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PUBLIC INTEREST COMMENT

FEDERAL MOTOR VEHICLE SAFETY STANDARDS; Electronic Stability Control Systems for Heavy Vehicles RIN 2127–AK97

The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of the impact of regulation on society. As part of its mission, RSP conducts careful and independent analyses employing contemporary economic scholarship to assess rulemaking proposals from the perspective of the public interest. In accordance with the approach of the Mercatus RSP, this comment on the Department of Transportation's (DOT) National Highway Traffic Safety Administration (NHTSA) proposed rulemaking[1] does not represent the views of any particular affected party or special-interest group but is designed to assist the Department of Transportation (DOT) as it seeks to exercise its regulatory function in a coherent manner.

The Mercatus Center Report Card (" Report Card") follows an approach to evaluation used by the Mercatus Center since 2008 to evaluate the quality and use of the Regulatory Impact Analysis (RIA) that is required to be carried out as part of the case for an economically significant proposed rulemaking published by a federal agency.[2] The Report Card identifies key issues and best practices in the regulatory process and highlights issues of concern applying to specific regulations. It evaluates the quality of regulatory analysis, scoring each area on a 0 to 5 scale, but does not evaluate whether the proposed rule is economically efficient, likely to meet fairness considerations, or a good public policy in any other sense. This public interest comment examines the quality of the underlying analysis contained in the proposed rulemaking going beyond the score provided by the Report Card (details of which are attached as an appendix to this comment).

The proposed rulemaking (NPRM) for the *Federal Motor Vehicle Safety Standards; Electronic Stability Control Systems for Heavy Vehicles* received a Report Card score of 33 out of 60, i.e., 55 percent. This is a modest score reflecting underlying problems in the RIA concerning the tendency of engineering analysis to overlook key economic issues, resulting in a poorly focused treatment of the purpose behind the regulatory change. There was also a notable tendency to use extrapolated economic data in a manner that created spurious precision in benefit-cost calculations, which on close inspection are revealed to be cost-effectiveness analyses rather than benefit-cost exercises. In effect, the analysis runs roughshod over the requirement that new federal regulation can be expected

1. Department of Transportation, Federal Motor Vehicle Safety Standards: Electronic Stability Control Systems for Heavy Vehicles, 2012, RIN 2127-AK97, *Federal Register*, 77, 30766-818.
2. Jerry Ellig and Patrick A. McLaughlin, "The Quality and Use of Regulatory Analysis in 2008," *Risk Analysis*, DOI: 10.1111/j.1539-6924.2011.01715.x.

For more information, contact:
Robin Bowen, Regulatory Studies Program, (703) 993-8582, email: rbowen5@gmu.edu
Mercatus Center at George Mason University
3351 North Fairfax Drive, 4th Floor, Arlington, VA 22201

to produce benefits that outweigh costs.[3] It creates an impression that NHTSA has used selected economic data to support a decision already made largely on the basis of safety studies.

INTRODUCTION

NHTSA seeks to establish a new Federal Motor Vehicle Safety Standard (No. 136) that would require electronic stability control (ESC) systems to be fitted as standard on truck tractors and certain passenger buses with a gross vehicle weight rating of greater than 26,000 pounds (vehicles not using air brakes are excluded from the NPRM). ESC systems work by automatically applying computer-controlled braking selectively at separate wheels and inducing lower engine torque output to reduce rollovers and mitigate severe under-steer or over-steer conditions that lead to loss of control in a vehicle. Such systems are widely adopted in passenger and other light vehicles but less so in truck tractors and large buses. Nonetheless, growth in take-up of ESC systems is occurring without a regulatory mandate and, according to its entry in the Federal Register, NHTSA expects that from 2012 on about 26 percent of new truck tractors and 80 percent of new buses will be equipped with ESC systems. It believes that ESC systems would prevent 40 to 56 percent of "un-tripped" rollover crashes (those not connected with an obstacle but related to momentum of the vehicle) and 14 percent of loss-of-control crashes.

One obvious question is whether the industry will adopt ESC just as quickly without the proposed regulation, as seen already in the case of passenger and other light road vehicles: after all, operator liability for tort damages is likely to be reduced by accident-preventing technology. NHTSA needs to show that there is a market failure in the first place and then demonstrate that the proposed regulation is the most efficient way to correct the failure. It is not clear from the NPRM whether NHTSA has considered other influences on un-tripped-rollover and loss-of-control crashes, e.g., road layout, training for driving procedures, and factors causing driver fatigue and technology limiting its effects. It is important to consider all alternatives unless NHTSA is content to present incomplete and therefore misleading evidence that favors selected regulatory change.

