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**ECONOMIC COMMISSION FOR EUROPE**

**INLAND TRANSPORT COMMITTEE**

Ad Hoc Multidisciplinary Group of Experts  
on Safety in Tunnels

**REPORT OF THE AD HOC MULTIDISCIPLINARY GROUP OF EXPERTS ON  
SAFETY IN TUNNELS ON ITS SIXTH SESSION**

(21-22 January 2003)

**ATTENDANCE**

1. The Ad hoc Multidisciplinary Group of Experts on Safety in Tunnels held its sixth session in Geneva on 21 January 2003 under the chairmanship of Mr. Michel Egger (Switzerland). Representatives of the following ECE member States participated: Austria; Belgium; Finland; France; Germany; Italy; Netherlands; Norway; Switzerland; and United Kingdom. A representative of the European Commission participated. The UNECE Trans-European North-South Motorway Project (TEM) was represented. The following international organizations participated: International Road Association (PIARC); International Tunnelling Association (ITA); International Road Federation (IRF); International Road Transport Union (IRU); and International Touring Alliance/International Automobile Federation (AIT and FIA). A representative of the Swiss Touring Club (TCS) participated as an observer. On 22 January 2003 a technical visit was organized to the Gotthard Tunnel in Switzerland.

**ADOPTION OF THE AGENDA**

Documentation: TRANS/AC.7/12.

2. The agenda was adopted without modification.

### **OPENING REMARKS BY THE DIRECTOR OF THE TRANSPORT DIVISION**

3. The Director of the Transport Division, Mr. José Capel Ferrer, briefly informed the Group of Experts about the adoption by the Inland Transport Committee (ITC) in February 2002 of Resolution No. 249 on safety in tunnels.

4. He welcomed, as a major follow up to the Resolution, the recent issuance by the European Commission of a Directive proposal on minimum safety requirements for tunnels in the Trans-European Road Network. However, he regretted that the proposed Directive did not make adequate reference to the work of the Multidisciplinary Group of Experts on which it was largely based. Aware of some comments made on the proposed Directive, he invited the Group of Experts to consider it in detail and hoped that there would be still be an opportunity to make the Group of Experts' position known before the finalization of the text. The Chairman, Mr. Egger, on behalf of the Group of Experts, shared this point of view.

### **RESULTS OF THE 64<sup>TH</sup> SESSION OF THE INLAND TRANSPORT COMMITTEE**

5. The secretariat informed the Group of Experts that at its sixty-fourth session (Geneva, 18-21 February 2002), the Inland Transport Committee had welcomed the conclusion of the work on road tunnels, finalized in the report of 10 December 2001 and its 43 recommendations and had warmly thanked the Chairman of the Group of Experts, Mr. M. Egger (Switzerland), for presenting the report to the Committee. It had also thanked and congratulated the Group of Experts on the quality of its work.

6. The Committee had also noted that, pursuant to its report, the Group of Experts had held a fifth meeting on 17 and 18 January 2002, essentially to draw lessons from the accident in the Gotthard tunnel and that this had led to the adoption of two further recommendations.

7. In order to officially endorse the work on road tunnels, to underline the strategic importance of the report and in particular its recommendations, and to establish guidelines for the future, the Committee had adopted the above-mentioned resolution on the basis of the text proposed by the secretariat and had asked its subsidiary bodies to consider the possibility of including some of the recommendations in the legal instruments under their purview.

### **FOLLOW-UP WORK IN ITC SUBSIDIARY BODIES**

8. The secretariat informed the Group of Experts about the follow-up given to its recommendations by different subsidiary bodies of the Inland Transport Committee including the Working Party on Road Traffic Safety (WP.1), the Working Party on Road Transport (SC.1), the World Forum for Harmonization of Vehicle Regulations (WP.29), and the Working Party on the Transport of Dangerous Goods (WP.15). The Group of Experts was also informed about the status of work on safety in railway tunnels. The secretariat stated that it would prepare for the next session of the Group of Experts a paper indicating the follow-up status for each recommendation.

### Working Party on Road Traffic Safety (WP.1)

9. In order to expedite its work on the study of the recommendations within its jurisdiction, WP.1 had decided at its thirty-eighth session (19-22 March 2002), to establish a small group comprising France, Norway, Switzerland (as chairman), the European Commission, PRI, IRU and the secretariat. The group's mandate was to consider the recommendations, also taking into account measures contained in the declaration adopted in Zurich by the Ministers of Transport of the Alpine countries in November 2001, to identify those which came within the remit of WP.1 and propose solutions for their incorporation, preferably in the Vienna Conventions or the European Agreements or the Consolidated Resolutions R.E.1 and R.E.2.

