost revenue
- what an appropriate level of government support for impacted businesses may be, and
- the number of displaced workers as a result of the prohibition on working with engineered stone and the estimated cost of government support for these workers.

This analysis would need to be supported through:

- an industry wide survey of businesses working with engineered stone
- formal stakeholder consultation with stakeholders
- analysis to understand:
 - the forecast demand for alternative products, and
 - historical and forecast trends in the labour market.

6.7 Qualitative assessment of economic and health benefits resulting from a prohibition on working with engineered stone

While the analysis presented here has provided a preliminary indication of the costs to industry and government, a number of health and economic benefits are likely to be generated as a result of a prohibition on working with engineered stone, as presented below.

6.7.1 Health benefits

A direct result of a prohibition on working with engineered stone is reduced workplace exposure to respirable crystalline silica (RCS) and a reduction in cases of silicosis and other silica-related diseases.

As presented in Section 2 of the DRIS, silica containing materials *in situ* do not cause silicosis and silica-related diseases; it is the dust that is generated from processing these materials that has the potential to cause harm when it is airborne and breathed in. While silicosis and silica-related disease can occur in workers in any industry where RCS is generated; there is a disproportionate number of cases in people who work with engineered stone.

A prohibition on working with engineered stone will result in a number of direct and indirect health benefits including:

- a reduction in premature death from silicosis and silica-related diseases
- reduced time workers would spend living with silicosis and/or silica related diseases, owing to reduced incidence of disease and later onset of disease, and
- reduced silicosis and silica related health care costs, including hospitalisations and treatment.

6.7.2 Economic benefits

A combination of record low unemployment and increased demand for workers has led to a tightening of the labour market. In turn, this has created increased competition for workers, with a number of occupations currently facing a shortage of workers as they are unable to fill vacancies.

The proportion of occupations that are rated “in shortage” by the National Skills Commission has risen significantly since 2021, particularly among sectors that are likely alternatives for those impacted by a prohibition on working with engineered stone.

Shortages were the most prevalent in the *Technicians & Trades Workers* Major Occupation Group, with 47% of occupations in this category rated “in shortage” in 2022. This includes occupations that require formal qualifications (Certificate III or IV) for trades such as cabinet makers, carpenters, metal fabricators and bricklayers.²³

A potential outcome of worker displacement from a prohibition on working with engineered stone is that a proportion of unskilled workers (without formal qualifications) may switch to another unskilled profession. Current labour market skills shortages combined with forecast growth in employment among labourers will provide opportunities to address worker shortages in this sector and create a smooth transition for displaced workers who do not wish to undertake formal training.

²³ National Skills Commission, 2022 Skills Priority List– Key Findings Report, March 2022

7 Who was consulted and how was their feedback incorporated?

This DRIS incorporates feedback from consultation conducted in two stages:

- preliminary consultation via workshops and individual consultation with key stakeholders to inform the Consultation Regulation Impact Statement: Managing the risks of respirable crystalline silica at work (CRIS), and
- public consultation on the CRIS.

7.1 Preliminary consultation

Preliminary consultations were held with a range of stakeholders including WHS regulators, industry peak bodies, employee representatives, employer representatives and health organisations. The consultation consisted of 3 workshops and 4 discussions with individual organisations. In total 24 stakeholders were invited to participate in the consultations, with representatives from 23 stakeholders taking part. This consultation was undertaken to inform the drafting of the CRIS and sought to:

- gain a deeper understanding of exposures to RCS in Australian workplaces and the extent of the risks of silicosis and silica-related diseases
- seek comment on and inform the development of regulatory and non-regulatory options
- identify and define gaps in available data and evidence that may affect the assessment of the impacts of each option, and
- understand implementation barriers that may exist for each of the proposed options.

Stakeholder feedback informed the drafting of the CRIS, including development of the problem statement and evidence base, and the options. Stakeholders provided information such as quantitative data, reports and peer-reviewed papers to inform this process.

7.2 Public consultation

Safe Work Australia sought feedback on the CRIS. The CRIS outlined specific consultation questions relating to the problem statement, proposed options and impact analysis. Submissions were accepted via Safe Work Australia's consultation platform, Engage, from 30 June 2022 to 15 August 2022. Late submissions were also accepted where requested.

A total of 67 submissions were received from a range of stakeholders, including:

- commonwealth, state and territory government departments
- peak health bodies
- industry groups
- unions
- commercial enterprises including engineered stone suppliers
- lawyers
- insurance groups
- academics, and
- individuals.

Overall, there was strong support for further government intervention to reduce workplace exposure to RCS.

There was broad support for the problem statement, which was developed through the preliminary consultations. However, it has been further refined to reflect the following feedback:

- the problem statement has a strong focus on engineered stone and should be broadened to include other sectors, and
- the use of health screening statistics drawn predominantly from the engineered stone sector is problematic and care should be taken when extrapolating this information to other sectors.

There was clear support for further government intervention to reduce the risks of RCS exposure at work. Only a small number of businesses and industry groups argued the existing regulations are adequate to address the need. Stakeholders were supportive of the objectives of government intervention. However, unions, professional organisations (AIOH) and peak health bodies consider the primary objective of government intervention should be the reduction of RCS exposure at work and elimination of silicosis, in line with the All of Governments response to the National Dust Disease Taskforce final report. These comments have been reflected in section 3.2.

Of the regulatory and non-regulatory options put forward, there was a marked lack of support for maintaining the status quo (option 1). The non-regulatory option supporting awareness and behaviour change initiatives (option 2) received consistent support amongst all stakeholder groups. Many of these stakeholders expressed support for a combination of option 2 with other regulatory options to address the problem. There was significant stakeholder support for further regulation, with relatively evenly distributed support for each of the proposed regulatory options. A number of submissions called for mandatory silica awareness training for workers.

The majority of stakeholders agreed that the methodology used for options 1-5 was appropriate to estimate the costs to industry and government. Some questioned the appropriateness of placing a value on a human life through MCA and BEA processes. Other submissions expressed the view that the impact costs were underestimated in the CRIS, and some that the impact of exposure to RCS, and resultant disease, were underestimated.

7.2.1 Refinement of options 1-5 in response to consultation feedback-

Option 1 – Base case

In response to commentary from unions, professional bodies and peak health organisations, the impact analysis for the base case, Option 1, now includes a discussion and acknowledgement of the costs silicosis and other silica-related diseases pose to the public health system, along with acknowledgement of the significant financial and emotional toll that silicosis and silica-related disease has on patients and their families.