NHTSA'S ANALYSIS OF THE DESIRABILITY OF MANDATING ELECTRONIC STABILITY CONTROL SYSTEMS

Broadly, NHTSA reports a series of controlled laboratory experiments examining factors such as vehicle "yaw" ("swinging about," in everyday terms) showing a safety advantage from fitting ESC systems to truck tractor units and large buses. The anticipated improvement in safety drives the conclusion that mandating ESC on new vehicles is a good thing. One way to see that there is a heavy engineering focus behind the conclusion is to note NHTSA's analysis of roll stability control (RSC) as a comparator; RSC is similar to ESC but does not have individual wheel selectivity built into it. Both ESC and RSC are compared using the same key economic variables and assumptions, notably concerning government-issued guidelines on the value of a statistical life[4] and estimates of demand elasticity for truck purchases that are derived from other studies. RSC emerges as less cost effective owing to its lower safety performance. RSC is just a little less costly to fit to a vehicle. Herein lurks a serious issue: The economic data used in the studies are based on numerous assumptions, with little allowance for market responses to technical or regulatory change, and it is not surprising that they do not drive the results of the comparisons. The conclusions in the comparison are mostly determined by engineering analyses covering safety performance.

3. Executive Order 12866, Regulatory Planning and Review, *Federal Register*, Title 3, 58, 51735-51744 is the common reference point for a series of Executive Orders broadly requiring a benefit-cost surplus.

4. The Value of Statistical Life (VSL) is currently approximately $6 million. The VSL has been periodically updated and developments are tracked on the Office of Transportation Policy website, http://ostpxweb.dot.gov/policy.

Much of NHTSA's analysis in the RIA is focused on a requirement that the mandated ESC system meet definitional criteria stated in terms of performance requirements. The stated purpose of standardization in both the RIA and in the NPRM entry in the Federal Register revolves around the claim that developing separate performance tests to cover the wide array of possible operating ranges, roadways, and environmental conditions would be impractical. The definition of the standard is broadly identical to those recommended by SAE International and used by the United Nations (UN) and the Economic Commission for Europe (ECE). This definition requires an ESC system to be one enhancing the stability of a vehicle using a computer-controlled system fed by inputs on a vehicle's acceleration and sway (yaw rate). The system must use the data in applying individual brakes individually and controlling engine torque so as to stabilize the vehicle within set limits. The proposal requires the system to notify a driver of malfunction by means of a warning light or instrument.

The economic data used to inform the comparisons are poorly construed. In stark contrast to NHTSA's laboratory efforts over engineering concerns, economic data are used from many different published sources and already available studies. One might see this as a commendable effort to save costs, but the emphasis in the comparisons is heavily focused on technical matters rather than benefit-cost aspects of safety impacts. Throughout the RIA, references are made to ranges of possible values for such variables as the price elasticity (responsiveness) of demand for truck tractor units, or trends in passenger vehicle sales, with data being extrapolated here, or smoothed out there, to fill gaps as they are encountered.

NHTSA argues that its demonstration of a safety advantage implies it should regulate accordingly. It is a long jump from the observations on laboratory-produced safety data to a public policy conclusion favoring mandatory ESC fitting. Strictly speaking, NHTSA needs to show that there is a market failure in the first place and then go on to demonstrate that regulating the manufacture of vehicles is the efficient way to correct the failure. Simply showing a technical advantage is not enough; it ignores alternative ways of achieving safety improvements, such as those that could be developed based on creating incentives to avoid injuring passengers. As an example, within the current legal system there are incentives to adopt many safety measures, which may be cost-effective methods of accident avoidance because of liability to compensate for damage.[5] Technically, there is an issue in identifying optimality in regulatory policy.

NHTSA states that it completed a benefit-cost analysis of the mandating of ESC system installation, according to its responsibilities under Executive Order 12866,[6] which requires the analysis when regulations have significant economic impacts. The analysis of benefits and costs is very much affected by the uncertain economic data used in the study. Even if the data had been better, NHTSA really should not have claimed more than that it carried out a study of cost effectiveness because its benefit-cost analysis was too simplistic. In the terms used in the entry for the NPRM in the Federal Register and associated RIA,[7] NHTSA defined cost-effectiveness analysis in terms of obtaining a safety benefit at lowest cost, which is broadly correct. It then claimed it carried out benefit-cost analysis in terms of factoring in the benefits of the measures studied and assessing the safety measure with the highest margin of benefit over cost. In fact, the latter type of comparison is still a cost-effectiveness comparison. NHTSA does show that ESC has better properties than a limited range of other options, but in the end, NHTSA is simply saying that ESC is a good safety measure and therefore must be adopted.

