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# **Implementation of the Tunnel Directive in EU Member States (MS)**

by  
**Dr.-Ing. Bernd Thamm**  
**BRT-Consult, Lindlar, Germany**  
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at the  
4th Portuguese Road Congress- Estrada 2006  
April 5-7, 2006  
Estoril, Portugal



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# Directive 2004/54/EC

## ➤ Scope

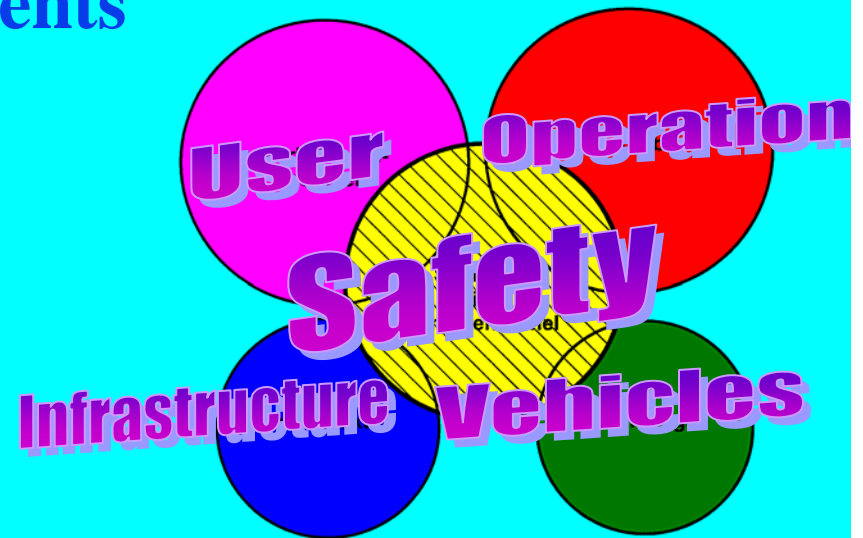
tunnels longer than 500 m in the trans-European Road Network (TERN)

