

THE INNOVATIVE DOT

**Focus Area 6:
Providing Efficient, Safe
Freight Access**

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With the emergence of just-in-time manufacturing and highly dispersed activity centers and markets, trucking has become a dominant freight mode. Increased truck traffic, in turn, adds wear and tear to infrastructure and can be a source of congestion and emissions.

Many DOTs are responding to this reality by looking for innovative ways to help shippers move freight more efficiently and with less impact on infrastructure and communities. Despite clear challenges, including finding funding sources and dealing with privately owned railways, DOTs are making strides in providing rail options for shippers, as well as integrating all modes in their planning. In addition, they are working with local governments, shippers, and others to optimize local freight pickups and deliveries and to reduce shipping times and local congestion. That's a win-win, reducing DOT expenses while at the same time benefiting freight service providers' bottom lines.

In this section:

- Support Freight Rail Service
- Support Intermodal Freight Connections
- Foster Win-Win Outcomes for Freight and Passenger Rail
- Encourage Innovative Freight Delivery



FOCUS AREA 6: PROVIDING EFFICIENT, SAFE FREIGHT ACCESS

Support Freight Rail Service

The Opportunity

Improving rail service as an alternative to shipping goods by truck provides a number of benefits, including economic development, reduced highway maintenance costs, and reduced emissions. It is also a more efficient and generally more cost-effective means of transportation for shippers themselves, allowing these vital businesses to cut costs.

From an economic development standpoint, ensuring the availability of rail service increases the viability of industries reliant on the movement of heavy, low-value goods. Because of the relatively low profit per ton on goods such as coal, gravel, grain, and scrap material, the difference in cost between shipping by truck, at 16.5 cents per ton-mile,¹ versus shipping by rail, at three cents per ton-mile,² can make the difference between a business's success and failure.

From a public agency perspective, promoting the movement of freight by rail yields several key benefits. Shipping by rail instead of truck reduces highway congestion, preserves pavement, and produces fewer air emissions. The emissions that are produced tend to have fewer health effects, because fewer people live in close proximity to railroads than to highways.³ Shifting freight from truck to rail also generates significant cost and operational advantages. Hundreds of trucks are required to move the same freight that can be carried by a single train.⁴ With each truck yielding a congestion impact equivalent to roughly three passenger vehicles,⁵ maintenance of rail service for freight-intensive industries has clear benefits in terms of reducing congestion.

In addition, while the congestion impact of an average truck may be equivalent to that of three cars, the impact of the pavement damage caused by an average truck is many times greater. Although the exact cost of pavement damage from trucks depends on a number of factors, including axle configuration and roadway design, estimates suggest that one fully loaded tractor-trailer generates pavement damage equivalent to hundreds of cars. The Federal Highway Administration (FHWA) estimates that a single tractor-trailer of 80,000 pounds (the legal limit on interstate highways) inflicts pavement damage on urban interstate highways equivalent to the damage inflicted by roughly 410 passenger vehicles,⁶ while others estimate that a single 18,000-pound axle load inflicts 3,000 times more damage than a typical axle load.⁷

1 Bureau of Transportation Statistics. (2007). "National Transportation Statistics, Table 3-21: Average Freight Revenue Per Ton-mile." Retrieved 1/19/12 from http://www.bts.gov/publications/national_transportation_statistics/html/table_03_21.html.

2 *Ibid.*

3 Personal communication with Tracey Holloway, Associate Professor of Environmental Studies, Atmospheric and Oceanic Sciences, and Civil and Environmental Engineering, University of Wisconsin-Madison (2011, December 29).

4 Parsons Brinckerhoff Consulting (2009). Oregon Rail Study, Appendix L. Retrieved 1/19/2012 from http://www.oregon.gov/ODOT/RAIL/docs/Rail_Study/Appendix_L_Rail_Industry_Return_on_Investment_Calculations.pdf?ga=t.

5 *Ibid.*

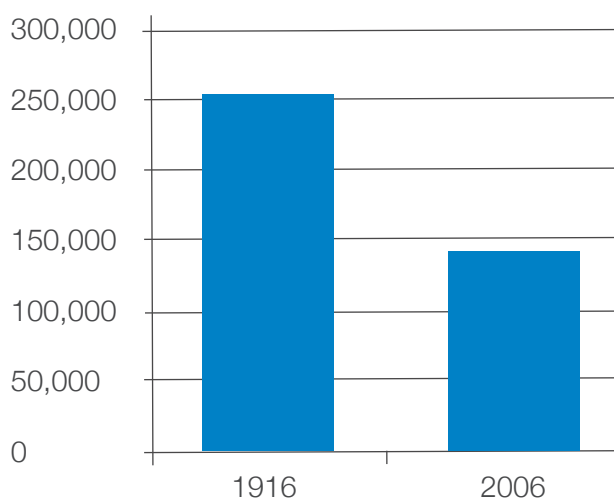
6 Federal Highway Administration. (2000, May). Addendum to the 1997 Federal Highway Cost Allocation Study. Retrieved 1/19/2012 from <http://www.fhwa.dot.gov/policy/hcas/addendum.htm>.

7 Advocates for Highway and Auto Safety. (2013, June). "The Dangers of Large Trucks." Retrieved 11/26/13 from <http://saferoads.org/dangers-large-trucks>.

What Is It?

