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PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 52
(Small capacity public service vehicles)

Transmitted by the Expert from Belgium

Note: The text reproduced below was prepared by the expert from Belgium jointly with the experts from the United Kingdom and Sweden. The document, that refers to document TRANS/WP.29/GRSG/1999/21, has as a main purpose to set up provisions regarding the stability of wheelchairs, to be introduced in annex 5 to the Regulation. It is based on a document distributed without a symbol (informal document No. 16) during the seventy-eighth session (TRANS/WP.29/GRSG/57, para. 22)

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

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Annex 5,

Paragraphs 3.8. to 3.8.2., amend to read:

"3.8. Stability of wheelchairs

3.8.1. Wheelchair restraint system. As an alternative to the requirements contained in paragraphs 3.8.1. to 3.8.1.3. restraint systems may comply with the requirements contained in paragraphs 3.8.2. to 3.8.2.11.

3.8.1.1. In a vehicle where passenger seats are not required with any kind of occupant restraint system, the wheelchair space shall be fitted with a restraint system in order to warrant the stability of the wheelchair;

A static test shall be carried out in accordance with the following requirements:

(a) a force of $250 \text{ daN} \pm 20 \text{ daN}$ per wheelchair shall be applied on the restraint system itself.

(b) the force shall be applied in the horizontal plane of the vehicle and towards the front of the vehicle if the restraint system is not attached to the floor of the vehicle. If the restraint system is attached to the floor, the force shall be applied in an angle of $45^\circ \pm 10^\circ$ to the horizontal plane and towards the front of the vehicle.

(c) the force shall be maintained for a period of not less than 1.5 seconds.

(d) the restraint system shall be capable of withstanding the test. Permanent deformation, including partial rupture or breakage of the restraint system shall not constitute failure if the required force is sustained for the specified time. Where applicable, the locking device enabling the wheelchair to leave the vehicle shall be operable by hand after removal of the traction force.

3.8.1.2. When passenger seats are required with occupant restraint systems, each wheelchair space shall be provided with a restraint system capable of restraining the wheelchair and its occupant.

This restraint system and its anchorages shall be designed to withstand forces equivalent to the ones required for the passenger seats and occupant restraint systems.

A static test shall be carried out in accordance with the following requirements

- (a) the forces referred hereto shall be applied in forward and rearward direction, separately and on the restraint system itself.
- (b) the force shall be maintained for a period of not less than 0.2 seconds.
- (c) the restraint system shall be capable of withstanding the test. Permanent deformation, including partial rupture or breakage of the restraint system shall not constitute failure if the required force is sustained for the specified time. Where applicable, the locking device enabling the wheelchair to leave the vehicle shall be operable by hand after removal of the traction force.

3.8.1.2.1. in forward direction in the case of a separate wheelchair and wheelchair user restraint system

3.8.1.2.1.1. For M2 category of vehicles

- (a) 1,110 daN \pm 20 daN in the case of a lap belt. The force shall be applied on the wheelchair user restraint system in the horizontal plane of the vehicle and towards the front of the vehicle if the restraint system is not attached to the floor of the vehicle. If the restraint system is attached to the floor, the force shall be applied in an angle of $45^\circ \pm 10^\circ$ to the horizontal plane of the vehicle and towards the front of the vehicle.
- (b) 675 daN \pm 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 675 daN \pm 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the torso portion of the belt in the case of a 3-point belt.
- (c) 1,715 daN \pm 20 daN in an angle of $45^\circ \pm 10^\circ$ to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system.
- (d) the forces shall be applied simultaneously.

3.8.1.2.1.2. For M3 category of vehicles

- (a) 740 daN \pm 20 daN in the case of a lap belt. The force shall be applied on the wheelchair user in the horizontal plane of the vehicle and towards the front of the vehicle if the restraint system is not, the force shall be applied in an angle $45^\circ \pm 10^\circ$ to the horizontal plane of the vehicle and towards the front of the vehicle.
- (b) 450 daN \pm 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 450 daN \pm 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the torso portion of the belt in the case of 3-point belt.
- (c) 1,130 daN \pm 20 daN in an angle of $45^\circ \pm 10^\circ$ to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system.
- (d) the forces shall be applied simultaneously.

3.8.1.2.2. in forward direction in the case of a combined wheelchair and wheelchair user restraint system

3.8.1.2.2.1. For M2 category of vehicles

- (a) 1,110 daN \pm 20 daN in an angle of $45^\circ \pm 10^\circ$ to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair user restraint system in the case of a lap belt.
- (b) 675 daN \pm 20 daN in an angle of $45^\circ \pm 10^\circ$ to the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 675 daN \pm 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the torso portion of the belt in the case of a 3-point belt.
- (c) 1,715 daN \pm 20 daN in an angle of $45^\circ \pm 10^\circ$ to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system.
- (d) the forces shall be applied simultaneously.

