Public consultation on outline proposals for a Regulation of the European Parliament and of the Council on Advanced Safety Features and Tyres

Consultation document

1. Objective of the Regulation

To update and simplify type-approval legislation for various safety-related components and systems for passenger and goods vehicles, and to introduce new requirements to contribute to road casualty reductions and reductions in CO_2 emissions; in particular

- Electronic Stability Control,

-Tyre Pressure Monitoring Systems, and

- Low rolling resistance tyres.

2. Background

European Community Directives concerning the type-approval of motor vehicle components and systems have been progressively introduced since 1970, under the framework of Community Directive 70/156/EEC. Over the last 35 years, the nature of the type approval regime has evolved from being a system designed to allow free trade of vehicle components between Member States, to a system based on compulsory whole-vehicle type-approval (WVTA) for most categories of vehicle. WVTA requires a series of approvals to the component or system Directives, or equivalent standards which are produced by the United Nations Economic Commission for Europe (UNECE). These Directives and Regulations have been updated over the years to reflect technical progress, so that there are now around 50 base Directives and over 100 amending Directives covering this subject area.

The framework Directive, 70/156/EEC is in process of being recast to reflect the evolution of the WVTA procedure. In addition, the requirements covering vehicle emissions have been updated and consolidated into new Council and Parliament Regulations which are directly applicable in Member States. In 2006 the CARS 21 group[1] recommended that 38 EC Directives should be replaced by equivalent UNECE Regulations in order to simplify the regulatory regime. UNECE Regulations are widely accepted in countries inside and outside the EU, and the EU is itself a contracting party to many of these Regulations. Therefore there is little point in the EU retaining and constantly updating its own Directives, unless there are particular aspects which are not covered, or are insufficiently covered, by UNECE Regulations.

There are some vehicle-related areas where the European Union may wish to take particular initiatives in order to meet important policy objectives; in particular those involving road casualty reduction, CO2 emission reduction and the reduction of environmental noise pollution. Advances in vehicle technology in the areas of braking, vehicle stability, sensing systems and tyre technology offer the potential for significant

[1] Competitive Automotive Regulatory System for the 21st Century

advances in these areas. Some advanced systems, such as vehicle stability control and tyre pressure monitoring systems, are already being offered by vehicle manufacturers. However, we believe that there is justification for mandating some of these systems on new vehicles by means of type-approval legislation.

3. The Proposed Regulatory Approach.

The proposed approach is to replace almost all the separate vehicle safety-related Directives by a single Regulation, which would have the following characteristics:

- It would be a split-level Regulation. The fundamental requirements, including critical limit values, would be included in a co-decision Regulation (i.e. subject to agreement by Council and Parliament). The detailed technical requirements and test procedures would be contained in implementing Regulations, to be agreed through the committee procedure.

- It would be directly applicable, thus the original Regulation, and any subsequent amendments, would not need to be transposed by Member States. This would save administrative costs and allow the quicker implementation of new requirements.

- It would allow the repeal of around 50 existing base Directives, many of which are outdated and which lack transparency due to successive amendments contained in separate amending Directives. Many of these Directives would be replaced by references to UNECE Regulations.

- It would allow the implementation of safety features such as electronic stability control and, at a later stage, advanced features such as automatic emergency braking and lane departure warning.

- It would allow the implementation of technologies related to the CO_2 reduction initiative, such as low rolling resistance tyres and tyre pressure monitoring systems.

4. Proposed Scope of new Regulation

The Regulation would apply to all vehicles covered by the Framework Directive (categories M, N and O) and cover all areas of vehicle safety with the exception of pedestrian protection, which will be covered by a separate Regulation. The areas of application of the Regulation would be divided into themes as follows:

a) Vehicle structural integrity

b) Driver control systems.

c) Driver visibility and information systems

d) Vehicle Lighting Systems

e) Vehicle occupant protection systems

f) Vehicle masses and dimensions

g) Safety of vehicle exterior and accessories

h) Vehicle tyres

j) Provisions relating to goods vehicles

k) Provisions relating to buses

l) Miscellaneous provisions

m) Advanced vehicle systems.

