

**DEPARTMENT OF TRANSPORTATION****National Highway Traffic Safety Administration****49 CFR Part 571****Federal Motor Vehicle Safety Standards No. 121; Air Brake Systems**

**AGENCY:** National Highway Traffic Safety Administration (NHTSA), DOT.

**ACTION:** Denial of Petition for Rulemaking.

**SUMMARY:** This Notice denies the petition for rulemaking from William B. Trescott, in which the petitioner requested that the National Highway Traffic Safety Administration (NHTSA) vacate Federal Motor Vehicle Safety Standard (FMVSS) No. 121, Air Brake Systems by removing requirements for antilock brake systems (ABS) for newly-manufactured vehicles equipped with air-brake systems; or that the agency require a driver-controllable switch that would allow the driver to deactivate the ABS on air-braked vehicles; or that the agency require the automatic deactivation of ABS on air braked vehicles when the vehicles are traveling at speeds greater than 55 mph. The petitioner claims that an agency report shows that ABS on tractor-trailers increases fatal crash involvements, and also that ABS allows incompetent truck drivers to drive trucks. The agency reviewed these claims and found them to be without merit, and concludes that the agency report cited by the petitioner does not support the conclusion that safety would be improved by allowing ABS to be deactivated. Rather, the data supports the conclusion that removing ABS from trucks would result in an increase in crashes.

**FOR FURTHER INFORMATION CONTACT:** For non-legal issues, you may contact Mr. Jeffrey Woods, Office of Crash Avoidance Standards, NHTSA, 1200 New Jersey Avenue, SE., Washington, DC 20590 (Telephone: 202-366-6206) (FAX: 202-366-7002). For legal issues, you may contact Mr. David Jasinski, Office of the Chief Counsel, NHTSA, 1200 New Jersey Avenue, SE., Washington, DC 20590 (Telephone: 202-366-2992) (Fax: 202-366-3820).

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**I. Trescott Petition**

On October 27, 2010, the agency received a petition for rulemaking from William B. Trescott of Bay City, Texas, requesting that FMVSS No. 121, Air Brake Systems, either be vacated entirely or amended to require one of two options regarding antilock brake systems that are required for air-braked vehicles. The first option would be to require automatic deactivation of the antilock brake system (ABS) when vehicles are travelling at speeds faster than 55 mph, and the second option would be to require an ABS deactivation switch to allow the driver to disable the ABS. The petition cited data from a recent NHTSA report, "The Effectiveness of ABS in Heavy Truck Tractors and Trailers,"<sup>1</sup> and stated that it showed no statistically significant benefits of ABS in reducing fatal truck crashes. The petition stated that the best estimate of a reduction in all crash types by having ABS on the tractor was only three percent, and that ABS increased overall fatalities by one percent. The petition cited several tables in the report describing both reductions and increases in certain types of crashes. For example, the petition cited Table 2, *Reduction in response group crashes based on tractor and trailer ABS equipment, Florida state data*, of the report which summarized state data from Florida showing a 30 percent decrease in single vehicle rollover crashes for tractors and trailers equipped with ABS, and a 21 percent increase in two vehicle front-to-rear crashes with the truck as the striking vehicle for tractors and trailers equipped with ABS. From Table 4, *Reduction in response group crashes on wet roads based on tractor and trailer ABS equipment, Florida state data*, the petition cited the 67 percent reduction in jackknife crashes on wet roads for tractors and trailers equipped with ABS. The petition stated that there is no doubt that ABS prevents jackknife crashes.

The petition cited specific roadway type, speed, and locality data that are contained in the report as follows. Table 17, *Number of crashes and reduction for ABS-equipped tractors according to type of locality and speed of road, FARS data*, indicates an 11 percent increase in fatal crashes on rural, high-speed roads for ABS-equipped tractors, while the data in Table 18, *Number of crashes and reduction for ABS-equipped tractors on roads that are not high-speed, FARS data*, show fatal crash reductions of 23

percent on all roads that are not high speed for tractors with ABS. Table 19, *Number of crashes and reduction for ABS-equipped tractors on roads that are rural and high-speed according to whether the road is an interstate or not, FARS data*, shows an eight percent increase in fatal crashes on rural interstate roads for ABS-equipped tractors, and a three percent decrease in fatal crashes on other non-interstate rural high speed roads for ABS-equipped tractors. Table 20, *Crash reductions for all crash mechanisms by locality and road type, FARS*, shows a 30 percent increase in fatal, two-vehicle rear impact crashes with the truck as the striking vehicle, for tractors equipped with ABS on rural interstate highways. On the basis of these data, the petition stated that long-haul truckers who operate primarily in rural areas should disable their ABS and the agency should issue a recall order to that effect. However, the recall order should not apply to drivers who operate primarily in urban areas, and further, it may be safest for truckers to turn off their ABS when exceeding 55 mph and to leave it on the rest of the time.

