

[Federal Register: March 6, 2007 (Volume 72, Number 43)]  
[Rules and Regulations]  
[Page 9855-9871]  
From the Federal Register Online via GPO Access [wais.access.gpo.gov]  
[DOCID:fr06mr07-10]

---

---

DEPARTMENT OF TRANSPORTATION

Federal Motor Carrier Safety Administration

49 CFR Part 393

[Docket No. FMCSA-2005-21323]  
RIN-2126-AA91

Parts and Accessories Necessary for Safe Operation: **Surge** Brake  
Requirements

AGENCY: Federal Motor Carrier Safety Administration (FMCSA), DOT.

ACTION: Final rule.

---

SUMMARY: FMCSA amends the Federal Motor Carrier Safety Regulations to allow the use of automatic hydraulic inertia brake systems (**surge brakes**) on trailers when the ratios of gross vehicle weight ratings (GVWR) for the towing-vehicle and trailer are within certain limits. A **surge** brake is a self-contained permanently closed hydraulic brake system activated in response to the braking action of the towing vehicle. The amount of braking force developed by the trailer **surge**-brake system is proportional to the ratio of the towing vehicle to trailer weight and deceleration rate of the towing vehicle. This action is in response to a petition for rulemaking from the **Surge** Brake Coalition (Coalition).

DATES: Effective Date: April 5, 2007.

ADDRESSES: Docket: For access to the docket to read background documents or comments received, go to <http://dms.dot.gov> at any time,

or go to Room PL-401 on the plaza level of the Nassif

[[Page 9856]]

Building, 400 Seventh Street, SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal Holidays.

FOR FURTHER INFORMATION CONTACT: Mr. Luke W. Loy, Vehicle and Roadside Operations Division, Federal Motor Carrier Safety Administration, 202-366-0676, 400 Seventh Street, SW., Washington, DC 20590-0001. Office hours are from 9 a.m. to 5 p.m., e.s.t., Monday through Friday, except Federal holidays.

SUPPLEMENTARY INFORMATION: This Final Rule is organized as follows:

- I. Legal Basis for the Rulemaking
- II. Background
  - A. Current Regulatory Environment
  - B. Regulatory History
  - C. Petition
  - D. Analysis of Petition
  - E. Notice of Proposed Rulemaking (NPRM)
- III. Discussion of Comments to NPRM
  - A. Comments Supporting
  - B. Comments Opposing
- IV. Summary
- V. Regulatory Analyses and Notices
- VI. Regulatory Language for the Final Rule

#### I. Legal Basis for the Rulemaking

This rule is based on the authority of the Motor Carrier Act of 1935 and the Motor Carrier Safety Act of 1984.

The Motor Carrier Act of 1935 provides that ``[t]he Secretary of Transportation may prescribe requirements for--(1) qualifications and maximum hours of service of employees of, and safety of operation and equipment of, a motor carrier; and (2) qualifications and maximum hours of service of employees of, and standards of equipment of, a motor private carrier, when needed to promote safety of operation'' [49 U.S.C. 31502(b)].

The amendments to 49 CFR part 393 adopted today deal directly with the ``safety of \* \* \* equipment of[ ] a motor carrier'' [sec. 31502(b)(1)] and the ``standards of equipment of[ ] a motor private carrier \* \* \*'' [sec. 31502(b)(2)]. The adoption and enforcement of rules relating to **brakes** on commercial vehicles was clearly authorized by the Motor Carrier Act of 1935. This rule rests squarely on that authority.

The Motor Carrier Safety Act of 1984 provides concurrent authority to regulate drivers, motor carriers, and vehicle equipment. It requires the Secretary of Transportation to ``prescribe regulations on commercial motor vehicle safety. The regulations shall prescribe minimum safety standards for commercial motor vehicles.'' Although this authority is very broad, the Act also includes specific requirements: ``At a minimum, the regulations shall ensure that--(1) commercial motor vehicles are maintained, equipped, loaded, and operated safely; (2) the responsibilities imposed on operators of commercial motor vehicles do not impair their ability to operate the vehicles safely; (3) the physical condition of operators of commercial motor vehicles is adequate to enable them to operate the vehicles safely; and (4) the operation of commercial motor vehicles does not have a deleterious effect on the physical condition of the operators'' [49 U.S.C. 31136(a)].

This rule focuses primarily on the mandate of sec. 31136(a)(1) that commercial motor vehicles (CMVs) be ``equipped \* \* \* and operated'' safely. FMCSA has determined that **surge brakes** can safely be allowed on trailers operating in interstate commerce under the conditions set forth in this final rule. Sections 31136(a)(2) and 31136(a)(4) deal with the safety and health effects, respectively, of the operational responsibilities imposed on CMV drivers. The Agency has concluded that operating a combination vehicle that includes a **surge**-braked trailer meeting the requirements of this rule would neither impair a driver's ability to operate safely nor adversely affect the driver's health. Finally, sec. 31136(a)(3) deals almost exclusively with a driver's ``physical condition,'' i.e., medical status. That subject is not specifically addressed in this rule, and the **surge**-brake provisions

adopted today would not affect a driver's physical condition.

Before prescribing any regulations, FMCSA must also consider the ``costs and benefits'' of its proposal (49 U.S.C. 31136(c)(2)(A) and 31502(d)). Those factors are discussed in the regulatory analysis for this rule filed separately in the docket.

## II. Background

### A. Regulatory History

The National Highway Traffic Safety Administration (NHTSA) has a legislative mandate under Title 49 of the United States Code, Chapter 301, Motor Vehicle Safety, to issue Federal Motor Vehicle Safety Standards (FMVSS) and Regulations to which manufacturers of motor vehicles must conform; manufacturers must certify that their vehicles and equipment comply with the FMVSSs. These Federal safety standards are regulations written in terms of minimum safety performance requirements for motor vehicles or equipment. These requirements are specified in such a manner that the public is protected against unreasonable risk of crashes occurring as a result of the design, construction, or performance of motor vehicles and is also protected against unreasonable risk of death or injury in the event crashes do occur.

FMVSS No. 121, ``Air brake systems,'' specifies performance and equipment requirements for trucks, buses, and trailers equipped with air brake systems, including air-over-hydraulic brake systems, to ensure safe braking performance under normal and emergency conditions. However, there are no requirements in FMVSS No. 121, or any of the other FMVSSs, relating to the performance of **surge brakes**, electric **brakes**, or parking **brakes** on trailers.

\1\ Certain trailers and trucks are exempted depending on width, axle GVWR, maximum speed, and unloaded vehicle weight.

Whereas the FMVSSs--other than FMVSS No. 121--do not specify performance requirements for trailer braking, Section 393.40 of the FMCSRs requires each CMV to have **brakes** adequate to stop and hold the vehicle or combination of motor vehicles. Trailer braking performance is specified in Section 393.52(d) of the FMCSRs, and generally requires property-carrying vehicles and combinations of property-carrying vehicles used in interstate commerce be able to stop within 40 feet from 20 miles-per-hour (mph) on a hard surface that is substantially level, dry, smooth, and free of loose material. However, any semitrailer, trailer, or pole trailer with a gross weight of 3,000 pounds or less is not required to be equipped with **brakes** if the axle weight of the towed vehicle does not exceed 40 percent of the sum of the axle weights of the towing vehicle. Thus, a combination operating in interstate commerce would not need **brakes** on a 3,000-pound trailer when pulled by a 7,500-pound or heavier towing vehicle (49 CFR 393.42(b)(3)-(4)). In these cases, the vehicle combination must be able to stop within 35 feet from 20 mph, and the service **brakes** of the towing vehicle alone are sufficient to stop the combination.

In 1952, the two requirements regarding **brakes** that are the subject of this rulemaking were included in the FMCSRs. Section 393.48 of the FMCSRs requires that all **brakes** with which a motor vehicle is equipped be capable of operating at all times. In addition, Sec. 393.49 requires that a single application valve must, when applied, operate all the service **brakes** on the motor vehicle or combination of motor

vehicles. While electric **brakes** on trailers used in interstate commerce are considered to meet the requirements of Sec. Sec. 393.48 and 393.49, and have been in use for many years, regulatory guidance issued by the Agency in 1975 (40 FR

[[Page 9857]]

50671, 50688, Oct. 31, 1975) \2\ indicated the use of **surge brakes** on trailers operated in interstate commerce was inconsistent with the requirements of Sec. Sec. 393.48 and 393.49. The 1975 guidance reads as follows:

-----  
 \2\ The Federal Highway Administration's (FHWA) Bureau of Motor Carrier Safety (Bureau) (FMCSA's predecessor agency) published these interpretations.

Section 393.48 **Brakes** to be Operative. The Bureau's position regarding **surge brakes** has been that they did not comply with the requirements of Section 393.48 of the Motor Carrier Safety Regulations. The cited section requires, in part, that all **brakes** with which motor vehicles are required to be equipped must be operative at all times. A **surge** brake which is only operative under certain preset conditions would not be in compliance with this requirement. In other words, **surge brakes**, in general, are only operative when the vehicles are moving in the forward direction.

Section 393.49 Single Valve to Operate All **Brakes**. A **surge** brake would comply with the requirements of Section 393.49 as it specifically states that the brake system shall be so arranged that one application valve shall, when applied, operate all of the service **brakes** on the motor vehicle or combination of motor vehicles. When the service **brakes** on a power unit towing a vehicle with **surge brakes** are applied, the **brakes** on both vehicles would be applied. The power unit **brakes** would be applied by its application valve and the **surge brakes** on the towed vehicle by the overrunning effect.

Subsequent regulatory guidance published by FHWA on November 17, 1993, (58 FR 60734, 60755) indicated that **surge brakes** did not comply with either Sec. 393.48 or Sec. 393.49. It reads as follows:

Section 393.48 **Brakes** to be Operative.

Question 1: Do **surge brakes** comply with Sec. 393.48?

Guidance: No. Section 393.48 requires that **brakes** be operable at all times. Generally, **surge brakes** are only operative when the vehicle is moving in the forward direction and as such do not comply with Sec. 393.48.

Section 393.49 Single Valve to Operate All **Brakes**. Question 1: Does a combination of vehicles using a **surge** brake to activate the towed vehicle's **brakes** comply with Sec. 393.49?

Guidance: No. The **surge** brake cannot keep the trailer **brakes** in an applied position. Therefore, the **brakes** on the combination of vehicles are not under the control of a single valve as required by Sec. 393.49. \* \* \*

The 1993 guidance was also republished in FHWA's April 4, 1997, publication, ``Regulatory Guidance for the Federal Motor Carrier Safety Regulations.'' (62 FR 16370, 16415-16416)

Various parties over the years expressed concern about FMCSA's position on trailer **surge brakes**. FMCSA advised interested parties to

follow the procedures found at Sec. 389.31 and submit a petition requesting such a rule change accompanied by sufficient information supporting the safety performance of their request. The **Surge Brake Coalition** (Coalition) submitted such a petition requesting a rulemaking to change the regulation. FMCSA notes that in contrast to the United States, Canada allows **surge** brake systems on trailers used in inter-Provincial commerce. Today's rule allowing **surge brakes** will enhance the uniformity of Canadian and U.S. safety regulations.

#### B. The **Surge Brake Coalition** Petition

The Coalition submitted a petition on February 28, 2002, asking FMCSA to undertake rulemaking to allow **surge brakes** by amending Sec. Sec. 393.48 and 393.49. Members of the Coalition include trailer manufacturers, parts suppliers, commercial users of **surge**-braked trailers, trailer rental companies, and trade associations representing segments of the trailer business. A copy of the Coalition's petition is included in the docket referenced at the beginning of this document.

The Coalition said:

Technological advances in braking systems render the original purpose of 393.49 and its ``single-valve'' criterion overly broad and excessively restrictive. FHWA [previously] developed this regulation as a materials-oriented specification to foreclose the shortcomings of and risks associated with the predominant braking system of the day, wheel **brakes** and their use in conjunction with large tractors or power units.

The Coalition asserted that Congress had declared that DOT's motor vehicle safety standards must be minimum performance standards, based upon performance of the vehicle (49 U.S.C. 30102(a)(8) and (9)). The standards must ``meet the need for motor vehicle safety'' and must be ``stated in objective terms'' (49 U.S.C. 30111(a)). However, FMCSA's interpretation of how Sec. Sec. 393.48(a) and 393.49 apply to **surge brakes** is a prescriptive component specification that does not address how the trailer braking system performs either as a unit or as part of a combination vehicle.

