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Your Ref.

31 May 2002

Dear Sirs

Docket No. NHTSA-00-8011 – Updating of Safety Performance Requirements for Tyres

Comment from the UNECE Group for Global Technical Regulations for Vehicle Tyres

Under the terms of the 1998 Agreement of the United Nations Economic Commission for Europe (UNECE), the World Forum for Harmonisation of Vehicle Regulations, WP29, agreed to the formation of a group to develop globally harmonised regulations for vehicle tyres. The Group comprised representatives from the Governments of the United States of America, Canada, Japan and from European countries, together with personnel from the American, Japanese and European tyre manufacturing industries. In addition the work of the Group has been open to comment from all 38 Countries that are Contracting Parties to the previously introduced but still current, UNECE 1958 Agreement Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts.

The Group had made considerable progress in the development of the globally harmonised regulations but largely as a result of the situation in the USA and the actions necessary to comply with the requirements of the TREAD Act, WP.29, at its 126th session in March 2002, made the decision that there was little prospect of achieving global agreement at this stage and any further work was suspended indefinitely. However, the Group was given the final task of submitting its comments to the Notice of Proposed Rulemaking concerning the updating of the safety performance requirements for tyres through the introduction of a new Federal Motor Vehicle Safety Standard, FMVSS 139.

As Chairman of the Group I am therefore writing to you to submit its majority view on the proposals contained in Docket No. NHTSA-00-8011, specifically Document No.19.

It is important to point out that a representative of the Government of the United States of America has participated in the work of the Group since its inception in July 1999, but the representative has not taken any active part in the development of the attached specific comments.

Yours faithfully

Geoff Harvey
Chairman of UNECE ad-hoc Group on Global Technical Regulations for Vehicle Tyres.

Comments on NPRM, NHTSA-00-8011-19, Upgrading of safety performance requirements for tyres

Submitted by the UNECE group on Global Technical Regulations for Vehicle Tyres

The comments below follow the layout used in the NPRM and have the same section or item number and heading as used in the NPRM.

I EXECUTIVE SUMMARY AND OVERVIEW

- The Group notes that the TREAD Act did not specify the scope or extent of any changes to existing Standards, except for reference to consideration of the effects of ageing on tyre performance.
- The Group feels that there is little substantiation for some of the upgraded requirements and introduction of new test procedures and that the arguments used are not always logical.
- The Group supports in principle the use of a high speed, accelerated endurance test to assess tyre design and in-production performance but does not support the proposals made in the NPRM. It is accepted that the purpose of regulation is to lay down minimum performance levels to assure safety but the group feels that the performance test should be related to the capability of the tyre as indicated by the speed symbol applied to the tyre and which reflects the speed capability of the vehicle to which the tyre is fitted. Minimum performance levels should not be based on regulated national road speed limits that are always subject to possible change.
- The drum test is an accelerated test procedure that creates a tyre to drum contact patch shape that is not representative of that achieved on a flat road and the corresponding sidewall distortion creates stresses in the tyre carcass that are not present in road use. The proposal to use a lower inflation pressure and higher speed than that applied currently will disproportionately exaggerate the sidewall and tread area stresses and the heat generated in both the tread and shoulder areas of the tyre. It is also possible that the combination of low inflation pressure and high speed may generate standing waves in the tyre that are undesirable and not representative of in service conditions. The phenomenon of standing wave generation and effect is well documented in several papers and publications, for example, in pages 773 to 783 of "Mechanics of Pneumatic Tires" published by the US Department of Transportation, NHTSA and edited by S K Clark (US Government Printing Office 1982 0-363-904).
- It is felt that little evidence has been provided to show that the proposed bead unseating and road hazard impact tests are an improvement on the existing tests. The procedures are not standardised with respect to testing tyres and should be correlated with in-service conditions and experience.
- Heat build-up in tyres during use is related to a combination of inflation pressure, speed and load on the tyre. Bearing in mind the artificial nature of the drum test as outlined above, the use of inflation pressures as low as 140kPa (20psi) for the proposed low pressure test, will result in testing at abuse levels well outside any that could be reasonably expected to be taken into account in tyre design and are outside operating recommendations given by the tyre industry. Design changes necessary to ensure compliance with this requirement will result in heavier tyres having increased rolling resistance and lower vehicle handling and comfort levels. Noise generation may also be increased.
- None of the proposals for ageing tests appear to take into account ambient conditions other than temperature. The alternatives proposed amount to other forms of endurance test.
- The Group feels that future analytical procedures should not be confined to shearography but should allow the use of alternative, proven, equally effective, techniques. The present level of technology means that shearography analysis techniques are subjective and depend on the skill and judgement of the operator.

