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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS

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TRANSPORT OF DANGEROUS GOODS

REPORT OF THE COMMITTEE TO THE ECONOMIC AND SOCIAL COUNCIL PURSUANT TO RESOLUTION 1743 (LIV) OF 4 MAY 1973

Pursuant to Resolution 1743 (LIV) of 4 May 1973, the Committee submits to the Economic and Social Council its report on the progress of its investigations and recommendations concerning the steps that should be taken with a view to establishing uniformity in the various modes of transport.

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DRAFT REPORT OF THE COMMITTEE TO THE ECONOMIC AND SOCIAL COUNCIL PURSUANT TO RESOLUTION 1743 (LIV) OF 4 MAY 1973

Contents

	Paragraphs
Introduction	1-4
The economic and social importance of the interest involved	5
The effects on man and his environment	6 and 7
The principal regulations on the international carriage of dangerous goods	8-15
The classification	16-28
The classification in the Recommendations	16-20
Classification in the other regulations	21-28
ADR and RID	21-24
SMGS	25
ADN/Rhine	26
IMCO International Maritime Dangerous Goods Code	27
IATA Restricted Articles Regulations	28
Packing	29-42
Packing requirements in the Recommendations	29-37
Packing requirements in the other Regulations	38-42
ADR and RID	38
SMGS	39
ADN/Rhine	40
The IMCO International Maritime Dangerous Goods Code	41
IATA Restricted Articles Regulations	42

Contents (Cont'd)

	Paragraphs
Labelling	43-51
Labelling requirements in the Recommendations	43-45
Labelling requirements in the other Regulations	46-51
The Transport Document	52 and 53
The transport document in the Recommendations	52
Particulars required in the transport document under the other Regulations	53
Conclusions	54-61

DRAFT REPORT OF THE COMMITTEE TO THE ECONOMIC AND SOCIAL COUNCIL PURSUANT TO RESOLUTION 1743 (LIV) OF 4 MAY 1973

Introduction

1. In resolution 1743 (LIV) of 4 May 1973, the Economic and Social Council requested the Committee of Experts to continue to investigate the divergencies existing in the modal practices applicable to the transport of dangerous goods in respect of their classification, identification, labelling and packaging, and to report to the Council on the progress of its investigations and recommendations concerning the steps that should be taken with a view to bringing about uniformity in the various modes. The progress of the Committee's work will be reviewed below in conjunction with a comparison of the Recommendations and the principal regulations for the international carriage of dangerous goods.

2. Investigation of the divergencies between the provisions relating to the carriage of dangerous goods by the various modes of transport is a continuing task and a prerequisite for the formulation by the Committee of its recommendations. Since 1953, when the Committee 1/ to which it is the successor was established, an ever-growing number of recommendations have appeared. The first were issued in 1956 in the form of a booklet; by 1964 they comprised a two-volume work; by 1966 they covered three volumes, which increased to four in 1970 and, in 1973, required the publication of two supplementary volumes containing the changes and additions adopted by the Committee at its seventh session (27 November - 6 December 1972). The report on that session was considered by the Economic and Social Council at its fifty-fourth session. 2/

3. These Recommendations are based on the principle that the transport of dangerous goods is regulated in order to prevent them from causing accidents to persons, damage to or even loss of the means of transport employed, or damage to or destruction of other goods. But at the same time the regulations must be so framed as not to impede the movement of such goods, or at any rate of those which are not too dangerous to be accepted for transport. With that exception, the aim of the regulations may be said to be to make international transport possible by eliminating risks or reducing them to a minimum. The problem is therefore both a safety problem and a problem of facilitating transport. 3/

4. To meet the request made by the Economic and Social Council, an assessment should first be made of the progress achieved in the field of harmonizing the principal regulations on the international carriage of dangerous goods with the Recommendations of the Committee of Experts (ST/ECA/81/Rev.2 and Rev.2/Amend.1). Attention must first be drawn, however, to the importance of the interests involved, the effects on man and his environment, and the means of ensuring the safety of persons and property during carriage prescribed in all the regulations on the international transport of dangerous goods.

1/ Economic and Social Council resolution 468 G (XV), adopted on 15 April 1953.

2/ ST/ECA/43, October 1956; ST/ECA/81, December 1964; ST/ECA/81/Rev.1, December 1966, ST/ECA/81/Rev.2, November 1970, and ST/ECA/81/Rev.2/Amend.1, July 1973.

3/ E/CN.2/143. Report of the Committee to the Transport and Communications Commission on the Committee's session held at Geneva from 10 August to 4 September 1954.

The economic and social importance of the interest involved

5. In considering this question, one is struck from the start by the economic and social importance of the interests involved. More than 50 per cent of all goods transported throughout the world are dangerous goods, produced in particular by the oil and oil products industry, the chemical industry and the nuclear energy industry. This percentage cannot but increase in the future, since the economy is becoming dependent less and less on natural products and increasingly on the use of manufactured, which are potentially dangerous or quite simply harmful, products. In addition to the producers of these dangerous goods, among them industrial firms that are some of the world's largest, the interested parties include the transport industries, the users of the products in question, whether the individual consumer, processing industry or agriculture, and, not least, the insurance companies. In short, it may be said that there is scarcely any activity in the world today which is not to some extent dependent on dangerous goods, and that nobody is unaffected by the risks they occasion or by the harm they may cause to the environment. The danger is universal and knows no frontiers. Such goods, manufactured in one part of the world, can be transported to the opposite ends of the earth, and thus means that answers have to be sought at the international level.

The effects on man and his environment

6. In contrast to the beneficial aspects of the transport of dangerous goods in economic and social terms, one fact has to be mentioned, and that is the amount of danger and harm they may occasion during transport. Goods are dangerous by reason of their being explosive, corrosive, inflammable, toxic, radioactive or even magnetic, a danger particularly feared by air pilots because it affects the functioning of the instruments of navigation. The effects of the danger sometimes lead to veritable national catastrophes - for example, shortly after the Second World War, a "liberty ship" carrying thousand tons of ammonium nitrate fertilizer blew up and devastated the port and town of Brest; before that, a ship that was also carrying ammonium nitrate partly destroyed the town of Texas City in the United States. In one case, hundreds of human beings disappeared and part of the environment was destroyed. Another instance is the stranding of the Torrey Canyon, and its effects on the coast in the south of England and in northern Brittany, in France. Other cases, more recent but less noticed, include the incident in which a drum of endosulfan, a product used in the manufacture of insecticides, fell from a barge into the Rhine and polluted the river for several days.

Lastly, there was the case in August 1967 of a road tanker carrying propylene that broke up on the Belgian-Luxembourg frontier, causing an explosion and the death of 20 persons.

7. The means of action, once the substance is classed according to the preponderant danger (which is not always easy), consist in treating the actual substance, where this is possible, so as to render it less dangerous (desensitization), choosing the packaging and identifying it externally to indicate the danger, adopting precautions for handling, selecting the appropriate transport equipment and, finally, observing the administrative procedures (transport document, written instructions in the event of accident, for example). This explains why all regulations on the carriage of dangerous goods comprise:

provisions relating to the goods for carriage (list of substances, packaging, labelling and transport document);

provisions concerning the means of transport proper (railway wagon, road vehicle, inland water vessel, ship or aircraft) and its movable equipment (e.g. movable tanks) and on the movement of such vehicles or equipment in traffic. 4/

While provisions of the second type do not, by their nature, lend themselves easily to harmonization, those relating to dangerous substances for carriage must, if international transport by various modes of transport is to be facilitated, be harmonized to the greatest possible extent. They cover precisely the fields referred to in the Council's resolution.

The principal regulations on the international carriage of dangerous goods

8. The principal regulations on the international carriage of dangerous goods are the following:

at the European level, the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), the International Regulations concerning the Carriage of Dangerous Goods by Rail (RID), the regulations known by the symbol SMGS, prepared under the auspices of the Organization for Co-operation between Railways (OSZhD) and, lastly, the Regulations (ADN/Rhine) established by the Central Commission for the Navigation of the Rhine, which are comparable to the draft European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterway (ADN), on which ADN/Rhine is largely based;

on a world-wide level, in respect of maritime transport, the IMCO International Maritime Dangerous Goods Code;

on a world-wide level, in respect of air transport, the IATA Restricted Articles Regulations.