Option 2 – National awareness and behaviour change initiatives

There was strong support for this option, with unions noting that any regulatory framework must be accompanied by education and awareness programs. Industry groups noted that the impact analysis for this option did not consider the cost businesses would incur due to workers participating in these types of awareness campaigns. This comment has been addressed in the qualitative analysis in chapter 5.

Option 3 - deleted

As discussed in Section 4.4; Option 3 was included in the CRIS to clarify the existing requirements of the model WHS laws into specific regulations covering high risk silica processes. Changes made to Option 5 as a result of stakeholder feedback (see below) meant that Option 3 is not being considered separately in this DRIS. Feedback on Option 3 as presented in the CRIS has been considered when refining Option 5, below.

Option 4 – Implementation of a national licensing framework for all PCBUs working with engineered stone.

Industry groups were generally not supportive of Option 4 and consider it will offer limited benefit and potentially disadvantage smaller businesses. If adopted, they suggest that reporting of air and health monitoring should be limited to WES exceedances and adverse health outcomes. They also raise concerns that the phrasing of this option in the CRIS would result in unintentionally capturing a range of businesses that undertake minor and infrequent work with engineered stone, such as cutting excess stone to fit to cabinetry, drilling a hole for electrical cable connections etc.

WHS regulators discussed the significant lead time required for a licensing scheme for engineered stone, and also discussed the administrative burden of managing such a licensing process. They postulate that it may draw resources away from other health and safety compliance work. While WHS regulators acknowledge that a licensing scheme for engineered stone would provide an ability to understand the supply chain, they point out that WHS regulators are already able to identify manufactured stone workplaces by issuing notices to the importers of manufactured stone, enabling targeted compliance activities using existing resources.

Government submissions consider a national licensing framework should encapsulate conditions that would restrict access to engineered stone to PCBUs who can demonstrate that they can use the product safely.

Option 4 of this DRIS has been modified to reflect feedback on reporting of air and health monitoring (i.e. limited to WES exceedances and adverse health findings); and to make the requirements around risk control plans and risk assessments align more closely with those outlined in Options 5a and 5b.

Option 5– Additional regulation of high risk crystalline silica processes

This option was presented in the CRIS as two variations (Options 5a and 5b) would allow this option to be implemented as either a standalone measure for all silica-containing materials (Option 5a), or in combination with

a licensing scheme for engineered stone (Option 5b, in combination with Option 4). Both Options 5a and 5b included all the elements of Option 3.

Stakeholders provided feedback on the definitions of crystalline silica substance, crystalline silica process, and high risk crystalline silica process proposed in Option 3.

Union stakeholders discuss the need for clearer requirements regarding training and provision of information provision to workers.

Submissions from a range of stakeholders, including professional bodies, industry groups and WHS regulators suggested mandatory reporting of air and health monitoring data should only apply for WES exceedances, and health monitoring where adverse outcomes were detected. Reasons includes cost to industry, burden on WHS regulators and issues around secure data storage.

WHS regulators raised that that the primary purpose of air monitoring under the WHS regulations is to check that controls are adequate, where there is uncertainty, rather than to assist regulators to monitor trends. They recommend that, should this option be selected, only exceedances data be reported to the regulator. They also raised privacy concerns around provision of health monitoring data to the WHS regulator, and noted that the processing of health and air monitoring data of the quanta proposed in the CRIS may not be a productive use of WHS regulator resources. It is worth noting, under the existing model WHS Regulations, PCBUs are already required to provide health monitoring reports to the WHS regulator under certain circumstances.

Unions appreciated that this option clarified the need for air monitoring, with one union reporting that only 31% of members reported their workplace undertakes air monitoring to determine the airborne concentration of silica. Unions raise that the outcome of a lack of clarity regarding air and health monitoring requirements is workers becoming ill before there is an identification of WHS system failures.

Option 5 has been refined in the DRIS to only require the reporting of WES exceedances, rather than all air monitoring data. Similarly, only adverse health outcomes would be required to be reported, in line with existing requirements. Given the feedback on the proposed definitions, further refinement, in consultation with stakeholders, may be required prior to finalising the amendment model WHS Regulations.

7.2.2 New option introduced in response to consultation – Prohibition on use of engineered stone.

As a result of the consultation process, a new option has been included in this DRIS for consideration by WHS ministers (see Section 4.8). Unions, peak health bodies, and professional organisations called for a prohibition on the use of engineered stone, stating that a ban on engineered stone would be consistent with the application of the hierarchy of controls.

7.2.3 Stakeholder feedback that will inform future considerations

A small number of submissions from a diverse range of stakeholders commented on the need for low dose high resolution computed tomography (HRCT) scans to replace chest X-rays as the minimum regulatory requirement for health monitoring in the model WHS Regulations. This is on the basis that HRCT is a more contemporary methodology with greater diagnostic ability in the earlier stages of silicosis disease. Other submissions urge caution in adopting HRCT as even low dose HRCT still exposes workers to several times the radiation of a chest X-ray. The current model WHS Regulations prescribe chest X-ray as a minimum but allow for another type of health monitoring where the registered medical practitioner conducting the health monitoring considers it is equal or better. Increasing the minimum requirement to a HRCT would remove a medical practitioner's ability to

determine the most appropriate method, including in circumstances where chest X-rays are more accessible or appropriate.

There were also several submissions from unions, and industry groups in support of mandatory silica awareness training. If preferred, Option 5a would include a requirement for PCBUs to provide instruction, information and training about the health risks associated with exposure to crystalline silica dust, the need for appropriate controls, and application of controls. However, future consideration can be given to any additional training requirements that may be required.

8 What is the best option or combination of options?

8.1 Recommendation:

Recommended options

On the basis of this DRIS and stakeholder feedback, it is recommended that WHS ministers agree to:

- national awareness and behaviour change initiatives (option 2)
- additional regulation of high-risk crystalline silica processes for all silica-containing materials (option 5a), and
- further analysis and consultation on the impacts of a prohibition on the use of engineered stone.

All options were considered in the context of consultation feedback, impact analysis, and ability to meet the objective of reducing exposure to RCS at work.

Consultation on managing the risks of crystalline silica at work showed that there was clear support for government action. Stakeholders agreed that there is a strong need to ensure that any action is protective of all workers who are exposed to RCS, and not limited to the engineered stone sector.