- The comments regarding the Agency's concern about the overall costs of the rulemaking and its inability to accurately quantify the possible benefits of the measures, are noted and it is felt that the costs that are quoted have been underestimated as they do not take into account the necessity to acquire the additional test equipment. The Group also feels that the overall benefits may well have been overestimated by the evaluation and extrapolation of non-specific or irrelevant statistical data. The ready availability of the suitable additional test equipment is also questionable.
- Possibly through changes to FMVSS 110 and 120, the Group would like to see more emphasis on the partnership necessary between the tyre and vehicle manufacturing industries in order to produce and specify tyres suitable for the designed performance and intended use of the vehicle that ensures the highest level of safety for the consumer.
- The Group feels that the road safety interests of the consumer would be better met by using speed values during the high speed test that take into account the speed capability of the tyre and the designed maximum speed of the vehicle to which it may be fitted.

II BACKGROUND

The Group does not have any comment on this section.

III EXISTING TYRE STANDARDS – PERFORMANCE REQUIREMENTS

The Group does not have any comments on this section.

IV CURRENT SAFETY PROBLEM – OUTDATED PERFORMANCE REQUIREMENTS

- The Group acknowledges the need to update the performance requirements of the existing FMVSS 109 and 119 and would draw the Agency's attention to the fact that in 1999 the Rubber Manufacturers Association petitioned to update FMVSS 109 by introducing the requirements given in the worldwide industry's standard GTS 2000 that was coincidentally used as the basis for the draft Global Technical Regulation for vehicle tyres.
- The statistical data presented relating to tyre problems do not take into account any element of abuse, for example, due to underinflation, accidental damage, misuse or other general lack of maintenance. However, the Group considers that this aspect may be largely addressed by the parallel introduction of the requirements for a vehicle inflation pressure and load placard and by a Tyre Pressure Monitoring System (TPMS) that is set at a proper level to give an indication or warning of low pressure.
- The Group also thinks that it is necessary to consider requirements for the selection of the correct tyre and inflation pressure to result in a greater reserve load and reserve pressure than that which exists currently.

A Transition from bias ply to radial tyres

The section draws attention to the advantages of the radial ply design in that it "allows the sidewalls to readily absorb road irregularities without overstressing the cords" and that "Impact breaks caused by cord rupture do not occur in radial ply passenger car tyres." In view of these statements and the fact that in North America and Europe, excluding temporary use spare tyres, around 99% of passenger cars and more than 90% of light trucks currently use radial ply tyres, the Group questions the need for a road hazard impact test for radial ply tyres.

B Safety Problems Associated with Tyres

1 Population of tyre related crashes

The Group notes that the statistics quoted are acknowledged as being “general tyre related problems” that do not show any causes of the problem or whether a noted tyre defect was the cause or a result of the accident. There is also not any reference to the type of tyre involved, its suitability in terms of load and pressure at the time of the accident or the existence of any previous abuse such as kerbing, running under-inflated or general lack of maintenance. It may be misleading to use these data to substantiate changes to the tyre design and production performance requirements for all future tyre manufacture.

Comparison data regarding warranty returns may be submitted by the tyre industry associations or individual tyre companies. In addition, the introduction of the Early Warning System to advise the Agency of any tyre warranty issues may improve the validity and relevancy of the statistical data in the future.

2 Geographical and Seasonal Effects

Again the Group feels that the data is insufficient as a reliable basis for such fundamental changes to existing standards. There is not any reference to the root cause of the tyre problem and the analysis does not address issues such as seasonal variations in exposure to risk, typical vehicle usage patterns, driving behaviour and vehicle speeds.

3 Tyre Problems by Tyre Type and Light Truck Type

Comments made under 1 and 2 above also apply in this case.

4 Crashes Indirectly Caused by Tyre Problems

The Group feels that the information given in this section is largely irrelevant and should not be used in substantiation of the proposed changes. The major flat tyre problem is simply a result of a puncture and there is not any requirement in the existing or proposed standards to check resistance to puncture, which is a totally unpredictable event. In the case of “tubeless” tyres, which form at least 95% of the market, the inner lining material is specifically chosen to allow, in conjunction with a correct and undamaged wheel rim, slow loss of inflation pressure following penetration. Consequently the tyre does not suffer the sudden and catastrophic loss of pressure (blow out) common to tyres using an inner tube.

C Implications of changes in US light vehicle market

The Group notes the comments in this section and supports the view that where “LT” tyres are fitted to what is essentially a passenger car duty vehicle, they should be tested to a test schedule appropriate to the anticipated service conditions. The Global Technical Regulation was being developed on the basis of identifying the tyre according to the performance schedule to which it had been tested, which would allow the vehicle manufacturer to make the correct tyre choice.

V AGENCY RESPONSE TO SAFETY PROBLEM

- The Group is pleased to see reference to its work, which has drawn upon the best practices and standards of several countries throughout the world and in which the performance requirements given in the draft Global Technical Regulation also mirror those agreed internationally by the International Standards Organisation in Standard number ISO 10191. A copy of the draft Global Technical Regulation has been submitted previously in response to the NPRM on tyre Labelling, Docket No. 11157 – 6.