## ➤ Organisational requirements

- Administrative authority
- Tunnel manager
- Safety officer
- Inspection entity

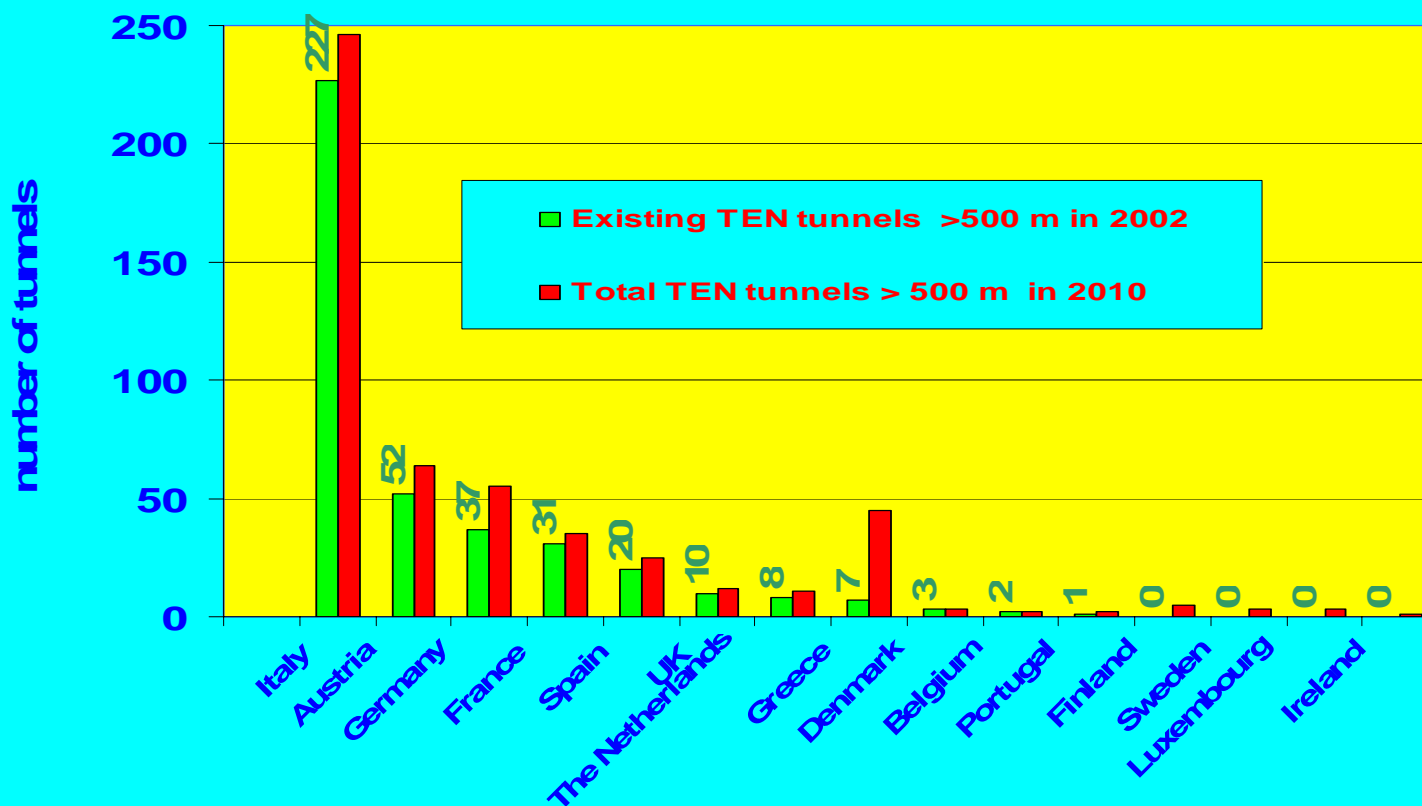
## ➤ Technical requirements

- Infrastructure
- Operation
- Vehicles
- Road users





# TERN tunnel inventory





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## **Directive: Status of Adoption and Publication**

- |                           |  |
|---------------------------|--|
| <b>30 December 2002 :</b> | <b>Proposal of the Commission for European Council and Parliament</b>                                      |
| <b>09 October 2003:</b>   | <b>Global compromise agreement in Council and Report adopted in first European Parliament (EP) reading</b> |
| <b>26 February 2004:</b>  | <b>Adoption of common position in Council</b>  |
| <b>20 April 2004:</b>     | <b>Adoption of common position second reading in EP</b>  |
| <b>29 April 2004:</b>     | <b>Publication in Official Journal –L 201</b>  |
| <b>07 June 2004:</b>      | <b>Publication of Corrigendum in OJ –L 167</b>   |



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## Directive Preparation

### Work done by:

- **PIARC C5**
- **OECD**
- **WERD (Alpine countries)**
- **Austria, France, Germany, Norway, Switzerland**
- **UN-ECE (Recommendations from December 2001)**
- **EU Commission and Council**  
(15 working group meetings between February and September 2003)
- **European Parliament (RETT Committee meetings)**

### Follow up work:

- **EU Technical Committee on Road Tunnel safety**
- **PIARC C3.3 (e.g. WG 2)**
- **EU research projects (e.g. DARTS, UPTUN, FIT, Safe-T)**
- **UN-ECE (e.g. WP1 and WP15)**



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## Directive Implementation

### Article 18:

Member States have to bring into force the laws, regulations and administrative provisions necessary to comply with the Directive by the **30th of April 2006**.

They have immediately to forward to the Commission the text of those provisions, together with a table correlating those provisions with the Directive.

*If MS do not provide those documents infringement measures can be taken by the Commission*



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## Implementation schedule

Time	Action	DATE
E	Entry into force	29.04.2004
E+ 2 years	transposition by Member states and notification of safety organisations; all tunnel at design stage shall comply from hereon or those built but not in operation shall be evaluated;	30.4.2006
E + 3 years	assessment of existing tunnels shall be completed; information of EU every 2 years thereafter about the implementation plan	30.4.2007
E+ 5 years	EU prepares a report about the risk analysis methodology used in Member states	30.4.2009
E+ 6 years	first round of technical inspections should be completed ; EU establishes report	30.4.2010
E+ 10 years	end of the implementation periode of the directive to existing tunnels	30.4.2014
E+ 15 years	end of the extented implementation periode of the directive to existing tunnels	30.4.2019



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# Questionnaire :

## State of transposition of the Directive in the MS

handed out to MS in November 2005

1. General
2. Existing situation of tunnel safety provisions
3. Transposition of the administrative requirements
4. Transitional Provisions
5. Tunnels already in operation
6. Refurbishment
7. Periodic Inspections
8. Risk analysis
9. Reporting of accidents and fires
10. Transposition time
11. Application to Non -TERN





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## Implementation status in MS 2005