The Coalition requested that section 393.48 be amended by:

1. Revising paragraph (a) to read:

``General rule. Except as provided in paragraphs (b), (c), and (d) of this section, all **brakes** with which a motor vehicle is equipped must at all times be capable of operating.''

2. Adding a new paragraph (d) to read:

``(d) **Surge brakes**. Paragraph (a) of this section does not apply to:

Any trailer with a gross vehicle weight rating (GVWR) of 12,000 pounds or less, equipped with inertial **surge brakes** when its GVWR does not exceed 1.75 times the GVWR of the towing vehicle; or

Any trailer with a GVWR greater than 12,000 pounds, but less than 20,001 pounds, equipped with inertial **surge brakes** when the GVWR does not exceed 1.25 times the GVWR of the towing vehicle.''

The Coalition also requested the following exception be added to Sec. 393.49:

``This requirement shall not apply to trailers equipped with **surge brakes** that satisfy the conditions provided in Sec. 393.48(d).''

The Coalition argued that **surge brakes** provide a safe, practical braking system for CMV combinations, especially for scenarios in which

the trailer is likely to be towed by a variety of vehicles. For example, in the rental market, trailers are commonly rented separately from towing vehicles, and towing vehicles frequently are not wired for electric brake controls. The Coalition indicated that rental companies believe it is ``prohibitively expensive and impractical'' to install or adapt an electric brake control system on each towing vehicle every time they rent a trailer or piece of mobile equipment outfitted with electric **brakes**.

The Coalition stated that **surge brakes** are a popular alternative to electric **brakes** because they activate automatically when the towing vehicle **brakes** are applied, adapt to the weight of the trailer load, have fewer components, and require less maintenance than trailers with electric **brakes**. These features make **surge brakes** ideal for flatbed and van-type trailers with a GVWR of 20,000 pounds or less, and boat trailers serving the marine industry. The Coalition also noted that manufacturers install approximately 250,000 **surge** brake systems annually on such trailers. This includes both in the personal market and the commercial intrastate market in 7 States, as of their 2002 petition, where the Coalition said **surge brakes** are allowed in intrastate commercial applications. (The 2004 article cited in the Regulatory Evaluation from Trailer Body Builders indicates the number of such States had risen to 9.\3\). The Coalition estimated that over 25 percent of the rental trailer fleet is equipped with **surge brakes**. There are no restrictions in any State on **surge**-braked trailers for personal use.

---

\3\ A Break on **Brakes**, in Trailer Body Builders, August 1, 2004, Rick Weber ([http://trailer-bodybuilders.com/mag/trucks\\_break\\_brakes/](http://trailer-bodybuilders.com/mag/trucks_break_brakes/)).

---

#### The Coalition's Engineering Tests

In order to demonstrate systematically that **surge** brake equipped trailers meet the safety performance requirements of the FMCSRs, as well as relevant testing

[[Page 9858]]

procedures adapted from NHTSA's FMVSS No. 121 that apply to air-braked trailers, the Coalition retained the services of Mr. Richard H. Klein, P.E., who is described as a nationally known expert in trailer safety and testing. Mr. Klein was tasked to develop a test plan, select an independent testing laboratory, and to oversee the testing of a variety of tow vehicles and trailers equipped with **surge brakes**. Mr. Klein finalized the test protocol, procedures and methods. The tests covered combinations of representative towing vehicles commonly used by customers and trailers widely available in the rental market. Special attention was given to the ratio of the gross vehicle weight rating (GVWR) of the towing vehicles to that of the trailers when evaluating braking performance. Mr. Klein then solicited bids to obtain the services of a qualified, reputable, independent testing lab to execute the tests.

The facility selected by Mr. Klein was Exponent Failure Analysis Associates' (EFAA) Test and Engineering Center in Phoenix, Arizona. EFAA is an ISO 9001 lab that conducts a wide variety of scientific testing and research. EFAA has performed compliance testing on various FMVSSs for NHTSA. Initially, EFAA tested and fully analyzed the data from the braking performance of 11 different combinations of

instrumented towing vehicles and trailers from the matrix developed by Mr. Klein. Those 11 combinations were chosen for full analysis from the 20 instrumented combinations initially tested because they represented a very wide range of towing vehicle to trailer GVWR ratios. Based on results of those initial tests, two additional vehicle configurations were tested to determine the performance of trailers over 12,001 pounds GVWR when the ratio of the simulated trailer GVWR to towing vehicle GVWR was restricted to 1:1.25.

Mr. Klein interpreted the test data provided to him by EFAA and prepared the final report. His report is included as part of the petition submitted by the Coalition, and is, thus, included in the docket for this rulemaking.

#### Test Vehicles

##### Trailers (GVWR)

Light. 1999 U-Haul tandem axle auto transport (6,000 pounds GVWR), equipped with U-Haul **surge** brake actuator.

Medium. 2000 Big Tex tandem axle, open cargo area, with side rails (14,000 pounds GVWR), equipped with Demco Model DA20 **surge** brake actuator.

Heavy. Two-2001 Wells Cargo flatbed trailers with triple torsion axles (20,000 pounds GVWR). One trailer was equipped with a Titan model 20 **surge** brake actuator and the other with a Demco DA20 **surge** brake actuator.

##### Towing Vehicles (GVWR)

Light. 1993 Chevrolet C-1500 (6,100 pounds GVWR), curb weight 4,194 pounds. The vehicle was equipped with front disc **brakes** and rear drum **brakes**. The vehicle was also equipped with a rear-axle antilock braking system (ABS).

Medium. 2001 Chevrolet K-3500 (11,400 pounds GVWR), curb weight 7,072 pounds. The vehicle was equipped with four-wheel disc **brakes**, four-wheel ABS and dual rear tires.

Medium. 2001 GMC Sierra (11,400 pounds GVWR), curb weight 7,476 pounds. The vehicle was equipped with four-wheel disc **brakes**, four-wheel ABS and dual rear tires.

Note: The petition referred to the Chevrolet K-3500 and GMC Sierra as ``heavy'' vehicles. This document labels them as medium weight vehicles to distinguish them from the later discussion of a towing vehicle with a 16,000-pound GVWR, which we term ``heavy.''

#### Test Protocol

The Coalition developed a test plan modeled on the procedures employed by NHTSA. It was designed to check brake performance in three areas of particular concern for **surge** brake equipped trailers.

1. Straight-line braking: Vehicle combinations were tested to see whether their stopping distance from 20 mph could meet the straight line performance requirements under Sec. 393.52. The vehicle combination was required to stay within a 12-foot-wide lane during the test and not exceed the 40-foot stopping distance limit.

2. Braking in a curve: FMVSS Nos. 105 and 121 both require testing of **brakes** in a 500-foot radius curve from 30 mph on wet pavement to determine functionality of the ABS **brakes** on what would be the towing vehicles in this rulemaking. This requirement does not apply since functioning of ABS **brakes** is not the subject of this rulemaking. Although the FMVSS do not have a specification for braking-in-a-curve tests for trailers, the Coalition decided to include such tests of

combination vehicles on a dry surface (as required by Sec. 393.52) to check for jack-knifing tendencies and any other sources of instability. Testing consisted of driving the towing and trailer combinations at 30 mph on a circular, 12-foot-wide, 500-foot-radius test track. The driver then applied the **brakes** to achieve maximum deceleration, and the vehicle combination was required to stay within a 12-foot-wide lane during the stop.

3. Brake-holding on a hill: Because **surge brakes** work by transforming the trailer's forward momentum into hydraulic braking pressure, a stationary trailer facing uphill generates no braking effect. The Coalition, therefore, tested whether a combination that is required to stop facing uphill on a 20 percent grade can safely remain stationary using only the service **brakes** of the towing vehicle. The issue has practical implications in hilly areas where stop signs or traffic signals might halt a combination heading uphill. The Coalition applied the standard normally used for the parking brake, which in this case is for the towing vehicle, as specified in FMVSS Nos. 105 and 121, i.e., holding on a 20 percent grade. The combination was required to remain stationary for at least 5 minutes.

#### Test Results

A total of 22 towing vehicle and trailer combinations were tested. The petition explained that data from 13 instrumented combinations representing the widest possible range of weight ratios were selected for detailed analysis and inclusion in Mr. Klein's final report, which was included in the petition. The petition says that data collected from the other instrumented vehicle combinations tested were not included in the report because of budget constraints, but these tests generated essentially the same performance results as those that were included.

Initially, three towing vehicles representing two weight classes were tested with three trailers representing three weight classes. Subsequently, a fourth medium weight towing vehicle and heavy trailer were added for two extra tests.

The first three towing vehicles were run both at their unloaded curb weights of 4,194 pounds, 7,072 pounds and 7,476 pounds, and also loaded to their approximate GVWR of 6,100 pounds, 11,400 pounds, and 11,400 pounds, respectively. The three trailers were loaded at different weights to simulate towing vehicle to trailer GVWR ratios of 1:1, 1:1.25, 1:1.5, 1:1.7 and 1:2. The test ``curb weights'' shown in the petition for the towing vehicles were measured by driving the towing vehicles with loaded trailers attached onto the scales just before starting the test. Thus, the ``curb weights'' shown in the test data includes the driver, test equipment, fuel load, and tongue weight. A reasonable approximation of the tongue weight is 10 percent of the loaded trailer weight. For example, in a medium towing vehicle with an unloaded curb weight of

[[Page 9859]]

7,072 pounds towing a heavy trailer loaded to 16,540 pounds, the weight of the driver, fuel and test equipment and tongue weight produced a test ``curb weights'' of 9,370 when the towing vehicle began the test. For similar reasons, a few of the actual test weights for the towing vehicle slightly exceeded the GVWR of the towing vehicle.

1. Straight-line braking: A light towing vehicle (GVWR of 6,100 pounds), operating both at test curb weight and loaded to full GVWR, was tested in combination with a light trailer loaded approximately to its GVWR at 6,030 pounds for a ratio of approximately 1:1. Both of

these combinations stopped from 20 mph well within the 40 feet allowed by Sec. 393.52.

The light towing vehicle loaded approximately to its GVWR of 6,100 pounds was also tested with a medium weight trailer (14,000 pounds GVWR) loaded to 9,090 pounds and 12,090 pounds (simulating GVWR ratios of approximately 1:1.5 and 1:2, respectively). These combinations also complied with Sec. 393.52 by stopping from 20 mph within 40 feet.

The medium towing vehicles of 11,400 pounds GVWR were tested loaded to their GVWR with (1) a medium trailer (GVWR 14,000 pounds) partially loaded to 12,090 pounds for a simulated ratio of approximately 1:1.1, and (2) a heavy trailer (GVWR 20,000 pounds) partially loaded to 14,600 pounds for a simulated GVWR ratio of approximately 1:1.25. These combinations complied with Sec. 393.52, demonstrating safe braking performance when the simulated GVWR of trailers heavier than 12,000 pounds was limited to approximately the requested 1.25 times that of the towing vehicle, or less.

A medium towing vehicle tested with a heavy trailer (both loaded to approximately their GVWR for a ratio of 1:1.75) achieved a stopping distance of 44.7 feet from 20 mph. This combination has a GVWR ratio that is considerably higher (approximately 40 percent higher) than the 1:1.25 requested by the petitioner for heavier trailers, yet the vehicle combination still came very close to the stopping distance requirement of 40 feet, as specified in Sec. 393.52.

This test with a GVWR ratio of 1:1.75 demonstrated that the Coalition's proposed GVWR ratio of 1:1.25 is conservative, and includes a substantial safety margin for trailers with a GVWR greater than 12,000 pounds.

2. Braking in a curve: EFAA conducted 39 brake-in-a-curve tests with 11 combinations. The actual or simulated GVWR ratios varied widely (from 1:1 to 1:2), depending on the load carried by the trailer. These tests included all the vehicle combinations described in the straight-line braking test above, except for the two combinations added later, i.e., a medium towing vehicle with a trailer loaded to 14,600 pounds for a weight ratio of 1:1.25. The braking-in-a-curve test was not done on those combinations because these tests had already been run for that vehicle at weight ratios up to 1:2.

The combinations included in these tests included: light towing vehicle and light trailer; the light towing vehicle and the medium trailer; medium towing vehicle and medium trailer; and medium towing vehicle and heavy trailer. The reported results indicated that in all of the 39 tests, the combinations were able to stop from 30 mph within a 12 foot lane on a 500 foot radius circle without any loss of control.

