

**ECONOMIC COMMISSION FOR EUROPE  
INLAND TRANSPORT COMMITTEE  
Working Party on the Transport of Dangerous Goods  
Seventy-fifth session,  
Geneva, 19 -23 January 2004**

**SAFETY IN ROAD TUNNELS**

**Note by the secretariat**

**General**

1. In accordance with paragraph 76 of the report of the Working Party on its 74<sup>th</sup> session (TRANS/WP.15/174), the secretariat has prepared this document reflecting the decisions of the Working Party, i.e. the texts proposed by the Ad hoc ADR Expert Meeting on Dangerous Goods Groupings for Road Tunnel Regulations, contained in informal document INF.15 submitted at the 74<sup>th</sup> session and the approach suggested by the secretariat in INF.24, which were provisionally adopted.
2. Due to the complexity of the task of preparing a consolidated proposal, this document is submitted late as an INF. paper, and the secretariat has not yet had time to consult the members of the Ad Hoc ADR Expert Meeting. A revised version will be issued if comments are submitted in time.
3. In preparing this proposal, the secretariat noted that the introduction of a new grouping system of dangerous goods in ADR is essentially linked to the implementation of a harmonized traffic restriction system by Contracting Parties for the passage of tunnels in relation to Chapter 1.9 of ADR. Although this new additional grouping system would not affect the existing conditions of transport of ADR, the introduction of the new provisions would imply a significant amount of changes to table A of Chapter 3.2, as well as significant additional training for drivers of vehicles carrying dangerous goods for proper understanding of the system. Therefore, the introduction of such a new system would make sense only if there were a clear commitment from authorities of Contracting Parties which are competent for traffic restrictions and tunnel management to implement a corresponding traffic signs and signals systems and the OECD/PIARC Quantitative Risk Assessment Model (QRAM) and Decision Support Model.

**Grouping System**

4. The OECD/PIARC proposed grouping system is based on the assumption that in tunnels there are 3 major hazards which may cause numerous victims and possibly serious damage to the tunnel structure:
  - Explosions;
  - Releases of toxic gas or volatile toxic liquid;
  - Fires.

A system with five groupings of dangerous goods which may be allowed in tunnels has been derived:

- Grouping A: All dangerous goods loadings authorized on open roads;
- Grouping B: All loadings in grouping A except those which may lead to a very large explosion (“hot BLEVE” or equivalent);
- Grouping C: All loadings in grouping B except those which may lead to a large explosion (“cold BLEVE”) or equivalent) or a large toxic release (toxic gas or volatile toxic liquid);
- Grouping D: All loadings in grouping C except those which may lead to a large fire;
- Grouping E: No dangerous goods (except those which require no special marking on the vehicle).

The problem with this system is that it is not compatible with the logic of international road traffic signs and signals for vehicles carrying dangerous goods which are designed to indicate prohibited dangerous goods rather than those which are allowed.

The OECD/PIARC groupings would have been more “user-friendly” if they had been presented as groupings of prohibited dangerous goods, i.e.

- Grouping X Dangerous goods which may lead to a very large explosion risk;
- Grouping Y: Dangerous goods which may lead to a large explosion or a large toxic release
- Grouping Z: Dangerous goods which may lead to a large fire.

It should also be noted that grouping A (All dangerous goods allowed in the tunnel) would not require any special marking of the tunnel, since there would be no prohibition. For Grouping E (No dangerous goods allowed in the tunnel), sign C<sub>3, h</sub> of the Vienna Convention on Road Signs and Signals could be used without any additional panel. Prohibitions for the three categories of dangerous goods defined above could be indicated by sign C<sub>3, h</sub> with an additional panel bearing the letters B,C or D matching those dangerous goods not allowed in the tunnel according to Groupings B, C and D of the OECD/PIARC report. In order to make the system user-friendly for road carriers, it would then be necessary to develop in ADR a system of classification of these three types of dangerous goods which may be prohibited in certain tunnels, and to assign all dangerous goods concerned to the proper grouping.

For this purpose, the secretariat proposes the addition of a new Chapter 2.4 to Part 2, and modifications to column (15) of table A of Chapter 3.2.