- However, bearing in mind the basis and aims of the Global Technical Regulation and the degree of global involvement in the discussions, the Group is disappointed that the Agency has summarily dismissed the work in considering the proposals in the present NPRM and has not pursued its aims with a view to achieving global harmonisation.
- The proposals given in the NPRM to upgrade the tyre performance requirements imply that there is an identifiable design problem with tyres currently on the market. The Group is not aware of any general problem with regard to tyre design and feels that the raw statistical data given by the Agency confirms this. However, it is concerned that the proposals will be ineffective unless the issues of correct tyre and inflation pressure selection, together with the maintenance of correct inflation pressure, are properly addressed.
- The arguments put forward for the proposed high speed test and the low inflation pressure test appear to be illogical and diametrically opposed. The argument for the former is that all tyres pass the present test therefore the test must be unsuitable whilst for the latter it is stated that all tyres will pass this test therefore the test must be appropriate.
- Tyres, like any products, are designed to perform adequately in service and to comply with specified standards. It should not be a surprise that, when tested, they meet the requirements of such standards and this should not, in itself, be used as a basis for making those requirements more onerous.
- The Group's view on the tyre pressure monitoring system "significantly under-inflated" level of 20% or 25% below the vehicle manufacturer's recommended cold inflation pressure, or the absolute minimum of 140kPa (20psi), irrespective of the actual load carried by the tyre, is that this results in a warning that is too late. The tyre may have already sustained damage and the user may have been exposed to a safety risk due to the tyre being used outside of the designed operating conditions. Restoration of the correct inflation pressure will not redress the damage that has been caused, the safety risk will still be present and the life of the tyre will have been reduced. The proposal is counter-productive in that it will result in less attention being paid to the maintenance of the correct inflation pressure, the user now waiting until a warning is given.

VI AGENCY PROPOSAL

A Summary of Proposal

The Agency's attention is drawn to the fact that, depending on tyre size, some high load capacity LT tyres correspond to a gross vehicle mass greater than 10 000lb (4 536kg).

- The Group is concerned that the proposed road hazard impact test is based on a method intended to test the wheel and that the parameters of the test may not be suitable for the evaluation of tyre damage. Results do not indicate that the test is any more valid than the existing plunger test.
- The results shown for the comparison of the revised bead unseating test with the existing test do not give any confidence in the new test being any more discriminating. The applied forces cannot be compared directly with the existing method as they are applied at different parts of the tyre. In addition, the proposal does not contain any details of, or specific requirements for, the test equipment to enable it to be manufactured or purchased in order to verify tyre performance.
- As previously stated, the Group feels that the ageing tests proposed do not take into account all aspects of ambient conditions and appear to result in another, extended, endurance test.

- The Group urges the Agency to give further consideration to the continuing use of UTQG Temperature Grading. In the event of using an appropriate high speed test schedule, the temperature grading system becomes superfluous and is unnecessary if the increasingly widespread system of tyre speed symbol identification and corresponding high speed test schedules as given in UNECE Regulations 30 and 54, are used.

B Applicability

The group notes the Agency's intention to consider updating of the test requirements for tyres used on medium and heavy vehicles and wish to point out that this was also the intention of the Global Technical Regulation which was deliberately structured to allow subsequent inclusion of tyres other than those designed primarily for use on passenger cars.

C Proposed Test Procedures

- The proposed High Speed Test, Endurance Test, Low Pressure Test and Ageing Test are all forms of accelerated endurance testing that use a different combination of parameters of load, speed, inflation pressure and duration to replicate in-service problems. The Group suggests that consideration is given to rationalisation of the tests to avoid unnecessary and costly test work. The view is that the High Speed Test and an Ageing Test are all that are necessary. The High Speed Test is an accelerated endurance test suitable for a regulatory control and will assess the performance of the tyre within the recommended and acceptable load versus pressure service conditions. Provided that controls are put into place regarding the correct selection of tyre for the vehicle application and the setting of any TPMS warning level, the use of the single high speed endurance test will overcome the need for an additional, longer term, endurance and a test low pressure test.