3. Brake-holding on a hill: Six combinations were parked heading uphill on a 20 percent grade. In all cases, the service **brakes** on the towing vehicle held the entire combination in place for 5 minutes, the duration of the test. The combinations tested included: A light towing vehicle both at its test ``curb weight'' and loaded to its GVWR attached to a trailer loaded to a simulated GVWR of 12,090 pounds, for a maximum GVWR ratio of approximately 1:2; a medium towing vehicle tested at its test ``curb weight'' with a heavy trailer loaded to 16,540 pounds for a simulated GVWR ratio of approximately 1:1.45; and a medium towing vehicle loaded approximately to its GVWR and tested with a heavy trailer loaded to its approximate GVWR of 20,000 pounds, representing a GVWR ratio of about 1:1.75.

Although **surge brakes** automatically release when deceleration stops, the tests showed that the service **brakes** of a towing vehicle are more than adequate to hold the combination at a stop even while facing uphill on a 20 percent grade, even when the GVWR ratios substantially exceed the limits proposed by the Coalition.

### C. Analysis of Petition

The data submitted by the Coalition indicate that approximately 250,000 **surge**-brake units are installed each year. This large number creates a considerable population of non-commercial **surge**-braked trailers operating on the public roads. Numerous commenters contend that this trailer braking technology is inherently unsafe, as discussed in following sections, because--compared to other brake systems--it increases (1) the risk of brake fires while descending large hills, and (2) the risk of crashes. FMCSA was unable to find any data to support those claims. Although **surge brakes** have been in use for many years, no government agency or private entity that FMCSA is aware of has found their performance to be inadequate or contributory to highway crashes. The absence of such data suggests that the alleged safety problems of **surge brakes** are in fact a non-issue for their manufacturers, renters and insurers of trailers so equipped, and State and local safety officials. FMCSA believes that the use of **surge brakes** has proven to be safe.

FMCSA investigated whether crash data could be obtained from either NHTSA's Fatality Analysis Reporting System (FARS) or the General Estimates System (GES) to assist in this evaluation. Neither FARS nor GES identifies the type of **brakes** used on trailers involved in fatal or non-fatal crashes and, therefore, cannot reveal whether **surge brakes** are under-or over-represented in crash statistics.

FMCSA analyzed the information provided by the Coalition and, as indicated in the NPRM, made a preliminary determination that the test results supported a number of conclusions. Vehicles equipped with **surge brakes**, subject to the GVWR ratios proposed in the petition and NPRM (1) have sufficient braking capability to comply with the Agency's stopping requirements while operating on public roads in interstate commerce; (2) have no braking stability problems; and (3) are able to safely hold their position when stopped facing uphill on steep grades, and then to proceed.

The test results involving a medium towing vehicle and a heavier trailer were particularly important. The tests demonstrated that heavier towing vehicles in compliance with FMVSS No. 105, which allows a longer stopping distance for non-passenger vehicles over 10,000 pounds, would still meet the vehicle braking performance requirements of Sec. 393.52 if the GVWR ratio of towing vehicle to trailer did not exceed 1:1.25. The Coalition's petition asked for the break point in towing vehicle to trailer GVWR ratio to occur at 12,000 pounds. At a GVWR ratio of 1:1.25, the FMVSS No. 105 definition for towing vehicles of 10,000 or more pounds would place that break point for trailers with a GVWR of over 12,500 pounds. FMCSA chose the more conservative 12,000 requested by the Coalition.

Thus, while **surge brakes** are not ``operable at all times,`` as required by Sec. 393.48(a), FMCSA concluded that the Coalition's safety performance test

[[Page 9860]]

results, which show that towing vehicles pulling **surge**-braked trailers were consistently able to stop within the distances required by Sec. 393.52, provided certain GVWR ratios were observed, adequately demonstrate that the design requirement of Sec. 393.48(a) is excessively restrictive. The purpose of Sec. 393.48(a) is to maintain highway safety, and the Coalition's wide-ranging test program showed that towing vehicles, which are all subject to either FMVSS Nos. 105, 121 or 135, when operated with **surge**-braked trailers that are within the specified GVWR ratios, meet all applicable stopping tests. In view

of those performance results, the Agency preliminarily determined that Sec. 393.48 should not be allowed to bar the operation of **surge**-braked trailers in interstate commerce.

FMCSA's analysis of the petition was reviewed by NHTSA, which concurred in the determination to grant the petition to initiate a rulemaking.

#### D. Notice of Proposed Rulemaking (NPRM)

FMCSA published an NPRM on October 7, 2005 (70 FR 58657). The Agency explained that the use of **surge brakes**, under the conditions specified in the NPRM, appeared to be consistent with the safety performance objectives, though not the letter, of Sec. Sec. 393.48 and 393.49. Therefore, the Agency concluded it was appropriate to propose amending the regulations to allow the use of **surge**-braked trailers in interstate commerce.

The NPRM proposed adding the following definition of **surge brake** to Sec. 390.5:

**Surge Brake.** A self-contained, permanently closed hydraulic brake system for trailers that relies on inertial forces, developed in response to the braking action of the towing vehicle, applied to a hydraulic device mounted on or connected to the tongue of the trailer, to slow down or stop the towed vehicle.

The NPRM proposed amending Sec. 393.48 by revising paragraph (a) and adding paragraph (d) to read as follows:

#### Sec. 393.48 **Brakes** To Be Operative

(a) General rule. Except as provided in paragraphs (b), (c), and (d) of this section, all **brakes** with which a motor vehicle is equipped must at all times be capable of operating.

(b) \* \* \*

(c) \* \* \*

(d) **Surge brakes.** Paragraph (a) of this section does not apply to:

(i) Any trailer with a gross vehicle weight rating (GVWR) of 12,000 pounds or less, equipped with inertial **surge brakes** when its GVWR does not exceed 1.75 times the GVWR of the towing vehicle; or

(ii) Any trailer with a GVWR greater than 12,000 pounds, but less than 20,001 pounds, equipped with inertial **surge brakes** when the GVWR does not exceed 1.25 times the GVWR of the towing vehicle.

The NPRM proposed replacing Sec. 393.49 in its entirety, including a revised title, to read as follows:

#### Sec. 393.49 Control Valves for **Brakes**

(a) General rule. Except as provided in paragraphs (b) and (c) of this section, every motor vehicle, manufactured after June 30, 1953, which is equipped with power **brakes**, must have the braking system so arranged that one application valve must when applied operate all the service **brakes** on the motor vehicle or combination of motor vehicles. This requirement must not be construed to prohibit motor vehicles from being equipped with an additional valve to be used to operate the **brakes** on a trailer or trailers or as provided in Sec. 393.44.

(b) Driveaway-Towaway Exception. This section is not applicable to driveaway-towaway operations unless the **brakes** on such operations are designed to be operated by a single valve.

(c) **Surge** brake exception. This requirement is not applicable to

trailers equipped with **surge brakes** that satisfy the conditions specified in 49 CFR Sec. 393.48(d).

In view of the representative nature of the simulated GVWR ratios for towing vehicles and trailers used in the Coalition's tests and the satisfactory performance results, the NPRM noted that it was appropriate to conclude that **surge**-braked vehicles were safe, when operating within the specified ratios of towing vehicle GVWR to trailer GVWR.

The petition did not include test data demonstrating that a towing vehicle with a GVWR of 16,000 pounds or more, towing a 20,000 pounds trailer, could stop within 40 feet. Therefore, FMCSA noted it was reasonable to assume such a combination would pass the test, but also asked for public comment and data either supporting or contradicting that assumption. Specifically:

The Agency requests comment on whether additional analysis is needed to support the Petitioner's assertion that vehicle combinations that include a heavy trailer (GVWR between 14,600 pounds and 20,000 pounds) would satisfy FMCSA's brake performance requirements under Sec. 393.52 when the GVWR of the trailer is 1.25 times that of the towing vehicle or less. The agency is also requesting the submission of brake performance data and information relevant to all the other issues raised in the petition, and the proposed amendments to Sec. Sec. 393.48 and 393.49.

## II. Discussion of Comments to the NPRM

The Agency received 63 individual comments in response to the NPRM. (In some cases, more than one person from the same organization submitted similar comments.) Comments were submitted on behalf of the following organizations: A-1 Rental; A to Z Rental Center; ABC Equipment Rental; Action Rental; ADH Equipment & Sales; Advocates for Highway and Auto Safety (Advocates); Aide Rentals & Sales II; All County Rental Center; All Star Rents; ALTCO Tool Rental, L.L.C.; American Rental Association (ARA); American Trucking Associations, Inc. (ATA); Aurora Rents, Inc.; Arapahoe Rental; Bee Gee Rental & Sales; Mr. Barry Hansel; Bill's Rental Center, Inc.; Bradley Rentals; Bryant's Rent-All, Inc.; Buttons Rent-It; Carlisle Industrial Brake and Friction (Carlisle); Construction Rental Inc.; County Corner Rental Center, Inc.; Do-It-Yourself, Inc.; Equipment Rentals Inc.; Front Range Rents; Grants Rental; Highway 55 Rental; House of Rental; Jackson Rentals & Supplies Inc.; Johnson Creek Rentals; Kimps ACE Hardware and Rental; LEW Corporation; Lew Rents; Lindner Hardware, Inc.; London Road Rental Center; Maryland State Highway Administration, Motor Carrier Division (MDSHA/MCD); Mikerentals, Inc.; National Marine Manufacturers Association (NMMA); the Ohio State Highway Patrol (OSHP); Reading Rentals, Inc.; Rental World; The Rentit Shop Inc.; S and M Rentals Inc.; Southwest Rentals, Inc.; Sunstate Equipment Co.; **Surge** Brake Coalition (Coalition); Taylor Rental; Taylor Rental Center; Truck Manufacturers Association (TMA); Tidewater Rental & Sales; Total Rental Center; Top Quality Rental and Sales, LLC; United Rentals; Wautoma Rental Center; Wirtz Rentals, Co.; and Wirtz Rentals Co. Summit Division.

### A. Comments Supporting the NPRM

Fifty-four (54) commenters identified themselves as members of the ARA, and provided comments supporting the NPRM. The ARA commenters stated they rent **surge** brake equipped trailers, and indicated that

FMCSA's current interpretation of the rules causes problems for both commercial and non-commercial customers. Specifically, non-commercial customers may use trailers equipped with **surge brakes** for private use without restrictions, while commercial customers are prohibited from using those same trailers in interstate commerce (or even in intrastate commerce in 41 States and the District of Columbia) due to the existing interpretations of the FMCSRs. These 54 commenters are grouped together under ARA.

1. ARA is a member of the Coalition, and supports its comments to the docket. ARA's initial comments essentially repeat material included in

[[Page 9861]]

the petition for rulemaking. Namely, the proposed modifications to 49 CFR Part 393 will allow commercial trailers to use **surge brakes** for specified weight combinations, thus harmonizing braking system regulations for commercial interstate, commercial intrastate and non-commercial trailers equipped with **surge brakes**. ARA believes the proposed action will simplify enforcement and eliminate the confusion that trailer rental and sales businesses experience when advising both commercial and non-commercial customers about appropriate equipment applications.

Under the current regulations, a person operating as a licensed contractor may not transport equipment on rented trailers equipped with **surge brakes** in interstate commerce. The requirement of the Motor Carrier Safety Assistance Program (MCSAP) that States adopt regulations compatible with Federal regulations (49 CFR 350.201(a), 350.341) has resulted in the widespread prohibition of **surge-braked** trailers for commercial purposes, even in intrastate commerce. However, the Coalition points out that an individual can legally use **surge-braked** trailers for non-commercial uses. ARA believes this creates a fundamentally unworkable system for rental businesses.

ARA contends that there are no viable alternatives to **surge brakes** for rental businesses, where customers usually own the towing vehicles. Trailers with electric brake systems are available, but are not standardized, and towing vehicles are not always equipped with electric brake controllers and the necessary wiring to operate trailers equipped with electric **brakes**. ARA states that trailer **brakes** are a fundamental safety requirement, and that use of self-contained **surge brakes** is the only viable way rental businesses can meet that requirement.

