Testimony of Marc Scribner
Senior Transportation Policy Analyst
Reason Foundation

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Hearing: Getting Back on Track: Exploring Rail Supply Chain Resilience and Challenges

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Chairman Nehls, Ranking Member Payne, and Members of the Subcommittee, thank you for the opportunity to testify before you today. My name is Marc Scribner. I am a senior transportation policy analyst at Reason Foundation, a national 501(c)(3) public policy research and education organization with expertise across a range of policy areas, including surface transportation.[1]

Throughout its 45-year history, Reason Foundation has conducted research on emerging surface transportation technologies and their interactions with public policy. My testimony focuses on the growing role and benefits of automation technologies in surface transportation generally and freight rail specifically, policy barriers to the development and deployment of these technologies, and the potential consequences of failing to address these barriers.

I. Introduction

After decades of excessive economic regulation nearly destroyed the railroad industry in the United States, Congress responded by enacting deregulatory measures that culminated in the Staggers Rail Act of 1980. The Staggers Act helped reverse U.S. freight rail's decline and has incentivized hundreds of billions of dollars in private investment since its enactment.

The gains enjoyed by customers and carriers in the decades that followed are large and unambiguous. Inflation-adjusted average freight rates (revenue per ton-mile) have declined by nearly half while freight volume (ton-miles) grew by more than 50%.[2] Even though the

1. My biography and writings are available at https://reason.org/author/marc-scribner/.
2. Association of American Railroads, *Railroad Facts 2021 Edition* (Washington: Association of American Railroads, 2021). 34. Bureau of Transportation Statistics, *National Transportation Statistics*, Table 1-50.

law only concerned economic deregulation, the Staggers Act also enabled large safety gains through system investment, with a 76% decline in train accident rates and an 85% decline in employee injuries and occupational illnesses since enactment.[3] A 2016 study published in the *Review of Industrial Organization* found that "Staggers may be responsible for most of the reduction in the accident rate from its 1978 high" and that "FRA regulatory restrictions that have been adopted since the Staggers Act, however, are not associated with improved safety."[4]

Despite this impressive turnaround, near- and long-term threats to freight rail's success have emerged. The COVID-19 pandemic threw supply chains into chaos and freight rail was not spared. The pandemic's impact was multifaceted with large shocks to both supply and demand.

During the worst of the pandemic, total consumption remained on-trend due in part to generous government assistance that kept personal incomes high. Consumers instead shifted their spending from services—many of which were shuttered to mitigate public health risks—to durable and nondurable goods. This shock was exemplified by the massive e-commerce boom.

This sudden shift in consumption overwhelmed every segment of the logistics industry. Warehouses stocked with goods meant to cater to pre-pandemic consumer demand became extremely congested as businesses sought to reorient inventory around new demand patterns. The lack of warehouse capacity led to delays in unloading shipping containers, many of which remained full, sitting on truck chassis in parking lots and loading docks outside warehouses—essentially as overflow storage capacity.

With warehouse parking lots and loading docks at capacity, rail and maritime shipping customers were not picking up their full containers from or returning their empty containers to ports and rail ramps on time. Carriers could then not return empty containers and chassis to repeat this transportation cycle, increasing congestion and compounding delays. This situation generated headline-grabbing news coverage of container ships floating off the California shore, waiting for days or even weeks to unload their cargo.

None of these problems could be resolved quickly absent a major economic recession—only subsiding goods demand or long-term investment in additional logistics capacity to serve these "new normal" demand patterns could ease congestion. However, emerging automation technologies could have improved logistics efficiency and blunted some of the negative effects experienced over the last few years. These include cargo handling

3. Association of American Railroads, *Railroad Facts 2021 Edition*. 62–63.
4. Jerry Ellig and Patrick A. McLaughlin, "The Regulatory Determinants of Railroad Safety," *Review of Industrial Organization* 49 (Sep. 2016). 371–398.

equipment used at ports and warehouses, as well as transportation automation technologies for trucks, trains, ships, and aircraft.

While many are in their infancy, all of these automation technologies offer great promise that could benefit freight carriers, shippers, and consumers in the decades ahead. In addition to enhanced efficiency, road and rail safety would also be improved by removing the human factors responsible for most accidents. The main challenge for policymakers going forward is ensuring that the development and deployment of transportation and logistics automation technologies is not unduly encumbered by obsolete or counterproductive new policies.