The petition stated that an unintended consequence of preventing jackknife crashes through the use of ABS is that incompetent drivers, who prior to the introduction of ABS would have been fired for the occurrence of a jackknife, were instead being retained and subsequently their continued driving resulted in increases in other types of crashes. The petition cited a 29 percent increase in two-vehicle rear end crashes on wet or icy roads with the truck as the striking vehicle, from Table 4, *Reduction in response group crashes on wet roads based on tractor and trailer ABS equipment, Florida state data*, for tractors and trailers equipped with ABS, as an example of incompetent truck driver retention. The petition also cited a 21 percent increase in single vehicle crash truck occupant fatalities in 1997, the same year that ABS was mandated on newly-manufactured tractors, and concluded that this increase in fatalities was an unintended side effect of less qualified drivers being hired that was made possible by ABS. The petition reasoned that trucking fleets realized cost savings because ABS reduced truck tire damage during panic stops, which thereby allowed the fleets to hire less qualified drivers who were subsequently involved in more crashes.

<sup>1</sup> Report No. DOT HS 811 339, July 2010, available at <http://www-nrd.nhtsa.dot.gov/Pubs/811339.pdf>.

## II. Summary of the ABS Effectiveness Study Results

The agency's study on the effectiveness of ABS on tractors and trailers included a statistical analysis of crash data from seven states for fatal and non-fatal crashes that occurred between 1998 and 2007 (data for all of these years were not used or were not available for every state), and from the Fatality Analysis Reporting System (FARS) for fatal crashes that occurred between 1998 and 2008 from all fifty states. All states provided the vehicle identification number (VIN) or the model year data for the tractors so that the model year of the tractor could be determined, while only two states for which trailer ABS was evaluated (Florida and North Carolina) included the VIN or the model year for the trailers. For all of the crashes, the data were limited to a tractor towing one trailer; thus tractors not towing a trailer (bobtail tractors) or tractors towing multiple trailers were not included in the analysis. Tractors of model year 1998 or newer were assumed to have ABS while those of model year 1996 or older were assumed not to have ABS. Model year 1997 was excluded since the ABS requirements in FMVSS No. 121 became effective on March 1, 1997, and therefore a model year 1997 tractor may or may not have been equipped with ABS. Similarly, trailers of model year 1999 or newer were assumed to have ABS, while those of model year 1997 or older were assumed not to have ABS, and model year 1998 trailers were excluded from the analysis, since the trailer ABS requirements became effective on March 1, 1998.

Limitations of the study included the overall small vehicle population for tractor-trailers (compared to light vehicles for which there are many more vehicles on the road) and the limited amount of crash data from the seven-state sample (27,777 total crashes). Additionally, all model years of vehicles prior to the ABS effective date were assumed not to have ABS, which did not account for an unknown number of vehicles that were voluntarily equipped with ABS prior to the effective date. Also, there was no way to discern whether the vehicles equipped with ABS had been properly maintained so that the ABS was functional at the time of the crash; both of these factors would result in underestimation of the ABS effectiveness. As described above, only two states had information on trailer model year, so the main focus of the analysis was on the effectiveness of tractor ABS.

The crashes, in which tractor-trailers were involved in either single vehicle crashes or multiple vehicle crashes, were divided into control and response groups that both contained tractors and trailers with and without ABS. The crash types for the control group were those in which ABS should not have been influential in the crash outcome, including crash involved tractor-trailers that were moving slowly, parking or unparking, backing up, impacted in the rear, etc. The crash types for the response group were those in which ABS should have been influential either by helping the driver to maintain control of the vehicle or by contributing to improved stopping distance. Response group single vehicle crash types included run-off-road collisions with fixed objects; collisions with animals, pedestrians, or bicycles; jackknife crashes, etc. Response group multi-vehicle crashes included those in which the truck was the striking vehicle in rear-end crashes or the truck was the at-fault vehicle in any other type of crash involving other vehicles. Differences in control group and response group crashes were used to determine ABS effectiveness as evidenced by reductions or increases in crashes among the response group, and statistical measures were provided to determine the statistical significance of the results.

The primary findings of the analysis are summarized as follows:

- The best estimate of a reduction by ABS on the tractor unit in all levels of police-reported crashes for air-braked tractor-trailers is three percent, based on crash data from seven states and controlling for the age of the tractor at the time of the crash. This represents a statistically significant six percent reduction in crashes in which ABS is assumed to be potentially influential, relative to a control group, of about the same number of crashes, in which ABS was likely to be irrelevant.
- In fatal crashes, there was a non-significant two percent reduction in crash involvement, resulting from a four percent reduction in crashes in which ABS should have been potentially influential. External factors of roadway urbanization and speed, and ambient lighting, were accounted for in the final estimates.
- Among the types of crashes that ABS influences, there is a large reduction in jackknife crashes, off-road truck rollovers, and at-fault involvements in crashes with other vehicles, except in rear-end crashes. Counteracting was an increase in the number of involvements in crashes with animals, pedestrians, or bicyclists and,

only in fatal crashes, two-vehicle rear-end crashes with the truck as the striking vehicle.

The first stage of the analysis considered ABS on both the tractors and the trailers. For the Florida data, the reduction in response group crashes was a statistically significant 14 percent for ABS-equipped tractors when towing either ABS-equipped trailers or non-ABS-equipped trailers.<sup>2</sup> The largest crash reductions associated with ABS on the tractor or trailer were among single-vehicle tractor-trailer crashes and particularly jackknife crashes (statistically significant reductions of 76 percent for ABS tractors with non-ABS trailers, and 65 percent for ABS tractors with ABS trailers). Crashes with pedestrians, bicycles, and animals increased, although this result was not statistically significant. For multi-vehicle crashes, increases were seen for rear-end crashes with the tractor as the striking vehicle when tractors with ABS were compared to those without, while decreases in other tractor-at-fault crashes were seen for the ABS tractors. These sub-group results were statistically significant while the overall results for all multi-vehicle crashes (a five percent reduction for ABS tractors with non-ABS trailers, and a one percent increase for ABS tractors with ABS trailers) were not statistically significant.

