



Tunnel Safety Activities in the last 10 years

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Road Tunnel Safety

Before 1999

**Catastrophic tunnel fires
in Europe (1999)**

After 1999

Road Tunnel Safety

Before 1999

Not a serious problem (for public opinion)

But work was done:

- ✓ Technical recommendations
- ✓ (A few) national regulations
- ✓ (Some) research projects

PIARC Technical Committee on Road Tunnel Operation

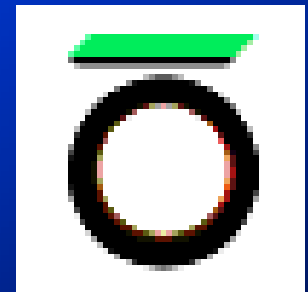
Operation, Safety, Geometry

Environment, Equipment (since 1957)



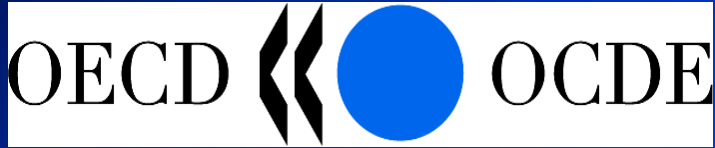
complementary activities / cooperation:

ITA (International Tunnelling and Underground Space Association)



Geotechnics, Construction,
Materials, including non-road tunnels

Other international co-operation



Joint OECD/PIARC project

Transport of dangerous goods
through road tunnels

- ✓ Harmonisation of tunnel regulations
- ✓ Quantitative Risk Assessment & Decision Support models
- ✓ Risk reduction measures