9. The International Regulations concerning the Carriage of Dangerous Goods by Rail (RID) first appeared on 14 October 1890, following the conclusion at Berne of the first International Convention concerning the Carriage of Goods by Rail (CIM), to which RID formed an annex. Twenty-two States are parties to CIM (26 from Europe and 6 from elsewhere). The most recent edition of RID dates from 1 October 1967; it was supplemented and revised successively on 1 July 1973 and 1 January 1974. 5/ The Central Office for International Railway Transport (OCTI), which was established under CIM to facilitate and ensure the operation of CIM, 6/ may convene a Committee of Experts for the purpose of amending the provisions of RID. 7/ The decisions of the Committee of Experts are notified to Governments through the Central Office and deemed to be accepted unless objections are lodged by at least five Governments within three months from such notification. They then come into force on the first day of the sixth month following the month in which notification is given. 7/ Since 1971, changes

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4/ See, for instance, ADR, Annexes A and B described below.

5/ Publications of the Central Office for International Railway Transport.

6/ CIM, article 58.

7/ CIM, article 69, paragraph 4.

to be made in the common provisions of RID and ADR are considered at Joint Meetings of the RID Safety Committee, a subsidiary body of the Committee of Experts, and the ECE Group of Experts on the Transport of Dangerous Goods. The Joint Meetings have no decision-making powers and must report to their respective parent bodies. 8/ 9/

10. The carriage of dangerous goods has at all times been one of the concerns of the Inland Transport Committee of the United Nations Economic Commission for Europe, for work in this field was started as early as 1951 in three separate working parties: one for road transport, one for inland waterways and one for handling operations, 10/ and then carried on from 1955 by the Working Party on the Transport of Dangerous Goods (renamed the "Group of Experts" in 1971). It resulted in the conclusion on 30 September 1957 of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), which entered into force on 29 January 1968, 11/ and in the preparation of a draft European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterway (ADN). 12/ Pursuant to resolution No. 95 adopted by the ECE Inland Transport Committee on 7 July 1951, the common provisions for transport by rail, road and inland waterway have been harmonized, and Annex A of ADR and of the draft ADN, entitled "Provisions concerning dangerous substances and articles" (classification, listing, packing, labelling, etc.), reproduces the corresponding provisions of RID virtually in toto. The procedure for amending the ADR annexes is left to the initiative of the Governments parties to the Agreement. Proposed amendments are deemed to be accepted unless, within three months of notification by the Secretary-General, at least one-third of the Contracting Parties, or five of them if one-third exceeds that figure, object thereto. They enter into force on expiry of a further period of three months. 13/ The Protocol of Signature to ADR recommends that proposed amendments should first be discussed at meetings of experts. The ECE Group of Experts on the Transport of Dangerous Goods acts as the expert body. Proposed amendments to provisions common to ADR and RID are considered at the Joint Meetings referred to in the preceding paragraph, before being submitted to the ECE Group of Experts.

11. In the countries of Eastern Europe, the body corresponding to the Central Office for International Railway Transport (OCTI) is the Organization for Co-operation between Railways (OSZhD). It was established in July 1956 at Sofia by a decision of the first Conference of Ministers of Transport of the socialist countries. At the second Conference of Ministers of Transport, held at Pekin in May-June 1957, it was decided that OSZhD would begin work on 1 September 1957. OSZhD's role in relation to the Convention on International Goods Traffic by Rail (SMGS), concluded on 1 November 1951

8/ Report of the ECE Inland Transport Committee on its twenty-ninth session (2-6 February 1970), paragraph 54; Report of the Working Party on the Transport of Dangerous Goods on its twenty-second session (4-7 May 1970), paragraph 23.

9/ The arrangements and procedures for the Joint Meetings are described in document W/TRANS/432.

10/ TRANS/141. Note by the Secretariat submitted to the twelfth session of the Inland Transport Committee (1955).

11/ E/ECE/322/Rev.1-E/ECE/TRANS/503/Rev.1 (two volumes).

12/ W/TRANS/WP15/100/Rev.2 and 101/Rev.2. A new draft is in preparation (W/TRANS/WP15/350).

13/ ADR, article 14, paragraph 3.

and revised most recently on 1 July 1966, 14/ is the same as OCTI's with regard to CIM. Annex 4 to SMGS covers the transport of dangerous goods.15/ The procedure for amending the provisions of Annex 4 is similar to that for revisions of RID. It should be noted, however, that the CIM (i.e. the RID) is applied jointly with SMGS in all Eastern European countries, except the Union of Soviet Socialist Republics and Albania.

12. Further to a resolution 16/ of the ECE Inland Transport Committee recommending, inter alia, that the international river commissions should as far as possible apply the provisions of the annexes to the draft ADN which had recently been prepared under the auspices of the Inland Transport Committee, the Central Commission for the Navigation of the Rhine (CCNR), on the basis of those annexes, drew up the Regulations on the Carriage of Dangerous Substances on the Rhine (ADNR), the provisions of which entered into force on 1 January 1972 for all States members of the Commission.17/ These Regulations have been supplemented by two fascicles containing changes, the more recent published in 1973 18/ on the proposal of the CCNR Committee on Dangerous Substances.

13. The International Maritime Dangerous Goods Code was drawn up by the Inter-Governmental Maritime Consultative Organization (IMCO) in implementation of Recommendation 56 f the 1960 International Conference on Safety of Life at Sea 19/ to the effect that Governments should adopt a unified international code for the carriage of dangerous goods by sea and that IMCO should in co-operation with the Committee of Experts pursue studies on an international code of that nature. 19/ Although the IMCO Code is recommendatory it has gained particularly wide acceptance, having been adopted so far by 26 countries owning the greater part of world shipping tonnage. Amendments to the Code are considered by the Sub-Committee on the Carriage of Dangerous Goods, which reports to the Maritime Safety Committee.

14. Prior to 1950 very few countries permitted carriage of dangerous goods by air. It was soon found essential, however, to authorize air transport of such goods, at least in small quantities. Accordingly, in 1950 the IATA Cargo Traffic Conferences gave the IATA Restricted Articles Board the task of preparing a set of rules applicable at the international level. Initially, the IATA Restricted Articles Board took as a basis for its work the provisions established at that time by the Interstate Commerce Commission (ICC) and in force in the United States of America, but it took account of provisions in other countries in order to frame international regulations that were accaptable to all. Thus, the first edition of these IATA Regulations appeared on 1 January 1956. As a result, an increasing quantity of goods can be transported by air throughout the world under appropriate safety conditions. The IATA Regulations are compulsory for all member companies of the Association (109 members) and are also applied by 88 non-member carriers. They are constantly brought up to date, and a new edition is published each year by the IATA Restricted Articles Board.

15. It should be noted that the recommendations concerning the transport of radioactive substances are prepared and brought up to date by the international Atomic Energy

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14/ Abkommen über den Internationalen Eisenbahn-Güterverkehr (SMGS).

15/ SMGS, Anlage 4 - Besondere Bedingungen für die Beförderung von gefährlichen Güten im internationalen Eisenbahnverkehr.

16/ Resolution No. 206 of 24 January 1964 (E/ECE/TRANS/535, annex 2).

17/ Namely; Belgium, France, Germany, Federal Republic of, the Netherlands, Switzerland and the United Kingdom.

18/ Publication of the Central Commission for the Navigation of the Rhine (CCNR), Palais du Rhin, Strasbourg.

19/ IMCO published in 1960 the Final Act of the Conference, followed by the annexes incorporating the International Convention on Safety of Life at Sea of 17 June 1960, and in 1970, the amendments to that Convention adopted by the IMCO Assemblies in 1966, 1967, 1968 and 1969.

