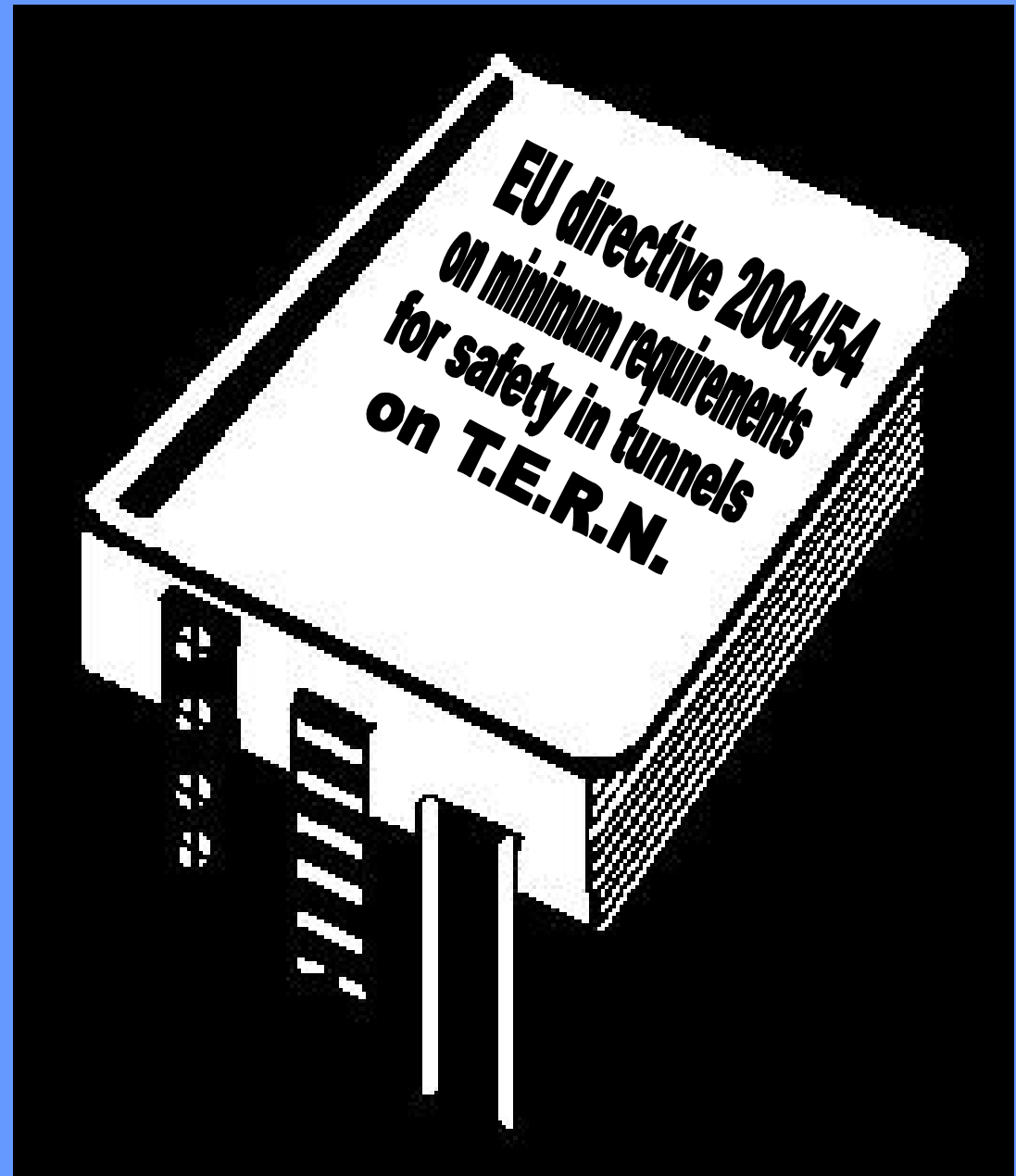


What is the  
message  
on tunnel  
safety ?



*The message is in brief:*

- Applies for all tunnels >500m on TERN
- Methods used to ensure safety are formalized
- Responsibility is from now on clearly placed
- Tunnels should have a minimum technical standard

...and the Commission worries, besides safety for European citizens, about the TERN capacity.

## Methods used to ensure safety

- Responsibility is clearly placed through organisation

Art.4 to 6

- Formalization of

- frequent inspection from qualified persons  
("Inspection entity")

Art.7&12

- all significant incidents to be recorded and evaluated  
in a feedback system

Art.5,1

- use of risk analysis ("why did we...")

Art.13 etc.

- training of contingency and drills

Annex II,5 etc.

