

### Case Study

### Industry Sector Building Technologies Division

Zug (Switzerland), April 29, 2010

**Straight around Zurich in all safety thanks to comprehensive tunnel solutions and services from Siemens**

**The Siemens Building Technologies Division has provided the fire safety systems for all the tunnels in one of largest road infrastructure projects of recent years in Switzerland: the A3 Zurich-West Bypass and the A4 connection to Zug through the Knonau district. These 2 stretches of the motorway network – most of which runs underground – have a significant regional importance: the new sections (respectively 10.6 km and 15.6 km) offer quicker connection between the economic center of Zurich and central Switzerland, a reduction of through traffic in numerous municipalities and in the city of Zurich, as well as new possibilities for public road transport.**

The new motorway sections run through 6 tunnels, including the Uetliberg tunnel (4 400 m long) and the Isisberg tunnel, the opening of which (in the autumn of 2009) marked the full completion of this decade-long project. The Isisberg tunnel is also the most important section of the A4 motorway in Knonaueramt southwest of Zurich – and the longest of all tunnels at 4 950m. All in all, a total of 27.8 kilometres of tunnel tubes were constructed – and needed to be made available and safe for traffic.

Safety was indeed a central consideration in the design, construction and subsequent operation of the tunnels: In order to simplify installation, operations, maintenance and services, the requirement was for similar technical equipment to be used throughout all the tunnels. The fire safety systems, therefore, had to be adaptable and scalable enough to provide each tunnel with the levels of safety performance required by Swiss Federal Roads Office (FEDRO) regulations, while catering for the specific safety challenges of each tunnel. Siemens Building Technologies Division (BT) was chosen for the supply and installation of the fire safety systems in all the tunnels – and entrusted with providing maintenance and repair services.

Due to the confined environment, incidents in tunnels – and particularly fires – can escalate rapidly. Early fire detection and accurate location is therefore essential to risk limitation – and is required by

the Swiss Federal Roads Office (FEDRO) tunnel safety regulations. In total, BT installed 36.5 kilometers of FibroLaser linear heat detection cable as well as 24 FibroLaser II controllers, which are connected with six segment controllers (one per tunnel). These segment controllers are networked with the overall tunnel control systems. This enables a coordinated response to any incident, through interaction of the fire safety systems with the lighting, ventilation, smoke extraction, traffic control, video surveillance and communication systems.

The redundant fiber optic cable FibroLaser can detect a fire within one minute and pinpoint its location with an accuracy of three metres of the ignition point - a performance which exceeds the most stringent European road and rail safety standards. FibroLaser is constantly tested during operation, ensuring high system availability. For routine service, system tests are carried out away from the tunnel tubes, and therefore do not require tunnels to be closed.

The tunnels are controlled via thirteen control centers. Altogether, the electromechanical installations are housed in five hundred operating rooms, of which approximately 50% are fitted with distribution and control cabinets. Over eight hundred distribution and control cabinets supply the tunnels with energy, information and switching commands. As availability of the tunnels also relies heavily on the operational continuity of critical systems (fire being one of the main risks), Building Technologies also equipped all the technical rooms of the tunnels with alarm signalling devices and 1500 Sinteso C-LINE smoke detectors. The fire safety systems are autonomous. In case of an emergency, they trigger the ventilation systems directly and alert the tunnel control center in Urdorf as well as the traffic control center via the superordinate control system and the emergency response system.

The outstanding performance of its fire safety systems was not the only factor in BT's appointment. Chosen not only to supply and install the fire safety systems within all the tunnels but also to maintain and service them, means that a large part of the responsibility to maintain the ongoing daily tunnel availability and general safety levels also fall to Siemens. The protection of all the tunnels' critical operational systems from damage by fire is ensured through Siemens as part of its Advantage Services offering.

These comprehensive services optimize the systems' operational efficiency while reducing the probability of any disruptions. In the case of the tunnels of the A3 Zurich-West Bypass and A4 in Knonaueramt, the services include life-cycle management, operational services and alarm management as well as preventive and corrective system maintenance, knowledge services (sharing expertise with customers through consulting, professional services, or training) – along with a guaranteed repair time within 24 hours. The services are designed to create real system

value over the whole life-cycle of the tunnels, keeping systems running at optimal efficiency and increasing reliability and ongoing tunnel availability.

The **Siemens Industry Sector** (Erlangen, Germany) is the worldwide leading supplier of environmentally friendly production, transportation, building and lighting technologies. With integrated automation technologies and comprehensive industry-specific solutions, Siemens increases the productivity, efficiency and flexibility of its customers in the fields of industry and infrastructure. The Sector consists of six divisions: Building Technologies, Drive Technologies, Industry Automation, Industry Solutions, Mobility und Osram. With around 207,000 employees worldwide (September 30), Siemens Industry achieved in fiscal year 2009 total sales of approximately €35 billion. [www.siemens.com/industry](http://www.siemens.com/industry)

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