Country	National guidelines	existing tunnels TERN	organ. Implementation problem	techn. Implementation problem	Remarks
<b>Austria</b>	RVS 9.281/2 (2002)	67	Yes*	No	RVS 9.282 contains already some risk based elements
<b>Belgium</b>	?	2	?	?	work will start in 2005
<b>Czech Republic</b>	TS98 (1997)	10	Yes	No	organisational requirements have still to be implemented
<b>Denmark</b>	?	4	Yes*	No	
<b>France</b>	French circulaire (2000)	33	No	No	
<b>Germany</b>	RABT 2003	37	Yes	No	foreseen privatisation may create organisational problems
<b>Greece</b>	?	38	No	No	mostly new tunnels
<b>Hungary</b>	?	0	?	?	design code work started in 2003
<b>Ireland</b>	?	3	No	No	
<b>Italy</b>	only for lighting and ventilation	227	Yes*	No	number of existing tunnels very high
<b>Luxembourg</b>	?	3	Yes	No	working group will be set up in 2005
<b>The Netherlands</b>	prescriptive guidelines	8	No	No	prescriptive Guidelines will be finished end 2004
<b>Slovenia</b>	national guidelines based on Austrian RVS	7	?	No	
<b>Spain</b>	?	36	Yes	No	national implementation plan will be presented in early 2006
<b>Sweden</b>	?	1	No	No	final decisions expected end of 2005
<b>United Kingdom</b>	BS 78/99	?	No	No	QRA + cost benefit analyses



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## Summary of Implementation Status

1. Existing national guidelines in 8 MS
2. No problems with transposition of minimum technical requirements in almost all MS
3. Problems with transposition of administrative requirements in 7 MS (mostly federal states)
4. Problems with refurbishments in MS with numerous tunnels which are already in operation
5. Most MS have still to develop their own risk analysis methodology
6. Application also to Non –TERN tunnels announced by 9 MS



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## Future Main Risks

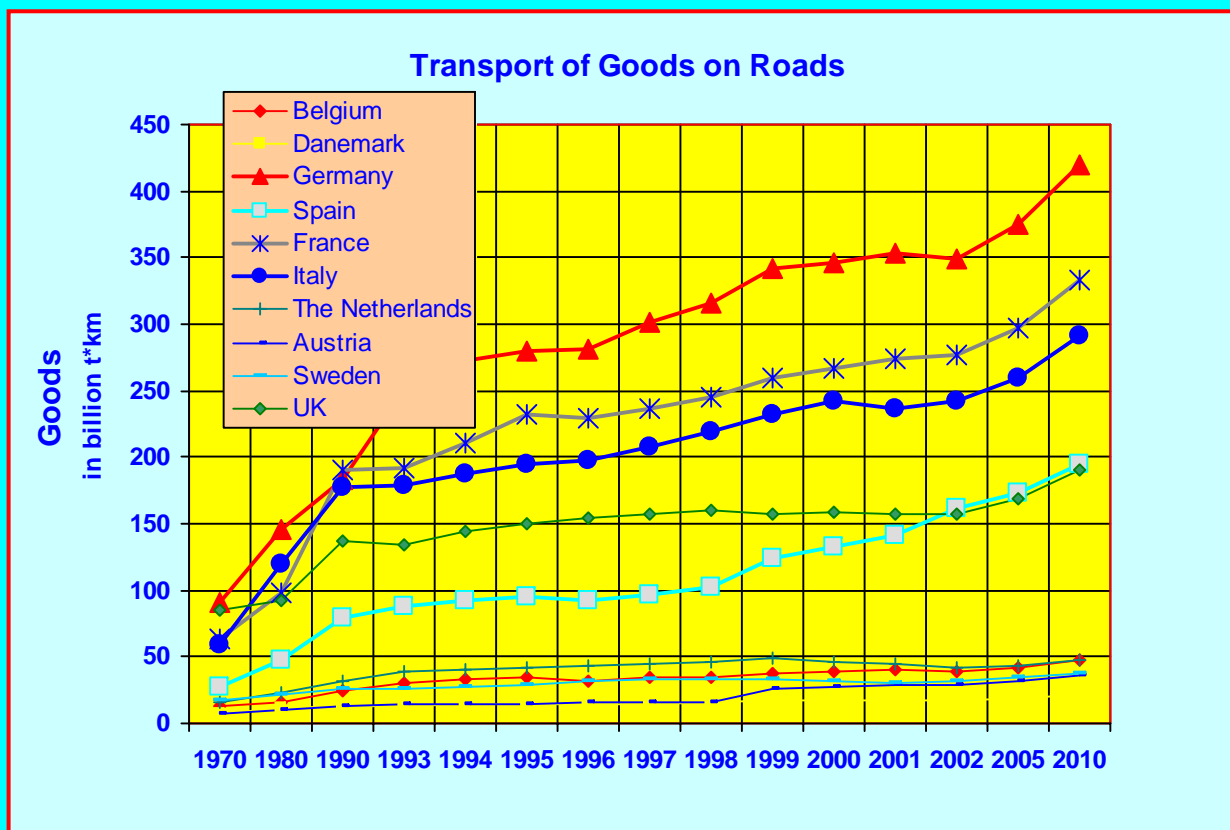
- **40 % to 60% increase of HGV traffic in the next 10-15 years**
- **Emergency preparedness of services**