While state DOTs generally focus on highways and roads, many of them are also involved in rail preservation activities. There are a variety of ways that states can improve freight rail service and accessibility: they can provide grants or low-interest loans to maintain or rehabilitate existing infrastructure in order to preserve rail service in places where it already exists, or they can provide funding to construct new infrastructure, such as industrial sidings or intermodal facilities. In addition, a number of states have acquired rail lines themselves. Because railroads are generally privately owned, some rail lines that might not be sufficiently profitable to justify private investment are worth maintaining or improving for economic development, congestion mitigation, or other purposes in the public interest.

Figure 1
Total U.S. Railroad Miles, 1916 and 2006



Railroads are and have long been an integral part of the national freight transportation system. However, due to both the growth of trucking as an alternative and changes in government regulations, rail service on lower volume lines throughout the United States is at risk of discontinuation. In many cases, rail lines that still provide public benefits could be abandoned without state support. Although private firms' decisions about freight shipment modes are ultimately based on cost, access, reliability, and travel time, providing financial support to maintain or improve freight rail service can help to divert freight movement away from highways. It also allows new businesses the option of shipping by rail when they might otherwise be forced to ship by truck.

Rail carries more than 40 percent of the United States' total freight ton-miles,⁸ but since the deregulation of the railroads in 1980, the largest (Class I) railroads have focused on high-volume, long-haul movements—such as transporting intermodal containers from Pacific Coast seaports to inland rail hubs and coal shipments from Wyoming's Powder River Basin to power plants in the eastern half of the United States—that allow them to capitalize on economies of scale in operations and revenue generation. As these railroads have focused on the largest shippers, they have increased prices and reduced service for many smaller shippers and have sought to shed their less profitable lines. Many branch lines previously owned by Class I railroads are now operated by short line (Class II and Class III) railroads (those with gross operating revenues below about \$400 million per year) that collect carload freight from smaller shippers and generally transfer it to a Class I railroad for the long-distance portion of its trip. In areas of sufficient demand, this arrangement has worked to provide adequate rail service for shippers, but in some areas of lower demand, rail service has ceased.

As shown in Figure 1, the number of railroad miles in the United States has declined by 45 percent, from a peak of more than 250,000 in 1916 to 140,000 in 2006.⁹

8 Association of American Railroads. (2008, May). *Overview of America's Freight Railroads*. Retrieved 11/23/13 from <https://www.aar.org/keyissues/Documents/Background-Papers/Overview-US-Freight-RRs.pdf>.

9 American Association of Railroads, as cited in: Weatherford, B. A., Willis, H. H., & Ortiz, D. S. (2008). *The State of U.S. Railroads: A Review of Capacity and Performance Data*. RAND Corporation. Retrieved 8/9/12 from http://www.rand.org/pubs/technical_reports/2008/RAND_TR603.pdf.

In areas where rail service has been discontinued, shippers who had previously been reliant on rail are forced to move their freight by truck for at least the first leg of the trip, transferring it to a Class I railroad at a logistics park, transload center, or grain consolidation facility. Although this situation is perfectly acceptable from the perspective of the Class I railroad, both shippers and the public feel the pinch. Shippers are forced to pay more for highway transportation, reducing the viability of businesses dependent on the movement of heavy low-value goods, and the public bears the cost of additional heavy truck traffic.

From the narrowest perspective of a state DOT interested primarily in maintaining highway assets, supporting freight rail service on lines facing abandonment or in need of rehabilitation may be a more cost-effective alternative than allowing rail service to cease and increasing funding for maintenance and/or highway capacity expansion to accommodate the additional freight shifted onto the state's highways. A study analyzing Kansas DOT's State Rail Service Improvement Fund (SRSIF), which provides loans and grants to support short line rail service in the state, estimated that each dollar spent on SRSIF program loans and grants resulted in more than two dollars of public sector benefits, including state and local tax revenues and reduced highway maintenance spending.¹⁰ Even excluding public sector tax revenues, the highway maintenance cost benefits of SRSIF grants were found to outweigh expenditures.¹¹

While states differ in the highway revenues they derive from combination trucks and the costs attributable to these vehicles, the FHWA has estimated that, at the federal level, there is a significant discrepancy between the revenues generated from highway-user fees on these vehicles and their share of highway agency costs. The Federal Highway Cost Allocation Study estimated that combination trucks pay only about 80 percent of their federal highway cost responsibility through highway-user fees, while passenger cars pay approximately 100 percent of their cost responsibility.¹² In addition, support for freight rail service by state DOTs can be justified as a way to spur economic development and reduce emissions.

Implementation

How and under what conditions states should provide financial assistance to railroads or involve themselves in providing rail service is a complicated issue. Railroads are unique among industries. They are extremely capital intensive, and are restricted to operating on tracks they own or on which they have operating rights. Moreover, the cost and regulatory obstacles associated with constructing new rail lines are often prohibitive. Railroads are also the only surface transportation mode that is almost entirely privately owned and operated. While highways and waterways are publicly maintained and generally accessible to a wide variety of private carriers, railroad track is generally maintained by the railroad companies themselves, which often require a high return on investment in order to justify expenditures to maintain or improve their infrastructure. Providing public funds for rail maintenance and improvements allows the public sector to support rail transportation services that are in the public interest but may not provide a high enough level of return to generate sufficient private investment.

Many states currently provide assistance to short line railroads and shippers, and occasionally to port authorities, communities, or other entities, in the form of low-interest loans and grants to support rail infrastructure improvements. These programs typically receive state funding to the tune of several million dollars annually. Matching funds from the applicant are generally required for state assistance.

