

Chenani-Nashri Tunnel

Through the Himalayas: delivering cellular and public safety communications in India's longest road tunnel

COBHAM

Case Study

The most important thing we build is trust

Overview

Together with partner Commtel Networks, Cobham Wireless deployed a cellular and public safety communications network in the longest tunnel in India. The construction reduces the travel time between Jammu and Srinagar by 30Km.

Challenge

The tunnel is positioned within the Himalayan mountain terrain making signal penetration impossible. Cobham Wireless had to deliver a solution that could support both cellular and public safety communication within the confined space of the tunnel.



The Challenge

India is home to the longest road tunnel in South Asia, spanning 9.28Km (5.8miles). The tunnel comprises of two tubes that run parallel to each other; one for main commuter traffic and one for safety and escape use in an emergency. The two tubes are connected by 29 cross passages at regular intervals of every 300 meters along the entire length of the tunnel. With each passage tunnel at 1km in length, this makes a total of 19km of tunnel to cover.

More than 15,000 engineers, geologists, skilled workers and labourers worked to construct the tunnel through the Himalayan terrain, reducing the travel distance between Jammu and Srinagar by 30Km. This resulted in reducing commuters travel times by 2 hours. The tunnel by-passes snowfall and avalanche prone areas in winter at places like Patnitop, Kud, and Batote that become obstructed every winter and cause long queues of vehicles - sometimes for days at length.

Due to the dense mountain terrain, the location of the tunnel and the materials used to build the tunnel, the RF signals could not reach the commuters and operational staff inside, denying them vital communication. Cobham Wireless' has extensive experience deploying public safety and cellular communications systems in numerous tunnels and underground deployments across the world, making us the clear choice when Commtel Networks needed a partner to help provision a system suitable of supporting GSM signals for commuters and UHF/FM for public safety communications.



The Solution

On introduction to the project, the Cobham Wireless team evaluated the environment and determined that a customised fibre optic distributed antenna system (DAS) would be needed to meet all the requirements. To deliver the project, the company partnered with systems integrator Commtel Networks.

"Commtel Networks chose to Partner with Cobham Wireless on this prestigious project, due to their highly reliable and state-of-the-art products. The solution worked exactly as designed and met all expectations of the Client and Consultant." Commented Prasad Pai, Head of Technology Solutions & Engineering for Commtel Networks. "We are delighted with Cobham Wireless' support on the customised solution based on project specifications as well as meeting the stringent timelines"



The system incorporated 3 types of communication; GSM cellular communications for the commuters, VHF for the tunnel operations staff ensuring the safety of those inside the tunnel, and FM for emergency voice break-in announcements.

The cellular solution incorporated our A-POI (Active Point of Interface) which channelled the Operator's signals from the base stations positioned at the Tunnel Portal to the OMU II (Optical Master Unit). Using fibre optic cables, the signal was distributed to 5 Multi-Band Repeaters positioned throughout the tunnel, delivering consist coverage for the duration of the commuters journey.

The National Highways Authority of India were committed to making this tunnel the safest in India. In order to achieve this status they needed to implement a solution that could support public safety communications between operational teams onsite and a one-way communication to commuters. Optical Master Units channel the signal to 8 BSF (Band Selective Fibre Optic Repeater) and 1 D-CSR (Digital Channel Selective Remote) positioned throughout the tunnel, supporting VHF and FM technologies, ensuring the clear, reliable communications needed.

The entire system can be overseen and controlled, using the Active Element Manager (AEM) system, from the Integrated Tunnel Control Room (ITCR).

The Benefit

The combined cellular and public safety communications network deployed by Cobham Wireless completes the tunnel's comprehensive range of integrated solutions, ensuring the safety and security of those travelling the Chenani-Nashri Tunnel.

Cobham Wireless' solution provides reliable seamless coverage of the radio signals throughout the tunnel, enabling commuters to remain connected during their journey. Combined with the shorter journey, the seamless connection makes the tunnel the favourable choice of route for commuters.

The solution also enables operational staff to communicate with each other with clarity, as well as allowing for simultaneous inter-department communication, with no interference.

As the digital repeaters are software based, new features and capabilities can be easily installed in the future via a remote download, making this solution future-proof.

Thanks to the solution, drivers and passengers in the tunnel can also benefit from one-way communication from emergency service teams. This break-in system allows operational teams to access the FM channel and alert drivers to potential safety issues in the tunnel, over their FM radios.

"We are extremely proud of our involvement in such a monumental tunnel project in India," commented Ajay Soni, Sales Manager, India, at Cobham Wireless. "Our success delivering this solution in such a complex environment will open up further opportunities to deliver similar systems across the Asia Pacific region."



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