

## Crystalline Silica Exposure in Tunnelling: Identifying Barriers to Safe Practices

**Authors :** Frederick Anlimah, Vinod Gopaldasani, Catherine MacPhail, Brian Davies

**Abstract :** The construction industry, particularly tunnel construction, exposes workers to respirable crystalline silica (RCS), which can cause incurable illnesses such as silicosis and lung cancer. Despite various control measures, exposures remain inadequately controlled. This research aimed to identify the barriers and challenges hindering the implementation of effective controls and the adoption of safe work practices to protect workers from RCS exposure in tunnelling. A mixed-method approach was employed for this research. Tunnel construction workers were observed, surveyed and interviewed to gauge their knowledge and attitudes and understand their challenges in reducing RCS exposure. The preliminary analysis of the data reveals a diverse array of sociotechnical factors interacting to influence RCS exposure. It is noteworthy that participants consistently emphasised the project as the most exemplary one they have been involved in, although there is room for improvement. While there is a commendable level of knowledge about RCS exposure and control in tunnelling, there is a striking lack of perceived satisfaction regarding dust control. Several factors were identified as interacting to prevent the effective management of dust. These include perceived time pressure, absence of on-tool dust controls, low risk perceptions among workers, and inadequate enforcement of controls. Moreover, participants highlighted communication and heat-related challenges as hindrances to the continuous wear of respirators. This research highlights the need for a paradigm shift in tunnel construction to address the barriers associated with RCS exposure reduction. It emphasises the importance of collaboration among various stakeholders, advocating for more effective controls and enforcement strategies and enhanced worker education through knowledge sharing.

**Keywords :** respirable crystalline silica, dust control, worker practices, exposure prevention, silicosis

**Conference Title :** ICTC 2024 : International Conference on Tunnel Construction

**Conference Location :** New York, United States

**Conference Dates :** July 11-12, 2024