

Hytera DMR System Unifies Subcontractor Communications Across Pakistan's Thar Coal Mine



Introduction

Operations at the Thar Coal Mine in Pakistan were being hampered by the fact that the various subcontractors working in the Block 1 area were using different radio systems. Hytera supplied a DMR two-way radio with base station, dispatch system, network management system, multimedia recording and playback system, portable and mobile DMR terminals. With the help of this communication system, the different subcontractors can now communicate more effectively with their own staff and with each other to deliver greater operational efficiency.

The Background

The Thar coalfield is located in the Thar Desert, Tharparkar District of Sindh province in Pakistan, about 240 km from the port of Karachi. The coal deposits are the largest (9,000 sq km) to be discovered so far in Pakistan and the 16th-largest in the world. It has coal reserves of about 175 billion tons. The mining area is divided into Block 1 and Block 2. Shanghai Electric is responsible for the Thar Block 1 Integrated Coal Mine and Power Project, but uses various subcontractors to extract, process and transport the coal for the power station.

Customer name

Shanghai Electric

Project time

2024

Industry

Mining

Products/Solutions

- DMR DS-6211 Base Station
- DMR HP78X Hand Portable Radios
- DMR HP78X UL913 "Intrinsically Safe" Hand Portable Radios
- DMR HM78X Mobile Radios
- SmartOne Dispatch System
- Multimedia Recording & Playback System (MRPS)
- Network Management System (NMS)



The Challenge

For some years now, these various subcontractors have been using two-way radio systems supplied by different manufacturers for their site communications. However, the coverage provided by these systems is not only limited within their own work areas, but the lack of interoperability between the different radio brands makes it difficult for the subcontractors to communicate with each other.

This has severely hampered the ability of the main contractor, Shanghai Electric, to assign work tasks and to communicate with the subcontractors. To improve the situation it was decided that a new communication solution was required, which would deliver comprehensive coverage across the whole of the mining area and integrate all the subcontractors onto a single communication system.

The Solution

Hytera's long history of manufacturing professional communications solutions and its experience in delivering radio systems for the mining industry made it the right company to provide a new radio network for the Thar Coal Mine.

Hytera carried out a detailed radio frequency (RF) site survey and undertook a number of coverage simulation tests. After analysing the results, Hytera recommended Shanghai Electric implement a modern Digital Mobile Radio(DMR) two-way radio system.

Hytera installed a DS-6211 DMR base station at a central location capable of providing radio signal coverage across the main coalfield working area. This was complemented by the deployment of a number of HM78X mobile radios at various key office sites. The mobiles acted as base radios with antennas mounted outside the offices to ensure the best signal reception. HM78X mobile radios were also installed in most of the important mine vehicles to make sure drivers can talk to controllers and other workers.

Mine workers, coal processing workers and coal transportation staff were issued with Hytera HP78X portable two-way radios. Personnel working in dangerous areas where flammable gases might be present, and, therefore, where no electrical sparks are allowed, were issued with Hytera HP78X UL913 “intrinsically safe” radios. These radios are specifically designed to operate safely in potentially explosive environments.

A Hytera SmartOne dispatch system was deployed in the control centre where dispatch engineers from Shanghai Electric are responsible for monitoring coal mining and electricity production. Dispatchers also coordinate the activities of the different subcontractors to ensure they work efficiently together.

Hytera's network management system (NMS) was deployed in the data center to monitor the radio system in real time, 24/7, so any abnormality or fault can be immediately detected and maintenance engineers can be quickly assigned to fix the problem. A Hytera multimedia recording & playback system (MRPS) ensures all transmissions and texts are recorded and logged and can be played back when required.



The Benefits

More Efficient Site Communications

The major benefit of having a single communication system is that each subcontractor can now communicate with its own staff anywhere in the coalfield and also communicate with all the other subcontractors, which greatly improves operational efficiency and helps to boost production.

Wide Area Coverage

The modern Hytera DMR system delivers signal coverage across the whole of the Thar Coal Mine using fewer base stations, which is more cost effective than the previous arrangement.

Full IP-based Digital System

The DMR system provides flexible networking and strong scalability to meet future expansion needs. The channel resources of a single base station can be expanded to 8 channels, while the base station network nodes can be expanded to 50.

Robust System Reliability and Redundancy

The radio network is highly resilient as communications will fall back to single-site mode in the event of any link failures in the central MSO-BS (mobile switching office-base station). Dual redundancy is ensured by the fact that both the BSCU (base station centralized unit) and control channels have backup configurations.

Products

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The Benefits

Power Resilience

The base stations are equipped with UPS (uninterruptible power supply) solutions in the form of backup batteries, which provide ≥ 48 hours runtime during power grid outages to ensure that communications are maintained and do not impact mining operations.

Infrastructure Hardening

Temperatures in the Thar desert range from near freezing to over 50°C in the height of summer. The radio infrastructure is protected from these extremes by outdoor cabinets with AC units sustained at 40°C+ to cope with the temperatures. Hytera's solutions help reduce the civil engineering costs compared with traditional radio equipment shelter builds.

Powerful System Management

Using standard Simple Network Management Protocol (SNMP), the DMR system supports various network management functions such as user management, performance management, configuration management, security management, alarm and fault management.

Rich Business Functions

The DMR system supports standard trunking voice and data functions (e.g. single call, group call, short message, status message, forced disconnection/forced insertion, remote stun/resurrection), as well as more advanced trunking functions such as full-duplex call, authentication, encryption, store-and-forward, and call forwarding. It also provides a wealth of secondary development interfaces, which can be tailored to add more types of applications as needed.

Loud, Clear Audio

The HP78X and HM78X radios feature Hytera's noise cancellation technology to filter out background noise, eliminate echoes, enhance speech and reduce howling when in close proximity to the transmitting radio. With this technology, the radio provides crisper and clearer audio when transmitting and receiving voice calls even in the noisy mining environment.

Tough, Robust Terminals

Mines are harsh, rugged environments, but the HP78X terminals are designed to cope as they are IP68 rated, making them highly resistant to dust and impervious to water jets. They also meet the MIL-STD-810G standard for resistance to drops, shocks, vibration and temperature extremes.



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