### **Restrictions**

For the additional text to be included in Chapter 1.9 as proposed in the report of the ad hoc ADR Expert Meeting (INF.15 submitted at the last session), the secretariat proposes to refer to the Convention on Road Sign and Signals and to the European Agreement supplementing it, as well as to the interpretation given by the Resolution on Road Sign and Signals (R.E.2). These paragraphs would concern all kind of restrictions, and not only road tunnels.

For the purpose of user-friendliness, the secretariat proposes to include in Part 8 a new Chapter 8.6, addressed to the road carrier, with explanations of these signs and signals and their interpretation, in particular how to comply with road tunnel restrictions.

The implementation of such provisions would require cooperation with the Working Party on Road Traffic Safety to make sure that the interpretation given in R.E.2 is amended appropriately. Some proposals had already been made in 1992 (TRANS/WP.15/124, annex 1) and in 1999 (TRANS/WP.15/1999/26 and TRANS/WP.15/157, para. 94). Some changes to the interpretations in R.E.2, are therefore proposed (see Chapter 8.6).

## **PROPOSAL**

### **CHAPTER 1.9**

Add the following paragraphs 1.9.5 to 1.9.7:

“1.9.5 When applying traffic restrictions in accordance with 1.9.3 (a) or (b), Contracting Parties shall indicate such restrictions by means of signs and signals in accordance with the Convention on Road Signs and Signals (Vienna, 1968) and the European Agreement supplementing the Convention on Road Signs and Signals (Geneva, 1971) as interpreted by the Resolution on Road Signs and Signals (R.E.2) of the UNECE Inland Transport Committee’s Principal Working Party on Road Transport, as amended \*. (See also Chapter 8.6)

Such restrictions shall also be published officially and made publicly available.

1.9.6 Traffic signs and signals intended to prohibit access to vehicles carrying dangerous goods shall be accompanied with, or preceded by, signs and signals indicating or prescribing alternative itineraries.

1.9.7 Traffic restrictions shall not apply to vehicles carrying dangerous goods in accordance with 1.1.3.6.”

Add the following new chapter:

### **CHAPTER 2.4**

#### **ROAD TUNNEL CLASSIFICATION OF DANGEROUS GOODS**

##### **General provisions**

2.4.1. For the purpose of passage of vehicles carrying dangerous goods through road tunnels, dangerous goods have been classified into groups which may not be allowed in tunnels depending on the possible consequences of accidents to be taken into account on the basis of the tunnel characteristics.

2.4.2 The grouping system is based on the assumption that in tunnels, there are three major dangers which may cause numerous victims and possibly serious damage to the tunnel structure:

- (a) Explosions;
- (b) Release of toxic gas or volatile toxic liquid;
- (c) Fires.

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\*/ UNECE Document TRANS/SC.1/295/Rev.3, as amended.

The groups are defined as follows:

Group B: Dangerous goods which may lead to a very large explosion;

Group C: Dangerous goods which may lead to a large explosion or a large toxic release but not to a very large explosion;

Group D: Dangerous goods which may lead to a large fire, but not to a very large or large explosion nor to a large toxic release.

Dangerous goods belonging to Group B are assumed to present a higher risk than those of groups C and D, and those of Group C are assumed to present a higher risk than those of Group D. Therefore when entry into a tunnel is prohibited for Group D, it is also prohibited for groups B and C; and when entry is prohibited for Group C, it is also prohibited for Group B but not for Group D.

2.4.3 Assignment of dangerous goods to these groups is based on the intrinsic dangerous properties of the dangerous goods carried, the type of containment and the quantity carried per transport unit.

2.4.4 Dangerous goods to be classified in groups B, C or D have been assigned to tunnel codes B, B1000, B1, C, C 5000, C1, D or D1 in column (15) of Table A of Chapter 3.2 as follows:

#### Group B

- B Class 1: Compatibility groups A, K and L  
Class 3 : UN Nos. 1204, 2059, 3064, 3343, 3357, 3379 (classification code D)  
Class 4.1: Classification codes D or DT  
Self-reactive substances, type B (UN Nos 3221, 3222, 3231, 3232)  
Class 5.2: Organic peroxides type B  
(UN Nos. 3101, 3102, 3111, 3112)
- B 1000 Dangerous goods of Divisions 1.1, 1.2 and 1.5 (except compatibility groups A, K and L), when the total net explosive mass per transport unit is greater than 1000 kg
- B1 When carried in tanks, dangerous goods of:  
  
