

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

49 CFR PART 393

[FHWA Docket No. MC-94-31]

RIN 2125-AD46

Parts and Accessories Necessary for Safe Operation; Antilock Brake Systems

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Notice of intent; request for comments.

SUMMARY: This document requests comments on the intent of the FHWA to initiate a rulemaking concerning requirements for antilock brake systems (ABS) on commercial motor vehicles engaged in interstate commerce. The National Highway Traffic Safety Administration (NHTSA) has issued a final rule, published elsewhere in today's **Federal Register**, requiring certain newly manufactured vehicles to be equipped with ABS. The FHWA intends to initiate a rulemaking addressing requirements for motor carriers to maintain the ABS on those vehicles which are subject to the NHTSA's final rule and address certain other ABS issues related to vehicles subject to the Federal Motor Carrier Safety Regulations (FMCSRs). The FHWA requests comments on this action.

DATES: Comments must be received on or before May 9, 1995.

ADDRESSES: Submit written, signed comments to FHWA Docket No. MC-94-31, Room 4232, HCC-10, Office of the Chief Counsel, Federal Highway Administration, 400 Seventh Street, SW., Washington, D.C. 20590. All comments received will be available for examination at the above address from 8:30 a.m. to 3:30 p.m., e.t., Monday through Friday, except Federal holidays. Those desiring notification of receipt of comments must include a self-addressed, stamped postcard.

FOR FURTHER INFORMATION CONTACT: Mr. Larry W. Minor, Office of Motor Carrier Standards, HCS-10, (202) 366-2981; or Mr. Charles E. Medalen, Office of the Chief Counsel, HCC-20, (202) 366-1354, Federal Highway Administration, 400 Seventh Street, SW., Washington, D. C. 20590. Office hours are from 7:45 a.m. to 4:15 p.m., e.t., Monday through Friday, except Federal holidays.

SUPPLEMENTARY INFORMATION:

Background

Section 4012 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) (Pub. L. 102-240, 105 Stat. 1914, 2157) directs the Secretary of Transportation to initiate a rulemaking concerning methods for improving braking performance of new commercial motor vehicles,¹ including truck tractors, trailers, and their dollies. Congress specifically directed that such a rulemaking examine antilock systems, means of improving brake compatibility, and methods of ensuring effectiveness of brake timing. The ISTEA requires that the rulemaking be consistent with the Motor Carrier Safety Act of 1984 (49 U.S.C. 31147(b)) and be carried out pursuant to, and in accordance with, the National Traffic and Motor Vehicle Safety Act of 1966 (49 U.S.C. 30111 *et seq.*).

The NHTSA Rulemaking

In response to the ISTEA, the NHTSA has issued a final rule (which is published elsewhere in today's **Federal Register**) amending Federal Motor Vehicle Safety Standard (FMVSS) No. 105, Hydraulic Brake Systems, and FMVSS No. 121, Air Brake Systems, to require medium and heavy vehicles to be equipped with an antilock brake system (ABS) to improve the lateral stability (i.e., traction) and steering control of these vehicles during braking. For truck tractors, the ABS requirement is supplemented by a 30-mph braking-in-a-curve test on a low coefficient of friction surface using a full brake application. By improving lateral stability and control, these requirements will significantly reduce jackknifing and other losses of control during braking as well as the deaths and injuries caused by those control problems.

In addition, the NHTSA final rule requires all powered heavy vehicles to be equipped with an in-cab lamp to indicate ABS malfunctions. Truck tractors and other trucks equipped to tow air-braked trailers are required to be equipped with two separate in-cab lamps: one indicating malfunctions in the towing vehicle ABS and the other in the trailer ABS. Trailers produced during an initial eight-year period must also be equipped with an external malfunction indicator that will be

¹ For the purposes of section 4012, the term "commercial motor vehicle" means any self-propelled or towed vehicle used on highways to transport passengers or property if such vehicle has a gross vehicle weight rating (GVWR) of 11,794 kilograms (kg) (26,001 pounds) or more. The NHTSA's final rule on ABS applies to medium and heavy vehicles with a GVWR of 4,536 kg (10,001 pounds) or more.

visible to the driver of the towing tractor. These indicators will provide valuable information about ABS malfunctioning to the driver in the event that the trailer is towed by a vehicle that is not equipped with an in-cab ABS malfunction indicator for trailers.

The amendments to FMVSS No. 105 become effective on March 1, 1999. The amendments to FMVSS No. 121 become effective on March 1, 1997, with respect to truck tractors, and on March 1, 1998, with respect to air-braked trailers, converter dollies, single unit trucks and buses.