Agency (IAEA), in accordance with the desire expressed by the Economic and Social Council at its twenty-eighth Session (1959). 20/ These recommendations are followed in the regulations on the international carriage of dangerous goods. IAEA has published them under the title "Regulations for the Safe Transport of Radioactive Materials". 21/

THE CLASSIFICATION

The classification in the Recommendations

16. The classification is based on the need to differentiate between those substances which are dangerous and those which are not, so as to ensure the physical safety of persons and the protection of goods. The appropriate protective measures, such as packing and labelling, depend on the substance's place in this classification. 22/

17. Three main types of classification are possible in theory: the first is based on the degree of danger, the second on the nature of the danger, while the third takes account of both the nature and the degree of danger. The drawback of a classification by degree of danger is that it is restrictive, since it is not invariably a guide to the extent of the damage (the degree of danger inherent in a particular substance depends entirely on the quantity). Another type of classification, based on the nature of the danger, groups substances into a number of classes, divisions, or even sub-divisions, each characterized by the preponderant danger: inflammability, corrosiveness, toxicity, etc. A substance that is potentially dangerous is first studied and then classed in one or other of the groups in terms of the preponderant risk. The problem is not an easy one to solve and differences in classification exist because the definition of the classes may be relatively broad and because opinions differ as to the intrinsic characteristics of the particular substance and as to the preponderant danger when the substance presents more than one danger. The third type of classification takes into account both the nature of the danger and the degree of danger. It involves grouping substances by classes of danger, as in the type of classification just described, but is also assigns them within each class, to categories comprising highly dangerous substances, moderately dangerous substances or slightly dangerous substances. 22/

18. In carrying out its instructions to compile a classification of dangerous goods universally applicable to all modes of transport, the Committee was confronted with a variety of classification included in regulations, some national and some international. In view of that situation, it adopted as basic a classification by nature of the danger, for such a classification accords best with technical conditions and interferes least with existing regulations. 23/ The subsequent arrangements of Class I, i.e. "Explosives", in divisions and sub-divisions proposed by the Group of Experts on Explosives introduced into the classification the notion of degree of danger. This tendency was furthered by the Committee's decision at its sixth session to request the Group of Rapporteurs to continue its work by grouping dangerous goods by degree of danger, different test requirements being drawn up for different groups. 24/ The classification finally adopted, although based essentially on the nature of the danger, nonetheless falls within the third type of classification so far as packing is concerned.

19. The Committee's Recommendations comprise nine classes, numbered 1 to 9, some of them split into divisions (Classes 5, 4 and 6) and even sub-divisions (Class 1).

20/ Resolution 724 C (XXVIII) of 17 July 1959.

21/ The latest revised edition appeared in 1973.

22/ See ILO "Occupational Safety and Health", volume II, No.1, January-March 1952 and No.2, April-June 1952.

23/ E/CN.2/143. Report of the Committee of Experts to the Transport and Communications Commission on the Committee's seventh session, held at Geneva (10 August-4 September 1954); and Recommendations, paragraph 8.

24/ E/CN.2/CONF.5/41. Report of the Committee of Experts on its sixth session (27 October-6 November 1969), paragraph 106; and Recommendations, paragraph 39.

Class 9: "Miscellaneous dangerous substances", is a separate case in that it lists substances which during transport present a danger not covered by other classes. 25/ To be absolutely accurate from the technical standpoint, definitions, for each class, of the nature of the goods included therein would have to be scientific. The Committee considered, however, that this would be difficult, since any such definition was liable to be both too narrow and too rigid. There was no need to draw up definitions in the strictly scientific sense of the word, and more general explanations - more flexible and therefore more easily adapted to the different situations encountered - would suffice, since they were supplemented by lists. 26/ The fact remains that the "explanations" given in the Recommendations are, for some classes, similar to definitions. The need for a better definition of the classes became apparent when dangerous substances were grouped by categories of risk for packing purposes, particularly in the case of the poisonous (toxic) substances and corrosives classes. 27/

20. The lists drawn up by the Committee are not exhaustive. They nonetheless cover most of the principal dangerous goods moving in commerce. They also include specimen goods that serve as examples, as it were, and provide an illustration of the definitions or explanations for the classes. In the Committee's view, the purpose of the list is to serve as a guide for the classification of other goods not included in it. 28/ But the Committee nevertheless recognized the need for the lists to be kept up to date. New dangerous products are constantly being put on the market. Opinions often differ as to the main risk that goods entail and, consequently, as to the class in which they should be placed. In the absence of any agreed decision, or arbitration by some central body, new goods giving rise to such doubts might not be uniformly classified in the various regulations. 29/ In fact, leaving aside explosives, which did not appear in the first edition of the Recommendations, the number of entries rose from approximately 500 in 1956 to more than 1,000 by 1973 (a two-fold increase which shows how new substances, which have acquired greater significance, particularly as a result of the development of the petrochemical industry have grown considerably in number). The subsidiary risk or risks involved in substances presenting such risks are indicated and the name of the substance is accompanied by the common name or names. In addition, the substance can be clearly identified by the serial number for each entry.

Classification in the other regulations

ADR and RID

21. ADR and RID comprise 14 classes, with roman numerals instead of the arabic figures used in the Recommendations. This difference is not without its effects, since it

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25/ Recommendations, paragraph 27.

26/ E/CN.2/143, referred to above, paragraph 33; Recommendations, paragraph 9.

27/ Recommendations (volume II). Introductory notes to Division 6.1 and Class 8.

28/ E/CN.2/143, referred to above, paragraphs 38 to 43; and Recommendations, paragraph 28.

29/ E/CN.2/143, referred to above, paragraph 49.

prevents ADR and RID, for the time being, from requiring the number of the class risk to be mentioned on the labels, as provided for in the Recommendations. The classification itself, as in the Recommendations, is based essentially on the nature of the danger. Broadly speaking, the ADR and RID classes can be collated with those of the Recommendations as follows:

ADR/RID		Recommendations
Ia	Explosive substances and articles	Class 1
Ib	Articles filled with explosive substances	
Ic	Igniters, fireworks and similar goods	
Id	Gases: compressed, liquefied or dissolved under pressure	Class 2
Ie	Substances which give off inflammable gases on contact with water	Division 4.3
II	Substances liable to spontaneous combustion	Division 4.2
IIIa	Inflammable liquids	Class 3
IIIb	Inflammable solids	Division 4.1
IIIc	Oxidizing substances	Division 5.1
IVa	Toxic substances	Division 6.1
IVb	Radioactive substances	Class 7
V	Corrosive substances	Class 8
VI	Repugnant substances and substances liable to cause infection	Division 6.2
VII	Organic peroxides	Division 5.2
	No equivalent	Class 9

(It should be recalled that the Recommendations include a Class 9 that is not found in ADR and RID, and that the Committee recognizes as dangerous only those infectious substances which contain disease-producing micro-organisms).

22. ADR and RID do not contain definitions of the classes, with the exception of Class Ia (Explosive substances and articles), Class Id (Gases: compressed, liquefied or dissolved under pressure) and Class IIIa (Inflammable liquids). This absence of definitions may be a source of difficulty for the experts called upon to classify new substances or for the shippers when determining the conditions for carriage of a substance falling under a collective entry or a substance that is not listed and belongs to classes, e.g., Classes IVa and V, for which an equivalent method has to be used.

23. ADR and RID draw a distinction between what are called "restrictive" and "non-restrictive" classes. 30/

30/ ADR marginal 2002 (1) and RID marginal 1 (3) and (4).

With regard to the "non-restrictive", classes, the substances mentioned in the lists are accepted for carriage only under the conditions laid down for them in the particular class, while other substances covered by the class heading are accepted for carriage without special conditions. This distinction between "restrictive" classes and "non-restrictive" classes serves no purpose so far as the Recommendations are concerned, since it relates to an obligation regarding carriage by rail.

24. The following features may be noted with regard to the definition and the listing in each class:

Classes Ia, Ib and Ic (Class I of the Recommendations). The Recommendations start by defining an explosive as a substance, whether or not contained in a device specially prepared, manufactured with a view to producing a practical effect by explosion or pyrotechnic effect, or any other substance which, by reason of the nature of its explosive properties, is to be treated as such; 31/ they then proceed, for classification purposes, to employ the notion of mass explosion risk. 32/ ADR and RID list first and foremost explosive substances and articles (Class Ia) and then the various articles containing explosives (Classes Ib and Ic). Class Ia does not cover substances that cannot explode on contact with a flame or that are not more sensitive to shock or to friction than dinitrobenzene. 33/ Consequently, ADR and RID fix a threshold which does not appear in the definition of this class in the Recommendations. 34/ The introductory note to division 4.1, however, specifies a threshold for "wetted explosives". Class Ia, in fact, consists in the main of substances that are liable to mass explosion and, consequently, it is very close to Division 1.1 of the Recommendations. With regard to some of the substances, it will be noted that organic peroxides are removed from Class 1 of the Recommendation to Division 5.2, but remain in ADR/RID Class Ia; similarly, on account of the note under the heading of Class Ia, some substances which fall under Division 1.1 of the Recommendations are not assigned to Class Ia in ADR and RID. Class Ib contains, side by side with one another, articles that are liable to mass explosion and others that are not; and hence it does not conform to the general principles of classification employed in the Recommendations. In Class Ic, the articles listed are not liable to mass explosion, and the sole condition laid down in ADR and RID is that articles in that class shall be so arranged that they cannot lead to an explosion of the whole contents of the package. 35/

Class Id (Class 2). In view of the difficulty of reconciling the definitions used in the two main systems of regulation for this class, the Committee established the two

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31/ Recommendations, paragraph 11.

