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BARRIERS TO INNOVATION AND AUTOMATION IN RAILWAY REGULATION

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EXECUTIVE SUMMARY

Every day, the United States becomes more dependent on the timely delivery of vital goods and materials carried on the nation’s rails. With that demand, the trains that haul these goods to all corners of the country are being subjected to ever-increasing pressure to satisfy consumer expectations. Fortunately, the U.S. rail industry and the multi-billion dollar infrastructure it supports¹ is well positioned to capture the benefits of new technologies that will automate systems to improve safety and provide better value to consumers.

Yet, obstacles to the adoption and beneficial realization of automated systems remain. The first arises from groups that are applying pressure on lawmakers to pass crew size mandates that require at least two operators onboard, irrespective of technical needs. These laws are based on misplaced concerns about safety, particularly in the face of

1. “Overview of American Freight Railroads,” Association of American Railroads, October 2018, p. 4. <https://www.aar.org/wp-content/uploads/2018/05/AAR-Overview-Americas-Freight-Railroads.pdf>.

TECH FREEDOM

CONTENTS

Executive Summary	1
Introduction	2
A Brief History of Rail Automation	2
Present Applications of Railway Automation Technology	2
Positive Train Control (PTC)	3
Track and Brake Inspection	3
Regulatory Environment	4
Lessons Learned	4
Automation does not kill jobs	4
A patchwork of state laws effectively block interstate commerce	5
Recommendations	6
Conclusion	6
About the Authors	7

Image 1: Crew Size Mandates (As of May 2019 Preemption) 5

technological advancements like Positive Train Control (PTC), and understate the role that human error can play in railroad incidents, regardless of crew size.

The second obstacle is perhaps more challenging to overcome, because it plays on a fear of the unknown—the effect of automation on employment. Indeed, the true animating principle for crew size mandates may not rest with safety at all. But, rather, is likely based in the misperception that railway automation, even where some form of human monitoring exists, will kill jobs in the railroad industry. While intuitively powerful, such arguments ignore economic precedent. Historically, the loss of some jobs through innovation also leads to job creation. Accordingly, creating a patchwork of state laws borne of that fear may ultimately disrupt the operation of the railroads that serve as a backbone of interstate commerce.

However, while news from the states is bad, a recent move by the Federal Railroads Administration (FRA) to rescind its

train crew size Notice of Proposed Rule-Making offers a clear path toward a uniform—and innovation friendly—posture.² This is because, as the preeminent regulator of rail safety in the nation, the FRA's pronouncement that there is no safety basis for a minimum crew size mandate,³ the reasoning of the now-rescinded NPRM,⁴ represents a solid example for states to follow, and potentially a case for negative preemption of the activity undertaken by the states to date.

This development, and the possibilities it ushers forth, are good news. Because, as goes the future of freight rail commerce in the United States, so goes the welfare of consumers and the many interdependent industries that rely on the goods it carries.

INTRODUCTION

The testing, adoption and deployment of automated technologies in the rail sector offer a story of success for policy-makers to learn from as they consider the regulation of other modalities of transit that are only now adopting automated technologies. Systems like Positive Train Control (PTC) and infrared track inspection, which serve to minimize the risks of human error and track failure, already exist. Other new developments in the field should be further encouraged by the robust use of pilot projects, which are authorized by regulation and are largely creatures of industry interest and regulatory flexibility.

Yet, inspired by misplaced fears about job loss, further developments in automation that would otherwise continue to improve safety and efficiency on the nation's rails are imperiled by the creeping development of a patchwork of state laws that impose crew size mandates. As the preeminent arbiters of rail safety, such laws offer federal regulators a way to ensure that going forward, railway automation is not encumbered by thinly masked exercises in sector-specific protectionism.

With the withdrawal of the 2016 Crew Staffing Mandate,⁵ the FRA has made clear that there is not a relationship between staffing and train safety. However, even with this clear statement of policy, thwarting states from passing mandates under the guise of safety-related oversight remains only an implicit proposition. The FRA should make it explicit. To that end, it should take action that makes clear that state laws that impose crew size mandates, especially against the back-

drop of feasible automated technologies, are an impingement on its sole authority as the arbiter of railroad safety.

