COMPETITIVE ENTERPRISE INSTITUTE

OnPOINT

March 29, 2017 **No. 225**

Toward Performance-Based Transportation Safety Regulation

Focus on Results Instead of Rigid Rules to Improve Safety and Promote Innovation

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Businesses and entrepreneurs have long complained about having to comply with unnecessarily rigid regulations that stress adherence to administrative rules rather than performance-based regulations, which focus on results. In recent decades politicians from both major parties have attempted to prioritize regulatory outcomes over detailed prescription and compliance, with varying degrees of success. In 1993, President Bill Clinton issued Executive Order 12866, which instructed regulatory agencies to "specify performance objectives, rather than specifying the behavior or manner of compliance that regulated entities must adopt."[1] This performance-based approach was retained by President George W. Bush and reaffirmed in 2011 by President Barack Obama through Executive Order 13563.[2]

The bipartisan recognition that prescriptive safety regulations can inhibit both economic growth and the achievement of regulatory outcomes has remained fairly constant. However, this progress has been far from uniform at the Department of Transportation. One mode largely left out of this trend has been freight rail. Recent actions by the Federal Railroad Administration highlight the need for continuing the kind of movement toward performance-based regulation we have seen for autos, pipelines, aircraft, trucks, and passenger rail.

Recent Movements toward Performance-Based Safety Standards Bypass Freight Rail. Performance-based safety regulation, defined succinctly, is an "approach that focuses on desired, measurable outcomes, rather than prescriptive processes, techniques, or procedures."[3] Prescriptive regulations, by contrast, specify the means of compliance, often through detailed design or operating standards that preclude alternative compliance methods, even if those alternatives produce superior outcomes at lower costs. In light of uneven progress being made by its child agencies, the Department of Transportation should develop a holistic performance-based regulatory philosophy that covers all modes.

Autos. In the auto safety realm, performance-based regulations are administered by the National Highway Traffic Safety Administration (NHTSA). One example is Federal Motor Vehicle Safety Standard (FMVSS) 208, which requires manufacturers to install airbags in their vehicles.[4] This mandate does not specify the particular design of the inflatable restraint system to be installed. Instead, it imposes impact force requirements that are then validated using crash-test dummies. The specific means of compliance is left to the manufacturer.

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Prescriptive rules, in addition to being more onerous for the regulated entities, often produce additional social costs by hindering innovation. One recent example involves automobile rear and side-view mirrors. New camera and sensor technologies can obviate the need for rearview mirrors by either replacing the mirrors' viewing function with superior cameras or by eliminating the need for driver viewing by automating the driving function. But FMVSS 111 currently requires that all passenger cars have side-view mirrors on both the driver and passenger side and rearview mirrors inside.[5]

In November 2015, Google requested an interpretation of FMVSS 111 from the NHTSA Office of Chief Counsel. Google had developed a full self-driving automobile and was asking about the possibility of alternative rearview mirror compliance with sensors, as the Google prototype eliminated the need for human driver monitoring. In February 2016, NHTSA's chief counsel replied saying that under current law, "it cannot interpret Google's [self-driving vehicle] as compliant with these standards and requirements. This would need to be undertaken through rulemaking."[6]

NHTSA did entertain the possibility of Google obtaining an exemption in the future from FMVSS 111, but such an exemption would not permit large-scale production and deployment, as current law caps exemptions at 2,500 units per year for two years.[7] That same month, NHTSA favorably interpreted FMVSS 111 as permitting the inside rearview mirror to double as a rearview camera display, but this permits cameras and driver displays only as supplements to mirrors, not replacements.[8]

Despite some prescriptive elements, U.S. auto safety regulations have generally been characterized as performance-based standards, particularly crashworthiness standards. The more prescriptive transportation safety regulations were generally found in the pipeline, aviation, trucking, and railroad regulatory regimes.

Pipelines. The pipeline industry has long criticized safety regulations covering it as excessively prescriptive. Supporters of stricter, less flexible standards such as environmental groups often argue that transport of hazardous materials via pipeline presents heightened risks that, coupled with a paucity of risk information, justify onerous compliance requirements. The first national pipeline safety regulations were established under the Natural Gas Pipeline Safety Act of 1968, which created the Office of Pipeline Safety (OPS) within the Department of Transportation.[9] Subsequent legislation amended the statute to cover liquid pipelines.[10] In 2004, the Pipeline and Hazardous Materials Safety Administration was created to provide pipelines and hazardous materials with a dedicated safety administration.[11]

Recent decades have seen a shift toward performance-based pipeline safety regulations, but this is not without controversy.[12] The Transportation Research Board of the National Academies recently convened a study committee to evaluate performance-based pipeline safety regulations.[13]