32/ Mass explosion is defined in the note to paragraph 12 of the Recommendations; and annex 1, appendix 2, describes a method for determining whether or not packages containing explosives constitute a mass explosion risk.

33/ Note to the heading of ADR and RID Class Ia.

34/ At its second session (2-6 September 1963), the Group of Experts on Explosives considered that it was premature to fix a threshold (E/CN.2/CONF.5/6, para. 10).

35/ ADR marginal 2100 (2) and RID marginal 100 (2).

formulas that are now used. 36/ One of them is taken from ADR and RID: "The substances of Class Id have a critical temperature lower than 50°C or, at this temperature, a vapour pressure greater than 3 kg/cm^2". 37/ The other is taken from the United States Regulations.

With the exception of little more than half a dozen substances, the ADR/RID list coincides with that of the Recommendations. One notable difference lies in the fact that the ADR/RID list is divided into categories (gases: compressed, liquefied, deeply-refrigerated liquefied, dissolved under pressure, aerosol dispensers, non-refillable containers of gas). This is because the Reccomendations do not include packing provisions for this class.

Class Ie (Division 4.3). ADR and RID do not give definitions for this Class, whereas the Recommendations supply, if not a definition, at least an explanation of the heading for Division 4.3. The ADR/RID list and that of the Recommendations are alike.

Class II (Division 4.2). Like the previous one, this is a restrictive class in ADR and RID. The same remarks may be made as for Class Ie.

Class IIIa (Class 3). This Class, inflammable liquids, is defined in the Recommendations as comprising liquids or mixtures of liquids, or liquids containing solids in suspension, which give off an inflammable vapour at or below 65.6°C (open test) or 60.5°C (closed test). In view of the differences with regard to risk, inflammable liquids may be divided into two divisions:

(a) liquids with a flash-point below 23°C (closed test) or 26.6°C (open test); and

(b) liquids with a flash-point of 23°C (closed test) or 26.6°C (open test) to 60.5°C (closed test) or 65.6°C (open test). 38/ For packing purposes the Committee also employed the concept of viscosity in the case of paints, enamels, lacquers and varnishes. 39/

In ADR and RID there are three groups:

(a) substances with a flash-point below 21°C (closed test),

(b) substances with a flash-point between 21°C and 55°C inclusive (closed test),

(c) substances with a flash-point above 55°C (closed test).

Furthermore, inflammable liquids with a flash-point of 21°C or above, completely soluble in water, are not subject to ADR and RID. 40/ Accordingly, the requirements for harmonizing ADR and RID with the Recommendations are as follows:

36/ Recommendations, paragraphs 14-16.

37/ ADR marginal 2130 (2) and RID marginal 130 (2).

38/ Recommendations, paragraph 19.

39/ General notes, paragraph 3, preceding the list of inflammable liquids (Recommendations, Volume II).

40/ ADR marginal 2301 and RID marginal 301.

fixing the flash-point at 60.5°C (closed test) as the ceiling for classifying a liquid in Class IIIa;

agreeing to a division of this class into two groups (see above),

eliminating the criterion of miscibility in water, in any proportion,

regarding the liquids as inflammable when they have a flash-point of 23°C or more (closed test) and contain more than 30 per cent solids, either dissolved or in suspension.

The RID Safety Committee, after adopting some of these changes at its session of 7-14 July 1967, reversed its decisions at its session of 10-14 June 1968. Consequently, the situation is still unchanged. The problem would seem to deserve renewed consideration, in view of the considerable number of substances in this class and the convenience of the flash-point criterion.

Class IIIa is a non-restrictive class. A comparison of the lists shows that a large number of substances (about 30) in Class 3 of the Recommendations are assigned to other classes in ADR and RID, because the Committee attached priority to the inflammability hazard.

Class IIIb (Division 4.1). This is a non-restrictive class in ADR and RID. It is defined in the Recommendations as comprising solids, other than those classed as explosives, which are readily combustible or may cause or contribute to fire through friction. 41/ A comparison of the lists reveals a number of differences in classification between the Recommendations and ADR and RID, the main difference relating to substances classed by the Committee in Division 4.1 although they have explosive properties (wetted explosives).

Class IIIc (Division 5.1). This class is also non-restrictive. In the Recommendations, Division 5.1 comprises substances which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause or contribute to the combustion of other material, 42/ while organic peroxides, which have the same properties, are placed in a separate division. There is but one difference between the lists: in ADR and RID, zirconium picramate containing at least 20 per cent water is classed as an explosive (Class Ia).

Class IVa (Division 6.1). The Recommendations, by grouping poisonous (toxic) substances into categories of danger for packing purposes, afford a definition of the substances in this division. 43/ ADR and RID, in the absence of definitions, give a long list of the substances in this class. The conditions of carriage for a substance not appearing on the list are established by assimilating it to another substance which has the same properties. In addition, this method is made more reliable not only because of the number of items included in this class but also because they are grouped into categories. The divergencies between the list of ADR and RID and the lists attached to the Recommendations are of two categories. On the one hand, some substances are contained in the list of ADR and RID and not in the lists attached to the Recommendations and vice versa. On the other, some substances are labelled with the "St.Andrew Cross" label according to ADR and RID and with the "Skull" label according to the Recommendations and vice versa.

41/ Recommendations, paragraph 21.

42/ Recommendations, paragraph 22.

43/ General notes preceding Division 6.1 (Recommendations, volume II).

Class IVb (Class 7). Pro memoria (radioactive substances).

Class V (Class 8). Class V, likewise a non-restrictive class, is not defined in ADR and RID. The Recommendations regard "corrosives" as substances which, by chemical action, will cause severe damage when in contact with living tissue or, in the case of leakage, will materially damage, or even destroy, other freight or the means of transport, and may also cause other hazards. 44/ The Group of Rapporteurs on the Packing of Dangerous Goods is currently studying criteria for this class, as it did in the case of Division 6.1. ADR and RID both gives a listing of the substances in Class V comprising, inter alia, collective entries to allow the procedure of assimilation to be used when substances are not specifically mentioned. A comparison of the ADR/RID list and the list in Recommendations shows that they are very close to one another.

Class VI (Division 6.2). In the Recommendations, only substances that are infectious, i.e. those containing disease-producing micro-organisms, are regarded as dangerous. 45/ ADR and RID go much further, for this class covers substances that are simply repugnant and substances that are liable to cause infection. These substances may therefore not include disease-producing elements to start with. The Recommendations do not give a list of infectious substances, because such substances are easily recognizable scientifically and would be described by their scientific names. 46/ Class VI is a restrictive class.

Class VII (Division 5.2). The Recommendations place organic peroxides in a division of the class entitled "Oxidizing substances; organic peroxides", whereas they form a separate class in ADR and RID. 47/ The divergencies between the lists are due to the differing opinions of the experts regarding the explosive nature of the particular substance. In the Recommendations, organic peroxides are treated as a separate case requiring specific arrangements.

Class of miscellaneous dangerous substances. The Recommendations include a class, namely Class 9, "Miscellaneous dangerous substances", which has no equivalent in ADR and RID. This class is for substances which during transport present a danger not covered by other classes. 48/ The possibility of creating such a class in ADR and RID led to an in-depth review by the RID Safety Committee, which reported thereon to the fifth session of the Committee (21-29 June 1967). The latter recognized that Class 9 was not essential for the purposes of carriage by rail or road, and it decided to add

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44/ Recommendations, paragraph 26.