Accordingly, the present study lays out the case for such an action; first by looking at the safety history of rail automation, then by providing an overview of contemporary projects in the space and finally, by looking into the labor concerns that are the real driver of crew size mandates. Put simply, such a case for FRA preemption of state crew size mandates is the case for a safer and future-ready rail industry.

A BRIEF HISTORY OF RAIL AUTOMATION

Railway automation, particularly in passenger operations, is not new in concept or application. Since the 1970s, when automation rolled out as a major cost-saving feature of the Washington Metropolitan Transit Authority's rail network, rail operators have invested billions of dollars building out operational procedures and refining the capabilities of automated systems. Other automated lines have followed, including BART in the Bay Area, the 7 and L trains in New York, MARTA in Atlanta and the Metromover in Miami—to say nothing of the dozen or so automated trains at American airports. That investment, and hard-won experience, has meant that rail automation has continually been a subject of innovation over the last 50 years.

Not only is there a great deal of experience with automated systems in the context of rail, but the modality is, itself, well-suited to automation. As a technical matter, there are fewer variables for automated systems to account for in rail applications than in automotive ones.⁶ Fewer vehicles in the right of way means fewer opportunities for human error to lead to crashes and other disasters. Improving the interface between humans and automated systems is one source of further improvements in an already-safe industry. What's more, automated systems in the context of rail also benefit from industry-wide coordination in a way that other applications lack. Indeed, via operational safety mechanisms like PTC and tracking programs like Railinc,⁷ the industry has gained experience coordinating such systems.

All of this is to say that, as a matter of experience and technical suitability, rail technology is uniquely well suited among major modalities of transit for the use of ever-more sophisticated automated systems.

2. "Withdrawal of Notice of Proposed Rulemaking: Train Crew Staffing," Federal Railroads Administration, May 23, 2019 [hereinafter "Crew Size Mandate Withdrawal"]. https://www.fra.dot.gov/eLib/details/L20134#p1_z5_gD.

3. *Ibid.*, p. 11.

4. 81 Fed. Reg. 13,917 (Mar. 15, 2016) [hereinafter FRA Staffing Mandate]. <https://www.federalregister.gov/documents/2016/03/15/2016-05553/train-crew-staffing>.

5. "Crew Size Mandate Withdrawal." https://www.fra.dot.gov/eLib/details/L20134#p1_z5_gD.

6. See, e.g., Nancy J. Cooke, "Human Systems Integration," Transportation Research Circular No. E-C212 (August 2016). https://sites.google.com/site/trbar070/files/Oma-ha_TRC2013_The%20Future%20Locomotive.pdf.

7. Railinc is a subsidiary of the American Association of Railroads that acts as a central hub, monitoring trains like an air traffic controller.

PRESENT APPLICATIONS OF RAILWAY AUTOMATION TECHNOLOGY

Arguments presented in favor of crew size mandates tend to focus exclusively on safety,⁸ ignoring not only historical evidence of the technology's suitability to rail, but also contemporary examples of automation's value as a tool to improve the safety and efficiency of railroads.⁹ For instance, in January of this year, Australian railroad Rio Tinto announced the successful deployment of its "AutoHaul" operation (named for its ability to complete autonomous heavy-haul shipments), which is already allowing iron mines to transport ore, long-distance, in the Pilbara region of Western Australia.¹⁰ Domestically, the potential for automated systems is similarly great, both to enhance operational safety and to improve inspection processes.

The Autohaul project runs through the Australian desert, a place with so little water that railroads need to fly crews to remote depots to change shifts. However, that does not describe many places in America, where railroad towns have had more than a century to sprout up along the existing network, and these towns face real safety risks should a derailment happen. For this reason, in the United States, railroads and their regulators will need to take extra precaution before moving to fully automated locomotive control. While the potential for complete automation is real, any move to completely remove operators from locomotives will need to be thoroughly tested in a laboratory environment and on remote stretches of track first.

