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TECHNICAL REPORT

The State of U.S. Railroads

A Review of Capacity and Performance Data

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A RAND INFRASTRUCTURE, SAFETY, AND ENVIRONMENT CENTER

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Summary

U.S. freight volumes are expected to double in the next 30 years. Increased use of rail freight is seen as a way to accommodate increased volumes while minimizing congestion on the highway system. However, the U.S. railroad network consists of many fewer track miles than it did several decades ago, and there is concern that it has become congested and incapable of handling additional volume.

Concern about the ability of the U.S. railroad system to accommodate a significant increase in rail freight volume without degrading the speed and reliability of railroad service has motivated several recent studies of railroad infrastructure. Many of these studies were commissioned by trade associations or organizations representing interested parties, and it is challenging to disentangle facts about the current capacity and performance of railroads from advocacy positions of carriers or shippers. This report draws from publicly available data on the U.S. railroad industry to provide observations about rail infrastructure capacity and performance in transporting freight.

Railroad capacity is determined by many factors, including the amount of railroad track and rolling stock, the number and power of locomotives, maintenance, staffing levels, and a wide variety of operating strategies. Increases in railroad productivity over the past quarter-century indicate that more freight (as measured in ton-miles) is being transported today than ever before. Data suggest that this has been made possible by increasing the utilization of railroad infrastructure through technological innovation and improved operations. However, analyzing trends using the single metric of capacity fails to capture the complexity of rail performance.

Speed and reliability are the most salient metrics of the performance of rail service. Long-term trends show improvements in both of these measures. However, publicly available data suggest that these decade-long trends may be slowing or reversing. Some shippers suggest that this is the case and that, in certain markets or regions, they are experiencing significantly higher costs or poorer performance from freight rail service. However, data are not shared publicly at the temporal, geographic, and commodity levels to assess these claims. Thus, it is not apparent whether performance is now stable, significantly declining, or improving.

One reason to examine the impacts of railroads performance on freight markets is that these markets are determined by the collective decisions of carriers from multiple modes and shippers of multiple types of freight.[1] In addition to the rates charged by a trucking or railroad company to transport its freight, the shipper must consider the amount of time it will take for its goods to arrive at the correct destinations; the risk that its freight might get damaged,

[1] In this report, we use *mode* to differentiate types of freight transportation: Rail is one mode; trucking another.

lost, or delayed; and other costs, such as paperwork, warehousing, and drayage. Railroads and trucking companies take actions that influence the overall cost of shipping freight, and shippers respond to these signals. Thus, when a railroad or trucking firm improves performance, shippers may respond by shifting the transportation of freight—even extremely time-sensitive shipments—from one mode to the other.

As an illustrative example of this issue, this report describes how slower and less reliable shipments led one firm to shift traffic from rail to truck to fulfill its customers' orders in a timely manner and maintain its supply chains at the lowest overall cost. This example illustrates the larger, public consequences of private decisions to shift freight transportation among modes. Shippers make transportation decisions based on what modes of transportation best satisfy their firm's logistics supply chain. Their decisions, however, have consequences that affect other users of the transportation system, communities through which the infrastructure passes, and the environment, because different modes of freight differ in their safety concerns, levels of pollution, and energy consumption. These interactions justify an expanded public-sector role for freight transportation planning.

Based on these observations, this report raises three issues for additional analysis to create options for transportation policy and support transportation planning:

- *Improved reporting and public dissemination of railroad system and performance statistics are needed to support transportation policy.* Far more data are available for highways than for railroads, which are no less critical to the efficient flow of goods. Analysis of freight transportation planning in general and railroad transportation planning in particular is hindered by a lack of publicly available, detailed, and accurate data. Better data allow for practical incentive-based policies to set rail performance standards.
- *The public and private cost trade-offs between shipping freight by truck and by rail need to be better understood.* Far too little is known about this important issue at this time to recommend major policy changes, but the implications are potentially large, especially as the highway system becomes increasingly congested and rail rates continue to rise. Future research should include developing a more accurate comparison of rail and truck freight transportation costs and a model that can be used to explore different policy options, such as congestion tolls, carbon taxes, and the proposed rail infrastructure tax credit. Capturing the relative congestion externalities will require developing improved economic modeling of decisionmaking in the freight transport industry as well as large-scale modeling of the nation's multimodal transportation network.
- *A national freight strategy should balance the private interests of the shippers and railroads with the public interest associated with the public costs of different modes of transportation.* By passing the Staggers Rail Act (P.L. 96-448), the government did not abdicate responsibility for overseeing the railroad industry. Surface-transportation advocates appear to agree that some federal coordination and possibly funding of rail capacity expansion will be necessary, but it is the federal government's responsibility to ensure that this investment benefits the public interest.