5. This claim is based on theoretical prediction and empirical observations. See Landes and Posner, *Economic Structure of Tort Law;* Mark Geistfeld, "Efficiency, Fairness, and the Economic Analysis of Tort Law," in *Theoretical Foundations of Law and Economics* (White, ed.).

6. Executive Order 12866, Regulatory Planning and Review.

7. Preliminary Regulatory Impact Analysis, FMVSS No. 136, Electronic Stability Control Systems on Heavy Vehicles, DOT 2012.

PROBLEMS WITH THE PROPOSAL

The Limited Nature of the Proposal

NHTSA should, but does not, begin its analysis with a thorough assessment of whether there is a need for regulation in the first place. It should then identify a range of possible responses to the perceived problem. Simply showing a technical advantage in adopting a particular safety measure is not enough to support an argument for mandating the installation of the ESC measure or, indeed, to support any measure. In the first place, several unexamined alternative technologies are currently in existence, such as devices that detect driver fatigue or icy conditions, and improved safety procedures, such as enhanced training that covers skid control. The unexplored alternatives could be enhanced or simply adopted more widely and might be considerably more cost effective than the ESC system. The agency starts in the wrong place: NHTSA really needs to begin by identifying a reason why the desirable safety improvement is not being picked up by manufacturers and fleet customers without intervention by the state. Why do we need the regulatory change? Is there a persistent systemic problem that could not be dealt with better by another approach? The focus on a need for regulation in the first place is particularly important because, according to NHTSA's own data, manufacturers *are* increasingly fitting ESC. The obvious question in such circumstances is why regulate at all?

An incentive to encourage the adoption of cost-effective safety measures is, indeed, already actively present in the economy. That overlooked incentive is the avoidance of legal liability for paying compensation for damage.[8] There are, *in general*, many ways in which cost-effective safety measures can be encouraged: for example, relying on after-accident civil liability for compensating damage, establishing an inspectorate with power to enforce standards before accidents occur, or imposing criminal liability for injury using approaches such as laws prohibiting "gross negligence." Examining just one of these possibilities, as with NHTSA's mandatory standards for fitting ESC to trucks and buses, is a seriously inadequate approach to the question of *optimal* regulation. Apparently, we should just trust passenger safety to NHTSA's standard setting.

In reality, the system of liability law has increased in sophistication in recent decades, even to the point of handling claims by dispersed victims of accidents or nuisance.[9] In the case of accidents caused by omitting ESC—for example, a vehicle rollover—it seems likely that victims of accidents would be small groups of people such as passengers on a bus, rather than the highly dispersed victims found in environmental cases, making pursuit of a tort easier than in many cases currently dealt with by the courts.

Why then is liability to compensate for accidents an insufficient incentive to motivate operators in their purchasing decision in relation to safety technology? On the face of it, there does not appear to be an impediment. The technology is valuable and is being incorporated over time as manufacturers look to make their product more attractive to operators who are keen to adopt measures reducing the probability of accidents—and therefore their liability for them. Think of it this way: If you fitted rod brakes[10] to your car in place of the vacuum-assisted hydraulic system that has been standard since the 1950s, you would be seen as negligent in operating the vehicle and more likely to pay damages in the case of a collision. Over time, a technically more efficient braking system has come to be considered appropriate and not having one is seen as negligent. Over time, an expectation has grown for "reasonable care" to encompass better vehicle systems as these have become cost effective in preventing accidents; this

8. See William M. Landes and Richard A. Posner, *Economic Structure of Tort Law; Geistfeld*, "Efficiency, Fairness, and the Economic Analysis of Tort Law," in *Theoretical Foundations of Law and Economics* (White, ed.).

9. The U.S. case illustrating the handling of dispersed damage is *Boomer v. Atlantic Cement*, New York 1970. The scope for class actions also allows dispersed victims to pursue injurers.