Positive Train Control (PTC)

The adoption and proliferation of PTC technologies represent a substantial achievement. PTC prevents train-to-train collisions, incidents due to excessively high speeds and situations wherein trains are on the wrong track—all arguments advanced to favor crew mandates. By leveraging onboard Communications-Based Train Control (CBTC) capabilities and other advancements, trains are able to communicate with traffic management and track equipment to monitor massive amounts of data in real-time and generate meaningful, minute-by-minute insights through Railinc. Ultimately, through the combination of all of these viable capabilities, trains can anticipate incidents well before a human conductor or engineer can.

But the benefits of PTC are not only useful as a matter of safety. PTC automation can also streamline train scheduling and

8. See "Crew Size Mandate Withdrawal." https://www.fra.dot.gov/eLib/details/L20134#p1_z5_gD.

9. *Ibid.*, pp. 8-10.

10. "Rio Tinto Completes AutoHaul Autonomous Train Project," *Railway Gazette*, Jan. 4, 2019. <https://www.railwaygazette.com/news/news/australia/single-view/view/rio-tinto-completes-autohaul-autonomous-train-project.html>.

direction using a moving-block system,¹¹ which ensures train operations are maximized to reduce the costs of shipping.¹² Based on the technical benefits achieved by PTC, studies have shown that between \$1.1 and \$2.5 billion in efficiencies could be gained by 2029 without jeopardizing operational safety.¹³ Such operational savings will translate into further investment into rail infrastructure and other consumer-side savings.

Track and Brake Inspection

The benefits of automation in the rail sector are not limited to when trains are rolling or even to the trains themselves. For example, track and brake inspection—vital and onerous tasks currently performed by human personnel on site—are also ripe to be improved through the deployment of automated systems because such systems yield generally superior safety results when compared to manual inspection.

To that end, the FRA has suspended the requirements of 49 CFR 213.233(c) and approved BNSF Railway's proposal for a track inspection pilot program on its "coal loop" that is using automated technologies to assess and monitor over 1,300 miles of main and siding tracks between Lincoln, Nebraska and Donkey Creek, Wyoming.¹⁴ The goal of the pilot is to demonstrate that automated inspection outcomes, no less safe than human inspection outcomes, are possible. Likewise, automated brake monitoring is also showing promise, as the Federal Railroad Administration has undertaken tests at the Facility for Accelerated Service Testing (FAST) track—a 2.7-mile closed loop that can closely replicate conditions over several days with a fully loaded train. These tests have shown an ability to accurately detect wheel temperature and perform brake inspection as the train moves [often referred to as "rolling stock inspection"].¹⁵

Beyond track and brakes, railroads use automation to inspect other parts of trains where equipment failure could lead to safety problems. BNSF has begun using artificial intelligence technologies to look for train wheel defects with cameras, supplementing existing acoustic and infrared inspection

11. "FRA Staffing Mandate," p. 5. <https://www.federalregister.gov/documents/2016/03/15/2016-05553/train-crew-staffing>.

12. "Automatic Train Control," *The Railway Technical Website*, 2019. <http://www.railway-technical.com/signalling/automatic-train-control.html>.

13. Elliott Long, "Under Legislation, Policymakers Would Micromanage Freight Rail Employment," *Medium*, May 6, 2019. <https://medium.com/@progressivepolicyinstitute/under-legislation-policymakers-would-micromanage-freight-rail-employment-e9cfad55d471?sk=fbe52198dc3632edff7512babd7b28fa>.

14. 83 Fed. Reg. 55,449 (Nov. 5, 2018). <https://www.federalregister.gov/documents/2018/11/05/2018-24111/approval-of-bnsf-railway-company-test-program-to-evaluate-automated-track-inspection-technologies>.

15. Office of Research and Development, "Using Wheel Temperature Detector Technology to Monitor Railcar Brake System Effectiveness," *Federal Railroad Administration*, December 2013. https://rosap.ntli.bts.gov/view/dot/28273/dot_28273_DS1.pdf?

technologies.¹⁶ The Canadian national railroad uses similar optic technologies to inspect whole railcars for potential issues, including broken or out-of-place parts.¹⁷

These automated technologies have begun to show promise because of a regulatory environment focused on safety- and efficiency-related outcomes, and not on specific approaches to achieving those outcomes. It is in that context that crew-size mandates persist as a regulatory aberration that should be addressed fully, and not simply avoided piecemeal by striking down state safety rationales.