II. Surface Transportation Automation

In the broader transportation automation landscape, applications for road vehicles have received the most attention. Advanced driver assistance systems such as automatic emergency braking and lane-keeping assistance are available in cars marketed to consumers today. Extensive testing and limited commercial deployments of fully automated—often called "driverless"—passenger and freight road vehicles have also occurred in recent years.

Truck automation technologies are currently being developed by numerous companies. Some, such as Aurora, TuSimple, and Waymo, are focused on automating the long-haul Class 8 tractor-trailer market segment, and testing is taking place in the southwest United States. Others, most notably Gatik, are focused on automating short-haul, less-complex operations with smaller trucks.[5]

While achieving fully automated commercial trucking operations at scale is years away, the industry has good reason to continue these technology investments. According to the American Transportation Research Institute, truck driver wages and benefits accounted for 44% of operating costs on a per-mile basis in 2021—roughly double the cost of fuel, the next highest cost category.[6] The potential productivity gains from reducing labor costs and increasing asset utilization would have dramatic competitive implications for the broader surface transportation market.

The freight rail industry in the U.S. is also pursuing automation technologies to improve safety and efficiency. Given the potential cost savings from trucking automation, automating rail will be necessary to compete in the transportation sector of the future, particularly for higher-value traffic such as intermodal for which railroads already compete intensely with truck carriers.

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5. Marc Scribner, "The Short and Long Views of Automated Trucking," *Surface Transportation Innovations* (10 Apr. 2023). https://reason.org/transportation-news/hydrogen-fuel-cells-automated-trucking-more/#c.
6. Alex Leslie and Dan Murray, "An Analysis of the Operational Costs of Trucking: 2022 Update," American Transportation Research Institute (Aug. 2022). 17. https://truckingresearch.org/wp-content/uploads/2022/08/ATRI-Operational-Cost-of-Trucking-2022.pdf.

One form of rail automation is occurring in infrastructure inspection. Manned track geometry cars have been in service for nearly a century after rail networks grew too large and dense for manual visual track inspections alone. While the parameters measured may vary, the general purpose of geometry cars is to examine tracks for defects to ensure compliance with industry and government standards, as well as inform and prioritize future maintenance actions. Today, automated track inspection vehicles may be hi-rail trucks (modified highway trucks with rail wheels that can be lowered to operate on tracks) or railcars with inspection equipment that can be added to trains in revenue service.

The benefits of automated track inspection (ATI) include more reliable defect detection, more robust maintenance data analysis and planning, redeployment of visual inspectors to higher-need areas and for infrastructure that cannot be inspected by ATI equipment, reduced human exposure to safety hazards in the field, and reduced delays to trains in revenue service. While it has long acknowledged the benefits of ATI, the Federal Railroad Administration (FRA), since 2021, has reversed course by denying multiple ATI waiver requests. The Committee's ongoing investigation will hopefully yield answers as to what motivated FRA's reversal, but continued oversight from both Congress and the courts is necessary to ensure FRA has not abandoned its rail safety mission. Congress should also examine better ways to permanently integrate ATI use into the track inspection regulatory framework that do not require case-by-case waivers.

A more ambitious application of rail automation is automating train operations. Train automation is likely to be incremental as functions are gradually automated and personnel are relieved from certain tasks as safety is assured. Energy management technologies save fuel through automated control of throttling and braking, much like cruise control in cars, and could be leveraged to automate additional tasks.[7]

The gradual adoption of train automation could result in sizeable cost savings. For instance, an incremental automation phase-in could allow for reducing train crew-sizes from two to one, which consultancy Oliver Wyman in 2015 estimated could save U.S. railroads up to $2.5 billion per year by 2029.[8] That same analysis, conducted at the request of the Association for American Railroads, found no evidence that two-person train crews are safer than one-person crews by analyzing European rail operations where single-person crews are common.[9]

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7. William C. Vantuono, "On Board with TALOS® at TTCI," *Railway Age* (3 Dec. 2019). https://www.railwayage.com/cs/ptc/on-board-with-talos-at-ttci/.
8. "Analysis of North American Freight Rail Single-Person Crews: Safety and Economics," Oliver Wyman (3 Feb. 2015). 48. https://www.reginfo.gov/public/do/eoDownloadDocument?pubId=&eodoc=true&documentID=1014.
9. Ibid. 36.