Aircraft. Similar to those for pipelines, aviation safety rules have long been highly prescriptive. Fortunately, the Obama administration and Congress began seeking ways to

reform the Federal Aviation Administration's (FAA) certification regulations in a more performance-based direction. In an October 2015 speech at a Flight Safety Foundation meeting, FAA Administrator Michael Huerta told the audience of the FAA's latest step toward a performance-based regulatory approach:

> So the FAA and industry began implementing Safety Management Systems, which are designed to identify hazards, assess the risks from those hazards, and put measures in place to mitigate those risks. This is the core of what we call our Risk-Based Decision Making Initiative.
>
> Now we're taking our Risk-Based Decision Making initiative to the next level through what we are calling the Compliance Philosophy.
>
> The Compliance Philosophy is the latest step in the evolution of how we work with those we regulate. It focuses on the most fundamental goal: find problems in the National Airspace System before they result in an incident or accident, use the most appropriate tools to fix those problems, and monitor the situation to ensure that they stay fixed.
>
> The Compliance Philosophy recognizes that what we all want is that everyone complies with aviation's high safety standards. It recognizes that most operators voluntarily comply with both the rules and the core principles of a Safety Management System. It also recognizes that in today's complex aviation environment, even the best operators make honest mistakes. But even unintentional errors can have a serious adverse impact on aviation safety, so we have to fix the problem.
>
> So, in cases where a deviation results from factors such as flawed procedures, simple mistakes, lack of understanding, or diminished skills, we use tools like training or documented improvements to procedures to ensure compliance.[14]

Administrator Huerta's remarks represented the FAA's most explicit public about-face on heavy-handed enforcement of aviation regulations. In fact, the FAA recognized that with an industry seeing rapid uptake of new technologies, a less adversarial and more collaborative, data-intensive approach was needed. New technologies, such as small unmanned aircraft systems, did not exist when the agency drafted its longstanding safety regulations. Applying rigid and complex airworthiness regulations to these low-cost, low-mass, geographically-constrained, nontraditional aircraft makes little sense in light of the reduced risks they present to aircraft and to people on the ground.

Rulemakings related to the integration of small unmanned aircraft systems into the nation's airspace remain in their early stages. But in keeping with its modest movement toward performance-based standards, in December 2016 the FAA published a final rule replacing its prescriptive airworthiness regulations (14 C.F.R. Part 23) for "normal, utility, acrobatic, and commuter category airplanes,"[15] a move applauded by small aircraft manufacturers and

one they expect to speed the regulatory approval of new aircraft designs and the introduction of new technologies.[16]

Trucking. Prescriptive trucking safety regulation overseen by the Federal Motor Carrier Safety Administration (FMCSA) has long been a source of controversy within industry, the agency, and Congress. For example, over the past decade, the industry, unions, and self-styled safety advocates have battled over driver hours-of-service regulations. In 2015, the Trucking Rules Updated by Comprehensive and Key (TRUCK) Safety Reform Act was introduced in the Senate to move the FMCSA toward a performance-based regulatory approach.[17] However, the dispute over the FMCSA's prescriptive safety regulations continues.

Rail. The railroad industry was the first nationally regulated sector in the United States, subject to oversight by the Interstate Commerce Commission (ICC) beginning in 1887.[18] In 1995, the ICC was replaced by the less aggressive Surface Transportation Board as the railroads' economic regulator.[19] Safety oversight is provided by the Federal Railroad Administration (FRA), which has been highly prescriptive in its approach. Unlike many modern safety regulators, the FRA has been slow to adopt performance-based alternatives.

Labor unions and their political allies have a long history of manipulating railroad labor laws and regulations to their benefit, particularly with respect to workplace rules.[20] Perhaps the most notorious historical example is the case of firemen, whose job it was to maintain steam pressure by shoveling coal into the boiler. That job persisted for decades after the transition to diesel engines because of featherbedding union contracts under the Railway Labor Act.

However, one recent bright spot is the FRA's proposed rule on alternative compliance for passenger train equipment safety standards.[21] The proposed performance-based rule would allow passenger railroads to purchase railcars that comply with crash standards using crash-energy management technology—crumple zones designed to absorb the energy of a crash—that has been deployed successfully by rail systems throughout Europe.[22]

Currently, U.S. passenger railcars must meet crashworthiness requirements related to railcar integrity, engineer seat integrity, and anticlimbing mechanisms to prevent telescoping—the deadly phenomenon in which a railcar "climbs" into the railcar in front of it when a crash suddenly halts a train's forward movement.[23] The assumption behind these prescriptive rules is that the railcar should remain rigid from end to end upon impact, as opposed to crumpling at the ends to absorb the crash energy.