REGULATORY ENVIRONMENT

To better understand the path to automation on the nation's rails, it is necessary to grasp the regulatory structures that will oversee the transition, and how they interact.

In 1966, Congress passed the Department of Transportation Act, which created the Department of Transportation (DOT) and the FRA.¹⁸ As an agency within the DOT, the FRA is charged with ensuring safety, reliability and efficiency in the transportation of passengers and goods along railways, and is the premier railroad safety agency for promulgating crew size and automated-systems rules and regulations.

Although the FRA has a storied history, it is not a faultless one when it comes to regulating outcomes instead of technologies. For example, in 2015, the FRA Coordinated with the Pipeline and Hazardous Materials Safety Administration to promulgate the Electronically Controlled Pneumatic Brake System (ECP) mandate, which would have required all new tank cars to include the ECP system by 2021.¹⁹ The ECP mandate faced sharp criticism from industry experts who claimed that it was misguided and unnecessary.²⁰ Although the FRA has regulatory authority to promulgate rules in this area,²¹ the ECP mandate was an over-reaching standard that locked train manufacturers and rail operators in to a prescriptive solution that served as a command-and-control

quick fix. Fortunately, the FRA repealed the ECP Mandate in September of 2018, allowing railroads to continue innovating and to avoid dangerous situations through performance-based innovation²²

Despite that outcome, in 2016, the FRA issued a prescriptive standards mandate yet again. The Staffing Notice of Proposed Rulemaking (NPRM) recommended the use of two-person crews (at a minimum) on freight trains, citing an incident at Lac-Mégantic, Quebec, Canada. Further, this action was taken in spite of the fact that the Transportation Safety Board refused to identify the train's one-person crew as the cause of the accident.²³ More remarkable still, it was taken in spite of the fact that Canadian authorities eventually concluded that crew size was not a factor in the incident. In fact, it occurred after operation, as a result of the engineer improperly securing the train when the locomotive's engines were powered down, which caused it to roll down a grade.²⁴ This is equivalent to forgetting to put a car in park before walking away.

While it was an unfortunate outcome, the Lac-Mégantic accident's cause bore little relation to the FRA's proposed prescriptive fix, which would have required all drivers to have a passenger. Indeed, the now-rescinded Staffing Mandate proposal was, as a technical matter, unnecessary—especially in the face of PTC and real-time track monitoring systems like CBTC.

In fact, the mandate really only made sense when viewed within the scope of legacy roles and responsibilities for conductors and engineers. For example, an image comes to mind of crew members frantically shoveling coal into a furnace to stop a speeding locomotive, but any crew member of a modern-day freight train knows that bringing a train to a halt involves little more than pulling a computerized lever or pushing a button. Things have changed dramatically and today, having an extra person in the locomotive may only serve to put another person in harm's way.²⁵

This line of reasoning was validated when the FRA decided to withdraw the 2016 NPRM on May 24, 2019, by making an affirmative decision not to regulate. In doing so, it implicitly preempted all state regulation of train crew sizes on the

16. Kyra Senese, "New BNSF Cameras Find Problems in Rails and Wheels," *Railway Track and Structures*, Jan. 29, 2018. <https://www.rtands.com/freight/bnsf-cameras-boost-maintenance-safety>.

17. Stuart Chirls, "CN Turns to Duos Technologies for Inspections," *Railway Age*, May 17, 2018. <https://www.railwayage.com/freight/cn-turns-to-duos-technologies-for-inspections>.

18. "About FRA," Federal Railroad Administration, accessed May 21, 2019. <https://www.fra.dot.gov/Page/P0002>.

19. "DOT Announces Final Rule to Strengthen Safe Transportation of Flammable Liquids by Rail," U.S. Dept. of Transportation, May 1, 2015. <https://web.archive.org/web/20150611191103/https://www.transportation.gov/briefing-room/final-rule-on-safe-rail-transport-of-flammable-liquids>.