Certain lower-risk operations, such as shunting in railyards, are likely to see automation technology deployed sooner. But international experience suggests fully automating at least some long-distance freight trains in the U.S. may be on the horizon.

In 2019, mining giant Rio Tinto Group successfully launched its AutoHaul fully automated train operations in Western Australia.[10] AutoHaul involves the simultaneous operation of up to 50 unmanned trains, each 1.5 miles long and carrying 240 cars of iron ore from mines to ports on an average 500-mile, 40-hour journey. Loading and unloading is completely automated, although crews still get on board and manually operate the trains as they approach ports. Rio Tinto's nearly $1 billion effort took over a decade of planning, development, and testing, but reductions in travel time, fuel consumption, and track and locomotive wear-and-tear have already been realized.

While sparsely populated Western Australia is a significantly less challenging environment than the U.S., given fewer potential conflicts, train automation in more urbanized areas will soon be taking place internationally. For example, Belgian startup OTIV announced earlier this year that it had signed a multi-year contract to deploy automated and remote-controlled freight train technology on a rail line between the Netherlands and Germany.[11]

III. Policy Barriers to Freight Rail Automation

There are two major emerging economic and operational regulatory threats related to automation that would reduce the ability of railroads to compete in the freight transportation marketplace over time and likely negatively impact the economy and consumers.

Return on Investment. Despite the success of the Staggers Act, new forms of direct economic regulation of freight railroads may be on the horizon, which could impact railroad innovation and long-run competitiveness.

The Surface Transportation Board (STB) is currently considering a re-regulatory proposal that would make it easier to require competing Class I railroads to interchange each other's traffic and impose service mandates.[12] Proposed regulations governing reciprocal switching may negatively impact railroads' return on investment, which would have negative long-run effects on shippers and consumers.

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10. Kevin Smith, "Rise of the machines: Rio Tinto breaks new ground with AutoHaul," *International Railway Journal* (9 Aug. 2019). https://www.railjournal.com/in_depth/rise-machines-rio-tinto-autohaul.
11. Nick Augusteijn, "OTIV announces multi-year contract for running remotely controlled freight trains," RailTech.com (13 Jan. 2023). https://www.railtech.com/infrastructure/2023/01/13/otiv-announces-multi-year-contract-for-running-remotely-controlled-freight-trains/.
12. Petition for Rulemaking To Adopt Revised Competitive Switching Rules; Reciprocal Switching, *Notice of Proposed Rulemaking*, Surface Transportation Board, Docket No. EP 711 (Sub-No. 1), 81 Fed. Reg. 51,149 (3 Aug. 2016)

Reciprocal switching arrangements occur voluntarily between carriers but can also be mandated by the STB to promote competition.[13] Among other requirements, current rules stipulate that anticompetitive conduct on the part of a rail carrier must be established in order for the STB to prescribe mandatory reciprocal switching as a remedy.[14]

In Feb. 2022, the STB held a public hearing on revisions to reciprocal switching regulations first proposed in 2016.[15] Most significantly, the STB's proposal would eliminate the anticompetitive conduct requirement and allow the STB to mandate reciprocal switching under diminished evidentiary standards because of "[t]he sheer dearth of cases brought."[16] In fact, since the mid-1980s when the anticompetitive conduct requirement was established, the STB and the Interstate Commerce Commission (ICC) before it have found precisely zero instances of anticompetitive conduct on the part of the rail carriers.

Weakening the evidentiary standards for mandatory reciprocal switching has long been a priority of some industrial shippers, who presumably hope to enjoy below-market rates that may result. While it may provide temporary private benefits to select shippers in the form of below-market rates, the potential operational complexity and resulting delays (as well as reduced rail productivity) may offset those temporary benefits.[17]

More concerning is the long-run impact of capriciously mandated reciprocal switching. In response to restrictions on market pricing that would reduce earnings and thereby reduce shareholder willingness to tolerate significant reinvestment of profits, rail carriers are likely to adopt strategies to minimize the costs and risks associated with this regulation in ways that harm shippers, such as reduced investment in new capacity and abandonment of low-demand lines.