These outmoded regulations greatly increase the weight and bulk of U.S. railcars and prohibit railroads from purchasing foreign railcars off the shelf, increasing costs and perversely increasing crash risks, as heavier railcars take longer to decelerate.[24]

However, this new enthusiasm for performance-based regulations at the FRA has not been extended to freight rail. Given that freight rail crashes generally pose far lower risks to

human life, there is no reason the FRA should not pursue similar changes to freight rail safety regulations that allow superior and less costly alternative methods of compliance.

Advancing Freight Rail Performance-based Safety Reform. As noted, the Federal Railroad Administration, to its credit, appears willing to adopt badly needed performance-based safety regulatory reforms for the passenger rail industry. And some FRA freight rail safety regulations can be characterized as performance-based. For example, FRA rail inspection rules set performance targets for track owners, specifying maximum service failure rates for Class 3, 4, and 5 track that vary based on movement characteristics.[25] Similarly, many elements of the FRA's Part 237 bridge safety standards grant a significant amount of compliance flexibility to railroad bridge engineers in developing bridge management programs.[26]

Unfortunately, recent rulemaking actions from the FRA suggest the agency has yet to adopt a comprehensive performance-based regulatory philosophy. In March 2016, with the support of railroad unions, the FRA proposed a rule that would require that all trains maintain at least two crew members at all times.[27]

Thanks to the advance of dieselization, automatic air brakes, and improved communications technology—which resulted in the eventual elimination of the firemen and brakemen positions aboard trains—most U.S. freight trains have been operated by two crew members: a conductor and an engineer. In 2008, following the collision of a Metrolink commuter train and a Union Pacific freight train in Los Angeles that resulted in 25 fatalities, Congress enacted the Rail Safety Improvement Act.[28] The law included a provision mandating the installation of positive train control (PTC). Formally mandated by the FRA in 2010, PTC harnesses improved communications and automation technology in an attempt to reduce the safety risks associated with operator error.[29]

In a world of increasing automation, mandating a two-person crew makes little sense. Automakers are currently developing fully automated vehicles, ranging from taxis to heavy trucks. NHTSA has been broadly supportive of these efforts and even conducted an audit of existing federal motor vehicle safety standards that may conflict with advances in automation.[30] Yet, the FRA is effectively proposing to forgo the future benefits of fully automated trains. Railroads have little incentive to invest in labor-savings and safety-enhancing automated train technology if they are greatly restricted from reducing crew sizes.[31]

One positive step would be to enact legislation similar to the TRUCK Safety Reform Act, which was aimed at moving trucking safety regulation toward a performance-based philosophy. This bill, which was taken up during the 114th Congress, included the following provisions that could easily be exported to an FRA reform bill:

- Every five years, the Federal Motor Vehicle Safety Administration must conduct a comprehensive review of all rules, guidance, and enforcement policies.
- Following each review, the agency must produce a publicly available report providing a complete inventory of the above policies and a determination as to

whether or not the policies are consistent, necessary, and reflective of the current state of the motor carrier industry.

- In its evaluations of its administrative policies and enforcement, the agency must explain how it plans to measure the intended outcomes of future regulations, while allowing regulated entities to submit comments showing how a performance-based rule could better achieve the stated intended outcomes.
- Benefit-cost analysis of new rules shall be subject to an independent peer review by a panel of experts.[32]

This framework could be further strengthened by requiring the FRA to adopt a performance-based regulatory approach across the board.

Conclusion. The Department of Transportation has achieved a number of important regulatory modernization milestones in recent years. However, the transition from prescriptive regulations toward performance-based standards has been inconsistent across the Department's sub-agencies. This is particularly true with respect to freight rail, which has not enjoyed much of the new flexibility offered to other modes of transportation. In some respects, the agency is moving backwards. The two-person crew rule should be withdrawn, but its having been proposed in the first place indicates broader regulatory reform is needed at the FRA.

Congress and the administration should directly address the FRA's continuing adherence to a prescriptive regulatory philosophy and work to establish goals and oversight for the Department of Transportation to achieve consistent adherence to a performance-based, outcome-focused regulatory philosophy among all its sub-agencies.