There was support from all stakeholder groups to undertake awareness and behaviour change initiatives, in combination with regulatory change. Option 5a as presented in this DRIS would achieve the objective to reduce exposure to RCS through:

- regulation of high risk crystalline silica processes for all crystalline silica materials, not just engineered stone
- improved PCBU awareness of their duties under the model WHS legislative framework, including requirements to undertake air monitoring and provide health monitoring and training to workers, and
- implementation of appropriate risk control measures through development and implementation of silica risk control plans.

8.2 Why are other options not preferred?

8.2.1 Option 1: Base case

There was very little support for maintaining the status quo and a clear call for further government intervention to protect workers from exposure to RCS.

8.2.2 Option 4: Implementation of a national licensing framework for PCBUs working with engineered stone

Implementation of a national licensing framework for PCBUs working with engineered stone is not preferred.

Stakeholder feedback was clear that action must not be limited to the engineered stone sector, but that all workers exposed to RCS be protected. A licensing framework would achieve the objective to reduce exposure to RCS in engineered stone workers, however it would need to be implemented in partnership with Option 5b (Regulation of high risk crystalline silica processes for all materials other than engineered stone) to ensure all workers exposed to RCS are protected. While a licensing scheme offers additional benefit of increased awareness for WHS regulators of those PCBUs working with engineered stone, WHS regulators in most jurisdictions are likely to already have this information through their education and compliance activities. WHS regulators also stated in their feedback that the administrative burden of a licensing scheme would likely draw resources from other risk-based compliance activities. There would also be additional costs and significant administrative burden to industry. The benefits of a licensing framework would not outweigh the added administrative and financial burden on both business and government.

Some stakeholders also called for an interim licensing scheme to be introduced ahead of a future introduction on a prohibition on use of engineered stone. However, the feasibility of a short-term interim licensing program, along with the significant lead time associated with introducing licensing regulations means that this is not considered a feasible option.

8.2.3 Option 6: Prohibition on the use of engineered stone

A prohibition on the use of engineered stone was developed in response to stakeholder submissions to the CRIS. Therefore, stakeholders were not able to provide feedback on this option or compare it to the other options in the CRIS. If WHS ministers want further consideration of a prohibition on use of engineered stone further analysis and stakeholder consultation should be undertaken to refine the option, and inform and test the impact analysis assumptions.

Further, the National Dust Disease Taskforce's Final Report did not recommend a ban on manufacture or use of engineered stone. It instead recommended that a ban on the importation of some or all engineered stone be considered by July 2024 if:

- “there is no measurable and acceptable improvement in regulatory compliance rates for the engineered stone sector as reported by jurisdictions, and
- evidence indicates preventative measures are not effectively protecting those working with engineered stone from silicosis and silica-associated diseases” (Department of Health 2021).

The All of Australian Governments' response to the National Dust Disease Taskforce report noted this recommendation and recognised that “... a comprehensive framework [is required] to evaluate the effectiveness of compliance with WHS duties and the effectiveness of measures to protect workers, including any further measures implemented following Safe Work Australia's regulatory impact analysis process”. The response also noted that further time may be required to make this assessment beyond the July 2024 proposed deadline (Australian Government 2022).

9 Implementation and Evaluation

9.1 Implementation

Should WHS ministers agree to the preferred options in this DRIS (Options 2 and 5a), the model WHS Regulations will be amended to reflect the proposed additional regulation of high risk crystalline silica processes described in Option 5a.

Amendments to the model WHS Regulations will be drafted by the Australasian Parliamentary Counsel's Committee (PCC) and once made, published on the Safe Work Australia website. For the amendments to the model WHS Regulations to apply, each jurisdiction will need to implement them separately through amendments to their jurisdictional WHS Regulations.

To avoid asynchronous implementation of the changes across jurisdictions, WHS ministers may wish to consider setting an implementation date, noting that this date will need to allow sufficient time for PCC to draft the amendments to the model WHS Regulations, and for jurisdictions to amend their legislation.

Industry stakeholders may also seek to have a transitional period before they need to demonstrate compliance with any changes. However, given the impacts of silicosis on workers and their families, a transitional period has not been proposed. As is usual practice for Safe Work Australia, communications and guidance materials will be developed to assist stakeholders to understand how the amendments to the model WHS Regulations affect them. These materials could be developed prior to the amendments being finalised, to assist stakeholders in their preparations.

The proposed awareness and behaviour change initiatives will not require legislative amendments. Safe Work Australia will develop materials for these initiatives in consultation with experts. These initiatives will be tailored to different audiences (e.g. PCBU's and workers) across multiple industries, delivered nationally, and will likely be delivered over multiple years.

9.2 Evaluation

Evaluation will be undertaken by Safe Work Australia to assess the impact of the preferred options on reducing exposure to RCS at work and reducing cases of silicosis.

9.2.1 Reducing exposure to RCS at work

Both the awareness and behaviour initiatives and the additional regulations of high risk crystalline silica processes are expected to result in reduced exposures to RCS at work.

Examples of how reduction in exposures to RCS will be monitored include:

- measuring (pre- and post- national awareness and behaviour change initiatives) the levels of stakeholder awareness of the requirements in the model WHS laws, the risks of RCS and the appropriate control measures
- reviewing relevant jurisdictional compliance data, and

- reviewing the air and health monitoring data provided to WHS regulators.

9.2.2 Silicosis cases

Currently, there are several data sources for silicosis cases – accepted workers’ compensation claims, jurisdictional health screening programs, and state-based dust disease registers. These will continue to be monitored to evaluate the impact of the preferred options on reducing silicosis cases. Once operational, the National Occupational Respiratory Disease Register, which will mandate the reporting of all diagnosed silicosis cases in Australia, will be relied upon in place of the state dust disease registries.

However, due to the latency from exposure to disease for silicosis (10-30 years), the impacts of the preferred option may take considerable time to be reflected in the number of reported silicosis cases.

There are currently no available data sets to monitor for the impacts of the preferred option on other silica-related diseases. However, should these data become available, they will also be included in the evaluation.

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Appendix A: Legislative and regulatory framework for crystalline silica under the model WHS laws

What are the duties of PCBUs?

Under the model WHS laws, a PCBU has a primary duty of care to ensure the health and safety of workers while they are at work in the business or undertaking and that the health and safety of others is not put at risk from carrying out of the work.

