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Working Party on the Construction of Vehicles

Working Party on General Safety Provisions
(Seventy-fifth session, 27-30 October 1998,
agenda item 1.)

PROPOSAL FOR DRAFT AMENDMENT TO REGULATION No. 36

(Public service vehicles)

Transmitted by the Expert from the Russian Federation

Note: The text reproduced below was prepared by the expert from the Russian Federation with a view to including trolleybuses in the scope of the Regulation. It is based on the text distributed without a symbol (informal document No. 9) during the seventy-fourth session of the Meeting of Experts (TRANS/WP.29/GRSG/53, para. 20).

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Note: This document is distributed to the Experts on General Safety Provisions only.

A. PROPOSAL

Paragraph 2.1.4., amend to read:

"2.1.4. "Trolleybus" means a vehicle of Classes I, II or III, electrically driven by energy from outboard wires."

Paragraph 2.1.4. (former), renumber as paragraph 2.1.5. and amend to read:

"2.1.5. "articulated bus, coach or trolleybus" means ..."

Paragraph 5.1.1.3., amend to read:

"... articulated buses, coaches or trolleybus..."

Paragraph 5.2.1.4., amend to read:

"...articulated bus, coach or trolleybus..."

Paragraph 5.5.4.5., amend to read:

"Fuel leaking from any part of the system shall be able to flow away freely to the road surface, but never on to the exhaust system of a bus or the high voltage electrical equipment of a trolleybus."

Insert a new paragraph 5.5.5.3.4., to read:

"5.5.5.3.4. operation of a trolley pole retriever."

Paragraph 5.5.9., amend to read:

"No flammable material shall be permitted within 10 cm of the exhaust system of a bus or the high voltage electrical equipment of a trolleybus or other unless ..."

Paragraph 5.6.1.2., amend to read:

"... bus, coach or trolleybus..." and "...articulated bus or trolleybus..."

Paragraph 5.6.1.5., after the table insert the sentence to read:

"For a trolleybus the total number of exits can be decreased on one exit"

Paragraph 5.6.1.6., amend to read:

"... bus, coach or trolleybus..."

Paragraph 5.6.2.4., amend to read:

"... in the roof, except for trolleybus."

Paragraph 5.9., amend to read.

"Articulated section of articulated buses, coaches or trolleybuses."

Paragraph 5.9.2., amend to read:

"When the articulated buses, coaches or trolleybuses,..."

Paragraph 5.9.4., amend to read:

"On articulated buses, coaches or trolleybuses,..."

Paragraph 5.10.3., amend to read:

"....in the case of an articulated bus, coach or trolleybus."

Paragraph 5.11., amend to read:

"Direction-holding of articulated buses, coaches or trolleybuses.

When an articulated bus, coach or trolleybus..."

Insert new paragraphs 5.16. To 5.16.3.3., to read:

"5.16. Special requirements for trolleybuses.

5.16.1. General requirements.

5.16.1.1. The trolleybus electrical systems will divided into two major electrical subsystems:

The nominal high voltage DC overhead traction power supplied system;

A low voltage (24 volts nominal) DC system for the traditional trolleybuses battery voltage electrical functions such as exterior lighting, radio, door controls, defroster blower, and similar low energy loads.

5.16.1.2. Transient voltage above 220 volts may be used in the fluorescent lighting system.

5.16.1.3. All circuits shall be protected by automatic reset circuit breakers or fuses. Protection shall include easily accessible fusible links in the supply wires to the bus bars inside the major electrical junction boxes.

5.16.1.4. All wiring between major electrical components and terminations, except battery wiring, shall have double electrical insulation to the extent practicable, shall be waterproof, and shall meet specification requirements of SAE Recommended Practice J1292 and J1128 - Type SXL, TSL or GXL, or equivalent European Standards. Except as interrupted by the master battery disconnect switch, battery wiring shall be continuous cables with connections secured by bolted terminals. Battery wiring shall conform to specification requirements of SAE Standard J1127 - Type SGT or SGX and SAE Recommended Practice J541, or equivalent European Standards.

5.16.1.5. Only low voltage electrical equipment may use the trolleybus chassis for current return grounds.

5.16.2. Traction power system.

5.16.2.1. The trolleybus shall be capable of passing through sections of insulated or shorted trolley line without damage to itself or the trolley line and without direct manual intervention by the driver. The trolleybus shall be capable of powering and braking through sections of reverse polarity trolley line (should such a condition exist) without manual intervention by the driver.