5. Particular Technical aspects

For the majority of the safety themes listed above, there would be no significant change in the technical requirements. In many cases, there would simply be a cross-reference to the equivalent UNECE Regulation which would in most cases be at an identical or slightly higher technical level. However, with regard to tyres and advanced vehicle systems, more specific requirements are proposed in order to meet safety and environmental objectives. These are discussed in detail below.

5.1. Requirements Related to Tyres

The current Directive on vehicle tyres (92/23/EEC) covers the approval of new tyres as components, and requirements for the equipment of new vehicles with suitable tyres. The requirements are mostly related to tyre safety, but the Directive was amended in 2001 (2001/43/EC) to cover additional requirements to limit tyre rolling noise emissions. The initial noise limit values agreed in 2001 were subject to a review, to assess whether it was possible to introduce tighter noise emission values without compromising other essential aspects of tyre design. This review has now been completed by the Federation of European Highway Research Laboratories (FEHRL)[2], and new noise limit values have been recommended.

In addition, as part of the Commission's CO_2 reduction strategy, tyres have been identified as potential sources for improvements in vehicle fuel economy (and hence reductions in CO2 emissions). In particular, the use of low rolling-resistance tyres can significantly reduce fuel consumption, and the use of tyre pressure monitoring systems (TPMS) can help ensure that tyres remain inflated to the optimum pressure to maximise fuel economy. TPMS can also offer safety benefits by providing the driver with a warning of any significant deflation in one or more of the vehicle tyres.

Studies have shown that it is possible to improve the noise and fuel economy performance of tyres without necessarily affecting their safety. However, safety is paramount and it is essential that existing safety standards are not compromised. Since it is recognised that it could be possible for manufactures to meet, say, more stringent rolling resistance requirements by designing a tyre which has poor grip performance (particularly in the wet), it is considered that new tyres should also be subject to wet grip performance requirements to ensure that wet grip performance is not overlooked in the pursuit of more energy-efficient, quieter tyres.

Consequently there are four areas where new technical/performance requirements for tyres are proposed:

- tighter noise emission requirements,
- new rolling resistance requirements,
- the introduction of TPMS to vehicles, and
- new wet-grip requirements.

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[2] FEHRL REPORT (Study on tyre/road noise, vol 1)

Further details of these four elements are given below.

5.1.1 Rolling Noise Emissions.

Road-traffic is perceived by the population to be the biggest source of noise pollution. Above a vehicle speed of 40 to 50 km/h, rolling noise is the dominant component of road traffic noise. Reducing the level of tyre/road noise thus represents an effective approach for protecting the population from noise. An integrated approach, involving the use of low-noise road surfaces and low-noise tyres is seen as being the best means of achieving this. The Commission has been involved, together with other stakeholders, in work to investigate the use of low-noise road surfaces. Thus, while this Regulation would deal solely with the noise reduction contribution from the tyre, it is anticipated that there would be complementary measures concerning improvements in road surface technology.

Annex 1 gives the FEHRL proposals for noise limits on tyres, anticipated for introduction in 2012. These represent an effective reduction from current values of between 2.5 and 6.5 dB(A) (taking into account the proposed changes in calculation method and revised tyre width categories). It is proposed to adopt the FEHRL recommendation for the new regulation for new and replacement tyres, with the possibility of certain exemptions for particular tyre types.

5.1.2 Rolling Resistance

Rolling resistance is the resistance to motion that occurs when an object (e.g. a wheel or tyre) rolls. It is caused mainly by the deformation of the wheel or tyre or the deformation of the contact surface (e.g, the road) and thus it depends very much on the material of the wheel or tyre and the type of road surface.

Rolling resistance has a direct impact on the vehicle CO2 emissions and fuel consumption. A study by TNO[3] estimates that use of low rolling resistance tyres (LRRT) could reduce fuel consumption by 3% for a given vehicle, and make a contribution to the Commission's CO_2 reduction targets.