In the 1970's, FMVSS No. 121 included stopping distance requirements which essentially required heavy vehicles to be equipped with antilock brake systems. In response to a legal challenge, the United States Court of Appeals for the 9th Circuit invalidated the stopping distance and "no lockup" requirements in Standard No. 121, along with certain other provisions, holding that the standard was "neither reasonable nor practicable at the time it was put into effect." *PACCAR v. NHTSA*, 573 F.2d 632 (9th Cir. 1978), cert. denied, 439 U.S. 862 (1978).

As explained in NHTSA's final rule, the preconditions for an ABS requirement for heavy vehicles differ markedly from 20 years ago when the petitioners challenged the agency in *PACCAR*. First, NHTSA's extensive fleet study of heavy vehicle antilock systems demonstrates that these systems are reliable. Second, the agency's testing of truck tractors equipped with antilock systems indicates that they provide significantly improved lateral control and stability compared to vehicles without antilock systems. Third, unlike air brake systems in existence in the mid-1970's that relied on significantly larger, more aggressive foundation brakes, which could possibly create safety problems if the antilock system malfunctioned, the requirements being adopted today do not necessitate such aggressive brakes. Fourth, antilock brake systems are now in widespread, everyday use in this country and throughout the world. Fifth, the performance requirements adopted in today's final rule are objective and practicable. Based on these and other considerations discussed throughout its final rule, NHTSA believes the final rule satisfies the concerns raised in the *PACCAR* case.

To evaluate the reliability of current-generation ABS designs, the NHTSA conducted extensive field studies of ABS-equipped heavy truck tractors and

semitrailers² in developing its final rule. In response to the PACCAR case, these studies were structured to assess whether current-generation heavy vehicle antilock brake systems were reliable and fail-safe, whether they inordinately increased vehicle maintenance costs, and whether they could be successfully maintained and would remain functioning in typical U.S. heavy truck operating environments.

The NHTSA Research

Between 1988 and 1993, the agency tracked the maintenance performance histories of 200 truck tractors and 50 semitrailers equipped with ABS, as well as the histories of a comparison group of 88 truck tractors and 35 semitrailers not equipped with ABS, to determine the incremental maintenance costs and patterns associated with installing ABS on these heavy vehicles. Additionally, special on-board vehicle recorders were used to monitor the functioning and performance of the ABSs. Finally, drivers and mechanics at the participating test fleets were periodically interviewed to ascertain their views about the ABS test vehicles' performance and ease of maintenance. The study authors concluded that, based on the data collected during the fleet study, currently available antilock brake systems are reliable, durable and maintainable. While ABS is not a zero-cost maintenance item, its presence on a vehicle did not substantially increase maintenance costs (less than one percent for tractors, less than two percent for trailers) or decrease vehicle operational availability. Moreover, the NHTSA study found that system malfunctions would not render the vehicle's braking system unsafe, since the brake system would merely revert to one without an ABS; foundation brakes are unchanged when ABS is added. The incidents noted during the test program in which an ABS malfunction did compromise the vehicle's underlying brake system performance involved defective components.

The NHTSA's research report indicates that in both the tractor and the trailer studies, many of the test vehicles either arrived in the test fleets with faulty ABS or had ABS malfunction indications shortly thereafter. These problems were the result of what was

referred to as installation or pre-production design-related problems. In general, these problems were easily remedied, with most of the ABSs requiring only adjustments or minor repairs. Problems of this nature were at least partially attributable to the prototype nature of many of the installations accomplished for this test program.

The NHTSA emphasizes that the problems encountered in the test program do not reflect inherent design flaws with the principal components (i.e., the electronic control units (ECU), modulators, and wheel-speed sensing hardware) of ABS. Instead, they highlight the importance of using high quality wiring components and paying close attention to installation details. The NHTSA anticipates that the frequency of these problems will be lower than that experienced during the agency's test program once ABS production/installation increases to a level high enough to enable the quality control programs typically utilized by suppliers and truck manufacturers to take effect.

An average of 1.35 labor hours and \$106.46 for replacement components per test truck tractor were necessary to rectify these installation/pre-production design-related problems. Comparable figures for semitrailers were 1.9 labor hours and \$65.36 for parts. All these costs are usually recovered by fleets under the terms of typical warranties offered by ABS suppliers and/or truck manufacturers. The NHTSA notes that the start-up or installation/pre-production design-related problems that the test fleets experienced are similar to the experiences that fleets were reported to have had with electronically controlled engines when they were first introduced on heavy trucks in the mid-1980's.