10 Kansas Department of Transportation. (2005). *Review of the Kansas Railroad Rehabilitation Program*. Retrieved from <http://ssti.us/wp/wp-content/uploads/2011/12/rehstudy2005.pdf>.

11 *Ibid.* \$11.96 million is the ten-year present value highway maintenance cost savings realized as a result of the acquisition of the Central Kansas Railroad by the Kansas and Oklahoma Railroad, facilitated by a grant of \$11.5 million through the SRSIF program.

12 Federal Highway Administration. (2000). *Addendum to the 1997 Federal Highway Cost Allocation Study Final Report*. Retrieved 8/1/12 from <http://www.fhwa.dot.gov/policy/hcas/addendum.htm>.

Some states own railroad infrastructure to ensure continued maintenance and passenger and/or freight service. While Alaska is the only state that owns a fully functioning passenger and freight railroad, other states own track or right of way, which has often been purchased in order to preserve service for rail-dependent industries or to preserve a rail corridor for the resumption of rail service at some time in the future.

Case Studies

Kansas: Loans and Grants to Support Freight Service on Privately Owned Rail Lines

Kansas DOT's SRSIF, started in 1999, currently offers \$5 million per year in loans and grants to improve rail access for businesses and preserve the condition of the state's short line rail network.¹³

Funding is available for projects that improve the condition or expand the capacity of short line railroads in the state or that can be used to recruit or expand businesses in the state by providing improved access to the state's rail network. Eligible applicants include local governments, short line railroads, port authorities, and shippers.

The local match for SRSIF funding is generally 30 percent, although other match amounts may be considered on a case-by-case basis.

Kansas requires that applicants for funding demonstrate:

1. That the benefit-cost ratio of the proposed project exceeds 1.0;
2. That operations will be made more efficient by raising the minimum operating speed on the line;
3. That the project will result in road or highway maintenance cost savings for the state and local government entities; and
4. A commitment of capital or a guarantee of a set amount of rail traffic by local shippers, government entities, or other interested parties to the applicant for the continued operation of rail service for which funding is sought.

In addition, completed projects must meet infrastructure standards set by the state as well as Federal Railroad Administration (FRA) and the American Railway Engineering and Maintenance-of-Way Association guidelines. In order to ensure that all projects have been built to required standards, all projects will receive a final inspection by a third-party FRA-certified track inspector.

Recipients of SRSIF loans and grants must agree to continue service for ten years on a line for which SRSIF program assistance was provided. If service on the line is discontinued after less than ten years, SRSIF loans must be repaid in full. If service is discontinued after less than ten years on a line that has been preserved using SRSIF grant funding, a pro rata share of the grant, based on the time the line remained in operation following the completion of the project, must be repaid.

Kansas' guidelines for SRSIF projects help to protect the interests of Kansas taxpayers by ensuring that there is an adequate need for funded projects, that the funded projects will benefit the state, and that the projects will be constructed to appropriate standards.

According to a 2005 study analyzing the efficacy of the SRSIF, the program has enabled higher train

¹³ Kansas Statute 75-5048: Rail service improvement program; rail service improvement fund; requirements; restrictions; funding. Retrieved from http://kansasstatutes.lesterama.org/Chapter_75/Article_50/75-5048.html.

speeds on short line railroad track, reduced derailments, extended the service life of existing rail lines, and improved capacity in rail yards. Based on the operational benefits accruing to shippers from rail rehabilitation projects during the first six years of the program, the benefit-cost ratio of the program was found to be nearly 9:1.¹⁴ The combined ten-year present value of public sector benefits for state and local tax revenues and highway maintenance cost savings resulting from the program was estimated at \$43.7 million, more than three times the state expenditure on SRSIF grants during this period and more than double the total SRSIF program expenditures for grants and loans combined.¹⁵

Alaska and North Carolina: State-Owned Railroad Companies

While a number of states own railroad track, only Alaska and North Carolina own railroad companies, the Alaska Railroad Corporation (ARRC) and the North Carolina Railroad Company (NCRR), respectively. Both of these companies function like private entities but because they are owned by their states, they do not have to pay dividends to private shareholders, allowing them to invest much more of their revenue into maintaining and improving their facilities for the benefit of their states. Amtrak and Norfolk Southern provide passenger and freight service on the NCRR track, while the ARRC provides passenger and freight service directly.

Alaska Railroad Corporation

Alaska is unique among states in owning and operating a railroad that provides both freight and passenger service, operating from Seward and Whittier in the south to Fairbanks in the state's interior. Unlike other State of Alaska agencies, the ARRC is incorporated and run like a private business.¹⁶ The ARRC receives no operating funds from the state, nor are its employees state employees.

The ARRC has been owned and operated by the State of Alaska since 1985, and is governed by a seven-member board of directors appointed by the Governor of Alaska, according to the provisions of the Alaska Railroad Corporation Act (AS 42.40). Prior to 1985, the railroad was federally owned and operated.¹⁷ It was first established in 1914 to move gold and other minerals from the state's interior to the coast for shipment south.

The railroad currently operates 467 miles of main line track, with an additional 184 miles made up of branch lines, sidings, and rail yard track. A 2005 report detailing the economic significance of the ARRC found that its average annual in-state expenditures of \$108 million between 2001 and 2003 supported 799 railroad jobs and 1,100 non-railroad jobs in the state, with an annual payroll of \$83 million.¹⁸ Other benefits of the railroad to the state include lower transport costs for heavy bulk commodities and regular passenger services.

