

Category 1: Work Health and Safety

Queensland insitu stabilisation specification
amendments to reduce the risks of respirable
crystalline silica (RCS) dust

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Queensland Department of Transport and Main Roads



Queensland Government

Department of Transport and Main Roads

2023 AustStab Awards of Excellence

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Background

- Queensland's Code of Practice - *Managing respirable crystalline silica dust exposure in construction and manufacturing of construction elements* released in May 2023 and is Australia's first silica dust code of practice.
- The workplace exposure standard (*maximum exposure limit*) for respirable crystalline silica dust is 0.05 milligrams per cubic metre averaged over an eight hour period.
- Crystalline silica can be found in many different natural and manufactured forms, including stones, rocks, quartz, sand & gravel.
- Crystalline silica content in materials can vary widely: sandstone can have up to 90% silica, granite typically contains 30% silica, and, concrete and aggregates can have a range of silica depending on its components.
- Sources of road base materials in QLD may include materials that contain crystalline silica, and, when worked (for example, during insitu stabilisation).
- "Dry" pavements can result in particles becoming airborne (as dust). These airborne particles can contain silica and therefore are a risk to roadworkers and the public driving through a project.
- TMR is committed to improving safety for all workers and the public – specifically in the insitu stabilisation industry.

Managing respirable crystalline silica dust exposure in construction and manufacturing of construction elements

Code of Practice

2022

WHSQ

Workplace Health and Safety Queensland
worksafe.qld.gov.au



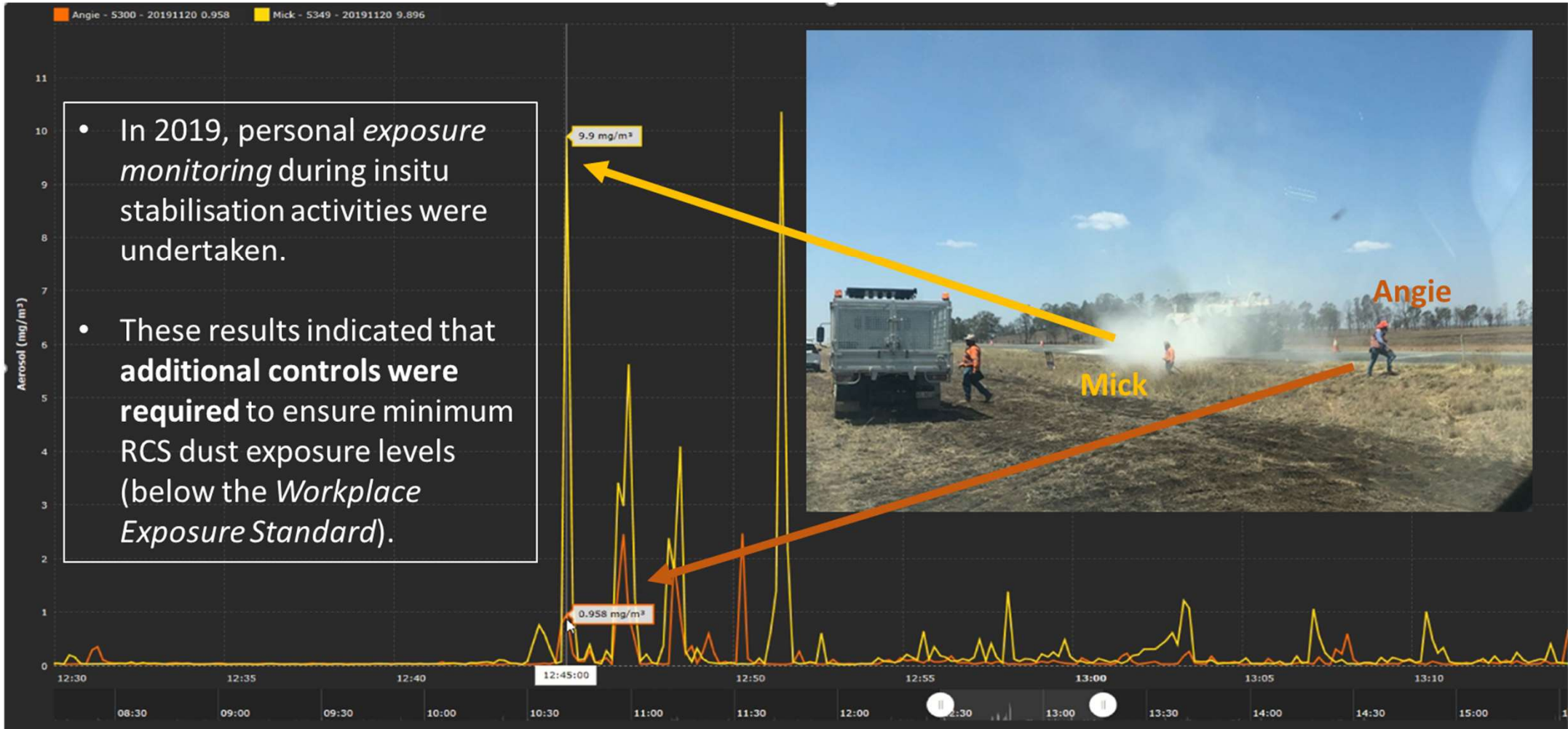
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Pavement Recycling and Stabilisation Association

