Hikvision’s smart video technology helps create ‘zero-accident’ working environment in Jiangzhuang Coal Mine, China

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Mines are unique operating environments with highly specific health and safety challenges. In particular, underground mining operations typically experience low-visibility conditions and light pollution from flashlights, vehicle lights and reflective strips on equipment and clothing, making traditional surveillance and safety monitoring difficult.

These were some of the challenges facing Jiangzhuang Coal Mine in the Shangdong Province of China, which covers an underground area of 43 square kilometres, and produces more than 1.8 million tons of coal each year. The top priority for the mine’s management team is worker safety, and working practices and production are monitored 24 hours a day to minimise accident risks.
Aging surveillance system

Kong Qingwei, Director of the Jiangzhuang Coal Mine Dispatch Office, says, “We need to respond immediately to unsafe situations in the mine, whether they are caused by environmental factors, poorly performing machines, or employees not following authorised work procedures.”

Its aging surveillance system made health and safety monitoring difficult in key areas of the mine.

Although the mine invests heavily in safety training and equipment for workers, its aging surveillance system made health and safety monitoring difficult in key areas of the mine. “Our previous surveillance system required us to monitor around 30 screens, 24 hours a day, often with sub-optimal image quality caused by low-light conditions or light pollution,” says Kong Qingwei. “This made our jobs extremely difficult and tiring, as well as impacting our ability to respond to safety issues quickly enough.”

Maximising worker safety

To address its health and safety challenges, Jiangzhuang Coal Mine has implemented an intelligent video surveillance and control system from Hikvision.

The Hikvision solution supports crystal-clear video imaging, even in low-light conditions, or where light pollution is created by lights or reflective strips. This quality and clarity of imaging ensures that hidden risks can be identified more quickly and easily, allowing the safety team to respond more quickly and to protect workers in all areas of the mine.

Improving worker health and safety

In addition to the improved imaging capabilities, the Hikvision cameras incorporate deep learning...
technologies to identify and respond to health and safety risks in the mine automatically, and in real time. Specifically, the cameras can identify when employees deviate from approved work procedures and send alerts to the safety team to ensure staff can be deployed before accidents occur.

"The new Hikvision system increases worker safety by monitoring the areas around winches and other equipment"

For example, it is prohibited for workers to come too close to winches when they are working due to safety risks, but this is hard to monitor with traditional video cameras. "The new Hikvision system increases worker safety by monitoring the areas around winches and other equipment, and by sending alerts if employees get too close," says Kong Qingwei.

Delivering continual improvement

In the first three months of operation, the new Hikvision system identified more than 30 deviations from safe operating procedures. Zhang Liu, Deputy Chief Engineer at Jiangzhuang Coal Mine, says, "In the past, many of these safety risks could have gone unnoticed. However, the Hikvision system has allowed us to identify every incident in real time and to take immediate action to protect our workers, which is a hugely satisfying outcome for us."

As well as alerting the team to potential security risks in real time, the Hikvision system also records the details of any safety incident for later analysis.

"As well as accurately capturing deviations from safe working procedures, the Hikvision system supports playback and download functions," says Zhang Liu. "We can use the insights we record to deliver continual improvement for safety procedures, and, ultimately, to support our vision for a ‘zero-accident’ mine," he adds.

Addressing mining-specific safety requirements
The Hikvision solution is configured to support specific mining-safety applications, such as constant monitoring of surface water levels in different areas of the mine.

“Constant seepage from rock formations means that surface water can accumulate in different areas of the mine, which is a problem in terms of potential flooding, damage to infrastructure, and worker safety risks,” says Zhang Liu. “With the Hikvision system, we can manage surface-water levels constantly and take action to deal with any problems that arise before water levels exceed safe limits,” he adds.

**Increasing effectiveness for the safety team**

In addition to surface water management, the Hikvision solution supports improved safety in other potentially dangerous areas of the mine, including inclined tunnels that are used for transporting coal and other materials underground. “The Hikvision system is like an intelligent ‘eye’ for us in all areas of the mine, helping us to identify potential safety issues in a timely and accurate way and to protect our workers at all times,” says Kong Qingwei.

With automated alerts for all manner of potential safety threats, the safety team can be far more effective, with no need to monitor video images constantly. “Instead of looking at grainy images on 30 screens, we can now spend more of our time responding to incidents, supporting workers, and keeping them safe,” says Zhang Liu. “This is a classic example of how automation can help to improve mine safety, while also reducing the tiring workloads associated with manual monitoring of screens.”
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