



Powerwave Coverage Solutions

Canadian Pacific Railway

Powerwave Extends Radio Coverage Within the Spiral Tunnels of the Rocky Mountains

The Customer

It was Canada's first prime minister, Sir John A. MacDonald, who resolved to "build a Pacific Railway to unite the country." In just 54 months – and six years ahead of schedule – the last spike was driven on North America's first transcontinental rail line on November 7, 1885. To quote the man who led this extraordinary endeavor, William Cornelius Van Horne, "It was the end. And the beginning." Today, Canadian Pacific Railway (also known as CP Rail) provides rail and intermodal freight transportation services over a 14,000 mile network, connecting Canadians with each other from Montreal to Vancouver, and with Americans throughout the U.S. Midwest and Northeast. Not surprising, Canadians have also been quick to embrace the advent of wireless communications as a means of further unification. According to a report from the Canadian Wireless Telecommunications Association, Canadians currently use more than 17 million wireless devices on a daily basis, including wireless phone, pagers, mobile radios and mobile satellite phones.

The Challenge

Calgary, Alberta is located in the foothills of the eastern slopes of the Canadian Rocky Mountains, where the elevation reaches 3,439 feet. From this point westward to British Columbia, the elevation majestically – and abruptly – ascends to a maximum altitude of 12,969 feet at the summit of Mt. Robson before descending again. For safety reasons and in order to hasten rail passage through this region, CP Rail built the Spiral Tunnels along the border between Alberta and British Columbia in 1906. An engineering marvel, this series of tunnels provides a direct route for their trains as they ascend or descend the seemingly impenetrable Rocky Mountains range. As communications technology progressed, the railroad eventually installed three separate radio systems to further enhance safety and efficiency along its rail lines. These included a VHF voice radio system, a UHF train integrity braking system and a VHF locomotive remote control system. However, they soon discovered that all of these systems lost their communications capabilities as trains passed through the tunnels. That is, all external signals to and from the trains were lost, as were all internal signals within each train. While the mountains themselves were the most obvious physical obstacles impeding the successful transmission of clear, strong, reliable wireless signals inside the tunnels, others included the concrete and steel used in their construction. This situation presented a major concern for railroad officials – not only because of the impact it had on operations and productivity – but because of the potential for disaster it posed should an accident ever occur.

The Solution

Based upon Powerwave Technologies' proven expertise in extending wireless coverage to those "impossible" spaces where it typically fails, the company was challenged by CP Rail to extend coverage of its three radio systems within the Spiral Tunnels. The first phase of this process involved a thorough on-site survey by Powerwave's highly experienced team of engineers in order to assess the lay of the land and determine RF characteristics of the environment. Once that was completed, they set about designing the optimum solution which involved specialized radiating RF cables, antennas and OFR repeaters – all technology components manufactured by Powerwave. The repeaters were specifically designed to receive and transmit their assigned frequency channel off the air in order to eliminate any noise, interference or adjacent channels. They were also designed to be vendor independent, making them compatible with all vendor equipment and modulation schemes.

The Results

Because Powerwave was able to provide a turn-key solution for extending coverage of all three radio communications systems inside the Spiral Tunnels and handled all aspects of its execution – including the design, manufacture and installation – the job was completed efficiently and cost effectively. To reassure CP Rail that all systems were now fully operational, Powerwave conducted systems acceptance tests as a final measure. CP Rail has since confirmed that they have seamless radio operations throughout the tunnels, and that customer service and satisfaction have dramatically improved. But more importantly, their safety concerns have now been alleviated...giving them invaluable peace of mind.

"For over 90 years we have had no radio communications available in the Spiral Tunnels. With the new Powerwave extension coverage system we now have full communications for all three systems. But most importantly, we are now providing a better safety environment for our employees and improved scheduling with faster service for our customers as their shipments travel through the Rocky Mountains."
-- Ray Charron, System Engineer, Canadian Pacific Railway

About Powerwave Technologies

A global leader in end-to-end wireless coverage and capacity solutions, Powerwave Technologies, Inc. offers cutting edge wireless infrastructure to address the demands of enterprise and commercial customers. Powerwave offers a comprehensive suite of solutions, including Antennas, Base Station Solutions and Coverage Solutions. Powerwave's product line supports all wireless network protocols and frequencies including Next Generation Networks in 4G technology such as WiMAX™ and LTE®. Powerwave solutions, products and services also help wireless operators and OEMs reduce capital and operating expenses, speed rollout of services, improve coverage and capacity, and reduce environmental impact. For more information, visit us at www.powerwave.com.



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