Most significantly for this discussion, the STB's proposed reciprocal switching regulatory changes would likely reduce investment in new technologies that are needed for freight rail to compete with increasingly automated trucking in the decades ahead.[18] A 2017 study published in *Transportation Research Record* surveying railroad managers and transportation engineers on freight rail automation found "significant concern that the industry will be unable to fund the development of new technology."[19]

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13. 49 U.S.C. § 11102(c).
14. 49 C.F.R. § 1144.2.
15. Reciprocal Switching, *Notice of Public Hearing*, Surface Transportation Board, Docket No. EP-711 (Sub-No. 1), 87 Fed. Reg. 62 (2 Jan. 2022).
16. Petition for Rulemaking To Adopt Revised Competitive Switching Rules; Reciprocal Switching. 51,152.
17. Joanna Marsh, "No simple swap: Ins and outs of reciprocal switching on US railroads," *FreightWaves* (1 Oct. 2021). https://www.freightwaves.com/news/no-simple-swap-ins-and-outs-of-reciprocal-switching-on-us-railroads.
18. Ibid.
19. James D. Brooks, et al., "Survey of Future Railroad Operations and the Role of Automation," *Transportation Research Record: Journal of the Transportation Research Board* 2608 (2017). 17.

Train Automation. Arbitrary labor requirements would also reduce the incentive of rail carriers to invest in and deploy automation technologies necessary to compete with increasingly automated trucking in the years ahead, which could produce a variety of economic, safety, and environmental impacts. In 2016, when the Federal Railroad Administration (FRA) first proposed a minimum crew-size regulation, it conceded that "FRA cannot provide reliable or conclusive statistical data to suggest whether one-person crew operations are generally safer or less safe than multiple-person crew operations."[20]

This admission of FRA's lack of data to support its proposed rule did not originate from FRA. Rather, it came from the White House Office of Management and Budget's Office of Information and Regulatory Affairs (OIRA). A review of the docket indicates that the draft notice of proposed rulemaking that FRA originally sent to OIRA for review instead incorrectly claimed, "Studies show that one-person train operations pose increased risks by potentially overloading the sole crew member with tasks."[21]

Despite the absence of evidence, FRA continued forward on the proposed crew-size rule until it was withdrawn in 2019. In its withdrawal notice, the agency concluded, "FRA's statement in the [proposed rule] that it 'cannot provide reliable or conclusive statistical data to suggest whether one-person crew operations are generally safer or less safe than multiple-person crew operations' still holds true today."[22]

The 2019 withdrawal notice also contained a nationwide preemption order that was aimed at overriding several state crew-size laws, which had been enacted in recent years. This was challenged in federal court by two railroad unions and three states. In Feb. 2021, the U.S. Court of Appeals for the Ninth Circuit ruled in favor of the challengers, finding that FRA had failed to meet procedural requirements in issuing the preemption order.[23] The court remanded the matter to FRA to reconsider the underlying issues and FRA has since issued a new proposed rule on train crew size.

Like the 2016 notice of proposed rulemaking (NPRM), FRA concedes in its latest NPRM from July 2022 that it does not possess "any meaningful data" to support the conclusion that two-person train crews are safer or that one-person crews are less safe.[24] Despite the lack of a safety basis supporting a two-person crew-size minimum, legislation introduced in the U.S. Senate in response to the recent derailment in East Palestine, Ohio, would impose

20. Train Crew Staffing, *Notice of Proposed Rulemaking*, Federal Railroad Administration, Docket No. FRA-2014-0033, 81 Fed. Reg. 13,917 (15 Mar. 2016). 13,919.
21. "NPRM Crew Staffing OIRA Edits," Federal Railroad Administration, Docket No. FRA-2014-0033 (8 Mar. 2016). 7. https://www.regulations.gov/document?D=FRA-2014-0033-0003.
22. Train Crew Staffing, *Notice of Proposed Rulemaking; Withdrawal*, Federal Railroad Administration, Docket No. FRA-2014-0033, 84 Fed. Reg. 24,735 (29 May 2019). 24,737.
23. *Transp. Div. of Int'l Ass'n-SMART v. Federal Railroad Administration*, No. 19-71787 (9th Cir. 2021).
24. Train Crew Size Safety Requirements, *Notice of Proposed Rulemaking*, Federal Railroad Administration, Docket No. FRA-2021-0032, 87 Fed. Reg. 54,564 (28 July 2022). 45,571.

such a mandate in statute.[25] Significantly, the East Palestine train had three crewmembers on board at the time of the derailment.[26]

As was noted previously, truck automation may be able to reduce truck operating costs by nearly half. A two-person crew-size mandate would impose a perpetual rail labor cost floor, thereby disadvantaging freight rail to its increasingly automated trucking competitors and cause some shippers to substitute trucks for rail.