10. A system that was common on earlier vehicles, in which connectors of fixed length physically moved the braking devices. Such systems were effective when newly set up but tended to move out of adjustment quickly through wear on linkages.

is exactly the process we can see beginning to emerge around systems like ESC.[11] Given the strong incentive that vehicle owners have to adopt state-of-the-art braking systems, NHTSA needs to demonstrate why these incentives are inadequate before concluding that regulation is necessary.

Engineering Dominates

The engineering data in NHTSA's regulatory impact analysis are much better than the economic data. In this NPRM mandating installation of ESC on truck tractors and passenger buses, NHTSA might as well have restricted its comparisons to the RIA's laboratory studies of the safety impacts. Those safety data tell us all that NHTSA is strictly capable of saying: It has studied crash tests and shown that ESC saves more lives than other forms of stability control, such as RSC. There really is not much else in the proposal: Economic data are drawn uncritically from a range of studies and are applied similarly to convert the effects of alternative safety measures into dollar magnitudes. NHTSA would have come to exactly the same conclusions based on engineering data alone, which is an unsettling observation. While it may be true that engineering and economics could point in the same direction, this cannot be proven with economic data as hazy as those in this RIA.

Standardization

The standardization of ESC systems is heavily focused on keeping NHTSA's administrative costs low in imposing a straightforward standard. One result is the shifting of costs to manufacturers, who might be able to achieve safety improvements using lower-cost means. What suits the administrative agency is not necessarily the best way of supporting a safety improvement. Policy over vehicle management could target safety outcomes: leaving the people on the ground to figure out the best way to meet the target. A more appropriate role for NHTSA might be to provide the engineering information from research carried out in the public interest, although it seems in practice that manufacturers are in fact well aware of safety issues affecting vehicles—as indeed they have the incentive to be. Operators and manufacturers could make their own decisions about adopting technology, for example, knowing that the legal system holds them to an increasingly strict standard of responsibility as the cost of safety technology falls over time.

Cost Effectiveness

NHTSA purports to have carried out a benefit-cost analysis of its intended changes but did not really do this. Indeed, given its poor economic data, it could not in fact carry out one completely. Although the administrative agency considers that it completed a benefit-cost analysis of ESC system adoption, which it appears to do largely because of its responsibilities under Executive Order 12866,[12] it really carried out variations of cost-effectiveness studies. Benefit-cost analysis is not just a matter of factoring in benefits to arrive at the net benefits of a project or, in this case, regulation; this approach is still a cost-effectiveness comparison. In terms of costs versus benefits, we should carry out all projects showing a surplus, unless our financing is limited—which it usually is—implying a much more exhaustive review of options than that carried out in this RIA. NHTSA succeeds only in identifying what it sees as the best option from a limited list of comparators, thereby answering the question of where it expects to find the best bang for your taxpayer buck. Given the poor data underlying the cost-effectiveness study, we cannot be confident that the best option has been identified: NHTSA has not identified the costs and benefits of very many possible approaches to vehicle rollover, so that even the cost-effectiveness results are of limited value.

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11. See Jerry L. Mashaw, "Regulation and Legal Culture: The Case of Motor Vehicle Safety," *Yale Journal of Law*, 1987, vol. 4: 273, footnote 39 for discussion of movement in the case law in relation to NHTSA's earlier standards.
12. Executive Order 12866, Regulatory Planning and Review.

PROBLEMS WITH THE ANALYSIS

There is a marked contrast between the quality of the laboratory work and that of the data on costs, benefits, and market trends. Estimation of the impact of the NPRM on the direct and indirect costs of regulation is substantially missing.

In identifying the outcomes of the proposed rule change, NHTSA seeks to mandate a defined technical standard for ESC mechanisms on truck trailers and most buses. The proposal does not envisage recordkeeping requirements as a result of its adoption, since the regulation is obeyed by the building in of the technology in new vehicles. Vehicle operators will have no choice and are not allowed to achieve similar safety results by other, possibly lower-cost means. No exemptions are permitted. NHTSA expects vehicle costs to increase but does not anticipate major impacts on costs or the purchase of vehicles: a conclusion largely reached by the application of low demand-elasticity estimates to projected cost changes. The theory and empirical support for the theory is not put together well on the economics side as it is far too assumptive and does not establish clear links between shifts in variables and behavioral changes.

