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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS

GROUP OF EXPERTS ON EXPLOSIVES

Thirteenth session
Geneva

REPORT BY THE GROUP OF EXPERTS ON ITS THIRTEENTH SESSION

7 - 11 August 1972

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REPORT

1. The Group of Experts on Explosives held its thirteenth session at Geneva from 7 to 11 August 1972. Experts attended from the Federal Republic of Germany, France, the United Kingdom and the United States of America, and from the Inter-Governmental Maritime Consultative Organization (IMCO) and the Central Office for International Railway Transport (OCTI).

ADOPTION OF THE AGENDA

2. The Group adopted the agenda proposed by the Secretariat (E/CN.2/CONF.5/R.268) and agreed to consider under item 9 the questions proposed by the expert from the United States of America in document E/CN.2/CONF.5/R.268/Amend.1.

ELECTION OF CHAIRMAN

3. Mr. W. BYRD (United States of America) was unanimously re-elected Chairman.

CLASSIFICATION OF NITROCELLULOSES WETTED WITH WATER OR ALCOHOL

4. The United States expert showed the Group two films of experiments carried out in his country to determine the combustion characteristics of nitrocelluloses of differing nitrogen content wetted with water or alcohol.

5. He also provided some additional information in writing on this subject which prompted him to propose the deletion from the Recommendation (ST/ECA/81/Rev.2) of item 1.1.2/261 in Sub-division 1.1.2 and of all reference to nitrogen content in items 3.0.0/2059, 3.0.0/2060, 3.0.0/2061, 3.0.0/2062, 4.1.0/2063 and 4.1.0/2064.

6. The Group then considered the results of the experiments carried out in the Federal Republic of Germany to determine the explosive properties of nitrocelluloses wetted with 25 per cent water and with a nitrogen content of 12.2 per cent (E/CN.2/CONF.5/R.282).

7. The United States expert observed that the purpose of the experiments performed in his country had been to determine whether the nitrogen content had a decisive effect on the behaviour of wetted nitrocelluloses in case of fire.

8. He pointed out that the main danger during carriage was fire, and for that reason fire had been used for the experiments at Carney's Point in 1971 and at Martinsburg in 1972, whereas in the experiments in the Federal Republic of Germany blasting caps and boosters had been used, particularly for tests 1, 8 and 11. But those devices could cause substances to detonate which the existing classification did not regard as high explosives.

9. The expert from France shared the United States expert's opinion with regard to the main danger during carriage. In his view the experiments in the United States had shown that the nitrogen content was not determinative for the behaviour of the wetted substance. For that reason he had favoured deleting from Sub-division 1.1.2

the nitrocelluloses wetted with water of item 1.1.2/261, provided, of course, that the packaging was such that the substance's moisture level could not diminish during carriage. With regard to nitrocelluloses wetted with alcohol, he wondered whether a fire during carriage by sea would not be a danger serious enough to justify their retention in Division 1.3; whereupon the United States expert stated that in that respect they were not more inflammable than alcohol itself.

10. The United Kingdom expert thought that the United States experiments seemed conclusive for the deletion from Sub-division 1.1.2 of the nitrocelluloses wetted with water of item 1.1.2/261, but not for the deletion of the nitrocelluloses wetted with alcohol, because their behaviour was similar to that of the substances classified in Division 1.3.

11. For him the basic problem was to draw the line between Division 1.3 and Division 4.1, although he recognized that the borderline was sometimes arbitrary. There were nitrocelluloses used by the explosives industry and others used by the paints and varnishes industry, and to put them under the same heading might lead to confusion.

12. The United States expert, adopting a more general approach, took the view that the end use of a product should not affect its classification, and he gave a few examples in support of that assertion.

13. The expert from the Federal Republic of Germany said that the series of experiments, carried out in his country, in which the nitrocelluloses had been ignited by an igniter or by an external fire, led to the same conclusions as did those of the United States expert. But the series of experiments in which the substance had been initiated by a booster showed that nitrocelluloses wetted with 25 per cent water could detonate. It was pointed out to him that the experiments performed in his country were not invalidated by those carried out in the United States of America.

14. In conclusion the Group took the view:

that the distinction by nitrogen content was not determinative for the classification of nitrocelluloses wetted with water or alcohol;

that the nitrocelluloses of 1.1.2/261 wetted with water should be placed in Division 4.1; and,

that as suggested by the United Kingdom expert the question of nitrocelluloses wetted with alcohol should be taken up again after agenda items 4 and 7 had been considered.