45/ Recommendations, paragraph 23.

46/ Note to the title of Division 6.2 (Recommendations, volume II).

47/ It should be noted that ADR specifies carriage of a range of organic peroxides at a controlled temperature. These substances do not figure in the RID list.

48/ Recommendations, paragraph 27.

a note to that effect in the Recommendations. 49/ In fact, the number of miscellaneous dangerous substances has steadily fallen (now 6 items). The substantive problem nonetheless remains and, at the request of the Committee, the Rapporteurs, on Packing are investigating a more satisfactory solution than introducing into the class in question substances involving a minor danger that can be ranked with one of those presented by the other classes. 50/

SMGS

25. Annex 4 to SMGS, which corresponds to annex 1 of CIM (RID), places dangerous goods in ten categories which correspond roughly to the classes in the Recommendations, as shown in the following table:

	SMGS, Annex 4	Recommendations
1.	Explosives and articles containing an explosive charge	Class 1
2.	Substances liable to form explosive mixtures and which contribute to combustion	Class 5
3.	Gases: compressed, liquefied or dissolved under pressure	Class 2
4.	Substances liable to spontaneous combustion	Division 4.2
5.	Substances which give off inflammable gases on contact with water	Division 4.3
6.	Solid or liquid substances, easily inflammable	Class 3, Division 4.1
7.	Corrosive substances	Class 8
8.	Poisonous substances	Division 6.1
9.	Repugnant products and substances liable to cause infection	Division 6.2
10.	Radioactive substances	Class 7
-	No equivalent	Class 9

Unlike ADR and RID, annex 4 does not distinguish between restrictive classes and non-restrictive classes. All substances and all articles falling within the definitions for the categories are regarded as dangerous goods.

ADN Rhine

26. Apart from minor differences that are justified by the mode of transport (organic peroxides at a controlled temperature, which are not carried by inland waterway, and the percentage of silicon in ferro-silicon), the ADR, RID and ADN Rhine lists are identical. The remarks made in connexion with ADR and RID thus apply equally to ADN Rhine.

49/ E/CN.2/CONF.5/28, paragraph 67; note to paragraph 27 of the Recommendations.

50/ E/CN.2/CONF.5/49, paragraph 100.

IMCO International Maritime Dangerous Goods Code

27. The classification in the IMCO Code is based on the Recommendations, from which it differs only in detail. One of these differences is the use that the Code makes of the class of miscellaneous dangerous substances (Class 9). Instead of adhering to the strict definition of Class 9 as formulated in the Recommendations, 51/ Class 9 in the IMCO Code also includes substances of relatively low transportation hazard. Hence it comprises some 30 entries (instead of 6 in the Recommendations). It will be recalled that the problems relating to Class 9 are currently being studied by the Group of Rapporteurs on Packing. Another difference lies in the fact that the IMCO Code contains a category of inflammable liquids with a flash-point between -18°C and 23°C (closed cup test).

IATA Restricted Articles Regulations

28. The IATA Regulations are applicable to "restricted" articles: explosives, inflammable compressed gases, non-inflammable compressed gases, combustible liquids, corrosive liquids, inflammable liquids, magnetized material, oxidizing material, radioactive materials, inflammable solids, poisonous articles. These dangerous goods fall into as many different classes, although the IATA Regulations do not give listings for each class. In addition, they include "Other restricted articles", which form a separate class that is similar to Class 9 of the Recommendations. The definitions for the different classes are described below.

Explosives (Class 1 of the Recommendations). The definition of explosives in the IATA Regulations is similar to that contained in paragraph 11 of the Recommendations: an explosive is any chemical compound, mixture or device, the primary or common purpose of which is to function by, or which is capable of, explosion or pyrotechnic effect. 52/ Generally, the only explosives permitted for air transport are certain types of manufactured devices having a minimal explosive hazard. Such devices are those having explosive components in limited quantities and which are so designed and packed that they will not function en masse, as a result of the functioning of any single device in the container or as a result of exposure to external flame. Additionally, functioning of any devices shall not result in dangerous fragmentation of any component of the package or its contents. 53/ In general, the explosives accepted for carriage by air are those found in Sub-division 1.4.2 of the Recommendations. Consequently, the distinctions within Class 1 of the Recommendations are not found in the IATA Regulations. As in the case of the Recommendations, definitions are given for certain articles or substances.

Inflammable compressed gases and non-inflammable compressed gases (Class 2). For compressed gases the IATA Regulations provide a definition that is identical with the second formula contained in paragraph 15 of the Recommendations. The definitions for inflammable compressed gases and non-inflammable compressed gases, on the other hand, have no equivalent in the Recommendations. 54/ The list in the IATA Regulations and the list in the Recommendations are very much alike.

51/ Recommendations, paragraph 27.

52/ IATA, Section II, Definitions.

53/ IATA, Section VI, Packaging Note No. 200.

54/ IATA, Section II, Definitions.

Combustible liquids, inflammable liquids (Class 3). The IATA Regulations distinguish between combustible liquids (flash-point exceeding 22.8°C (closed-cup), but less than 38.3°C) and inflammable liquids (flash-point of 22.8°C or less (closed-cup)). 55/ The range of inflammable and combustible liquids therefore covers liquids with flash-points up to 38.3°C (closed-cup), whereas the ceiling for the classification of inflammable liquids in the Recommendations is fixed at 61°C (closed-cup). It should be noted that, within the flash-point range for inflammable liquids, the IATA Regulations establishes a category for pyrophoric liquids, 55/ which are inflammable liquids that become self-igniting when exposed to atmospheric conditions normally incident to transportation. The definition of pyrophoric liquids is supplemented by an explanation which describes them as liquid chemicals that may ignite on exposure to moist air, although ignition does not always occur, which are decidely combustible and which all fume strongly on exposure to air to produce fumes that are somewhat irritating and may be somewhat toxic. 56/ These products are differentiated in the Recommendations by their subsidiary risks.

Corrosive material (Class 8). The corrosive material is defined as any liquid or solid material which is considered to be desctructive or to cause irreversible alteration in human skin tissue if, by analogy, the material in the form in which it will be shipped will destroy or change irreversibly, at the site of contact, the structure of intact skin tissue of albino rabbits after an exposure period of 4 hours or less, when tested according to a recognized technique; or any liquid material which will produce a corrosion rate that exceeds 6.35 millimetres (0.25 inch) per year on SAE (Society of Automotive Engineers) 1020 steel or non clad 7075-T6 aluminium alloy, when tested at 54.5°C (130°F) according to a recognized method. 57/ This definition is inspired by the Recommendations, which also cover damage to living tissue, damage to other freight and the means of transport in the event of leakage, and the causing of other hazards. 58/

Oxidizing materials (Class 5). The definitions in the Recommendations 59/ and the IATA Regulations are similar. 57/ There are, however, two exceptions: nitrocarbonitrates, which are classed in the Recommendations among explosive substances (and more precisely ranked with type D blasting explosives), 60/ and organic peroxides, which are classed in the IATA Regulations either among inflammable liquids or among oxidizing materials. 61/

55/ IATA, Section II, Definitions.

56/ IATA, Section X, Explanation of articles and terms.

57/ IATA, Section II, Definitions.

58/ Recommendations, paragraph 26.

59/ Recommendations, paragraph 22.

60/ Recommendations, Annex 1, Appendix 1: Description of some substances and articles in Class 1.

61/ IATA, Section X, Explanation of articles and terms.

