

**Committee of Experts on the Transport of Dangerous Goods
and on the Globally Harmonized System of Classification
and Labelling of Chemicals**

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**Sub-Committee of Experts on the Transport of
Dangerous Goods**

Fifty-fourth session

Item 2 (b) of the provisional agenda

**Recommendations made by the Sub-Committee on its fifty-first,
fifty-second and fifty-third sessions and pending issues:
explosives and related matters**

**Concerns about some definitions related to Class 1 in the
Model Regulations**

Transmitted by the expert from Sweden

Introduction

1. This paper deals with three issues related to Class 1; the definition of Class 1 in 2.1.1.1 (c), the definition of pyrotechnic substance in 2.1.1.3 (b) and the phrase “explosion of the total contents” in Glossary of Terms in APPENDIX B. During the drafting of this paper, input has been received from the representative of the Australian Explosives Industry Safety Group (AEISG).

Issue 1: Definition of Class 1 in 2.1.1.1 (c)

2. Definition of Class 1 is given in 2.1.1.1 of the Model Regulations. This definition comprises three parts or sub-definitions; (a), (b) and (c). A product which falls into any part of the definitions is a candidate of Class 1. A candidate of Class 1 may be excluded from Class 1 by virtue of test results.

3. Definitions (a) and (b) are straightforward; (a) is meant for explosive substances which are stable enough for transport and (b) for articles containing explosive substances. On the contrary, definition (c) is not as straightforward. It leaves a large degree of freedom for interpretations.

4. For the reader’s convenience, the text of definition (c) is duplicated in the following:
“(c) Substances and articles not mentioned under (a) or (b) which are manufactured with a view to producing a practical explosive or pyrotechnic effect”.

Problem

5. One interpretation of definition (c) is that any substance or article which is not Class 1 according to definition (a) or definition (b) but manufactured with a view to producing a practical explosive or pyrotechnic effect is still Class 1. Then, according to this interpretation, primary explosives which are too sensitive to be transported but manufactured with a view to producing a practical explosive effect will be accepted as Class 1 by definition (c),

although they are not accepted into Class 1 according to definition (a). Articles which contain a small quantity of explosive substances and present no hazard during transport but are manufactured with a view to producing a practical explosive or pyrotechnic effect will be included in Class 1 by definition (c), although they are excluded from Class 1 by definition (b). In such cases, definition (c) is in contradiction to definition (a) and (b).

6. Definition (c) can also be interpreted in other ways. Since the terms “practical explosive effect” and “practical pyrotechnic effect” are not defined in the Model Regulations, any noticeable effect such as shock wave, fragment, heat, sound, smoke or flame may be considered as a practical explosive or pyrotechnic effect. Consequently, everything that is manufactured with a view to producing such a noticeable effect is Class 1. One example is the explosive atmosphere of gas, vapour or dust, which is not Class 1 according to definition (a) but will be Class 1 according to this interpretation of definition (c).

7. In summary, anything can be Class 1, dependent on how definition (c) is interpreted.

8. The representative from AEISG has traced back to earlier versions of the Model Regulations and identified that the definition (c) was introduced to the Model Regulations 1977. Since then, there have been many unanswered questions about definition (c). What was the rationale behind definition (c) when it was introduced to the Model Regulations? Has there been any product accepted into Class 1 by virtue of definition (c)?

9. The most important questions are: is definition (c) necessary and is there any reason to keep it in spite of the confusions illustrated above?

10. From numerous discussions with experts in the Working Group on Explosive and in the International Group of Experts on the Explosion Risks of Unstable Substances in the past years, the expert from Sweden noticed one arguable reason to keep definition (c). That is, in the case where a substance has shown negative result in Test Series 2 but is still able to be used to produce a practical explosive or pyrotechnic effect, this substance shall be kept in Class 1. For this purpose, definition (c) is needed.

11. The counterargument is, is it possible to have such a case at all? So far, Test Series 2 has always been the dividing line between Class 1 substances and non-Class 1 substances. If in any case, this dividing line is demonstrated not adequate, we should change this dividing line instead of the definition of Class 1.

Possible solution

12. The expert from Sweden is of the opinion that definition (c) should be deleted. As described above, it exists for unknown reasons and is of no use but to cause confusion.

Issue 2: Definition of pyrotechnic substance in 2.1.1.3 (b)

13. In conjunction with the definition of Class 1, terms “explosive substance” and “pyrotechnic substance” are defined in 2.1.1.3 of the Model Regulations.

14. According to the definition, the reaction in a pyrotechnic substance producing the designed effects shall be non-detonative. This causes problems.

Problem

15. First of all, this description is not technically correct. Field experiences have demonstrated that some pyrotechnic substances are capable to detonate, especially when in large quantity.

16. Other legislations such as the EU Directive 2013/29/EU on pyrotechnic articles has accepted the fact that a pyrotechnic substance is capable to detonate by excluding the word “non-detonative” from the definition of pyrotechnic articles.

Possible solution

17. To delete the word “non-detonative” from the definition of pyrotechnic substance in 2.1.1.3 (b) will make the definition scientifically correct.

Issue 3: Phrase “explosion of the total contents” in Glossary

18. The phrase “explosion of the total content” is included in Appendix B “Glossary of Terms”. The current description of the phrase is: *“The phrase “explosion of the total contents” is used in testing a single article or package or a small stack of articles or packages.”*

Problem

19. The problem is that the description alone does not provide any help to understand the phrase. Rather it only tells where the phrase is used.

20. A review of the Model Regulations and the Manual of Tests and Criteria (MTC) showed that this phrase “explosion of the total contents” has been used twice in the MTC where testing procedures for Test 6 (a) and Test 6 (b) are described, namely in 16.4.1.3.5 for Test 6 (a) and in 16.5.1.7 for Test 6 (b).

21. It should be noticed that in both cases, the wording is “explosion of the total contents of the package”, not “explosion of the total contents” alone. Since the phrase “total contents” is explained in “Entire load and total contents” in the Glossary of Terms and the meaning of “explosion” can be deduced from the defined word “explode” in the Glossary of Terms, there is no problem to understand the meaning of the phrase “explosion of the total contents” in the context in 16.4.1.3.5 and 16.5.1.7 of MTC. Therefore, there is no need to explain this phrase “explosion of the total contents” in the Glossary of Terms.

22. Since Test 6 (a) is designed to test a single article or package and Test 6 (b) is designed to test a small stack (0.15 cubic meters) of articles or packages, and after considering the contexts in 16.4.1.3.5 and 16.5.1.7, we can substitute “testing a single article or package” by “Test 6 (a)” and “testing a small stack of articles or packages” by “Test 6 (b)” in the description of the phrase “explosion of the total contents” in the Glossary of Terms.

23. Following this line of logic, the description may now be simplified to *“The phrase “explosion of the total contents” is used in Test 6 (a) or 6 (b)”*.

24. Obviously, such a description contributes nothing to the understanding of MTC. Thus, this phrase in the Glossary of Terms should be deleted. It makes no sense to have it there.

Possible solution

25. Delete the phrase “explosion of the total contents” and its description from the Glossary of Terms.