There has been a gradual reduction in rolling resistance for tyres of comparable dimensions over recent years. This has partly been driven by the desire of car manufacturers to reduce the overall fuel consumption of new cars. However, development and use of LRRT needs to be encouraged and accelerated if they are to make a significant contribution to the CO2 reduction strategy. This could be achieved by a combination of mandatory requirements and consumer information (e.g. through tyre labelling). The proposed approach is to define four rolling resistance performance bands (A to D) each with a specified maximum rolling resistance value. D would be the minimum requirement for type approval. However, consumers would be encouraged to purchase tyres in categories A or B. Vehicle manufacturers specifying tyres for new vehicles would be encouraged to specify tyres with a lower RR value in order to improve

[3] Review and analysis of the reduction potential and costs of technological and other measures to reduce CO2-emissions from passenger cars Final Report- TNO Contract nr. SI2.408212 , see http://ec.europa.eu/enterprise/automotive/projects/report_co2_reduction.pdf

a car model's CO_2 rating. After-market consumers would be guided by means of a labelling scheme. The proposed rolling resistance bands are set out in Annex II.

5.1.3 Tyre Pressure Monitoring Systems.

Maintaining proper tyre inflation is essential for both fuel efficiency and better tyre performance. Deflated tyres can cause up to 4% increase in fuel consumption while reducing tyre lifespan by 45% . Tyres can lose 5% of their pressure per month, and this may not be noticed by the driver. Deflated tyres are also an important factor causing road accidents resulting in numerous fatalities and injuries throughout Europe. Despite the fact that tyre pressure is important for the operation of the vehicle car owners are not careful with the condition of their tyres. The TNO study quotes research which shows that 50% of all cars are driven on under-inflated tyres, and US estimates which indicate that under-inflation causes an increase in the average rolling resistance of about 8%.

A solution to this problem is the use of Tyre Pressure Monitoring Systems (TPMS). TPMS are systems that monitor tyre pressure and warn the driver in case a tyre has to be inflated, and can also warn for tyre failures for safety reasons. It is considered that there are sufficient safety and environmental grounds for requiring new passenger cars to be fitted with tyre pressure monitoring systems. However, it is likely that a TPMS would need to be able to detect a drop in pressure of less than 20% in order to ensure that the tyre is maintained sufficiently close to its optimum pressure.

5.1.4 Wet Grip Requirements.

Wet grip performance, in other words, the skid resistance of tyres under wet road conditions, is a significant safety feature. Although the FEHRL report did not find any correlation between noise and wet grip performance for existing tyres, it could not rule out the possibility that future tyres designed to minimise noise or rolling resistance could compromise tyre safety, and recommended that safeguards should be introduce to ensure that safety was not compromised. This issue has already been discussed in the UNECE working group that deals with tyre noise regulations, with the result that the relevant UNECE tyre noise regulation (ECE Regulation 117) now includes provisions for wet grip testing for passenger car tyres. It is proposed that these wet grip requirements are included in this Regulation.

5.1.5 Discussion on tyre requirements.

The design of a tyre involves compromises between various design requirements including grip, noise, rolling resistance, comfort and durability. Maximising one of these can adversely affect one or more of the others. However, this does not mean there is no scope for improvement. We believe the proposed noise and rolling resistance values are realistic, bearing in mind the proposed introduction date of around 2012. However, we would be interested to hear the views of stakeholders on this point.

There is also the question concerning exemptions from the rolling resistance or noise requirements. The FEHRL report recommended a 1 dB(A) allowance for 'special' category tyres which are designed for off-road use and meet certain conditions, including a speed restriction of 160km/hr. It has been suggested that certain professional off-road tyres should be exempted from the noise and rolling resistance requirements altogether, due to their special design requirements. We believe there may be justification for exemptions for tyres for which the proposed noise and rolling resistance requirements

may be unfeasible. However, in order to prevent widespread use of such tyres it may be necessary to introduce a lower speed limitation (say, 120km/hr).