- what kind of documentation should be at hand

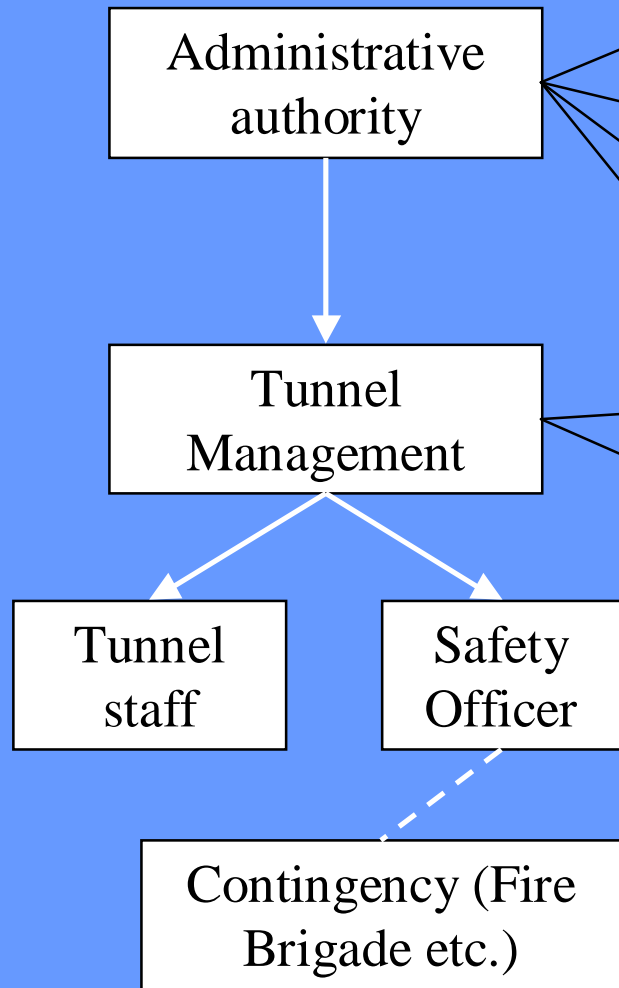
Annex II, 2,1

- Minimum level of technical systems, depending on amount of  
traffic

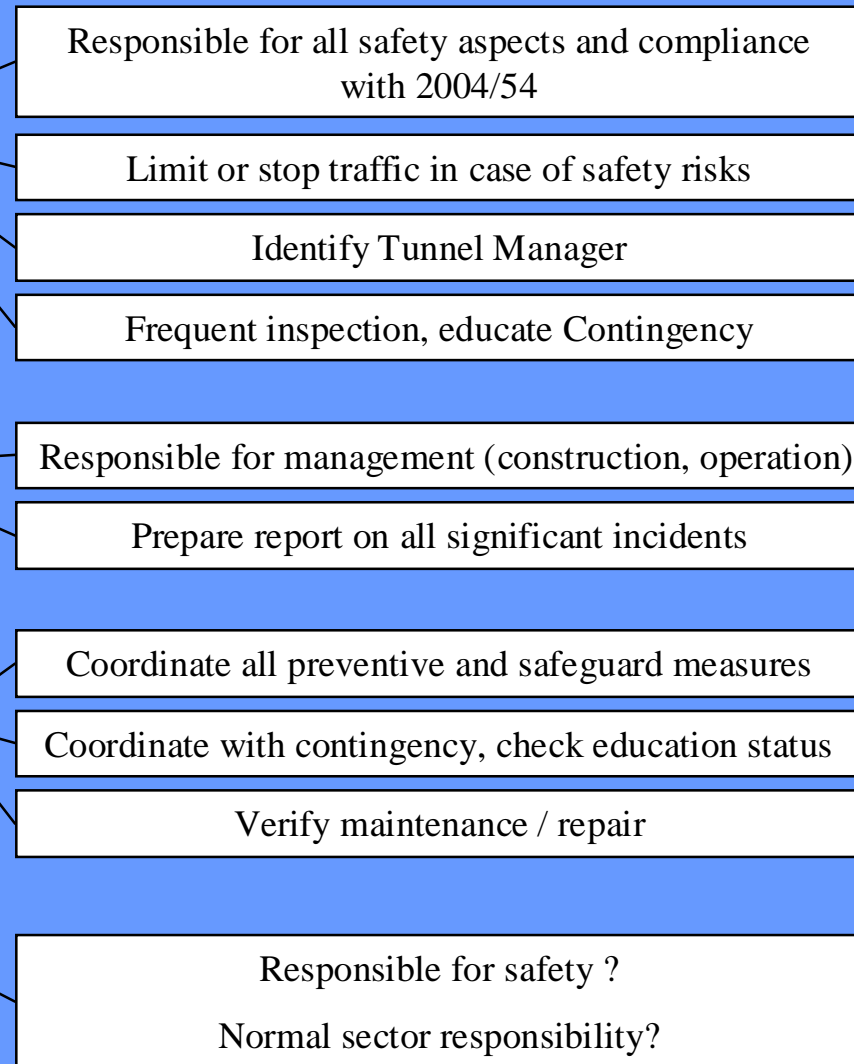
Annex I

# Defining responsibility

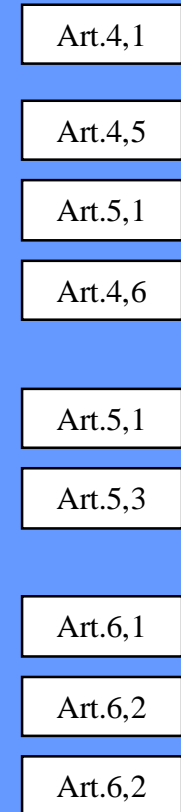
## "Organisation chart"



## Main responsibility



## Reference to 2004/54



## Minimum requirements for technical safety

*(examples only)*

- Tunnels under design shall, if traffic is above 10,000 vehicles per lane 15 years from now, have 2 unidirectional tubes Annex I, 2.1.2
- Longitudinal gradients  $>5\%$  is not permitted in new tunnels Annex I, 2.2.2
- Drainage shall be designed to prevent fire and toxic liquids from spreading inside and between tubes Annex I, 2.6.1
- Longitudinal ventilation in bi-directional or congested unidirectional tunnels if Risk Analysis shows it is acceptable Annex I, 2.9.3

## Minimum requirements for technical safety *(the hard ones to handle)*

- Dangerous goods: Perform risk analysis and place signs to enforce regulation

Annex I, 3.7

*... how to find out type and amount of dangerous goods?*

- Passenger cars should keep distance corresponding to 2 seconds driving distance. Enforcement measures as appropriate.

Annex I, 3.9

*... important aspect, but enforcement is difficult.*

*Automatic speed control with fines could be effective.*

## Status in the Nordic countries (I)

	NORWAY	SWEDEN	FINLAND	DENMARK
Existing Tunnels	500 tunnels >500m, 123 on TERN	Total 29 tunnels / 20km, 8 of these are > 500m On TERN:Götatunnel 1,6km	Nordsjöhamn 1550 m Karnainen 2240 m ( E18) Tervakorpi 600 m (E18) Pitkämäki 640 m (E18) Orosmäki 660 m (E18)	Øresundsbron: 4km Limfjord: 583m Tårnby: 700m