1 High Speed Test

- Load versus speed performance testing is designed as a simulated service test to reduce testing time whilst ensuring that the mode of failure is representative of that occurring during service. Parameters such as load or speed or inflation pressure may be varied in relation to each other taking into account the effects of testing on a drum, provided that the eventual failure is representative. It is the view of the Group that a single high speed test which assesses the tyre's designated speed capability, as outlined in the draft Global Technical regulation, is an accelerated endurance test and fulfils this requirement. It imparts a sufficiently rigorous stress/strain input to the tyre to reproduce possible service failures and it is unnecessary to introduce additional, longer term, "endurance" testing. Industry is working on further data to substantiate this view and to add to the comments made in its response to question 8 of the series of questions posed by the Agency following the RMA,s petition in 1999 to upgrade FMVSS 109.
- It is important to consider test parameters collectively. To increase the severity of one may need changes to others in order to reproduce the correct, in-service, failure mode.
- The Group is opposed to the use of a test loosely based on nationally imposed road speed limits which, it feels, will result in lower standards of consumer safety. It considers it more appropriate and responsible to relate the test speeds to the designed capability of the tyre and vehicle to which they are fitted. This will ensure added safety margins where the tyre is used at speeds lower than those for which it was designed whilst also ensuring safety if the vehicle is driven occasionally to its designed capability. The association of the test speeds with a requirement to use the widespread speed symbol identification for tyres, would obviate the requirement for temperature grading under the UTQGS.

- The values of load and inflation pressure quoted in the test schedule given in the draft Global Technical Regulation, are chosen to partly offset the artificial nature of the drum test, particularly where the drum used is the smaller, 1,7m, diameter. Based on the experience of many years since the introduction of the UNECE Regulation No.30 (passenger car tyres) the coincident increase in load value and reduction in inflation pressure, is felt to be unrepresentative, even for accelerated testing, and is unnecessarily severe. This severity is increased if the inflation pressure is not increased in association with the increasing speed capability of a tyre as indicated by a speed symbol.
- The Group does not see any advantage in increasing the time duration of the intermediate speed steps prior to attaining the final test speed. Previous information submitted by industry in response to questions asked by the Agency following a petition to amend FMVSS 109, argued that temperature equilibrium was achieved after 10mins at speed steps lower than those at which failure was anticipated. At these lower speed steps something like 5 hrs was necessary to cause significant additional stress/strain in the tyre.
- It is agreed that there is a relationship between ambient temperature and the temperature achieved in the shoulder area of the tyre and it has been shown that this is simply additive. A 10°C increase in ambient temperature gives an equivalent increase in shoulder temperature. Although the draft Global Regulation quoted laboratory temperatures of 25°C, which have been found to be satisfactory, it is recognised that many countries use $38 \pm 3^\circ\text{C}$ and this could have been accepted. A proposed further increase to 40°C minimum is seen as being purely arbitrary and cannot be considered to be “slight” as it is a 5°C increase in the minimum value. The Group suggests that the temperature is established at 35°C minimum preferably or at $38 \pm 3^\circ\text{C}$, even though this may require that some laboratories have to be heated to attain this temperature with the inevitable increase in test cost.
- The Group would urge the Agency to reconsider the form of high speed test and replace that proposed in the NPRM with the schedule given in the draft Global Technical Regulation with the possible exception of introducing a further 10 minute step at a final test speed equivalent to that given by the speed rating of the tyre and a laboratory ambient temperature of 35°C minimum or $38 \pm 3^\circ\text{C}$. This suggestion is in line with the proposal made by The Rubber Manufacturers Association in its submission.

a Ambient temperature

In addition to the comments above, the Group is concerned that the control equipment available to ensure a minimum temperature of 40°C may result in working temperatures as high as 46°C with attendant health and safety problems for test operators.

b Load

The Group does not understand the relevance of comparing the test load with the required “reserve” load for vehicle tyre fitment. The load percentage used for testing should reflect the vehicle normal load condition but also take into account the effect of the curvature of the drum. In the schedule given in the draft Global Technical Regulation, a figure of 80% is chosen on the basis of applying 90% to represent the vehicle normal load and further dividing this by a factor of 1,125 to offset the artificial nature of testing on a small diameter drum. If the reserve load is reduced in FMVSS to 85% then the test load could be reduced to 76% on this basis but the Group is content to remain with 80% as specified in the draft Global Technical Regulation. Reference to the background for the determination of these factors may be found in “New Testing Machine for the Study of Tyres” by K Kollmann, Revue General du Caoutchouc (10) (1959), and quoted in the NHTSA publication “Mechanics of Pneumatic Tires” referred to earlier in these comments.

c Inflation pressure

Again the Group feels that the chosen test inflation pressures should take into account the artificial nature of the test and does not agree that the higher pressures given in the draft Global Regulation for higher speed rated tyres are not representative of vehicle manufacturer's recommended cold inflation pressures. A survey of vehicle manufacturer's recommended pressures for higher speed vehicles (regardless of whether they are used at the designed maximum speeds) found pressures between 200kPa and 350kPa, taking into account the increase recommended for maximum load. Testing on a drum at the lower inflation pressures specified in the NPRM will result in an increase in stress in areas of the tyre not usually subject to such high stress levels and may result in some tyres having to be "stiffened" by having a greater amount of material in these areas simply to pass the artificial test. The effect on tyre weight, rolling resistance, comfort and vehicle handling may be significant.

d Speed

We have already commented in this submission on the validity of the proposed high speed test schedule and reiterate that the Group's view is that the test is unsuitable and should be replaced with a procedure based on the rated speed capability of the tyre. The Group feels that this is a more searching test that will result in higher levels of safety for the consumer. In addition, tyres that had been produced and tested in accordance with this form of a FMVSS would have wider acceptance in a global market where regulatory road speed limits may be different from those in the USA.