ARA asserted that safety is a serious concern for its members and that the safety record of **surge-braked** rental trailers is good. ARA said that ARA Insurance Services (AIS), its wholly owned insurance subsidiary, offers property, casualty and liability insurance to ARA members. It offered the following information:

AIS writes insurance policies for approximately 40 percent of the ARA membership. AIS researched all trailer claims in its system back to 1989. During those 16 years, only six percent of the claims were for accidents involving trailers or towable equipment. In 91 percent of those claims, AIS was able to determine that on trailers equipped with **surge brakes**, the **brakes** were not the cause of the accidents. On the remaining nine percent [or 0.54% of all claims], there was not enough information or evidence available for AIS to find that **surge brakes** were a factor, nor to rule out the possibility that **surge brakes** were involved. However, within that 9 percent, we [AIS] found only two claims that actually mentioned **surge brakes** and neither of those specified that the insured [rental company] was liable for faulty **surge brakes**. It is noteworthy that

through 25-plus years in business, AIS has and continues today to write insurance coverage for ARA members that have **surge** brake-equipped trailers in their fleets. There are no special provisions, premiums, or riders required for insuring **surge** brake equipped trailers in rental fleets.

FMCSA Response: As noted earlier, this rule focuses primarily on the mandate of 49 U.S.C. 31136(a) (1) that CMVs be ``equipped \* \* \* and operated'' safely. The fact that ARA's insurance subsidiary (AIS) does not charge a premium to cover **surge**-braked rental trailers is a strong indicator, based on actuarial experience, that trailers with **surge brakes** are no less safe than trailers with any other kind of braking system. The only two claims AIS was able to locate that mentioned **surge brakes** do not indicate that they malfunctioned.

Many of ARA's comments addressed the issue of efficiency in trailer-rental operations that, while not directly related to safety, were considered in the preparation of this rule, including the regulatory analysis of its costs and benefits.

2. (a) The Coalition pointed out that **surge** brake technology has evolved since the petition was submitted and suggested the definition of **surge brakes** may someday require modification. For example, non-hydraulic **surge** brake systems have been developed and are entering the marketplace in Europe. The Coalition proposed that FMCSA consider deleting ``permanently closed hydraulic'' and the adjective ``hydraulic'' from the definition of **surge brakes** as proposed in Sec. 390.5 to eliminate any future design restrictions, or the need for further rulemaking petitions. The bulk of the Coalition comments responded to the request in the NPRM to provide additional information on trailers with weights between 14,000 pounds and 20,000 pounds.

(b) The Coalition acknowledged its tests did not include a towing vehicle with a GVWR exceeding 11,400 pounds. Under the proposal, a towing vehicle with a minimum GVWR of 16,000 pounds would be required to tow a trailer with a GVWR of 20,000 pounds. Instead of obtaining a 16,000 pound towing vehicle and running actual tests, the Coalition hired a national trailer expert, Dr. Michael Graboski, to perform independent mathematical analyses to predict braking performance from the data generated by the Coalition's tests. Specifically, Dr. Graboski used the test data submitted in the petition and analytically predicted that the combination of a heavy towing vehicle (GVWR of 16,000 pounds or greater) and a trailer of 20,000 pounds GVWR would comply with the stopping distance requirements of Sec. 393.52.

The Coalition again asserted that the stopping distance for a properly matched combination vehicle depends on the ratio of the towing-vehicle to trailer weight, and not just on the weight of the trailer. The Coalition argued that the EFAA straight-line braking data is sufficient to predict that combinations with heavy trailers (14,600 to 20,000 pounds GVWR) would comply with the requirements of Sec. 393.52 at GVWR ratios of 1:1.25 and less. It then reiterated the following test data results:

Test data showed that the medium towing vehicle loaded to its approximate test GVWR of 11,730 pounds successfully completed the braking in a 2curve testing at 30 mph with a test weight trailer of 20,560 pounds. This represents a simulated GVWR ratio of 1:1.75, compared to the proposed GVWR ratio of 1:1.25.

The towing vehicle loaded to its approximate test GVWR of 11,730 pounds with a test weight trailer of 20,560 pounds also successfully held the combination facing uphill on a 20 percent grade for 5 minutes using the service **brakes**. This is a GVWR ratio of 1:1.75, compared to the proposed GVWR ratio of 1:1.25.

The towing vehicle loaded to its approximate test GVWR of

11,730 pounds, pulling a test weight trailer of 20,560 pounds, was also able to stop in a straight line from 20 mph in a distance of 44.7 feet, which only slightly exceeds the 40 feet stopping distance requirement of Sec. 393.52. But this combination represents a GVWR ratio of 1:1.75 as compared to the proposed GVWR ratio of 1:1.25 for trailers between 12,001 pounds and 20,001 pounds GVWR.

The towing vehicle (both at test curb weight of 9,260 pounds and loaded to its GVWR of 11,400 pounds) pulling a 20,000 pound GVWR trailer loaded to 14,600 pounds (ratio of 1:1.28) stopped within 38.5 and 38.9 feet respectively. The test data was used to perform the two following analytical analyses.

Analysis one: Dr. Graboski analyzed the different combinations of towing vehicle and trailer load ratios using linear regression. That analysis predicted a stopping distance of exactly

[[Page 9862]]

40 feet for a towing vehicle with a GVWR of 16,000 pounds pulling a trailer with a GVWR of 20,000 pounds, which meets the standard for stopping distance allowed by Sec. 393.52.

Analysis two: Dr. Graboski then performed a separate engineering analysis based upon the mathematical modeling relationship found in the final report submitted by Klein and Szostak under the 1979 NHTSA contract (DOT-HS-805-327).\4\ The details regarding **surge** brake gain (defined and discussed below) were subsequently published as a Society for Automotive Engineers (SAE) paper.\5\ This model quantifies the braking performance of towing vehicles with trailers equipped with **surge brakes**. Using the principles of engineering mechanics set forth in the Klein and Szostak model, Dr. Graboski applied the brake test data collected by EFAA to calculate the minimum **surge** brake gain necessary to achieve the required braking performance for a 16,000 pound GVWR towing vehicle with a 20,000 pound GVWR trailer equipped with **surge brakes**.

---

\4\ Development of Car/Trailer Handling and Braking Standards; Volume II: Technical Report, November 1979, copy in docket.

\5\ Klein, R.H., Szostak, H.T., ``Description and Performance of Trailer Brake Systems with Recommendations for an Effectiveness Test Procedure,`` SAE 820135, 1982. This model quantifies the braking performance of combination vehicles with trailers equipped with **surge brakes**. An abstract of this copyrighted paper has been included in the docket. Anyone who wishes to examine a hard copy of this document should contact Mr. Luke Loy at the phone number given at the beginning of this rule. The paper may be also purchased from SAE. [[http://www.sae.org/servlets/productDetail?PROD\\_TYP=PAPER&PROD\\_CD=820135](http://www.sae.org/servlets/productDetail?PROD_TYP=PAPER&PROD_CD=820135)]

---

The deceleration of a towing vehicle-trailer combination is the sum of the towing vehicle and trailer braking forces divided by the sum of the weights of the towing vehicle and trailer. **Surge** brake operation relies on the compression force at the trailer hitch caused by deceleration of the towing vehicle being delivered to the trailer's hydraulic actuator to activate the trailer's hydraulic **brakes**. The compression force at the hitch is the product of the deceleration of the towing vehicle and the weight of the trailer minus the brake force of the trailer **surge brakes**.

Upon applying the towing vehicle **brakes**, the **surge** brake actuator,

located between the trailer and the towing vehicle, receives the initial compressive force that results from the inertia difference between the braked towing vehicle and the as-yet-unbraked trailer. The **surge** brake actuator drives a piston in the trailer's hydraulic brake system master cylinder producing hydraulic pressure in the trailer's braking system proportional to that initial compressive force. The ratio of the resulting initial braking force applied to the trailer **brakes** to the compressive force at the **surge** brake actuator is termed the **surge** brake gain. More simply stated, the gain is the ratio of the amount of trailer braking force developed per pound of horizontal hitch force. This is a measure of the performance of that **surge** brake system. The value achieved is determined by the design characteristics of that particular system, including characteristics of the actuator. Although initial compression force generated at the hitch is subsequently diminished because of the braking force being applied by the trailer **brakes**, the amount of trailer braking force remains dependent on the gain realized above the remaining force at the hitch.

Dr. Graboski used the Klein and Szostak model to calculate the minimum required **surge** brake gain, G, necessary for the combination vehicle to stop within the 40 feet stopping distance requirement of Sec. 393.52. That value is 1.48.

Instrument readings from several tests were available from EFAA. Those readings were used to calculate the initial **surge** brake gains that occurred for the two actuators tested for the two 20,000 pound GVWR 2001 Wells Cargo flatbed trailers. One was equipped with a Titan Model 20 **surge** brake actuator and the other with a Demco DA20 **surge** brake actuator.

Towing vehicle loaded to its approximate test GVWR of 11,300 pounds and the 20,000 pound GVWR trailer loaded to 16,540 pounds, for a simulated GVWR ratio of approximately 1:1.45.

Towing vehicle of 11,400 GVWR at test curb weight of 9,370 pounds and the 20,000 GVWR trailer loaded to 16,540 pounds, for a simulated GVWR ratio of approximately 1:1.45.

Towing vehicle at approximate test GVWR of 11,730 pounds and the trailer loaded to its test GVWR of 20,560 pounds, for a GVWR ratio of approximately 1:1.75.

Towing vehicle at approximately test GVWR of 11,400 pounds and the 20,000 pounds GVWR trailer loaded to a test 14,600 pounds, for a simulated GVWR ratio of about 1:1.28.

Towing vehicle of 11,400 GVWR at test curb weight of 9,260 pounds and the 20,000 pounds GVWR trailer loaded to 14,600 pounds, for a simulated GVWR ratio of approximately 1:1.28.

Using the Klein and Szostak model, the **surge** brake gain, G, achieved for each of these **surge** brake actuators was calculated. It was 1.59 for the Demco DA20 and 1.84 for the Titan Model 20 **surge** brake actuators. The **surge** brake gain achieved by each of these actuators is thus well above the calculated minimum **surge** brake gain, G, of 1.48 needed to stop a combination of a 16,000 pound towing vehicle with a 20,000 pound trailer within 40 feet from 20 mph.

Based upon these analyses, the Coalition submits that it is safe to operate 20,000-pound GVWR trailers with towing vehicles having GVWRs of 16,000 pounds or more with braking characteristics similar to the vehicles tested. In summary, the Coalition believes that their tests and analytical evaluation of the data provide sufficient information to conclude that the proposals in the NPRM should be adopted.

FMCSA Response: (a) No data are available to the Agency regarding the performance of other **surge** brake technologies to support the Coalition's request to remove the word ``hydraulic'' from the definition of **surge** brake. If the Coalition wishes to make such data available to FMCSA, a modification of this definition may be evaluated.

(b) The additional analysis is consistent with the provision of Sec. 389.31(b)(4) that requires petitions to contain ``\* \* \* any information and arguments available to the petitioner to support the action sought.'' It is also consistent with the following request in the NPRM:

The Agency requests comment on whether additional analysis is needed to support the Petitioner's assertion that vehicle combinations that include a heavy trailer (GVWR between 14,600 lbs and 20,000 lbs) would satisfy FMCSA's brake performance requirements under Sec. 393.52 when the GVWR of the trailer is 1.25 times that of the towing vehicle or less. The agency is also requesting the submission of brake performance data and information relevant to all the other issues raised in the petition, and the proposed amendments to Sec. Sec. 393.48 and 393.49.

The Agency notes that the Klein and Szostak model was applied on the assumption that the sustained braking deceleration of the heavy towing vehicle with a 16,000-pound GVWR remains the same as the initial braking deceleration achieved by the medium 11,400-pound GVWR vehicles. The basis for this assumption is that the 16,000 pound GVWR vehicle is required by FMVSS No. 105 to comply with the same braking performance (stopping distance) as the 11,400 pound GVWR vehicle. Therefore, the total braking capability of the 16,000 pound vehicle must be proportionally greater than for the 11,400 pound vehicle, making it more capable of maintaining the initial

[[Page 9863]]

braking deceleration force when the forward momentum of the trailer comes to bear upon the trailer hitch.

The assertion by the Coalition that the **surge** brake gain of both the Demco and Titan exceeds the minimum necessary for the combination vehicle to stop within 40 feet is relevant only if these actuators are reasonably representative of the brake gain provided by other **surge** brake actuators available in the market.