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# Main risk: Increase of HGV Transport





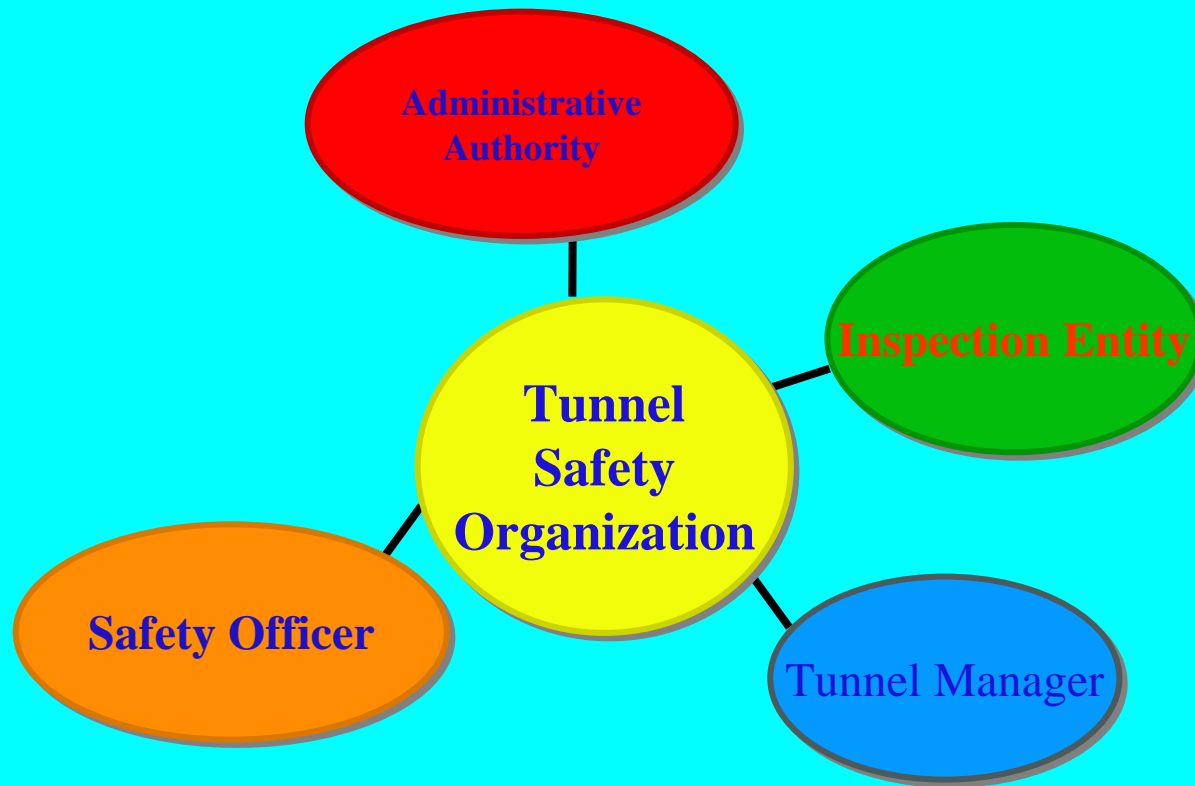
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# Integrated tunnel safety organization?