Objectives

Reduce the exposure of airborne dust to insitu stabilisation workers (and public).



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Data Collection and Analysis

- Previously, the initial pulverisation and stabilising agent incorporation passes were undertaken without the incorporation of water (often referred to as “dry passes”).
- As shown by the 2019 data, this operation had the potential to generate significant levels of dust.
- The amount of dust generated was often dependent on project specific factors such as the material type and insitu moisture condition



Workers fitted with personal exposure monitoring equipment.

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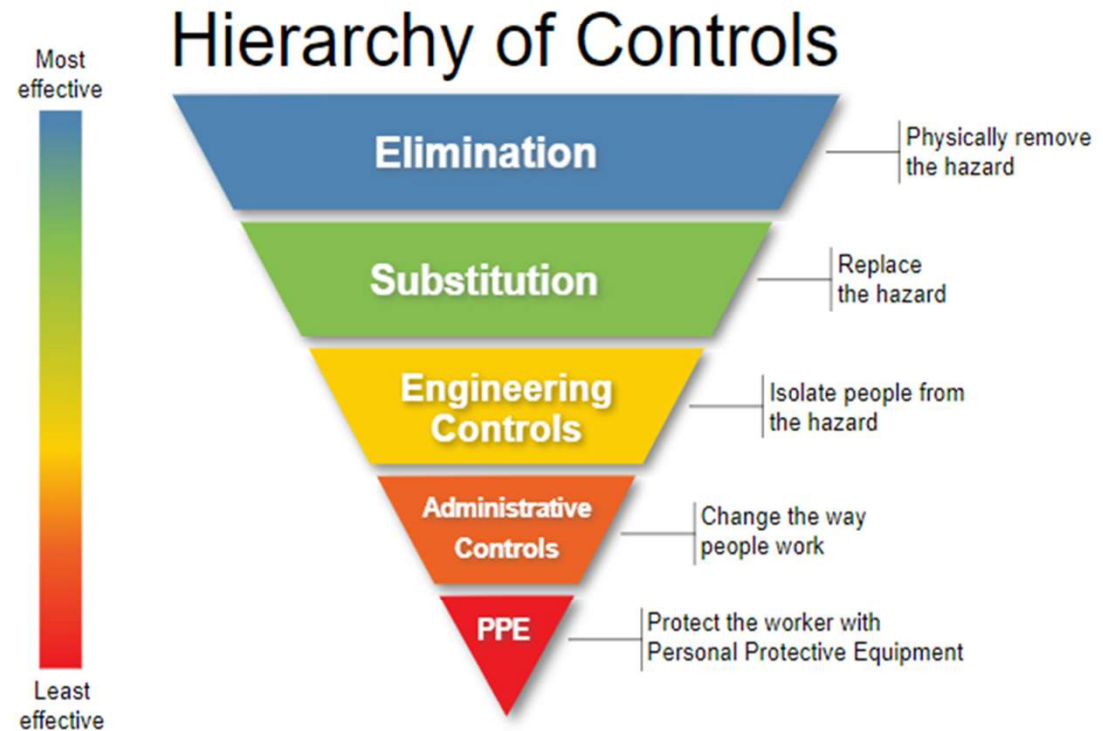
Outcomes

- As a result of the 2019 personal exposure trials, TMR insitu stabilisation technical specifications (MRTS) were amended in 2021 to allow the incorporation of water into all three stabilising passes
 1. Initial pulverisation,
 2. Stabilising agent incorporation, and
 3. Final pass.

The incorporation of moisture during the pulverisation pass allows the insitu materials to be pre-conditioned (in particular, those insitu materials with higher water absorptions).

Typically, 0.2-0.5% moisture rate through the reclaimer / stabiliser for the pulverisation pass.