Revenue generated by the ARRC is retained and managed by the corporation for railroad and related purposes, in accordance with the Alaska Railroad Transfer Act.¹⁹ Because the ARRC is operated for the benefit of the people of Alaska, the corporation is exempt from taxation.²⁰

14 Kansas Department of Transportation (2005). Review of the Kansas Railroad Rehabilitation Program. Retrieved from <http://ssti.us/wp/wp-content/uploads/2011/12/rehstudy2005.pdf>.

15 *Ibid.*

16 For more information, see Alaska Railroad's website at <http://alaskarailroad.com/>.

17 Alaska State Legislature. (1982). Alaska Railroad Transfer Act. Retrieved 1/31/12 from http://alaskarailroad.com/Portals/6/pdf/corp/Corp_ARTA_2005.pdf.

18 Tuck, B. & Killorin, M. (2005, March). *Research Summary of Economic Significance of the Alaska Railroad*. Institute of Social and Economic Research, University of Alaska–Anchorage. Retrieved 1/4/12 from <http://www.alaskarailroad.com/Portals/6/pdf/corp/ISER%20report%203-16-05.pdf>.

19 State of Alaska. *Statute 42.40.530. Revenue*. Retrieved 1/31/12 from <http://touchngo.com/lglcntr/akstats/Statutes/Title42/Chapter40/Section530.htm>.

20 State of Alaska. *Statute 42.40.910. Exemption From Taxation*. Retrieved 1/31/12 from <http://touchngo.com/lglcntr/akstats/Statutes/Title42/Chapter40/Section910.htm>.

North Carolina Railroad Company

North Carolina's ownership of the NCRR may represent a more feasible model than the ARRC for states interested in railroad ownership but not in handling day-to-day operations.²¹ While the NCRR functions like a private corporation, any dividends received by the state must be used by the North Carolina DOT for the improvement of railroad property, as recommended and approved by the railroad's board of directors. The improvements may include the following project types²²:

1. Railroad and industrial track rehabilitation;
2. Railroad signal and grade crossing protection;
3. Bridge improvements;
4. Corridor protection; and
5. Industrial site acquisition.

Unlike the ARRC, the NCRR is not completely tax exempt. However, in 1995, it was reorganized as a Real Estate Investment Trust, to lower its federal tax burden, and with the passage of the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) the NCRR became largely tax exempt under Section 11146.²³ In 2010, the NCRR had net income of \$1.7 million and paid only \$60,000 in income taxes.

According to a 2007 study estimating the economic impact of the railroad, the NCRR contributes roughly \$338 million to North Carolina's economic output each year.²⁴ In addition, the report estimated the value of improved road safety and reduced pavement damage and emissions to be at least an additional \$65 million per year.

Although the State of North Carolina contributes to the maintenance and improvement of NCRR facilities, the fact that the NCRR is owned by the state and reinvests its profits in maintenance and improvements means the state can be confident that its investment is not simply a handout to a private company. While there is a risk that the railroad providing service on the NCRR track, Norfolk Southern, could receive excessive benefits as a result of the state funding maintenance and improvement activities, the terms of the operating lease can be renegotiated in the future to correct such imbalances.

While the ARRC is an historical anomaly and it is unlikely that another state would be interested in acquiring and operating a railroad, it represents a valuable example of a railroad being operated more akin to a public utility than a private company. The NCRR model potentially provides a more likely alternative for states that are interested in the acquisition of track to maintain freight or passenger rail service but not in handling day-to-day railroad operations. Through state ownership of a railroad company that can negotiate mutually beneficial service agreements with passenger and freight rail carriers, states can help to ensure that the public will benefit from its ownership of railroad infrastructure and reduce the potential that it will generate undue benefits for private interests.

21 For more information, see NCRR's website at <http://www.ncrr.com/>.

22 State of North Carolina. General Statutes §124-5.1 State use of North Carolina Railroad dividends. Retrieved 1/31/12 from http://www.ncleg.net/enactedlegislation/statutes/pdf/bychapter/chapter_124.pdf.

23 Available at: http://www.nhtsa.gov/nhtsa/Cfc_title49/PL109-59.pdf.

24 Heller, et al. (2007, May). *The Economic Impact of the North Carolina Railroad: Summary of Findings*. Prepared by RTI International and University of North Carolina—Charlotte for the North Carolina Railroad Company. Retrieved 7/24/12 from http://cai-dev.com/~ncrr/wp/wp-content/uploads/2011/10/Exec-Summary-final_printing1.pdf.

Resources

American Association of State Highway and Transportation Officials & American Short Line and Regional Railroad Association. State Financing Programs for Short Line Railroads. http://rail.transportation.org/Pages/rail_success.aspx.

This website provides brief descriptions of short line railroad support programs in many states and links to program websites.

CTC & Associates, for the California Department of Transportation, Division of Research and Innovation. (Revised 2011, June 21). Rail Preservation Programs: A Survey of National Guidance and State Practice—Preliminary Investigation, http://www.dot.ca.gov/newtech/researchreports/preliminary_investigations/docs/rail_preservation_preliminary_investigation_6-21-11.pdf.

This report provides detailed descriptions of state railroad support programs as well as descriptions of and links to a variety of resources, and is a good starting point for those interested in learning about state-level rail preservation programs.

National Cooperative Highway Research Program, Transportation Research Board. (2007). Preserving Freight and Passenger Rail Corridors and Service, NCHRP Synthesis 374. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_374.pdf.