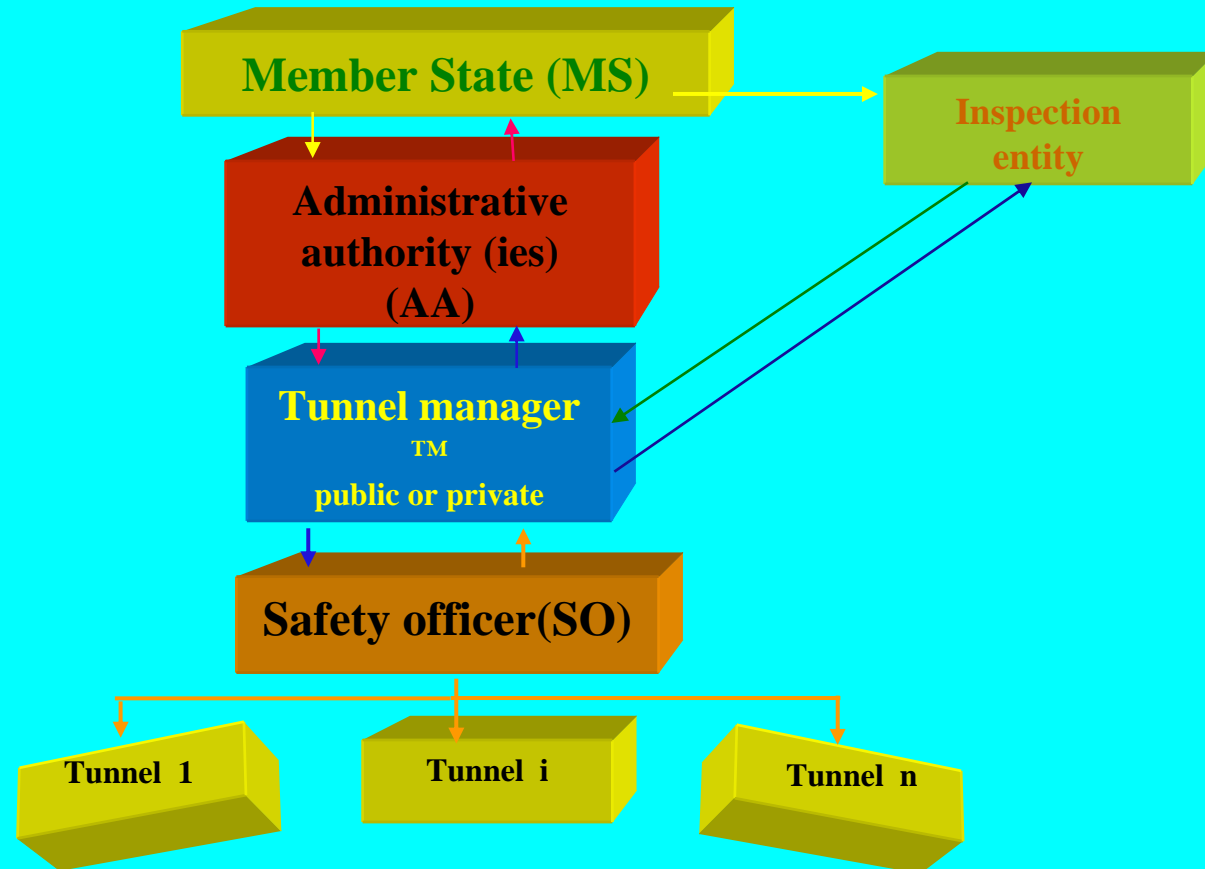
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**Tunnel Safety Organization TOS**



## Organisational structure example







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# **Administrative Authority (AA)**

- **Appointed by Member States (MS) at national, regional or local level**
- **Possible to use existing administrative services in MS**
- **Responsible for all tunnel safety related aspects**

## **Tasks:**

- **testing and inspecting tunnels on a regular basis;**
- **drawing up safety requirements;**
- **organising the training of emergency services;**
- **defining the procedure for immediate closure of a tunnel in an emergency case;**
- **implementing the necessary risk reduction measures**

**Tunnel Safety Organization TSO- AA**



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# Tunnel Manager (TM)

- **Appointed by AA's**
- **Responsible for safety in each tunnel**
- **Member of AA may perform this function**

## **Tasks:**

- **appointing a safety officer;**
- **reporting of any incidents in tunnels;**
- **analyzing the circumstances of incidents;**
- **defining the procedure for immediate closure of a tunnel in an emergency case in accordance with AA;**
- **implementing the necessary risk reduction measures in accordance with AA**

Tunnel safety Organization TSO-TM



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# Safety Officer (SO)

- Appointed by TM's**
- Coordination of all preventive and safeguard measures**
- Member of tunnel staff or emergency services may perform this function**

Tunnel safety Organization TSO- SO

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## Tasks of a Safety Officer

Function or Task	Type of mission			
	Coordination	Advice	Evaluation	info
general role	X			
special role:				
Emergency services	X			
Operational schemes			X	
Planning, implementation and evaluation of emergency operations		X	X	
Safety programmes			X	
Specifications of structure, equipment and operation			X	
Training of operational staff and emergency services		X		
Organisation of exercises			X	
Commissioning of the structure		X		
Commissioning of equipment and operation		X		
Maintenance and repair		X		
Evaluation of incidents/accidents			X	



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# Safety documentation

## Role of a Safety Officer

Function or Task	Typ of mission		
	Advice	Evaluation	info
<b>special tasks:</b>			
Safety documentation	X		
Copy of safety documentation			X
Opening of a tunnel	X		
Structural and operational modifications			X
Consequences of modifications	X		
Periodic exercises		X	
Report on exercises and evaluation of results	X	X	



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## **Inspection Entity (IE)**

- **Appointed by Member States (MS)**
- **Member of AA may perform this function**