A PCBU is often an employer. However, the concept of PCBUs also captures modern work relationships outside of the traditional contract of employment. For example, it includes principal and subcontractor relationships, host employers in a labour hire arrangement, as well as multiple employers in sub-contracting arrangements.

It is the PCBU's responsibility to eliminate risks arising from exposure to RCS or, where not reasonably practicable²⁴, minimise the risks so far as is reasonably practicable to workers and other persons at the workplace²⁵. This includes the maintenance and monitoring of the workplace environment, as well as the provision of information, training, instruction, or supervision to protect people from risks to their health and safety.²⁶ PCBUs must also, so far as is reasonably practicable, consult with workers who carry out work for the business or undertaking who are or are likely to be directly affected by a work health and safety matter.²⁷ PCBUs must also consult with the workers' health and safety representatives on work health and safety matters.²⁸ For PCBUs working with RCS, examples of when consultation must occur include when preparing risk assessments and SWMS, developing a silica dust control plan, deciding on control measures and selecting the medical practitioner to undertake health monitoring.²⁹

Where there is more than one person responsible for a duty in relation to the same WHS matter, each person with the duty must, so far as is reasonably practicable, consult, cooperate and coordinate activities with all other persons who also owe the have a duty in relation to the same matter.³⁰

²⁴ Safe Work Australia has published an interpretive guideline on the meaning of reasonably practicable (Safe Work Australia 2011).

²⁵ model Work Health and Safety Act s17 (WHS Act); model Work Health and Safety Regulations r35 (WHS Regulations).

²⁶ model WHS Act s19 and s21; model WHS Regulations r39.

²⁷ model WHS Act s47.

²⁸ model WHS Act s70.

²⁹ model WHS Act s47; model WHS Regulations r299 and r369.

³⁰ model WHS Act s46.

Workplace exposure standard for RCS

A PCBU 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.³¹ The duty to ensure the WES is not exceeded is absolute and not qualified by so far as is reasonably practicable. A WES must not be adjusted upwards, even for shifts of less than eight hours (Safe Work Australia 2021a).

This means that a PCBU must ensure that no person at the workplace is exposed to RCS at a concentration above the WES, which is an eight-hour TWA of 0.05 mg/m³. An exposure standard represents the airborne concentration of a particular substance or mixture that must not be exceeded. However, it does not represent a line between a 'safe' and 'unsafe' concentration of an airborne substance or mixture. The exposure standard does not eliminate risk of disease and some people might experience adverse health effects below the exposure standard.

Air monitoring

A PCBU must undertake air monitoring in the breathing zone of workers (Safe Work Australia 2013) if there is uncertainty that the workplace exposure standard is being exceeded or if it is necessary to determine whether there is a risk to a worker's health.³² Air monitoring records must be kept for a period of 30 years and must be readily accessible to persons in the workplace who may be exposed to RCS.³³ The air monitoring report should be made available to a work health and safety inspector on request and to a registered medical practitioner carrying out or supervising health monitoring (Safe Work Australia 2021a).

Health monitoring

PCBUs must also provide and pay for health monitoring for workers if they carry out ongoing work generating RCS, or there is a significant risk to the worker's health because of exposure.³⁴ Health monitoring must be undertaken by or under the supervision of a medical practitioner with experience in health monitoring and a record must be kept for a period of 30 years and be given to the worker as soon as practicable after receipt and to the WHS regulator in certain circumstances.³⁵

Under Schedule 14 to the model WHS Regulations, the minimum requirements for health monitoring for crystalline silica through exposure to RCS are:

- collection of demographic, medical and occupational history
- records of personal exposure
- standardised respiratory questionnaire
- standardised respiratory function tests, and
- chest X-Ray full posterior-anterior view.

The model WHS Regulations allow for alternative types of health monitoring if they are equal or better to these methods and the use of that other type of monitoring is recommended by a registered medical practitioner with

³¹ model WHS Regulations r49.

³² model WHS Regulations r50 and r368.

³³ model WHS Regulations r378.

³⁴ model WHS Regulations r370.

³⁵ model WHS Regulations rr371, 375, 378.

experience in health monitoring.³⁶ In Western Australia low dose HRCT is explicitly required instead of chest X-Ray for health monitoring.

The PCBU is also responsible for providing information to staff about health monitoring, and for providing copies of the health monitoring report to the worker, other PCBUs who have a duty to the worker, and in some cases the WHS regulator (Safe Work Australia 2021a). If a report indicates that a worker is experiencing adverse health effects or signs of illness because of exposure to RCS, control measures in the workplace must be reviewed and revised as necessary (Safe Work Australia 2021a).

High risk construction work and preparation of SWMS

Construction work is defined in the model WHS Regulations as any work carried out in connection with the construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment, demolition, decommissioning or dismantling of a structure. Regulation 291 of the model WHS Regulations sets out a list of high risk construction work for which a SWMS is required. This includes work carried out in an area that may have a contaminated or flammable atmosphere. Construction work that involves processing silica-containing materials is high risk construction work when it generates RCS that may contaminate the workplace's atmosphere and would require a SWMS (Safe Work Australia 2021a).

The SWMS must be accessible and understandable to any individual who needs to use it.³⁷ If any high risk construction work is carried out, outside the manner stipulated in the SWMS, the PCBU must ensure that the work is stopped immediately or as soon as it is safe to do so, and only resumed in accordance with the SWMS.³⁸

Other duties for PCBUs working with engineered stone

The model Code of Practice: Managing the risks of respirable crystalline silica from engineered stone in the workplace (the model Code), published in October 2021, outlines specific duties for PCBUs working with engineered stone.

To have legal effect in a jurisdiction, a model Code must be approved as a code of practice in that jurisdiction. As of June 2022, the model Code has been enacted in New South Wales and Tasmania. In 2019, Queensland implemented a Code of Practice: Managing respirable crystalline silica dust exposure in the stone benchtop industry covering natural and engineered stone (Workplace Health and Safety Queensland 2019). WorkSafe Victoria has also implemented a Compliance Code: Managing Exposure to Crystalline Silica - Engineered Stone (WorkSafe Victoria 2020).