FMCSA notes that the Demco and Titan actuators on the test trailers represent manufacturers with very prominent market shares for heavy trailer actuators. The technology on which these actuators are based is quite standardized. The market for **surge** brake actuators for heavy trailers (14,600-20,000 pounds) is relatively small. As such, it is reasonable to assume other competing **surge** brake actuators in this weight range will have to provide comparable performance to remain competitive in the market. Therefore, the Agency believes the measured **surge** brake gains of 1.59 and 1.84 are representative, and that it is reasonable to presume the minimum gain necessary of 1.48 will be met by available actuators.

The Agency determined that the Coalition has provided sufficient additional analytical information supporting its original proposal to allow **surge brakes** on trailers when the towing vehicle to trailer GVWR ratio does not exceed 1:1.25 for trailers with GVWRs between 14,600 pounds and 20,000 pounds. The two independent analytical methods used by the Coalition, in conjunction with available test data, both predict that combination vehicles towing **surge**-braked trailers with GVWRs between 14,600 and 20,000 pounds, but not more than 1.25 times the GVWR of the towing vehicle, can meet the 40 feet stopping distance of Sec. 393.52.

FMCSA finds these additional analyses persuasive and agrees with their conclusions.

3. The National Marine Manufacturers Association (NMMA) supports

the use of trailers equipped with **surge brakes** in interstate ``commercial'' applications, and argues the recreational marine industry has a unique problem regarding **surge brakes**. NMMA notes that **surge brakes** are especially useful and reliable in marine applications where the boat trailer is expected to be repeatedly immersed in water, a practice that could damage components of electric **brakes**. NMMA states that while the consumer use of **surge brakes** on boat trailers is exempt from existing Federal regulations, the same brake system that is considered a safety feature for consumer use is prohibited when that boat trailer is used in a technically ``commercial'' application (for example, when a boat dealer or repair shop transports a boat to or from a customer using the customer's trailer). In addition, the FMCSRs may be violated when a boat dealer or manufacturer transports a boat on a consumer type **surge**-braked trailer to or from a boat show.

NMMA believes the current regulation is especially burdensome for the recreational boat industry, since a consumer boat trailer is often specifically matched or manufactured for a particular boat and is the preferred way to transport that boat. NMMA notes that this use of a **surge** brake equipped boat trailer, although sometimes commercial in nature, is in fact identical to the use of the boat trailer by the consumer. In addition, even if a boat dealer or repair shop did use its own trailer for these trips, NMMA states that it would be preferable to use a trailer with **surge brakes**, since those trailer **brakes** are generally considered more durable and suitable for water applications.

FMCSA Response: The NMMA comments explain the marine uses of **surge brakes** in detail as well as the problems created by the Agency's position that **surge brakes** do not comply with the requirements of Part 393. While much of its discussion centers on the operational difficulties that NMMA's industry partners face given the current regulatory requirements, NMMA also addresses the operational safety of **surge brakes** through real-world experience.

NMMA specifically states that a large number of private boat owners are personally using **surge** brake equipped trailers. Some of those trailers are for larger boats that would require a GVWR in the heavier range of 12,001 to 20,000 pounds. The fact that no safety problems relating to **surge** brake performance have been reported by the marine industry or by State and local highway safety officials, as a result of that usage on the public roads, suggests that these trailers and their braking systems are safe.

#### B. Comments Opposing the NPRM

1. The Ohio State Highway Patrol (OSHP) believes **surge brakes** are a viable alternative to braking systems currently in use on smaller commercial motor vehicles, but also commented that:

(a) (i) Additional testing is appropriate, and

(ii) Such testing should be completed by FMCSA, NHTSA, and/or an independent group other than the Coalition. OSHP recommends that any additional testing include old vehicles, to the point where the requirements of Sec. 393.52 cannot be met. OSHP believes that such testing would provide law enforcement with an acceptable level of confidence, and a margin of safety, for the use of **surge brakes**.

(iii) OSHP recommended that testing should also include the vehicle's ability to stop during backing maneuvers.

(b) OSHP also believes that the criterion set forth in the NPRM, i.e., that the ratios of the towing vehicle to trailer weight must be based solely on GVWR, is incomplete, and should include provisions for using each of the vehicles' actual gross weights to determine compliance with the proposed regulation. Specifically, OSHP recommended the inclusion of a provision to allow law enforcement to use either the

vehicles' GVWR or their actual gross weights to determine compliance with the regulation. OSHP believes that this would keep the operator of the vehicle ``honest'' and keep unsafe combinations of vehicles from operating on the highway.

FMCSA Response: (a) (i) FMCSA has reviewed the Coalition's test procedures and finds them well grounded in modern scientific practice and sufficient to measure the safety performance of **surge** brake systems. The tests were performed in a controlled fashion by a reputable organization, EFAA, precisely to ensure that the test results would not be influenced by the Coalition. Further, EFAA is an ISO 9001 compliant facility that has conducted FMVSS testing for NHTSA. FMCSA does not believe additional testing is required.

(a) (ii) A review of the test results provided by the Coalition indicates the towing vehicles were not new, and that the more extreme weight ratio combinations tested failed to achieve the brake performance requirements of Sec. 393.52(d). The Coalition petitioned FMCSA to adopt GVWR ratios substantially more stringent than the ratios at which test combinations failed to meet the required stopping distance.

Manufacturers were required by NHTSA rules and Sec. 393.55(a) to include ABS systems on new vehicles built after March 1, 1999; the brake performance of older vehicles manufactured before that date is essentially grandfathered. FMCSA acknowledges that two of the three Coalition test vehicles were newer than March 1999 and, thus, were equipped with ABS on all wheels. The third vehicle was a 1993 model that only has ABS on the rear axle **brakes**.

[[Page 9864]]

However, such older vehicles are in use towing commercial trailers with electric **brakes**, and commercial trailers weighing less than 3,000 pounds that are not required to be equipped with any **brakes**.

No data were submitted to the docket indicating that towing vehicles without ABS are a safety hazard. The subject of this rulemaking is the safety of **surge brakes** on trailers, not whether the Agency or anyone else believes that the lack of ABS on a grandfathered CMV would adversely affect the performance of a trailer equipped with **surge brakes**. As a practical matter, **surge**-braked trailers might improve the stopping performance of some pre-1999 towing vehicles (especially unloaded pickups) by putting added weight on the rear tires and, thus, delaying the onset of lock-up.

The Coalition's test procedures were specifically selected to address several existing specifications for braking systems. These include FMVSS No. 105 for Hydraulic **Brakes**, FMVSS No. 121 for Air Brake Systems, and Sec. 393.52(d) for the FMCSA vehicle stopping distance requirements. FMCSA has no reason to believe the test procedures used by EFAA failed to demonstrate the braking characteristics of combination vehicles using **surge**-braked trailers.

The testing performed by EFAA utilized a wide variety of towing-vehicle and trailer weight combinations, with numerous different simulated GVWR ratios. Multiple test runs for each combination were made and measured. The ratios of weights for towing vehicle to trailer simulated GVWRs covering all ratios proposed in the petition, and included testing of GVWR ratios exceeding the request. Test data showed that all combinations were stable while braking in a curve and held firm on a 20 percent uphill grade while using only the towing vehicle's service **brakes**, some at GVWR ratios much higher than those proposed by the Coalition, in some cases at a ratio of 1:2. The subsequent mathematical analysis performed by Dr. Michael Graboski also predicted that the requirements of Sec. 393.52(d) would be met by towing

vehicles with GVWRs of 16,000 pounds or greater, towing **surge** brake trailers with a GVWR of 20,000 pounds or less, for a GVWR ratio of 1:1.25 or less.

The FMVSS currently includes manufacturers' performance standards only for air-braked trailers; there are no such standards for trailers with electrical, electric over hydraulic, or **surge brakes**. OSHP provided no information that the operation of **surge** brake equipped trailers for personal use has created undue concern among safety and law enforcement personnel.

(iii) There are no FMCSA or NHTSA regulatory standards for brake performance when a vehicle backs up. Rather, brake performance requirements for motor vehicles are applicable only when a vehicle is operating in the forward direction. Because vehicles typically operate in reverse at speeds much lower than when operating in the forward direction, and only for very short distances, existing tests that specify brake performance in the forward direction are considered to be sufficient to ensure that the same vehicle can stop safely when operating in reverse. As such, none of the FMVSSs or the FMCSRs specify braking performance requirements for vehicles operating in reverse.

While **surge brakes** automatically release when deceleration stops--and therefore, are not operable while the vehicle is operating in reverse--the brake holding on a hill tests conducted by the Coalition clearly showed that the service **brakes** of a towing vehicle alone are more than adequate to hold the combination at a stop (1) even while facing uphill on a 20 percent grade, and (2) even when the GVWR ratios substantially exceeded the limits that had been proposed by the Coalition. FMCSA considers these brake holding on a hill tests to be a much more severe test of brake performance than stopping a vehicle/**surge** brake equipped trailer combination traveling in reverse at low speeds or backing down an incline at less than a 20 percent grade. While recognizing that vehicles are not required to demonstrate the ability to stop while operating in reverse, as noted in the preceding paragraph, FMCSA is confident that these test results, in conjunction with the conservative GVWR ratios specified in this rule, will ensure that combinations with **surge** brake equipped trailers will be able to stop safely while operating at low speeds in reverse.

(b) FMCSA agrees with OSHP that an overloaded **surge**-braked trailer, or one without a manufacturer's GVWR certification, could pose safety risks. Therefore, the Agency has added provisions to the reformatted Sec. 393.48(d) to deal with missing GVWR labels and overloading. New paragraphs (2) and (3) are added to read as follows:

(2) The gross vehicle weight (GVW) of a trailer equipped with **surge brakes** may be used instead of its GVWR to calculate the weight ratios specified in this paragraph (d)(1) of this section when the trailer manufacturer's GVWR label is missing.

(3) The GVW of a trailer equipped with **surge brakes** must be used to calculate the weight ratios specified in paragraph (d)(1) of this section when the trailer's GVW exceeds its GVWR.

General or approximate GVWRs for most models of towing vehicles covered by this rule are commonly known. FMCSA will ask the Commercial Vehicle Safety Alliance (CVSA) to make these values available for use when towing vehicles between 10,000 and 16,000 pounds do not have a GVWR plate. If OSHP is concerned about overloaded towing vehicles, all existing enforcement procedures remain in effect for dealing with vehicles loaded beyond their manufacturer's GVWR. OSHP has the authority under the State version of Sec. 396.7 (adopted pursuant to MCSAP) to remove such vehicles from the road, and this provision is incorporated in the North American Standard (NAS) Out-of-Service

criteria.

2. Mr. Barry Hansel commented that ``**surge brakes** are better than no **brakes**,'' but he argued:

(a) That **surge brakes** have numerous shortcomings that do not apply to electric over hydraulic brake systems \6\ available from numerous manufacturers. Specifically, Mr. Hansel stated that (i) **surge brakes** cannot provide braking when backing down a hill, because they do not have an electrical solenoid that can be activated, (ii) **surge brakes** can be unintentionally activated by backing up a grade of as little as a 1 percent, (iii) a jack-knifing trailer cannot be straightened out with a **surge** brake, and **surge brakes** can actually create or aggravate a jack-knife condition, and (iv) when going down steep mountain roads, **surge brakes** would activate the trailer **brakes** and cause them to overheat or burn out.

---

\6\ Electric over hydraulic is distinguished from the more commonly known electric brake systems in that the former consists of an electric motor, pump, and brake fluid reservoir attached to the trailer and plumbed into the hydraulic brake system of the trailer. The **brakes** are applied by pushing on the brake pedal of the towing vehicle, which activates the electric brake controller mechanism in the towing vehicle. This sends an electrical signal to the electric motor and pump on the trailer, causing the trailer **brakes** to pressurize and slow or stop the trailer. With the same controller, the trailer **brakes** can be activated by themselves simply by activating the manual override on the controller.

---

(b) Mr. Hansel contends that alternative brake technologies for trailers--specifically electric over hydraulic brake actuators--are safer because they do not have the shortcomings associated with **surge brakes** that were noted above.

(c) Mr. Hansel stated that the stopping distances documented by the Coalition were most likely achieved under ideal road conditions. He contends that **surge brakes** cannot stop a trailer on ice covered, wet, or dirt roads safely.