During the two-year period in which the reliability of these systems was evaluated, 200 ABS-equipped test tractors accumulated 39,818,659 miles of travel. During that period, 126 trucks (63 percent) needed ABS related maintenance that could best be attributed to normal service wear factors rather than installation or pre-production design-related problems. A total of 421 incidents of this type occurred with the 126 trucks, the majority (321 or 76 percent) of which involved inspections/adjustments. The remainder (100 or 24 percent) involved repairs/replacements. All brands of the ABSs involved in the test program experienced incidents of this type at one time or another during their in-service operation.

Forty vehicles experienced more than one failure warning, the reason for which could not be discovered. Two vehicles experienced 35 and 31 such indications (23 percent of the total ECU resets (clearing the failure message from the ECU memory)) respectively. Two other trucks experienced 12 and 10 separate indications, respectively. These four vehicles (4.5 percent of the trucks with failure warning problems) accounted for 30 percent of the total intermittent failure warning indications and ECU resets.

All five ABS systems (Bendix, Bosch, Midland, Rockwell, and WABCO) experienced intermittent failure indications with at least one of the forty test trucks each had involved in the test program. In each case, the ABS was either manually reset or the warning light did not reactivate when the truck's ignition was turned off and subsequently turned on again at some later time. However, 61 percent of the total failure warning indications of this type, and 34 percent of the vehicles experiencing intermittent failure indications, were attributable to one supplier's ABS. Another supplier's system accounted for 18 percent of total failure warning indications and 28 percent of the total vehicles involved. Since the time of the agency's test, both suppliers' systems have been modified to reduce the number of these false-positive malfunction indications.

The NHTSA's final rule summarizes the maintenance related to in-service wear that was required during the tractor portion of the program on each of the ABS components. Inspections and ECU resets associated with intermittent failure warning indications were the principal occurrences. In general, most of the work did not involve parts replacements. Parts-replacement incidents totaled 40, with 55 percent of these (22) involving failure warning lamp bulbs or fuses. The average number of in-service wear-related maintenance incidents, including all inspections, adjustments, repairs, and replacements, was 2.11 incidents per truck over the two-year period of the test.

Replacing faulty major ABS components, plus performing all other inspections, adjustments and repairs that were in-service wear-related, required approximately 403 hours of labor and \$4,068 for parts replacements for all tractors in the test. At a standard hourly rate of \$35, this amounts to \$18,173, or 0.046 cents per mile (based on 39,818,659 total miles of travel) for the cost of maintaining the ABSs over the two-year period. The inspections/ECU resets, which only involved labor

² "An In-Service Evaluation of the Reliability, Maintainability, and Durability of Antilock Braking Systems (ABS) for Heavy Truck Tractors," DOT Report No. 807 846, March 1992, and "An In-Service Evaluation of the Reliability, Maintainability, and Durability of Antilock Braking Systems (ABS) for Semitrailers," DOT Report No. 808 059, October 1993.

expenditure, accounted for 45 percent of these total costs. Although they occurred infrequently, ECU replacements were costly, accounting for 21 percent of the in-service wear-related maintenance costs.

Similar findings were noted for the 50 ABS-equipped semitrailers that were evaluated. The test vehicles accumulated 4,001,369 miles of in-service use during almost two years of operation. In that period, 23 semitrailers (46 percent) needed ABS-related maintenance that could best be attributed to normal service factors, rather than installation or pre-production design-related problems. This compares favorably to the 63 percent of tractors requiring ABS service during the tractor program. A total of 44 incidents of this type occurred with the semitrailers, with the majority (29, or 66 percent) involving inspections or adjustments. The remainder (15, or 34 percent) involved repairs or replacements. These percentages are similar to the 76 percent for adjustments and inspections and 24 percent for repairs and replacements seen during the tractor program.

In summarizing the in-service maintenance that was required for ABS components during the trailer portion of the test program, the NHTSA notes that inspections and ECU resets associated with intermittent failure warning indications were the principal occurrences. Parts-replacement incidents totaled six, with three of these being status light bulbs and three speed sensors. In general, most of the work did not involve parts replacement.

The average number of in-service maintenance incidents, including all inspections, adjustments, repairs, and replacements, was 0.88 incidents per semitrailer over the two-year test period. This compares well with the 2.11 incidents per tractor seen during the tractor portion of this program.

