



Underground Intelligence

117 Ringwood Drive, Unit 5
Stouffville, Ontario
L4A 8C1, Canada
Tel: (905) 640-1839
Fax: (905) 640-1649

Application Note AN03.5

VHF Tunnel Communications

Introduction

This application note describes a VHF communications system supplied by Mine Radio Systems for use during the construction phase of a major tunnelling project in metropolitan Sydney, Australia. Communications is vital for smooth operation during construction. Personnel that need to always be in contact can talk to other personnel or to the outside world through a telephone interconnection. The systems provided by Mine Radio Systems are simple to install, extend and maintain during all stages of construction from initial excavation, through to tunnelling, break-through and the final fit-out.

Background

The M5 East Freeway links the M5 Motorway at Beverly Hills with General Holmes Drive at Sydney Airport and on to the Eastern Distributor. The freeway includes twin four kilometre tunnels and a 550 metre tunnel under the Cooks River. The M5 has been widened from two to four lanes between Fairford Road and King Georges Road to further assist traffic flow. With the opening of the M5 East, a four-lane carriageway now extends from Canberra and Bookham (west of Yass) to the Sydney CBD. The M5 East is a major addition to the growing Sydney Orbital road network and an important part of the city's long term traffic management plan. The M5 East significantly improves access between south western Sydney, the City, and the major industrial and commercial areas of South Sydney leading to growth in the NSW economy. The freeway reduces traffic congestion in residential areas, improves traffic flow and takes off heavy vehicles off



Turrella ventilation shaft

key local roads, with safety, noise and air pollution benefits for the community. In December 1997 the RTA was given planning approval to proceed with the project, subject to 150 conditions. In August 1998 the State Government awarded the tender to design, build, operate and maintain the M5 East Freeway for 10 years, to the Baulderstone Hornibrook, Bilfinger+Berger Joint Venture.



Twin two lane tunnels between Bexley Road and Marsh Street, Arncliffe

Mine Radio Systems Inc.
Stouffville, Ontario
Canada (Head Office)
Tel. 905-640-1839
Fax. 905-640-1649
General@MineRadio.com

Mine Radio Systems Inc.
Sudbury, Ontario
Canada
Tel. 705-897-2440
Fax. 705-855-1336
General@MineRadio.com

Mine Radio Systems Inc.
Wilmington, Delaware
USA
Tel. 302-798-9444
Fax 302-798-9448
USA@MineRadio.com

MRS (Pacific) Pty. Ltd.
Devonport, Tasmania
Australia
Tel. 61-36-423-3333
Fax 61-36-423-3331
Australia@MineRadio.com

Mine Radio Systems
(Africa) Pty. Ltd.
Pretoria, South Africa
Tel. 27-14-379-9498
Fax 27-12-379-9499
Africa@MineRadio.com

A principle component of the M5 East Freeway was the construction of twin two-lane tunnels between Bexley Road at Earlwood and Marsh Street, Arncliffe. These tunnels are currently the longest in Australia. The two tunnels run parallel for 3.9 km and are approximately 10-15 m apart. Each of the two-lane tunnels is typically 8.6 m wide and 6 m in height. Vehicular clearance is posted at 4.6 m.



The fit-out of the main tunnels began in mid 2000, in the eastbound carriageway at the Bexley Road portal, and includes construction of pavement, drainage, lining and the installation of ventilation, safety and traffic management systems, lighting, fire protection and other. These items were a major part of road tunnel work.

MRS (Pacific) Pty Ltd was awarded the contract to supply VHF communications equipment for installation in the twin two-lane tunnels for the construction phase of the project.

A web site at www.rta.nsw.gov.au provides further details of the construction of the M5 tunnel.

Radio Communications

The communications needs for this project were met by two VHF leaky feeder head ends (as pictured opposite) connected to either end of the tunnel. The head-end were connected to standard leaky feeder cable with FLA amplifiers spaced at 350 metres intervals. Additional cable (in 350 metre spools) and FLA amplifiers were added as the tunnel progressed. When the tunnel breakthrough occurred, one head end was removed and the FLA amplifiers reversed in one section to create a single system that ran along the entire length of the tunnel. The system was maintained in service until the fit-out and commissioning of the tunnel was completed.

For Further Information

If you require clarification of any of the above notes or have any comments or suggestions relating to this or other application notes from Mine Radio Systems please call your nearest Mine Radio Systems distributor or agent.