[[Page 9865]]

(d) He further argues the only reason the **Surge** Brake Coalition favors **surge brakes** is because they are cheaper than electric over hydraulic **brakes**.

FMCSA Response: (a) (i) As discussed earlier, neither FMCSA nor NHTSA has any regulatory standard for braking while a vehicle backs up. Although not a significant safety concern, this issue is largely addressed by the tests documenting the ability of towing vehicles' service **brakes** to hold several combinations facing uphill on a 20 percent grade.

(ii) The amount of braking force applied to the trailer **brakes** is a proportional function of the ratio of the towing vehicle and the trailer weight, and braking inertial forces generated by deceleration of the towing vehicle. Mr. Hansel is correct that, when a combination is backed up an incline, the trailer weight/gravity component could induce a braking effect. The larger inertial force generator is virtually absent. Additionally, some trailers are equipped with **surge brakes** with mechanisms that allow the operator to lock out the braking effect while backing the trailer. In any case, the Agency does not believe the presence or absence of this device is a safety issue. If the **brakes** should engage during a backing operation, it most likely

would be an annoyance to the operator of these combination vehicles, not a safety issue associated with operating on public roads.

(iii) It is possible for some combination vehicles with air **brakes**, electric **brakes**, or the electric over hydraulic system described by Mr. Hansel, to apply the trailer **brakes** independently, in an effort to address a jack-knife situation. This technique is not easy to use in an emergency. Further, neither the FMVSSs nor the FMCSRs require combination vehicles to have this capability. **Surge**-braked trailers cannot be faulted for lacking a system that no other trailer is required to have.

**Surge brakes** are designed so that the amount of braking force applied by the trailer **brakes** is proportional to the effective braking/ deceleration of the towing vehicle. Thus, the amount of braking of the trailer adjusts to that of the towing vehicle. If the braking ability of the towing vehicle is limited by the road conditions, so too is the brake-gain of the trailer, thus, preventing lock-up of the trailer **brakes**. However, in the unlikely case that the trailer **brakes** locked up, the driver could release them simply by taking his or her foot off the brake pedal, exactly the same technique used with electric or electric over hydraulic trailer **brakes**.

The braking-in-a-turn tests were specifically included to determine the inherent stability of each combination evaluated, i.e., whether there was a tendency to jack-knife. As pointed out in the discussions above regarding the breaking-in-a-turn test results, all combinations tested by EFAA passed this stability test.

(iv) With regard to the possibility of **surge** brake systems overheating or catching fire going down a steep mountain grade, no such problems have come to the Department's attention as data in either of NHTSA's crash databases (FARS or GES), despite the large number of personal trailers equipped with **surge brakes** currently in use. This has not been identified as a safety issue in mountainous regions by enforcement personnel in such States. While it is incumbent on the commenter to substantiate claims made, Mr. Hansel did not do so. Thus, FMCSA must conclude that no available empirical data supports his concern.

(b) FMCSA's role is limited to determining whether a braking system meets the safety performance requirements of the FMCSRs. Manufacturers may select any system that complies with Federal standards, including the electric over hydraulic advocated by Mr. Hansel.

(c) Mr. Hansel is correct that the Coalition's testing was performed in dry conditions. This is required by Sec. 393.52(c), which directs that stopping distance tests be performed on a hard surface that is substantially level, dry, smooth, and free of loose material. These are the test conditions that apply to all CMVs, including electric and hydraulic over electric braked trailers.

(d) If the emerging brake technology espoused by Mr. Hansel, electric over hydraulic, meets the FMCSR safety performance standards, this final rule does not preclude its development, marketing, and use.

3. TMA acknowledged that **surge brakes** are well adapted to the rental market where trailers are towed by a wide variety of vehicles.

(a) TMA expressed general concern, however, that no test results or other evaluations are available to assess how these trailers would perform when towed by air- or hydraulically-braked vehicles with GVWRs exceeding those that were tested by the Coalition. In the absence of performance standards for trailers equipped with **surge** brake systems, TMA said it was unable to predict with certainty whether overall combination-unit braking performance would be acceptable.

Like OSHP, TMA recommended that FMCSA and NHTSA conduct additional research, testing, and evaluation prior to amending the standard to allow the use of **surge brakes** in interstate commerce.

(b) With regard to stopping distances on public roads, TMA expressed concern over the potential failure of the towing unit's brake system. This would reduce deceleration rates, which in turn would reduce the braking forces generated by the **surge**-braked trailer, and the net effect would be even longer stopping distances. TMA cited the requirements of S5.1.2 and S5.1.3 of FMVSS No. 105, which set manufacturing standards to deal with partial brake failure and inoperative power assist units, respectively. TMA also drew attention to S5.7 of FMVSS No. 121, which sets emergency brake standards for trucks and buses. The organization acknowledged, however, that FMVSS No. 105 includes no specific test of vehicle performance after brake failure.

(c) TMA expressed concern that users could unwittingly park combination units with gross combination weights (GCWs) in excess of 40,000-50,000 pounds facing uphill on grades. In these situations, and in others less severe, TMA was concerned that the towing vehicle's parking brake system, which is neither designed nor required to handle that amount of weight, would not be able to hold the combination vehicle stationary.

TMA noted that FMCSA's recently revised parking brake requirements at Sec. 393.41 (70 FR 48008) require the following:

(a) Hydraulic-braked vehicles manufactured on or after September 2, 1983. Each truck and bus (other than a school bus) with a GVWR of 4,536 kg (10,000 pounds) or less which is subject to this part and school buses with a GVWR greater than 4,536 kg (10,000 pounds) shall be equipped with a parking brake system as required by FMVSS No. 571.105 (S5.2) in effect at the time of manufacture. The parking brake shall be capable of holding the vehicle or combination of vehicles stationary under any condition of loading in which it is found on a public road (free of ice and snow) (Emphasis added). Hydraulic braked vehicles which were not subject to the parking brake requirements of FMVSS No. 571.105 (S5.2) must be equipped with a parking brake system that meets the requirements of paragraph (c) of this section.

TMA further noted:

\* \* \* the new FMCSA requirement, Sec. 393.42(c), which applies to vehicles not subject to FMVSS Nos. 105 and 121 on the date of manufacture (which would be the case with all **surge**-brake trailers since NHTSA made it clear in their most recent revision to FMVSS 105 that it does not apply to hydraulic brake trailers), reads in part:

\* \* \* every combination of motor vehicles must be equipped with a parking brake

[[Page 9866]]

system adequate to hold the vehicle or combination on any grade on which it is operated, under any condition of loading in which it is found on a public road (free of snow and ice).

TMA's reference in its December 2, 2005 letter to NHTSA making it clear that FMVSS No. 105 does not apply to trailer parking **brakes** can be found at (70 FR 37711, June 30, 2005).

TMA stated that since the parking brake system of the towing unit is neither required to meet, nor likely to be capable of meeting, this standard by itself, it is not apparent how this requirement could be met, under particularly adverse conditions, without the trailer having some type of parking brake system as well. While air-brake equipped

trailers have this capability, TMA noted that trailers equipped with **surge brakes**--particularly those at the upper end of the proposed allowable weight range--generally do not have parking brake systems.

(d) TMA also pointed out concerns similar to those raised by Mr. Hansel regarding (i) excessive thermal loading of the towing unit's **brakes** on a long downhill grade, and (ii) the ability of a towing vehicle pulling a **surge**-braked trailer to make an abrupt stop while backing up at any speed above 1-2 mph.

FMCSA Response: (a) TMA members manufacture trucks weighing 19,500 pounds or more, which include a relatively higher percentage of air braked vehicles. Although air-braked towing vehicles subject to FMVSS No. 121 were not tested by EFAA, data available in the rulemaking and the additional explanations in this final rule should allay TMA's concerns.

The heaviest **surge**-braked trailer allowed by this final rule has a GVWR of 20,000 pounds. In order to meet the weight ratio specification, the minimum towing vehicle GVWR allowed for that trailer is 16,000 pounds, for a combined GVWR of 36,000 pounds. A higher combined weight rating is possible only if the additional GVWR is in the towing vehicle. Thus, a towing vehicle of 30,000 pounds GVWR would be required in order to achieve a combined GCWR of 50,000 pounds. If it were hydraulically braked, it would be subject to FMVSS No. 105, like the 16,000-pound GVWR towing vehicle, with the same stopping distance requirement. If that towing vehicle were air braked, it would be subject to FMVSS No. 121. It requires the same stopping distance as FMVSS No. 105. Thus, there appears to be no basis for TMA's suggestion that vehicles with higher GVWRs might not match the braking performance of a vehicle with a 16,000-pound GVWR. The Coalition's analysis, based on the model by Klein and Szostak, indicates that the braking performance of a lower GVWR ratio, i.e., a larger towing vehicle in combination with the same 20,000 pound GVWR trailer, would be better. This is because the stopping performance of the combination, including the **surge**-braked trailer, is dependent on the GVWR ratio of the towing vehicle to the trailer. The lower the ratio of GVWR of a trailer compared to that of the towing vehicle, the better the stopping power of the combination. The GVWR ratio of a 30,000 pound towing vehicle to a 20,000 pound trailer would be less than 1, i.e., 1:0.66.

In summary, FMVSS Nos. 105 and 121 have the same requirement for stopping distance. There is no reason to believe that a heavier towing vehicle with or without air **brakes**, which thus has a GVWR ratio below that required by this rule, would not meet the 40-foot stopping distance required by Sec. 393.52(d), the 30 mph braking-in-a-curve test, and the 20 percent grade-service brake holding test.

(b) We agree with TMA's conclusion that no specific test applies to trailer brake performance after brake failure on the towing vehicle.

(c) TMA correctly noted there is no standard in FMVSS No. 105 that applies to the parking brake capability of hydraulically braked trailers. Neither is there a parking brake standard for electrically braked trailers or for trailers weighing less than 3,000 pounds that are exempted from having any **brakes**. Only air-braked trailers are subject to a parking brake standard. NHTSA, not FMCSA, has the authority to set manufacturing standards. Any rule requiring retrofitting of parking **brakes** to trailers already in operation would be prohibitively expensive, and the results of the tests submitted with the petition make it clear there would not be commensurate safety benefits.

Section 393.41(c) of the FMCSRs says that the parking brake on combination vehicles must be sufficient to prevent the combination from rolling backward. Although the rule does not further specify the performance standard, such as the grade on which roll-back must be

tested, this standard applies to all combinations, including unbraked, electric braked, and **surge**-braked trailers. TMA's comments give no indication that its members have any parking brake problem for comparable electric-braked trailers, which do not have parking **brakes**. If manufacturers have no parking brake problem with similar GVWR electric-braked trailers, FMCSA is unable to see why there should be a problem with comparable **surge**-braked trailers.

(d) As discussed under 2(a)(iv) in response to Mr. Hansel's comments above, no data have been submitted in this rulemaking which supports this theoretical concern.

4. Carlisle elaborated on the points raised by Mr. Hansel and TMA.

(a)(i) Carlisle was primarily concerned that testing by EFAA for the Coalition was conducted on dry road surfaces. Carlisle contends that because the coefficient of friction drops with moisture or ice on the road surface, the trailer inertia may act to ``push'' the towing vehicle, thus, creating conditions where trailer jack-knife is much more likely to occur.

(ii) Carlisle noted that electric and electric over hydraulic trailer brake actuators do not rely on towing vehicle inertia to apply the trailer **brakes**. In these situations, the trailer **brakes** are applied at a proportionate rate whenever the towing vehicle **brakes** are applied. The combined braking of the two units minimizes the likelihood of a jack-knife condition. In addition, unlike **surge brakes**, the trailer **brakes** work when the vehicle backs up.

(b)(i) Carlisle, like Mr. Hansel, pointed out that alternative braking systems are available from more than one manufacturer, including themselves.

(ii) They also pointed out that most newer towing vehicles are wired for easy installation of in-cab brake controllers.

(c) Carlisle also expressed concern regarding elimination of the requirement, for trailers equipped with **surge brakes**, of a single control valve capable of operating all of the service **brakes**.

(d) Carlisle believes that one of the inherent problems with a **surge** brake system is the inability to verify that the system is working without driving the combination. Like MDSHA/MCD below, Carlisle questioned how a rental customer or enforcement agent could test a trailer to verify that the **surge brakes** are working.

