GSMA 5G TRANSFORMATION HUB

The world's most innovative 5G solutions

Introducing 5G to Inner Mongolia's coal mines

China Telecom

Responding to the state's call to build intelligent coal mines, and also wider industry trends, Zhunneng Group launched the '5G + Smart Mining Application' project in the middle of 2021.

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CHALLENGE:

The harsh and complex production environment of Zhunneng's open-pit coal mines has resulted in a high rate of occupational diseases among workers and a great number of accidents.

SOLUTION:

5G solutions can help ensure the intrinsic production safety of open-pit mines and improve operational efficiency.

IMPACT AND STATISTICS:

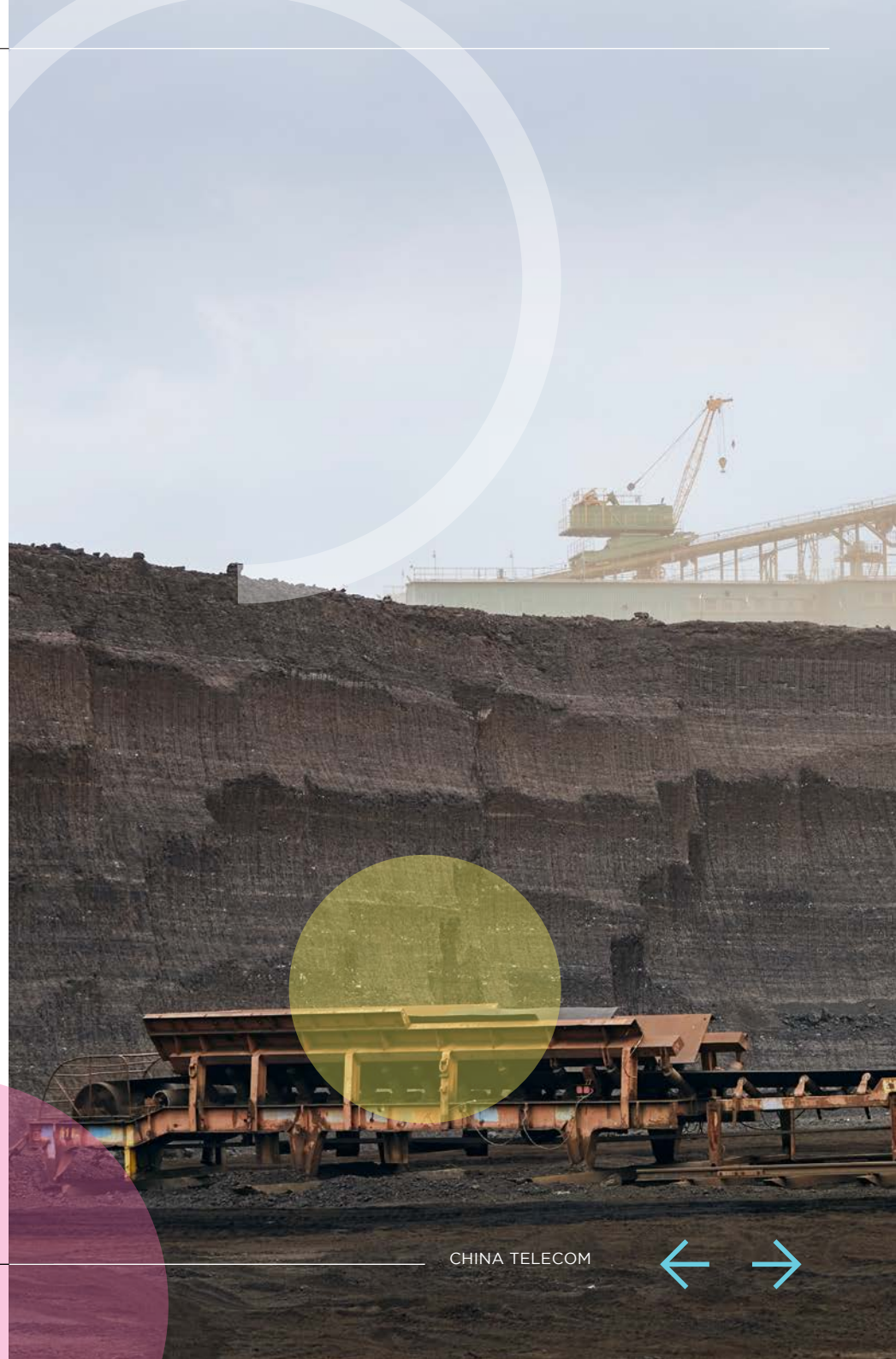
By deploying a 5G core network respectively in Zhunneng Group's Heidaigou and Haerwusu coal mines, the project ensured stable, secure, and reliable network signal backhaul of 103 5G macrocells to enable low-latency access to the the unmanned driving application platform by more than 200 mining trucks, 40 electric shovels and 1,000 auxiliary vehicles.

