Transmitted by the representative
of the Russian Federation

Informal Document No. **WP.29-147-12**
(147th WP.29, 10 - 13 March 2009
agenda item 7.1.)

Proposal for new draft rule to be annexed to the Agreement concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of such Inspections

Uniform provisions

for periodical technical inspections of wheeled vehicles with regard braking

1. SCOPE

1.1. For the purpose of Article 1 of the Agreement concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of such Inspections, the items to be inspected are related to safety requirements;

1.2. Wheeled vehicles used in international transport shall satisfy the requirements set out below;

1.3. Contracting Parties may decide to extend the requirement of paragraph 1.2. above also to vehicles used in domestic transport.

2. DEFINITIONS

For the purpose of this Rule,

2.1. "Agreement" means the 1997 Vienna Agreement concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of such Inspections;

2.2. "International Technical Inspection Certificate" means a certificate about the first registration after manufacture and the periodical technical inspections of wheeled vehicles in compliance with the provisions of Article 1 and Appendix 2 of the Agreement (see para. 2.1. above);

2.3. "Periodical Technical Inspection" means a periodical administrative uniform procedure by which the authorised technical Inspection Centres responsible for conducting the inspection tests declare, after carrying out the required verifications, that the wheeled vehicle submitted conforms to the requirements of this Rule;

2.4. "Wheeled vehicle" means motor vehicles of categories M2, M3, N2 and N3, as specified in Consolidated Resolution R.E.3. (document TRANS/WP.29/78/Rev.1, as amended), used in international transport whose

permissible maximum mass exceeds 3,500 kg, except those used for the carriage of passengers and having not more than eight seats in addition to the driver's seat;

2.5. "Verification" means the proof of compliance with the requirements set out in the Annex to this Rule through tests and checks carried out using techniques and equipment currently available, and without dismantling or removing any part of the vehicle;

2.6. "1958 Geneva Agreement" means the Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be fitted and/or used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals granted on the basis of these Prescriptions, done at Geneva on 20 March 1958 and amended as of 16 October 1995;

2.7. "ECE Regulation" means a Regulation annexed to the 1958 Geneva Agreement.

3. Inspection requirements

3.1. The service braking system must meet the requirements for braking performance and stability of vehicle during braking, and secondary, parking and an auxiliary brake system - for braking performance according to table 1 and 2.

Table 1 - Application of requirements for braking performance and stability under braking on roller stands

Requirement	Braking system					
	Service				Secondary	Parking
	Without ABS, or ABS with a threshold of switching off above the speed the stand		ABS with a threshold of switching off below the speed the stand			
	Effectiveness of Braking	Stability of the vehicle under braking	Effectiveness of braking	Stability of the vehicle under braking		
Specific braking force	+	-	-	-	+	+
The relative difference in brake force of wheel axle	-	+	-	-	-	-
Locking wheels on rollers or automatically switch off the stand because the wheels slip on rollers	+	-	-	-	+	+

Table 2 - Application of performance requirements and stability of vehicle under braking on the road

Requirement	Braking system						
	Service				Secondary	Parking	Auxiliary
	Without ABS		With ABS				
	Effectiveness of Braking	Stability under braking	Effectiveness of Braking	Stability under braking			
Stopping distance	+	-	+	-	+	-	-
Settled slowdown	+	-	+	-	+	-	+
Initial response and pressure build-up time	+	-	+	-	+	-	-
Corridor of braking	-	+	-	-	-	-	-
The slope of the road, where vehicle is held motionless	-	-	-	-	-	+	-
Straight-ahead during braking	-	-	-	+	-	-	-

Note to Table 1 and 2 - The sign "+" means that the requirement should be used when evaluating the performance of the braking or braking stability, the sign "-" should not be used.

3.2. The service braking system must ensure compliance with performance requirements of braking at the stands according table 3, or on the road according table 4 or 5, with an initial speed of braking on the road - 40 km/h.

Table 3 - Braking performance requirements to the service braking system for checks on roller stands

Vehicle	Category	The force on the control $\mathbf{P_п}$, N	Specific brake force $\boldsymbol{\gamma_т}$, no less, to:	
			service braking system	Secondary braking system
Passenger and passenger/cargo vehicles	M_1	490 (392*)	0,53	0,26
	M_2, M_3	686 (589*)	0,46	0,23
Trucks	N_1, N_2, N_3	686 (589*)	0,46	0,23

Trailers with two or more axles	O_1, O_2, O_3, O_4	686	0,45	-
central axis trailers and semi trailers	O_1, O_2, O_3, O_4	686	0,41	-
* For secondary braking system with hand controls				

Table 4 - Braking performance requirements to the service braking system for checks on the road with test device

Vehicle	Category	The force on the control $\mathbf{P_п}$, H:	Stopping distance $\mathbf{S_т}$, m, not more, to:	
			service braking system	secondary braking system
Passenger and passenger/cargo vehicles	M_1	490 (392*)	15,8	28,1
	M_2, M_3	686 (589*)	19,6	31,4
Cars with a trailer without brakes	M_1	490	15,8	-
Trucks	N_1, N_2, N_3	686 (589*)	19,6	31,4
* For the secondary braking system with hand controls				