FMCSA Response: (a)(i) As mentioned above, the FMCSRs require that brake testing be performed on a hard surface that is substantially level, dry, smooth, and free of loose material. Based on that, the brake-in-a-curve test, not required for trailers even by FMVSS No. 121, was also performed on a comparable surface. FMCSA cannot require **surge**-braked trailers to meet a different standard than other vehicles.

(ii) It is unclear whether Carlisle is possibly implying that electric or electric over hydraulic brake systems

[[Page 9867]]

may have a more proportional trailer braking force. Carlisle provided no explanation of what they mean by use of the word ``proportionate,'' and how their system is more or less safe than **surge brakes**, or how that relates to jack-knifing.

**Surge brakes** by their physical design apply a braking force proportional to that generated by the towing vehicle, that varies whether empty or loaded to any weight up to its GVWR. In contrast, the brake gain set on the controller for electric and electric over hydraulic brake systems has to be manually adjusted based on the load being carried by trailers equipped with those systems, and the driving conditions. This is a different meaning for the word proportionate. It is not apparent from Carlisle's comments how electric or electric over

hydraulic **brakes** on a trailer would prevent it from jack-knifing in wet or icy conditions. Historically, a major cause of jack-knifing was locking up the **brakes** on the rear axle of the towing vehicle, now addressed by ABS systems.

(b) (i) The availability of alternative braking systems is not germane to determining whether **surge** brake systems meet FMCSA's safety performance requirements.

(ii) Carlisle's assertion that towing vehicles are wired for easy installation of in-cab electric brake controllers appears to be a reference to the common manufacturing practice of installing wiring harnesses that can accommodate optional equipment, such as a controller for electric trailer **brakes**. Carlisle fails to mention the cost and difficulty of purchasing and installing a controller in the cab of the towing vehicle. A brake expert on a specific model year truck could perhaps install a controller in 15 minutes. However, thousands of trailer rental companies are unlikely to (1) have such expertise readily available, or (2) stock appropriate controllers for all electric brake systems. While the Agency does not consider the installation of electric brake controllers ``easy'' based on the above, the availability of alternative brake systems is not related to the issue of whether **surge** brake systems meet the performance requirements of the FMCSRs.

(c) The rule requiring a single control valve (Sec. 393.49) is designed to enhance safety. The Coalition's petition argued that the actual, operational safety performance of **surge**-braked trailers demonstrates that this rule need not be applied to **surge**-braked trailers. FMCSA granted the petition for a rulemaking and via that process has now concluded that **surge brakes** are safe, when limited to certain GVWR ratios.

(d) Carlisle's concern about the ability of customers and enforcement personnel to verify that the trailer **brakes** are working was shared by MDSHA/MCD below. There are ways to verify that trailer **brakes** are operational. The following examples illustrate this:

Canada allows **surge**-braked trailers to be used for commercial purposes. Enforcement officers in the Provinces begin by making a visual inspection of the brake components. They perform the on-road inspection specified for hydraulic **brakes** in the NAS Out-of-Service criteria. Just as for all other hydraulically braked vehicles, this includes checking for leaks in the hydraulic system, sufficient fluid in the actuator/master-cylinder reservoir, and whether there are any unusual component conditions.

Then, if anything in the visual inspection causes concern, it is possible to physically test the trailer's hydraulic brake system. This is because combination vehicles--including trailers equipped with **surge** brake systems--must also meet the operational brake performance requirement of Sec. 393.43(d) for trailer breakaway and emergency braking. A trailer equipped with **surge brakes** meets this requirement only if it also includes an emergency release mechanism that would be actuated on a breakaway. The standard design for **surge** brake actuators is for that emergency breakaway capability to work through the hydraulic actuator to apply the wheel **brakes**. In some designs the emergency release mechanism can be manually actuated, and a simple determination can then be made whether the **brakes** are operational, either by attempting to move the trailer, or by jacking up a trailer wheel and attempting to rotate the tire. In other designs, a different procedure is used.

Information on applying these approaches is available from the manufacturers of the **surge** brake actuators. FMCSA is convinced this two-stage inspection procedure is adequate for pre-trip and roadside inspections to insure safety of the braking function.

The current NAS Out-of-Service criteria gives nine different items the inspector is to check at the roadside for a vehicle with a hydraulic system. The instructor and student guide give more details on how to carry out inspections for these criteria.

Instructions very similar to this already exist in the CVSA NAS Out-of-Service criteria for a Level 1 inspection of electric **brakes**. The current instructor and student guides for the NAS Out-of-Service criteria read:

Electric **brakes** can be checked for operation by activating a manual control in the cab without activating the tractor's service **brakes**, and attempting to move the vehicle while the **brakes** are applied.

The Agency will ask CVSA to update the Out-of-Service criteria to reflect this rule's change in the meaning of Sec. 393.48(a), allowing **surge brakes**, and to provide comparably explicit guidance for inspecting **surge**-braked trailers as part of the NAS Instructor and Student guides for Inspection criteria.

5. MDSHA/MCD commented that in 2004, Maryland Vehicle Law was modified by working with the trailer manufacturing industry to allow trailers and semi-trailers less than 10,000 pounds equipped with **surge brakes** to be used on Maryland highways, but limited to combination vehicles in intrastate commerce that would not require a CDL.

(a) MDSHA/MCD takes exception to allowing the use of **surge brakes** on trailers over 10,000 pounds operated in interstate commerce, contending that the very limited testing of a few vehicle combinations fails to justify revising the standards that currently apply. (i) MDSHA/MCD states the tests performed were not comprehensive enough and addressed only four towing vehicle and trailer combinations. (ii) MDSHA/MCD notes that since the NPRM proposed that a trailer may have a GVWR up to 20,000 pounds, a combination vehicle could include larger or smaller types of vehicles, including cargo type vans normally used by small construction and/or landscaping companies. MDSHA/MCD notes that these, as well as other, vehicles were not tested nor was data provided to substantiate that towing vehicles like cargo vans would be able to meet similar requirements for braking in curve from 30 mph, service **brakes** holding on a 20 percent uphill grade, and straight line stopping distance from 20 mph. (iii) MDSHA/MCD stated that no tests were conducted using towing vehicles that were not equipped with anti-lock braking systems (ABS). (iv) MDSHA/MCD contends that the amendments proposed in the NPRM do not address the GCW for the combinations tested, but only the GVWR ratio for the towing units and trailers equipped with **surge brakes**. MDSHA/MCD believes that the limited testing by the Coalition is not representative of the range of real-world applications.

(b) MDSHA/MCD is concerned that if the proposed amendments are adopted, enforcement personnel would be unable

[[Page 9868]]

to determine if the **surge** brake system is working properly.

MDSHA/MCD noted that 49 CFR 396.17 provides that periodic inspections shall be conducted covering those ``accessories set forth in Appendix G of this subchapter.'' However, MDSHA/MCD states that a review of Appendix G fails to reveal any guidance and/or methodology for conducting an inspection of any ``**surge** brake'' component to determine that it is working and/or maintained correctly to some unidentified accepted standards, e.g., SAE standards. MDSHA/MCD believes that this omission jeopardizes safety and, absent any

guidance, owners and operators have no way of knowing what methods should be employed to assure that the **surge** brake equipment is functioning properly.

(c) (i) MDSHA/MCD, like Carlisle, commented that tests were not conducted on wet or icy surfaces to determine what could potentially occur when **surge brakes** are applied.

(ii) MDSHA/MCD expressed concern that during brake application under wet or icy road conditions, forward inertia could cause the **surge** brake to lock up and the operator to lose control of the combination vehicle. With electric or other **brakes**, by contrast, MDSHA/MCD maintains the operator has the ability to correct a brake lock condition by lifting his/her foot off the brake pedal.

(d) MDSHA/MCD believes that the revisions to Sec. 393.48 are flawed, as the proposed amendment to paragraph (a) exempts **surge brakes**; therefore, they do not have to work or be capable of working. MDSHA/MCD contends that Sec. 393.5 needs to be reworded to reflect that a vehicle and combinations must be equipped with **brakes** that are operative. In addition, MDSHA/MCD believes that wording to the effect that **brakes** must at all times be capable of operating should not exclude any system regardless of braking type, as does the proposed language.

FMCSA Response: (a) (i) As explained in the background information, the test data submitted by the Coalition meets what FMCSA believes are reasonable requirements for evaluating the safety performance of trailer **surge** brake systems. The Coalition's additional analysis for trailers in the range of 14,600 to 20,000 pounds GVWR demonstrates that these trailers, subject to the GVWR ratio limitation of this rule, meet the safety performance criteria for these braking systems. FMCSA has determined that the combination of tests performed and analysis submitted are sufficiently rigorous, and that no further tests or analysis are required to establish this performance.

(ii) The other types of vehicles MDSHA/MCD mentioned, including cargo vans, are normally built on a chassis similar to that of a pick-up truck in that vehicle's class, with similarly sized brake components meeting the FMVSS No. 105 requirement. For example, the light truck tested was a Chevrolet C-1500, which serves as the light truck chassis for the cargo vans built by GM in that model size class. Cargo vans built on light truck chassis have the same braking system and thus stopping ability of the truck chassis they are built on. The agency points out that vehicles like the C-1500 are required by FMVSS No. 105 to have a shorter stopping distance than larger vehicles over 10,000 pounds.

Further, for the even smaller cargo vans that are built on a truck chassis like the Chevrolet S-10 pick-up truck, all such vehicles less than 3,500 kilograms (7,716 pounds) are required by FMVSS No. 135 to have the same stopping distance performance as required by FMVSS No. 105 for light trucks over 7,716 pounds and less than 10,000 pounds.

The Agency concluded that the braking characteristics of other towing vehicles, such as cargo vans, will be similar to that of the vehicles tested by EFAA. As long as the towing vehicle meets the applicable FMVSS standard, and the combination meets the GVWR ratios of this rule, all evidence demonstrates that such combinations will have braking system performance similar to the vehicles tested by the Coalition.

(iii) As explained above, there is no justification for requiring a different testing standard for **surge brakes** than for electric **brakes**. Trucks manufactured before March 1, 1999, when the requirement for ABS brake took effect (see Sec. 393.55), have always been allowed to tow trailers with electric **brakes**. These vehicles will be equally safe when towing **surge**-braked trailers, within the GVWR ratios required by this

rule.

(iv) MDSHA/MCD may have been confused by the repeated use of the term GVWR in the NPRM. The Coalition tested a variety of simulated GVWR combinations by loading the trailers to different weights. These were selected to be representative of or simulate different GVWR combinations in order to test the safety performance of the associated **surge** brake systems. The combinations were tested at simulated towing vehicle to trailer weight/GVWR ratios from 1:1 up to 1:2. FMCSA believes that the data provided by the Coalition thoroughly address the concern of MDSHA/MCD that vehicles be tested at a wide range of GCWs.

(b) Since Maryland allows **surge** brake systems on trailers up to 10,000 pounds GVWR in intrastate commerce, at least some of the larger trailers are used as part of combination vehicles over 10,000 pounds. It appears Maryland felt **surge**-braked trailers operating in intrastate commerce are safe without needing a roadside inspection program. Such a program is feasible, as the response to Carlisle under section 4(d) above demonstrates.

Appendix G to Chapter III, Subchapter B of title 49, identifies hydraulic brake components that must be checked. FMCSA believes inspection of **surge brakes** should begin with these hydraulic brake components. If compromised components are found by the first stage inspection, it would then be appropriate or necessary to perform a second stage performance inspection.

(c) (i) As discussed above under section 2(c) of the Agency's response to Mr. Hansel, the performance regulations require the testing to be conducted under dry conditions.

(ii) The theory that under icy conditions the **surge brakes** of the trailer could lock up requires an assumption that the towing vehicle has enough friction with the road to create a deceleration force on the trailer actuator. Thus, the towing vehicle would have to have better friction contact with the road than the trailer. While this could momentarily be true, the combination is traveling down the road, and the trailer wheels will encounter exactly the same friction contact that the towing vehicle just passed over. Thus, as the trailer wheels move forward that might have momentarily locked up on ice, they will encounter the greater traction just experienced by the towing vehicle. And as MDSHA/MCD pointed out, the operator has the ability to correct a brake lock condition by lifting his/her foot off the brake pedal.