Replacing faulty ABS components, plus performing all other inspections, adjustments, and repairs that were in-service related, required approximately 44 hours of labor and \$234 for parts replacements. At a standardized hourly rate of \$35, the total cost of maintaining the ABSs over the two-year period (\$1,774) amounts to 0.044 cents per mile (based on 4,001,369 total miles of travel). The inspections and ECU resets (which only involved labor expenditure) accounted for 35 percent of the total costs. The comparable tractor figures are 0.046 cents per mile for total costs and 45 percent of the total costs for inspection and ECU reset, indicating that the semitrailers performed very much like the tractors.

Maintenance of ABS

At the completion of the overall 5-year test program, the NHTSA conducted a final follow-up survey among the participating fleets. Among the 13 fleets that were continuing to maintain the ABS on the original test tractors, 97 percent of those tractors had functioning ABS. On the other hand, the ABSs were not functioning on two-thirds of the original test tractors in the other three fleets surveyed that chose not to continue maintaining the systems. This demonstrates that fleets must be committed to maintaining the ABS if it is to be kept operational.

Antilock brake systems require some periodic, and occasionally non-periodic, non-scheduled maintenance in order to remain functional. Nonetheless, the NHTSA believes that the data contained in the two fleet study reports indicate that equipping vehicles with ABS is appropriate. Taken in total, those data indicate that, while ABS is not a zero-maintenance component, it is neither difficult nor unduly expensive to maintain. The fleet test results do not indicate that the level of maintenance attention needed to keep ABS functional is unreasonable relative to the safety benefits that will result from use of these systems.

FHWA Intention

The FHWA has concluded that a rulemaking should be initiated proposing to amend the FMCSRs to include ABS requirements for certain commercial motor vehicles subject to those regulations. At a minimum, the rulemaking would propose that motor carriers be required to maintain the ABS units on all vehicles subject to the NHTSA rule.

The agency is not offering for comment at this time any proposed language for amendments to the FMCSRs. The FHWA does, however, solicit comments on its decision to initiate a rulemaking on ABS. Following a careful review of the docket comments sent in response to this notice, the FHWA will publish a notice of proposed rulemaking containing specific regulatory language. The FHWA anticipates that this rulemaking will be concluded prior to the effective date of the NHTSA's ABS requirement.

Rulemaking Analyses and Notices

All comments received before the close of business on the comment closing date indicated above will be considered and will be available for examination in the docket room at the above address. Comments received after the comment closing date will be filed

in the docket and will be considered to the extent practicable. In addition to late comments, the FHWA will also continue to file in the docket relevant information that becomes available after the comment closing date, and interested persons should continue to examine the docket for new material.

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

The FHWA has determined that this action is not a significant regulatory action within the meaning of Executive Order 12866 or significant within the meaning of Department of Transportation regulatory policies and procedures. Due to the preliminary nature of this document and lack of necessary information on costs, however, the FHWA is unable to evaluate fully the economic impact of the potential regulatory changes being considered in this rulemaking. Based on the information received in response to this notice, the FHWA intends to carefully consider the costs and benefits associated with various alternative requirements. Comments, information, and data are solicited on the economic impact of the potential changes.

Regulatory Flexibility Act

Due to the preliminary nature of this document and lack of necessary information on costs, the FHWA is unable to evaluate fully the effects of the potential regulatory changes on small entities. Based on the information received in response to this notice, the FHWA intends, in compliance with the Regulatory Flexibility Act (Pub. L. 96-354; 5 U.S.C. 601-612), to carefully consider the economic impacts of these potential changes on small entities. The FHWA solicits comments, information, and data on these impacts.

Executive Order 12612 (Federalism Assessment)

This action has been analyzed in accordance with the principles and criteria contained in Executive Order 12612, and it has been determined that this rulemaking does not have sufficient Federalism implications to warrant the preparation of a Federalism assessment. Nothing in this document directly preempts any State law or regulation.

Executive Order 12372 (Intergovernmental Review)

Catalog of Federal Domestic Assistance Program Number 20.217, Motor Carrier Safety. The regulations implementing Executive Order 12372 regarding intergovernmental

consultation on Federal programs and activities apply to this program.

Paperwork Reduction Act

This action does not contain a collection of information requirement for the purposes of the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.*

National Environmental Policy Act

The agency has analyzed this rulemaking for the purpose of the National Environmental Policy Act of

1969 (42 U.S.C. 4321 *et seq.*) and has determined that this action would not have any effect on the quality of the environment.

Regulation Identification Number

A regulation identification number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be

used to cross reference this action with the Unified Agenda.

List of Subjects in 49 CFR Part 393

Highway safety, Motor carriers, Motor vehicle safety.

Authority: 49 U.S.C. 31136, 31502; 49 CFR 1.48

Issued on: March 1, 1995.

Rodney E. Slater,

Federal Highway Administrator.

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