Inflammable solids (Class 4). The IATA Regulations rate inflammable solids as any solid material, other than one classified as an explosive, which, under certain conditions, is liable to cause fire through friction, absorption of moisture, spontaneous chemical changes, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation hazard. 62/ Metallic hydrides (Division 4.3 in the Recommendations), certain oily fabrics (Division 4.2) and nitrocellulose products (Division 4.1) are quoted as examples. It will thus be seen that the IATA Regulations are very close to the Recommendations in this respect. 63/

Poisonous articles (Division 6.1). The IATA Regulations include three classes of poisonous articles. Class A comprises poisonous gases or liquids of such nature that a very small amount of gas or vapour of the liquid mixed with air is dangerous to life. 62/ It does not cover pesticides having very high toxicity (low LD50 values). 64/ Class B comprises less dangerous poisonous liquids and solids of such nature that they are chiefly dangerous by external contact with the body or by being taken internally, 62/ namely, liquid or solid substances other than those in the other classes, which are known to be so toxic to man as to afford a hazard to health during transportation, or which are presumed to be toxic to man. 64/ For this class, the IATA Regulations give objective criteria based on oral toxicity, toxicity by skin absorption and toxicity on inhalation. 64/ The same applies in the case of the Recommendations, although the figures are different. In addition, the latter provide a classification of pesticides by principal formulation and the percentage of active substance for each group of pesticides. 65/ Lastly, the IATA Regulations include a Class C, consisting of liquid or solid substances, other than those of Class A, which, upon contact with fire or when exposed to air, give off dangerous or intensely irritating fumes. 66/

Other restricted articles. In this category of dangerous goods, 67/ which is itself divided into three groups, the IATA Regulations are similar to Class 9 as conceived by IMCO in the International Maritime Dangerous Goods Code. The category includes, inter alia, substances having low toxicity.

Listing. A comparison of the lists for carriage by air and those in the Recommendations shows that, out of more than 2,200 entries, only 140 are not included in the Recommendations. It should be noted that a number of the entries in the IATA Regulations are of relatively little commercial importance.

62/ IATA, Section II, Definitions.

63/ Recommendations, paragraph 21.

64/ IATA, Section X, Explanation of articles and terms.

65/ Recommendations, Introductory note to Division 6.1 and additional list for that division.

66/ IATA, Section X, Explanation of articles and terms.

67/ IATA, Section II, Definitions.

PACKING

Packing requirements in the Recommendations

29. In the transport of dangerous goods, although safety is at all times the essential aim, users may instinctively respond to economic considerations and the changing nature of packaging. This means a need to build up an open-ended system of regulation, one with a framework that is able to achieve the desired aim but incorporate any new type of packaging capable of meeting that aim. For that reason, the Committee agreed not to lose sight of improvements and changes that may occur as a result of progress in science and technology: provisions are made for the use of packagings which, while not complying with the specifications set out in the Recommendations, would be as satisfactory in every respect as those complying with these specifications, provided that the packages, prepared as for shipment, could successfully pass the recommended tests. 68/ The Recommendations exclude packages containing radioactive substances (in respect of which reference is made to the IAEA recommendations), gas cylinders, (pending completion of the work assigned to ISO) and, in general, packages whose net weight exceeds 400 kg (for which the safety provided may be assessed by calculation). 69/ They do not contain provisions concerning carriage in bulk or carriage in tanks.70/ Moreover, certain types of packagings were omitted from the Recommendations, either because their use is limited or because their continued use was not considered desirable, having regard to safety in transport.71/

30. The Committee has drawn up general packing requirements, with supplementary requirements applicable to explosives, and these constitute the basic conditions that have to be met.72/ The requirements are complemented by specifications and provisions concerning performance tests for packages or packagings, and it is understood that if the specifications and provisions regarding the tests are complied with, their purpose, i.e. safety in transport, is fulfilled. Based in the main on existing international and national regulations, in which the prevailing trend is to replace detailed specifications for packagings, which may vary considerably from one country to another, by tests designed to ensure that packages containing dangerous goods can withstand normal conditions of transport and thereby secure adequate safety,73/ the recommendations on packing attach more importance to the tests than to the specifications. Furthermore, the Committee felt that it should proceed from the least onerous conditions, applicable to a given mode of transport, and supplement these in turn, where necessary, with additional provisions for the other modes of transport.74/

68/ Recommendations, paragraph 33.

69/ Recommendations, paragraph 34.

70/ Recommendations, paragraphs 1 and 35.

71/ Recommendations, paragraph 35.

72/ Recommendations, annex 2 (volume IV).

73/ Recommendations, paragraph 33.

74/ First and second sessions of the Group of Rapporteurs (E/CN.2/CONF.5/14, para. 7, and E/CN.2/CONF.5/20, para. 10) and the fifth session of the Committee (E/CN.2/CONF.5/28, para. 93).

31. The general provisions on packing 75/ are based largely on the corresponding provisions of the IATA Regulations.76/ The purpose of these general provisions may be defined in terms of the function of the packing. The latter must, whatever the constituent materials, the type or the closure:

be free from leakage and compatible with the product it contains,

preserve its other functional qualities (stackability, handling, safe use, etc.)

when subjected to the stresses of a particular mode of transport (including trans-shipment and warehousing) under conditions regarded as "normal", and under the influence of such factors encountered during transport as moisture, temperature and, possibly, pressure.

32. With regard to the specifications, 77/ the Committee has included in its Recommendations a series of 21 main packagings, of varying types: for example, twenty different types of steel drum, and three different types of fibreboard drum. These specifications, while not as comprehensive as in some national regulations, nevertheless provide a means of clearly identifying the type of packing. Some packagings, although they are in use, have not been included in the Recommendations - for example, glass carboys, which fall in the category of packagings which the Committee did not consider it desirable to recommend for the international carriage of dangerous goods.78/ Other types of packaging, for example, receptacles, no matter how small, conforming to the definition of drums, are included in the drum group.79/ The Recommendations do not contain a list of inner packagings or, consequently, of specifications for them. The Committee considered that there was little point in establishing any relevant provisions, since the performance tests have to be carried out on the packages as prepared for carriage, which therefore, as indicated below, include any inner packagings. An Illustrated Glossary of Packagings for the Transport of Dangerous Goods has been prepared to clarify, if necessary, the specifications contained in the Recommendations. For reasons of concordance between the texts of the different language versions, the Committee was unable to incorporate the Glossary in the Recommendations. It is therefore published separately.80/ To allow for advances in science and technology, the Committee felt that there should be no objection

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75/ Recommendations in respect of packing, section 1 (Recommendations, volume IV).

76/ IATA, Section V.

77/ Recommendations in respect of packing, section 4 (Recommendations, volume IV).

78/ Recommendations, paragraph 35.

79/ Recommendations, paragraph 36.

80/ Illustrated Glossary of Packagings for the Transport of Dangerous Goods (ST/ECA/191 - E/CN.2/CONF.5/52). Sales No. E.74.VIII.1.

to the use of packagings having specifications different from those recommended, provided they are at least equally effective, acceptable to the competent authority and able successfully to withstand the tests described in the Recommendations.81/ The principle of "equivalence" follows on from the Committee's decision to make the Recommendations an open-ended system of regulation.

33. The purpose of the tests is to establish whether a given packaging described in the specifications fulfils the general packing requirements set out in the Recommendations and, consequently, to state the minimum quality required if the package is to withstand carriage. The task of formulating provisions on the tests led the Committee to decide on a number of options regarding the object of the tests (packaging or package), the choice of test, the values to be applied in carrying out the tests and, lastly, the criteria for determining whether they have been passed.

34. With regard to the first point, the Committee felt, as did the Group of Rapporteurs on Packing, that except when otherwise specified in specific provisions concerning tests or where evident (e.g. for hydraulic tests or leakage tests), tests should be carried out on packages prepared as for shipment, including, where applicable inner, packagings.82/ In addition, the Committee allowed that, except where this might vitiate the results of tests, the goods to be shipped may be replaced by non-hazardous substances.82/ Special provisions apply in this case.83/

35. Choice of test was determined by the fact that, apart from the chemical compatibility of the product and the packing, the fundamental functional quality of packagings for dangerous goods is that the sides, joints and closures should be leakproof, for while they are leakproof the danger inherent in the substances is neutralized. The other functional qualities, such as stackability, are relevant only in so far as they affect leakproofness. Moreover, the Committee took into consideration the difficulties some countries would experience in using the advanced test methods which exist in the highly industrialized countries. The tests selected by the Committee are therefore the drop, leakage and hydraulic tests and also the stacking test, which is of special importance for maritime transport. The tests must in some cases be performed after the packagings have been preconditioned at a given temperature and relative humidity for sufficient time to reach equilibrium.84/

36. The Committee recognized that very dangerous goods need particularly strong packagings; but that, on the other hand, less severe tests may be justified for packages to contain these goods usually listed as dangerous which have only a minor hazard.85/ Accordingly, the Recommendations differentiate between the various test requirements: provisions of middling severity are applicable to packages or

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81/ Recommendations in respect of packing, paragraph 4.1.3.