Class 2, classification codes F,TF and TFC;  
Class 4.2, Packing Group I;  
Class 4.3, Packing Group I;  
Class 5.1, Packing Group I;

#### Group C

- C Dangerous goods of:  
  
Class 1: Division 1.1, 1.2,1.5 (except compatibility groups A,K,L);  
Class 1: Compatibility groups H and J;  
Class 7: UN Nos 2977 and 2978.
- C 5000 Dangerous goods of Division 1.3 (except compatibility group L), when the net explosive mass per transport unit is greater than 5000 kg.
- C1 When carried in tanks, dangerous goods of:  
  
Class 2: Classification codes T, TC, TO, TOC  
Class 3: Packing Group I of classification code FC and FTC

Class 6.1: Packing Group I of classification codes TF1 and TFC  
Class 8: Packing Group I of classification code CTI.

Group D

D Dangerous goods of:

Class 2: Classification codes F, FC, T,TC, TF, TO, TFC, TOC  
Class 4.1: Self-reactive substances, types C, D, E, F, and UN Nos 2956, 3241, 3242, 3251  
Class 5.2: Organic peroxides, types C,D,E,F  
Class 6.1: Packing group I of classification code TF1 and TFC  
Class 8: Packin Group I of classification code CTI  
Class 9: Classification code M10 (UN 3258)

D1 When carried in bulk or in tanks dangerous goods of :

Class 3: Packing Group I or II or classification code F2  
Class 4.2: Packing Group II  
Class 4.3: Packing Group II  
Class 6.1: Packing Group I of classification codes TF2 and TW1  
Packing Group II of classification codes TF1, TF2, TFC and TW1  
Class 8: Packing Group I of classification codes CF1, CFT and CW1.

**CHAPTER 3.2**

3.2.1 Amend the explanations for column (15) to read:

“Transport category/Tunnel code”

Contains at the top of the cell a figure indicating the transport category to which the substance or article is assigned for the purposes of exemption related to quantities carried per transport unit (see 1.1.3.6).

Contains at the bottom of the cell the code(s) and/or alphanumeric code(s) (between brackets) to which the substance or article is assigned for the purpose of carriage restrictions in tunnels (see 1.9.6 and Chapters 2.4 and 8.6). When no tunnel group has been assigned, this is indicated by the mention “(-)”.

When two codes are indicated, the applicable one is the one corresponding to the transport condition, e.g. (B1000, C) indicates that the load is in Group B if the total net explosive mass on board the transport unit is greater than 1000 kg, otherwise the load is in group C. (C1, D) means that the load is in group C if the dangerous goods are carried in tanks, otherwise the load is in group D.

Table A

Amend the heading of column (15) to read:

“Transport category  
(Tunnel code)

1.1.3.6  
(2.4.4,  
8.6)”.

Column (15): Add, between brackets, the tunnel group code (s) to which the substance or article is assigned in accordance with the criteria of new 2.4.4, i.e:

Class 1: compatibility groups A, K or L:	(B)
Class 1: Divisions 1.1, 1.2 and 1.5, except Compatibility groups A,K or L:	(B1000, C)
Class 1: Division 1.3	(C 5000)
Compatibility groups H and J:	(C)
Class 1: Division 1.3, except compatibility groups A, K, L, H and J	(C5000)
Class 1: Division 1.4, compatibility groups H and J	(C)
Class 2: classification codes F,TF, TFC	(B1, D)
FC	(D)
T, TC, TO, TOC	(C1 D)
Class 3: classification code D	(B)
PGI,classification code FC, FTC	(C1)
PGI and II; classification code F2	(D1)
Class 4.1: classification codes D and DT	(B)
UN Nos 3221, 3222, 3231, 3232	(B)
Self-reactive substances, types C, D, E, F	(D)
UN Nos 2956, 3241, 3242, 3251	(D)
Class 4.2: PGI	(B1)
PGII	(D1)
Class 4.3: PGI	(B1)
PGII	(D1)
Class 5.1: PGI	(B1)
Class 5.2: UN Nos 3101, 3102, 3111, 3112 (Type B)	(B)
Types C, D, E, F	(D)
Class 6.1: Packing Group I of classification codes TF1, TFC	(C1, D)
Packing Group I of classification codes TF2 and TW1	(D1)
Packing Group II of classification codes TF1, TF2, TFC and TW1	(D1)
Class 7 UN Nos 2977 and 2978	(C)
Class 8: Packing Group I of classification code CTI	(C1, D)
Packing Group I of classification codes CF1, CFT, and CW1	(D1)
Class 9: Classification codes M2, M3	(D1)
M10	(D)