This synthesis report details rail preservation strategies and profiles six rail preservation success stories.

FOCUS AREA 6: PROVIDING EFFICIENT, SAFE FREIGHT ACCESS

Support Intermodal Freight Connections

The Opportunity

Freight and the movement of physical goods remain the backbone of the American economy and a key area of focus for restoring the nation's economic health. We move goods by water, air, and land, but these modes have separate and isolated oversight, planning, and funding functions. Supporting a smooth and efficient transition between modes is essential to reducing public expenses for highway maintenance and expansion and boosting economic growth.

Freight markets extend far beyond individual cities and regions. A single shipment often moves via multiple modes before reaching its destination. Coordination is needed between states and regions, between public and private sectors, and across modes to increase the efficiency of intermodal transfer activities, reduce pressure on overburdened highway corridors, and increase economic competitiveness.

Increasingly, state and national leaders are focusing on rebuilding the manufacturing sector, and goods production is steadily recovering. States that target resources and leadership attention on comprehensive freight programs, integrated with land use and mobility policies, will be in a better position to recover from the current economic downturn and thrive in the economy of the 21st century.

What Is It?

Because many states plan and manage their highways, rails, waterways, and airports separately from one another, the connections between these modes sometimes fall between the cracks. Many state DOTs have an almost exclusive focus on highways and often fail to optimize the connections between modes. Without sufficient access to rail transportation, businesses ship goods by truck that they could otherwise move by train. Moving goods by truck, which is considerably more expensive and fuel intensive than shipping by rail, reduces businesses' profitability. More importantly from a state DOT's perspective, each 100-car train can move as much freight as roughly 435 fully loaded trucks,²⁵ each of which generates hundreds of times the pavement damage of a typical passenger car.²⁶ When shippers are forced to move goods by truck that they would otherwise have transported by rail, these trucks clog highways and local streets, creating the need for additional capacity and more frequent pavement maintenance and repair.

Integrated planning and programming, and a focus on easing intermodal connections can help states optimize their existing freight system. Several activities DOTs can pursue to accomplish this include:

- Developing integrated freight plans,
- Investing in intermodal freight facilities, and
- Improving intermodal connectors.

Developing integrated freight plans. The first step to enhancing freight coordination is to develop and adopt an overarching and comprehensive plan for the design and operation of a multimodal state freight system. While most states have completed some form of a freight plan, many lack the

25 Iowa Department of Transportation website. Retrieved 7/23/12 from www.iowadot.gov/compare.pdf.

26 Federal Highway Administration. (2000). *Addendum to the 1997 Federal Highway Cost Allocation Study Final Report*. Retrieved 7/23/12 from <http://www.fhwa.dot.gov/policy/hcas/addendum.htm>.

level of detail that provides the redundancies and coordination necessary for a reliable and resilient freight transportation system. Freight plans should incorporate state and regional land use goals and economic development objectives. Studies by the National Cooperative Highway Research Program (NCHRP) have identified seven keys to success for integrated freight planning:²⁷

1. Establish a freight technical lead;
2. Understand the statewide freight system;
3. Link freight planning with transportation planning and programming;
4. Understand freight data needs;
5. Involve stakeholders;
6. Provide freight training and education;
7. Advocate for freight planning.

Investing in intermodal freight facilities. In today's global marketplace, goods come from around the world to meet consumer demand. Likewise, goods produced domestically are shipped nation- and worldwide in a globally integrated market. This often means that goods may make three or more transfers between modes before they reach their final destination. Facilities that link these different modes are critical to the efficient movement of goods, and states have an important role to play in coordinating the location of these sites and developing the transportation linkages that serve them.

Improving intermodal connectors. Connectors, critical roads and highways that link key ports and rail terminals to the highway network, often fall between the jurisdictions of state DOTs, port authorities, metropolitan planning organizations (MPOs), local governments, and private sector terminal operators and carriers.²⁸ These routes tend to be lower volume industrial roads and often have less vocal constituents than major commuter routes or transit lines.²⁹ State DOTs would benefit from working with other levels of government and the private sector to identify these key corridors for improvement. When states identify intermodal connectors that meet federal guidelines,³⁰ they should submit a proposal for inclusion of the facility as a link in the National Highway System.

Implementation

There are several ways states can increase the integration of their various freight systems and provide a more comprehensive picture of freight mobility for their state.

1. **Have a laterally integrated and economy-focused freight office.** Most states have a freight program, but these programs vary significantly from state to state. More often than not, they are a small unit, perhaps just one person, and, just as often, that person is more consumed with gathering the data necessary to report to federal agencies than thinking strategically about the freight networks of the state. Strategic planning means that the freight program cannot be isolated within a truck or train silo. It must coordinate with state land use planning, economic development, and multimodal passenger transport planning. Investments in freight delivery should not come at the expense of other state objectives. Rather, by elevating its role and insisting on strategic integration, intermodal freight planning can enhance and support state objectives, and, in turn, other activities can be designed to support freight.

27 Extracted from NCHRP Report 594: *Guidebook for Integrating Freight into Transportation Planning and Project Selection Processes*. Retrieved 9/19/13 http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_594.pdf.

28 Cambridge Systematics, Inc. (2003). *NCHRP Project 8-36: Intermodal Freight Connectors: Strategies for Improvement*. Prepared for Transportation Research Board. Retrieved 8/10/12 from [http://intermodal.transportation.org/Documents/8-36\(30\)connectors.pdf](http://intermodal.transportation.org/Documents/8-36(30)connectors.pdf).