When the Florida data were limited to wet roadways (with the road surface coded as wet, slippery, or icy), the reductions in crashes for ABS tractors were even higher: 26 percent when operated with non-ABS-equipped trailers, and 23 percent when operated with ABS-equipped trailers, both statistically significant.<sup>3</sup> These results suggested that ABS is more effective on wet roads than on dry roads, noting that comparison data were not always statistically significant but nevertheless showed an overall trend. When the North Carolina data (the other State providing trailer model year) were also considered, the tractor ABS was still seen to be the most influential in overall crash reductions, although the crash data sample was small. The amount of available data from both Florida and North Carolina was found to be insufficient to draw further conclusions about the effects of ABS on the trailers.

An initial analysis of the state data for all levels of crash severity (property damage only, or resulting in an injury or

<sup>2</sup> See Table 2: Reduction in response group crashes based on tractor and trailer ABS equipment, Florida state data.

<sup>3</sup> See Table 4: Reduction in response group crashes on wet roads based on tractor and trailer ABS equipment, Florida state data.

a fatality) for the seven states showed reductions in response group crashes for ABS-equipped tractors ranging between 10 percent and 17 percent for each state.<sup>4</sup> Results by crash type were typically similar in magnitude and in the same direction (reductions or increases in crashes) for each state. The largest percentage reductions for ABS tractors were for jackknife crashes, followed by single-vehicle run-off-road rollovers and other types of single-vehicle crashes (both on-road and off-road). Reductions in multi-vehicle crashes were also seen across the states, with only Florida data showing an increase in rear-end crashes with the truck as the striking vehicle. Substantial increases were seen for single vehicle crashes with animals, pedestrians, and bicyclists, although these results were not statistically significant and the number of crashes was small.

However, the age differences between the ABS and non-ABS tractors were found to have biased the results because the non-ABS tractors were at least two years older than the ABS-equipped tractors. Additional analyses of the state data were conducted on an age-restricted subset of the crash data for overlapping tractor ages at the time of the crash for both ABS tractors and non-ABS tractors. Since varying years of state data were used, the tractor age varied between three and ten years at the time of the crash depending on the state (e.g., between three to ten years for Florida, and eight to nine years for North Carolina).

The results of the age-restricted state data still showed crash reductions for the ABS tractors in each of the seven states, but the reductions were smaller than those seen from the unrestricted data set and there were few results that were statistically significant.<sup>5</sup> The ABS tractors in the response group of crashes showed crash reductions ranging between three percent and 10 percent for each state in comparison with the control group, and similar to the results in the unrestricted data set, single vehicle jackknife crashes had the largest reductions of all the crash types, followed by single-vehicle rollovers. Increases were seen in five states for crashes with animals, pedestrians, and bicyclists, and in three states for two-vehicle rear end crashes with ABS tractors as the striking vehicle. Considering the total crash population for the combined response and control

groups, ABS tractors were associated with overall crash reductions of between two percent and six percent for each state.

A similar analysis was conducted using 50-state FARS data from 1998 to 2008 with a data set of 30,275 crashes. The analysis considered tractors towing one trailer, but only the effectiveness of tractor ABS was considered since trailer model year information was not available. Comparisons were conducted similarly to those in the state data analysis, with a control group consisting of crash types in which ABS would not be considered to have an influence, and a response group in which ABS could be considered to have an influence in the crash. The response and control groups included both ABS tractors and non-ABS tractors.

The initial FARS results found that the ABS tractors in the response group had an overall two percent increase in crashes compared to non-ABS tractors, although these results were not statistically significant.<sup>6</sup> In single-vehicle crashes, there was a reduction in run-off-road crashes with rollover and single-vehicle jackknife crashes for the ABS tractors. However, there was an increase in run-off-road crashes without rollover and crashes with pedestrians, animals, and bicyclists. A few of the subgroup results were statistically significant, but the overall results were not.

In two-vehicle rear end crashes with the truck as the striking vehicle, a 44 percent increase was seen for the ABS tractors. However, there was an eight percent reduction in other multi-vehicle crashes in which the truck was the at-fault vehicle. Since there were many more multi-vehicle crashes that are in the "other," non-rear-end crash category, the net result was a non-significant one percent increase in overall multi-vehicle crashes for the ABS tractors. In addition, the ABS tractors were found to have a slightly higher percentage of crashes occurring on wet roadways (18 percent of crashes occurring on wet roadways) compared to the non-ABS tractors (16 percent of crashes occurring on wet roadways), which was contrary to what was seen in the analysis of the state data.

The FARS data were then segregated by roadway locality and speed, and the results showed that reductions in crashes for the ABS tractors occurred on non-high-speed roadways (both rural and non-rural), while the increases occurred on high speed roadways (mainly rural, with only a slight

increase on non-rural roads).<sup>7</sup> Further segregation showed that the increases occurring on high speed roads were on interstate highways, although these results were not statistically significant.<sup>8</sup> When overall results were compared among four categories of road locality and type, the only statistically significant result was a 24 percent decrease among ABS tractors for all road types that were not high speed (including both single-vehicle and multi-vehicle crashes).<sup>9</sup> Furthermore, when individual crash types were reviewed within these data, a 43 percent overall increase in rear-end crashes with an ABS tractor as the striking vehicle, considering all roadways, was considered questionable because it was more negative than seen for any individual road locality and speed type. Therefore, adjustments were made in the final estimates for tractor ABS effectiveness in fatal crashes.

