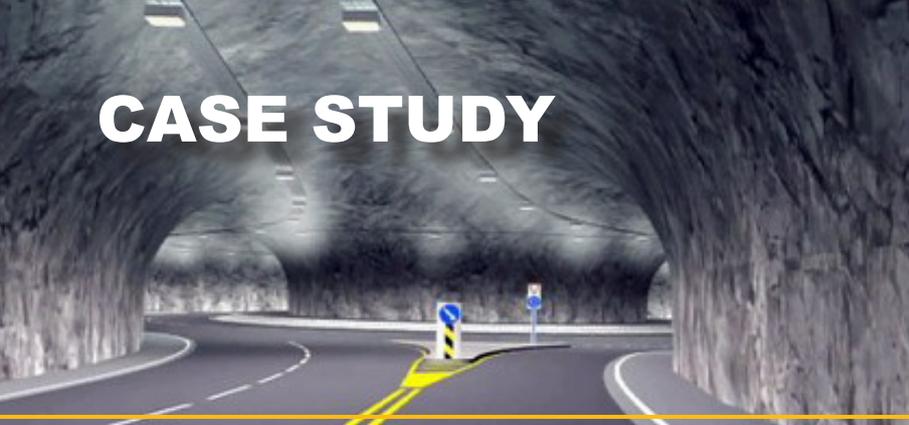


CASE STUDY



T-Forbindelsen

- Place: Rogaland, Norway
- Tunnel length: 8,9 kilometers
- Customer: Traffic Solutions

Solutions delivered by TRAFSYS: Radio System, roadside telephones, LED signs, video surveillance, IP network, and PREVISION traffic management

“T” for Tunnel Communications

The T-Connection (T-Forbindelsen) is the largest road construction project ever to be completed on the south-west coast of Norway. TRAFSYS has delivered a number of intelligent traffic solutions (ITS) for this project, including a radio system, Norphonic emergency roadside telephones, video surveillance, LED signals and a traffic management system.



TRAFSYS delivers ITS systems for tunnels

A Radio System and Emergency Roadside Telephones

The radio system offers VHF, FM, DAB and UHF (TETRA) radio coverage, which is achieved by installing a Leaky Feeder cable inside the tunnels. Repeater amps are installed throughout the tunnel (every 1500 meters), and transceivers are installed to achieve the best coverage both inside and outside the tunnel.

Car radios can receive signals from the Norwegian FM-stations “NRK 1”, “P4” and “Radio Norge”, in addition to DAB channels “Riks” and “Local Rogaland”. In an emergency situation, operators at the Traffic Management Centre (VTS) can override the broadcasts to give essential information to commuters by using a microphone located outside the tunnel, or by dialling an emergency telephone number. The radio system from TRAFSYS also have dedicated channels for ambulance, police and fire services, so that the emergency services easily can communicate with each other.

TRAFSYS have also delivered Norphonic emergency roadside telephones (ERT). If a telephone handset is lifted, the conversation will be connected to the Traffic Management Centre, which automatically is informed about the exact location of the caller. All the emergency telephones are redundant, which means that the telephones will still work if one network cable or other telephones goes down. The Norphonic telephones also provide advanced information about their individual components, and can be monitored and upgraded from a remote location.

Video Surveillance, LED Signals and Data Network from TRAFSYS

TRAFSYS have also delivered a video surveillance system which automatically warns the Traffic Management Centre about wrong-way drivers, queue tail build up, lost cargo or people walking inside the tunnel. In addition, TRAFSYS have delivered variable LED signals, which can be used to inform about tunnel closures or route changes.

TRAFSYS also delivered the overall IP data network, which is used by the intelligent tunnel systems. This network consists of a fibre network with high capacity routers. The system is also redundant (use dynamic OSPF routing) and is dimensioned to handle large amounts of data – including video footage from the cameras. There are also 10 redundant sub-nets controlled by using rapid spanning tree protocol (RSTP) inside the tunnel.

Intelligent Traffic Management

All the individual ITS systems in the T-Connection is connected to the overall traffic management system PREVISION. This is an intelligent management system that is designed to manage environment and safety within road tunnels. PREVISION can be used to control telephones, LED signals, radio systems and video surveillance solutions. The PREVISION system also provide the operator with information from pre-made emergency plans, which is very beneficial in emergency situations such as tunnel fire or car breakdowns.

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