15. Reverting to the question of the classification of nitrocelluloses wetted with alcohol, the Group took the view that the French expert's apprehensions concerning the danger of fire where such nitrocelluloses were carried in large quantity by sea could be overcome for that mode of transport by provisions regarding stowage, which fell within the competence of IMCO.

16. The expert from France accepted that view, and it was decided that nitrocelluloses wetted with alcohol should be treated similarly to nitrocelluloses wetted with water. Consequently nitrocelluloses wetted with alcohol should be placed in Class 3 and nitrocelluloses wetted with water in Division 4.1.

17. The Group thanked the United States expert for the experiments carried out in his country and the films he had shown, and the expert from the Federal Republic of Germany for the experiments described in document E/CN.2/CONF.5/R.282.

CLASSIFICATION OF EXPLOSIVES

18. The Group considered the various documents submitted to it, namely: the revised text E/CN.2/CONF.5/R.233/Rev.2, supplemented by document E/CN.2/CONF.5/R.233/Rev.2/Add.1, by a new figure 6 circulated during the meeting (E/CN.2/CONF.5/R.233/Rev.2, page 11), and by proposals, likewise circulated during the meeting, additional to those in the appendix to the annex to document E/CN.2/CONF.5/R.233/Rev.2. It also considered the communication from the United Kingdom expert in document E/CN.2/CONF.5/R.280.

19. The United Kingdom expert said that in revising document E/CN.2/CONF.5/R.233/Rev.1 he had merely acted in compliance with the wish expressed by the Group at its preceding session. The principles on which the revision was based should therefore be regarded as established, the Group's task at the present session being essentially to put the finishing touches to the draft.

20. The Chairman then opened the discussion on the "Explanatory notes" in the appendix to the annex to document E/CN.2/CONF.5/R.233/Rev.2, including the additions contained in the document circulated during the meeting.

21. After considering this material, the Group adopted the amendments in annex 1 to this report.

22. The discussion of paragraph (B), on the nitrocarbonitrates, gave rise to an exchange of views, based on a test report distributed during the meeting by the United States expert and dealing with low-sensitivity substances such as slurries and the nitrocarbonitrate explosives, on the desirability of establishing a new Division 1.5. The idea was set aside for the time being, more particularly because as it would include substances which were not all lowest-hazard substances in the explosives class its establishment might upset the order of the present classification of explosives. It was nevertheless agreed that the question of the nitrocarbonitrates, which were provisionally retained among the blasting explosives of Group D, would have to be reviewed.

23. The Group considered the part of document E/CN.2/CONF.5/R.233/Rev.2/Add.1 which concerned classification, and set up a small working group to work out on the basis of decisions of principle already adopted the amendments and additions to be made to the Recommendations. Those of the small group's proposals which were adopted have been incorporated in a partial revision of document E/CN.2/CONF.5/R.233/Rev.2 circulated at the meeting, and will appear in annex 1 to this report.

24. Consideration of the results of the small group's work prompted the discussion of a number of questions.

25. The deletion of the word "explosive" from a number of headings prompted the expert from the United States of America to draw attention to the drawbacks that might flow from the fact that in consequence the word would no longer appear on the transport document. The expert from the Federal Republic of Germany stated that the Class symbol appeared on transport documents drawn up in his country. The expert from the United Kingdom said that in certain headings the addition of the word "explosive" was superfluous. In the end the Group took note of the statement by the expert from the United States of America concerning the drawbacks that might ensue from the word's omission. It took the view, moreover, that the matter could be considered again later in connexion with the transport document.

26. With regard to liquid monopropellants the Group took the view that since they would be offered for carriage in the near future it would be desirable to insert a footnote reading as shown in annex I to this report.

27. The reference to RDX (hexogene) in certain sub-headings of the classification by hazard and by compatibility group was maintained because it was constantly being used. It was made clear that what was concerned was RDX in the dry state.

28. The case of PETN in the dry state will be considered later, on the basis of proposals by the United States of America.

29. The Group considered in connexion with this agenda item the proposal by IMCO in document E/CN.2/CONF.5/R.276 concerning the classification of nitroglycerine in solution in alcohol. It seemed to the Group that IMCO's Sub-Committee on the Carriage of Dangerous Goods was referring in its proposals to nitroglycerine solutions differing in strength from those referred to in the entries in the lists annexed to the Recommendations. After discussion, the Group agreed not to include IMCO's proposals in the Recommendations. The expert from the United States of America nevertheless considered that IMCO's proposals might be acceptable if they were accompanied by certain packaging restrictions, which he offered to draft for a later session.