The analysis found that the type of road locality, travel speed, and ambient lighting condition (daylight or non-daylight) were influential in the fatal crash data. The data were then weighted to account for these influences and the final estimates for tractor ABS effectiveness and confidence intervals were derived.<sup>10</sup> The result was a four percent reduction among all ABS tractor response group crashes, although this result was not statistically significant. Single vehicle crashes among ABS tractors were reduced by five percent (not statistically significant) with the largest reductions in the run-off-road with subsequent rollover (statistically significant) and jackknife crash types (not statistically significant). The results also showed an increase in crashes with pedestrians, animals, and bicycles. ABS tractors had an overall five percent reduction in fatal multi-vehicle crashes (not statistically significant) with a nine percent reduction (statistically significant) in multi-vehicle crashes with the tractor at fault, and a ten percent increase (not statistically significant) in rear end crashes with the tractor as the striking vehicle. Tractor age was not found to be influential in the FARS data. Therefore, there was no need to conduct an age-restricted analysis of these data.

<sup>7</sup> See Table 17: Number of crashes and reduction for ABS-equipped tractors according to type of locality and speed of road, FARS data.

<sup>8</sup> See Table 19: Number of crashes and reduction for ABS-equipped tractors on roads that are rural and high-speed according to whether the road is an interstate or not, FARS data.

<sup>9</sup> See Table 20: Crash reductions for all crash mechanisms by locality and road type, FARS.

<sup>10</sup> See Table 23: Final weighted estimate of tractor ABS effectiveness from FARS.

<sup>4</sup> See Table 11: Reduction in response group crashes for various crash mechanisms, summary of seven States.

<sup>5</sup> See Table 27: Reductions in all crash mechanisms, age-restricted State data.

<sup>6</sup> See Table 15: Reduction in response group crashes for various crash mechanisms, FARS data.

### III. ABS Requirements

During the rulemaking in the 1990's to require ABS on air-braked heavy vehicles (and, concurrently, to require ABS on medium and heavy trucks and buses equipped with hydraulic brakes), the agency solicited public comments and input on how the ABS requirements would be implemented, including a definition of ABS, ABS equipment requirements for different vehicle types, and ABS road tests to set pass-fail performance criteria for tractors, trucks, and buses. An advanced notice of proposed rulemaking (ANPRM) was published on June 8, 1992<sup>11</sup> outlining the agency's general approach to include heavy vehicle ABS requirements, followed by a notice of proposed rulemaking (NPRM) on September 28, 1993<sup>12</sup> that included more detailed information along with an agency proposal for the regulatory text to include the ABS requirements in FMVSS No. 121. The agency was not aware of any reason to consider including an ABS on-off switch to allow the drivers to deactivate ABS during the rulemaking, and the heavy vehicles that were available with ABS at that time did not include any ABS on-off switches. None of the public comments or petitions for rulemaking submitted during the rulemaking requested that ABS disabling switches be provided.

On May 1, 1998, the agency issued an interpretation letter in response to an inquiry from Navistar International (Navistar) regarding air-braked vehicles that are equipped with an all-wheel drive (AWD) system that is selectable by the driver. Under this scenario, the vehicles are normally operated in two-wheel drive mode, and the AWD mode is selectable by the driver for severe service, off-road operation. Navistar asked if the ABS on such vehicles needed to be fully operational when the vehicle is in the AWD mode. The agency's letter stated that there is no exception in FMVSS No. 121 to permit the ABS to be disabled when AWD has been selected, although the ABS operation could be modified to better suit off-road conditions, as can be found in construction, logging, or mining operations for example. The requirements in S6, *Test conditions*, in FMVSS No. 121 specify that during road tests for the braking system, a vehicle equipped with an interlocking axle system or a front wheel drive system which is engaged and disengaged by the driver is tested with such system disengaged.

The practical effect of this agency interpretation letter is that during a stopping distance test, the vehicle must comply with the stopping distance requirements and meet the wheel lockup provisions specified in the standard, and during a stability and control test the vehicle must remain in the 12-foot-wide lane during a full brake application in at least three out of four test runs, with the ABS fully functional and, if so equipped, a front drive axle or an interaxle locking system disengaged via the driver controls. However, when either a front drive axle or interaxle locking system is engaged by the driver, additional wheel lockup could be provided to meet operational needs. An example of this is a logging truck descending a steep grade on a muddy road at very low speeds, where some wheel lockup is needed to restrict the forward motion of the vehicle by allowing a wedge of mud to build up in front of the tires. Thus, a vehicle manufacturer can activate a modified ABS algorithm based upon the driver engaging the controls for an interaxle locking system or front wheel drive system as such needs are identified by the vehicle manufacturer. To date, the provisions already contained in FMVSS No. 121 permit modified ABS operation, without the need for an ABS on-off switch.

