

Informal document

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INLAND TRANSPORT COMMITTEE

Ad hoc Meeting of the Multidisciplinary  
Group of Experts on Safety in Tunnels  
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agenda item 5)

## **The Dutch Vision on Safety in Road and Rail Tunnels**

The Dutch project group on tunnel safety has formulated a policy on safety in tunnels which is laid down in a policy document. Part A, “Requirements for the Decision Process” of this document, has been submitted to the Parliament in November 2003. In June 2005 Part B, “Safety Requirements” of the policy document will be submitted.

The policy document deals with the following problem fields

1. The lack of transparency in the decision process of tunnels (clear responsibilities concerning decisions on safety). To solve this lack of transparency a number of measures has been conceived under the heading: *Assurance of safety in the decision process*
2. The problem that the tunnel management and the public rescue services might not be aware any more of the safety requirements (established in the design phase, or due to new developments in the use or construction of the tunnel) is tackled with a system of *Safety assurance management during the actual use of the tunnel*
3. The problem that motorists and train passengers do not know how to behave in a good way in tunnels, both in normal use as in case of incidents and accidents, can be mitigated by *Promoting safe conduct in tunnels*
4. The lack of generally accepted safety levels and standards for tunnels. This problem is solved with a set of safety levels and a set of functional (and performance) requirements under the heading: *Establishing safety requirements*

The elements of the direction of solution are highlighted in the following text.

<b>Problem fields and directions of solution</b>				
	<i>Assurance of safety in the decision process</i>	<i>Safety assurance management during the actual use of the tunnel</i>	<i>Promoting safe conduct in tunnels</i>	<i>Establishing safety requirements</i>
<b>Elements of the direction of solution</b>	1. Decision planning of the safety process	6. Safety assurance system	9. Communication, education and training	10. Probabilistic and deterministic standards
	2. Safety file(s)	7. Contingency planning		11. Functional and performance requirements
	3. National set of requirements for license to use the tunnel	8. Supervision and enforcement		
	4. New responsibilities			
	5. New functions			

*Preparatory remarks:* In the Netherlands many (road and rail) tunnels are in the process of realisation. They differ greatly in purpose, method of construction, length, position with regard to the surroundings. Therefore it is difficult to prescribe general measures. In the Netherlands the mayor of the municipality is responsible for safety in general and for the performance of the public rescue services (police, fire brigade, ambulance) in particular. The requirements of the building license and the requirements for use may differ from municipality to municipality, whereas the Dutch government prefers uniformity as much as possible. In order to reconcile these views the following process agreements are proposed:

### **1. Decision planning of the safety process (step-by-step-plan)**

The following phases are discerned:

Study phase	Design phase	Building phase	Opening	Use
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The initiator of a project in which a tunnel will be built has to *start a safety file* in which all relevant documents concerning the safety are stored. In the *study phase* agreements have to be made with the relevant actors about the use of the tunnel and the safety standards (probabilistic standards and deterministic scenarios and requirements) that will be maintained. These agreements will be examined by an *independent group of experts* on tunnel safety at the request of the empowered authority. The empowered authority finally decides on the points of departure for the design phase.

During the *design phase* the points of departure are translated into concrete proposals for measures concerning the construction, the installations and the organisation of safety during the use of the tunnel and it is demonstrated that the safety standards are met.

The local authority submits the application for a building license, and a separate set of requirements concerning safety, to the *independent group of experts* on tunnel safety. After consulting this group the local authority decides on the issue of the building license and the decision on the set of requirements for use.

This decision on the set of requirements for use will contain conditions regarding the fire-safe use of the tunnel, the monitoring of the use, intensities, and accidents and periodical examinations and training (exercises) in cooperation with the rescue services

During the *building phase* the future owner of the tunnel sets up the organisation for the maintenance of the tunnel and its installations and works out the safety organisation (contingency plan). Also the monitoring of the use of the tunnel (registration of use and incidents) and the state of the installations is registered. Prior to the opening of the tunnel the *independent group of experts* on tunnel safety advises on these measures.

During the actual use of the tunnel, the tunnel, its installations and safety organisation is periodically (once in four years) tested by the competent authorities.

## **2. Safety file**

The safety file contains the following elements:

- a. the registration of the safety process
- b. the documents with the considerations leading to the safety decisions
- c. a list of the decisions (including the building license, the decision on requirements for use and the decision to open the tunnel for use)

## **3. National set of requirements for license to use the tunnel**

This will be formulated in the course of this year.

## **4. New responsibilities for four actors**

The *initiator* has the following new responsibilities

- the forming and maintaining of the safety file (until the start of building)
- formulating and laying down the agreements concerning the parties involved
- the specification of the safety concept

The future *owner* has the following new responsibilities:

- the maintaining of the safety file after its transfer by the initiator before the opening of the tunnel,
- the setting up of the maintenance organisation and the monitoring plans

The empowered (local) *authority* is given the following new responsibilities:

- the specification of the safety concept
- the specification of the scenarios to be investigated
- the judgement of conformity with the national decision on license to use tunnels
- license to use the tunnel
- the periodical examination of the decision to open the tunnel

The *Inspection Entities* are given the following new responsibilities:

- supervision of the safety file

- judgement and supervision of the safe use of road tunnels

## **5. New functions**

An *independent group of experts* on tunnel safety is formed by the government. The municipality is obliged to consult this group before deciding on the terms of reference for the design phase, the issue of the building license, the decision on requirements for use and the decision to open the tunnel.

A *safety officer*, in conformity with the EU Directive, will be given his position in the tunnel organisation.

## **6. Safety assurance system**

This will contain:

- a the traffic management plan
- b the train operating plan
- c the maintenance plan (inspection of safety provisions and conditions for execution of repairs)
- d the maintenance plan for tunnel staff
- e the monitoring plan
- f the contingency plan

## **7. Contingency planning**

The main item is the emergency plan. This plan contains all the tasks of the tunnel manager, the traffic center, the users and the rescue services in case one of the relevant scenarios happens. Part of the emergency plan is the frequency of the training and exercises with the rescue services.

The municipality might consider drafting a contingency plan for the case of tunnel calamities also concerning all effects on the environment of the tunnel. This plan contains all the tasks the municipal managers have to do in case of calamities.

## **8. Supervision and enforcement**

The Inspection Entities of the various Ministries will focus their attention more on tunnel safety.

## **9. Communication, education and training**

The communication will be inspired by the EU-leaflet. It will be focused on good behaviour. Information to tunnel users in case of an emergency will be given mainly by tunnel operators and train staff. Professional drivers and train staff will be educated and trained for emergencies in tunnels.

## **10. Probabilistic and deterministic standards**

The safety analyses start with a description of the desired use of the tunnel, the functional requirements for tunnel safety and a set of basic measures. Then relevant scenarios are selected, taking into account the chance of occurrence and the possible consequences. These scenarios are elaborated to decide on the capacities and reliabilities of the measures (for instance decreasing the distance between emergency doors). A probabilistic risk analysis is performed to compare the consequences of the measures suggested by the scenario analysis and to compare the risk level with the standards.

## **11. Functional and performance requirements**

Three levels of requirements are discerned:

1. functional requirements
2. performance requirements
3. measures

The solutions 10 and 11 will be elaborated in part B of the policy document.