29 *Ibid.*

30 Federal Highway Administration. (1997). *Federal-Aid Policy Guide, Subchapter E—Planning, Part 470—Highway Systems*, Appendix D—Guidance Criteria for Evaluating Requests for Modifications to the National Highway System. Retrieved 6/28/12 from <http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0470a.htm#appd>.

2. **Develop an intermodal freight plan.** Federal regulation requires that every state transportation plan include a freight component. The quality and depth with which states meet this requirement, however, varies greatly. Some simply acknowledge the need and priority to move freight. Much more useful are those states that identify key truck, rail, and water routes, major freight generators, and the linkages between them. States should reach out to local governments and MPOs as well as shippers and carriers in the private sector to better understand the needs of each. By working proactively with private sector partners, the state can identify areas of future demand and target existing chokepoints for improvement. This process can help states to identify key highways and roads as intermodal connections and support their inclusion as such in the National Highway System.
3. **Modernize intermodal facilities.** There is often an uncertain relationship between states and intermodal transfer facilities. These transfer facilities are the essential nodes that connect the various systems; however, while critical to a state's economy, they are typically not state-owned assets. When modernization of these facilities is necessary and budgets are tight, public-private partnerships can assist, providing dividends to the states.
4. **Work closely with local governments, MPOs, neighboring states, and the private sector.** Although freight movement is dispersed, metropolitan areas have a critical and leading role to play in delivering a strong freight system. MPOs work with states and local governments to improve transportation in their regions and often have a better understanding of the critical routes serving freight-intensive industries. Developing inter-state working relationships through invested groups can help coordinate freight investments across states and ensure they are based on a common network, shared priorities, and logical timing.

Case Studies

Maryland: Port of Baltimore

The State of Maryland provides a good example of a state at the forefront of change heading into the new economy. In partnership with private industry and with an eye on global transportation changes, Maryland is adapting the critical freight facilities of one mode in response to changes in another.

The Port of Baltimore supports more than 50,000 jobs and \$3.2 billion of economic activity for the region and the state—plus thousands more jobs and many millions of dollars in related activity.³¹ As a deepwater seaport, the port is a major national asset for global imports and exports as well.

For more than 100 years, the Howard Street Tunnel provided a critical link serving the port and freight rail transport up and down the east coast, but the tunnel is not adequate for the needs of the next century. The nature of shipping is changing, with ships growing in size in response to the widening of the Panama Canal, set for completion in 2014.³² The Howard Street Tunnel's "single track, single stack" format, which was once an asset to freight mobility, has now become an obstacle to getting these larger shipments onto the national railroad network.

31 Maryland State Archives. (2012, June 6). "Maryland at a Glance. Waterways: Port of Baltimore." Retrieved 8/9/12 from <http://www.msa.md.gov/msa/mdmanual/01glance/html/port.html>.

32 Halsey III, A. (2012, March 28). "Aging Baltimore tunnel a threat to shipping economy for the city and Maryland." Washington Post. Retrieved 9/19/2013 from http://www.washingtonpost.com/local/trafficandcommuting/aging-baltimore-tunnel-a-threat-to-shipping-economy-for-the-city-and-maryland/2012/03/28/gIQAjYCVhS_story_2.html.

The tunnel is too short to carry trains with a double stack of shipping containers, and it is too constrained to easily adapt. The city has grown up around the tunnel, and the adjacent development restricts raising, lowering, or widening the tunnel. In addition, despite being critical to the regional and state economy, the tunnel doesn't belong to the state—it belongs to the transportation company CSX.

The cost of reconstructing the tunnel is estimated at \$3 billion, too expensive of a project for private industry or the state alone to fund. In order to solve this problem, the State of Maryland has partnered with CSX to provide a new transfer station south of the tunnel capable of receiving double-stacked trains, removing a stack for the run through the tunnel, and restacking again on the other side of the pinch point. While imperfect, it is creative, and at just \$160 million, a much lower cost than reconstructing the tunnel.³³ The project demonstrates that Maryland is committed to maintaining the vitality of the port economy and responding to changing freight market trends.

The Howard Street Tunnel project illustrates the interdependency of freight mobility: a port project affects a rail project which will also affect trucking connections, all of which have effects on consumer markets and several job sectors.

Indiana: Multimodal Freight and Mobility Plan

In July 2009, the Indiana DOT released the Indiana Multimodal Freight and Mobility Plan, which assessed the condition of the freight systems in the state and the increasing pressure being put upon them (from freight operators as well as other system users). The report concluded, "What is clear is that no single mode of transportation will sufficiently serve the growing demand for the movement of goods and passengers in Indiana. What is needed is a coordinated multimodal freight network."³⁴

The plan was developed through collaboration with a broad group of stakeholders that included neighboring states and the state economic development corporation. This collaboration revealed the demands on the various modal systems and the intermodal facilities that integrate them, but also highlighted the economic impacts of integrated freight system planning for job creation and affordability of goods to consumers. Lowering transport times, increasing travel time reliability, and increasing freight transportation efficiency make the state more attractive to industry. Indiana estimates that "freight-intensive" industries in the state account for 43 percent of gross state product and 38 percent of the state's employment, and cost-effective transportation is a key factor in the economic competitiveness of these industries.³⁵

Anticipating, planning, funding, and implementing a system that maintains economic health and vitality is a top priority for the state. Goods movement in the manufacturing and retail sectors is dominated by trucking services, which are often challenged by increasing highway congestion. Intermodal planning provides a way to improve trucking services and design redundancies into this system in a changing world.

