

was detected. A report that more fully discusses this data and analysis is contained in the Docket (NHTSA-02-8011-20).

The agency has decided to adopt for the new standard the current requirement for the plunger test in FMVSS No. 109 for P-metric tires and the current requirement for the strength test in FMVSS No. 119 for LT tires. Based on the agency's testing and the comments received in response to the proposal, the agency concludes that the SAE road hazard impact test is not suitable to evaluate the capability of a tire to resist damage from impacts with road hazards.

While the agency is not establishing a new or revised test at this juncture, information and data provided to the agency by Ford indicates that certain test forces and other specifications can be specified that would possibly evaluate tire-to-hazard impact worthiness performance. After completing the research on tire aging discussed below and then the research on bead unseating discussed below, the agency will conduct research to refine the current test and/or to identify and refine an alternative test that better simulates road hazard impact. When this research is complete, the agency will decide whether to initiate rulemaking on a new or revised test procedure for tire strength.

5. Bead Unseating

In response to our proposal, commenters consistently suggested that the proposed procedure required further research and specification to appropriately evaluate the ability of a tire bead to remain on the rim during varied maneuvers. For instance, the Alliance suggested that a test-wheel specification be developed because bead unseating is partially a function of the specific test wheel on which the tire is mounted. Similarly, Ford recommended that the agency include a specification for the test rim to accompany the test since the force required to unseat a tire bead is dependent on rim design. TUV Germany suggested that the agency utilize a dynamic (*e.g.*, rotating wheel) rather than a static test. Additionally, the levels of certain proposed parameters, *e.g.*, load and force and applied to the tire, were highlighted as needing further consideration.

Commenters also questioned the practicability of the Toyota test given the expected cost of equipment required to perform the test and the perceived lack of benefits resulting from the absence of failures in NHTSA's research. RMA suggested that the agency retain the current procedure,

with revised specifications applicable to tires with smaller aspect ratios.

The current resistance to bead unseating test has the force applied to the center of the sidewall of the tire. The agency believes that while the Toyota test parameters may provide a more "real world" approach by applying forces in the tread area, they would not necessarily increase the overall stringency of the test. This belief is supported by agency research, which found that the Toyota test yields results (no failures) identical to those derived from testing tires to the current bead unseating test.

The agency's research on this test consisted of fifty-four tires evaluated in the agency's Phase 1A Tire Debeading tests for their propensity to debead. Each tire was bead unseat tested using one of the two following procedures: (1) A modification of a procedure developed by Toyota that utilizes a sliding wedge-based test fixture to apply a force across the tread until the tire debeads or the rim comes in contact with the wedge, and (2) a modified version of the FMVSS No. 109 test procedure which allows the plunger load to continue until bead unseating occurs. A report that more fully discusses these data is contained in the Docket (NHTSA-02-8011-21).

The agency has decided to include in the new standard the current requirement for bead unseating that exists in FMVSS No. 109. To make this requirement consistent for all light vehicle tires, the agency has also decided to extend this requirement to LT tires. While the agency is not establishing a new or revised test at this stage, it continues to believe that bead unseating may contribute to a major safety problem: rollover. Therefore, bead unseating, if appropriately addressed through a safety performance requirement, could beneficially impact rollover crash prevention.

Information and data obtained and analyzed by the agency indicate that tire bead unseating does occur in real world applications and that it contributes to rollover because rim contact with the road is a tripping mechanism that leads to a tripped rollover. During the agency's 1997-98 dynamic rollover testing, 3 out of 12 vehicles debeaded their tire during severe maneuvers. These three vehicles included a pick-up truck, a MPV, and a passenger car. All three vehicles were equipped with P-metric tires, and all were certified as complying with the current bead unseating requirements. TREAD rollover testing conducted in 2001 and 2002 also

demonstrated debearing as a result of severe maneuvers.³³

After completing the research on tire aging discussed below, the agency will conduct research to try to identify and refine an alternative test that better simulates bead unseating than the current test. If supported by our research results, the agency will initiate rulemaking to adopt an improved bead unseating test.

With regard to RMA's suggestion that the agency revised testing specifications for tires with smaller aspect ratios, the agency notes that the current testing apparatus (the "block") can be used to test a vast majority of tires in the OE and replacement market. Low aspect tires that may be problematic fits with the testing apparatus would, in any case, comply with the requirements because the block would contact/"bottom out" on the rim before debearing could occur. The agency plans, during its bead unseating research, to review the design of the bead unseating apparatus and to determine whether and how to best modify it to accommodate low aspect ratio tires.

6. Aging

In the NPRM, the agency proposed adopting one of the following tests: (1) an adhesion (peel) test based on the American Society for Testing Materials (ASTM) D413-98, Standard Test Methods for Rubber Property-Adhesion to Flexible Substrate, (2) a long term durability endurance test based on Michelin's procedure for endurance testing, and (3) an oven aging test.

Commenters generally asserted that the three tests, as proposed, are not appropriate means of testing the effects of aging on tires or that they do not reflect real world performance. RMA opposed adoption of the peel strength test and the long term durability endurance test. RMA stated that the results of its testing in accordance with the ASTM D-413 protocol demonstrated that such testing has poor repeatability. Further, they assert that peel force does not correlate with field performance or the test wheel test because: (1) It evaluates only a component of the tire, not the tire's overall performance, (2) peel strength data inversely correlates with field data, and (3) it evaluates the tire's belt compound for ultimate tensile strength in a non-aged state and does not simulate long-term duration or field exposure.

RMA also opposed the long term durability endurance test stating that the length of the test would add a \$100

³³ The tires involved in these debearing incidents passed the FMVSS No. 109 test.