Planned Tunnels	10-15 new tunnels each year	Under construction: Norra Länken 3km, under design: Förbifart Stockholm 19km, Ny Älvtunnel Göteborg 500m	2 new tunnels >500m being designed	None.
Administrative Authority	Vegdirektoratet	Länsstyrelsen (01.01.2009: Transportstyrelsen)	Central authority of Vägförvaltningen	Øresundsbron:The Owner (note: Danish/Swedish) Limfjord: Vejdirektoratet Tårnby: Sund & Bælt
Tunnel Management	Regional Manager in Statens Vegvesen in the tunnel area	Vägverket (regional departments)	Nordsjöhamn: Nylands Vägdistrikt, E18: Private company	Named persons at the Adm.Auth.
Safety Officer	1 or 2 persons in each region	Vägverket (central unit "Samhälle och trafik")	Nordsjöhamn: An employee of Nylands Vägdistrikt. E18: An employee of the private company	Øresundsbron: The safety responsible. Limfjord: An employee at a private company. Tårnby: Named employee

## Status in the Nordic countries (II)

	NORWAY	SWEDEN	FINLAND	DENMARK
Inspection entity	Part of the Adm.Auth. 5 teams with each 3 members have been formed.	No entity formed	No entity formed	Entity established by the 3 Adm.Auth.
General status	<p>Many old tunnels - from the beginning no tunnels where in compliance.</p> <p>For many tunnels the main deviations are :</p> <ul style="list-style-type: none"> <li>-Emergency exit signs</li> <li>- Emergency telephones</li> <li>- Fire extinguishers</li> </ul> <p>Main challenge: There are only rarely emergency exits</p>	<p>Göta tunnel: Details are being discussed between tunnel management, safety officer and authority.</p>	The Administrative Authority has approved the safety documentations.	<p>Generally good. Deviations are being examined.</p>