The RIA embedded in the proposals does not state how outcomes are to be measured, even though it could easily use safety statistics in the future to determine the frequency of accidents and the extent to which ESC turns out to affect the frequency. Ideally, a controlled statistical examination of the impact of ESC should be carried out. The RIA claims the rule will have a minimal impact on costs and vehicle purchases, but this prediction partly results from adopting low demand-elasticity measures from studies that were not designed to test the specific issues examined by NHTSA in this NPRM. Elasticity refers to the responsiveness of demand to changes in price, and, if this is assumed to be low, then it is hardly surprising that NHTSA's conclusions point to little effect in markets for vehicle sales.

The proposed rulemaking fails to identify a market failure that could justify intervention using a mandated safety standard in trucking and passenger road transport. Conventionally, market failures are considered to result from problems of asymmetric information and noncompetitive elements in markets. The only real claim made in the NPRM is that safety will be enhanced if ESC becomes standard on new vehicles. Yet the industry itself appears to have arrived at a conclusion favoring adoption some years before the NHTSA proposal, as illustrated by the high rates of adoption cited in the RIA and the entry in the Federal Register.

NHTSA does a very good job of identifying the safety impact of the ESC technology. The work on economic impacts is much poorer, and the range of alternative policies is limited to considering what amounts to a variant on ESC: RSC. It cannot be overemphasized that such an approach results in limited cost-effectiveness analysis that is not turned into benefit-cost analysis simply from factoring in benefits. The difference between benefit-cost analysis and cost-effectiveness analysis is that the first approach is—and the second is not—free of resource constraints in adopting all worthwhile projects. At a more detailed level, the NPRM does not do a good job of examining increased expenditures within the operating sectors, nor of the behavioral responses likely to result. We are simply told that such changes are not expected to be significant on the basis of data extrapolated from related studies. NHTSA needs to recognize that the assumptions made concerning responsiveness of markets may be completely misleading; proper estimation of market response is needed.

CONCLUDING COMMENTS

NHTSA creates the impression that it has pursued the mandating of ESC in the case of truck tractor units and large buses almost entirely on the basis of the improvement in safety expected to occur. There is no doubt that the technical issue here is fairly described, but there are many other safety-related improvements that could be encouraged and might be cost effective in saving lives. There is not a strong sense of a link between analysis and

the proposal, which looks as though it is being pushed regardless of the results of the analysis. The economic analysis attached to the NPRM gives the impression that it was designed to support a proposal based entirely on the underlying technology having a positive safety impact. This approach is not in keeping with the requirement that economically significant regulatory changes show a surplus of benefits over costs following a meaningful economic analysis.

NHTSA claims on the basis of its RIA that mandating the installation of ESC systems in new truck trailers and larger passenger buses will lead to safety improvements and therefore is justifiable new regulation. The major difficulty with this argument is that it is fundamentally based on an engineering analysis of safety impacts rather than a substantial study of the relevant safety economics. The RIA operates in a vacuum where the impetus toward spontaneous adoption of the technology, although noted by NHTSA, is ignored. It is as if manufacturers and operators have no incentive to adopt safety measures, even though the RIA notes that adoption is occurring.

The NPRM for ESC systems does not present compelling evidence that favors the mandating of ESC systems on trucks and large buses. The reader is carried along from extensive laboratory trials to economic data drawn from studies carried out for other purposes: a kind of "bait and switch." From an economics perspective, the major issue is a failure to establish an initial market failure necessitating regulation in the first place. This inappropriate approach is linked to an over-assessment of the strength of the case for mandating ESC systems for truck tractors and passenger buses that results from confusing benefit-cost and cost-effectiveness elements in the RIA.

In examining the arguments put forward in the NPRM, based on the RIA, the question must be: What is the problem with simply allowing the observable trend toward adoption of ESC, or other safety enhancing alternatives, to continue at its own pace? A serious, evidence-based answer to that question may reveal that no regulation is needed, or it may identify a genuine problem that NHTSA could solve with more focused regulation.

APPENDIX

Regulatory Scoring

AGENCY: DOT

RULE TITLE: Federal Motor Vehicle Safety Standards; Electronic Stability Control Systems for Heavy Vehicles

RIN: 2127–AK97

RIA SEPARATE? Yes

STAGE: NPRM

PUBLICATION DATE: 5/23/12

RULE SUMMARY:
Regulation establishes a new Federal Motor Vehicle Safety Standard No.136 to require electronic stability control (ESC) systems on truck tractors and certain buses with a gross vehicle weight rating of greater than 11,793 kilograms (26,000 pounds). Electronic Stability Control systems in truck tractors and large buses are designed to reduce untripped rollovers and mitigate severe understeer or oversteer conditions that lead to loss of control by using automatic computer-controlled braking and reducing engine torque output.