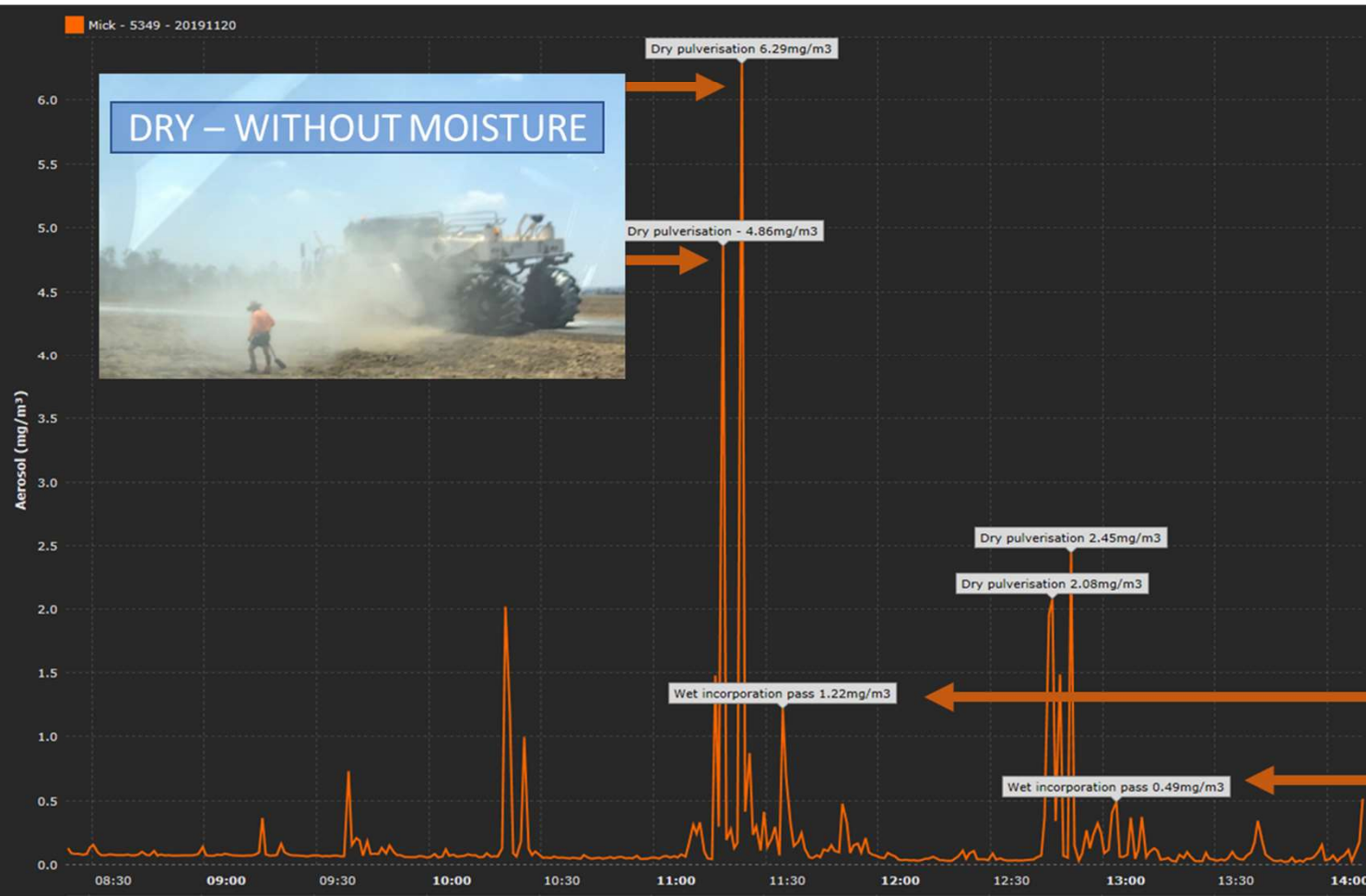
Where the insitu materials has a relatively higher moisture content at the time of insitu stabilising, the addition of moisture during the pulverisation pass may not be required to pre-condition the materials.



https://upload.wikimedia.org/wikipedia/commons/3/36/NIOSH%E2%80%99s_%E2%80%9CHierarchy_of_Controls_infographic%E2%80%9D_as_SVG.svg