82/ Recommendations in respect of packing, paragraph 3.4.1.

83/ Recommendations in respect of packing, paragraph 3.4.2.

84/ Recommendations in respect of packing, paragraph 3.4.3.

85/ Recommendations in respect of packing, paragraph 3.1.2.

packagings for the carriage of goods presenting medium danger (classed in Packing Group II), more stringent provisions are applicable to packages or packagings for the carriage of very dangerous goods (Group I) and less stringent provisions are applicable to packages or packagings for the carriage of goods presenting only minor danger (Group III). 86/

37. If they are to be comprehensive, the Recommendations must specify special packing requirements for every substance included in the lists. The Group of Rapporteurs had actually been instructed to do this. 87/ In fact, there was no time to make use of the studies carried out, and the Committee agreed to reconsider the question when the provisions of a larger number of bodies of regulations governing the carriage of dangerous goods were closer to its own Recommendations. 88/ Nevertheless, because of the highly dangerous nature of explosives, the varying degree of hazard they present according to the manner in which they are packed, and of the desirability of bringing about more uniformity in packing them, detailed recommendations are given on the way in which explosives should be packed. For similar reasons, recommendations are included concerning the way in which organic peroxides should be packed, the maximum quantities, the indication of the secondary risk of explosion and, in the case of those which must be carried at a controlled temperature, that temperature. 89/ On the other hand, except in the case of explosives, the Recommendations do not contain provisions on mixed packing. Consequently, so far as packagings are concerned, the Recommendations do not yet provide all the solutions for the problems involved. Packages should bear indelebile and clearly visible markings showing the State in whose territory the tests have been carried out, evidence in the form of a registration number or in another form that the type of packaging has successfully passed the prescribed tests, the name of the manufacturer and the year and in certain cases the month of manufacture.

Packing requirements in the other Regulations

ADR and RID

38. ADR and RID include a large number of packagings, both inner and outer, which must fulfil the general conditions of packing. 90/ These also include precise specifications and tests for certain packagings. 91/ But the principle of technical tests on packages and packagings, although adopted by the RID Safety Committee in 1968, has not yet been applied, except in the case of steel drums used for the carriage of certain substances 92/ which have to be tested under conditions that are drawn entirely from the Recommendations of the Committee. In addition, ADR and RID contain provisions on mixed packing of dangerous goods, provisions that have no equivalent in the Recommendations, except in the case of explosives, which are, in this respect, classed by compatibility groups.

86/ Recommendations in respect of packing, paragraph 3.1.3.

87/ E/CN.2/CONF.5/7. Report of the Committee on its third session (9-13 September 1963), paragraph 32.

88/ E/CN.2/CONF.5/41. Report of the Committee on its sixth session (27 October-7 November 1969), paragraph 118.

89/ Recommendations, paragraphs 40 and 41, and Annex 2, Appendices 1 and 2.

90/ See the section entitled "General conditions of packing" for each class.

91/ See, for example, ADR Class Id and Appendices A.2 and A.5 (RID Appendices II and V).

92/ ADR, Appendix A.5 (RID, Appendix V).

SMGS

39. Annex 4 to SMGS does not give precise details regarding the strength and nature of certain packagings, as do ADR and RID. The differences between Annex 4 to SMGS and the Recommendations are on the whole very similar to those found in comparing the Recommendations with ADR and RID.

ADN/Rhine

40. The Recommendations and ADN/Rhine are not comparable, since it is required in the latter that packing must comply with the provisions of one of the international systems of regulation, namely, ADR, RID or the IMCO Code.93/

The IMCO International Maritime Dangerous Goods Code

41. The General Introduction to the IMCO Code devotes a section to packaging.94/ It includes general considerations regarding package testing and definitions of the materials for manufacturing containers and of the various types of closure. This General Introduction refers the reader to specification and testing methods and an illustrated glossary 95/ that are taken over entirely from the Recommendations and the Illustrated Glossary prepared by the Committee. It should be noted that the IMCO Code does not preclude the possibility of competent authorities permitting the use of another type of packaging which, after official evaluation, may be considered to be equivalent to the packaging mentioned in the Code.96/ In some cases, the IMCO Code advocates "receptacles approved by the competent authority of the country concerned".

IATA Restricted Articles Regulations

42. The IATA Regulations contain a comprehensive set of provisions concerning packaging: general packaging requirements, the standards for inner and outer containers and the tests they have to pass, 97/ and a series of more than 100 packaging schedules covering more than 900 restricted substances or articles.98/ It should be noted that the provisions concerning general packaging requirements and packaging specifications and tests were used as a model for the Recommendations.

93/ ADN/Rhine, marginal 6007 (2).

94/ IMCO Code, General Introduction, Section 10.

95/ IMCO Code, General Introduction, paragraph 10.2.2.

96/ IMCO Code, General Introduction, paragraph 10.3.

97/ IATA Regulations, Sections V and VII.

98/ IATA Regulations, Section VI.

LABELLING

Labelling requirements in the Recommendations

43. The entire labelling system was adopted by the Committee at its session held in Geneva from 10 August to 4 September 1954. 99/ It has remained virtually unchanged, except for the labels for radioactive substances prepared by IAEA, 100/ the label for corrosives, which was changed by the Committee at the request of the ILO at a session held from 9 to 26 March 1959, 101/ and a new label for products having low toxicity that was created at its session from 25 November to 6 December 1972. 102/

44. This system is based on the principle enunciated in the Economic and Social Council's mandate to the Committee that labels should "identify the risk graphically and without regard to printed text". 103/ Adhering to this principle, the Committee recommended labels bearing a symbol indicating to all concerned, no matter what language they speak, the nature of the risk connected with the goods. The labels are in addition differentiated by colour to make it easier to distinguish the goods and thus provide a very useful guide for handling and stowing operations. The colours were chosen so as to distinguish those goods which may be freely loaded or placed together from those which, on the contrary, must be kept apart from each other. The meaning of the colours can likewise be understood by those concerned, whatever language they speak. 104/ The symbols are no more than seven in number, namely, a bomb for the risk of explosion and a gas cylinder for non-inflammable compressed gases, a flame for the risk of fire, a skull and crossbones for the risk of poisoning and a St. Andrew's cross over an ear of wheat for dangerous goods having low toxicity, two test tubes spilling acid over a hand and a metal for corrosives, and lastly, the trefoil recommended by IAEA for ionizing radiation. The labels are in the form of a square upended at an angle of 45 degrees. The symbol occupies the upper part, the bottom corner is kept for the compulsory insertion of the class or division number, and the remainder of the bottom part may, if desired, be used for a written text. 105/

45. With regard to their utilization, the Committee felt that in general, not more than one label should be affixed to a package. Since a substance may present more than one significant risk, however, the package must bear in such cases, in addition to the label corresponding to the major risk, such additional labels as indicate important subsidiary risks. Naturally, the label corresponding to the class or division in which the substance is listed must bear the number of that class or division. 106/ Lastly, the Committee considered that there is no reason to exclude additional labelling indicating precautions to be taken. 107/ In order to properly identify dangerous goods, the Committee added a requirement that each package be marked on the outside with the name of its contents. 108/

99/ E/CN.2/143, referred to above.

100/ IAEA, Regulations for the Safe Transport of Radioactive Materials, Revised Edition, 1973.

101/ E/CN.2/191, Report of the Committee to the Transport and Communications Commission, paragraph 24 and annex 2.

102/ Report of the Committee on its seventh session (E/CN.2/CONF.5/49, paragraphs 151-154 and annex 6.)

103/ Economic and Social Council resolution 468 G (XV) of 15 April 1953.

104/ E/CN.2/143, referred to above, paragraph 51; and Recommendations, paragraph 44.

105/ Recommendations, Annex 3.

106/ Recommendations, paragraph 49.

107/ Recommendations, paragraph 51.

108/ Recommendations in respect of packing, paragraph 2.1.5.

Labelling requirements in the other Regulations

46. A comparison is easily made, since all the international regulations on the carriage of dangerous goods, with the exception of SMGS, have been brought into line with the system recommended. The remaining differences both as regards the labelling system and the way it is used are few in number and of little consequence. It should be pointed out that, along with the danger labels provided for in the Recommendations, some of these regulations include labels which simply indicate the precautions to be taken (for example, handling labels). Such labels, although accepted by the Recommendations, 109/ are not peculiar to dangerous goods and will not therefore be considered in the following paragraphs.

