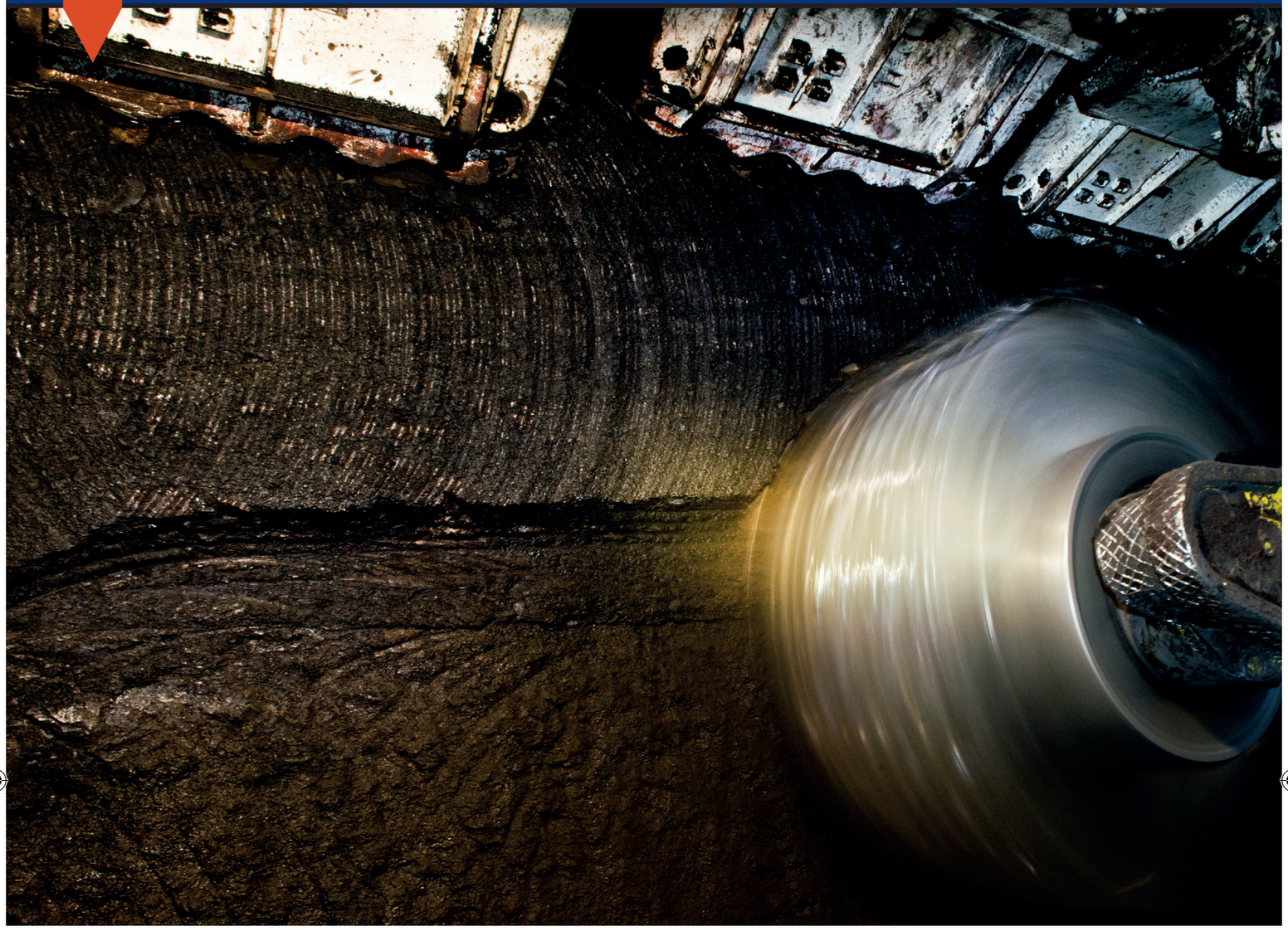

Staying connected in an underground mine

Automation, electrification, and digitisation have had a significant impact on the underground mining industry's development

By Chris Mason, Vice President of Sales, EMEA for Rajant

Above: There is no room for error when dealing with the realities of an underground mining operation

It's an incredibly dynamic sector; the equipment, vehicles, and tools that make mining operations possible have changed dramatically as the industry demonstrates a continued willingness to adopt new technologies that can be shown to get results. This has kept mining pushing what's possible in terms of connectivity.

However, despite this commitment to embracing new technological advances, and to advancing the mining industry towards safer, more efficient operations, the business of underground mining remains challenging.