Questions:

- *Are the proposed noise and rolling resistance limits in Annexes 1 and 2 a) sufficient and b) realistic? Is there a viable alternative approach, for example, 'trading-off' noise requirements for rolling resistance requirements under certain circumstances?*

- *Is there any justification for partial or complete exemption for particular categories of tyre from the noise or rolling resistance requirements?*

- *Should tyre pressure monitoring systems be made mandatory? What degree of accuracy is necessary for them to be effective in maintaining optimum tyre pressure?*

5.2 Advanced Vehicle Safety Systems.

It is proposed that this Regulation should be the legislative tool used to introduce mandatory requirements for advanced vehicle safety systems, where such requirements are technically and economically feasible and can be justified in terms of projected casualty savings. Where possible, the detailed technical specifications of these systems will be based on UNECE Regulations or other international standards. The first system likely to be covered is Electronic Stability Control (ESC). In the longer term, systems such as Automatic Emergency Braking and Lane Departure Warning may also be considered. All these systems are described below.

5.2.1 Electronic Stability Control.

Electronic stability control (ESC) systems act on the braking or power systems of a vehicle to assist the driver in maintaining control of the vehicle in a critical situation (caused, for example, by poor road conditions or excessive speed during cornering). ESC usually acts by sensing wheel slip in individual wheels and reducing power or applying braking to one or more wheels to regain stability. ESC can reduce accidents by more than 20 percent in normal conditions and more than 30 percent in wet or icy conditions. It has been available on some cars for around 10 years, and costs have been reducing due to improved technology and increased volumes. In some markets, over 50% of cars are already fitted with ESC since it is seen as a good marketing feature. However, for heavy commercial vehicles, there is less customer demand and therefore less incentive for manufacturers to supply ESC voluntarily.

Two separate technical standards for ESC have been under development within the UNECE. A standard for heavy vehicles, to be included in the ECE regulation on braking for heavy vehicles (Regulation 13), is likely to be adopted in November 2007 and will be phased in for new vehicles over the next few years, with the actual implementation timetable depending on the vehicle type. For light vehicles, including passenger cars, we are co-sponsoring (with the USA) a global technical regulation (GTR) on ESC which will introduce a harmonised stability test procedure to allow manufacturers to sell cars meeting the test requirements in a wide range of markets. It is anticipated that the GTR will be adopted in 2008 and the requirements incorporated into the ECE regulation on braking for light vehicles (Regulation 13-H). It is intended that the proposed Vehicle Safety Regulation will mandate the ESC requirements of ECE Regulations 13 and 13-H

for new vehicle type-approvals at the earliest possible date. For passenger cars, this is likely to be in 2011.

5.2.2 Advanced Safety Systems for possible longer term introduction.

The Commission is also considering the potential benefits of other advanced safety systems which are already being introduced in certain vehicles and could be included in this Regulation for implementation over the next decade. The following are the two main systems under consideration:

5.2.2.1 Automatic Emergency Braking Systems. Some vehicles are already fitted with **s**ystems which employ sensors to monitor the proximity of the vehicle in front and detect situations where the relative speed and distance between the two vehicles suggest that a collision is imminent. In such a situation, emergency braking can be automatically applied and the effects of the collision are either mitigated or avoided altogether. The capability of such systems could be expanded in the future to cover other types of accident (for example, pedestrian accidents or even head-on collisions). Preliminary studies suggest that such systems could ultimately save around 7000 fatalities and 50,000 serious injuries per year across the EU.

5.2.2.2 Lane Departure Warning Systems. Lane departure warning (LDW) systems can be described as systems which assist drivers in keeping their lanes by warning drivers when their car is in danger of leaving the lane unintentionally (mainly due to lack of driver attention). Current systems use either an audible beep or a "rumble strips" noise, which mimics the sound made when the tyre runs over the road verge. Presently used in trucks, the system causes the steering wheel to vibrate and emits a sound from the appropriate side. A supplement to the LDW system is the lane change assistant (LCA) system which assists drivers intending to change lanes. The lane change assistant monitors the adjacent lanes and warns the driver if another vehicle is likely to come within colliding distance during the lane change. This occurs for example, if the other vehicle is located in the LCA equipped vehicle's blind spot. Presently the system would warn the driver of such a problem with e.g. a red flashing side mirror. Alternatively a system with feedback in the steering wheel could be employed. The lane change assistant needs predictive sensors to scan the surrounding vehicles. Preliminary studies suggest that a combination of LDW and LCA systems could save around 4000 fatalities and 20,000 serious injuries per year across the EU.

