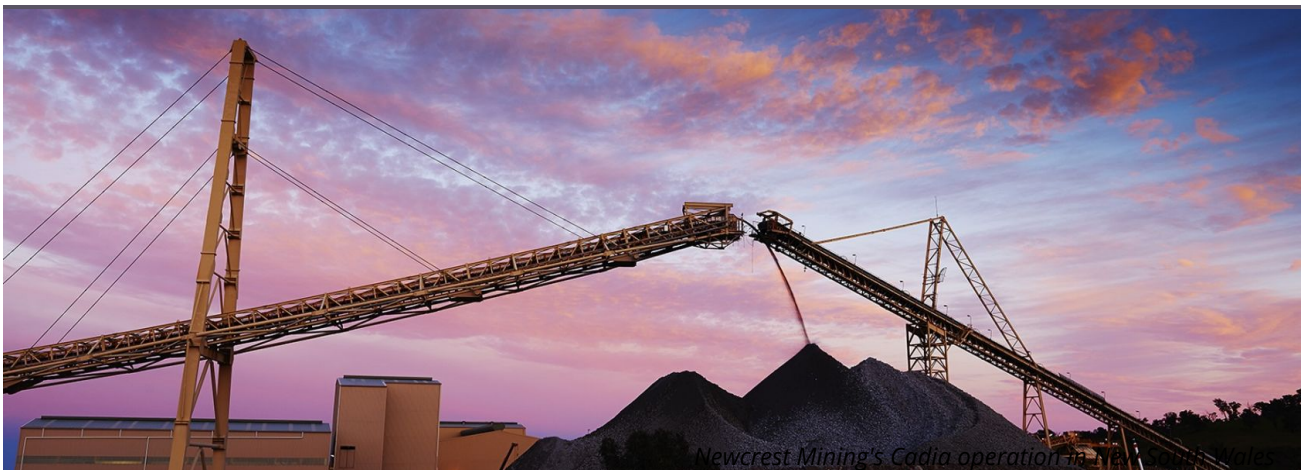# Newcrest blazing a trail with big data

Big data is still a pot of gold at the end of the rainbow for many miners, but at Australian gold major Newcrest Mining it's delivering actual pots of gold and showing the rest of the industry just how much can be achieved with innovative digital technology.

Newcrest Mining's Cadia operation in New South Wales

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David Upton In Adelaide

Addressing the South Australian government's recent Copper to the World conference in Adelaide, Newcrest's chief information and digital officer, Gavin Wood, gave a rundown on what had already been achieved at Newcrest with data science, virtual and augmented reality and artificial intelligence. He also talked about the benefits delivered by crowd sourcing, although this can also create some unique challenges of its own.

"If you can imagine, an experienced operator at a site being told by a university student in Argentina the answer for optimising their part of the plant is quite different to something they believe from their experience of 20 or so years. Those are real challenges for our business," Wood said.

He said data science coupled with machine learning had already delivered good successes at Cadia and Lihir and was expected to lead to step-changes in operating performance.

At Lihir, Newcrest has put in place a predictive algorithm that can identify when there is going to be a mill overload event with two hours' notice, allowing time for preventative action. In the 12 months prior to the algorithm being adopted, a total of A$20 million was lost as a result of downtime or rate loss due to overload events. There have been no events since the predictive algorithm was implemented.

Wood said identifying the signal that would predict a mill overload drew on hundreds of datasets, terabytes of data and all the computing power available today.

"We looked at hundreds of different variables, and the trigger or the signal that said an overload was going to happen was a conveyor in the crushing circuit that no-one had even thought about as being the cause. It shows you the power the technology and how it can help you get to a prediction, an optimisation or even just the root cause of something," he said.

Data science at Lihir had also identified that when restarting the crushing circuit the traditional approach of ramping up feed was unnecessarily affecting throughput. "It actually made more sense to start it up without going through that ramp-up period, and as a result that's led to a 9% throughout increase on that circuit. That came from looking at all of the data and dispelling some thinking at the site about the best way to run the plant," Wood said.

At Cadia, another algorithm now predicts overpressure events in the pipe from the mine site to the dewatering facility where the concentrate is loaded onto rail. "That's a critical piece of infrastructure and it's a massive advantage for us to know when we could have an event that could cause down time, and to be able to take steps to correct that."

Newcrest's Gavin Wood at the Copper to the World conference

Big data also allows much better understanding of why some plant operators are better than others. "We have put in place a lot of data science to understand why that is and identify the corrective actions that we can take to improve and get a more even outcome. It's been a real eye-opener. We have first put that in at our Lihir site and we are taking it to all of our other sites," Wood said.

He said there were a number of reasons Newcrest had been able to put digital technology to work when many companies were still talking about it. Foremost among these was investment and "a lot of work" over the past few years in building a big data platform that could integrate almost every IT system at Newcrest.

"Whether its metal accounting, downtime accounting, plant historians, financial data, asset maintenance data or people data, it's all integrated into one big data platform."

He said having an open platform, which Newcrest has based on Microsoft Azure, was also critical. "We are not looking to lock in with different suppliers. We want to be able to use insights and expertise from all around the world on the one platform."

Newcrest has co-created a crowd sourcing platform with Unearthed, where it runs online competitions. The first competition, known as Hydrosaver, looked at how to better manage water at Cadia. The competition was open for two months, attracting 450 participants from 12 countries who developed 750 predictive models.

"We closed this competition in February/March and began implementing it in June. It just shows the products you get back are of a much higher quality and more finished than hackathons, and it gets us access to people who don't work in mining. There are digital people around the world who are just interested in the data and how it works," Wood said.

Behind the platform is a lot of other work to build a digitally-connected business, which can be challenging at remote sites such as Lihir. A couple of years ago, the site had only a 6MB satellite link to service the mine and a 10MB link for a workforce of more than 2,000 people at the camp.

The company looked at many different solutions, including undersea cables and microwave links from nearby islands, before settling on a service known as O3B, but had to lean on one of Australia's major telcos to bring the technology to PNG. The new service provides a 100MB link that has the potential to be optimised to up to 170MB.

Wood said technology in itself was not the solution, but what businesses did with it and how they used it to overcome the big problems of declining ore grades and flat productivity.

He said miners needed to move from being opportunistic to systematic in the way digital technology was applied.

"It is really going to need the whole industry to change their thinking and embrace these tools."