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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the
Transport of Dangerous Goods

Thirty-third session
Geneva, 30 June-9 July (a.m) 2008
Item 2 of the provisional agenda

EXPLOSIVES AND RELATED MATTERS

Comments on ST/SG/AC.10/C.3/2006/62 and 2007/29

Transmitted by the expert from Germany*

Introduction

1. At the twenty-ninth session of the Sub-Committee, the expert from Canada proposed an unconfined single package test named 6(d) test. At the thirty-first session a new proposal including a test prescription of that 6(d) test was transmitted.

2. As shown by the expert of Canada, the Manual of Tests and Criteria in the current version does not address the risk of hazardous effects outside the package from accidental functioning. Either the risk of mass explosion or the behaviour in a fire is dealt with.

3. The expert from Germany agrees that there is a lack of assessment of the behaviour of substances or articles in test 6(a) concerning other hazardous effects than mass explosion. It is therefore necessary to have a test to answer the question: "Is there any hazardous effect from accidental functioning not confined within the package?" Only if the answer is "No", the substance or article should be classified 1.4S.

* In accordance with the programme of work of the Sub-Committee for 2007-2008 approved by the Committee at its third session (refer to ST/SG/AC.10/C.3/60 para. 100 and ST/SG/AC.10/C.3/34, para. 14).

4. The expert from Canada proposes an unconfined single package test. The test should be conducted in the same manner as 6(a) test but unconfined. The substance or article would be tested in the package as it is offered for transport. A steel witness plate is also used.

The proposed criteria for an assignment to compatibility group S are:

(a) No damage to the witness plate beneath the package.

(b) No fireball or jet of flame which extends more than 1 m from the package.

(c) No disruption and scattering of the package and its contents.

(d) No metallic projection with a kinetic energy exceeding 8 J as assessed by the distance-mass relation given in Figure 16.6.1.1.

Comments from the expert from Germany

5. Damage to the witness plate beneath the package.

The expert from Germany agrees that the damage of the steel witness plate is a clear sign of a hazardous effect outside of the package.

6. A fireball or jet of flame which extends more than 1 m from the package.

The expert from Germany is concerned that there is a different behaviour with accidental functioning and a bonfire. The criteria above is that for the bonfire when the packaging is degraded by fire. In the case of accidental functioning the diameter of a fireball or the length of a jet of flame should be not more than the maximum dimension of the package.

7. Disruption and scattering of the package and its contents.

The disruption of the package and scattering of parts of it as well as scattering of the contents at first view seems to be a clear sign for hazardous effects outside of the package. But whether an effect is hazardous or not can only be determined by impact on adjacent packages. Tests have been conducted showing that the package was disrupted and was scattered and the content was scattered when not confined. The same procedure but confined by fibreboard boxes as they are used for transport of Class 1 goods filled with sand showed that there were nearly no effects to the adjacent packages. In this single package test detonators were internally initiated. The initiation caused the disruption of the package and many detonators were scattered, initiated ones as well as original ones (see Fig. 1and 2). The 5 fibreboard boxes (1 at each side of the initiated package, one on top of the initiated package) were moved away about 3-6 cm and that one on top sank on one side into the damaged package (see Fig. 3 and 4). The inspection of the adjacent packages showed that there were no marks at 3 packages beside the detonator package as well as at the package on top. Only one (behind the detonator package) had slight marks at the outside (see Fig. 5) and nearly unvisible marks inside (see Fig. 6). That result demonstrates that there is no hazardous effect

outside of the initiated package. For such a demonstration fibreboard boxes design type tested for use for Class 1 should be used. If it is proved that there is no hazardous effect on an adjacent package the assignment to compatibility group S should be possible even if the unconfined test has shown disruption and scattering of the package and its contents.

8. A metallic projection with a kinetic energy exceeding 8 J as assessed by the distance-mass relation given in Figure 16.6.1.1.

The expert from Germany is concerned that there is a different behaviour with accidental functioning and a bonfire. The criteria above is that for the bonfire when the packaging is degraded by fire. The energy to perforate the wall of an adjacent package is assumed to be less than 8 J. Maybe the better way to decide if there is a hazardous effect outside the initiated package is to conduct a confined test (see above). A perforation of the wall of an adjacent package is a clear sign of hazardous effect.

Conclusion

9. The expert from Germany invites the Sub-Committee to discuss some aspects of the proposed criteria, as there are:

The size of a fireball or jet of flame.

The value of the energy of a metallic projection.

The conduction of a confined test to show that the effects outside an initiated package are not hazardous to an adjacent package.

10. The figures below show unconfined and confined tests conducted with time delay detonators and sand filled fibreboard boxes.

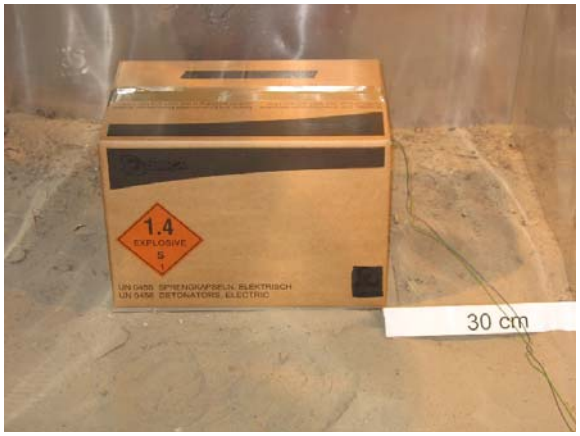

Fig. 1 Unconfined single package test

Fig. 2 Result of unconfined test

Fig. 3 Confined single package test

Fig.4 Result of confined test

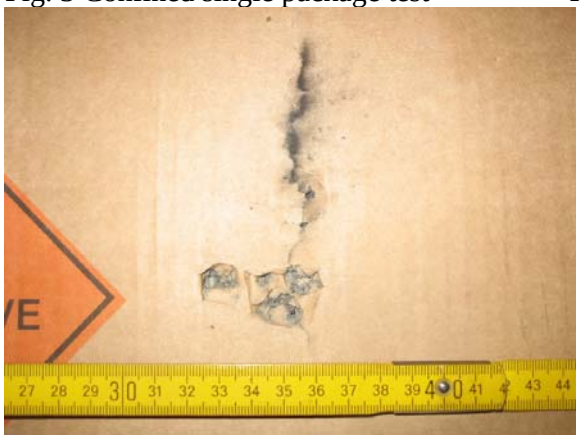

Fig. 5 Fibreboard wall outside

Fig. 6 Fibreboard wall inside