The model Code:

- provides a definition of engineered stone
- clarifies that the on-site installation of engineered stone is considered high risk construction work if the processes used to install, modify or repair the engineered stone such as, cutting, grinding, trimming, drilling, sanding, or polishing generate RCS and contaminates the work area
- requires PCBU(s) to prepare a SWMS before any on-site installation of engineered stone that involves any processing, modification or repair of engineered stone that may generate RCS
- clarifies the duties for PCBUs working with engineered stone to undertake air and health monitoring, and

³⁶ model WHS Regulations r370.

³⁷ model WHS Regulations r299

³⁸ model WHS Regulations r300

- specifies that PCBUs must not direct or allow workers to undertake uncontrolled dry cutting or processing of engineered stone.

Duties of designers, manufacturers, importers, suppliers and those who install or commission plant or structures

A designer, manufacturer, importer or supplier of silica containing products must ensure, so far as is reasonably practicable, that the silica containing products they design, manufacture, import, supply or install is without risk to health and safety. This includes undertaking necessary testing and providing adequate information about the silica containing products.

Suppliers of equipment (such as hand-held water-fed power tools or RPE) should take all reasonable steps to ensure appropriate information about the safe use of the equipment is available.

A PCBU who installs, constructs or commissions structures must also ensure, so far as is reasonably practicable, all workplace activity relating to the plant or structure including its decommissioning or dismantling is without risks to health or safety. A structure is defined as anything that is constructed, whether fixed or moveable, temporary or permanent, including buildings and underground works (such as shafts or tunnels).

Duties of principal contractors

Projects involving construction work that cost \$250,000 or more are classified as 'construction projects' under the model WHS laws. Each construction project has a 'principal contractor'. A principal contractor is also a PCBU.

In addition to the primary duties imposed on a principal contractor as a PCBU, the principal contractor has duties relating to WHS management plans, ensuring general compliance, and managing specific risks.

Duties of workers

Workers have a duty to take reasonable care for their own health and safety, and to take reasonable care to not adversely affect the health and safety of other persons.³⁹

Workers must also:

- comply as far as they are reasonably able with any reasonable WHS instructions given by the PCBU, such as participating in health monitoring and wearing relevant personal protective equipment (PPE), and
- co-operate with any reasonable policy or procedure relating to WHS at the workplace that has been notified to them.⁴⁰

The PCBU must make workers aware of the hazards associated with the use of silica-containing materials, including the process for reporting safety incidents.

If a worker refuses to participate in health monitoring or refuses to use PPE as they have been trained and instructed, a PCBU would need to take other action to meet its duties under the WHS laws. This could include removing the worker from the source of exposure to RCS.

³⁹ model WHS Act s28

⁴⁰ model WHS Act s28

Duties of officers

An officer (for example a company director) must exercise due diligence to ensure the PCBU complies with the WHS Act and WHS Regulations.⁴¹ This includes taking reasonable steps to ensure the PCBU has and uses appropriate resources and processes to eliminate or minimise risks of working with silica and silica containing products. This includes:

- identifying the hazard of RCS
- controlling the risk of exposure to RCS
- conducting air monitoring, and
- providing health monitoring for workers.

Duties of other persons at the workplace

Other persons at the workplace, like visitors, must take reasonable care for their own health and safety and must take care not to adversely affect other people's health and safety.⁴² They must comply, so far as they are reasonably able, with reasonable instructions given by the PCBU to allow that person to comply with the WHS Act.

⁴¹ model WHS Act s27

⁴² model WHS Act s29

Appendix B: Complementary initiatives

[Whole of Australian Governments' response to the National Dust Disease Taskforce Final Report](#)

In April 2022, the Commonwealth, in consultation with state and territory governments, released the All of Governments' Response to the Final Report of the National Dust Disease Taskforce (Australian Government 2022). Australian governments supported 14 of the National Dust Disease Taskforce's sub-recommendations, and noted 2 others related to a full or partial ban on importation of engineered stone by July 2024 and funding multi-disciplinary teams of medical professionals to support treatment of patients with silicosis.

Key initiatives not otherwise mentioned in this CRIS include:

- a request for Heads of Workplace Safety Authorities to consider developing best practice compliance and enforcement principles in relation to the risks associated with RCS
- collaboration between Commonwealth, state and territory governments to develop a framework to measure the progress and impact of initiatives on worker safety and health outcomes, and to support evaluation of a full or partial ban on importation of engineered stone by July 2024
- development of National Guidance for doctors assessing workers exposed to respirable crystalline silica dust with specific reference to engineered stone related silicosis, which was published in February 2022 (Department of Health 2022)
- funding for the continued operation of the National Occupational Respiratory Disease (building on the election commitment of \$1.6 million provided through the 2019-20 Budget), which will capture mandatory notifications of silicosis diagnoses by respiratory and occupational physicians
- finalisation of the National Silicosis Prevention Strategy and National Action Plan, to support more effective prevention of silicosis in Australia
- Commonwealth funding for specific education and awareness activities to raise awareness about the risks to lung health in the workplace, targeting high risk employees, high risk industries, carers and families of those impacted, and culturally and linguistically diverse employees and employers
- developing a silicosis care management plan for health professionals to use in consultation with their silicosis patients
- funding to support additional training for medical practitioners to better recognise, diagnose and treat silicosis and other occupational respiratory diseases
- funding to deliver a support service for affected workers and their families to provide information, advice and referrals, and peer to peer virtual support groups
- establishment a research forum focused on further developing the evidence base in relation to dust diseases, and
- funding for the development of a protocol to enable the early identification of and response to, emerging occupational respiratory risks and associated diseases.

Silica safety awareness – nationally recognised training

In February 2021, the Construction, Plumbing and Services Industry Reference Committee agreed to develop a Silica Safety training package to address WHS skills gaps related to RCS.

With Commonwealth funding, four units of competency were subsequently developed:

- CPCSIL1001 Prepare to work safely with products and materials containing crystalline silica,
- CPCSIL2001 Use and maintain respiratory protective equipment,
- CPCSIL3001 Work with products and materials containing crystalline silica, and
- CPCSIL4001 Supervise and manage work with products and materials generating respirable crystalline silica.

At its April 2022 meeting, the Australian Industry and Skills Committee agreed to approve these units of competency. Skills ministers endorsed three of the four units of competency, with only CPCSIL1001 not endorsed.

Appendix C: Cost modelling key assumptions and methodology

Key assumptions

The following tables present the key assumptions and methodology used to estimate the total cost to industry and government for each option. This analysis was conducted in April 2022, and parameter assumptions were current at that point in time, with key assumptions updated to incorporate feedback from stakeholders provided in their response to the CRIS.