Road Tunnel Safety

Before 1999



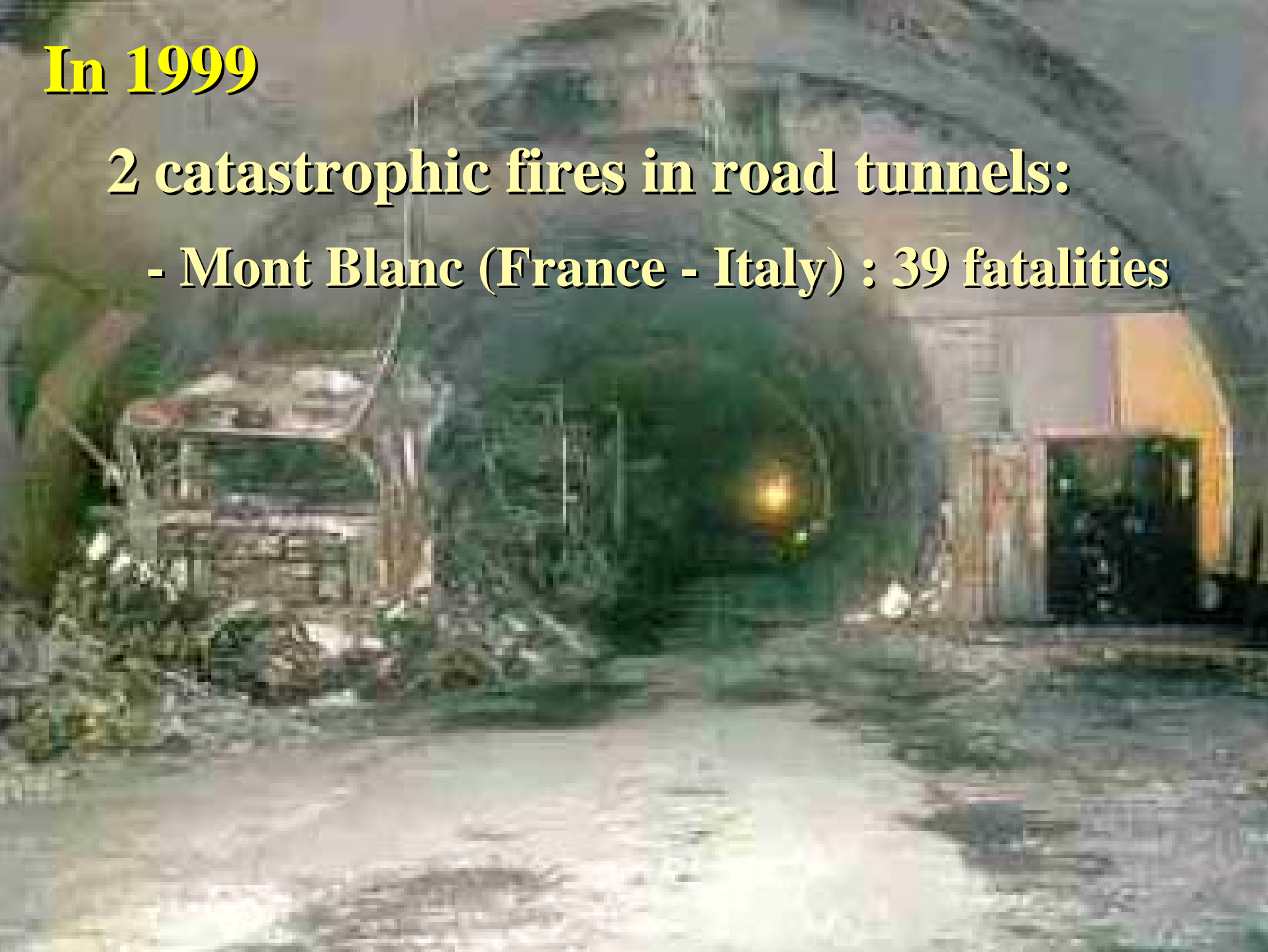
1999

After 1999

In 1999

2 catastrophic fires in road tunnels:

- Mont Blanc (France - Italy) : 39 fatalities



In 1999

2 catastrophic fires in road tunnels:

- Mont Blanc (France - Italy) : 39 fatalities**
- Tauern (Austria) : 12 fatalities**

**→ Created a shock in public opinion
and led to political / technical initiatives**

In 2001

Another catastrophic fire in a road tunnel:

- St Gotthard (Switzerland) : 11 fatalities

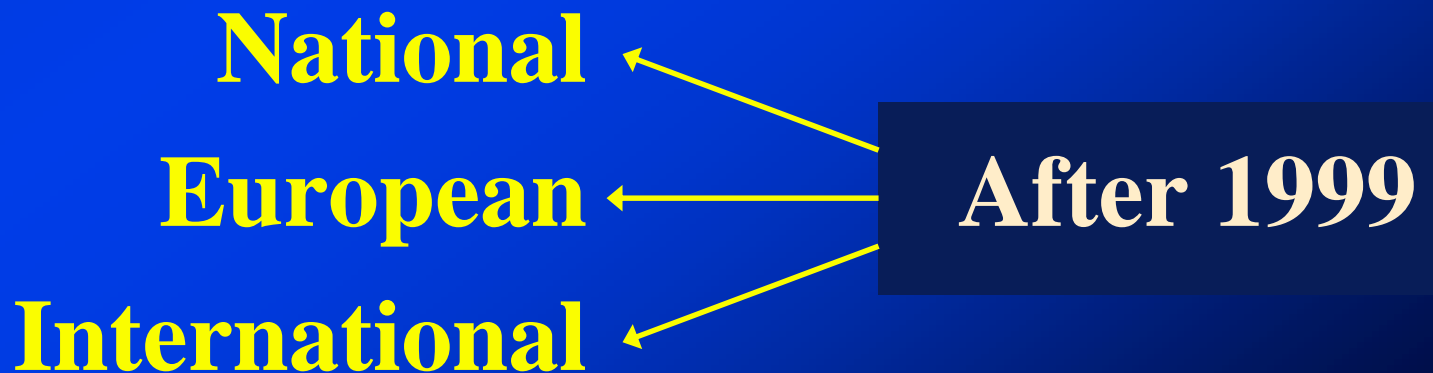


→ Reinforced the awareness

Road Tunnel Safety

Before 1999

Catastrophic tunnel fires
in Europe (1999)



National responses

France / Italy

→ joint investigation into Mont Blanc fire

France

→ check of all tunnels > 1000 m

→ new laws and regulations

Switzerland

→ Tunnel Task Force

Austria, Norway, etc.