The Group also feels that a test procedure based on the speed capability of the tyre, obviously allied to a requirement to identify that capability, would overcome the need for any UTQGS temperature grading and would satisfy the Agency's declared intention of setting minimum performance standards.

e Duration

Based on many years of experience and confirmed by recent industry testing, a test duration step of 10 minutes has been found to be acceptable in achieving temperature equilibrium. The Agency comments that very few failures occurred during its testing using a 10 minute duration but it is difficult to establish from the data presented how many more failed during the subsequent 20 minutes running. The Group feels that the intermediate speed step duration is less relevant than the duration at the chosen final speed.

2 Endurance Test

- With the exception of winter type tyres it is unusual in Europe to find passenger car radial ply tyres of a lower speed rating than "S" (180km/h). Long term experience is that a high speed test based on tyre speed capability is a satisfactory accelerated endurance test and longer duration endurance testing does not form part of the UNECE test requirements. The argument is that once temperature equilibrium has been reached there is not anything to be gained from extending the time.
- Industry has conducted testing of tyres to the high speed accelerated endurance test given in the draft Global Regulation and compared the results with track testing at high speed for a distance equivalent to the use of one complete tank of fuel. The results showed similar patterns of tyre performance and were submitted to the Agency in response to its questions (question 8) following the RMA's petition in 1999 to upgrade FMVSS 109.
- The Group does not agree that the arbitrary load, speed and inflation pressures chosen, represent a more "real world" test as they do not take account of the unusual conditions resulting from testing on a drum at shoulder temperatures and tyre stresses that would not be expected in on-road use. The view is that it is not justifiable to have all three parameters of load, speed and inflation pressure largely outside "real world" figures and that a compromise has to be reached.

- Study of the test matrix carried out by the Agency shows that the tyres tested were only of 75 to 65 nominal aspect ratio and of “normal” configuration. Tyres of other aspect ratios taken from the wide range available in the market, or of innovative configuration such as CT or PAX System tyres, may have shown a different pattern of results.
- If the Agency is committed to the retention of a longer term endurance test then the Group suggests that consideration should be given to combining the proposed endurance and ageing tests in order to eliminate unnecessary testing. The alternatives given in the proposals for an ageing test are little more than modified endurance tests.
- In determining the duration of an endurance test, account should be taken of the extreme cost to industry of testing and continually monitoring the wide range of tyre sizes and types produced.
- The only true form of endurance testing is to carry out the test at actual conditions and it has to be accepted that tests of the form under consideration are all accelerated endurance tests. These are satisfactory if the parameters are correctly chosen and is convinced that the single High Speed Test as given in the draft Global Technical Regulation does this. However, the Group is not convinced that the arbitrary choice of parameters that happened to fail a certain percentage of tyres of a limited range of aspect ratios currently on the market is a justifiable approach for all tyres. The Group is not aware of any service problems under “real world” conditions with the tyres that were considered to have been “failed” by the procedure used for the test matrix.
- Failures during any accelerated test procedure should be representative of the in-service condition and the Group is concerned that there has not been any information given in the results of the matrix testing that indicates the mode and position of failure and how this relates to actual in-service failures.
- The Group notes the Agency’s intention to apply a greater “load in reserve” factor in FMVSS 110 to cater for the claimed abuse through overloading. We suggest that a requirement for “pressure in reserve” is also applied such that the TPMS warning level associated with the percentage drop below the vehicle manufacturer’s recommended cold inflation pressure for the vehicle maximum load condition, results in a load and pressure being within the tyre load versus pressure operating envelope.
- The Group feels that the individual industry associations and companies are better placed to respond with comments on the PEA.

a Ambient Temperature

The group does not have any comment other than that expressed under the high speed test but confirms its wish to see the temperature specified as $38 \pm 3^{\circ}\text{C}$.

b Load

The load figures given in the NPRM must be considered together with inflation pressure and test speed. The Group feels that an increase in severity for all three parameters is not justifiable.

c Inflation pressure

The data given shows that more tyres failed when tested using lower inflation pressures and we agree that this confirms the importance of choosing all three parameters correctly.

d Speed

Whilst the Group agrees that a speed of 120km/h is more representative of current use, it cannot be taken in isolation and must be considered in conjunction with load, inflation pressure and duration.

e Duration

In simulated service testing, the duration of endurance testing, in terms of mileage covered during test, is irrelevant, provided that the mode of failure is representative of that occurring in service. The object should be to establish representative service failure by means of an accelerated endurance test, in as short a time as possible.