Notes

[1] Executive Order No. 12866, 3 C.F.R. 638 (1993).
[2] Executive Order No. 13563, 3 C.F.R. 215 (2011).
[3] U.S. Nuclear Regulatory Commission, "Performance-based regulation," NRC Glossary, https://www.nrc.gov/reading-rm/basic-ref/glossary/performance-based-regulation.html.
[4] 49 C.F.R. § 571.208.
[5] 49 C.F.R. § 571.111.
[6] Letter to Chris Urmson from Paul A. Hemmersbaugh, NHTSA Chief Counsel, February 4, 2016, https://isearch.nhtsa.gov/files/Google%20--%20compiled%20response%20to%2012%20Nov%20%2015%20interp%20request%20--%204%20Feb%2016%20final.htm.
[7] 49 U.S.C. § 30113.
[8] Letter to Brian Latouf from Paul A. Hemmersbaugh, NHTSA Chief Counsel, February 22, 2016, https://isearch.nhtsa.gov/files/Full%20Display%20Mirror%20System%201%20GM%20Feb%2011.htm.
[9] Natural Gas Pipeline Safety Act of 1968, Pub. L. 90–481, 82 Stat. 720 (August 12, 1968).
[10] Hazardous Liquid Pipeline Safety Act of 1979, Pub. L. 96–129, 93 Stat. 989 (November 30, 1979).
[11] Norman Y. Mineta Research and Special Programs Improvement Act of 2004, Pub. L. 108–426, 118 Stat. 2423 (November 30, 2004).
[12] Johanna Dolle, Bridget Faust, and Tyge Larsen, "Evaluating the Applicability of Performance-Based Regulations to High-Hazard Industries," presentation to the Transportation Research Board of the National Academies' Committee for a Study of Performance-Based Safety Regulation, July 2016, http://onlinepubs.trb.org/onlinepubs/PBRLit/Moynihan.pdf.

[13] Committee for a Study of Performance-Based Safety Regulation, Transportation Research Board of the National Academies, http://www.trb.org/PolicyStudies/PBR.aspx.
[14] Remarks of FAA Administrator Michael Huerta before the Flight Safety Foundation Media Breakfast, October 6, 2015, https://www.faa.gov/news/speeches/news_story.cfm?newsId=19554.
[15] Federal Aviation Administration, "Revision of Airworthiness Standards for Normal, Utility, Acrobatic, and Commuter Category Airplanes," *Final Rule*, 81 Fed. Reg. 96572 (December 30, 2016).
[16] Sandy Murdock, "Why Did It Take So Long for the FAA to Go from This to This," JDA Journal, December 20, 2016, http://jdasolutions.aero/blog/faa-rulemaking-speed/.
[17] TRUCK Safety Reform Act, S.1669, 114th Congress (2015).
[18] Interstate Commerce Act, Pub. L. 49–41, 24 Stat. 379 (February 4, 1887).
[19] ICC Termination Act of 1995, Pub. L. 104–88, 109 Stat. 803 (December 29, 1995).
[20] Morgan O. Reynolds and D. Eric Schansberg, "At Age 65, Retire the Railway Labor Act," *Regulation*, Vol. 14, No. 3 (Summer 1991), https://object.cato.org/sites/cato.org/files/serials/files/regulation/1991/7/v14n3-8.pdf.
[21] Federal Railroad Administration, "Passenger Equipment Safety Standards; Standards for Alternative Compliance and High-Speed Trainsets," *Notice of Proposed Rulemaking*, 81 Fed. Reg. 88006 (December 6, 2016).
[22] David Edmondson and Marc Scribner, "Reducing Passenger Train Procurement Costs: The FRA's Outmoded Safety Regulations Should Be Repealed," *OnPoint* No. 183, Competitive Enterprise Institute, June 5, 2013, https://cei.org/onpoint/reducing-passenger-train-procurement-costs.
[23] Ibid., pp. 2-3.
[24] Ibid., p. 1.
[25] 49 C.F.R. § 213.237. For definitions and examples of track classifications, *see* Kevin P. Keefe, "Track classifications," *Trains*, May 1, 2006, http://trn.trains.com/railroads/abcs-of-railroading/2006/05/track-classifications.
[26] 49 C.F.R. Part 237.
[27] Federal Railroad Administration, "Train Crew Staffing," *Notice of Proposed Rulemaking*, 81 Fed. Reg. 13917 (March 15, 2016).
[28] Rail Safety Improvement Act of 2008, Pub. L. 110–432, 122 Stat. 4848 (October 16, 2008).
[29] Federal Railroad Administration, "Positive Train Control Systems," *Final Rule*, 75 Fed. Reg. 2597 (January 15, 2010).
[30] Anita Kim, David Perlman, Dan Bogard, and Ryan Harrington, "Review of Federal Motor Vehicle Safety Standards(FMVSS) for Automated Vehicles," *Preliminary Report*, prepared for the Intelligent Transportation Systems Joint Program Office, National Highway Traffic Safety Administration, March 2016, https://ntl.bts.gov/lib/57000/57000/57076/Review_FMVSS_AV_Scan.pdf.
[31] Marc Scribner, "DOT Compromises Safety and Efficiency for Union Favoritism," Competitive Enterprise Institute blog, March 14, 2016, https://cei.org/blog/dot-compromises-safety-and-efficiency-union-favoritism.
[32] TRUCK Safety Reform Act.