USA

→ standardisation



NFPA 502

→ Need to foster improved safety
and harmonise safety measures



United Nations

UNECE

Economic Commission for Europe
(Geneva - 55 countries)

Ad hoc multidisciplinary group of experts

- ✓ Report on road tunnel safety (Dec. 2001)
- ✓ Amendments to European agreements



European Union

(Brussels - 15 → 27 countries)

*Not competent in road tunnels (subsidiarity)
but requested by the Heads of States:*

Calls for research projects / networks

✓ **under the 5th framework programme**



European research projects/networks

D•A•R•T•S





European Union

Calls for research projects / networks

- ✓ under the 5th framework programme
- ✓ and the 6th framework programme



**Large Scale Underground Research Facility
on Safety and Security**



Sixth Framework Programme

Structuring the European Research Area Specific Programme



European Union

After the St Gotthard fire,
preparation of a European legislation:

Directive 2004 / 54 / EC of 29 April 2004
on minimum safety requirements
for tunnels
in the trans-European road network

Transposed into national legislation
in the 27 EU member countries (+ N, CH,...)



At international level

Road Tunnel Operation Committee

**A stronger focus on safety
in pre-existing working groups:**

- ✓ WG1: Operation
- ✓ WG4: Detection, communication, safety equipt
- ✓ WG6: Ventilation and fire control

and creation of new working groups:

- ✓ WG2: Management of safety
- ✓ WG3: Human factors of safety

- The First Road Tunnel - A Planner Guide for Countries Without Previous Experience of New Road Tunnels
- Classification of Tunnels, Existing Guidelines, Recommendations
- Road Tunnels: Emissions, Environment, Ventilation
- Road Safety in Tunnels
- Road Tunnels: Reduction of CO₂ Emissions
- Fire and Smoke Control in Road Tunnels
- The Role of Nitrogen Dioxide in Road Tunnels
- Cross Section Design of Bidirectional Tunnels
- Tunnel Management Systems used in Road Tunnels
- Road Tunnels: Vehicle Emissions and Air Demand for Ventilation
- Cross Section Design of Bidirectional Road Tunnels
- Good Practice for the Operation and Maintenance of Road Tunnels
- Road Tunnels: Systems and Equipment for Fire and Smoke Control

**+ 6 new reports on safety
out of 11 under preparation**

ITA Committee on Operational Safety of Underground Facilities (COSUF)



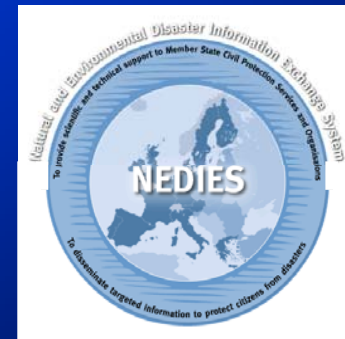
- ✓ Initiated by European projects/networks partners to continue/extend their activities **worldwide**
- ✓ An **ITA** committee also supported by **PIARC**
- ✓ **Scope:** all kinds of underground facilities
- ✓ **Objectives:** worldwide network to promote research and safety

Other points of view

Fire-fighters

Quite a number of specific initiatives
*(in addition to taking part in aforementioned
European projects / networks, PIARC WG, etc.)*

- ✓ National working groups, recommendations...
- ✓ European Fire Safety Tunnel Group
- ✓ NEDIES special meeting / report
- ✓ CTIF seminar



Other points of view

Automobile clubs



- ✓ EuroTAP project, funded by EC (tunnel tests on users' point of view, information / tips to drivers, etc.)

Courts

- ✓ Trial of the Mont Blanc tunnel fire (8 sentenced to suspended jail; 1 sentenced to jail)



A nighttime photograph of a city street. In the center, a large fountain is illuminated with bright lights. The background features several tall buildings, one of which has a sign that says "Novotel". The street is lit by streetlights, and there are light trails from cars in the foreground. A speed limit sign with the number "70" is visible on the right side of the road.

~~THE END~~

*This was just to set the scene.
Real presentations can begin!*