20. See, e.g., Pat Foran, "ECP mandate: under study and on hold," *Progressive Railroading*, April 2016. <https://www.progressiverailroading.com/mechanical/article/ECP-mandate-under-study-and-on-hold--47875>.

21. Department of Transportation Act of 1966, Pub. L. No. 89-670, § 6(e)(3)(A), [codified 49 U.S.C. § 303 (2019)].

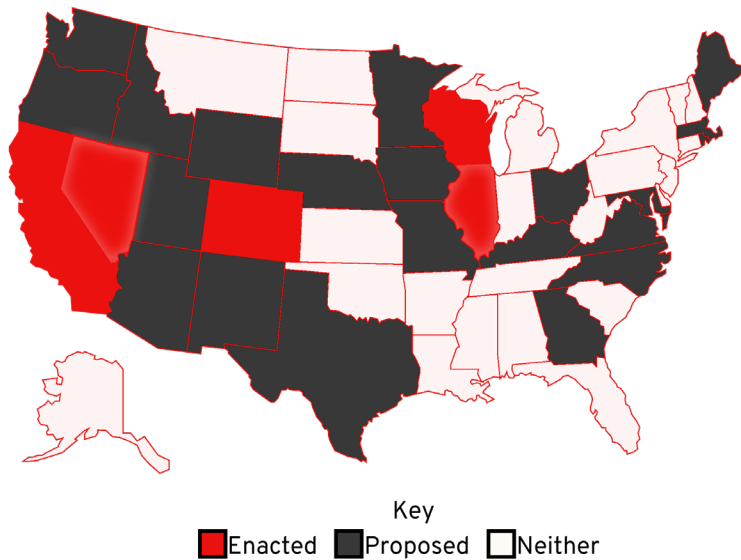
22. 83 Fed. Reg. 48,393 (Sept. 25, 2018). <https://www.federalregister.gov/documents/2018/09/25/2018-20647/hazardous-materials-removal-of-electronically-controlled-pneumatic-brake-system-requirements-for>.

23. "FRA Staffing Mandate." <https://www.federalregister.gov/documents/2016/03/15/2016-05553/train-crew-staffing>.

24. *Ibid.*, p. 12.

25. See, e.g., Shawn Logan, "CP Rail Workers Killed In B.C. Derailment Identified as Calgary-Based Crew," *Calgary Herald*, Feb. 5, 2019. <https://calgaryherald.com/news/local-news/three-cp-rail-workers-killed-in-massive-derailment-near-field-b-c>.

IMAGE I: CREW SIZE MANDATES (AS OF MAY 2019 FRA PREEMPTION)



SOURCE: Data compiled by the authors.

basis of safety.²⁶ As a result, state rules mandating crew sizes, when based on purported safety benefits from additional crew members, now represent inappropriate interventions into the jurisdiction of the FRA.²⁷

LESSONS LEARNED

Automation does not “kill” jobs

Although the FRA’s Staffing Rule has been withdrawn, it will endure as an example of how not to regulate. That is, it demonstrated that it was less than favorable to prescribe a particular technical solution when industry could more effectively innovate to achieve the desired regulatory outcome—without imposing needless and significant burdens on operations or safety.²⁸ Further, the rule’s existence was not predicated on a safety outcome but rather existed as a job guarantee for rail workers.

In the now partially-counterfactual world in which the 2016 Staffing Rule took effect, engineers on long-haul routes through the ranches of Wyoming’s open plains or the desert stretches of the southwest would have had an unnecessary “buddy” to watch the cows go by; a second employee

26. “Crew Size Mandate Withdrawal.” https://www.fra.dot.gov/eLib/details/L20134#p1_z5_qD.

27. *Ibid.*, p. 24.