3.8.1.2.2.2. For M3 category of vehicles

- (a) 740 daN \pm 20 daN in an angle of $45^\circ \pm 10^\circ$ to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair user restraint system in the case of a lap belt.

(b) 450 daN \pm 20 daN in an angle of 45° \pm 10° to the horizontal plane of the vehicle and towards the front of the vehicle on the lap portion of the belt and 450 daN \pm 20 daN in the horizontal plane of the vehicle and towards the front of the vehicle on the torso portion of the belt in the case of 3-point belt.

(c) 1,130 daN \pm 20 daN in an angle of 45° \pm 10° to the horizontal plane of the vehicle and towards the front of the vehicle on the wheelchair restraint system.

(d) the forces shall be applied simultaneously.

3.8.1.3. in rearward direction

810 daN \pm 20 daN in an angle of 45° \pm 10° to the horizontal plane of the vehicle and towards the rear of the vehicle on the wheelchair restraint system.

3.8.2. Alternative wheelchair restraint system:

3.8.2.1. a wheelchair space shall be fitted with a wheelchair restraint system suitable for general wheelchair application and shall allow the carriage of a wheelchair and a wheelchair user facing the front of the vehicle;

3.8.2.2. a wheelchair space shall be fitted with a wheelchair user restraint system which shall comprise a minimum of two anchorage points and a pelvic restraint (lap belt) designed and constructed of components intended to perform in a similar manner to those of a seat belt conforming to the European Community Directive 77/541/EEC, as amended.

3.8.2.3. any restraint system fitted to a wheelchair space shall be capable of being easily released in the case of an emergency.

3.8.2.4. any wheelchair restraint system shall either:

3.8.2.4.1. meet the dynamic test requirements described in paragraph 3.8.2.8. and be securely attached to vehicle anchorages meeting the static test requirements in paragraph 3.8.2.6.; or

3.8.2.4.2. be securely attached to vehicle anchorages such that the combination of restraint and anchorages meets the requirements of paragraph 3.8.2.8.

3.8.2.5. any wheelchair user restraint shall either:

3.8.2.5.1. meet the dynamic test requirements described in paragraph 3.8.2.9. and be securely attached to vehicle anchorages meeting the static test requirements in paragraph 3.8.2.6.; or

3.8.2.5.2. be securely attached to vehicle anchorages such that the combination of restraint and anchorages meets the dynamic test requirements described in paragraph 3.8.2.9. when attached to anchorages set up as described in paragraph 3.8.2.6.7.

- 3.8.2.6. A static test shall be carried out on the anchorage points for both the wheelchair restraint system and the wheelchair user restraint in accordance with the following requirements:
- 3.8.2.6.1. the forces specified in paragraph 3.8.2.7. shall be applied by means of a device reproducing the geometry the wheelchair restraint system;
- 3.8.2.6.2. the forces specified in paragraph 3.8.2.7.3. shall be applied by means of a device reproducing the geometry of the wheelchair user restraint and by means of a traction device specified in paragraph 5.3.4. of European Community Directive 76/115/EEC, as amended.
- 3.8.2.6.3. the forces in paragraphs 3.8.2.6.1. and 3.8.2.6.2 shall be applied simultaneously in the forward direction and at an angle of $10^{\circ} \pm 5^{\circ}$ above the horizontal plane;
- 3.8.2.6.4. the forces in paragraph 3.8.2.6.1. shall be applied in the rearward direction and at an angle of $10^{\circ} \pm 5^{\circ}$ above the horizontal plane;
- 3.8.2.6.5. the forces shall be applied as rapidly as possible through the central vertical axis of the wheelchair space; and
- 3.8.2.6.6. the force shall be maintained for a period of not less than 0.2 seconds.
- 3.8.2.6.7. the test shall be carried out on a representative section of the vehicle structure together with any fitting provided in the vehicle which is likely to contribute to the strength or rigidity of the structure.
- 3.8.2.7. The forces specified in paragraph 3.8.2.6. are:
- 3.8.2.7.1. In the case of anchorages provided for a wheelchair restraint system fitted to a M2 vehicle:
- 3.8.2.7.1.1. 11,100 N applied in the longitudinal plane of the vehicle and towards the front of the vehicle at a height of not less than 200 mm and not more than 300 mm measured vertically from the floor of the wheelchair space, and
- 3.8.2.7.1.2. 5,500 N applied in the longitudinal plane of the vehicle and towards the rear of the vehicle at a height of not less than 200 mm and not more than 300 mm measured vertically from the floor of the wheelchair space;
- 3.8.2.7.2. In the case of anchorages provided for a wheelchair restraint system fitted to a M3 vehicle:

