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 2008
Item 2 of the provisional agenda

EXPLOSIVES AND RELATED MATTERS

Amendments to an additional test for 1.4S classification

Transmitted by the expert from Germany

Introduction
Purpose of this INF. Paper is to support the proposal in ST/SG/AC.10/C.3/2008/11 for an additional test for 1.4S classification.
In addition to document ST/SG/AC.10/C.3/2008/44 we want to state more precisely the amendments to the proposed text we like to recommend.

Proposal 1
Replace “severe” with “hazardous” at 10.4.2.3 Type 6 (d), 16.1.1 Type 6 (d), 16.7.1.1.

Justification
The wording then is in consistence with the note in 2.1.1.4 (d) of the UN Recommendations as well as with the proposed texts in boxes 33 of figures 10.3 and 10.8.

Proposal 2
Replace “damage” with “any dent or penetration” in 16.7.1.4 (a).
In 16.4.1.4 “damage” should be replaced with “any dent or penetration” also.

Justification
It is not clear what “damage” of the witness plate means. The witness plate is made of steel and is 3 mm thick. If the effect outside the package dents or penetrates such a steel plate it should be assessed to be hazardous. Since there is the same wording in 6 (a) test it should be changed there also.

Proposal 3
At the end of 16.2.2 insert:
“Test 6 (d) may be waived if the result of test 6 (a) unambiguously shows that there is no hazardous effect outside the package.”

Justification

If a 6 (a) test which is performed according to the preferred method prescribed in 16.4.1.3.4 of the Manual (see below) shows that there are no or only marginal effects to an adjacent package (see example in ST/SG/AC.10/C.3/2008/44) it is not necessary to perform the proposed 6 (d) test. 6 (d) test may be waived in that case.

Manual of Tests and Criteria 16.4.1.3.4 (Procedure of 6 (a) test)

"The preferred method of confinement consists of containers, similar in shape and size to the test package, completely filled with earth or sand and placed as closely as possible around the test package…"

Discussion about hazardous effect outside the package

The effect outside the package may be hazardous on fire-fighting or emergency response efforts as well as on packages transported with packages containing 1.4S goods.

We have to bear in mind that the Compatibility Groups are used to regulate mixed loading either between goods of Class 1 belonging to different Compatibility Groups or between goods of Class 1 and goods of other classes.

Recommendations on the Transport of Dangerous Goods Model Regulations

"7.1.3.1.4 Goods in Compatibility Group S may be transported with goods of Class 1 in all Compatibility Groups other than A and L."

"7.1.3.2.2 Goods in Division 1.4, Compatibility Group S, may be transported together with dangerous goods of other classes."

In conjunction with that the effect on an adjacent package is important.

A main question is if a penetration of the outer wall of an adjacent package is a hazardous effect outside the package in the meaning of the note in 2.1.1.4 (d).

We think such a penetration indeed is a hazardous effect outside the package.

In the same note the effect on fire-fighting or other emergency response efforts only applies to the case when the package has been degraded by fire.

What is the result if there is no severe disruption and scattering of the packaging but a penetration of the wall of the package (see picture 1) which in the 6 (a) test would cause a penetration of the wall of an adjacent package, e.g. fibreboard box.

You will not recognize a penetration of an adjacent package in 6 (a) if the confinement is only sand around and on top, but you will also not recognize in 6 (d) test because you have not got an adjacent package.

Energy of a metallic projection and effects on different materials

For the proposed 6 (d) Test (simulating accidental functioning) the limiting energy for a metallic projection should be 8J calculated by the distance/ mass relation.

You can determine the effect of such a projection having an energy of 8J on a special material. Tests performed similar to those for calibration of the aluminium witness screens have shown that a Fragment Simulating Projectile (FSP) having an energy of 8J clearly perforates the wall of a fibreboard package used as outer packaging for Class 1 goods at a distance of 4 m.

In transport there is no distance between packages or even a very short one.

