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ENVIRONMENT, JOBS AND HOUSING WINS POSSIBLE FROM NEW RESEARCH

New research could result in wins for the environment, while providing cheaper materials for land development, infrastructure, mine-site rehabilitation and extending the jobs of mine workers. The project examined data gaps that have inhibited the wider use of surplus natural rock materials, generated as a by-product from coal mining processes.

The Australian coal sector generates tens of millions of tonnes (Mt) of rock by-product materials annually.

Currently this material is either managed on mine sites or transported offsite to approved emplacement areas. In many cases, the material is not considered for beneficial uses, such as engineered fill for housing-land developments, infrastructure projects and land rehabilitation projects.

Researcher Chris Meikle, SLR Consulting's APAC Mining Sector Leader said the research demonstrated that the materials from NSW southern coalfield mines, studied as part of this research, would be suitable for many purposes over and above those already permitted under NSW and local government regulations.

Chris said the environment could be a big winner.

"The sustainable use of these readily available materials for infrastructure, housing land, and back-filling quarry voids to the natural landform offers significant merit," he said.

Australia currently requires about 200 Mt of quarry products annually for building and construction.*

In the 12 months to March 2022, CO_2 gas emissions from quarrying in Australia were estimated to be 487 Mt CO_2-e (million metric tons of carbon dioxide equivalent).**

"So roughly speaking, the carbon offset is twofold; every tonne of coal mining by-product that is put to beneficial use, is one less tonne that goes to waste and one less tonne of new quarry product required," said Chris.

"This is an area where we will be doing more research to firm up these figures and highlight the environmental benefits of enabling wider use of by-product rock from coal mining," he said.

Affordable housing is a huge issue, and developers have already completed a number of projects where by-product material was used to cost-effectively improve ground conditions for housing land. This is important for growing cities.

"The Albion Park Rail bypass project in the Illawarra took advantage of significant quantities of by-product from the case study mines for use as embankment fill over a period of two to three years," he said.

Significant opportunities are arising that could make wider use of coal mining by-products, currently limited by government regulations and lack of guidance.

“The beneficial use of mining by-product rock could also extend the life of mines, and therefore the jobs of mine workers.”

While known by different names, within the regulatory framework the by-product rock from coal mining is more commonly known as Coal Washery Reject (CWR), a term that often prejudices its beneficial use.

The research paper, Southern Coalfield Coal Washery Reject (CWR) Characterisation and Classification, including management strategies for applications in Civil Engineering, authored by SLR’s Ben Tarrant, Chris Meikle and Elyssa De Carli with support from B3 Mining Services, used the Southern Coalfield CWR as a case study. Their research presents the history of evaluation and use and compares contemporary regulation of CWR to other widely adopted construction and rehabilitation materials.
Chris said the work provides a robust dataset, assessment methodologies and addresses a number of preconceptions and data gaps to demonstrate the environmental and geotechnical merits of using CWR in wider engineering applications.

“CWR is typically held to higher environmental performance thresholds than other routinely used fill materials.”

“Common constraints to using CWR for engineering purposes relate to its perceived combustion potential and its geochemical behaviour below the water table; however, regulatory controls do not adequately assess these risks, or provide conditions for their use,” he said.

"This project has demonstrated that CWR is suitable for a much wider range of civil engineering applications when considered with appropriate control measures. CWR from other regional coalfields has potential to offer equally beneficial uses but is likely to require more scrutiny and require additional controls to address site-specific risks.

However, a screening process has been developed that enables the wider coal industry to assess the viability of using their CWR in off-site civil engineering applications.

This project provides a basis for enhanced assessment including a suite of characterisation tests and management options to assist in demonstrating its suitability.

In addition, where CWR may be considered non-compliant with existing regulations, it is proposed that operators seek project-specific exemptions based on site and application risks.

Determining origin-specific naming of by-product rock materials also offers an opportunity to address potential bias.

Chris said that the research had been well received by stakeholders and his team was confident that the science would be persuasive in opening more opportunities for the beneficial use of coal mine by-product materials Australia wide. He said the research provided a good foundation to improve regulations regarding the use of the material.

*Cement Concrete and Aggregates Australia
** National-greenhouse-gas-inventory quarterly update March 2022

FOR MORE INFORMATION

ACARP report C29016 can be downloaded at ACARP.com.au

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