ADVANCE QUEENSLAND

Small Business Innovation Research

Information exchange day

Real-time personal monitoring of dust at Queensland underground coal mines

Department of Natural Resources and Mines

Queensland Government

Objectives

- Provide an affordable personal dust monitoring device that will provide real-time data to a worker regarding their exposure levels to respirable dust, consistent with Australian Standards.

- Provide a device that informs coal operators and mine workers of their exposure to respirable dust, in real time, in all areas of underground coal mines in Queensland.

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Key issues and background

- Current techniques are based on gravimetrical testing.
- Feedback of exposure is typically weeks after exposure occurred.
- Other devices available on the market that provide real-time measurement do not meet one, or all of the following:
  - Australian standards for intrinsic safety
  - the minimum measurement accuracy
  - are cost prohibitive at present.

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Key issues and background

There are currently no commercially available real-time systems that:

- distinguish between different types of respirable dust (coal particles, diesel particles, or silica)
- measure to Australia Standard 2985, providing an average dust concentration that can be compared against the regulatory exposure limit of respirable dust and respirable crystalline silica.

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Design parameters

- Alert an individual worker if their breathing zone is approaching, or exceeds, the recommended respirable dust exposure limits.
- Collect individual data to allow end-of-shift analysis (currently two week delay on analysis).
- Identify areas of operation that require improved dust control.
- Be intrinsically safe and meet Australian Standards to enable its use in all areas of QLD underground coal mines (Queensland hazardous area standards are based on Australian (ANZEx) and IECEx international standards.)

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Design parameters

- Be tamperproof and robust (heat, humidity, dust and moisture ingress).
- Enable personal monitoring (wearable, light weight).
- Not introduce a new hazard into the worker’s environment (ergonomic risk, or safety risk).
- Be cost effective.

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Design parameters

- Be useable as a fixed-point / static monitor to gauge effectiveness of controls.
- Measure an individual mine workers' exposure to respirable dust in real time, within their breathing zone.
- Measure respirable dust concentration accurately as milligrams per cubic metre (mg/m3).
- Reach feasibility stage within 6 months.

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Design parameters

Additional, desirable specification:

- To distinguish respirable coal dust from other respirable dust fractions (e.g. diesel particulate matter, silica)

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Resources

- Australia standard 2985-2004

Workplace atmospheres - Method for sampling and gravimetric determination of respirable dust

- Coal Mining Safety and Health Act 1999
- Coal Mining Safety and Health Regulation 2001
- ANZEx
- IECEx international standards

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More information

- Advance Queensland

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Questions?

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