3 Low Inflation Pressure Tests

- As previously argued, the choice of relevant parameters in a single high speed accelerated endurance test, coupled with appropriate requirements in FMVSS 110 for “load and pressure in reserve”, will obviate the need for a separate low pressure inflation test. However, if the Agency is committed to the introduction of a low pressure test it may be possible, based on suitable research, to incorporate a short test after completion of the high speed test.
- The Group is opposed to the establishment of 140kPa, or any specified single figure applicable to the wide range of tyres available in the market and irrespective of the actual load borne by the tyre, as an acceptable level of inflation pressure at which to carry out a low inflation pressure test. A specified level may be outside of the load versus pressure acceptable operating conditions to which tyres are designed. In addition, to use any minimum pressure level associated with the TPMS that results in the user being exposed to a safety danger without also giving some earlier indication of a reduction in inflation pressure is seen to be counter productive in road safety terms.
- The Group urges the Agency to consider applying requirements for the vehicle manufacturer to choose tyres that result in the tyre remaining within the tyre industry’s load versus pressure acceptable operating conditions when at a pressure indicated by the TPMS, that being a specified percentage figure below the cold inflation pressure recommended by the vehicle manufacturer for the maximum load condition.
- If a tyre is used continuously at a pressure only slightly higher than the minimum to cause TPMS warning light operation, it may have already suffered some damage due to abuse. The vehicle manufacturer should be required to give instructions to the user concerning any action to be taken following a TPMS warning that may be due to either poor maintenance or a puncture.
- The Group feels that in both alternatives given in the NPRM, that the duration of the test is excessive in relation to the amount of use to be reasonably expected from a tyre in service at these conditions..

a Low Pressure – TPMS

Using the argument relating to distance travelled during test, the proposals seem to suggest that, even under the conditions of an accelerated test, the Agency is asking for tyres to perform adequately for a distance of 180 miles at 75mph (290km at 120km/h) after the driver has been warned by the TPMS of low tyre pressure. The Group feels that this is an unjustifiable requirement and one that could encourage the user to disregard the TPMS warning.

The requirements assume that the low pressure is due to poor maintenance and do not take into account loss of pressure due to a puncture. We suggest that the vehicle manufacturer is asked to give instructions on any action to be taken following a TPMS warning.

b Low Pressure – High Speed Test

The Group feels that it is irresponsible to intimate that a tyre with an inflation pressure as low as 140kPa should be considered suitable for use for 30 minutes at 100mph (160km/h). Considering the statements made earlier in the NPRM regarding relationship to the real world, the Group is surprised that for a condition that is expected to follow some cause of the loss of pressure, a test load of only 67% is quoted. Whilst this may allow the tyre to remain within the load versus speed acceptable operating conditions recommended by the tyre industry, it is thought to be unrealistic in relation to use as it would not be practical to reduce the vehicle load following a TPMS warning indication.

4 Road Hazard Impact Test

- The Group is not convinced that the equipment and procedure designed for testing impact damage to wheels is suitable, without modification, to be applied to tyres.
- If they are being interpreted correctly, the test results presented do not appear to indicate that this form of test is any more searching than the present plunger test which has been shown to be ineffective for radial ply tyres. In all cases where the pendulum drop angle is 100° , there is evidence of rim contact or striker “bottom out” without any note of tyre damage or air loss.
- Whilst the test technique may appear to be more dynamic and realistic than the present test, the Group questions the necessity to impose the considerable costs to the industry of acquiring the substantial numbers of this new equipment necessary to install in all tyre manufacturing plants, for no positive gain.
- We feel that the introduction of this revised equipment and procedure is premature and requires further substantial validation. It is understood that the ASTM is working on this subject and that results may be available in around twelve months. Further comment is expected from the RMA.

5 Bead Unseating

- Again the results do not appear to show that the test is any more discriminating than the present test using shaped blocks applied to the sidewall and confirms that radial ply tubeless tyres fitted to the correct rims will pass this test.
- There is concern that this test is not based on any accepted, widely recognised, Standards or equipment and that there are not established, free market, sources for the equipment. We also understand that the shape of the wedge, particularly in the approach area to the tyre, is not defined and gives inconsistent results.
- The cost to industry of acquiring and using this new equipment will be significant without any safety gain.
- The Group supports the use of a laboratory based test rather than a test track dynamic vehicle based procedure. The latter creates problems of consistency of test driver performance, the safety of the test driver and the difficulties associated with time available for testing due to ambient conditions.
- The Group remains unconvinced that bead unseating is a problem with radial ply tyres fitted to appropriate rims and this view seems to be substantiated by the negative results of this claimed, more real world representative, test procedure.
- We feel that the introduction of this revised equipment and procedure based on an in-house test of a single vehicle manufacturer, is premature and requires further substantial validation.

