netlab GmbH
D-40217 Düsseldorf
Germany

sgt Sensor Consulting Dr. Guido Tschulena
D 61273 Wehrheim
Germany

Road Tunnel Fire Detection Systems

As a consequence of several, very severe, fire accidents in European road tunnels, for instance Mont Blanc (March 24, 1999), Gotthard (October 24, 2001) and Tauern (May 29, 1999), the question was raised whether the fire alarm systems are adequate. This report on installed systems as well as on novel optical fiber based fire alarm systems gives a comprehensive view of the technological means available to tunnel operators.

Within a 4 years period form 1999 to 2002 Europe road tunnels experienced a number of deadly fires killing altogether 81 people. For each accident, the causes and consequences were the same: trucks with flammable cargo, sleepy driver, pile up of cars and trucks and intense heat, which prevented rapid intervention by the fire fighters. The question was raised whether the fire alarm systems functioned properly. The answer is that in most cases the systems worked, communications were however cut because phone and fire detector cables were quickly destroyed at temperatures exceeding 1100 ºC.

In this report Netlab presents an investigation of currently used fire detections systems in road tunnels and makes an assessment of reliability, costs and describes examples of applications. The systems examines are:

- **Twisted wire systems** where the melt down of the insulation creates a short which constitutes the detection signal, such systems were installed as early as 1945;
- **Copper tube system** in which an inert gas when heated builds up a pressure which in turn at a threshold triggers the fire alarm;
- **Temperature sensor cable**, in this case discrete electronic temperature sensors at regular intervals record the evolution of the temperature and trigger the fire alarm;
- **Optical fiber continuous sensor cable** where the entire cable is the sensing element, the location of a temperature peak can be determined by TDD, these are the latest products on the market.

Tauern tunnel fire on May 29, 1999

Mont Blanc Tunnel fire on March 29, 1999

Gotthard tunnel fire on October 24, 2001

*More information and the Table of Content of this useful 100 page report can be obtained from **sgt Sensor Consulting Dr. Guido Tschulena**, who has written the report together with Felix Trojer from Netlab GmbH in Düsseldorf. Tel: + 49 6081 56 168, Fax: + 49 6081 57 222, Mail:* info@tschulena.de

netlab GmbH
D-40217 Düsseldorf
Germany

sgt Sensor Consulting Dr. Guido Tschulena
D 61273 Wehrheim
Germany

Road Tunnel Fire Detection Systems

Table of content **Page**

netlab GmbH
D-40217 Düsseldorf
Germany

sgt Sensor Consulting Dr. Guido Tschulena
D 61273 Wehrheim
Germany

ORDERING FORM

This Tech Watch study can be ***ordered*** by completing this form and sending it by fax or mail to:

Dr. Guido Tschulena
sgt Sensorberatung Dr. Guido Tschulena
sgt Sensor Consulting Dr. Guido Tschulena
Reichenberger Str. 5
D- 61273 Wehrheim, Germany
Fax: + 49 (0) 6081 / 57 222
e-Mail: info@tschulena.de

Name, First Name .....

Organisation . .....

ID number for Sales Tax (VAT-ID) ……

Address .....

.....

e-Mail : .....Phone.....

I hereby order ..... copy/copies of the report at the price of **1.500.00 Euro plus VAT & shipping** (Germany: 10 Euro, Europe 40 Euro , other countries: 70 Euro) for the first copy. Price reduction for further copies on request.

Payment

Per bank transfer to our account
Dresdner Bank AG, Gallusanlage 2
D- 60613 Frankfurt am Main, Germany
Account holder: Dr. Guido Tschulena
BLZ 500 800 00 IBAN: DE 11 5008 0000 4922 0720 00
Account Number 49 220 720 00 SWIFT-BIC: DRES DE FF

.....

Signature *Location* *Date*