

development of improved ABS systems. NTEA stated that the proposal should be abandoned on the basis that there are no additional benefits attained by adding the proposed test procedure.

In regard to costs, TMA argued that in preparing the proposal, NHTSA tested only the most common two- and three-axle truck configurations (*i.e.*, 4 x 2 and 6 x 4), and has not adequately addressed the problems posed by other axle configurations. As aftermarket axles are often added to incomplete vehicles—which can cause a vehicle to fall outside of the Incomplete Vehicle Document (IVD) parameters specified by the incomplete vehicle manufacturer—final stage manufacturers will bear additional responsibility for certification. TMA stated that low-volume, special configurations may need to be excluded from this portion of the standard, and believes that it is premature to conclude that the proposal is practicable for all single-unit trucks and buses. TMA also believes the agency has significantly underestimated the cost of performing stand-alone braking-in-a-curve tests on previously certified vehicles. TMA stated that stand-alone testing will require shipping vehicles to a test site, installation of new brake system parts, burnishing, loading and unloading, charges for facilities, drivers, mechanics and test engineers as well as instrumentation support and reporting. The organization estimated that stand-alone braking-in-a-curve testing costs will average between \$4,500 and \$6,000 per test and a full FMVSS No. 105 or 121 certification will cost \$10,000 to \$13,000.

NTEA also believes that pass-through certification requirements supplied by incomplete vehicle manufacturers will be so restrictive that pass-through certification will not be available and that small companies would not have the means to conduct certification testing. NTEA stated that a final stage manufacturer could ensure compliance only through actual testing. In NTEA's view, the added cost of this testing will be prohibitive. Therefore, NTEA contends that final stage manufacturers would be compelled either to cease operations or choose not to test and risk a host of liabilities. NTEA further argues that the agency has repeatedly taken the position that alternatives to actual compliance testing, such as engineering analyses, computer simulations, or group testing through trade associations, may not suffice as evidence of the due care required for certification.

DaimlerChrysler referred to what it believes to be errors in the agency proposed changes to FMVSS No. 105. The company stated that the proposed

regulatory text deleted S7.8 from the list of test procedures and sequences, and inadvertently added S7.11.

DaimlerChrysler also believes that the words “except for vehicles with a GVWR greater than 10,000 lbs.” were inadvertently deleted from S7.5(b), and that the word “must”—proposed in lieu of the current “shall” in S7—should be retained. DaimlerChrysler also noted that the word “control” was deleted from the phrase “transmission selector control” in S7 and recommended that the word “control” be retained. Finally, DaimlerChrysler indicated that while it prefers retaining the existing language for S5.7(b), which governs test speeds for each category of vehicle for the second effectiveness test, that the existing language of S5.7(b) is also incorrect.

#### V. Final Rule

This final rule adopts the amendments to FMVSS No. 105 and FMVSS No. 121 proposed in the December 21, 1999 NPRM with several modifications. First, because the agency agrees with those commenters who argued that the lightly loaded test condition is the most severe test of an ABS system in a braking-in-a-curve test, the final rule eliminates the proposed requirement that testing include braking runs by a vehicle in a loaded-to-GVWR condition. The final rule also modifies the proposed test sequence to reflect the elimination of the loaded-to-GVWR condition requirement and to simplify testing. We are also modifying the requirements for the full brake application used in the braking-in-a-curve test and making a number of corrections to the regulatory text.

The most significant modification to the proposal is our decision to eliminate the requirement that the braking-in-a-curve test be performed with the test vehicle in a lightly loaded and heavily loaded configuration. The comments submitted in response to the NPRM favored elimination of the requirement that vehicles be tested in a loaded-to-GVWR condition. These commenters argued that the brakes on a lightly loaded vehicle are generally much more likely to lock on a low friction surface than those on an identical vehicle with a heavy load.

The agency's own testing and data submitted by TMA indicate that the lightly-loaded test condition has a lower margin of compliance than tests in the loaded-to-GVWR condition. In those few cases in which the loaded-to-GVWR test condition resulted in a lower margin of compliance, the margin of compliance was still quite large for the lightly-loaded condition. These tests and data

demonstrate that the loaded-to-GVWR test offers little additional information about a vehicle's ABS performance beyond what can be shown by just using the lightly-loaded test.

In addition, the agency agrees with the observations of several commenters that there is a risk of vehicle rollover while conducting the braking-in-a-curve test with a loaded-to-GVWR vehicle unless a low center-of-gravity loading scheme is required. Developing and implementing a uniform low center-of-gravity scheme for single-unit vehicles would be difficult given the large number of single-unit truck configurations. Use of a higher center-of-gravity load increases concerns about roll stability. During the maximum drive-through speed test, which determines the speed at which the braking-in-a-curve test is conducted, the test vehicle will depart from the test lane if the driver exceeds the maximum drive through speed of the vehicle for that road surface condition. If this occurs, the test vehicle may move laterally onto a wet asphalt surface with a higher coefficient of friction (PFC 0.8). In these conditions, a vehicle loaded so that it has a high center of gravity could become unstable and rollover. The HDBMC offered its view that the agency should specify a 32-inch center-of-gravity height for any ballast added to create a loaded condition for any agency braking tests, including the proposed test. We note first that as the agency is not specifying that the braking in a curve test be performed in a loaded-to-GVWR condition, this eliminates HDBMC's concerns for that test.

While the agency is not including the fully-loaded-to-GVWR braking-in-a-curve test for single-unit vehicles in this final rule, it will keep this test requirement in FMVSS No. 121 for truck tractors. Reasons for keeping this requirement include the large variation in vehicle weight of unladen tractors (bobtail) to fully-loaded-to-GVWR tractors; the large contribution of the tractor in providing braking force when a loaded semi-trailer is coupled to the tractor; and the articulated configuration of the tractor and semitrailer that results in the trailer contributing to the lateral force on the tractor drive wheels during a braking-in-a-curve test. In addition, since loading a tractor to GVWR is accomplished by coupling a loaded control trailer to the tractor, the labor effort for loading and unloading is minimal compared to single-unit vehicles.

This final rule also modifies the test sequence. We note that our proposed test sequence, which is already in effect for truck tractors, is based on several