Traffic gate control system for major tunnel project
2008-04-22

Location / Country : Taiwan, Fu Chyu Industrial Co., Ltd.

Product Solutions:
NPort 5230 Series

2-port RS-422/485 serial device servers

EDS-505A/508A Series

5 and 8-port managed Ethernet switches

IMC-101 Series

Industrial 10/100BaseT(X) to 100BaseFX Media Converters

Introduction

Project Introduction

Taiwan's Hsuehshan Tunnel is an engineering marvel. With a total span of 12.9 kilometers, it is the world's fifth longest tunnel, the longest in Southeast Asia, and the world's longest two-way tunnel.

Emergency preparedness and safety are critical for long tunnels. At Hsuehshan Tunnel, there were to be fire hydrants every 50 meters, emergency phones every 175 meters, and emergency parking areas along the shoulder every 1400 meters. In addition, there would be pedestrian tunnels every 350 meters and connecting tunnels between the east and west tunnels every 1400 meters. Within the tunnels and at each entrance, traffic control gates would be installed to control the movement of cars during an emergency. During a fire alarm or emergency, these gates would automatically be lowered to divert vehicles from affected areas. Therefore, it was essential that the control system be extremely reliable and able to stand up to punishing environmental conditions.

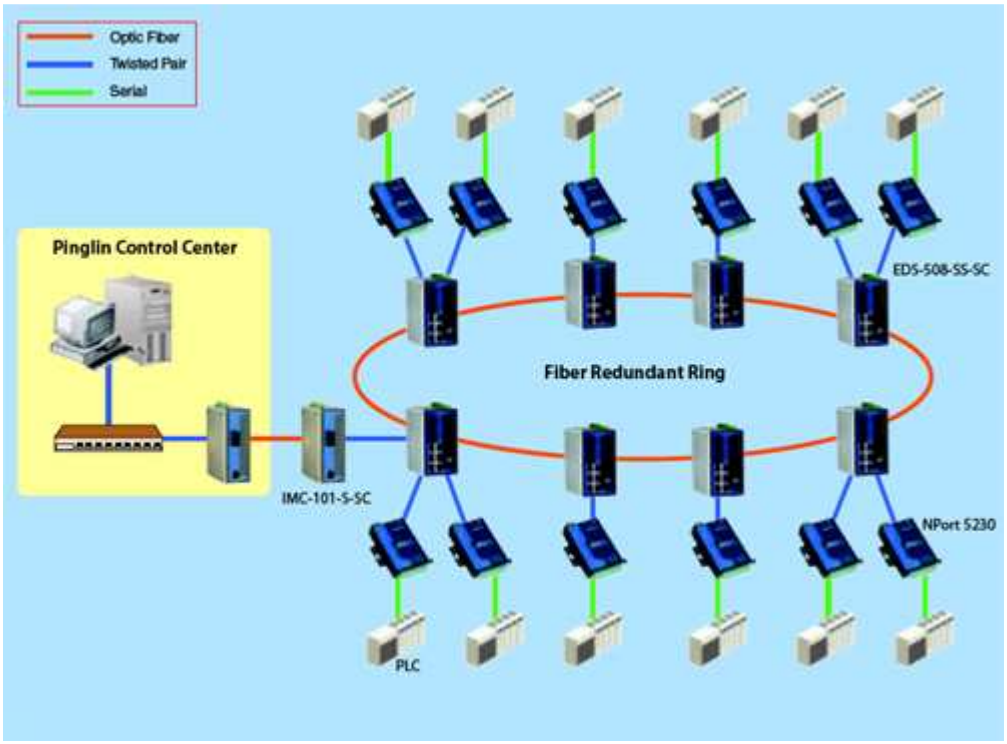
Moxa Solution

10 sets of automatic gate machines were installed at strategic points along and outside the tunnel. Serial-based OMRON PLCs were used for gate control, supporting both manual operation and operation from from automated traffic control signals. The PLC systems were integrated into an Ethernet network using Moxa's NPort 5230 device servers.

To handle data transmission between the eight control gates within the tunnel, Moxa's EDS-508-SS-SC was used to form a single-mode fiber optic Ethernet network with a redundant ring topology. Two IMC-101-S-SC media converters were used to connect the control room at the south entrance to the main control center in Pinglin.

The fiber optic network supported the long-distance transmission needs of the traffic gate control system. Copper Ethernet networks were used for shorter network connections less than 100 meters. Each gate was equipped with warning lights and sensors and was synchronized with traffic signals.

With the system installed, the Hsuehshan Tunnel's main control center could respond quickly to emergencies by broadcasting a warning to all drivers and using the control gates to prevent traffic from entering the tunnel or the affected areas. The reliable communication network helped to ensure effective containment of emergency situations for the safety of other drivers.



Why Moxa

- High network reliability for PLC control and fault alarm signals, using redundant Turbo Ring architecture with network recovery in 300 ms
- Single-mode fiber optic connections for long distance transmission.
- Easy configuration and real-time administration by web browser, Windows utility, or Telnet/serial console
- Stable and reliable media conversion in harsh environments with Ethernet-to-fiber-optic converter
- Remote control and monitoring of RS-422 and RS-485 serial devices over Ethernet LAN