Add a new Chapter 8.6 as follows :

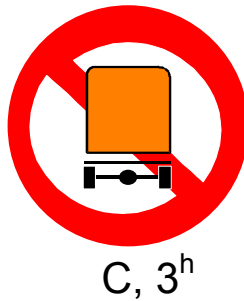
## CHAPTER 8.6

### SPECIAL PROVISIONS CONCERNING TRAFFIC RESTRICTIONS

#### 8.6.1 Signs and signals

8.6.1.1 In accordance with 1.9.5, Contracting Parties may decide to restrict the circulation of vehicles carrying dangerous goods. For this purpose, they may use signs and signals according to the Vienna Convention on Road Signs and Signals (Vienna, 1968) and the European Agreement supplementing the Convention on Road Signs and Signals (Geneva, 1971), as follows:

8.6.1.2 Sign C, 3<sup>h</sup>



“NO ENTRY FOR VEHICLES CARRYING DANGEROUS GOODS FOR WHICH SPECIAL SIGN PLATING IS PRESCRIBED”

To indicate no entry for vehicles carrying certain types of dangerous goods.

The sign C, 3<sup>h</sup> may be used in conjunction, if necessary, with an additional panel. The information given on this additional panel specifies that this prohibition applies only to the carriage of dangerous goods as defined by domestic legislation \*\*.

NOTE – It is open to Contracting Parties to omit the red oblique bar joining the upper left quadrant and the lower right quadrant or, provided that this does not make the symbol less easy to see and understand, not to interrupt the bar where it crosses the symbol.

Interpretation according to the Consolidated Resolution R.E.2\*/:

#### Existing interpretation

This sign should be used without an additional panel to prohibit the entry of vehicles defined in Article 1(a) of ADR carrying dangerous goods defined in Article 1 (b) of ADR for which orange-coloured plates according to the provisions of ADR for marking are required on the vehicles. For prohibitions related to other dangerous goods (e.g. goods listed in national legislation), prohibitions restricted to certain periods (e.g. peak hours) or those restricted to transit, the sign should be used with an additional panel specifying the prohibition.

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\*/ Consolidated Resolution on Road Signs and Signals (R.E.2) of the UNECE Inland Transport Committee’s Principal Working Party on Road Transport, as amended.

\*\*/ The secretariat suggests that this last sentence in the Vienna Convention should be deleted and that the words “specifying the prohibition” should be added to the first sentence

### Proposal interpretation

[This sign may be used without an additional panel to prohibit the entry of vehicles defined in Article 1(a) of ADR carrying dangerous goods defined in Article 1 (b) of ADR for which orange-coloured plates according to section 5.3.2 of Annex B of ADR for marking of vehicles are required on the vehicles.

For prohibitions related to specific dangerous goods, prohibitions restricted to certain periods (e.g. peak hours) or those restricted to transit, the sign should be used with an additional panel specifying the prohibition.

For prohibitions restricting the carriage of dangerous goods in tunnels, the sign should be used as follows:

- with an additional panel bearing letter B: No entry for vehicles carrying dangerous goods presenting a very large explosion risk, (Group B, tunnel codes B, B1000 or B1 according to 2.2.4 of Annex A of ADR), for which the orange-coloured plate marking according to 5.3.2 of Annex B of ADR is required;
- with an additional panel bearing letter C: No entry for vehicles carrying dangerous goods presenting a very large or large explosion risk or a risk of large toxic release (Groups B and C, tunnel codes B, B1000, B1, C, C5000 or C1 according to 2.2.4 of Annex A of ADR), for which the orange-coloured plate marking according to 5.3.2 of Annex B of ADR is required;
- with an additional panel bearing letter D: No entry for vehicles carrying dangerous goods presenting a very large or large explosion risk, or a risk of large toxic release or a large fire risk (Groups B, C and D, tunnel codes B, B1000, B1, C, C5000, C1, D or D1 according to 2.2.4 of Annex A of ADR), for which the orange-coloured plate marking according to 5.3.2 of Annex B of ADR is required;
- with no additional panel: No entry for vehicles carrying any type of dangerous goods, except class 6.2, UN Nos 3291 and 3373, for which the orange-coloured plate marking according to 5.3.2 is required.]