30. The Group then considered document E/CN.2/CONF.5/R.280, in which the expert from the United Kingdom had raised a number of questions. Some had been answered by the results of the small group's work; the others gave rise to an exchange of views which led to the conclusions set out below.

Compatibility groups A and B

31. Regarding the meaning to be attached to the term "primary explosive" the Group took the view after a long discussion that the following definition might answer the question raised by the United Kingdom expert:

"A primary explosive is a relatively sensitive substance which is used to actuate an explosive device either through detonation or through deflagration.". The Group did not deem it necessary to add such a definition to that existing in the Recommendations.

32. On the meaning to be attached to the term "pyrotechnic substance" the Group's view was that in the absence of a general definition, difficult to formulate, it was necessary to keep to a list of pyrotechnic articles and substances, as was done in the case of fireworks.

Compatibility groups A-L

33. The Group replied in the affirmative to the question raised by the United Kingdom expert.

TESTS DESIGNED TO DETERMINE THE HAZARDS OF EXPLOSIVES AND THEIR ASSIGNMENT TO THE APPROPRIATE DIVISION

34. The Group considered documents E/CN.2/CONF.5/R.234/Rev.2 and Amend. 1, the part of document E/CN.2/CONF.5/R.233/Rev.2/Add.1 that was relevant to the agenda item under discussion, and a document circulated during the meeting by the expert from the United States of America.

35. After a general discussion in which the experts from the United Kingdom and the United States of America participated to introduce their studies and the experts from the Federal Republic of Germany and France to express their interest in and preference for the proposals by the expert from the United Kingdom, the Group agreed to set up a small working group to reconcile the conflicting points of view and to prepare provisions acceptable to all.

36. The substance of the second part of document E/CN.2/CONF.5/R.233/Rev.2/Add.1 was not considered in the absence of certain supplementary particulars which it was not possible to furnish during the meeting.

37. As instructed, the small group based its work on a pattern or chart of tests applicable to explosive articles, the Group having taken the view that explosive substances presented problems whose solution called for more thorough examination.

38. The small group prepared a draft which was adopted by the Group. The provisions of that draft will be found in annex 1 to this report.

39. While the Group took the view that the same chart could be applied to explosive substances, it was unable to take a final decision at the present session. Between the present session and the next the United Kingdom expert will apply himself to the problem and will submit with regard to explosive substances a text possibly similar to that adopted with regard to explosive articles. The expert from the United States of America said that he would undertake a study on the same lines.

40. After the discussion of the present agenda item the United Kingdom expert briefly outlined the scope, under that item, of the topic of classification by compatibility, deriving from document E/CN.2/CONF.5/R.233/Rev.2, and the topic of tests to determine classification by degree of hazard, deriving from document E/CN.2/CONF.5/R.234/Rev.2. His outline showed that a desirable preliminary step would be to attempt to construct a chart for determining the properties, explosive or not, of substances and articles.

41. The Group took the view that the explanations given and the table summarizing them should be incorporated in the Recommendations in the form of a preamble to the two sets of proposals adopted at the present session.

42. The United Kingdom expert said he would prepare a draft chart for determining the properties, explosive or not, of substances and articles.

43. The Group expressed its thanks to the United Kingdom expert for his past and future assistance.

TESTS FOR FIBREBOARD BOXES AND STEEL BOXES FOR THE CARRIAGE OF EXPLOSIVES

(a) Fibreboard boxes

44. At its previous session the Group, having had placed before it by the Italian expert on the Committee of Experts a number of proposals aimed at the institution of more severe tests for fibreboard packagings for the carriage of explosives, had asked for a period of reflexion in view of the innovations inherent in the proposals (E/CN.2/CONF.5/R.262).

45. Reverting to that matter, the Group took the view that the problems arising in connexion with the packing of dangerous goods already subdivided into Divisions, Sub-divisions and compatibility groups did not necessitate the breakdown into degree-of-danger groups which the Group of Rapporteurs on the Packing of Dangerous Goods had adopted for other Classes. Moreover, if the proposals for severer mandatory tests were adopted the results achieved might on occasion be contrary to the aim sought by the author of the proposals. The Group therefore concluded that the proposals in question could not be applied in the particular case of explosives.

(b) Steel boxes

46. The Group of Rapporteurs had asked the Group of Experts to consider the same question concerning steel boxes used mainly for the carriage of explosives as is dealt with in paragraph 45 above.

47. On the same grounds as are set out in the foregoing with regard to fibreboard boxes, the Group of Experts took the view that it would be undesirable in the case of explosives to prescribe more severe tests than those at present embodied in the Recommendations.