10. The Working Party adopted the guidelines proposed by the small group in document TRANS/WP.1/2002/28 at its 39<sup>th</sup> session (23-26 September 2002) and decided, given the urgency of the work, that proposals for amendments to the Vienna Conventions regarding safety in tunnels should be included in the package of amendments to be sent to the Secretary-General in 2003. A special session of WP.1 was held in November 2002.

11. Following the work done, the Swiss delegation had prepared proposals for amendments to the Vienna Conventions. The Chairman of WP.1 said that once the work of amending the Conventions and the Agreements supplementing them, which had first priority, was completed, considerable work remained to be done on the Consolidated Resolutions so as to incorporate into them the relevant recommendations which did not come under the legal instruments.

12. The proposals submitted by Switzerland, contained in document TRANS/WP.1/2002/39, included amendments to Article 25 bis (special regulations for tunnels indicated by special road signs) and new signs E, 17 for an emergency stopping place (lay-by), F, 14 for an extinguisher, G, 23<sup>a</sup> and G, 23<sup>b</sup> to indicate the location of emergency exits, and G, 24<sup>a</sup> and G, 24<sup>b</sup> to indicate the direction of and distance to the nearest emergency exit.

13. The Working Party asked its Group of Legal Experts to consider certain issues in greater detail and decided to provide a new document of amendment proposals for the Working Party's 41<sup>st</sup> session (31 March to 3 April 2003).

### Working Party on Road Transport (SC.1)

14. Under the aegis of the Working Party on Road Transport (SC.1), the Ad hoc Meeting on the Implementation of the European Agreement on Main International Traffic Arteries (AGR) had gone through the recommendations of the Group of Experts and had selected those which could be included in the AGR. On the basis of the selection, the delegate of Italy had been requested to draft proposed amendments to the AGR. The proposals contained in document TRANS/SC.1/AC.5/2003/1 will be considered by the Ad hoc Meeting on the AGR at its nineteenth session in May 2003.

15. In addition, SC.1 had requested the secretariat to submit proposals regarding access to the profession of road transport operator, the subject of one of the two new recommendations adopted by the Group of Experts following the accident in the Gotthard Tunnel. The Working Party considered that the opinion of the Inland Transport Committee should be requested on the possibility of incorporating the relevant provisions into the ongoing draft revision of the Consolidated Resolution on the Facilitation of International Road Transport (R.E.4). The secretariat submitted a proposal in this regard at the 65<sup>th</sup> session of the ITC.

Working Party on the Transport of Dangerous Goods (WP.15)

16. At its 73<sup>rd</sup> session (4-8 November 2002), WP.15 discussed the transport of dangerous goods in tunnels (TRANS/WP.15/172, para. 55-50). Some delegations supported the introduction of a table into Chapter 1.9 of the European Agreement on the Transport of Dangerous Goods (ADR) containing, in grouped form, the various categories of dangerous goods which tunnel managers could permit in accordance with parameters linked to tunnel construction, traffic constraints, etc., which would make it possible to achieve a harmonized approach to restrictions on traffic in tunnels.

17. Others considered that restrictions should be decided by tunnel managers on the basis of analyses of risks specific to each tunnel, and that the work of OECD/PIARC on the subject, although based on advanced scientific research, was not sufficient to take satisfactory account of the specific features of each road tunnel.

18. After lengthy discussion of the question, the Working Party had decided to include instructions on behaviour in tunnels in the driver-training programme and to insert a table in Chapter 1.9. An informal group of experts would be organized to define in greater depth the substances and types of load (packages, bulk, tanks) to be included in each group, taking into account the OECD/PIARC criteria; to introduce provisions explaining more clearly the meaning of the table; possibly to introduce these provisions into other sections so as to facilitate their implementation by drivers; possibly to provide the Working Party on Road Traffic Safety (WP.1) with a system of road signs and signals at the entrance to tunnels so as to enable the groups permitted in the tunnel to be identified; and to provide a system to allow checks, e.g. by vehicle marking, documentation, or otherwise.

19. The WP.15 noted that cooperation with the Working Party WP.1 should make it possible to introduce a consistent system of road signs and signals by means of amendments to the 1968 Convention on Road Signs and Signals and the European Agreement supplementing it.