### IV. Agency Analysis of the Petition

The purpose of requiring ABS on medium and heavy vehicles, including tractors and trailers, is to improve vehicle control and stability during panic braking. During normal driving, drivers brake lightly and no wheel lockup occurs. However, when faced with an imminent crash situation, drivers may apply the brakes by making a full brake pedal application, which can result in wheel lockup at one or more wheels on a vehicle. Since locked wheels cannot provide the lateral force needed to maintain directional control or to permit the driver to steer the vehicle around an obstacle, a loss-of-control situation occurs. A jackknife can occur if the tractor's drive axle wheels are locked and the tractor rotates about its center of gravity (often until it makes contact with a trailer being towed), or if the locked wheels on the trailer cause it to swing out of its travel lane. Both a jackknifed tractor and a trailer that has swung out of its lane can crash into other vehicles, skid off the road and strike roadside objects, or rollover. ABS keeps the wheels from locking up; thus lateral control of the vehicle is retained so the vehicle stays in its lane and the driver can also execute a steering maneuver to try and avoid a crash.

The March 10, 1995 final rule on heavy vehicle ABS included an appendix that provided details on heavy vehicle braking systems, tire characteristics related to lateral force and longitudinal force generation relative to wheel lockup, and explained why braking-related wheel lockup causes loss-of-control crashes on heavy vehicles.<sup>13</sup> Also, it describes why heavy vehicles are more prone to braking-related wheel lockup compared to light vehicles. Since heavy vehicle brakes are sized to stop the vehicle in the fully-loaded condition, they are over-braked (a brake imbalance condition) on the drive axles or trailer axles when operated in a lightly-loaded condition. The ratio of the weight of a loaded truck to the weight of an unloaded truck is considerably greater than the comparable loaded-to-unloaded weight ratio of a light vehicle. All of the physical conditions discussed in the appendix are still true today and thus removing ABS would result in the described loss of control conditions and a subsequent increase in crashes related to loss of control.

However, since the ABS final rule was published, the agency published a final rule on July 27, 2009, which requires shorter stopping distances for truck tractors.<sup>14</sup> The availability of improved foundation brakes for tractors, including more powerful S-cam drum brakes and air disc brakes, enabled the agency to reduce both the loaded and unloaded stopping distance requirements for newly manufactured tractors by 30 percent (starting with most tractors manufactured on or after August 1, 2011), compared to the existing FMVSS No. 121 tractor stopping distance requirements. The agency estimated that once all tractors are equipped with improved foundation brakes (which will take a considerable number of years as new tractors are phased into the national fleet), the safety benefits will be 227 fewer fatalities, 300 fewer serious injuries, and \$205M in reduced property damage each year. The new stopping distance requirements in the unloaded condition are particularly relevant to ABS. The old requirement of stopping within 335 feet for an unloaded (bobtail) tractor from 60 mph was a considerably long distance because, during compliance tests, the test driver needed to carefully modulate (apply and release) the brake pedal or only make a very light brake pedal application to keep the drive axle wheels from locking up during the stop. However, now that tractors are required to be equipped

<sup>11</sup> 57 FR 24212.

<sup>12</sup> 58 FR 50738.

<sup>13</sup> 60 FR 13259.

<sup>14</sup> 74 FR 37122.

with ABS, the test driver can simply make a hard brake application and the ABS prevents wheel lockup on the drive axle wheels. Thus, the new stopping distance of 235 feet can be readily achieved without the danger of losing control of the tractor due drive wheel lockup. The ABS plays an important role in achieving shorter stopping distances on tractors, because it allows higher brake torques to improve a loaded tractor's stopping distance, yet also provides for shorter stopping distances in the unloaded condition without wheel lockup. Removing ABS from tractors, or permitting it to be disabled, would not allow reductions in stopping distance to be safely achieved without compromising the ability of the driver to maintain full directional control of the tractor under all loading and road conditions.

In terms of on-the-road stopping distance performance of tractor-trailers, ABS may also improve the stopping distance compared to a driver's best effort on a non-ABS brake system, particularly if the vehicle is not loaded optimally or if the roadway is slippery. For example, a tractor-trailer that is half-loaded with the load placed only in the forward half of the trailer would first experience trailer wheel lockup during hard braking if there was no ABS on the tractor or trailer. In order to prevent the trailer from swinging out of the lane, the driver would need to modulate the brake pedal to alternate between a momentary trailer wheel lockup condition, and an unlocked trailer wheel condition. However, if the tractor and trailer both were equipped with ABS, then the driver could apply the brakes with a higher pressure to take advantage of the greater tire traction available on the heavier-loaded tractor drive axles, and the ABS would prevent the trailer wheels from locking up. Thus, ABS allows the driver to use the peak amount of friction available at each wheel position even though the load at each wheel may vary greatly.

Under ideal loading conditions, such as a fully loaded tractor-trailer on dry pavement, a highly skilled test driver may be able to achieve the shortest possible stopping distance without activating the ABS system by braking the vehicle so that the brake pressure is just below the threshold of wheel lockup. However, on the highways when faced with an imminent crash threat, drivers often make a full brake application, thus engaging the ABS if any wheels are prone to lockup or going into a jackknife or trailer swing on vehicles without ABS. In summary, we believe that trucks equipped with ABS have improved stopping distance

compared to non-ABS trucks when lightly-loaded, and particularly on wet or slippery roads. ABS also provides the driver with an increased level of confidence that he/she can make a hard brake application in crash-threatening situations and still be able to maintain directional control of the vehicle.

