service brake's friction linings for the parking brake be tested at a speed of 80 km/h and that vehicles utilizing separate friction linings for the parking brake be tested at 60 km/h. The agency decided that it was not necessary to include a stopping distance requirement, as was proposed in the 1987 SNPRM.

Volkswagen, Mercedes Benz, GM, Suzuki, MVMA, Chrysler, Ford, and OICA objected to the proposed dynamic parking brake test. These commenters stated that the agency had not identified any safety need for a dynamic parking brake test and that FMVSS No. 105 has no such test. These commenters stated that such a test is neither needed nor appropriate since the primary purpose of the parking brake is to statically hold a vehicle on a gradient and not to provide deceleration capabilities for a moving vehicle. They state that it is potentially dangerous for drivers to apply parking brakes in a dynamic situation because it is difficult to modulate the application force. Moreover, such applications could lead to uncontrollable rear wheel lock up and loss of vehicle control.

Volkswagen, Mercedes Benz, GM, Suzuki, MVMA, Chrysler, Ford, and OICA stated that the dynamic parking test was adopted in ECE R13 prior to the almost universal use of dual split service brake systems. Such brake systems provide extra braking reserves in the event of a partial failure because an independent part of the split system remains intact and unaffected by the failure in the other part of the system. According to the commenters, ECE is no longer working on revising its dynamic test, and is even discussing eliminating it.

Mercedes commented that a dynamic test penalizes parking brake designs that are highly self energizing (*i.e.*, that require a relatively low control force but are highly effective in static situations) because their static-efficient design makes them more susceptible to fading. It stated that deleting the dynamic test would improve the design of parking brakes by permitting the optimization of their static holding performance.

In contrast, Advocates and CAS supported including a dynamic parking brake test, although they opposed the agency's decision not to propose stopping distance requirements in the 1991 SNPRM. Advocates stated that the important function of a dynamic standard for parking brake performance is the ability to control manufacture of parking brake systems either with or without separate friction that will reasonably stop a car from controlling test speeds when there is a complete failure of service brakes. That organization stated that without a specific stopping distance requirement, the agency was essentially conceding its attempt to strengthen .105 in order to ensure adequate dynamic performance of the parking brakes when all service brakes fail.

CAS commented that NHTSA's defect files contradict GM's comment that current brake system designs "obviate the safety need" for emergency brakes and performance standards. It believed that in many instances drivers have had to use the emergency brake as a last resort to stop the car.

After reviewing the available information, NHTSA has determined that a dynamic parking brake test would provide no significant safety benefits. This decision is based on the fact that FMVSS No. 105 does not include a dynamic parking brake test and on the current state of braking technology. As the manufacturers correctly stated, the ECE requirement pre-dated the widespread use of split service brake systems, which are now standard on all passenger cars. Therefore, the justification for using the parking brake in an emergency situation is no longer relevant. The agency further notes that the partial failure requirements are sufficient in dynamic emergency situations.

Advocates and CAS argued that these requirements are needed to address the situation of "complete failure" of a service brake system. The agency has no evidence that complete brake failure (simultaneous failure of both circuits of a split brake system) occurs with any significant frequency. Moreover, because the parking brake is for static situations such as parking and not dynamic ones, the parking brake is not designed to act in dynamic emergencies. Therefore, the agency is concerned that applying the parking brake in emergency situations may cause wheel lockup and instability. The agency further notes that the initial impetus to harmonize with the ECE with respect to a dynamic parking brake requirements will likely become moot, given that the ECE is currently discussing deletion of this requirement from R13 and R13H.

*b. Static test.* FMVSS No. 105 requires that a passenger car's parking brake be able to hold the vehicle when it is parked on a 30 percent grade and a force is applied to the parking brake control not exceeding 125 pounds for foot operated parking brake systems and 90 pounds for hand operated parking brake systems. In the NPRM, the agency proposed requiring the brake to hold the vehicle when parked on a 20 percent grade and a force not exceeding 500N (112 pounds) for foot-operated parking brakes and 320N (72 pounds) for hand operated parking brakes.

In the 1991 SNPRM (Notice 5), NHTSA proposed that the parking brake be able to hold the vehicle when it is parked on a 20 percent gradient and a force is applied to the parking brake control not exceeding 500N (112 pounds) for foot operated brakes and 400N (90 pounds) for hand operated brakes. The static parking brake test is a pass/fail type of test, *i.e.*, the parking brake either holds the vehicle or it does not. Accordingly, the test's stringency is determined by the gradient and the allowable control force. The two test conditions are interrelated since the higher the force that is applied to the control, the steeper the gradient on which the vehicle can be held in place. In proposing in the SNPRMs to have the hand control force limit at 400 N, the agency stated that the static parking brake test would be somewhat less stringent for manual transmission vehicles, but would be equivalent for automatic transmission vehicles, which make up the majority of cars sold in the U.S. today.

Advocates objected to the reinstatement in the 1987 SNPRM (Notice 4) of the 400 N (90 lbs.) allowable control force for hand brakes, stating that the 320 N (72 lbs.) level proposed in the NPRM clearly recognized the increasing prevalence of hand-operated parking brakes in the American car fleet and the simultaneous surge in numbers and percentage representation of elderly car operators who often cannot apply high levels of force to hand-operated parking brakes.

Advocates also argued that other aspects of the existing parking brake requirements of FMVSS No. 105 have been weakened. That organization noted that the gradient for the parking brake test is 30 percent in FMVSS No. 105, as opposed to 20 percent in the proposed FMVSS No. 135. Advocates stated that in order to offset this less stringent test parameter, the agency proposed lower allowable control forces in the NPRM, 500 N for foot-operated systems and 320 N for hand-operated systems, but later conceded the proposed improvement for hand-operated systems.

Advocates stated that in the 1987 SNPRM, NHTSA reasoned that it was appropriate to specify a less severe gradient and a stronger engagement force for hand-operated parking brakes, because the "requirements are somewhat less stringent than those of FMVSS No. 105, but [the agency] also believes that the FMVSS No. 105 level of stringency for those particular requirements is unsupported as