6 Ageing Effects

- The Group agrees that in-service tyre failures do not normally occur with new tyres and that, at first glance, a test that assesses performance following some period of use would be advantageous.
- Regrettably, use may entail indeterminable levels of abuse that may render the imposition of test procedures to assess the effects of controlled simple ageing (in terms of period of use rather than actual ambient deterioration) ineffective in preventing in-service failures. Examples of such abuse may be persistent under inflation, carcass damage due to “kerbing” or other impacts, deterioration through chemical contact, poor repair of penetration damage and so on.

a Adhesion (Peel) Test

The NPRM states that the adhesion levels will vary depending upon the formulation of the compounds, the curing process and the different materials used in the carcass construction and it is difficult to see how a meaningful peel strength value could be written into regulation that would apply to all tyre manufacturers. The figure of 30lb/in (0,54kg/mm) is quoted as being tentative, based on data from Ford and Firestone, but we feel that further information and work would be necessary to achieve a figure that could be applied overall. This form of test is associated with production quality control techniques to be applied to component parts of tyre construction and each manufacturer may have a target value that may vary from tyre type to tyre type.

The ASTM test deals with the adhesion between two bonded surfaces and the proposals do not specify which of the several interfaces of the belt construction are to be tested. In addition a sample taken from a tyre that has been tested will be in a variable curved state and not necessarily suited to this form of test.

- The Group would not support the introduction of a peel test to be applied to a tyre following an endurance test..

b Michelin’s Long Term Durability Endurance Test

The case has been argued previously in this submission that, provided the test parameters are correctly chosen such that the type of failure is representative of an in-service failure, the duration of the test is irrelevant and should be as short as possible. Whilst this may be a form of test that certain manufacturers find to be valuable in the development of a new type of tyre, and which could be used in defence in the event of an in-service failure, it is generally felt that it is excessively long to apply as a regulatory requirement. The cost of test time and of tying up a test drum for this length of time is considered to be prohibitive in view of the wide range of tyres in production.

Once a newly developed tyre has entered production, any further “pass-off” tests use a considerably shortened, accelerated test procedure, for evaluation.

- The Group would not support the application of this form of test as a regulatory control.

c Oven Ageing

Oven ageing prior to endurance testing can be a valid procedure for certain products but it is questionable whether it is applicable to tyres in the context of applying it to check in-service safety performance. It has been pointed out by one manufacturer that general high temperature soaking is not as searching as the achievement of temperature differential between the sidewall and the undertread belt edge. This differential is only generated during dynamic testing of the tyre that imposes stress/strain to the relevant areas of the tyre that are liable to failure.

- The Group could support the incorporation of an oven ageing test but feels that it should be investigated whether or not it could be combined with other forms of endurance test proposed in the NPRM.

D Deletion of FMVSS No. 109

There are not any strong views on this issue but we feel that there may be legal problems if there are not any standards applicable to tyres for earlier vehicles. It may also be necessary to retain part or all of FMVSS 109 as there are not any requirements for temporary use spare tyre in the new, FMVSS 139.

E FMVSS Nos. 110 and 120

In addition to the reserve loading requirement, the Group would urge the Agency to also apply a reserve pressure requirement such that the vehicle manufacturer chooses tyres that remain within the tyre industry's load versus speed acceptable operating conditions when the inflation pressure has dropped to an established percentage below that recommended by the vehicle manufacturer for the maximum mass condition of the vehicle. This percentage figure should correspond with the point at which a TPMS warns the driver of dangerously low tyre pressure.

The Group is extremely concerned at the road safety implications if this requirement does not form part of the standards as the introduction of TPMS is likely to have the effect of less attention being paid to the maintenance of correct tyre pressures.

A tyre should be required to be suitable for the maximum designed speed of the vehicle. This, together with the chosen load capability, is best identified to the user, for the correct selection of a replacement tyre, by the requirement to use the "Service Description", consisting of a load index and speed symbol, moulded into the sidewall of the tyre.

F FMVSS Nos. 117 and 129

There has not been any discussion relating to retreaded tyres within the Group but the principle of requiring retread tyres to meet the same performance requirements as new tyres is followed in the United Nations ECE Regulations 108 and 109 for car and truck retread tyres respectively.

G Derating of P metric tyres

The Group supports the retention of the 10% down rating of P metric passenger car tyres when used on specified othertypes of vehicle and combined with provisions for reserve load and pressure.

H Other NHTSA Research Plans

1 Bead Unseating Research

Comments on this issue have already been made in section C5 of this response, but we reiterate that an examination of the results placed in the Docket do not appear to show that the Toyota Wedge Test is any more searching than the existing FMVSS 109 test in showing bead dislodgement with radial ply tyres.

Applying the side forces at the tread surface rather than at the sidewall would suggest that this was a more representative procedure but it is necessary to establish that the applied side forces in relation to the vertical load correspond to those experienced in dynamic testing.

There are concerns regarding the lack of a fully defined procedure, the specification of the test equipment and the availability of suitable equipment on the open market. The introduction of this revised test without further validation would seem to be premature at this stage.