Tests with a plunger having the same shape at the end as FSP performed with BAM Fallhammer (see pictures 2, 3, 4 and 5) have shown that even an energy of 1J is enough to perforate such a fibreboard wall (see picture 6and 7).

Knowing that it is not admissible per se to compare the energy of the calibration determined by the velocity of the projectile and the energy of the drop weight of BAM Fallhammer, we tested the aluminium of the 6(c) test witness screen by means of the FSP plunger to get an indentation of about 4 mm depth. The energy was found to be about 3J (see picture 8).

With an energy of 3J that FSP plunger penetrates clearly one and also two layers of corrugated fibreboard 3 mm thick (see picture 9 and 10) as well as an aluminium plate 0.5 mm thick (see picture 11) which can be used as packaging for dangerous goods, even liquid ones.

These results show the effects on adjacent packages.
The value of the energy limit should be discussed again.

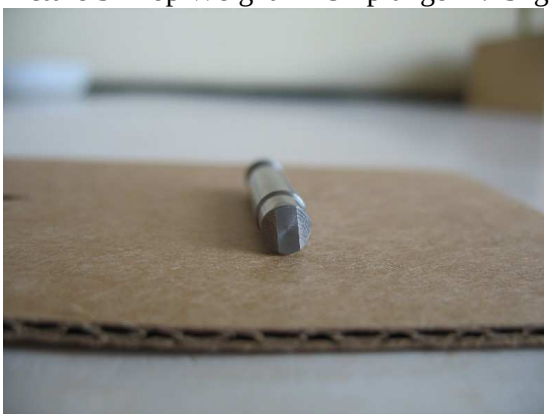
<u>Annex of pictures</u>

Picture 1 Penetration of the wall

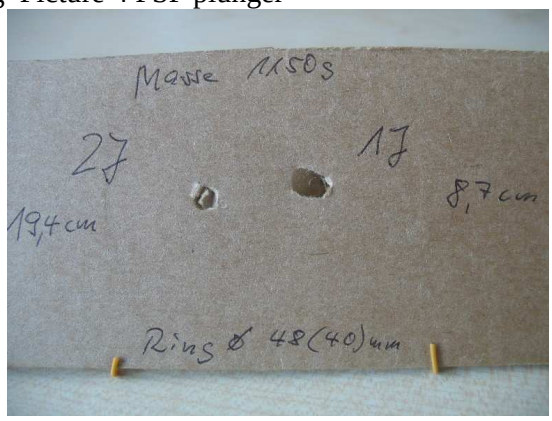
Picture 2 BAM Fallhammer

Picture 3 Drop Weight + FSP plunger 1.15kg

Picture 4 FSP plunger



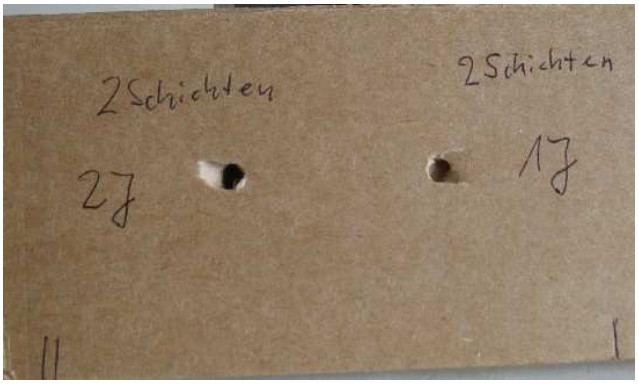
Picture 5 FSP plunger



Picture 6 Fibreboard penetration

Picture 7 Back side

Picture 8 Witness screen Aluminium 3 J
Indentation approx. 4 mm depth



Pictures 9/10 2 layers cardboard 1 j and 2 J, 1st layer both penetrated, 2nd layer 2 J penetrated 1 J not penetrated

Picture 11 Aluminium 0.5 mm 2 J, penetration