### **Tasks:**

- **has to carry out inspections, evaluations and tests**
- **must have a high level of competence and high quality procedures;**
- **must be functionally independent from the TM**

**Tunnel safety Organization TSO- IE**



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## **Operational Requirements**

### **Traffic Management System (TMS) e.g.:**

- **Operational means**
- **Emergency planning**
- **Management of incidents**
- **Traffic control centre**
- **Tunnel closure**
- **Transport of dangerous goods**
- **Works in tunnels**



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## Traffic management



Traffic Control Centre





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## Traffic management

**Mechanical  
barrier**



**Signals**

**Panel for  
announcements**

Tunnel closure facilities



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# Information of Road Users

## Information campaigns

- Behaviour in cases of incidents
- Overtaking in tunnels
- Speed
- Distance between vehicles

## Tunnel Signing

- Conventional, special
- Variable Message Signs (VMS)
- Pictograms



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# EU road user leaflet for professional drivers

## Safe driving in road tunnels for professionals

Tips for truck and coach drivers

### Typical safety equipment in road tunnels

**Tunnel lighting**  
The lighting systems enable the human eye to adapt to the reduced visibility in tunnels. Emergency exits and stations are fitted with continuous emergency lighting.

**Traffic radio**  
Signs may indicate the radio frequency for traffic information. The tunnel operator may use this frequency to broadcast emergency announcements.

**Traffic surveillance cameras**  
If there are traffic surveillance cameras and if an emergency call comes from an emergency station inside the tunnel, the image from the camera in that particular station may appear automatically on the monitor in the tunnel operator's control room.

**Ventilation systems**  
In the event of a fire the ventilation system either extracts smoke from the tunnel or pushes smoke in a single direction.

**Emergency exits**  
These are clearly marked by appropriate signs and lights and have fireproof and smokeproof doors.

**Emergency lanes or lay-bys**  
If there are either emergency lanes or emergency lay-bys at regular intervals use them, if your vehicle has broken down. Lay-bys usually have an emergency station.

Produced by European Commission  
Translated by Bernd Rüdiger Thamm

<b>1 Before you reach the tunnel</b> <ul style="list-style-type: none"> <li>Check your fuel, oil, coolant and the engine temperature. If overheating, stop and let it cool.</li> <li>Check your brakes and lights.</li> <li>Ensure any fire extinguishers are serviceable and you know how to use them.</li> <li><b>TRUCK DRIVERS:</b> Ensure that your vehicle and its load comply with the tunnel regulations. If not, take an alternative route.</li> <li><b>COACH DRIVERS:</b> Ensure that you know all safety procedures including the evacuation of passengers.</li> </ul>	<b>5 Breakdown or accident</b> <ul style="list-style-type: none"> <li><b>Switch on your warning lights.</b></li> <li>If possible, drive your vehicle out of the tunnel. If not possible, pull over to an emergency lane, or an emergency lay-by, or the side of the road.</li> <li><b>Switch off the engine, leave the key in the ignition and leave your vehicle.</b></li> <li>Call for help (ONLY) from an emergency station (mobile phones do not indicate where you are calling from). Say if you are transporting dangerous goods (what type) or passengers (and if any are injured).</li> <li>Follow instructions given by tunnel officials.</li> <li>If possible, give first aid to injured people.</li> </ul>
<b>2 When you enter the tunnel</b> <ul style="list-style-type: none"> <li><b>Switch on your headlights.</b></li> <li>Take off your sunglasses.</li> <li>Listen to messages on the radio.</li> <li>Obey traffic lights, speed limits and signs.</li> <li>Do not use your mobile phone. Do not smoke.</li> </ul>	<b>6 Fire</b> <ul style="list-style-type: none"> <li><b>Switch on your warning lights.</b></li> <li><b>YOUR VEHICLE IS ON FIRE:</b></li> <li>If possible, drive out of the tunnel. If not possible, pull over to the side of the road.</li> <li><b>Switch off the engine, leave the key in the ignition and leave the vehicle immediately.</b></li> <li><b>COACH DRIVERS:</b> Evacuate all your passengers to safe areas. (e.g. escape routes, emergency exits or shelters).</li> <li><b>ANOTHER VEHICLE IS ON FIRE:</b></li> <li><b>Keep a safe distance from the vehicle in front of you.</b></li> <li>Stop your vehicle as close to the side of the road as possible giving free access for emergency services.</li> <li><b>Switch off the engine, leave the key in the ignition and leave the vehicle immediately.</b></li> <li><b>COACH DRIVERS:</b> Evacuate all your passengers to safe areas.</li> </ul>
<b>3 In the tunnel</b> <ul style="list-style-type: none"> <li><b>Keep a safe distance from the vehicle in front, even if you are moving slowly or have stopped.</b></li> <li>Do not overtake if there is only one lane in each direction.</li> <li>Do not make any U-turns or reverse unless ordered to do so.</li> <li>Do not stop, except in an emergency.</li> </ul>	<b>4 Traffic congestion</b> <ul style="list-style-type: none"> <li><b>Switch on your warning lights.</b></li> <li><b>Keep a safe distance from the vehicle in front, even if you are moving slowly or have stopped.</b></li> <li>Switch off your engine, if the traffic has come to a halt.</li> <li>Listen to messages on the radio.</li> <li>Follow instructions given by tunnel officials or by variable message signs.</li> </ul>
<b>REMEMBER</b> As a professional, you should guide and help other drivers and passengers in an emergency! Smoke and fire can kill – save yourself and your passengers, not your vehicle!	