Number of businesses covered by regulatory and non-regulatory options

Industry classification

The number of businesses captured by the regulatory and non-regulatory options assessed were estimated using *Counts of Australian Businesses* data published by the Australian Bureau of Statistics (2021b). This data presented the total number of businesses at the four-digit ANZIC industry classification level for each jurisdiction. An assessment of all four-digit ANZIC categories was undertaken to determine which industries undertake high risk silica processes and would be covered by the proposed regulatory and non-regulatory options.

For the purposes of our analysis, relevant ANZIC industry codes were grouped into broad industry sectors as outlined in Table 36.

Table 36: ANZIC industry classification

Industry category	ANZIC industry classification
<i>Construction</i>	Bricklaying Services, Concreting Services, Non-Residential Building Construction, Other Construction Services, Plastering and Ceiling Services, Plumbing Services, Roofing Services, Tiling and Carpeting Services
<i>Manufacturing</i>	Cement and Lime Manufacturing, Clay Brick Manufacturing, Concrete Product Manufacturing Other Ceramic Product Manufacturing, Other Non-Metallic Mineral Product Manufacturing, Plaster Product Manufacturing, Ready-Mixed Concrete Manufacturing
<i>Quarrying</i>	Gravel and Sand Quarrying Other Non-Metallic Mineral Mining and Quarrying
<i>Mining</i>	Bauxite Mining, Coal Mining, Copper Ore Mining, Gold Ore Mining, Iron Ore Mining, Mineral Sand Mining, Nickel Ore Mining, Other Construction Material Mining, Other Metal Ore Mining, Silver-Lead-Zinc Ore Mining
<i>Tunnelling</i>	Other Heavy and Civil Engineering Construction, Road and Bridge Construction
<i>Demolition</i>	Site Preparation Services

Size of the industry

Given the variability of some costs is dependent on the size and scale of operations, businesses count data was further split into the following categories to account for this variability:

- Sole trader and small: non-employing (sole trader) - 19 employees
- Medium: 20 – 199 employees
- Large: 200+ employees.

It is likely that not all businesses in each industry would undertake high risk silica work and therefore would not be required to meet the additional duties outlined in the proposed options.

Using assumptions developed in the Victorian Occupational Health and Safety Amendment (Crystalline Silica) Regulations 2021 Regulatory Impact Statement, a proportion of businesses within each industry category will be required to meet the additional duties beyond the existing model WHS laws as presented in Table 37 which includes:

- WorkSafe Victoria data informed the assumptions used to estimate the cost to industry for the options assessed in the Victorian Occupational Health and Safety Amendment (Crystalline Silica) Regulations 2021 Regulatory Impact Statement. This data indicated that:
 - 37% of the earth resources industries (quarrying, tunnelling, mining and demolition) worked with high risk resources containing crystalline silica.
 - In the manufacturing and construction industries, a lower rate of 10% has been applied after assessing the ANZIC industry sectors included in the analysis. In the absence of more robust data, it is to be noted that these percentages contain a high degree of uncertainty.
- For bricklaying and concreting services in the construction industry and concrete product manufacturing in the manufacturing sector all businesses are deemed to undertake high risk silica work.

Table 37: Size of industry and proportion of businesses undertaking high risk silica work

Industry category	ANZIC industry classification	Proportion of businesses covered by options
<i>Construction</i>	Non-Residential Building Construction, Other Construction Services, Plastering and Ceiling Services, Plumbing Services, Roofing Services, Tiling and Carpeting Service	10%
	Bricklaying services, Concreting services	100%
<i>Manufacturing</i>	Cement and Lime Manufacturing, Clay Brick Manufacturing, Other Ceramic Product Manufacturing, Other Non-Metallic Mineral Product Manufacturing, Plaster Product Manufacturing, Ready-Mixed Concrete Manufacturing	10%
	Concrete Product Manufacturing	100%
<i>Quarrying, mining, tunnelling, demolition</i>	Bauxite Mining, Coal Mining, Copper Ore Mining, Gold Ore Mining, Gravel and Sand Quarrying, Iron Ore Mining, Mineral Sand Mining, Nickel Ore Mining, Other Construction Material Mining, Other Heavy and Civil Engineering Construction, Other Metal Ore Mining, Other Non-Metallic Mineral Mining and Quarrying, Road and Bridge Construction, Silver-Lead-Zinc Ore Mining, Site Preparation Services	37%

Assumptions around the number of businesses in Australia not subject to the model WHS laws

As mentioned in Section 1.6, the scope of this DRIS covers industries that are subject to the model WHS laws. Therefore, the following exclusions apply:

- Victorian businesses that operate solely within Victoria (small and proportion of medium sized businesses) have been excluded from the total business count estimates. Victorian businesses are not included under Option 4 as it is assumed that a licence acquired to work with engineered stone in Victoria to be reciprocal reciprocated across jurisdictions
- Mining and quarrying businesses in Tasmania, Queensland and New South Wales

It is to be noted that the business counts data represents a point in time estimate using historical data. No analysis has been undertaken to determine the likely labour market trends across industries impacted by the proposed regulatory and non-regulatory changes over the 10 year forecast period.

The total estimated number of businesses covered by Options 2 and 5 are presented in Table 38.

Table 38: Estimated number of businesses per industry category covered by Options 2 and 5a/5b (Australian Bureau of Statistics 2021b)

Industry category	Small		Medium		Large		Total	
	Total number of businesses	Businesses covered by regulations	Total number of businesses	Businesses covered by regulations	Total number of businesses	Businesses covered by regulations	Total number of businesses	Businesses covered by regulations
<i>Construction</i>	92,745	16,979	1,502	150	42	4	94,289	17,133
<i>Manufacturing</i>	2,075	415	149	15	33	3	2,257	433
<i>Quarrying</i>	109	40	6	2	0	0	115	43
<i>Mining</i>	841	311	66	24	23	9	930	344
<i>Tunnelling</i>	7,150	2,646	478	177	64	24	7,692	2,846
<i>Demolition</i>	14,578	1,458	484	48	15	2	15,077	1,508
Total	117,498	21,849	2,685	416	177	42	120,360	22,307

Worker wage assumptions

The average wage per hour has been estimated using Average Weekly Earnings (AWE) data provided by the Australian Bureau of Statistics (ABS). summarises the number of businesses included within this assessment across each industry category. Table 39 presents estimates of SWA salary costs per employee.