IV. Potential Consequences of Unaddressed Policy Barriers

Since partial deregulation of the railroad industry under the Staggers Act, the fastest growing traffic segment has been intermodal—the shipping containers and trailers that can be moved between rail, truck, and waterborne carriers—where intermodal rail traffic increased by nearly 340% between 1980 and 2020.[27] Intermodal rail traffic in 2020 accounted for 9.4% of total tons originated and 17% of gross revenue, which would constitute the largest revenue share of any commodity group if intermodal traffic was grouped together. Much of the future growth of intermodal traffic on rail is likely to depend on how adequately rail can compete with and complement over-the-road trucking.

Automated trucking would be a boon to shippers. Certain applications of truck automation, such as platooning formations of "road trains" consisting of multiple trucks, could create new dimensions of surface transportation competition where rail currently has a strong advantage over trucks. To compete in this increasingly automated transportation marketplace, rail will also need to harness automation technologies.

However, if the aforementioned policy barriers to rail automation are left unaddressed, rail will increasingly be at a competitive disadvantage to trucking. This would cause some rail customers to choose truck carriers instead and have safety and environmental consequences as well.

With respect to safety, trucks are involved in far more accidents than rail. Rail's safety advantage becomes apparent when accounting for the volume of freight moved, with a 2011 Government Accountability Office report estimating that truck accidents produce more the six times as many fatalities per billion ton-miles moved than rail accidents and nearly 17 times as many injuries.[28] Thus, a shift in freight traffic from rail to truck can be expected to have a negative impact on overall transportation safety.

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25. Railway Safety Act of 2023, S. 276, 118th Cong., 1st Sess. (2023). § 6.
26. Eric Boehm, "After the East Palestine Derailment, Congress Is Trying To Force Unrelated, Costly Regulations on Railroads," *Reason* (24 Mar. 2023). https://reason.com/2023/03/24/after-the-east-palestine-derailment-congress-is-trying-to-force-unrelated-costly-regulations-on-railroads/.
27. Association of American Railroads, *Railroad Facts 2021 Edition*. 29.
28. "A Comparison of the Costs of Road, Rail, and Waterways Freight Shipments That Are Not Passed on to Consumers," Government Accountability Office (Jan. 2011). 27. https://www.gao.gov/assets/gao-11-134.pdf.

Similarly, a modal shift from rail to truck is likely to worsen environmental outcomes. According to the Environmental Protection Agency, when compared to freight rail, trucks produce approximately 10 times as much carbon dioxide (CO_2), more than three times as much fine particulate matter ($PM_{2.5}$), and two-and-a-half times as much nitrogen oxides (NO_X) per ton-mile.[29] If automated trucking leads rail customers to shift their traffic to highways, it can be expected that the emissions intensity of the transportation sector will increase.

V. Conclusion

The fallout from the COVID-19 pandemic raised the profile of issues related to freight transportation efficiency and resilience. While the supply chain chaos experienced during the last few years has moderated, Congress should continue to monitor these trends. Emerging automation technologies are expected to reshape the transportation sector in the coming decades. To encourage innovation, outdated prescriptive rules should be replaced with performance-based regulations.

In the case of freight rail, Congress should ensure existing regulations and new policies do not unduly hamper freight rail's ability to adapt to the evolving competitive landscape. A failure to do so would not only harm America's consumers, who benefit greatly from robust competition between freight modes of transportation, but would have negative safety and environmental consequences as well.

Thank you for the opportunity to testify before the Subcommittee, and I welcome your questions.

29. "2022 SmartWay Online Shipper Tool: Technical Documentation," U.S. Environmental Protection Agency (Oct. 2022). 28, Appendix A. https://www.epa.gov/system/files/documents/2022-10/420b22046.pdf.