

km/h (21 to 30 mph) delta-v range. The agency believes that the offset rear impact test procedure specified in this final rule will simulate vehicle-to-vehicle crashes with a delta-v range of 32 to 48 km/h (20 to 30 mph).

The agency is also not adopting the recommendations of DC, GM, and Ford to specify design changes to the MDB and cart system. DC, GM, and Ford commented that, in their rear impact testing under the proposed test procedure, the MDB honeycomb appeared to bottom out. NHTSA, in the rear impact testing that it conducted in support of this rulemaking, took detailed post-crash test honeycomb crush measurements. None of the measurements indicated complete bottoming out of the honeycomb, and only a few of the measurements indicated about 85 percent compression.

Honeycomb, by design, is limited to approximately 85 percent compression, at which point it begins to stiffen considerably until it becomes infinitely stiff at 90–95 percent compression. During the 85–90 percent compression phase, it is similar to vehicle structures that become progressively stiffer as the crush in a crash increases. The measurements that were at 85 percent compression were observed near the edges of the MDB face, and since the total area was miniscule compared to the overall block of honeycomb, there will be little or no effect on the total or local forces exerted. Therefore, the energy absorbing honeycomb element has fully served its function of spreading the loads to the soft and hard structures of the vehicle and dissipating its share of the crash energy by the time that nearly full compression occurs. Accordingly, the agency believes that bottoming out of the honeycomb is not a concern.

DC, GM, and Ford also commented that, in their rear impact testing, the uprights supporting the cart face inadvertently contacted the struck vehicle. None of the commenters provided details on specific tests. However, the agency observed such contact in several of its rear impact tests. The NHTSA tests were conducted with the Standard No. 214 barrier, which has uprights that extend approximately 100 mm (4 inches) above the backing plate. The agency conducted film analysis of its tests and found there was no contact between the uprights and any significant vehicle structural components. The only vehicle components that contacted the uprights were trunks or tailgates that were already deformed. These contacts came late in the crash event and did not influence the outcomes.

The agency also notes that GM conducted several rear impact crash tests with a non-Standard No. 214 barrier. The cart used by GM had uprights extending approximately 600 mm (24 inches) above the backing plate, or 20 inches taller than the uprights on the barrier used by NHTSA. Despite this significant difference, there was no difference in the GM and NHTSA test results. Accordingly, the agency believes that contact between the cart uprights and the struck vehicle is not a concern.

GM noted that in some of its tests the barrier face underrode the struck vehicle and, upon rebound, the upright that contacted the vehicle became “caught” on vehicle structure (e.g., bumper, frame cross member, etc.), with undetermined effects on the struck vehicle. Ford stated that, in some of its tests, right angle corners of the barrier face hung up on vehicle trim, potentially affecting test repeatability.

NHTSA did not observe either of these phenomena in any of its testing. The agency notes that the top edge of the deformable element of the barrier is 31 inches above the ground. Consequently, for the barrier face to underride the struck vehicle, the rear end of the vehicle would have to be lifted approximately 20 to 24 inches off the ground. The agency believes that such lifting is highly unlikely. Moreover, the agency believes that any possible effects from the phenomena observed by GM and Ford would be secondary since they occur after the maximum crush damage of the test. The agency notes that damage to the fuel systems tested by NHTSA and GM appeared to result from crush damage rather than from any secondary damage. Accordingly, the agency believes that the points raised by GM and Ford are not of concern.

NHTSA is not adopting VW’s suggestion to not lower the barrier face by 50 mm (2 inches) to simulate pre-crash braking. NHTSA has determined that this change will have no measurable effect on the performance of the barrier.<sup>23</sup> The agency’s tests indicate that the center of gravity of the barrier will drop about 7.4 mm (0.29 inches), which is well within the 25.4 mm (1 inch) allowed tolerance for center of gravity locations. The moment of inertia of the barrier about the longitudinal (roll) and transverse (pitch) axes will be reduced 0.1 percent and 0.02 percent, respectively, and there will be no change in the vertical (yaw) axis. The

<sup>23</sup> The agency has docketed its findings on which this determination is based. See Docket No. NHTSA–00–8248, entry 3.

agency notes that the device currently used to measure these parameters is not capable of measuring such small changes in the moment of inertia. Moreover, these small changes will not produce any measurable effect on the test results.

The agency is not adopting the recommendation of Advocates, IIHS, and AAD to specify the use of a heavier (4,000 pound) barrier because, as the agency noted in the NPRM, in an 80 km/h (50 mph) rear impact offset crash test, a 3,015-pound barrier effectively reproduces the damage profile seen in real world crashes that most often lead to fires. If a heavier barrier were used, the proposed rear impact crash test would no longer reproduce that profile. In addition, the agency has conducted its crash tests in support of this rulemaking with a 3,015-pound barrier. The agency would have to conduct further research and development before a heavier barrier could be proposed for use in any test procedure.<sup>24</sup>

Honda claimed that the MDB overrode the rear of the test vehicle but was not specific about the vehicle test in which the override occurred. We presume that Honda may have examined the test film of a Honda Accord test conducted by GM under the GM C/K settlement agreement with NHTSA. While NHTSA personnel made suggestions and witnessed the testing, we did not have direct control over the conduct of the tests. The Standard No. 301 upgrade test protocol was not precisely followed, but was instead modified according to what GM believed to be a worst case. Two major exceptions to the Standard No. 301 upgrade protocol were the test speed and the barrier height. GM believed that testing near the Standard No. 214 height and at 85 km/h would provide a worst case scenario. In GM’s test with the Honda Accord, there was indeed severe override, which we believe was due to the additional 2.5 inches in the height of the MDB face, and to a lesser degree the additional speed of the test.

VW also recommended that the proposed rear impact test be on the side of the vehicle where the filler pipe is located. Our test results indicated that fuel leakage is not dependent on the location of the filler pipe; rather, it is dependent on how the overall fuel system is protected against the impact. Therefore, we are not incorporating

<sup>24</sup> The agency notes that the impact with the 3,015-pound barrier at 50 mph produces an impact energy 2.09 times greater than the impact energy produced by the current Standard No. 301 test. If the agency specified the use of a 4,000-pound barrier at 50 mph, the impact energy would be 2.78 times greater than the current Standard No. 301 test.