

Transforming Dust Control – Lessons from Tunnelling

De Andrade, A¹, Fanning, A², Palmer, B³ and Stowasser, P⁴

1. Chief Executive Officer, Grydale Solutions Pty Ltd, Brisbane Qld 4500. Email: alex.deandrade@grydale.com.au
2. Director of Innovation and Design, Grydale Solutions Pty Ltd, Brisbane Qld 4500. Email: andrew.fanning@grydale.com.au
3. Head of Engineering, Grydale Solutions Pty Ltd, Brisbane Qld 4500. Email: bill.palmer@grydale.com.au
4. Research Consultant, Brisbane Qld 4500. Email: p.stowasser@hdr.qut.edu.au

Keywords: mobile dust collectors, tunnelling, dust, respirable crystalline silica, mining

ABSTRACT

Mining and tunnelling share many commonalities (e.g., confined working environments, excavation equipment and processes, regulations), but of significance is an overarching commitment to provide safe work conditions and environments. This includes reducing exposure to hazardous airborne contaminants such as dust, including Respirable Crystalline Silica (RCS), and diesel fumes. In mining, wet methods are common to suppress dust, however these methods are reliant on water availability, can be less effective for respirable dust, can have implications for environmental water contamination and can increase maintenance on mining equipment. In contrast, alternative technologies that provide filtration of dust (i.e., mobile dust collectors) are well established in the tunnelling industry and frequently used to provide spot extraction (dust control at the source) and act often as a complement to the main ventilation system. The aim of this paper is to share the advancements within tunnelling that can be easily and readily applied to mining. The paper includes a review of regulations specific to respirable dust and processes, interviews with tunnel employees and industry leaders, and reveals operational efficiencies with respect to drill and blast. The paper situates mobile dust collectors as a cost-effective alternative to reduce respirable dust and diesel fumes in underground mining. Three considerations believed relevant to underground mining are presented. The first relates to safe work conditions and environments with the mobile dust collectors evidencing a NATA certified filtration efficiency of 99.99% at 0.067 microns. This means extremely small particles of dust (i.e., respirable dust) are removed from the atmosphere. The second relates to operational flexibility, with different types of mobile dust collectors (e.g., skid-mounted units, hydraulic stepping systems and track mounted units) able to complement different mining processes and methodologies. A final consideration relates to the captured dust, which has the potential to be reprocessed to remove any valuable metals.