28. See, e.g., Marc Scribner, “Toward Performance-Based Transportation Safety Regulation,” Competitive Enterprise Institute, March 29, 2017. <https://cei.org/sites/default/files/Marc%20Scribner%20-%20Toward%20Performance-Based%20Transportation%20Safety%20Regulation%202.0.pdf>.

dispatched far from home “just in case.” This is because, as the job of a locomotive engineer is reoriented to focus on the maintenance of automated systems, less time will be required to operate the trains. But, just because the nature of an engineer’s job is changing, does not mean that less human engagement in the operation of railroads will be necessary. Indeed, contrary to arguments that claim railway automation will kill jobs,²⁹ more jobs could be created—just in different capacities.³⁰

This transition is already underway. For example, jobs have been created to implement PTC, with some engineers performing maintenance, upgrades and implementation of PTC as their sole responsibility.³¹ Likewise, personnel currently dedicated to safety inspections in the field will be no less necessary, but instead will perform their responsibilities in the safety of centralized operations hubs. There is no indication that this trend of job creation will not continue.

A patchwork of state laws effectively block interstate commerce

While the federal government has moved away from acting to mandate a minimum crew size, some states have begun to move in the opposite direction. As of May 2019, five states had enacted legislation that would mandate at least two-person crews on all trains, while 21 were actively considering legislation to introduce such a requirement. And, although these bills should be preempted where they focus on safety as the basis for regulation, without additional action, those that base their regulations on other grounds will continue to complicate railway automation.

Rail networks span the nation, and shipping products and materials inexpensively across thousands of miles can be significantly affected by a patchwork of inconsistent state laws that increasingly represent a burden to interstate commerce. For instance, even after the NPRM’s withdrawal, it may still be the case that in Illinois, where no rail carrier can operate a train unless it has an operating crew of at least two individuals,³² a train hauling fertilizer from Fort Worth, Texas to Chicago will be required to come to a full stop to

29. Paul Davidson, “Automation could kill 73 million U.S. jobs by 2030,” USA Today, Nov. 28, 2017. <https://www.usatoday.com/story/money/2017/11/29/automation-could-kill-73-million-u-s-jobs-2030/899878001>.

30. Katie Patrick, “Rail Industry Says Automation Will Create More Jobs, But Congress Isn’t So Sure,” InsideSources, May 13, 2019. https://www.insidesources.com/rail-industry-says-automation-will-create-more-jobs-but-congress-isnt-so-sure/?utm_source=The+Signal&utm_campaign=e868c225e6-EMAIL_CAMPAIGN_2018_01_16_COPY_01&utm_medium=email&utm_term=0_70b8080426-e868c225e6-49716557.

31. *Ibid.*

32. 625 Ill. Comp. Stat. 5/18c-7402 (2019).

board an additional engineer who provides no additional safety benefit.

This patchwork has since likely been preempted by the FRA's announcement of the withdrawal of its crew staffing mandate³³ under the authority of the Federal Rail Safety Act, which provides:

A State may adopt or continue in force a law, regulation, or order related to railroad safety or security until the Secretary of Transportation (with respect to railroad safety matters) [...] prescribes a regulation or issues an order covering the subject matter of the State requirement.³⁴

Combined with the specific preemption language in the FRA's withdrawal of the federal crew size mandate,³⁵ this authority effectively preempts state safety-related crew size mandates.³⁶ However, the preemption contemplated in the FRA mandate withdrawal is limited since its basis was the specific section of the Federal Rail Safety Act mentioned above, which forbid states from imposing safety-related mandates.³⁷ This section did not preempt all crew size mandates, however, and a state law purporting to simply secure additional jobs would remain legal.³⁸ What's more, preemption is only effective if enforced. Those states that hold out on crew size mandates may propose post hoc arguments that the crew size mandates were also intended to be a job creation mechanism.

This means that if the states are not fully preempted, the same destructive patchwork that came about under the prior safety-related crew size mandates could re-emerge under a labor-specific mandate. In light of this, a federal standard should exist to conform inconsistent state laws that burden interstate commerce and thus it is time for federal regulators to step in to quash the further expansion of a problematic regulatory patchwork.

RECOMMENDATIONS

As a matter of constitutional law, determinations made by the federal government supersede inconsistent state laws that unduly interfere with commerce between the states.³⁹

33. "Crew Size Mandate Withdrawal," p. 24. https://www.fra.dot.gov/eLib/details/L20134#p1_z5_gD.