The agency reviewed the crash data that were cited in the petition as the basis for requesting to either vacate FMVSS No. 121, or requiring an on-off switch or automatic disabling of the ABS on heavy vehicles at speeds greater than 55 mph. The petition stated that the agency's report on the ABS effectiveness on tractors and trailers showed no statistically significant benefits in reducing fatal truck crashes and that the best estimate of a reduction in all types of crashes by having ABS on the tractor was only three percent. The petition stated that ABS increased overall fatalities by one percent. The agency finds that the overall three percent crash reduction for the data from the seven states correctly reflects the findings in the report, with overall crash reductions ranging between two percent and six percent for each state. Considering the response group of crashes in which ABS was possibly influential in the crash, the reductions in all crash types for ABS tractors ranged between three and ten percent for the seven states, with a median value of six percent, when compared to a control group of vehicles involved in crashes in which ABS would not be likely to be influential.

However, the one percent increase in fatal crashes for ABS tractors cited in the petition is from Table 15, *Reduction in response group crashes for various crash mechanisms, FARS data*. However, as described in the report, those initial FARS results were found to have influences of road locality and speed category, and ambient lighting condition. Thus, the results in Table 23, *Final weighted estimate of tractor ABS effectiveness from FARS*, have been adjusted for control group exposure for roadway type and lighting condition, and indicated an overall four percent reduction in fatal crashes. The confidence intervals of  $-0.7$  percent to 9.0 percent fell short of statistical significance, and therefore it is not an unequivocal confirmation of fatality reduction for tractor ABS. But, the results for the state data and the FARS data both showed reductions in crashes for tractor ABS and this result leads the agency to conclude that ABS is an effective safety system. We therefore disagree with the statement in the petition that ABS on heavy trucks increases fatal crashes; overall, the

analysis shows crash reductions for both fatal and non-fatal crashes.

The petition addresses the effectiveness study's findings on the effect of ABS in selected subgroups of crashes. The agency notes that examination of subgroups is typically an important component of the agency's evaluations. Nevertheless, when the data are limited, as in this case, the results for the various subgroups typically comprise a wide range of positive and negative results, and some of the outlying results may even achieve statistical significance. However, without additional confirmation from other sources, it is not clear if such results are meaningful. They should be considered secondary to the overall effectiveness rating.

The petition cited the subgroup of two-vehicle rear end crashes with the truck as the striking vehicle in Table 20, *Crash reductions for all crash mechanisms by locality and road type, FARS*, where a 30 percent increase in rear end crashes among ABS tractors is shown for roads that are interstate (high speed) and rural. Here again, the petition cites the unweighted FARS results, and the agency considers the values for the weighted FARS data in Table 23 to be more representative of the highway usage for tractors with ABS. The Table 23 results indicated a non-statistically significant 10 percent increase in two-vehicle rear end crashes with the truck as the striking vehicle.

However, this single data result does not convince the agency that there would be any potential safety benefit to disabling the ABS at speeds greater than 55 mph, allowing drivers to disable the ABS, or removing ABS altogether on heavy vehicles. The aggregate of all fatal crash data shows a trend of tractor ABS reducing fatal crashes. Six of the crash subgroups also reflect reductions in crashes among ABS tractors, and two subgroups show increases among ABS tractors. The petition did not address specifically how ABS could be contributing to increases in fatal rear end crashes with the tractor as the striking vehicle, other than the unsubstantiated indirect effect of motor carriers retaining less qualified drivers to drive ABS-equipped tractors.

Furthermore, the state data results in Table 27, *Reductions in all crash mechanisms, age-restricted State data*, indicated that four states showed a reduction in two-vehicle rear end crashes with the truck as the striking vehicle among the ABS tractors, and three states showed increases in these crashes among the ABS tractors. The median value was a one percent reduction in rear end crashes for the

ABS tractors. The agency concludes that the evaluation does not present clear evidence of an overall increase in rear-end crashes among the ABS tractors, but in fact presents some evidence to the contrary.

In summary, since ABS improves vehicle control and stability and may have improved stopping distance performance during panic braking and under other circumstances, the agency is not able to explain why the crash data show an increase in fatal rear end crashes among the ABS tractors with the truck as the striking vehicle. The state data for all types of crashes involving tractor-trailers show decreases in rear end crashes among the ABS tractors in four states while three states show an increase in rear end crashes among the ABS tractors. The answer may not be related to ABS at all. However, the crash data provided no insight into possible relationships between the data and ABS performance in rear end crashes.

The petition stated that "antilock brakes reduce rollovers by preventing truckers from steering to avoid hitting cars" and alluded that this prevention of steering control caused an increase in rear end crashes with the ABS tractors as the striking vehicle. However, the agency finds that ABS prevents wheel lockup during braking so that steering control is maintained. Therefore, because trucks without ABS would not have steering control when the wheels are locked in a panic braking situation, the agency believes that they would be more likely candidates to strike leading vehicles than tractors equipped with ABS. The agency concludes that the petition incorrectly stated that tractor-trailers equipped with ABS do not have steering control; in fact they have improved steering control compared to tractor-trailers without ABS. We note, however, that if the ABS is not maintained in proper working order, it would not provide the improved steering control as designed. That is one reason that a crash data analysis on the basis of year of vehicle manufacture contains some uncertainty regarding the effectiveness of ABS, as was noted in the report.