The Indiana study is a model in integrated and collaborative planning that combines current industry needs and challenges with anticipated economic market demands in the future.

33 *Ibid.*

34 Indiana Department of Transportation. (2009, July 9). *Indiana Multimodal Freight and Mobility Plan*, p. 1. Retrieved 9/19/13 from <http://www.in.gov/indot/files/FreightMobilityPlan.pdf>.

35 *Ibid.*

Resources

Goodchild, A. (2011). Defining the Washington State Truck Intermodal Network. Prepared for the Washington State Department of Transportation. <http://www.wsdot.wa.gov/research/reports/fullreports/783.1.pdf>.

This report provides criteria for use in defining the state's intermodal network and reviews criteria used in other states to identify key intermodal facilities.

Rahall Transportation Institute at Marshall University & Wilbur Smith & Associates. (2004). Meeting the Transportation Challenges of the 21st Century: Intermodal Opportunities in the Appalachian Region, Intermodal Case Studies. Prepared for the Appalachian Regional Commission. http://www.arc.gov/assets/research_reports/MeetingTransportationChallengesIntermodalopportunitiesintheAppalachianRegion3.pdf.

This study builds on the companion regional study of commodity movements within the Appalachian region and between the region and the rest of the world by transportation mode, identifying exemplary case studies of intermodal initiatives and opportunities in the Appalachian region.

Wilbur Smith & Associates. (2009). Arizona Multimodal Freight Analysis Study, Technical Memorandum #3: Strategic Directions for Freight Planning in Arizona. Prepared for the Arizona Department of Transportation. http://mpd.azdot.gov/mpd/systems_planning/PDF/freightstudy/Arizona_Multimodal_Freight_Analysis_TM3_Final_Feb.pdf.

This report offers a menu of options for integrating freight considerations into the Arizona DOT's planning functions. The strategy's recommendations touch on all modes operating within the state.

FOCUS AREA 6: PROVIDING EFFICIENT, SAFE FREIGHT ACCESS

Foster Win-Win Outcomes for Freight and Passenger Rail

The Opportunity

With only a handful of exceptions, privately owned freight rail lines are the backbone of the passenger rail system. Many regional commuter rail systems operate at least a portion of their service on freight rail lines or rights of way.

Freight and passenger railroads often have an uneasy relationship. As oil prices have climbed and roadways have become more congested, demand to move people and goods by rail has steadily increased.³⁶ At the same time, deregulation has led railroads to restructure or shed their lower volume lines. Because new rail lines and capacity improvements are difficult to establish today, freight railroads are trying to protect the limited capacity that remains, putting the squeeze on passenger rail.³⁷ Concerns that inhibit the shared use of facilities by passenger and freight railroads include issues of safety, capacity, compensation, and liability.³⁸

Poor cooperation between freight and passenger railroads leads to inefficient use of rail infrastructure and additional strain on the highway network. When railroads are unreliable or inconvenient or lack sufficient capacity, shippers and passengers will increasingly rely on roads, leading to increased congestion and lower economic productivity.

States that can maintain strong freight rail operations alongside rich and reliable commuter and intercity train service can reduce transportation costs for businesses and individuals, increase sustainability, and reduce highway congestion and resultant maintenance and capacity expansion costs.

What Is It?

Because of the interstate nature of the freight system, policies and standards for integrating freight and passenger rail services come from the federal government. However, states still have a role to play in developing state rail plans, defining and advocating for state priorities, and strategically directing state funding to support these objectives. For example, they can establish new rights of way or acquire abandoned corridors. States often serve as the mediator, balancing freight and passenger demands and ensuring that expanded capacity for one does not decrease the other's operability.

Although passenger and freight rail infrastructure needs are similar, the financial, operating, and regulatory environments are radically different. Passenger rail is nearly universally provided by a public entity, commonly a transit authority or state department of transportation. Freight rail, on the other hand, is almost exclusively a private for-profit enterprise. It is not always easy to reconcile these competing interests, but there are steps state DOTs can take that benefit both sides and promote states' overall economic interests, including:

36 American Association of State Highway and Transportation Officials. (2007, February). *Transportation: Invest in Our Future: Future Needs of the U.S. Surface Transportation System*. Available at https://bookstore.transportation.org/item_details.aspx?ID=1003.

37 Prozzi, J. (2006, March). "Passenger Rail Sharing Freight Infrastructure: Creating Win-Win Agreements." Center for Transportation Research. The University of Texas at Austin. Retrieved 9/19/13 from <http://www.reconnectingamerica.org/resource-center/browse-research/2006/passenger-rail-sharing-freight-infrastructure-creating-win-win-agreements/>.

38 Association of American Railroads. (2013, November). *Freight and Passenger Rail: Finding the Right Balance*. Retrieved from <https://www.aar.org/keyissues/Documents/Background-Papers/Freight-and-Passenger-Rail.pdf>.

Acquire or construct rail corridors where necessary. States interested in expanding passenger service or providing freight service in underserved markets may need to acquire or construct new railroad infrastructure themselves. Service on state-owned lines may be provided by private short line railroads, Amtrak, and/or commuter railroads.

Upgrade track and communications networks on existing lines. Railroads are some of our oldest transportation infrastructure—many sections of track are over 100 years old. While generally adequate for freight transport, where speed is typically less of a factor, poor track conditions hinder passenger transportation. Providing aid to rail owners to improve track conditions and upgrade signal technology with grants or low-interest loans can enable cost-effective passenger rail operations, improve the speed and reliability of freight operations, and reduce pressure on highways.