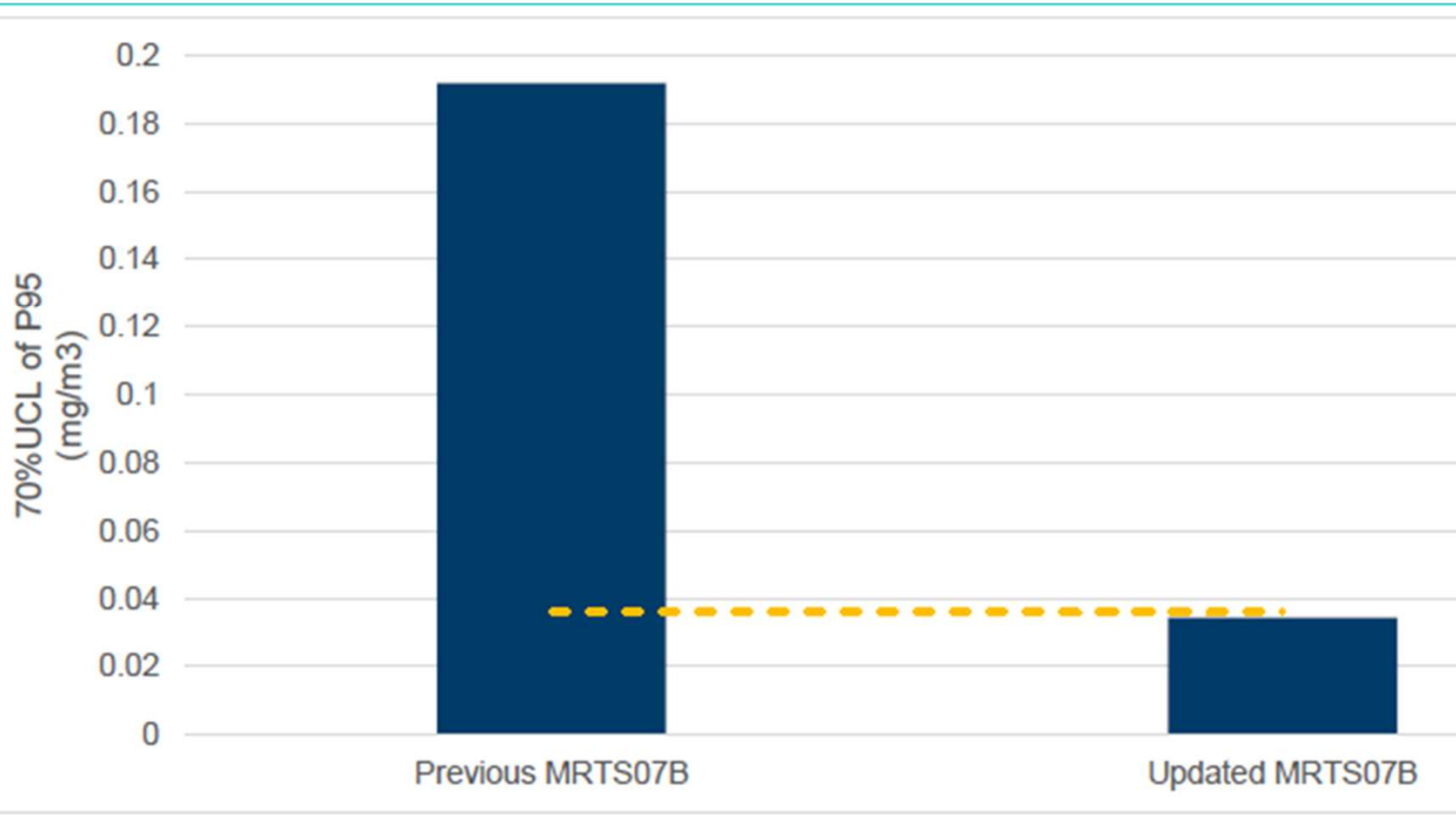
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Verification of Controls



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Data Comparison



Available data collected prior to the update of MRTS07B was reviewed and compared to the data in 2021 and 2022 (after amendments to include moisture in all passes).

A statistically significant comparison between the two data sets was not possible for all SEGs due to the limited details provided by the previously collected data set.

The EN689 statistical test for RCS in the ground worker SEG was calculated for the data collected prior to the update of MRTS07B. The Figure shows the 70% upper credible limit of the 95th percentile of each data set, show as the bars. This value is compared to the adjusted Workplace Exposure standard (WES), shown as the dotted line. The SEG is conformant to the EN689 statistical test if the bar is below the WES line and non-conformant if the bar is above the WES line.

The chart in this slide shows that previously exposures to RCS in the ground worker SEG would not be compliant to EN689. However, with the implementation of the update of MRTS07B, exposures have been reduced to a level in conformance with EN689.

The results indicate that implementation of stabilising technical specification amendments reduced exposures and additional controls are no longer required.

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Looking to the Future

- TMR continues to review its construction practices to improve workers safety.
- This is also relevant for other construction processes – for example, road profiling, saw cutting and so on.
- For insitu stabilisation, TMR will continue to improve its specifications based on project learnings, best practice and research.



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