COMMENTARY:
The standard is recommended based on a benefit-cost study of three different command-and-control options without any serious discussion of why all heavy vehicles have not previously come equipped with Electronic Stability Control technology in recent years or why the industry would not have evolved to make this technology the norm or even come up with better technology. The NPRM has an engineering focus and does not address behavioral responses particularly well.

OPENNESS	SCORE	COMMENTS
1. How easily were the RIA, the proposed rule, and any supplementary materials found online?	4	1A
2. How verifiable are the data used in the analysis?	3	1B
3. How verifiable are the models and assumptions used in the analysis?	3	1C
4. Was the Regulatory Impact Analysis comprehensible to an informed layperson?	3	1D
Total Openness (Sum of 1-4)	13	

ANALYSIS	SCORE	COMMENTS
5. How well does the analysis identify the desired outcomes and demonstrate that the regulation will achieve them?	3	2A
6. How well does the analysis identify and demonstrate the existence of a market failure or other systemic problem the regulation is supposed to solve?	1	2B
7. How well does the analysis assess the effectiveness of alternative approaches?	3	2C
8. How well does the analysis assess costs and benefits?	4	2D
Total Analysis (Sum of 5-8)	11	

USE	SCORE	COMMENTS
9. Does the proposed rule or the RIA present evidence that the agency used the Regulatory Impact Analysis?	3	3A
10. Did the agency maximize net benefits or explain why it chose another alternative?	4	3B
11. Does the proposed rule establish measures and goals that can be used to track the regulation's results in the future?	1	3C
12. Did the agency indicate what data it will use to assess the regulation's performance in the future and establish provisions for doing so?	1	3D
Total Use (Sum of 9-12)	9	
TOTAL SCORE	**33**	

OPENNESS

Criterion	Score	Com. No.	Comment
1. How easily were the RIA, the proposed rule, and any supplementary materials found online?	4	1	Proposed rule, but not the PRIA, came up immediately on regulations.gov. RIA came up immediately upon search at DOT.gov and on NHTSA.gov .
2. How verifiable are the data used in the analysis?	3	2	Data are mostly documented by naming studies. Safety impacts based on commissioned research (e.g., U of Mich., U of Iowa, Va. Tech) and reports available. CBA data are more assumptive but based on 2009 Value of Statistical Life (VSL) guidelines.
3. How verifiable are the models and assumptions used in the analysis?	3	3	Models and assumptions are clearly laid out with references to many relevant studies. Yaw rates and so forth are detailed for the FR reader along with test maneuvers.
4. Was the analysis comprehensible to an informed layperson?	3	4	Complex models detracted from readability even if the conclusions were clear; models quite complex; engineering approach.

ANALYSIS

	Score	Com. No.	Comment
5. How well does the analysis identify the desired outcomes and demonstrate that the regulation will achieve them?	3		
Does the analysis clearly identify ultimate outcomes that affect citizens' quality of life?	4	5A	Analysis identifies reduction in target rollover and LOC (loss of directional control) crashes as a result of the regulation. Proposal results in monetary savings as a result of prevention of property damage, travel delays, and value of life (VSL used) saved. No fuel impact expected; elasticity calculations in RIA for impact on trucking costs and demand for freight services. Modest attention to regulatory management costs reduces score here.
Does the analysis identify how these outcomes are to be measured?	4	5B	Agency believes ESC systems could prevent 40 to 56 percent of untripped rollover crashes and 14 percent of loss-of-control crashes. By requiring that ESC systems be installed on truck tractors and large buses, this proposal would prevent 1,807 to 2,329 crashes, 649 to 858 injuries, and 49 to 60 fatalities. Also measures travel delay and damage savings.
Does the analysis provide a coherent and testable theory showing how the regulation will produce the desired outcomes?	3	5C	Based on 2006-2008 General Estimates System (GES) and Fatality Analysis Reporting System (FARS), annually, truck tractors and large buses were involved in 201,600 crashes (198,800 non-fatal and 2,800 fatal crashes). These crashes caused 3,721 fatalities and 60,400 non-fatal police-reported injuries. Of these truck tractor and large bus crashes, 13,200 crashes (5,700 first event rollover and 7,500 LOC crashes) would be reduced in impact by the proposal. Consequently, the proposal would potentially further reduce the 415 fatalities and 5,400, non-fatal police-reported injuries that were associated with these rollover and LOC crashes. Surprisingly, there is little to no mention of driver error such as fatigue, or other factors, as possible causes of crashes. Well quantified in its engineering, but many rebuttable assumptions enter, especially cost-benefit projections over population.