The petition stated that drivers operating in rural areas should disable their ABS, while drivers operating in urban areas should not. The agency does not believe that it is valid to apply the subgroup results from the data analysis in reaching conclusions about whether ABS should be disabled on roads because of their locality. ABS operates identically on either type of road. There is no technical justification included in the petition explaining how disabling the ABS would reduce crashes, other

than the concept that more highly skilled drivers would be required to be hired to drive trucks. The agency believes that disabling the ABS on heavy vehicles would result in an increase in crashes, based upon the overall results of the ABS effectiveness study. The only technical justification that the agency is aware of for disabling ABS to increase braking performance is to increase wheel lockup on loose surface roads under severe, off-road conditions. We note that this has already been addressed by vehicle manufacturers without the need to completely disable the ABS.

The petition stated that the agency's study was unable to explain the 21 percent increase in single vehicle trucker fatalities observed in 1997 when ABS was mandated, and speculated that this was not directly caused by ABS itself, but due to an unintended side effect of hiring less qualified drivers since ABS reduces the cost of tire damage from lockup of the truck's wheels during panic stops. The agency has not previously analyzed this yearly increase in truck occupant fatalities, and this issue was not investigated in the agency's ABS effectiveness study. However, we have reviewed the data and reached the following conclusions. Table 10, *Vehicle Occupants Killed in Large Truck Crashes by Vehicle Type, 1975-2008*, of the Federal Motor Carrier Safety Administration report *Large Truck and Bus Crash Facts 2008*,<sup>15</sup> does indicate that total truck occupant fatalities in single-vehicle truck crashes increased from 412 in 1996 to 499 in 1997. The agency attributes this mainly due to year-to-year variability in the data (and to a lesser extent, a five percent increase in truck miles travelled from 1996 to 1997<sup>16</sup>), and does not believe it has any direct or indirect relationship to ABS. The overall trend for truck occupant fatalities (considering truck occupant fatalities in both single-vehicle and multi-vehicle fatal crashes) is a reduction from a range of 950 to 1400 truck occupant fatalities each year in the late 1970's, to a range of 600 to 750 truck occupant fatalities each year in the late 1990's. Considering that total vehicle miles travelled by trucks and the number of registered trucks both increased greatly over that time frame, the rate of truck occupant fatalities per 100 million miles of vehicles travelled

by trucks decreased greatly (see, for example, Table 13, *Combination Truck Fatal Crash Statistics, 1975-2008*, in the *Large Truck and Bus Crash Facts 2008* report).

Furthermore, the effective date of March 1, 1997 for truck tractors to be equipped with ABS only applied to newly-manufactured tractors, which would have only made up a small percentage of the total number of tractors on the road by the end of 1997. We do not have production figures for 1997 tractors but assuming that ABS-equipped tractor production was on the order of 100,000 units manufactured between March 1, 1997 and December 31, 1997, they would have constituted less than six percent of the 1,790,000 registered combination trucks on the road in 1997 (plus an additional small unknown percentage of tractors also on the road that were already voluntarily equipped with ABS prior to March 1, 1997). There were few ABS-equipped tractors on the road in 1997 so any positive (or potentially negative) safety effects of ABS would have been minimal during the first year of the ABS mandate for tractors. Thus the agency cannot attribute any ABS effects to the unusual increase in truck occupant fatalities that occurred in 1997.

As to the premise in the petition that the presence of ABS on heavy vehicles causes less-qualified truck drivers to be retained by motor carriers, when those drivers would otherwise have had their employment terminated due to a tractor jackknife crash that could occur with a non-ABS equipped tractor, the agency has no data, nor did the petitioner provide any, to support this claim. However, we believe that it is unlikely that the presence of ABS on a tractor by itself causes less-qualified truck drivers to be hired or retained. Truck driving has many professional aspects including driver physical qualifications; commercial driver's license requirements, including an air brake endorsement to operate air-braked trucks; and the Federal regulations that govern the loading and securing of cargo, vehicle inspections and maintenance.

The petition stated that the petitioner's own calculations showed that ABS probably saved the lives of 12 percent of truckers in 1998, 16 percent in 1999, and 5 percent in 2000. Here again, the agency believes that while tractors on the road were increasingly equipped with ABS as new vehicles entered service after March 1, 1997, there were still many trucks on the road that were not ABS equipped during those years. The details of the petitioner's analysis were not included

<sup>15</sup> Report No. FMCSRA-RRA-10-043, March 2010, available at: <http://www.fmcsa.dot.gov/facts-research/LTBCF2008/Index-2008LargeTruckandBusCrashFacts.aspx>.

<sup>16</sup> See Table 13: Combination Truck Fatal Crash Statistics, 1975-2008, and Table 14: Single-Unit Truck Crash Statistics, 1975-2008, of the FMCSA 2008 Large Truck and Bus Crash Facts report.

in the petition for review so it was not possible for the agency to determine what assumptions were made as to how many trucks on the road were equipped with ABS. In summary, the petition claims that ABS contributed to reductions in truck occupant fatalities during three years (1998 through 2000) but also contributed to increases in truck occupant fatalities in the first year (1997). The agency study of ABS effectiveness did not specifically address how ABS contributed to truck occupant safety (due to the limited amount of available crash data it only reviewed overall increases and reductions in crashes), but since ABS prevents tractor-trailers from losing control under a variety of circumstances the agency believes it is likely that it has reduced injuries and fatalities among truck occupants.

