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ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

Working Party on the Transport of Dangerous Goods

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Agenda item 7

ANY OTHER BUSINESS

Application of sub-section 1.8.5.2

Transmitted by the Government of Belgium

1. Accident at the port of Antwerp, 4 March 2004
2. – Tractor + semi-trailer chassis;
– 8,000-litre tank container transporting liquid bromine (UN No. 1744), density 3.1;
– Filled to 90 per cent of capacity.
3. Circumstances:
– Vehicle became unstable in 90° bend (at speed of 32 km/h);
– Bolts attaching container to chassis tore off;
– Protective cap over top-mounted loading/unloading hatches unable to withstand impact.

4. Consequences:

- Discharge of bromine through hatches and loss of about 6,000 litres;
- Evacuation of significant number of persons;
- Closure of road network and complete stoppage of port traffic;
- Soil pollution.

5. Cause of accident:

- Excessive speed of vehicle (32 km/h);
- Use of a semi-trailer with two axles and floor height of 1.40 m.

6. Comparative calculations of the stability of semi-trailers with two and three axles were performed by a Belgian manufacturer under the following conditions:

- Identical floor height;
- Fitted with identical 8,000-litre lead-lined tank container;
- Loaded with 19,120 kg of bromine (UN No. 1744), density 3.1, equivalent to a load of 6,000 kg (tare weight of container) + 19,120 kg of bromine or 25,120 kg in total.

The results indicated that:

- (1) The centre of gravity of the loaded semi-trailer shifted from 2,006 mm (two axles) to 1,943 mm (three axles) and the lateral stability, as per Rule 111, from 0.375 g (two axles) to 0.448 g (three axles);
- (2) When semi-trailer with three axles is filled with 23,560 kg of bromine (to 95 per cent of maximum capacity), centre of gravity is 1,964 mm and lateral stability is 0.442 g (these critical values offer greater security than corresponding values for two axles).

7. Proposed measures:

- Use of a more stable container platform (maximum height \pm 1.10 m, three axles);
- Special training for drivers transporting high-density liquids.