5.16.2.2. A two - pole contactor, or two one-pole contactors, to disconnect both sides of the trolley line shall be provided. Dewiring shall open the contactor. This contactor shall be rated to at least 1200 amps at high voltage DC and shall be located on the roof. A remote control circuit of this contactor shall be provided.

5.16.2.3. The design of the power collection and conditioning equipment shall be protected from high voltage transient spikes and trolley wire lightning strikes, which may occur in the intended service operating areas.

5.16.2.4. All wiring circuits and components energized by the high voltage traction power system shall be double insulated to the extent practicable. Double insulation shall consist of two separate levels of insulation, each of which is a complete insulation in itself, separated (except where approved based on service experience) by a metallic intermediate, where practicable. Electric leads from the metallic intermediates of double-insulated components shall be brought to a group of convenient test points. The group of test points shall include a high voltage test point and a chassis ground test point and

any other items necessary to enable both levels of insulation on the entire high voltage system to be checked with a “Megger” or other similar device when the trolley poles are down.

5.16.2.5. Electrical components energized by the trolley line voltage - including the traction equipment, the battery charger, auxiliary converters, and accessory equipment - shall be protected from overvoltage and overcurrent transients. Precautions shall be taken to minimize hazards to service personnel arising from stored energy in high voltage filter capacitors.

5.16.2.6. Class H (IEEE or equivalent) rating is required for motor insulation and the motor shall not exceed Class F (IEEE or equivalent) limits in routine service under worst case ambient conditions. Each motor shall be tested in accordance with IEEE Standard II (or equivalent).

5.16.2.7. The motor and power train shall not be in an unsafe over-speed condition if the trolleybus is travelling 20 per cent above the top speed.

5.16.2.8. Trolleybus shall be protected from damage due to lightning striking either the trolleybus or the trolley supply wires, or from broken electric utility distribution wires contacting the trolleybus power supply wires. Service proven capacitor and/or voltage break - over lightning arresters shall be sized and roof mounted for effective lightning protection of the trolleybus equipment.

5.16.2.9. All high voltage DC wiring shall have insulation rated at no less than 2500 volts. The group of test points shall include a high voltage test point and a chassis ground test point and any other items necessary to enable both levels of insulation on the entire high voltage system to be checked with “Megger” or similar device when the trolley poles are down (high voltage power source disconnected).

5.16.2.10. The trolleybuses must be equipped with indicators that provide the driver with a visual and audible alarm when current leakage greater than three (3) milliamperes (mA) exists from the high voltage DC system to the trolleybus frame or body. Leak circuit must contain a bleed resistor to discharge static build-up to the negative overhead.

5.16.2.11. In doorways electrical insulation shall be required from the trolleybus body to all doors, stanchions, railings and grab rails to preclude and avoid shocks due to “hot body” shorting situations. All parts of the doors and other components that can be touched or reached by any child or adult standing on the

ground outside the trolleybus shall be completely electrically isolated and insulated from the rest of the vehicle body structure.

5.16.3. Bases, Poles and Current Collectors.

5.16.3.1. The poles and pole bases shall be electrically insulated from the trolleybus body and from the trolley electric current collector. The poles shall be insulated with heavy-duty abrasion-resistant, weatherproof, electrical insulating material for a length of 3.5 meters from the tip of the pole down.

5.16.3.2. Trolley poles shall not extend more than approximately 1200 millimeters beyond the rear of the bus in the down position. Poles in the down position of a trolleybus with deflated suspension system shall not contact a trolleybus approaching from the rear.

5.16.3.3. The free end of each trolley pole shall be attached by means of a rope to a retriever mounted on the rear body panel of the trolleybus. The retriever shall use a light winding force to keep the rope from hanging slack. In case the pole dewires, the retriever shall reliably, quickly, and firmly pull the pole down without damage to the pole and to the trolleybus roof equipment. The retriever shall contain adequate rope to allow the poles to be positioned at the maximum angle at which they can be used.

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B. JUSTIFICATION

We would like to bring to your attention the subject of trolleybuses, which we believe, are of increasing importance worldwide. However, this issue is not covered by the current Regulations.

Having in mind that the majority of participants are not prepared to discuss this question, we suggest that it would be useful if we could inform our colleagues with our point of view on this subject.

We believe that this subject could be recognized as an issue for general discussion at one of the forthcoming sessions.