Does the analysis present credible empirical support for the theory?	3	5D	Rollover and LOC crashes made up a significant portion of truck tractor and bus crashes. In 2006, NHTSA initiated programs to evaluate performance of heavy vehicle stability control systems and to develop objective test procedures and performance measures. NHTSA concluded evidence demonstrates ESC is a crash avoidance countermeasure that would prevent crashes. The Agency tentatively determined that ESC systems can be 28 to 36 percent effective in reducing first-event untripped rollovers and 14 percent effective in eliminating loss-of-control crashes caused by severe oversteer or understeer conditions. Surprisingly, there is little to no mention of driver error such as fatigue as causal factors behind crashes.
Does the analysis adequately assess uncertainty about the outcomes?	2	5E	Benefits for target rollover crashes are presented as a range from using a range of ESC effectiveness against the target rollover crashes. By contrast, at the time of publication, there is only one available effectiveness estimate for LOC. Therefore, benefits for LOC are presented as a single point estimate. Considers a range of results from lab-type research. Does not have a keen sense of possibility of random events or changes in freighting unrelated to vehicle rollover.
6. How well does the analysis identify and demonstrate the existence of a market failure or other systemic problem the regulation is supposed to solve?	1		
Does the analysis identify a market failure or other systemic problem?	1	6A	Analysis does not directly identify or discuss a market failure problem but indirectly implies too few vehicles are equipped with ESC technology. No discussion of why so many more cars are equipped with EST technology than heavy trucks and buses. Seems determined to support adoption of ESC rather than analyzing need for regulation.
Does the analysis outline a coherent and testable theory that explains why the problem (associated with the outcome above) is systemic rather than anecdotal?	1	6B	Analysis does point out that more vehicles are being equipped with ESC but does not explain why this trend is insufficient to remedy the supposed market failure. Coherency therefore lacking.
Does the analysis present credible empirical support for the theory?	1	6C	Analysis presents credible evidence that ESC technology results in fewer crashes, does not directly address what is the optimal level of ESC adoption, and indirectly assumes that it is 100 percent since this is what the regulation proposes.
Does the analysis adequately assess uncertainty about the existence or size of the problem?	0	6D	Estimates percentages of vehicles without ESC technology that would be affected by regulation but does not assess it as a range of percentages. Focus is on certainty.
7. How well does the analysis assess the effectiveness of alternative approaches?	3		
Does the analysis enumerate other alternatives to address the problem?	3	7A	The proposal examines three alternatives, including the proposal. Alternatives proposed require less-expensive RSC technology but are variants on stability control.
Is the range of alternatives considered narrow (e.g., some exemptions to a regulation) or broad (e.g., performance-based regulation vs. command and control, market mechanisms, nonbinding guidance, information disclosure, addressing any government failures that caused the original problem)?	2	7B	All are command-and-control regulations. No discussion of insurance premiums, fines, or other incentive-structured ways that might reduce crashes.

