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EUROPEAN AGREEMENT ON MAIN INTERNATIONAL RAILWAY LINES (AGC)

Safety provisions in long rail tunnels

Note by the secretariat

Please note that the distribution of documentation for the Working Party on Rail Transport (SC.2) is no longer "restricted". Accordingly, the secretariat has adopted a new numbering system whereby all working documents other than Reports and Agendas will be numbered as follows: TRANS/SC.2/year/serial number. Reports, Agendas, resolutions and major publications will retain their previous numbering system (i.e. TRANS/SC.2/189).

## **Background**

Bearing in mind the serious accidents which occurred recently in tunnels along main international routes, the question of safety in long tunnels is currently at the centre of governmental concern in many ECE countries. As there are to date no provisions in the AGC Agreement on this issue, the Working Party may consider the possibility of developing some basic operational and infrastructure parameters and/or guidelines for long rail tunnels in order to improve their safety conditions. Depending on their scope, these parameters may be included subsequently in the AGC, in a specific Agreement or issued as recommendations.

As one of the purposes of the AGC Agreement is to promote the development and construction of a European railway network conforming to certain technical characteristics, the inclusion of a number of specifications concerning long railway tunnels could further reinforce the facilitation and development of international railway traffic in Europe.

The secretariat has made a partial review of the existing situation, as well as an attempt to tentatively identify some of the aspects that could be addressed concerning the technical characteristics of railway tunnels. The results of this exercise are summarized in this note.

## **Specifications for long rail tunnels: possible approaches**

Currently, the main international specifications concerning rail tunnels are possibly the following UIC leaflets:

- 779-11. Determination of railway tunnel cross-sectional areas on the basis of aerodynamic considerations.
- 861-4. Standard UIC 61 R (61.13 kg/m) and UIC 68 R (68.46 kg/m) rail sections for laying in tunnels.

There is also a technical report of interest for safety in long rail tunnels: *Measures to limit and reduce the risk of accidents in underground railway installations with particular reference to the risk of fire and the transport of dangerous goods* (IF 4/91).

National approaches to this issue seem to be extremely varied, although, thus far, the situation in ECE member countries has not been systematically checked. Three different situations seem to exist:

- Some countries may have developed more or less extensive national standards on railway tunnel design and operation.
- Some countries have developed national guidelines, describing the safety goals that the Public Authority wishes to achieve.
- In some countries, specific recommendations are lacking. Designers are only tied by general standards on underground works and facilities, fire hazard, etc.

Although an in-depth analysis of national policies could give further information, this exploratory review already suggests that, for the development of the E-railway network on a consistent basis, the definition of some criteria regarding long tunnels would be necessary, if similar safety levels are to be expected throughout the whole network in the future.

This gap is not easy to be completely filled at the international level, as the development of detailed standards would imply a considerable effort to address all the issues, including stability of the tunnel structure, evacuation, derailment, emergency access points, cross passages between running tunnels or to a service tunnel, track surface and side walkways, fire-fighting facilities, ventilation, lighting and communications, etc. As the nominal speed defined in AGC for new E-railway lines is 300 km/h, it could be considered whether some specifications should also be developed for long rail tunnels linked to aero-dynamic considerations, taking into account the material already developed by UIC. As a practical alternative, at least for some of these items, qualitative guidelines, rather than detailed technical standards could be more easily developed and agreed upon, leaving each country (and even each constructor/operator) freedom in choosing the way to achieve these safety goals.

Furthermore, two specific issues are of major concern for long rail tunnel safety: the **risk of fire** and the **transport of dangerous goods**. As mentioned above, the primary review made has identified only one UIC report on this subject at the international level. There are also the OTIF's *Regulations concerning transport of dangerous goods by rail*, included as Annex 1 in the CIM rules (Appendix B of the COTIF Convention). These regulations define and classify the different types of dangerous goods, establish which of them can be transported and in what conditions, but they do not make particular considerations concerning the characteristics of the railway infrastructure. There might be a need for developing appropriate additional guidelines.

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