2 Road Hazard Impact Test (SAE J1981) Research

This issue has been referred to previously in section C4 and, as with the bead unseating proposals, we feel that the results given in the Docket do not show any advantage for this test over the existing plunger test given in FMVSS 109. In the case of radial ply tyres there is invariably striker or plunger contact with the rim (with tyre material interspersed) and there is not any evidence of damage to the tyre.

Again, the appearance of the test procedure would seem to be more representative of real world conditions but the Group is aware of the work of an ISO Group that has been developing test procedures for evaluating wheel damage and in which there has been much discussion concerning the use of a single or double strike of the test block to properly evaluate the wheel. There has also been discussion on the effects of the use a rotating or non-rotating wheel.

There is work being carried out by the ASTM on this subject and the Group feels that the results of this further research are necessary to establish the validity of this test before its introduction.

I Additional Considerations

1 Lead time for implementation of new tyre standard

The Group's view is that a two year lead in time for 100% compliance is too short but more detailed comment is expected to be provided by industry.

2 Shearography Analysis

The Group feels that this is only one of a range of damage assessment techniques available to the industry and that the standard should not be design restrictive in the sense of specifying only one technique for analysis. All techniques rely on a subjective assessment by a skilled operator and the present state of technology is such that they may not be acceptable as a regulatory control requirement.

3 Revised Testing Speeds in UTQG Temperature Grading Requirement

The Group recognises that UTQGS is a consumer information system rather than a regulatory control and is pleased to read that it is to be reviewed. The Group has been consistently critical of the system in as much that a temperature rating is unnecessary if tyres are required to be tested and identified in relation to the maximum speed capability and the widely used speed symbol. The continued use of UTQGS in this scenario appears to be in contradiction of the Agency's declared wish to introduce minimum performance requirements.

4 Request for Comment on Particular Issues

1) The United Nations Economic Commission for Europe (UNECE) first introduced Regulation No.30 for tyres primarily designed for passenger cars, in 1975. The principle of using a single, short duration, high speed test for the regulatory control of load versus speed performance has not changed and experience has shown that relating the high speed test requirements to the maximum speed capability of the tyre, as indicated by a speed symbol moulded into or on to the tyre, is perfectly satisfactory. This form of test has been adopted by many other countries and is given in the International Standards Organisation Standard, ISO 10191. The UNECE Regulation No. 30 is also that which forms the basis of the high speed test given in the draft Global Technical Regulation.

The adoption of the UNECE Regulation No.30 type test would help to ensure that safety standards are consistent worldwide and that the burden on industry through having to meet several differing standards of various countries is removed. This would assist the breaking down of barriers to trade and improve the acceptability of USA produced tyres in a global market.

2) It is accepted that “real world” testing is always preferable to artificial laboratory based tests and more easily understood and accepted by the general public. However, it is rare that conditions can be controlled such that test results are consistent and comparable and there is much more limited scope for any form of accelerated testing. The Group supports the approach of using controllable, laboratory based tests wherever possible and provided that they reproduce in-service conditions.

3) The Group supports the introduction of a new standard and agrees with the cut-off date of 1975. We suggest that consideration is given to the retention of FMVSS 109 for tyres for earlier vehicles to counteract any possible legal problems in the lack of any standards for earlier tyres.

4) It should be a general principle that the units for all parameters should be those of the Système International d’Unités (SI) and that pressure should be shown in kiloPascals (kPa). Industry operates on a global basis and SI units are familiar to all sectors. Documents for reference are ISO 31 and ISO 1000 and we would draw your attention to the National Institute of Standards and Technology (NIST) Special Publication 811 of 1995 on this subject.

VII BENEFITS

The analysis of benefits appears to be based on the assumption that the problems recently experienced have been caused primarily by incorrect design rather than by difficulties in manufacture, improper application, general poor maintenance or abuse during service. It is likely that the predicted benefits will not accrue unless the measures are allied to other changes that emphasise the shared responsibility that exists between the tyre manufacturer, the vehicle manufacturer and the user. These other measures may include the provision of TPMS based on realistic low pressure thresholds and with earlier loss of pressure indication, and a requirement to ensure the correct selection of tyre and inflation pressure for any vehicle application.

The Group questions the validity of adding the estimated percentage values, 7% and 15% to predict a 22% improvement and considers that the inclusion of data regarding flat tyre occurrence is misleading.

It is very unlikely that the proposal will lead to any improvement in the production variability of tyres but this is an issue that may result from the future introduction of more automated tyre build procedures. The basic tenet is that you cannot inspect quality into a product, it has to be inbuilt.

VIII COSTS

The Group has decided to leave the question of costs to be dealt with by individual businesses but is concerned that in the Agency’s analysis, the cost to industry of acquiring the necessary test equipment to deal with the wide range and volume of tyres designed and produced has not been taken into account.