5.2.3 Discussion on Advanced Vehicle Safety Systems.

The voluntary installation of ESC systems has increased considerably over recent years, particularly for cars at the upper end of the market, and the installation of other advanced safety systems is expected to follow a similar pattern. There is an argument that with the increasing market penetration of such systems, legislation is not necessary. However, the market penetration of such systems varies widely between Member States and legislation may be necessary to ensure that all sectors of the market are covered. Also, the increased production volume of these systems resulting from mandatory installation is likely to lead to reductions in costs.

Questions

- *Do you support the mandatory installation of ESC for all categories of M and N class vehicles (plus trailers over 3.5 tonnes)? Should any exemptions be allowed?*

- *Is 2011 a reasonable target for a requirement for new car models to be fitted with ESC?*

- *What would be a reasonable time scale for the mandatory introduction of systems such as automatic emergency braking and lane departure warning (assuming a favourable cost-benefit case can be made)?*

6. Timetable

The Commission intends to introduce a formal proposal to Council and Parliament during 2008. In the meantime, an Impact Assessment will be prepared covering all aspects of the proposed Regulation.

ANNEX 1 – Proposed Tyre Noise Limits

Class C1 tyres, with reference to the nominal section width of the tyre.

tyre class	Nominal section width (mm)	Limit values in dB(A)	reductions compared with current values
C1A	≤ 185	71	2.5-4.5
C1B	> 185 ≤ 215	72	4.5
C1C	> 215 ≤ 245	72	5.5
C1D	> 245 ≤ 275	73	4.5
C1E	> 275	75	2.5

For tyres classified in the category of use "Special"[4] the limit values for all the above categories shall be increased by 1 dB(A) .

[4] *)* "Special use tyre" means a tyre intended for mixed use both on- and off-road or for other special duty, and which has all of the following characteristics:

a) A tread depth ≥ 11 mm,

b)A void-to-fill ratio ≥ 35 %

c)A maximum speed rating of ≤ 160 km/h (symbol Q)

d) Marking to denote mud and snow use .

Class C2 and C3 tyres with reference to the category of use of the range of tyres:

tyre class	Nominal section width (mm)	Limit values in dB(A)	reductions compared with current values
C2	Normal	71	5.5
	Snow (M+S)	72	6.5
	Special	74	5.5
C3	Normal	71	6.5
	Snow (M+S)	73	6.5
	Special	75	5.5

Annex 2 – Proposed Tyre Rolling Resistance Limits

The maximum values for the rolling resistance coefficient for each tyre type, measured in accordance with ISO 28580[5], shall not exceed the following:

tyre category[6]	Max value (kg/tonne)
C1	13.5[7]
C2	12.0
C3	8.0

For tyres classified in the category of use "Special" (as defined in Annex 1) the limit values for categories C1, C2 and C3 shall be increased by 1 kg/tonne.

In addition, tyres in categories C1 and C2 are to be graded according to the following bands.

Tyre Category	Maximum rolling resistance coefficient per band (kg/tonne)			
	Band A	Band B	Band C	Band D
C1	9.0	10.5	12.0	13.5
C2	7.5	9.0	10.5	12.0

[5] ISO standard currently still in draft form

[6] Tyre categories defined in Directive 92/23/EEC. In general terms, C1 tyres are used for passenger cars, C2 tyres are used for light commercial vehicles and C3 tyres are used for heavy commercial vehicles

[7] Limit to be 12.0 kg/tonne for tyre types approved from a date two years later than the application of the initial requirements.