(d) The MDSHA/MCD expressed concern that the exemption in Sec. 393.48(d) would mean that **surge brakes** do not have to operate. The NPRM pointed out that **surge brakes** will still be subject to the performance requirements of Sec. 393.52(d), which served as guidance for the tests performed by the Coalition. The NPRM said:

The Agency emphasizes that the granting of the petition for rulemaking, and subsequent proposal to amend Sec. Sec. 393.48 and 393.49 should not be construed as an exception to the brake performance requirements under Sec. 393.52. Therefore,

[[Page 9869]]

adoption of a final rule would not relieve motor carriers of their responsibility to ensure that any commercial motor vehicle, or combination of commercial motor vehicles, operated in interstate commerce, comply with the brake performance requirements under Sec. 393.52.

The NPRM and this final rule also contain a new Sec. 393.40(b) (5) requiring **surge** braked trailers to comply with the same existing provisions required for electric **brakes**. However, to further clarify

that the **surge brakes** must operate, FMCSA has added an additional paragraph to the reformatted Sec. 393.48(d) to read as follows:

(4) The **surge brakes** must meet the requirements of Sec. 393.40.

6. The American Trucking Associations, Inc. (ATA), on behalf of its members that manufacture commercial vehicles, expressed the same concern as TMA above regarding the lack of parking-brake capability with **surge brakes**, and the potential that the parking brake system on the towing vehicle could be overloaded, thus, creating a roll-away situation. ATA believes this is reason enough to continue to ban the use of **surge brakes** on commercial vehicles where they are more likely to be used beyond the towing vehicles' rated capacities. ATA believes that additional parking brake

Testing should be completed on situations where the trailer has the maximum proposed gross vehicle weight rating of 1.75 times the weight of the towing vehicle for 12,000 pounds or less, and 1.25 times the weight of the towing vehicle for 12,000-20,000 pounds GVWR to verify if the towing vehicle has the capacity to hold the combined weight. This testing may have to include a variety of makes and models as individual vehicles from different manufacturers can have performance variations.

FMCSA Response: ATA's concern regarding parking **brakes** is the same as that addressed in the response to TMA above.

7. Advocates for Highway and Auto Safety (Advocates) opposed the proposed rulemaking on the grounds that FMCSA moved the petition immediately into rulemaking, rather than preliminarily asking for comments and views on the wisdom of changing current regulations to permit this technology. Advocates regards the subject rulemaking proposal

both as inadequate and premature, as well as failing to meet the agency's basic responsibilities to conduct its own investigations and make its own determinations about the merits of major changes to its safety regulations. Moreover, the agency has failed to offer this petition for public evaluation in a timely manner through an earlier notice asking for preliminary information that would be relevant to determining whether to propose changes to the FMCSR and exactly what changes are documented by the agency's own tests to be in the public interest to advance motor carrier and commercial vehicle safety.

Advocates contend that a proposed rule is not the occasion for requesting comment on whether additional analysis is needed to support the petitioner's assertions.

FMCSA Response: FMCSA followed established procedures in this rulemaking. Section 389.31, Petitions for Rulemaking, specifies that any interested person may petition the Administrator to establish, amend, or repeal a rule. Each petition filed must set forth the text or substance of the rule or amendment proposed, and include any information or arguments available to support the action. The Coalition filed such a petition, and it contained their requested regulatory changes and their data supporting the safety performance of their request.

FMCSA determined in accordance with Sec. 389.33(b) that the petition appeared to have merit, and the Administrator, therefore, notified the Coalition their petition for rulemaking was granted.

FMCSA subsequently issued the NPRM, asking for specific data

regarding trailers over 14,600 pounds. The NPRM is the official opportunity for the public to provide comments or data relevant to the proposed rule. There is nothing unusual about asking potential commenters who may possess data or analysis to share it with an agency, nor is there any requirement of administrative law that an agency digest and republish for an additional round of comments all data submitted in response to an NPRM.

#### IV. Summary

1. As specified in Part 389, the **Surge** Brake Coalition submitted a petition for rulemaking containing safety performance test data supporting their contention that **surge**-braked trailers meet the safety performance requirements of Part 393, and, thus, should not be prescriptively excluded.

2. FMCSA determined that the test data supported the contention of the Coalition, and that a rulemaking on this subject was warranted. Therefore, FMCSA granted the petition for a rulemaking.

3. FMCSA then developed and issued an NPRM putting forth the proposal and asking for any additional information from the public. In particular, FMCSA requested data regarding the safety performance of trailers with a GVWR greater than 14,600 pounds.

4. FMCSA analyzed all information submitted to the docket and developed this final rule specifying that **surge**-braked trailers subject to the specified GVWR ratios are allowed as part of combination commercial motor vehicles operating in interstate commerce.

#### V. Regulatory Analyses and Notices

Executive Order 12866 (Regulatory Planning and Review) and DOT Regulatory Policies and Procedures

FMCSA has determined that this action is a significant regulatory action within the meaning of Executive Order 12866 because it is the subject of both a regulatory reform nomination and an industry petition. This rule has generated a significant amount of public interest and has been listed in the 2005 ``Regulatory Reform of the U.S. Manufacturing Sector'' as published by the Office of Management and Budget. We expect the rule will have minimal costs and small benefits that outweigh the costs. The Agency has prepared a regulatory analysis of the costs and benefits of this rulemaking action. A copy of the analysis is included in the docket referenced at the beginning of this document.

#### Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (5 U.S.C. 601-612), FMCSA considered the effects of this regulatory action on small entities and determined that this final rule has a minimal, but positive impact on a substantial number of small entities. This is because it removes a regulatory obstacle to the use of **surge brakes** on small and medium trailers. There are over 150 firms that manufacture trailers, about 300 firms that are in the boat delivery service, thousands of landscape and construction firms that may use trailers, and over 2,000 rental equipment firms that may offer trailers for rent. The majority of these firms are small businesses according to the definition provided by the Small Business Administration. No entity is required to use **surge brakes**, and those currently using electric or other types of **brakes** have the option to continue with no change.

This final rule allows a braking system that was not allowed in

interstate commerce for a number of years. Many businesses use small or medium trailers in their daily operations; if these operations are in interstate commerce, and the vehicle combination meets the definition of CMV (49 CFR 390.5), they are subject to the FMCSRs, which previously did not allow the use of **surge brakes**. CMVs

[[Page 9870]]

towing such trailers are most likely to be operated in interstate commerce if the operation is near a State boundary. This final rule establishes uniformity without compromising safety. It removes the dilemma faced by numerous State agencies responsible for motor carrier safety of enforcing Federal regulations prohibiting the use of **surge brakes** on trailers operated in interstate commerce, while allowing identical trailer combinations to operate on the same roads, under the same conditions, in intrastate commerce.

Accordingly, FMCSA certifies that this rule does not have a significant economic impact on a substantial number of small entities.

#### Unfunded Mandates Reform Act of 1995

This rulemaking does not impose an unfunded Federal mandate, as defined by the Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1532, et seq.), that results in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$128 million or more in any 1 year.

#### Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments)

In accordance with E.O. 13175, we evaluated possible effects on federally recognized Indian tribes and have determined there are no effects.

#### Executive Order 12988 (Civil Justice Reform)

This action meets applicable standards in sections 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

#### Executive Order 13045 (Protection of Children)

FMCSA analyzed this action under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. The Agency determined that this rulemaking does not create an environmental risk to health or safety disproportionately affecting children.

#### Executive Order 12630 (Taking of Private Property)

This rulemaking does not effect a taking of private property or otherwise have taking implications under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights.

#### Executive Order 13132 (Federalism)

This action was analyzed in accordance with the principles and criteria contained in Executive Order 13132. The FMCSA determined this rulemaking does not have a substantial direct effect on States, nor does it limit the policy-making discretion of the States. Nothing in

this document preempts any State law or regulation.

Executive Order 12372 (Intergovernmental Review)

The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities do not apply to this program.

Paperwork Reduction Act

This rulemaking does not contain a collection of information requirement for the purposes of the Paperwork Reduction Act of 1995, 44 U.S.C. 3501, et seq.

National Environmental Policy Act

The Agency analyzed this action for purposes of the National Environmental Policy Act of 1969 (42 U.S.C. 4321, et seq.) and determined this action does not have an effect on the quality of the environment. However, an environmental assessment (EA) supporting this conclusion was prepared because the rulemaking is not among the type covered by a categorical exclusion. A copy of the environmental assessment is included in the docket listed at the beginning of this notice.

Executive Order 13211 (Energy Effects)

The Agency analyzed this action under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution or Use. The Agency determined it would not be a ``significant energy action'' under that Executive Order because it is not economically significant and does not have a significant adverse effect on the supply, distribution, or use of energy.

List of Subjects in 49 CFR Part 393

Highway safety, Motor carriers and Motor vehicle safety.

VI. Regulatory Language for the Final Rule

0

In consideration of the foregoing, FMCSA amends title 49, Code of Federal Regulations, chapter III, as follows:

PART 393--PARTS AND ACCESSORIES NECESSARY FOR SAFE OPERATION

0

1. The authority citation for part 393 continues to read as follows:

Authority: Section 1041(b) of Pub. L. 102-240, 105 Stat. 1914; 49 U.S.C. 31136 and 31502; and 49 CFR 1.73.

0

2. Amend Sec. 393.5 by adding a new definition for ``**Surge Brake**'' in alphabetical order to read as follows:

Sec. 393.5 Definitions.

\* \* \* \* \*

**Surge Brake.** A self-contained, permanently closed hydraulic brake system for trailers that relies on inertial forces, developed in response to the braking action of the towing vehicle, applied to a hydraulic device mounted on or connected to the tongue of the trailer, to slow down or stop the towed vehicle.

\* \* \* \* \*

0

3. Amend Sec. 393.40 by adding paragraph (b) (5), a new specification of ``**Surge** brake systems,`` to read as follows:

Sec. 393.40 Required brake systems.

\* \* \* \* \*

(b) \* \* \*

(5) **Surge** brake systems. Motor vehicles equipped with **surge** brake systems must have a service brake system that meets the applicable requirements of Sec. Sec. 393.42, 393.48, 393.49, and 393.52 of this subpart.

\* \* \* \* \*

0

4. Amend Sec. 393.48 by revising paragraph (a) and adding paragraph (d) to read as follows:

Sec. 393.48 **Brakes** to be operative.

(a) General rule. Except as provided in paragraphs (b), (c), and (d) of this section, all **brakes** with which a motor vehicle is equipped must at all times be capable of operating.

(b) \* \* \*

(c) \* \* \*

(d) **Surge brakes.** (1) **Surge brakes** are allowed on:

(i) Any trailer with a gross vehicle weight rating (GVWR) of 12,000 pounds or less, when its GVWR does not exceed 1.75 times the GVWR of the towing vehicle; and

(ii) Any trailer with a GVWR greater than 12,000 pounds, but less than 20,001 pounds, when its GVWR does not exceed 1.25 times the GVWR of the towing vehicle.

(2) The gross vehicle weight (GVW) of a trailer equipped with **surge brakes** may be used instead of its GVWR to calculate compliance with the weight

[[Page 9871]]

ratios specified in paragraph (d) (1) of this section when the trailer manufacturer's GVWR label is missing.

(3) The GVW of a trailer equipped with **surge brakes** must be used to calculate compliance with the weight ratios specified in paragraph

(d) (1) of this section when the trailer's GVW exceeds its GVWR.

(4) The **surge brakes** must meet the requirements of Sec. 393.40.

0

5. Revise Sec. 393.49 to read as follows:

Sec. 393.49 Control valves for **brakes**.

(a) General rule. Except as provided in paragraphs (b) and (c) of this section, every motor vehicle manufactured after June 30, 1953, which is equipped with power **brakes**, must have the braking system so arranged that one application valve must when activated cause all of the service **brakes** on the motor vehicle or combination motor vehicle to operate. This requirement must not be construed to prohibit motor vehicles from being equipped with an additional valve to be used to operate the **brakes** on a trailer or trailers or as required for busses in Sec. 393.44.

(b) Driveaway-Towaway Exception. This section is not applicable to driveaway-towaway operations unless the **brakes** on such operations are designed to be operated by a single valve.

(c) **Surge** brake exception. This requirement is not applicable to trailers equipped with **surge brakes** that satisfy the conditions specified in Sec. 393.48(d).

Issued on: February 26, 2007.

John H. Hill,  
Administrator.

[FR Doc. E7-3815 Filed 3-5-07; 8:45 am]  
BILLING CODE 4910-EX-P