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## Variable Message Signs (VMS)



Installationsystems for VMS



VMS Lane signing

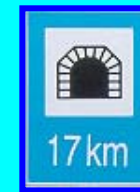


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## Signing for tunnels



Too many signs at tunnel portal



Tunnel sign



Escape sign



Lay-by sign

SOS station signs





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## Periodic exercises

- **as realistic as possible every 4 years**
- **yield clear results**
- **prevent damage to the tunnel**
- **may be partly table top or computer simulations every year in between realistic excercises**



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## The Firebrigades



Is this emergency bus of any use?



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## **Technical Committee on Road Tunnel Safety**

After the adoption of the Directive in April 2004 the Commission has set up a **Technical Committee on Road Tunnel Safety** according to Article 17, which has created a working group of national experts from Member States.

### **Meetings in Brussels :**

18 November 2004

24 June 2005

next : 06 April 2006

### **Tasks:**

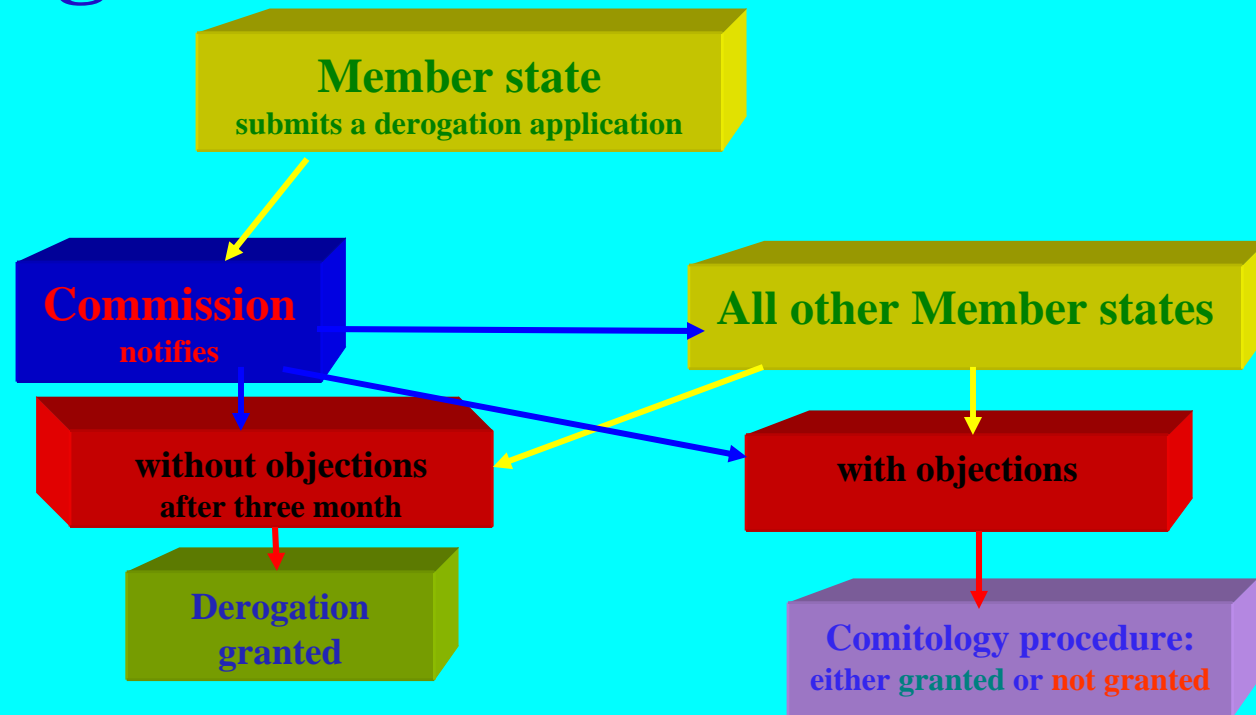
**Comitology procedure** (e.g. derogations for innovations)