- 3.8.2.7.2.1. 7,400 N applied in the longitudinal plane of the vehicle and towards the front of the vehicle at a height of not less than 200 mm and not more than 300 mm measured vertically from the floor of the wheelchair space, and
- 3.8.2.7.2.2. 3,700 N applied in the longitudinal plane of the vehicle and towards the rear of the vehicle at a height of not less than 200 mm and not more than 300 mm measured vertically from the floor of the wheelchair space;
- 3.8.2.7.3. in the case of anchorages provided for a wheelchair user restraint system the forces shall be in accordance with the requirements of paragraph 5.4. of European Community Directive 76/115/EEC, as amended.
- 3.8.2.8. A wheelchair restraint system shall be subject to a dynamic test carried out in accordance with the following requirements:
 - 3.8.2.8.1. a representative wheelchair test trolley of mass 85 kg shall, from a speed of between 48 km/h to 50 km/h to rest, be subject to a deceleration-time pulse
 - 3.8.2.8.1.1. exceeding 20 g in the forward direction for a cumulative period of at least 0.15 seconds;
 - 3.8.2.8.1.2. exceeding 15 g in the forward direction for a cumulative period of at least 0.4 seconds;
 - 3.8.2.8.1.3. exceeding a duration of 0.075 seconds;
 - 3.8.2.8.1.4. not exceeding 28 g and for not more than 0.8 seconds;
 - 3.8.2.8.1.5. not exceeding a duration of 1.2 seconds, and
 - 3.8.2.8.2. a representative wheelchair test trolley of mass 85 kg shall, from a speed of between 48 km/h to 50 km/h to rest, be subject to a deceleration-time pulse:
 - 3.8.2.8.2.1. exceeding 5 g in the rearward direction for a cumulative period of at least 0.012 seconds;
 - 3.8.2.8.2.2. not exceeding 8 g in the rearward direction and for not more than 0.2 seconds;
 - 3.8.2.8.3. the test in paragraph 3.8.2.8.2 shall not apply if the same restraints are used for the forward and rearward direction or if an equivalent test has been conducted.
 - 3.8.2.8.4. for the above test, the wheelchair restraint system shall be attached to either:

- 3.8.2.8.4.1. anchorages fixed to the test rig which represents the geometry of the anchorages in a vehicle for which the restraint system is intended, or
- 3.8.2.8.4.2. anchorages forming part of a representative section of the vehicle for which the restraint system is intended, set up as described in paragraph 3.8.2.6.7.
- 3.8.2.9. A wheelchair occupant restraint shall comply with the test requirements specified in paragraph 2.7.8.4. of European Community Directive 77/541/EEC or an equivalent test to the deceleration-time pulse in paragraph 3.8.2.8.1. A seat belt approved to European Community Directive 77/541/EEC and so marked shall be deemed to comply.
- 3.8.2.10. A test in paragraphs 3.8.2.6., 3.8.2.8. or 3.8.2.9. shall be deemed to have failed unless the following requirements are met:
 - 3.8.2.10.1. no part of the system shall have failed, or shall have become detached from its anchorage or from the vehicle during the test;
 - 3.8.2.10.2. mechanisms to release the wheelchair and user shall be capable of release after completion of the test;
 - 3.8.2.10.3. in the test in paragraph 3.8.2.8. the wheelchair shall not move more than 200 mm in the longitudinal plane of the vehicle during the test;
 - 3.8.2.10.4. no part of the system shall be deformed to such an extent after completion of the test that, because of sharp edges or other protrusions, the part is capable of causing injury.
- 3.8.2.11. Its operating instructions shall be clearly displayed adjacent to it.
- 3.8.3. As an alternative to the provisions of paragraph 3.8.1.1., the wheelchair space shall be designed for the wheelchair user to travel unrestrained with the wheelchair facing rearwards against a support or backrest, in accordance with the following provisions:
 - (a) one of the sides of the space for a wheelchair shall rest against a side or wall of the vehicle;
 - (b) a support or backrest perpendicular to the longitudinal axis of the vehicle shall be provided in the forward end of the wheelchair space;
 - (c) the support or backrest shall be designed for the wheels or the back of the wheelchair to rest against the support or backrest in order to avoid the wheelchair from tipping over;

- (d) the support or backrest of the seat row in front shall be able to withstand a force of $250 \text{ daN} \pm 20 \text{ daN}$ per wheelchair. The force shall be applied in the horizontal plane of the vehicle and towards the front of the vehicle in the middle of the support or backrest. The force shall be maintained for a period of not less than 1.5 seconds;
- (e) a handrail or handhold shall be fitted to the side or wall of the vehicle in such a way to allow the wheelchair user to grasp it easily;
- (f) a retractable handrail or any equivalent device shall be fitted on the opposite side of the wheelchair space in order to restrict any lateral shift of the wheelchair and to allow the wheelchair user to grasp it easily;
- (g) the floor surface of the special area shall be slip-resistant;
- (h) a sign shall be fixed adjacent to the wheelchair area with the following text:

"This space is reserved for a wheelchair. The wheelchair must be placed facing rearwards resting against the support or backrest with the brakes on."