World Forum for Harmonization of Vehicle Regulations (WP.29)

20. At its 126<sup>th</sup> session (12-15 March 2002), WP.29 had considered recommendations related to road vehicles (TRANS/WP.29/841, paras. 27 and 28) and requested the Working Party on General Safety Provisions (GRSG) to include in its programme of work measures 4.1 Fire extinguishing device, 4.3 Fire resistance of fuel tanks, and 4.5 Use of highly inflammable materials in vehicles. Concerning the remaining measures for vehicles, WP.29 agreed that 4.2 Quantity of fuel carried be referred to the Working Party on the Transport of Dangerous Goods that already had established a limit of 1,500 litres for the main fuel tanks of vehicles.

21. Regarding measure 4.4 Weight and dimensions of heavy goods vehicles, WP.29 considered that this was a subject outside its responsibility, regulated by national legislation and EC legislation for EC Member States. Measure 4.6 Technical inspections should be addressed by the 1997 Agreement Concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of Such Inspections. Its proper function is currently dependent on the position of its signatories that are due to ratify it.

22. Action had already been taken related to measure 4.05 in the proposals related to Regulation No. 34 and the proposed new draft Regulation on burning behaviour of materials.

#### Ad hoc Multidisciplinary Group of Experts on Safety in Tunnels (rail)

23. The first and second meetings of the Ad hoc Multidisciplinary Group of Experts on Safety in Tunnels (rail) were held on 27-28 June 2002 and 25-26 November 2002. The group had agreed that its recommendations would refer to new tunnels longer than 1,000 metres. For old/existing tunnels and tunnels longer than 15 kilometres, specific and additional safety measures might be necessary and they will be referred to when and if appropriate. The recommendations of the Group will consider only railway tunnels on open track and will not consider underwater tunnels, Alpine tunnels, underground platforms, underground railways/subways and tunnels in urban areas.

24. The Group noted that, although national legislation regulating safety in rail tunnels exists in many countries, there is a need for harmonization of many elements of railway safety in tunnels when considering international railway transport.

25. The third session of the Multidisciplinary Group of Experts on Safety in Tunnels (rail) will take place in Geneva on 27-28 March 2003.

#### **EUROPEAN COMMISSION DIRECTIVE PROPOSAL**

26. The representative of the European Commission, Mr. Bernd Thamm, introduced the work of the Commission on safety in tunnels. He said that too many human lives had been lost in tunnel fires in recent years. The direct costs of tunnel fires amounted to 210 million Euros per year and the indirect costs to the economy of the closure of a tunnel were huge. In the case of the Mont Blanc Tunnel, for example, they amounted to 300-400 million Euros per year.

27. Mr. Thamm said that on 30 December 2002, the Commission had adopted a Directive proposal aimed at achieving a uniform, constant and high level of protection for all European citizens driving through tunnels on the Trans-European Road Network (TERN). The proposal fixes minimum safety requirements for all tunnels longer than 500 meters and belonging to TERN. Tunnels would be required to comply with the new standards within ten years of the entry into force of the Directive. Fifty per cent of tunnels would have to comply in the first six years.

28. The total cost of implementing the Directive would be in the range of 2.3 – 6.3 billion Euros depending on whether all existing tunnels are adapted to meet the new provisions outlined in the Directive or whether member States choose to apply alternative less costly measures.

29. Mr. Thamm explained that the Directive proposal had been sent to both the European Council and the European Parliament. He indicated that in parallel the Commission would create a working group composed of experts from EU member States. Norway, Switzerland and UNECE would be invited to participate.

30. In response to the introduction by Mr. Thamm, the Group of Experts was informed that the working group "Tunnel Safety", created by the Executive Committee "Transport Safety and Mobility in the Alps Area", composed of road tunnel safety experts from Austria, France, Germany, Italy and Switzerland, had prepared a common statement on the Directive proposal. The statement is reproduced in the annex to the present report.

31. In order to prepare an official written comment on the draft Directive proposal, the Group of Experts decided to hold its next meeting on 1-2 September 2003.

#### **WORK UNDERWAY IN OTHER FORA**

32. The Vice-Chairman of the Group of Experts, Mr. Didier Lacroix, presented information on the work of the PIARC Technical Committee on Road Tunnel Operation (C5) and its six working groups which cover the fields of road tunnel geometry, equipment, operation, environment and safety. PIARC had held an International Seminar on Tunnels and Road Technology in Beijing (China) on 4-8 November 2002. The twenty-second World Road Congress to be held in Durban (South Africa) in October 2003 would hold a special session aimed at harmonizing and coordinating the various different tunnel safety initiatives at which UNECE will participate.