OPINION ASKED FOR BY THE GROUP OF RAPPORTEURS ON PACKING CONCERNING "WETTED EXPLOSIVES" IN DIVISION 4.1

48. When classifying dangerous goods for packing purposes by degree of danger the Group of Rapporteurs had placed the substances commonly called "wetted explosives", of Division 4.1, in Group I. It had asked the Group of Experts to give it its opinion in that connexion.

49. The question was considered thoroughly by the Group of Experts, which concluded by:

recommending that wetted explosives should continue to be classified in Division 4.1;

reminding the Group of Rapporteurs, first that it should make sure that packages for those substances were capable of retaining the percentage of water required for their carriage, and secondly that the utmost caution should be exercised to avoid assigning to those substances packagings which confined them too closely.

50. At the end of the discussion the IMCO representative pointed out that the package weight limits prescribed in the International Maritime Dangerous Goods Code varied considerably from one wetted explosive to another. The Group of Experts expressed the view that IMCO should reconsider the percentages of water by weight.

51. Consideration of the list of wetted explosives of Division 4.1. revealed that the percentage of water in trinitrobenzene (1.1.2/214) ought to be raised from 30 to 35 per cent. It was decided to do so, which entailed a consequential modification of item 4.1.0/1354.

52. Its consideration of the question of the content of water in per cent prompted the Group to add to the lists a footnote concerning the hexolites, octolites, pentolites and nitroguanidine and stating that the percentage water content should be reviewed.

OTHER QUESTIONS

(a) Type of danger warning to be affixed to vehicles

53. The expert from the United Kingdom described a warning system under consideration in his country to ensure the application of appropriate measures in the event of an accident. It consisted essentially of a square board standing on one corner, representing the danger label advocated by the Recommendations for packages of explosives and bearing the Division number 1.1 or 1.2, etc.

54. The expert from the United States of America described a system called the "hazard information system", which had been given the advance publication required by United States law. Exhaustive studies had been carried out in order to develop that body of rules. The symbols and colours were those advocated in the Recommendations. The shape selected was that of a square standing on one corner. For explosives the square standing on its corner was on a white circle against a black ground, and additional triangular boards were prescribed to show that the vehicle was not loaded or that water must not be used.

55. After thanking the experts from the United Kingdom and the United States for their explanations, the Group recommended the general use of the square board standing on one corner, orange in colour and bearing the symbol advocated by the Recommendations for explosives.

(b) Compatibility of explosives with dangerous goods of other Classes

56. The Group was of the opinion that the problem should be studied and it proposed that the Committee of Experts should include it in its programme of work and take a decision regarding the body competent to carry out the study.

NEXT SESSION

57. The Group expressed the desire that arrangements should be made for the experts to meet early in the spring, without interpretation and without Secretariat help and if possible at Geneva, to prepare the next session, tentatively planned for some time in the summer of 1973.

58. The Secretariat informed the Group that the United Nations Office at Geneva would be able to place a meeting room for about twenty-five persons at its disposal from 26 to 30 March 1973.

59. The Group thanked the representative of OCTI, who had undertaken to procure a meeting room at OCTI's headquarters at Berne if the United Nations Office had not been able to accommodate the experts on the desired dates.

Annex 1

PROPOSED AMENDMENTS AND ADDITIONS TO THE RECOMMENDATIONS (ST/ECA/81/Rev.2), AS ADOPTED BY THE GROUP

(This annex will be circulated later under the symbol E/CN.2/CONF.5/47/Add.1)

Annex 2

LIST OF EXPERTS

Chairman: Mr. W. BYRD (United States of America)

Mr. Q. BANKS	(United States of America)
Mr. H. BARKER	(United Kingdom)
Mr. W. BYRD	(United States of America)
Mr. W. CAMERON III	(United States of America)
Mr. G. CHAUSSARD	(France)
Mrs. Y. DESMEULES	(Central Office for International Railway Transport)
Mr. R. EATON	(United Kingdom)
Mr. H. HEEGER	(Federal Republic of Germany)
Mr. E. HEINRICH	(Federal Republic of Germany)
Mr. R. HERMAN	(United States of America)
Mr. L. MEDARD	(France)
Mr. H. RITTMAN	(United States of America)
Mr. G. ROUSSEAU	(United States of America)
Mr. C. SCHULTZ	(United States of America)
Mr. R. SCHWING	(United States of America)
Mr. W. TAYLOR	(United States of America)
Mr. F. TRIMBORN	(United States of America)
Mr. H. WARDELMANN	(Inter-Governmental Maritime Consultative Organization)
Mr. R. WATSON	(United Kingdom)
Mr. H. YALLOP	(United Kingdom)