Activities to accelerate the industry's trajectory toward more efficient mining operations are continuous, and it's clear that ultra-reliable connectivity plays a critical part in that process. Real-time connectivity, specifically, is required to make the enhancements in terms of increased safety and efficiency. The future of underground mining is incomplete without integration into IIoT.

Rajant Corporation has tried to address these operational challenges by developing new wireless Kinetic Mesh industrial networking capabilities, which aim to maximise safety and productivity.

When the benefits of integration are compelling, with health and safety requirements and consistently superior levels of reliability and productivity in the equipment, the move to real-time oversight proves an essential component for mining companies worldwide.

THE IMPORTANCE OF MINING TECH

Running a modern underground mining operation requires the

coordination of personnel and multi-million-dollar vehicles. Equipment, people and machinery constantly move in an ever-changing environment that must be monitored and controlled.

There is no room for error when dealing with the realities of an underground mining operation. This makes the task of coordination essential.

Situational awareness is a key requirement that mining organisations seek. A robust and dynamic real-time monitoring system is of immense value to achieve communication and connectivity that facilitates safe, efficient underground mining operations.

This allows operators to coordinate on a level of precision that has previously required considerably more resources to achieve. Indeed, the complex process of managing and monitoring a fleet of mining has historically entailed reactive repairs, meaning that machines are off duty and in workshop bays far longer for examination and maintenance.

Traditionally, sensor points could only be checked by manual processes, and the cost in terms of time out of service was considerable. Not to mention each time an extra set of maintenance personnel boots on the ground are deployed, it represents another team member whose health and safety must be considered and monitored.

Here, Kinetic Mesh technology represents a breakthrough. It allows for real-time monitoring and continuous access to data without sending in extra teams. Continuous connectivity can keep equipment and vehicles operational longer and tackle problems far more efficiently in a proactive manner that would be almost impossible without real-time monitoring capabilities. The value of this is significant when you consider the cost of vehicle downtime in an industry where equipment costs millions of dollars.

DELIVERING VALUE

By adopting wireless solutions, the mining industry has an opportunity to harness and deploy the latest digital technology to meet the demands of modern mining and create mines that are future-proof.

This technological progress reduces costs while simultaneously raising the standards of health and safety, not to mention the efficiencies achieved in the area of equipment coordination.

Historically, wired connections run via fixed infrastructure connected to fibre, and present another asset that can be damaged or otherwise fall victim to physical interference, nowhere near dynamic as the newer mesh network solutions. For obvious reasons, a fixed connection cannot match the dynamism of a robust, intelligent wireless solution because it is simply not as flexible or portable.

Furthermore, the process of underground mining necessitates that every new area of the mine is connected immediately. This demands that connectivity needs to be extended to each area of a mine to facilitate this essential knowledge of the environment. When the mining environment changes over time, traditional fixed connectivity solutions are problematic as they fail to keep up with the mine's continued growth. The optimal solution can readily transform as quickly as the mine itself.

KINETIC MESH

Kinetic Mesh with BreadCrumb radio nodes and InstaMesh software is a solution to the trials of underground mining operations and their connectivity.

The Kinetic Mesh solution allows mining operators to access new productivity levels. Real-time monitoring, faults, or other issues can be dealt with proactively and far more quickly, long before they potentially jeopardise workers' safety.

The network consists of highly portable devices that can easily be moved and distributed to transmit and receive data. These devices, known as Rajant Breadcrumbs, can be both static and fitted to machinery and deployed to personnel, creating a network potentially comprising of hundreds of devices that can communicate intelligently and efficiently in real-time.

The network can respond to interference effectively through redundancy and calculates the most efficient data traffic routes to preserve communication in issues, as and when they arise, to ensure continued connectivity.

Every node or BreadCrumb can be fixed or mobile. It can work either independently or with full routing options to receive and transmit data from other connected devices while simultaneously serving as a Wi-Fi transmitter. This is due to Rajant InstaMesh networking protocols.

The network constantly and intelligently discerns the quickest route for traffic prior to it arriving and delineates a new, alternative path for data to take in the event of interruptions. This avoids downtime and allows for a zero-compromise approach to mining connectivity. In the ever-changing and harsh environment of an underground mine, this has tremendous value.

Mining operators understand the gravity of what the IIoT represents in the context of productivity, efficiency, and health and safety.

It's no surprise that Rajant Kinetic Mesh continues to be deployed in mines worldwide. Mine operators are reaping the rewards of a reliable, dynamic wireless network that optimises operations at a previously untenable level. By seizing the industry's momentum and pursuing the most up-to-date connectivity solutions, mines can stay in optimal action 24/7, 365 days a year.

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