**Future work to improve the directive**





# Derogations for innovations





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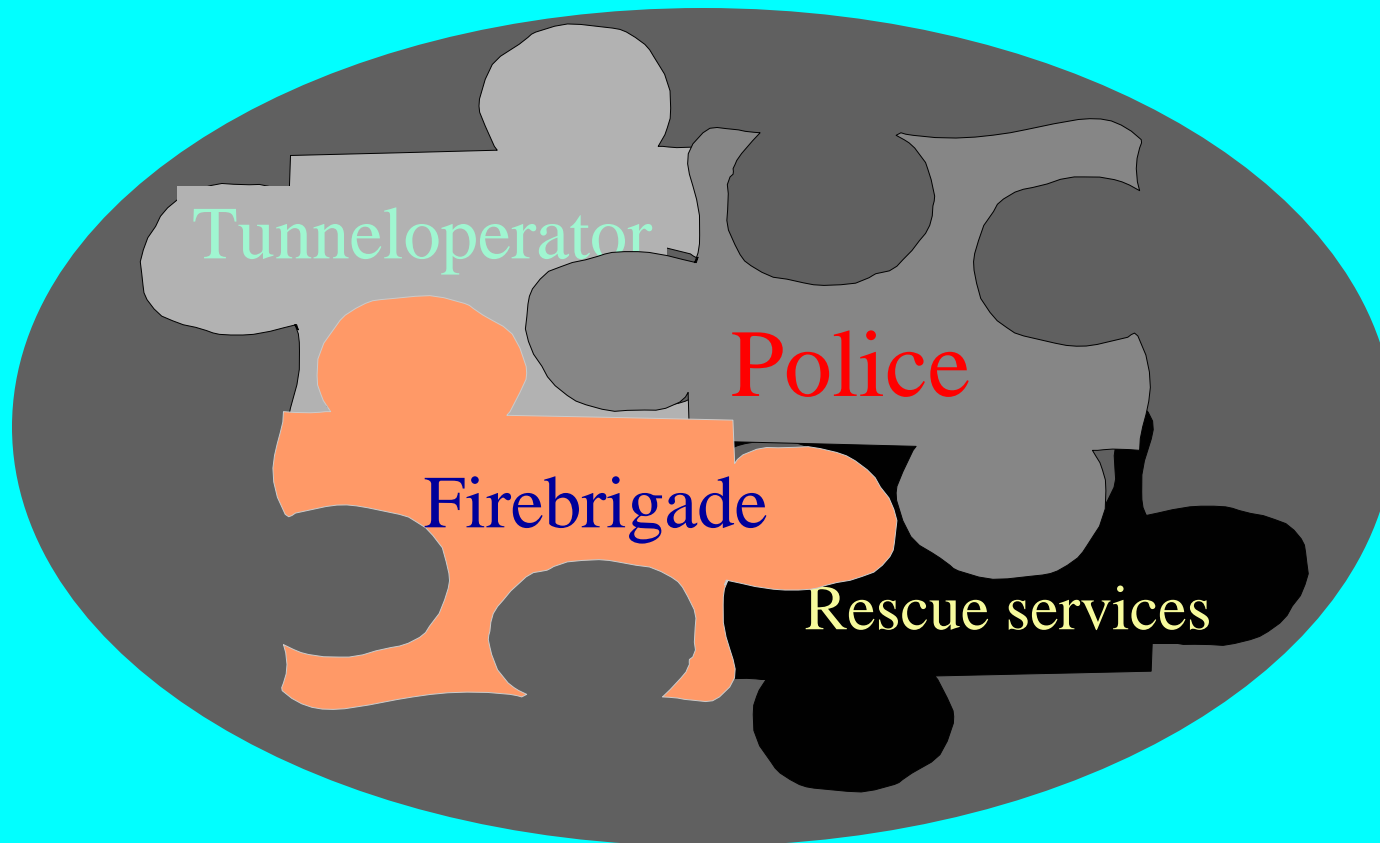
## **Future work to improve the Directive**

- **future improvements to the minimum safety provisions e.g.:**
  - CEN Standard for tunnel lighting
  - Best practice guidelines for ventilation of tunnels
- **collection of information of safety provisions, evaluation and recommendations:**
  - Results of EU research projects ( 2001-2006) output of Safe-T network
- **harmonised procedures for risk analysis**
  - Collection of existing methods OECD/PIARC, NL, CH, NO, EU projects
  - Evaluation
  - Recommendations
- **Harmonised signing for tunnels**
  - Development of pictograms
- **Regulations for the Transport of Goods through tunnels**



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# Integrated tunnel safety organization





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**Thank you  
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