

COMMUNICATIONS FOR A CHALLENGING CONSTRUCTION ENVIRONMENT



One of New Zealand's largest infrastructure projects including two tunnels, a service tunnel and above ground construction area beyond the immediate portal zone required a leaky feeder radio system with multiple mobile and portable units, seven Tait TB7100 Repeaters and twenty-five PBE Bi-directional amplifiers.



THE CLIENT

One of New Zealand's biggest ever roading projects and longest road tunnel in the country, the Waterview Tunnel road of National Significance included 2.2.4km long tunnels, with a budget of \$1.4 billion. The project was anticipated it would convey 70,000 vehicles a day on commissioning and play a major role in reducing critical gridlock issues in the Auckland region.

THE CHALLENGE

The Waterview connection project asked Dove Communications to supply a communications system for the construction phase of the project that would deliver:

- Communications between critical operations of tunnel boring and concrete ring placement teams.
- Direct emergency services communications between services and UHF tunnel radios/VHF radios.
- Communication with the cross tunnel emergency access culverts.
- Hands free gantry crane operation communications.
- Above ground coverage of 500m beyond each tunnel portal.
- Coverage over a challenging above ground construction site with multiple height obstructions.

The tunnel environment was a damp, dusty challenging one with multiple staff requiring 2 way radios communications in a high noise, poor quality transmission environment.

The equipment had to have the ability to integrate with a moving tunnel boring machine, and have the capacity to easily access emergency services.

The operational demands on communications were made more challenging when the second tunnel was bored – this meant

communication was also needed within the service culverts that were used as escape passages or to provide access to an emergency response team.

System reliability and integration both above and below ground was a critical factor in a challenging and lengthy project where health and safety of the work crews was of paramount importance.

THE SYSTEM

Dove Communications provided equipment, installation and backup on the Waterview project, with multiple components sourced from Logic Wireless.

Equipment included installing seven Tait repeaters, over 100 Tait TP8100/TP9300 portable radios, over 100 Hytera TM610 mobile radios, 10km of leaky feeder cable plus 25 bi-directional amplifiers.

The core of the tunnel communications was based on the installation of a PBE Mine Radio VHF Headend unit linked to a leaky feeder radio system to ensure complete signal dispersion throughout the tunnel space. This in turn had all radio communications linked to it. The leaky feeder cable was laid out behind the Tunnel Boring Machine via a drum, linked through a special rotary coupler.

Cross band links and communications with emergency services UHF frequencies and tunnel VHF radios were installed via a quiet Emergency Response Team channel, ensuring two way conversations were isolated from the site wide emergency communications channel.

PORTABLE SYSTEM FOCUS ON RELIABILITY AND RUGGEDNESS

The decision to opt for Tait portable radios was driven by the brand's reputation for being highly reliable and capable of operating day in day out in demanding environments.



“As projects get bigger it can be tempting to amp up the complexity. But in fact you need it to stay relatively simple, given more people are often involved and the Tait & Hytera radios fitted the brief well. They are easy to use and extremely reliable”

The Hytera radios also offered good performance at an acceptable price point as a day to day communications tool, within a compact easy to use design.

Technician Chris Grala said as the project increased in size with the addition of the second tunnel, it was critical to keep communication systems as simple as possible.

The Tait portable radios also came with the company’s well established reputation for bomb proof reliability and were used by the directional drilling team. The handhelds operated seamlessly for days on end at the sharp end of the project, with its high levels of moisture and mud exposure.

A stand-alone Sonetic voice headset system was interfaced to the radio system, ensuring that in an emergency workers using the Vox headset could hear any emergency announcement. The system was placed on the boring machine, and used by the team placing tunnel ring segments, enabling exclusive communications between the boring and ring placement crews without the interruption of open channel communications from entire site.

A tailored solution was also provided to ensure a hands free communication ability in the large gantry cranes on site. This required installing a radio head set with a push to talk switch and a specially designed circuit board to interface with headset speaker, microphone and switch.

Above ground communications on the challenging concrete segment storage site involved installing an leaky feed line above ground, with aerial couples to boost communications in areas where signal was shaded.

OUTCOME

The Waterview project was judged a major success, not only in its construction, but for the level of communications provided by Dove. The company was recognised for its efforts winning the prestigious Project Excellence Award for the Waterview project, along with Employee of the Year award, and special recognition from Hytera for its loyalty.

ABOUT DOVE COMMUNICATIONS

Dove Communications specialise in providing radio and communication products and services throughout New Zealand. Based in Hamilton and with 20 years experience in the mobile communications sector Dove has a dedicated team of sales and support specialists delivering the latest in high quality communications equipment across all industries. Dove’s client portfolio includes local government authorities, forestry, mining and utility companies, alongside transport, emergency and service organisations.

Dove Communications founder and managing director Kevin Dove is a Gold Award winner of the Motorola Dispatch and Solutions Award for Asia-Pacific, and an approved radio certifier for the Ministry of Business, Innovation & Employment – Radio Spectrum Management. Kevin leads his team in providing effective communication solutions by first understanding their clients’ business, and tailoring a solution to their needs. They are proud partners with Logic Wireless.

“While the primary function was workplace communication, the radio system was a key part of the emergency response for the site and had to be robust and reliable. Also the radio system had to tie into the external emergency services such as the NZ Fire Service.

Dove worked with NZFS to achieve a system where they had access to the leaky feeder system via a channel programmed on specific site radios that were for emergency services only”

Andy Schmidt , Tunnel Safety Manager

PROJECT SUMMARY

Client: Waterview Tunnel Project- Well Connected Alliance

Sector: Transport infrastructure

Equipment:

7 Tait TB7100 Repeaters, 100 Tait TP8100/TP9300 Portable Radios, 100 Hytera TM610 Mobile and Base Radios, 10km-plus Leaky Feeder Cable, 25-plus PBE Bi-Directional Amplifiers

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