

New emulsion explosives technology ups Modder East's advance rate

As part of its strategy to reduce its cost per ton mined, Gold One's Modder East operation has rolled out an innovative infrastructure to use emulsion explosives for all 70 of its underground narrow-reef stope panels.

Developed and installed in partnership with blasting company [BME](#) over the past three years, the rapid reloading system includes the world's deepest vertical emulsion pipeline of 318m to deliver emulsion from surface to storage tanks underground. Used with narrow-reef pump technology, this system has allowed Modder East to move away from the use of cartridge explosives and fully convert to emulsion explosives.



"The new arrangement will allow us to achieve our campaign goal for the coming year of a 0,8m advance per panel per day – a substantial improvement on the 0,65m we used to average," says James McArdle, explosives and technical manager at Modder East. "The cost savings and productivity improvements convince us that this technology will be the only way for mines to go in the future."

Specialised transporters in the haulages are filled with emulsion from the underground tanks and delivered to re-filling stations near the stope face, from where portable charging units (PCUs) are filled.

He said the increase in the daily advance rate could generate additional gold mined per month.

“The beauty of this system includes the time saved to get the product underground, as well as the efficiencies gained by not having to manually manage explosive cartridges – which are also closely regulated for safety and security reasons,” McArdle explains.

The emulsion-filled bags, or bladders, that fit onto the hand-held chargers weigh just 18kg each – making them lighter and easier to carry than the cartridge boxes traditionally moved from surface to the stope face for blasting.

The handling and storage of emulsion is much less onerous than cartridges as it is classified as a 5.1 oxidiser – rather than an explosive – and is only sensitised when actually inside the drill-hole; this also eradicates theft.

The highly stable characteristics of the double-salt emulsions have allowed them not only to be pumped to this record-breaking depth, but also to re-pumped frequently and stored for extended periods before use.

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