Honeywell
THE POWER OF CONNECTED

Connected Tunnel Solutions

TUNNEL SAFETY SOLUTIONS

Case Study

Tunnels are among the most demanding environments for fire safety technology, and require careful planning and rigorous testing before commissioning. From road tunnels to subways and railroad tunnels, these structures serve as an integral part of modern infrastructure which should remain operational around the clock. This pushes expectations of fire safety equipment, software and knowhow to an even higher level.

Case Study

HONEYWELL EQUIPS TUNNELS ON THE BELT HIGHWAY NEAR PRAGUE WITH DTS FIRE DETECTION

The tunnels on the belt highway around the Czech Republic's capital Prague are critical to local transport infrastructure. Meeting all standards and regulations, Honeywell installed an advanced fire alarm system with distributed thermal sensing (DTS) technology. This equipment is ideally suited to work reliably under very difficult environmental conditions inside the tunnel.

Benefits

DTS incorporates fiber-optic cables which have unique properties ideally suited to tunnel environments:

- Minimal diameter (<5 mm) and weight (<30 g/m) – heating up quickly for rapid heat detection, and very flexible to install, even in difficult locations
- Bend radius: 4-8 cm
- No active elements
- Max. length 10 km, detection over entire length
- Ability to withstand temperatures of up to 1,000° Celsius
- Resistant to corrosion, air flow and humidity
- Wide range of operating temperatures (-10 to 60° C)
- Laser output below 20 mW

Challenge

Despite entering the project after the planning stage, Honeywell was able to outperform a competitor's initial offer by suggesting a superior technical solution. After a detailed analysis, Honeywell's solution featuring a redundant loop configuration was selected as the technically more advanced and safer option.

Solution

Honeywell installed a sophisticated ESSER by Honeywell fire detection and alarm system, ideally suited to the environmentally challenging conditions inside the tunnels. The system includes two DTS linear heat detectors with a length of more than 4,000 meters each in redundant loop configuration to guarantee reliable operation. The innovative fire alarm system features seven IQ8Control panels. These are connected by a fiberoptic essernet network in single-mode-configuration and process signals from several hundred O^{2}T point detectors and various complementary aspirating smoke detectors. Honeywell VARIODYN D1 Public Address & Voice Alarm (PA/VA) technology was fully integrated with Digital Output Modules (DOM), connected via a dedicated optical ethernet network, further illustrating the flexibility and quality of Honeywell solutions.

Distributed Thermal Sensing (DTS)

By utilizing the Raman effect, the optical signal within the cable is processed through patented OTDR signal analysis to localize heat sources. This is achieved with a resolution of 0.5 meters and an accuracy of 1° Celsius at a refresh rate of 10 seconds. Combined with powerful Honeywell software, DTS systems provide reliable and safe operation at low operating cost requiring minimal maintenance.

Case Study

HONEYWELL SUPPLIES FIRE SAFETY TECHNOLOGY TO THE POPULAR AUSTRIAN SKI RESORT OF SAALBACH-HINTERGLEMM

In the Austrian municipality of Saalbach-Hinterglemm, a road tunnel provides a welcome opportunity for drivers to bypass the city center. The tunnel gives residents and visitors a more comfortable and safer way of driving through the narrow valley, which sees heavy snowfall and difficult road conditions in winter. Therefore, improving road safety in the tunnel with a state-of-the-art fire detection system from Honeywell was a key priority for the local authorities.

Background

The ski resort of Saalbach-Hinterglemm in the Salzburg mountains has been famous for its scenic slopes and benefiting from winter tourism, since skiing became popular in the 1950s. Each year, more than 300,000 tourists from all over the world visit the region, necessitating a reliable and high-quality infrastructure.

In the supervised test assembly, *test fires with ethanol, petrol and diesel were set in the tunnel and successfully detected within time limits in the certification process.*

Challenge

In collaboration with a longstanding strategic partner, Honeywell was invited to supply fire safety technology for the Hinterglemm tunnel in Salzburg. With a length of almost 1 kilometer, the tunnel was the first structure to feature Honeywell DTS technology in Austria. The project thus served as a test bed for certifying the technology for use in the Austrian market. To meet national RVS road safety requirements, test fires need to be located accurately and within very tight time frames.

Solution

With its wide range of products, Honeywell was able to supply a complete fire safety solution, including a 1,180 meter-long DTS sensor cable, monitored by sensor control units on each end of the tunnel in a fully redundant configuration. An ESSER by Honeywell IQ8Control fire alarm system completes the technical fire safety equipment of the tunnel. After the installation, all Honeywell products were subjected to real-world emergency conditions by creating a test fire in the tunnel, supervised by the local fire brigade and certification officials. Thanks to careful programming and coordination, all Honeywell systems operated flawlessly during testing and were successfully certified for the Austrian market.

As a result, Honeywell was able to win further tunnel projects in Austria, including a tunnel in Tyrol and a famous tourist attraction in the capital of Styria.

Case Study

DEDICATED HONEYWELL PA/VA SYSTEM FOR TUNNEL APPLICATIONS

Due to the rigid construction of tunnel tubes, the conditions for evacuation systems are very challenging. While road noise from passing cars is an obvious problem, long reverberation time and loudspeaker acoustics need to be considered.

Standards & Regulations

Honeywell Fire and PA/VA Solutions are operating in many countries across the entire Eastern European region. The company has great technical expertise and a deep understanding of the regulatory requirements of each project. All Honeywell product and system solutions for road tunnels are fully compliant with European road safety standards and regulations, such as the Austrian National Roads Administration's RVS guidelines and European Union Directive EU/2004/54/EC.

Honeywell installs advanced PA/VA solution in a unique tunnel project in Poland

Due to high reverberation times in tunnels, it is necessary to avoid echoes during the transmission of evacuation orders or messages in the event of an emergency. Speech intelligibility begins to deteriorate when sounds from different loudspeakers overlap by only a few milliseconds.

To achieve the highest possible level of speech intelligibility in this project, a feasibility study was conducted in collaboration with the Polish Building Research Institute. As a consequence, Honeywell was able to identify the ideal acoustic properties for loudspeakers, which were incorporated into the PA/VA system with fiberoptic essernet and distributed architecture. The system thus allows drivers to understand emergency messages inside moving vehicles despite the considerable road noise inside the tunnel. It is fully compliant with the German RABT guidelines for the equipment and operation of road tunnels.

Results

By supplying high quality fire safety and PA/VA technology, Honeywell played an important role in the implementation of these tunnel projects which continue to have an enormous positive impact on local communities and their surroundings. Improved road safety in tunnels is not only a major infrastructure upgrade, but better transport infrastructure should increase the quality of life for residents and boost local economies as well.

For more information

To learn more about Honeywell products and solutions, visit www.hls-austria.com or contact your Honeywell Account Manager or System Integrator.

Honeywell Life Safety Austria GmbH
Technologiestr. 5, Building F, 3. OG,
1120 Vienna, Austria
www.hls-austria.com

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