Table 39: Employee wage by industry category (Australian Bureau of Statistics 2021c)

Industry category	Average weekly earnings (\$)	Average weekly hours worked (hrs)	Employee hourly rate (\$)
Construction	\$1,734.10	37.5	\$46.24
Manufacturing	\$1,557.10	37.5	\$41.52
Quarrying	\$2,656.30	37.5	\$70.83
Mining	\$2,656.30	37.5	\$70.83
Tunnelling	\$1,734.10	37.5	\$46.24
Demolition	\$1,734.10	37.5	\$46.24

Annual employee wages for SWA staff have been used to estimate the average annual government labour cost for each option (as presented in Table 40).

Table 40: Government employee salaries (Safe Work Australia 2022d)

Industry category	Average annual salary (\$)
APS 6 or equivalent	\$94,966
EL1 or equivalent	\$118,733
EL2 or equivalent	\$149,595

Methodology

The methodology and underlying assumptions used to estimate the total costs to industry and government for each option are presented in Table 41 and 42.

Table 41: Additional cost to industry: key assumptions and cost estimate methodology

Cost assumption	Description	Variable	Input/assumption	Formula
Option 4				
Licence application	Labour to prepare a licence application for PCBUs working with engineered stone	Number of hours to prepare licence application (hours)	18.75 (Deloitte 2021)	Total licence application cost = Number of hours to prepare licence application ×
		Average wage / hour (\$)	\$46.24 (Australian Bureau of Statistics 2021c)	

Cost assumption	Description	Variable	Input/assumption	Formula		
		Number of PCBUs working with engineered stone in Australia (#)	1,000 (Australian Engineered Stone Advisory Group 2019)	Average wage/hour × Number of PCBUs working with engineered stone in Australia		
<i>Licence fee</i>	Licence fee paid by PCBUs to work with engineered stone	Licence fee (\$)	\$302 (Deloitte 2021)	Total licence fee cost = Licence fee × Frequency of licence fee payment × Number of PCBUs working with engineered stone in Australia		
		Frequency of licence fee (years)	5 years (Deloitte 2021)			
		Number of PCBUs working with engineered stone in Australia (#)	1,000 (Australian Engineered Stone Advisory Group 2019)			
		Average wage / hour (\$)	\$46.24 (Australian Bureau of Statistics 2021c)			
<i>Risk assessment: (Initial assessment) - Year 1</i>	Additional labour costs for the preparation of a risk assessment in year 1. This may include seeking expert advice, and baseline analytical tests/analysis of source materials	Cost of consultant to inform risk assessment	\$4,500 ⁴³	Cost of risk assessment report: (Year 1) = Cost of consultant to inform risk assessment × Number of PCBUs working with engineered stone in Australia		
		Number of PCBUs working with engineered stone in Australia (#)	1,000 (Australian Engineered Stone Advisory Group 2019)			
<i>Risk assessment: all industries (annual assessment) - year 2 – 10</i>	Additional labour costs for the preparation/revision of risk assessment on an annual basis	Time taken to prepare risk assessment (hours)	Small 3	Medium 3	Large 4 ⁴⁴	Cost of risk assessment: (year– 2-10) = Time taken to prepare risk assessment report × Average wage/hour × Number of workers × Number of PCBUs working with engineered stone in Australia
		Average wage / hour (\$)	\$46.24 (Australian Bureau of Statistics 2021c)			
		Number of workers (#)	2 ⁴⁵			
		Number of PCBUs working with engineered stone in Australia (#)	1,000 (Australian Engineered Stone Advisory Group 2019)			
	Labour costs to prepare an engineered stone	Number of hours per year to prepare engineered stone	4 ⁴⁶			Cost of engineered stone control plan

⁴³ Model Assumption based on feedback provided by stakeholders in response to CRIS

⁴⁴ Model assumption

⁴⁵ Model assumption

⁴⁶ Model Assumption based on feedback provided by stakeholders in response to CRIS

Cost assumption	Description	Variable	Input/assumption	Formula
<i>Engineered stone control plan</i>	control and implementation plan	control plan (hours/year)		=
		Average wage/hour (\$)	\$46.24 (Australian Bureau of Statistics 2021c)	Number of hours to prepare an engineered stone control plan × Average wage/hour
		Number of PCBUs working with engineered stone in Australia (#)	1,000 (Australian Engineered Stone Advisory Group 2019)	× Number of PCBUs working with engineered stone in Australia
<i>Air monitoring – provision of report to regulators where WES exceedance detected</i>	Additional labour costs for the preparation of air monitoring reports for submission to WHS regulators in each jurisdiction where RCS values exceed WES	Number of hours per year to prepare air monitoring report for submission (hours/year)	2 ⁴⁷	Cost of air monitoring – provision of report to regulators = Number of hours to prepare air monitoring report for submission × Number of workers to prepare report for submission × Average wage/hour × Number of PCBUs working with engineered stone in Australia × Proportion of PCBUs where RCS exceeds WES
		Number of workers (#)	2 ⁴⁸	
		Average wage/hour (\$)	\$46.24 (Australian Bureau of Statistics 2021c)	
		Number of PCBUs working with engineered stone in Australia (#)	1,000 (Australian Engineered Stone Advisory Group 2019)	
		Proportion of PCBUs where RCS exceeds WES	30% ⁴⁹	
<i>Preparation for and participation in compliance audits</i>	Labour to prepare for and participate in compliance audits of licensees.	Average number of compliance audits per PCBU per annum (# / PCBU / year)	2 (Deloitte 2021)	Cost of compliance audits = Average number of compliance audits per annum × Time to participate in compliance audits × Number of workers to participate in compliance audits × Average wage/hour
		Time to participate in compliance audits (hours)	4 ⁵⁰	
		Number of workers required compliance audits (#)	2	

⁴⁷ Model Assumption based on feedback provided by stakeholders in response to CRIS

⁴⁸ Model assumption

⁴⁹ Model assumption

⁵⁰ Model Assumption based on feedback provided by stakeholders in response to CRIS