8.6.1.3

Sign C, 3<sup>m</sup>

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C, 3<sup>m</sup>

“NO ENTRY FOR VEHICLES CARRYING MORE THAN A CERTAIN QUANTITY OF EXPLOSIVES OR READILY INFLAMMABLE SUBSTANCES”

Interpretation according to Consolidated Resolution R.E.2

This sign should be used to prohibit the entry of vehicles defined in Article 1 (a) of ADR, carrying dangerous goods of Class 1, of Class 2 classified as flammable, of Class 3, except those of packing group III, of Class 4.1 classified as self-reactive and of Class 5.2 or ADR,



provided that orange-coloured plates on the vehicle according to the provisions of ADR concerning marking [5.3.2] are required for the carriage of the relevant goods.

8.6.1.4 Sign C, 3<sup>n</sup>



**C, 3<sup>n</sup>**

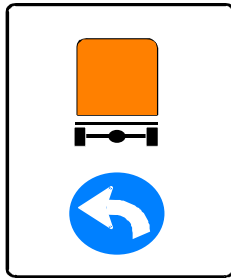
“NO ENTRY FOR VEHICLES CARRYING MORE THAN A CERTAIN QUANTITY OF SUBSTANCES LIABLE TO CAUSE WATER POLLUTION”

(No interpretation provided).

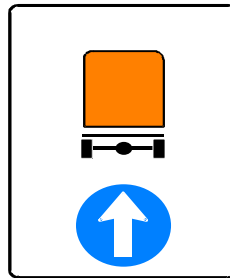
Proposed interpretation

[This sign should be used to prohibit the entry of vehicles defined in article 1(a) of ADR carrying dangerous goods classified as pollutants to the aquatic environment according to ADR provided that orange-coloured plates on the vehicle according to the provisions of 5.3.2 of Annex B of ADR concerning marking are required for the carriage of such goods.]

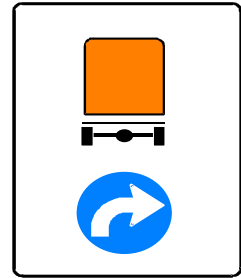
8.6.1.5 Signs D, 10<sup>a, b</sup> and <sup>c</sup>



D, 10<sup>a</sup>



D, 10<sup>b</sup>



D, 10<sup>c</sup>

“DIRECTIONS IN WHICH VEHICLES CARRYING DANGEROUS GOODS SHALL PROCEED”

(No interpretation given).

Proposed interpretation

[This sign may be used without an additional panel to prescribe a direction for vehicles defined in Article 1(a) of ADR carrying dangerous goods defined in Article 1(b) of ADR for which orange-coloured plates according to section 5.3.2 of Annex B of ADR are required on the vehicle.]

For compulsory directions related to specific dangerous goods, or during certain periods (e.g. peak hours), or for transit, the sign should be used with an additional panel specifying the obligation in the same manner as prohibitions are specified when sign C, 3<sup>h</sup> is used.].

## **8.6.2 Tunnel restrictions**

8.6.2.1 When restrictions concerning the entry of vehicles into tunnels, or compulsory directions for vehicles not allowed in tunnels, are indicated by signs C, 3<sup>h</sup> or D, 10<sup>a, b</sup> or <sup>c</sup> with an additional panel bearing letters B, C or D, the carrier shall determine the group to which the load belongs according to 2.2.4 and the indications given in column (15) of table A of Chapter 3.2.

8.6.2.2 The restrictions or compulsory directions do not apply when an orange-coloured plate is not required according to 5.3.2, i.e. when the carriage is subject to exemption according to the provisions of 1.1.3.6.

8.6.2.3 When two tunnel codes are given in column (15) of Table A of Chapter 3.2 for the same substance or article, only the one which corresponds to the transport condition is applicable:  
e.g.:

(B1000; C): Group B if the net explosive mass on board the transport unit is greater than 1000 kg; Group C otherwise

(C1, D): Group C if the substance is carried in tanks, Group D otherwise.

8.6.2.4 When dangerous goods of different tunnel codes are carried in the same transport unit, the load shall be assigned to the most stringent group, Group B taking precedence over Groups C and D, and Group C over Group D.

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