Table 5 - Braking performance requirements to the service braking system for checks on the road with registration of braking parameters

Vehicle	Category	The force on the control $\mathbf{P_п}$, H	Settled slowdown $\mathbf{j_{уст}}$, m/s^2, not less	Initial response and pressure build-up time $\boldsymbol{\tau_{ср}}$, s, not more than, for:	
				service braking system	secondary brake system
Passenger and passenger/cargo vehicles	M_1	490 (392*)	5,2	0,6	0,6
	M_2, M_3	686 (589*)	4,5	0,8 (1,0 **)	0,8 (1,0**)
Cars with a trailer without brakes	M_1	490	5,2	0,6	-
Trucks	N_1, N_2, N_3	686 (589*)	4,5	0,8 (1,0 **)	0,8 (1,0**)
* For vehicles with hand controls for the secondary braking system. ** For the vehicles, manufactured prior to 01.01.1981.					

3.3. During service braking with the initial braking speed of 40 km/h any part of vehicle should not exit from the normative movement corridor of 3 m wide and vehicle less of 1,7 m width- the corridor movement 2,5 m wide.

3.4. When checked on the stands it is allowed that relative brake force difference for the wheel axle (percentage of highest value) with disc wheel brake mechanisms is not more than 20% and for the wheel axles with drum brake mechanisms is not more than 25%. For the vehicles of category M_1 until the end of the period of running in allowed the use requirements pre-installed in the operational documentation.

3.5. The service braking system of vehicle combination with pneumatic brake control should be workable in an emergency mode.

3.6. Parking brake system must ensure:

for the vehicle loaded to its technically permissible maximum mass:

- a specific braking force of not less than 0,16;

- or stationary mode on a slope of (16 ± 1)%.

For a vehicle in running order:

- design specific braking force is not less then the least: 0,15 of relation technically permissible maximum mass to the mass of vehicle in the verification or 0,6 relation curb weight per axle (s) on which the parking brake system acts, to curb weight;

- or stationary mode for vehicles of categories M_1-M_3 on a slope of (23 ± 1)% and (31 ± 1)% for vehicles of categories N_1 - N_3.

The force applied to the control of parking brake system to bring it into operation, shall not exceed:

- in the case of manual control:

392 N - for vehicle of category M_1;

589 N - for vehicles of another categories.

- in the case of the leg control:

490 N - for vehicle of category M_1;

688 N - for vehicles of another categories.

Parking brake system in which the spring chamber has a separate drive from the secondary braking system, while braking on the road with an initial speed of 40 km/h should ensure deceleration at least:

for categories M_2 and M_3 vehicles, having not less than 0,37 curb mass distributed to the axle (s) equipped with parking braking system - 2,2 m/s^2;

for categories N vehicles, having not less than 0,49 curb mass distributed to the axle (s) equipped with parking braking system - 2,9 m/s^2.

3.7. Auxiliary braking system, except for motor retarder should ensure in a speed range of 25 - 35 km/h steady deceleration of not less than 0,5 m/s^2 - for vehicles loaded to authorized maximum weight and 0,8 m/s^2 - for vehicles in running order.

3.8. Secondary braking system, equipped with the independent control, must ensure braking performance in accordance with table 3, or in table 4 or 5. Start braking with speed checks on the road - 40 km/h.

3.9. The allowed drop in air pressure in pneumatic hydraulic or pneumatic brake actuator when engine is shout down should be no more than 0.05 MPa within:

30 minutes - in off position of the control braking system;

15 minutes - after full actuation of the brake control system.

Leakage of compressed air from the wheel brake chambers are not permitted.

3.10. Pressure at monitoring outlets of pneumatic brake receivers with the engine running is allowed within the limits set by the manufacturer in the operating documentation.

3.11. In the brake actuator is not allowed:

- brake fluid leakage in the pipes or joints of hydraulic brake actuator;

- Excessive visible abrasion and damage the brake pipe;

- Corrosion, threatening the loss of tightness or destruction;

- Availability of parts with cracks or permanent deformation

3.12. Violation of the lock of control parking brake system shall not be permitted.

3.13. Flexible brake hoses, transmitting pressure of compressed air or brake fluid wheel to brake mechanisms must be connected to each other without additional transitional elements (for vehicles manufactured after 01.01.81). The location and length of the flexible brake hoses should be leak-proof connection with the maximum elastic deformation of the suspension and the angles of rotation of wheels. Swelling hose under pressure, and the presence of cracks and abrasion are not allowed.

3.14. The location and length of connecting hose of pneumatic brake drive of vehicle combinations must be free of damage, with reciprocal movement of the tractor and trailer (semitrailer).