34. 49 U.S.C. § 20106(a)(2).

35. "Crew Size Mandate Withdrawal," p. 24. https://www.fra.dot.gov/eLib/details/L20134#p1_z5_gD.

36. *Ibid.*

37. *Ibid.*, p. 23.

38. *Ibid.*, pp. 22-25.

39. See *Gibbons v. Ogden*, 22 U.S. (9 Wheat.) 1, 211 (1824); and *South Carolina State Highway Department v. Barnwell Bros., Inc.*, 303 U.S. 177 at 186 (1938).

Such was the situation presented by the patchwork of state crew size mandates based on safety rationales that have since been explicitly deemed inappropriate by the FRA and implicitly preempted.⁴⁰ Yet, where states decide to move away from the backdoor safety rationale now preempted and base crew size mandates on more labor-specific grounds, such mandates still pose a significant barrier to the free flow of commerce—and the progress made by railway automation. Accordingly, policymakers should undertake the following actions to promote the further use and development of automation in the rail industry.

First, the FRA should promulgate rules that reinforce its withdrawal of the Staffing NPRM to align with the Regional Rail-Reorganization Act,⁴¹ which provides that:

No State may adopt or continue in force any law, rule, regulation, order, or standard requiring the Corporation to employ any specified number of persons to perform any particular task, function, or operation, [...] and no State in the Region may adopt or continue in force any such law, rule, regulation, order, or standard with respect to any railroad in the Region.⁴²

Again, to specifically make explicit what is now implicit in this space will make it easier for courts to enforce the impermissibility of these state laws.

Second, states that seek to attract innovation and investment from railways should pass similar legislation that makes clear that railways—and the benefits that result from their continued investment in railway automation technologies—will not be prevented from moving commerce within those states.

Finally, in line with the DOT's novel "multi-modal" approach to automated technologies, the FRA should look to evaluate the potential scope of further pilot programs in a manner that gives firms interested in testing new automated technologies the maximum flexibility possible under existing law. Programs such as the BNSF pilot program approved by the FRA serve as a beacon of possibility and regulatory cooperation that will push railway automation forward.

Taken together, the effects of these actions would be enormous. The first would preempt state crew size mandates once and for all, fulfilling the duties charged to the FRA by Congress in its enabling legislation,⁴³ and exercising the necessary preemption authority delegated by Congress and reserved by the Constitution to ensure the free flow of com-

40. Crew Size Mandate Withdrawal, pp. 22-25. https://www.fra.dot.gov/eLib/details/L20134#p1_z5_gD.

41. Often referred to as the "3R Act."

42. 45 USC 797j (2019).

43. Dept. of Transportation Act of 1966, Pub. L. No. 89-670, § 6(e)(3)(A), [codified 49 U.S.C. § 303 (2019)].

merce along railways, and alleviate undue burdens imposed by the states.⁴⁴ The second would be an express vote of confidence in railway automation that would spur further innovation and move the technology forward toward safer and more efficient forms of railway shipment. The third would promote the sort of innovative experimentation that will lead to further safety breakthroughs and added efficiencies.

CONCLUSION

To ensure that goods move efficiently and affordably is at the very core of the federal government's role as the nation's chief regulator of interstate commerce. And, making sure that railroads can legally use the best practices enabled by modern safety technology is key to the nation's economic competitiveness in world markets. Where states intervene in transportation markets in the name of local interests, we all lose. When that happens, federal officials in Congress and the administration have a duty to step in for the good and prosperity of the nation as a whole. Using past Congressional guidance, the FRA has already stopped the growing problem of safety-based crew size mandates, but they will face similar challenges in the future, as the pressure to put state benefits ahead of national prosperity is not going anywhere. In light of this, Congress will need to step up and clearly assert that state rules that seek to stem railway automation are and will forever be "off track."

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44. See Art. I, § 8, cl. 3. See also, *Nat'l Fed'n of Indep. Bus. v. Sebelius*, 567 U.S. 519 (2012).