47. The ADR and RID labelling system has, since 1 July 1973, been the same as that in the Recommendations, with only two exceptions: these two agreements do not admit the "gas cylinder" label, but include the "St. Andrew's Cross" label that was later to be replaced, in the Recommendations, by the new label adopted by the Committee in 1972. In the use of labels on packages, ADR and RID prescribe the principle of a single label inasmuch as a substance or article is marked only with the label for the preponderant danger (the one which determines how it is classed). (One or two labels of the same model may nevertheless be affixed for the purposes of mixed loading). There are a number of exceptions to this principle, however, - for example, in the case of certain inflammable substances which are also poisonous. 110/

48. The SMGS labelling system was, before 1 July 1973, similar to that of ADR and RID. Apart from the labels for radioactive substances, one label used a different symbol (a smoking carboy and a hand attacked by acid, for corrosives), one label was to be found in ADR and RID but not in SMGS (St. Andrew's Cross) and, lastly, SMGS uses the "gas cylinder" label (which does not exist in ADR and RID). With regard to the way the system is used, SMGS has adopted the principle of multiple labelling. Accordingly, a not inconsiderable number of dangerous goods are marked by two, or even three labels.

49. ADN/Rhine recognizes the labelling systems adopted in regulations like ADR, RID and the IMCO International Maritime Dangerous Goods Code. 111/ The problem of divergences from the system provided for in the Recommendations does not therefore arise.

50. The labelling system recommended by the Committee was adopted in the IMCO International Maritime Dangerous Goods Code from the start. It should be noted that in the lower part of the IMCO labels there are written inscriptions, an option that is also allowed for in the Recommendations. 112/ With respect to the use of the labels, the IMCO Code allows the system of multiple labelling of packages. 113/

51. Ever since it was incorporated in the IATA Regulations, on 1 June 1973, the labelling system for carriage of dangerous goods by air has been the same as that in the Recommendations. 114/ The classes not being numbered, however, the labels do not carry a class number in the bottom corner. The IATA Regulations therefore provide for the use of inscriptions.

109/ ADR, Appendix A.9, and RID, Appendix IX, labels nos.7, 8 and 9.

110/ ADR marginal 2307 and RID marginal 307.

111/ ADN/Rhine, marginal 6007 (2)

112/ IMCO Code, General Introduction, paragraph 7.2.6.

113/ IMCO Code, General Introduction, paragraph 7.2.4.

114/ IATA, Section III

THE TRANSPORT DOCUMENT

The transport document in the Recommendations

52. When dangerous goods are shipped, the same papers have to be made out as are required for other categories of goods. The form of these papers, the particulars to be entered on them and the obligations they entail are often fixed by international conventions applying to certain means of transport, and by legislation. The Committee felt that it had no authority to tamper with these rules. 115/ On the other hand, the only condition especially essential in the case of dangerous goods is that they should be given an absolutely correct and accurate designation in the papers, in order to prevent any misunderstanding as to their nature on the part of those concerned, in particular the carriers. The user must certify, either on the shipping paper itself or in a separate declaration, that he has put up his goods for shipping in accordance with the operative regulations. It may be added that these requirements as regards the designation of the goods and the declaration are included in most international and national regulations. 116/ The Committee of Experts therefore framed its recommendations on these lines. 117/ It also prepared a specimen declaration form suitable for use where the declaration is made in a separate document. 118/

Particulars required in the transport document under the other regulations

53. The Committee's Recommendations have been incorporated into the IMCO Code, which includes not only the name of the substance as stated in the Recommendations but also the United Nations serial number. There are a fairly large number of differences between the other Regulations and the Recommendations and also between the Regulations themselves - between ADR and RID on the one hand, for example, and SMGS on the other. The solution to these problems is closely bound up with problems of classification, since the aim is, ultimately, to make the entries, the numbering of the classes and perhaps also the serial number the same.

CONCLUSIONS

54. In formulating its conclusions, the Committee had a number of considerations in mind. The first is that, for reasons of convenience, the Committee deliberately chose to compare the Recommendations and the Regulations as they existed in mid-1973, without taking account of work in hand or of decisions of principle adopted but not yet applied.

55. Another consideration relates to the scope of the Recommendations. As early as 1954, the Committee took up its position on this point, i.e. that the Recommendations do not constitute a new world-wide system to be substituted for existing regional or national systems. The Committee merely contemplated that Governments, intergovernmental and other organizations preparing regulations should adapt them to the Recommendations so that the desired uniformity would be brought about smoothly and

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115/ E/CN.2/143, referred to above, paragraph 57.

116/ E/CN.2/143, referred to above, paragraph 58.

117/ Recommendations, paragraph 52-53.

118/ E/CN.2/143, referred to above, paragraph 59.

not abruptly. 119/ The Committee therefore has to introduce the time element into its estimate of the extent to which harmonization is being achieved.

56. A further consideration is that the special characteristics of each mode of transport sometimes call for divergencies, and that harmonization does not therefore signify complete uniformity. The Committee may recall in this connexion that it has, in the main body of the present report, drawn attention to the principal divergencies of that kind.

57. Finally, another factor is the changing character of the requirements for the carriage of dangerous goods. These requirements are established by bodies forming separate legal entities and responding to their own concerns or needs. In assessing the degree of harmonization achieved, the Committee must therefore take into account the different stages of development reached by the Recommendations and the other Regulations in relation to each other.

58. In view of these considerations, the Committee will draw conclusions on two levels:

first, on the level of a comprehensive view of the divergenices noted above between the Recommendations and existing regulations as at mid-1973;

second, on the level of a survey of the trends noted since then in areas where systematic comparison is not possible.

59. At the first level, a comprehensive view of the divergencies noted in detail in the main body of this report shows that two systems of regulation are at an advanced stage of harmonization. These are the IMCO International Maritime Dangerous Goods Code and, to a lesser extent, the IATA Restricted Articles Regulations. These two bodies of regulations are relatively recent, since the IMCO Code was approved by the IMCO Assembly in Paris in September 1965, and the first edition of the IATA Regulations was published on 1 January 1956. The European Regulations, on the other hand, whether RID and the texts based on it (such as ADR and ADN/Rhine), or Annex 4 to SMGS, have not been harmonized to the same degree. In the case of RID, the RID Safety Committee did take, however, in 1967, a number of decisions of principle leading towards harmonization, such as the adoption of class numbering in accordance with the Recommendations, the addition of the substance number as given in the lists annexed to the Recommendations, and the adoption in principle of the idea that RID should be supplemented by performance tests on packagings. The Committee nevertheless finds that there is a lag between the Recommendations and these European Regulations which should be made good if the objective that the Committee had in mind as early as 1954 is to be achieved.

60. As regards trends observed since mid-1973 in the work of the various bodies dealing with the carriage of dangerous goods, the Committee cannot but express its concern that when the same problems are considered by different groups they may be given solutions which are scarcely compatible, and which are therefore likely to impede harmonization. Not to go too deeply into detail, the Committee noted that provisions concerning tank containers have been established for maritime transport by the IMCO Sub-Committee on the Carriage of Dangerous Goods and for carriage by road and rail by the Joint Meetings of the RID Safety Committee and the Group of Experts on the Transport of Dangerous Goods. Similarly, it should be noted that a vehicle identification

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119/ E/CN.2/143, referred to above, paragraphs 28-29; Recommendations, paragraphs 1-3.

system, with a view to the establishment of measures to be taken in the event of accidents, has because of its urgency entered into force at the European level at the very time when the question is being studied by the Committee in order to arrive to a world-wide solution. Lastly, the Committee found that classification problems were being considered in some circles without regard to the fact that solutions were provided by the Committee some years ago.

61. To arrive at some uniformity between the various modes of transport in fields in which the requirements must be similar, if not identical, efforts should in particular be focused in two areas:

to give the Recommendations more scope and depth;

to strengthen harmonization on the bases that have now been laid; and

as the Recommendations are given more scope and depth, to ensure that trends within the various competent bodies are not inconsistant with the Committee's action.