3.15. Effects of working and secondary braking systems should ensure smooth, proper reduction or increase of braking forces (deceleration of vehicle) with a decrease or increase, respectively, the efforts on the control of braking system.

3.16. Violation of the integrity of governor of braking forces if fitted, is not permitted.

3.17. Vehicles equipped with anti-lock braking systems (ABS) in running order when braking with an initial speed of not less than 40 km/h must move straightforward within a corridor of motion without skidding, and the wheels must not leave traces on the road up to the moment of switching off the ABS when ABS disable threshold reached (no more than 15 km/h).

3.18. The inertia brake for trailers of categories O_1 and O_2 should provide a specific braking force according to para 2.2 and the relative difference in the braking forces according to para 2.3 with an pushing effort in coupling of single-axle trailers not more than 0,1 weight of fully laden trailer, while the rest of trailers - no more than 0,067 the value.

4. Inspection methods

4.1. Characteristics of inspection methods.

4.1.1. The effectiveness of braking and stability of vehicle under braking is checked on the stands or on the road.

4.1.2. Means of measurements used in the verification must be operational and approved. Measurement error must not exceed in determining:

Stopping distance	± 5,0%
Initial speed of braking	± 1,0 km/h
Brake force	± 3,0%
Efforts on the control	± 7,0%
The brake system response time	± 0,03 c
A deceleration growth time	± 0,03 c
Deceleration	± 4,0%
Air pressure in pneumatic hydraulic or pneumatic brake actuator	±5,0%
Push in efforts in coupling of trailers equipped with inertial brake	±5,0%
Slope	± 1,0%
Vehicle mass	± 3,0%

4.2. Terms of the inspection

4.2.1. Brake mechanisms should be «cold» before the check.

4.2.2. Tires must be clean, dry. Tires pressure should comply with the provisions set by the manufacturer of ATS in the operational documentation.

4.2.3. Inspections on the stands and on the road (except check of auxiliary braking system) should be held while engine is running and disconnected from the transmission. Axles drives should be switched off.

4.2.4. Requirements 3.2, 3.4, 3.6 are checked on roller stands for testing of brake systems. The force on the control should be increased in accordance with guidance (instructions) for the operation of the stand.

4.2.5 Depreciation roller stand up to the full erasure of corrugated surface or destruction of abrasive coating of rollers are not permitted.

4.2.6 Inspections on the road to hold on straight flat horizontal dry clean road with cement or asphalt surfaces. Braking of the service braking system is operated in a full emergency

braking by a single exposure to the control. Time of full actuation of the brake control system shall not exceed 0,2 s.

4.2.7 Adjustment of pathway of vehicle during braking on the road is not permitted (if it is not required by the security of checks). If this adjustment has been made, the test results do not take into account.

4.2.8 The total mass of technical means of diagnosis used in the inspection in road conditions, should not exceed 25 kg.

4.2.9 Vehicles equipped with ABS should be checked in the road conditions.

4.3. Verification of the service braking system

4.3.1. To check on the stands the wheels of each axel of the vehicle should be set on rollers stand. Engine is disconnected from the transmission, the additional axle drives and transmission differentials should be disconnected as well. Engine is runnig at minimum sustained speed. Measurements carried out under the instruction on the operation of the roller stand. For the roller stands are not providing the measurement of weight per wheel weighting device or manufacturer’s information on the mass of vehicle should be used. Measuring and recording on the stand must be performed for each axel. After that specific brake forces and the relative difference between the braking forces on wheel axle are to be calculated.

4.3.2. For the vehicle combination when checking on the stands the specific brake force must be determined separately for the tractor and trailer (semitrailer).

4.3.3. When checking on the road a direct measurement of deceleration and the brake system response time or the calculation of stopping distance is allowed.

4.3.4 When testing on the stand the relative difference of the brake forces is calculated. Measurements and calculations are repeated for each wheel axle.

4.3.5 Stability of vehicle under braking on the road must be tested by performing braking in the standard corridor. Axis, right and left border corridor are denoted by parallel markings on the road. Vehicle before the break to move rectilinearly with a initial velocity along the axis of the corridor. Exit of any exterior part the vehicle outside the standard set of motion is determined visually or by the device to check the brake.

4.4. Checking the parking and secondary braking system

4.4.1. Check parking brake system on the road made by placing vehicle on the supporting surface with a slope equal to the specified in 3.5. Service braking system must be applied first, and then - parking brake system, with simultaneous measurement of the efforts attached to the parking brake control, and the subsequent disconnection of the service braking system. Under the influence of parking brake system vehicle should not move for a period of not less than 1 min.

4.4.2. The test on the stand shall be held by rotation and braking wheels of axle on which the parking brake system effects.

4.4.3. Secondary braking system is checked on the procedures established for the verification of the service braking system.

4.5. Check of the auxiliary braking system

4.5.1. An auxiliary braking system is checked on the road by bringing it into effect and to measure deceleration during braking in the range of speeds specified in 3.7. In the transmission must be engaged a gear avoiding exceeding the maximum permissible engine speed.