Does the analysis evaluate how alternative approaches would affect the amount of the outcome achieved?	4	7C	Yes.
Does the analysis adequately address the baseline? That is, what the state of the world is likely to be in the absence of federal intervention not just now but in the future?	3	7D	Projected model year 2012 installation rates serve as baseline compliance rates, and NPRM assumes these ESC-equipped vehicles would all comply with the proposed test. Benefits and costs of the proposal reflect increasing ESC installation rates from 26 percent in truck tractors and 80 percent in large buses to 100 percent in both vehicle types. Although analysis indicates that more vehicles have been equipped with ESC technology over time, this analysis assumes all will be in compliance when the regulation takes effect. Baseline is an extrapolation showing continued adoption at current rates rather than modeled or tested profile.
8. How well does the analysis assess costs and benefits?	4		
Does the analysis identify and quantify incremental costs of all alternatives considered?	4	8A	The ESC system cost is estimated to be $1,160 (in 2010 dollars) per vehicle, which includes all the components for ESC and the ESC malfunction telltale. The total incremental cost of the proposal (over the MY 2012 installation rates and assuming 150,000 unit truck tractors and 2,200 large buses sold per year) is estimated to be $113.6 million to install ESC and malfunction indicator lamps. The average incremental cost is estimated to be $746 per vehicle. Similar cost estimates are made relating to two alternatives to the ESC proposal.
Does the analysis identify all expenditures likely to arise as a result of the regulation?	3	8B	Adoption of ESC technology is estimated for case of 100 percent adoption and compliance, but direct costs of regulation inadequately considered as there is no attention to the administrative agency's costs of running the regulation.
Does the analysis identify how the regulation would likely affect the prices of goods and services?	2	8C	Costs are assumed to be entirely passed onto buyers of new vehicles, but analysis does not indicate if buyers of vehicles will pass on their costs to their customers. Discusses change using a range of elasticity measures for vehicle costs and freight use, but "identify" is a bit too strong a description. "We don't have a specific elasticity for large buses."
Does the analysis examine costs that stem from changes in human behavior as consumers and producers respond to the regulation?	2	8D	NHTSA believes costs are insignificant, thus leading to little to no behavioral changes other than perhaps lowering new vehicle sales by less than 400 units. Annual basis for calculations is itself a giveaway that behavioral changes neglected.
If costs are uncertain, does the analysis present a range of estimates and/or perform a sensitivity analysis?	4	8E	Range of costs (e.g., incremental ESC and ESC) are estimated under two discount rates, different relative fatality ratios, and low and high estimates. Alternative engineering assumptions explored. Loss of control impacts effectively treated as certain: "at the time of publication, there is only one available effectiveness estimate for LOC."
Does the analysis identify the alternative that maximizes net benefits?	4	8F	The proposed rule exhibits the largest net benefit range of the three alternatives, but benefit calculations are poor owing to the use of economic variables borrowed from other studies.
Does the analysis identify the cost-effectiveness of each alternative considered?	5	8G	Range of net cost per equivalent life saved are shown for proposed regulation and for two alternatives not proposed; Alternative 1 is slightly more cost-effective and lower in total costs than the proposal, but would save fewer lives and accrue lower net benefits. Alternative 2 would save even fewer lives than Alternative 1 and is significantly less cost-effective than both the proposal and Alternative 1 and would produce negative net benefits. Really a cost-effectiveness study anyway and so better here.

Does the analysis identify all parties who would bear costs and assess the incidence of costs?	4	8H	Reasonably comprehensive in identifying impacts on manufacturers, operators, and users such as bus passengers. The agency assumes costs fully passed on to consumers, which are trucking companies and bus transit companies of vehicles. Agency believes additional cost per vehicle of $1,160 for ESC is a business expense having little bearing on the demand for new trucks or large buses. The added weight from ESC, which consists primarily of electronic sensors and wiring, is insignificant relative to the 11,793 kg (26,000 pounds) plus weight of the truck tractors and large buses. Consequently, the increase in fuel use is considered to be negligible. Compliance costs are assumed to not exert a significant impact on a significant number of small businesses.
Does the analysis identify all parties who would receive benefits and assess the incidence of benefits?	4	8I	Reasonably comprehensive and identifies impacts on manufacturers, operators, and users such as freight customers: examines saved lives, reduced property damage, and travel delay associated with crashes. Overall, the rule would save $13.9 to $17.8 million at a 3 percent discount rate or $11.0 to $14.1 million at a 7 percent discount rate in property damage and travel delay. The proposal is expected to have positive economic impacts on ESC manufacturers.

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Criterion	Score	Com. No.	Comment
9. Does the proposed rule or the RIA present evidence that the agency used the analysis?	3	9	PRIA has been used by agency to choose proposed regulation over two other options, but there is a sense of pressing on from the finding that electronic stability control saves lives to the conclusion that it should be mandated.
10. Did the agency maximize net benefits or explain why it chose another alternative?	4	10	Its proposed rule is the one with highest net benefits of the three considered; however, options other than command-and-control were not considered, thus bringing into question if it chose the optimal regulation. Benefit cost analysis poor in places though.
11. Does the proposed rule establish measures and goals that can be used to track the regulation's results in the future?	1	11	The rule requires manufacturers to equip their vehicles with ESC and to certify that their products comply with the standard. PRIA states that there is no record keeping for this proposal. However, agency should be able to examine if perfect compliance results in significant reduction in crashes over time. But nothing explicit here.
12. Did the agency indicate what data it will use to assess the regulation's performance in the future and establish provisions for doing so?	1	12	No mention, but data will be available for a retrospective evaluation.