33. Mr. Lacroix also informed the Group of Experts about UPTUN (Cost-effective, Sustainable and Innovative Upgrading Methods for Fire Safety in Existing Tunnels), a large research project which will focus on innovative technologies and develop a methodology to evaluate tunnel safety levels. It is being carried out by a consortium of 41 European partners.

34. In addition to research projects, Mr. Lacroix spoke about the European thematic networks which provide fora for exchanging experience, exploiting research results and preparing future projects. The thematic network FIT (Fire in Tunnels) was launched in March 2001 for a duration of four years. It has 33 partners from 12 European countries. It maintains six technical databases on research projects, fire test facilities, numerical models, tunnel safety equipment, assessment of real tunnel fires and upgrade activities in tunnels. Other technical work includes the preparation of recommendations on fire scenarios, fire safe design and fire response management.

#### **REPORT ON THE MEETING**

35. The Group of Experts agreed that the report of the meeting would be prepared by the secretariat after the meeting.

#### **TECHNICAL VISIT TO THE GOTTHARD TUNNEL**

36. On 22 January 2003, the Group of Experts conducted a technical visit to the Gotthard Tunnel (Switzerland). The Chairman of the Group of Experts, Mr. Michel Egger, made a presentation on the new "drip-feed" system which has been introduced to maintain an optimal traffic flow in the tunnel. The Group of Experts also visited the control centre in Göschenen and inspected the safety tunnel and a shelter.

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Annex**Statement on the Directive proposal on Tunnel safety**

**submitted on behalf of the working group “Tunnel Safety”, created by the Executive Committee “Transport Safety and Mobility in the Alps Area”**

*(composed of road tunnel safety experts from Austria, France, Germany, Italy and Switzerland)*

A European Directive on Tunnel Safety is a valuable initiative to improve safety in road tunnels. It would ensure a harmonized thinking of safety and lead to harmonized safety levels throughout the European Union and in consequence supply a unified interface for tunnel users in Europe.

However, a European Directive should not specify detailed safety means. This would not be compatible with its legislative status because of the large variety of specific cases and the very fast technological development in the area. Worse, legislation based on detailed means might result in consequences opposite to its aims, because it would not be compatible with a real thinking of safety. An appropriate safety approach should be based on precise safety objectives and analyse the various safety functions before safety means best adapted to the specific case can be chosen.

Concerning existing tunnels, the implementation of standard detailed solutions is sometimes not possible or at least very expensive. Most generally, case-by-case decisions will lead to solutions with a better cost/benefit ratio.

For all these reasons, the technical and technological specifications which constitute annex 1 of the draft should not appear at the level of a directive. Moreover the current technical content of annex 1 is not in agreement with the international state-of-the-art such as recommended by UN/ECE, PIARC etc.

Besides these technical weaknesses, the implementation of safety measures cannot be based on a tunnel classification which takes into account a limited number of parameters. Many other factors must be considered to assess the safety of a tunnel. The best use of every safety measure is not linked to the same parameters (i.e. some measures are more related to tunnel length, others to cross-section, others to uni- or bi-directionality, or to whether the tunnel is manned or not, etc.).

Another disadvantage of imposing standard technical solutions is that it acts as a brake upon innovation. Making case by case decisions on innovative techniques at the level of the European Commission, as required by the current draft, would discourage innovation even more.

The draft does not seem to define clear responsibilities. The most important point is the respective responsibilities of the administrative authority and the tunnel owner. It is crucial for safety that the tunnel owner and operator should have the full responsibility for the safety in their tunnel; the role of the administrative authority should be to check that they correctly assume their responsibility and take appropriate actions if they do not. Additionally the role of the Safety Officer should be clarified (for instance he currently appears to be appointed by the tunnel manager, but has authority over public emergency services). It is questionable whether very detailed procedures, as appear in annex 2 of the draft, should be part of the Directive.

As a conclusion, the European Directive should set strategic safety lines and objectives, and require member States to implement appropriate procedures (broadly defined in the Directive) to meet these targets. Any technical requirements should be based on the UN/ECE report (report of the Ad Hoc Multidisciplinary Group of Experts of December 2001, with additions of January 2002) and should not go into more detail. The precise definition and implementation of the safety measures should be left to the States, with the help of recommendations prepared on behalf of the European Commission and other European and international organizations.

There is also a clear need for harmonisation of safety facilities at the disposal of the users (signing, emergency telephones, extinguishers, emergency exits, etc.) as well as requirements regarding user behaviour inside tunnels. This could also be achieved through standardization and/or European agreements at the level of the UNECE.

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