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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
(Twenty-first session, 1-10 July 2002,
agenda item 6 (a))

PACKAGINGS (including IBCs and large packagings)

Vibration test (ST/SG/AC.10/C.3/2002/2)

Transmitted by the Expert from Germany

The expert from Spain has submitted a proposal on the amendment of the design type test regime for packagings, including IBCs and large packagings by a vibration test (ST/SG/AC.10/C.3/2002/2). The proposal is based on the majority vote by the Sub-Committee at its seventeenth session, that, in principle, a vibration test shall be included in the Model Regulations taking account of available standards and after clarification of form and criteria of the test.

The Spanish proposal has been supported by the expert from the United States of America in paper ST/SG/AC.10/2002/17, which includes further proposed details of the test performance requirements. The expert from Germany has still some problem with these proposals in general and especially with the described test method. He asked the Sub-Committee to consider the following aspects.

1. Missing data

Statistically relevant data to demonstrate the need for an amendment of the packaging design type test regime have not been provided.

Based on our national experience in packaging performance it can be confirmed that, occasionally, there are failures due to fatigue cracks in metal packagings as there are from other reasons, such as mechanical transport and handling impacts, climatic conditions, chemical interactions or nonconforming quality.

However, there is currently no evidence, that the UN performance test standards as a whole, properly applied, do not provide for an acceptable level of safety and that a revision of the test regime, in particular the addition of vibration test requirements would be justified.

2. Adequate test methods

Of great concern are the vibration test methods and procedures in the Spanish and the American proposals. They are not acceptable due to several reasons. The clause in the US-proposal on other, equally effective methods does not help because it is just the effects of the proposed test which is criticized.

It is envisaged that the establishment of a performance test standard for transport vibrations is particularly difficult. There need to be a relationship to the real transport conditions on one hand and some simplification to reduce the testing efforts to an acceptable level and to allow the testing done with available means. Concerning the test period, it's clear that it has to be shorter than the time of shipments – an acceleration method is necessary.

The proposed test method fails to cope with these basic aspects. The nature of the test are repeated impacts (“bounce test”) in contrast to transport vibrations of secured cargo. Unrealistic local plastic deformations at the impact area are the consequence. The damages caused are not representative for realistic fatigue failures. Other vibration test standards based on different, more realistic principles are available (ISO 13353:2001, MIL-STD-810F, ASTM-D4728-95). The same applies for modern hydraulic or electromechanical shakers. They are state of the art of vibration testing and are capable of causing packagings to vibrate in the described manner. However, it has been proven, that the form of the shock waves used to let the packagings vibrate is of significant influence on the test result. So it would be necessary to specify it.

The relationship of the test period (1 hour) with typical transport periods is unclear; does it cover single trip packagings only or also packagings which are used over a long period of time, such as reconditioned drums?

How are differences in density between test medium water and dangerous goods considered?

The questions raised and the possible options are certainly not adequate to be dealt with by the Subcommittee; its a specialists subject. It’s therefore proposed to allow for a specialists group meeting.

3. Grand-fathering existing design types and reused items

The addition of vibration test requirements to the UN performance standards would be the first significant change since its establishment. It would be indispensable to set grandfather-clauses.

Grand-fathering would be necessary for tenth of thousands of design type approvals worldwide in order to decide whether they need to be withdrawn or kept with the consequence that unlimited numbers of packagings, IBCs and large packagings without proven vibration resistance may be built in future.

Additionally, grand-fathering would be necessary to decide on the further use of packagings, IBCs and large packagings designed for repeated or long-term use and which are already on the market at the time when the new requirements come into force.

Both aspects shed a light on the considerable economical consequences of an amendment of Part 6, as proposed by Spain and the United States of America.
