Clear vision underground: The changing role of surveillance in mining

Stephanie Rosenmayer, Business Unit Manager at Datacentrix

Over the past 24 months, the conversation around surveillance has changed significantly. Instead of falling purely within the security or facilities side of a business, the ability to take raw video and audio footage, convert it into data and analyse it has become a hot topic across many sectors, including mining.

Surveillance has become something that affects an organisation's physical security measures as well as the areas of IT and risk management.

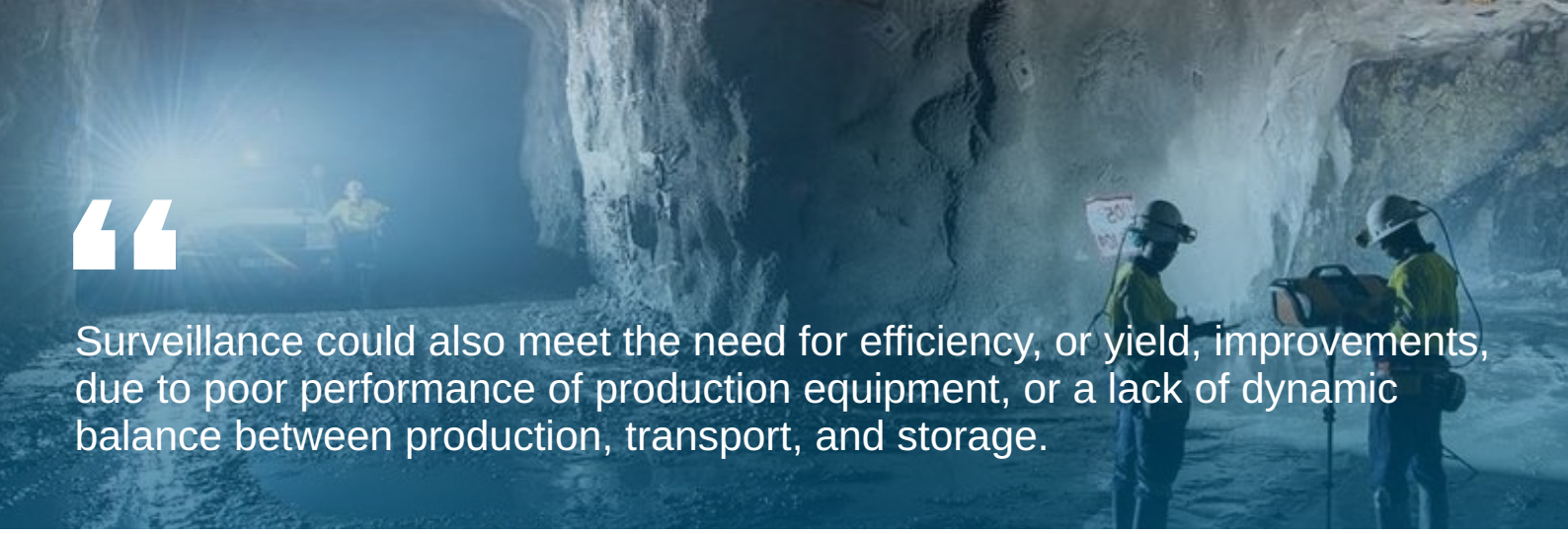
“With the addition of intelligence, the humble camera has essentially become the 'eye' in IoT, and there is suddenly so much more value to be gained from an asset that is already deployed,” explains Stephanie Rosenmayer, Business Unit Manager at Datacentrix, a hybrid IT systems integrator and managed services provider. “If captured correctly it is here, at the source of the data, that we can bring actionable intelligence into the business.”

Technology driving surveillance

According to Rosenmayer, there are several trends driving the evolution of surveillance. “We know that artificial intelligence (AI) and surveillance are moving to the cloud and it's a fact that surveillance is now an integral part of the enterprise architecture. Furthermore, we understand that this has a massive impact on bandwidth requirement, and it's now a conversation that must include the IT department. We've also seen analytics move to the edge, which includes the incorporation of analytics into new smart camera technology.

“There has been an AI explosion,” she continues. “Consider the Open Security & Safety Alliance (OSSA), a non-profit corporation created to establish a common standardised platform for security and safety solutions that is accessible for everyone. These standards pertain to operating systems, the actual infrastructure, privacy, and data. The aim is to reach a point where we can apply or select any AI application and deploy it on any camera, regardless of brand, that is specifically required within that business environment.”

A good example of this for the mining environment would be if there is a need for an application that deals with crushers solely. “OSSA's latest drive will remove the barrier to entry of great AI development skills to enter the surveillance market, that was traditionally limited to OEM manufacturers. This means that you would be able to find the right crusher app for your needs and deploy it on any camera.



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“This is not a pipe dream, and we will see it coming to the fore over the next year or two, as the larger camera manufacturers are starting to join the OSSA and are beginning to add processing capabilities to the cameras themselves.”

Cameras playing key role in both safety and efficiency gains

Says Rosenmayer: “Ultimately the source of our data is sensors – cameras, environmental sensors or power distribution systems – and all of this information needs to be collected in a place where it can be used for two things. Firstly, it can be used for an emergency alert, where the right person can be dispatched to deal with an issue, and secondly, to take unstructured content and organise it into output that can be useful and actionable for the organisation, adding value in terms of the bottom line.”

For instance, typical safety challenges that may be tracked and addressed using surveillance within this context could include personnel violations (like employees not wearing the correct personal protective equipment (PPE) or field workers walking across a track), sudden changes in the operational environment, poor risk foresight, and challenges related to the supervision of underground staff.

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A good example here would be system belt performance challenges, Rosenmayer explains. “For a coal mine using an underground conveyor belt in the process of coal transmission, a lack of real-time monitoring and poor communication could mean that the organisation is unaware that the conveyor belt, which covers a long distance, is at certain times carrying a zero load, which could even stretch to hours.

“The belt conveyer is a significant consumer of a mine's overall electric energy use, expending up to 40 percent of the operational cost. This means that at times where there is no load, the mine is consuming power - and paying for it - at a time that it is completely unnecessary.”

There may also be occasions where foreign objects falling on the conveyor belt, or oversized ore, cause blockages or even belt damage, which often leads to larger transport economic losses. Perhaps there has there been an abnormal shutdown of the conveyor, people approaching it when they shouldn't be, or there may be conveyor deviations.

“These are all challenges that a real-time view of the critical parts of your facility and the overall status of the underground environment could help to solve.”

In fact, according to Rosenmayer, case studies from international mines using AI technologies have shown a proven reduction of conveyor belt downtime from three days per month to one. No-load power consumption has also been reduced from $650,000 per year, to $280,000 per annum.

“In addition, these mines have seen several benefits for enhancing management, such as the ability to anticipate major risks, identify personnel violations and contain major accidents. They have been able to avoid mine shutdown due to severe accidents. They also now have access to intuitive measures for mining operation supervision; reliable evidence for accidents retrospection; and can provide statistical reporting on abnormal mining operations to support scientific decision making.

“From a mining perspective, the key question to ask when it comes to surveillance today is: how valuable is it to your organisation to have this information in real time, instead of finding out how it affected production at the end of the day?” she asks.

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