WIDER IMPLICATIONS:

Zhunneng have discovered several best practices for future 5G implementations to mining as well as a number of future digital projects to build on existing enhancements.

STAKEHOLDERS:

China Telecom, Huawei, Zhunneng Group



Using 5G to improve Zhunneng's mines

In 2021, as part of Zhunneng Group's '5G + Smart Mining Application' they began using 5G to modernise mining operations at its two sites in Heidaigou and Haerwusu. This involved bringing automation and remote control to 200 mining trucks, 40 electric shovels, and 1,000 auxiliary vehicles. By using 5G networks in conjunction with AI, HD video, big data, and cloud computing, Zhunneng Group's coal mines have achieved intelligent operations,

ubiquitous connectivity, and precise control of production lines. This has resulted in using 5G to improve applications such as unmanned driving, remote control, intelligent coal mining, and intelligent inspection, all of which are helping improve the safety and efficiency in open-pit mines.

Implementing 5G solutions to coal mining

Coal mines have complex and diverse geographical environments and require are serviced by a variety of complex machinery and operational systems - these factors demand high-availability SLA to support network applications.

Crucial to the mines' digital transformation was the installation of 103 5G macro cells – vital to enabling a variety of systems and services within. These have enabled significantly higher network reliability and throughput across the site. To support this, the sites make use of China Telecom and Huawei's Super Uplink technology to meet the large uplink and bandwidth demands. These speeds are supported by network slicing, which allows the network to service specific applications in the way they need them. For example, video service flows have higher requirements on uplink bandwidth stability, and flows can be divided into different network slices to ensure safe and stable transmission of service flows.

These new network capabilities have also made it possible to deploy drones across each site which accurately render and reconstruct high-definition images of the mining areas – vastly improving on manual inspection methods. High speeds have resulted in replacing optical cables with wireless solutions, saving energy and connecting previously unconnected areas such as such as Zhunneng's new towed intelligent hydraulic platform – the first of its kind to be deployed.

Underpinning new equipment is a 5G network self-management platform, which can quickly identify network issues to shorten production interruption time caused by network failures, and support customised application development and efficient network operation and maintenance.

For example, the mines' mining truck management platform can now actively perceive malfunctions and accidents to ensure safety, stability, and reliability of vehicles and unmanned driving system.

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Summary and findings

This 5G project has become one of the largest of its kind in China, and even the world, transforming operations and the personal safety of its workers. In implementation, Zhunneng discovered three key recommendations for similar projects:

- Accurate business profiling of terminal-side applications is a key input to support precise planning of 5G networks.
- Feasibility should be considered during network planning and design, and toB network planning requires customised network schemes for specific industries and scenarios.
- Risks should be identified in advance of the delivery stage, with a risk response plan formulated by stakeholders to ensure quality is maintained.

> Accurate business profiling of terminal-side applications is a key input to support precise planning of 5G networks.

Next steps

Zhunneng have identified the following steps as the next part of their digital transformation:

- By introducing 3D modelling of the sites' premises, Zhunneng will be able to enhance the how their 5G networks are developed and maintained and add additional functionality such as personnel and vehicle positioning.

- 5G has made it possible for the mines to implement enhanced video tracking which will add decimetre-level positioning to significantly improve electronic fence monitoring over blasting areas, conveyor belts and other dangerous operating areas.

- Zhunneng will be introducing an intelligent management platform which will standardise the data formats of different production subsystems to improve management and operation efficiency.

- The project plans to implement 5G edge clouds in the mining data centres to save investment in hardware equipment, improve on-site operation and maintenance, and ensure rapid deployment and release of new services and new applications.

About the GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

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GSMA 5G Transformation Hub

The GSMA 5G Transformation Hub is a source of information on some of the most innovative 5G solutions in the world. This portal contains case studies detailing design, benefits, key players, measured value and the future impact of scaling up these 5G solutions worldwide. The 5G Era is now firmly established and this family of standardised GSM technologies, including mmWave, are being rolled out successfully across the globe. The GSMA 5G Transformation Hub, launched at MWC Barcelona in 2022, provides details of how 5G is best placed to deliver real value for a range of key sectors including manufacturing, energy, transportation, media and live entertainment, smart cities and construction.. Many more case studies will be added, in the coming months, covering even more industries and the GSMA is asking Members to nominate innovative 5G case studies to add to this global digital showcase. The 5G Transformation Hub and this particular Case Study are both sponsored by Qualcomm.

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