### V. Agency Decision

The agency has reviewed the petition and is denying it. The agency does not plan to initiate rulemaking or other actions to consider removing ABS from heavy vehicles, to consider requiring an on-off switch for the driver to disable the ABS, or to consider requiring the automatic disabling of ABS at speeds greater than 55 mph. The petitioner has not demonstrated that a safety need exists, which would justify removing or disabling ABS on heavy vehicles, or to vacate FMVSS No. 121 or the ABS requirements contained in it. The safety-need basis of the petition included citations of the agency's study on the effectiveness of ABS on tractor-trailers, and a claim that ABS has allowed less-skilled truck drivers to operate trucks. However, citing a subgroup of FARS data where there was an increase in fatal rear-end crashes among ABS tractors on a particular type of roadway (*i.e.*, high-speed rural highways) does not prove by itself, or provide sufficient evidence, that a safety problem with ABS exists. We note that state data indicated reductions in rear-end crashes for ABS tractors in four states and increases in rear-end crashes for ABS tractors in three states. The crash data were not sufficiently detailed, or consistently conclusive, to present clear evidence that ABS causes an increase in rear-end crashes when it is installed on tractors.

The petition cited a slight increase in overall fatal crashes among ABS tractors, but when those data were weighted to account for the effects of road type and lighting condition, the results indicated an overall reduction in fatal crashes. Although this result was not statistically significant, possibly due to the limited amount of available crash data, the results of the study indicated

that ABS is effective in reducing all crashes, with quite possibly a similar effect on fatal crashes. Beyond these data that were cited in the petition, there was the claim that ABS allows incompetent truck drivers to operate trucks. The agency concludes that while there are variations in levels of experience of truck drivers, they all must meet the same qualifications to drive trucks. We do not believe that ABS somehow allows incompetent drivers to drive trucks. The agency notes that, since the ABS final rule was published in 1995, only one ABS functionality problem has been identified related to some trucks operating in severe, off-road conditions. This problem has been resolved by using a modified ABS algorithm to provide an additional amount of wheel lockup at very low vehicle speeds. The vehicle manufacturers can incorporate this feature as needed by switching to a modified ABS wheel slip algorithm when a front drive axle or interaxle locking system is engaged by the driver. The agency is not aware of any other functionality problems with heavy vehicle ABS that would justify disabling it. We conclude that the petition has not demonstrated that there is a safety need or other technical reason that would justify disabling the ABS at highway speeds under any circumstances.

Issued: September 2, 2011.

**Christopher J. Bonanti,**

*Associate Administrator for Rulemaking.*

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## DEPARTMENT OF COMMERCE

### National Oceanic and Atmospheric Administration

#### 50 CFR Part 660

**RIN 0648-BB27**

#### **Fisheries Off West Coast States; Notice of Availability for Secretarial Amendment 1 to the Pacific Coast Groundfish Fishery Management Plan**

**AGENCY:** National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

**ACTION:** Availability of Secretarial amendment to a fishery management plan; request for comments.

**SUMMARY:** NMFS has prepared Secretarial Amendment 1 to the Pacific Coast Groundfish Fishery Management Plan (FMP). Secretarial Amendment 1 would modify the FMP to add an

overfished species rebuilding plan for petrale sole and revise existing overfished species rebuilding plans. In addition, Secretarial Amendment 1 would modify the default proxy values for  $F_{MSY}$  and  $B_{MSY}$  as they apply to the flatfish species, including petrale sole; and the harvest control rule policies. Finally the amendment makes non-substantive changes and updates factual information.

**DATES:** Comments on Secretarial Amendment 1 must be received on or before November 8, 2011.

**ADDRESSES:** You may submit comments on this document, identified by NOAA-NMFS 2011-0207, by any of the following methods:

- *Electronic Submission:* Submit all electronic public comments via the Federal e-Rulemaking Portal <http://www.regulations.gov>. To submit comments via the e-Rulemaking Portal, first click the "submit a comment" icon, then enter NOAA-NMFS 2011-0207 in the keyword search. Locate the document you wish to comment on from the resulting list and click on the "Submit a Comment" icon on the right of that line.

- *Mail:* William W. Stelle, Jr., Regional Administrator, Northwest Region, NMFS, 7600 Sand Point Way NE., Seattle, WA 98115-0070, *Attn:* Sarah Williams.

- *Fax:* 206-526-6736, *Attn:* Sarah Williams.

*Instructions:* Comments must be submitted by one of the above methods to ensure that the comments are received, documented, and considered by NMFS. Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered. All comments received are a part of the public record and will generally be posted for public viewing on <http://www.regulations.gov> without change. All personal identifying information (*e.g.*, name, address, etc.) submitted voluntarily by the sender will be publicly accessible. Do not submit confidential business information, or otherwise sensitive or protected information. NMFS will accept anonymous comments (enter "N/A" in the required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word or Excel, WordPerfect, or Adobe PDF file formats only.

**FOR FURTHER INFORMATION CONTACT:** Sarah Williams (Northwest Region, NMFS), *phone:* 206-526-4646; *fax:* 206-526-6736; and *e-mail:* [sarah.williams@noaa.gov](mailto:sarah.williams@noaa.gov).

**SUPPLEMENTARY INFORMATION:**