Cost assumption	Description	Variable	Input/assumption			Formula
		Average wage/ hour (\$)	\$46.24 (Australian Bureau of Statistics 2021c)			× Number of PCBUs working with engineered stone in Australia
		Number of PCBUs working with engineered stone in Australia (#)	1,000 (Australian Engineered Stone Advisory Group 2019)			
Option 5a and 5b						
<i>Risk assessment: (Initial assessment) - Year 1</i>	Additional labour costs for the preparation of a risk assessment in year 1. This may include seeking expert advice, and baseline analytical tests/analysis of source materials	Cost of consultant to inform risk assessment	\$4,500 ⁵¹			Cost of risk assessment report: (Year 1) = Cost of consultant to inform risk assessment × Number of businesses undertaking high risk silica work
		Number of businesses undertaking high risk silica work (#)	Refer to Table 38			
<i>Risk assessment: all industries (annual assessment) - year 2 – 10</i>	Additional labour costs for the preparation/revision of risk assessment on an annual basis	Time taken to prepare risk assessment (hours)	Small 3	Medium 3	Large 4 ⁵²	Cost of risk assessment: (year– 2-10) = Time taken to prepare risk assessment report × Average wage/hour × Number of workers × Number of businesses undertaking high risk silica work
		Average wage per hour - by industry (\$)	Refer to Table 39			
		Number of workers (#)	2 ⁵³			
		Number of businesses undertaking high risk silica work (#)	Refer to Table 38			
<i>Silica risk control plan</i>	Additional labour costs for the preparation of a silica risk control plan	Number of hours per year to prepare silica risk control plan for submission (hours/year)	Small 3	Medium 3	Large 4 ⁵⁴	Cost of silica risk control plan = Number of hours to prepare silica risk control plan for submission × Average wage/hour ×
		Average wage per hour by industry (excluding	Refer to Table 39			

⁵¹ Model Assumption based on feedback provided by stakeholders in response to CRIS

⁵² Model assumption

⁵³ Model assumption

⁵⁴ Model assumption

Cost assumption	Description	Variable	Input/assumption			Formula
		construction industry) (\$)				Number of workers x Number of businesses undertaking high risk silica work in Australia
		Number of workers (#)	2 ⁵⁵			
		Number of businesses undertaking high risk silica work Australia (excluding construction industry) (#)	Refer to Table 38			
<i>Air monitoring – provision of report to regulators</i>	Additional labour costs for the preparation of air monitoring reports where WES exceedances have been detected.	Number of hours per year to prepare air monitoring report submission (hours/year)	Small 3	Medium 3	Large 4 ⁵⁶	Cost of air monitoring - provision of report to regulators = Number of hours to prepare air monitoring report submission x Average wage/hour x Number of workers x Number of businesses undertaking high risk silica work in Australia X Proportion of PCBUs where RCS values exceed WES
		Average wage/hour (\$)	Refer to Table 39			
		Number of workers (#)	2 ⁵⁷			
		Number of businesses undertaking high risk silica work in Australia (#)	Refer to Table 38			
		Proportion of PCBUs where measured RCS values exceed WES	30% ⁵⁸			

⁵⁵ Model assumption

⁵⁶ Model assumption

⁵⁷ Model assumption

⁵⁸ Model assumption

Table 42: Additional cost to government: key assumptions and cost estimate methodology

Cost assumption	Description	Variable	Input/assumption	Formula
Option 2				
<i>Behaviour change initiative – planning and design</i>	Costs related to the planning and design for behaviour change and awareness campaigns on an annual basis.	Engagement with behavioural insights consultants (\$)	\$120,000 ⁵⁹	Cost of behaviour change initiative – planning and design = Cost to plan and engage with behavioural insights consultants
<i>Behaviour change initiative – roll out across all industry sectors</i>	Costs related to the development and distribution of information for behaviour change and awareness campaigns	Costs related to the development and distribution of information for behaviour change/awareness campaigns across seven jurisdictions (\$)	\$840,000 ⁶⁰	Cost of behaviour change initiative – roll out across industry sectors = Cost to rollout behaviour change initiatives × Number of jurisdictions
Option 4				
<i>Development, implementation, and maintenance of a system for administration of licensing framework</i>	Cost of developing a licensing platform(s) and implementation across in each jurisdiction.	Cost of developing of a licensing platform(s)	\$750,000 (Deloitte 2021)	Cost of developing of a licensing platform = Cost to acquire online licensing portal × Number of jurisdictions (excluding Victoria)
		Number of jurisdictions (excluding Victoria) (#)	7 ⁶¹	
<i>Implementation and processing of licences</i>	Labour to implement licensing software and assess licence applications	Number of workers to implement licensing and assess applications (#)	1 (Deloitte 2021)	Cost to implement licence software and process applications = Number of workers to implement licensing and assess applications × Labour cost to implement licensing and assess applications × Number of jurisdictions
		Labour per year to implement licensing and assess applications (\$/year)	Refer to Table 40	
		Number of jurisdictions (excluding Victoria) (#)	7 ⁶²	

⁵⁹ Model assumption

⁶⁰ Model assumption

⁶¹ Model assumption

⁶² Model assumption

Cost assumption	Description	Variable	Input/assumption	Formula
<i>Prepare and conduct compliance audits</i>	Labour to prepare for and conduct compliance program specific to engineered stone licence scheme	Average number of scheduled compliance audits per year (#/year)	2 ⁶³	<p>Cost of compliance audits</p> <p>=</p> <p>Average number of scheduled compliance audits per annum</p> <p>×</p> <p>Time to participate in compliance audits</p> <p>×</p> <p>Number of employees required for compliance audits</p> <p>×</p> <p>PCBUs working with engineered stone</p> <p>×</p> <p>Average wage/hour (\$)</p>
		Time to participation in scheduled audits (hours)	4	
		Number of workers required for scheduled audits (#)	2	
		Number of PCBUs working with engineered stone	1,000 (Australian Engineered Stone Advisory Group 2019)	
		Annual salary for government workers	Refer to Table 40	
<i>Awareness campaign</i>	Cost of education/awareness campaign to inform PCBUs and other relevant duty holders of requirements resulting from regulatory changes	Cost of national awareness campaign (\$)	\$120,000 ⁶⁴	Cost of education/awareness campaign
Option 5a and 5b				
<i>Awareness campaign</i>	Cost of education/awareness campaign to inform PCBUs and other relevant duty holders of requirements resulting from regulatory changes	Cost of education/awareness campaign	\$120,000 ⁶⁵	Cost of education/awareness campaign

⁶³ Model assumption

⁶⁴ Model assumption

⁶⁵ Model assumption