Improve state rail planning. To receive federal aid, states are required to create plans that outline rail infrastructure priorities and objectives for both passenger and freight. However, these plans vary widely in quality and timeliness. Plans that describe the state's existing rail system in detail, including industries reliant on the system and their economic importance to the state, and define clear objectives and priorities can form a foundation that will lead to increased capacity and service reliability, reduced travel times, cost efficiencies, and improved asset conditions.

Implementation

Expanding passenger and freight rail services, and strengthening cooperation between the two, can provide states with a strong return on investment. A small investment in better information and rail management can bring a big return in network efficiency, market competitiveness, and quality of life. States can improve passenger and freight rail service by taking the following steps:

- 1. Take an inventory of assets.** Rail lines crisscross states. Many of these are active rail corridors, but many others are dormant or abandoned. Likewise, many state DOTs are not fully informed of the extent and condition of their railroad networks. In 2005, California created an inventory of all rail corridors in the state,³⁹ which is now helping state transportation leaders map out opportunities for new rail services to meet rising passenger and freight demand.
- 2. Designate a rail coordinator or office.** Many state freight offices are understaffed, sometimes consisting of just one employee. However, having focused and designated leadership on rail issues is essential to advancing both passenger and freight rail priorities, and to navigating the complicated channels of ownership, policy, operations budgets, and regulatory requirements. A rail coordinator is typically responsible for coordinating a state's rail plan development, keeping it current, and tracking implementation progress.
- 3. Manage public expectations and leverage political partnerships.** Counter-intuitively, vocal public support for passenger rail can diminish the state's negotiating power with private railroad holding companies. In the United States, the railroads have enormous power—not only do they own the rights of way on which passenger service depends, but they are protected from the state's eminent domain powers. This puts the state in a difficult negotiating position, which can be made even more difficult if the state has made commitments to the public to deliver service and rights of way before securing the necessary rights or agreements. Railroad owners know when credibility is on the line and may use it to their advantage. As a result, it is important to secure agreements before stimulating public enthusiasm. Likewise, it is important

39 Simpson, David P. (2007). *NCHRP Synthesis 374: Preserving Freight and Passenger Rail Corridors and Service*. Transportation Research Board. Retrieved 9/19/2013 from http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_374.pdf.

to keep national legislators engaged in passenger and freight rail, as they can have tremendous influence over the freight rail financial and regulatory environment.⁴⁰

4. **Build trust.** Trust is essential to improving the relationship between passenger and freight railroads. Developing an open and accessible rapport between state leadership and freight railroads builds trust, allows candid discussions about needs and concerns, and can lead to mutually beneficial solutions. Building trust takes work, time, and focus, but because rail facilities are in place for decades, it is worth the effort.
5. **Improve communication and coordination.** Communication is the key to maintaining quality passenger and freight services on shared alignments. Track maintenance activities and natural disasters can alter rail schedules and service reliability. While rail assets are owned by private corporations, they are vital parts of state transportation systems. Strong communication networks can reduce the impacts of unexpected incidents on passengers and freight shippers by allowing railroads to better respond to these events.
6. **Get smart on costs.** Compensating freight railroads for track access can be a contentious topic, and sorting out who is responsible for which costs can be difficult. Certain costs are easy to assign—passenger stations are a passenger cost, freight depots are the responsibility of freight alone—but how track maintenance, signalization, communication, and administration costs should be apportioned is less clear. Passenger rail service demands higher speed and safety standards, while freight railroads may be willing to accept slow speeds on some rail lines in order to reduce costs. For states to negotiate with railroads effectively, they need to understand the industry.

Case Studies

California: Rail Right-of-Way and Abandoned Corridors Inventory

Throughout the 1980s and 1990s, California's economy grew at a rapid rate. During the same period, the railroad deregulation of 1980 led to the restructuring of many freight rail operations. Low-density freight lines were abandoned or sold, even as the pressure for more passenger rail grew.

In 2001, the governor tasked Caltrans, the state transportation agency, to inventory the rail facilities and rights of way in the state (both active and dormant). A large, multidisciplinary stakeholder advisory committee analyzed links and segments based on their potential use for passenger rail service, bicycle or pedestrian connections, or joint use, and geographically coded each to create a comprehensive database. The 150-member committee represented diverse interests, including railway officials, transit providers, and regional and local representatives and activists.⁴¹

To rate the potential use or demand for the various segments, Caltrans and the advisory committee developed evaluation criteria. These included potential demand, connectivity, track geometry, safety, and congruence with local plans. Segments were then sorted into typologies from high-demand/high feasibility to low demand/low feasibility, based on their performance in each area.⁴² Caltrans gave the inventory to local and regional transportation agencies and authorities for their

40 Prozzi, J. (2006, March). "Passenger Rail Sharing Freight Infrastructure: Creating Win-Win Agreements." Center for Transportation Research. The University of Texas at Austin. Retrieved from <http://www.reconnectingamerica.org/resource-center/browse-research/2006/passenger-rail-sharing-freight-infrastructure-creating-win-win-agreements/>.

41 California Department of Transportation. (2005). *Rail Right-of-Way and Abandoned Corridors Study*. Retrieved 7/13/12 from http://149.136.20.80/rail/dor/assets/File/Report_Files/rowreport.pdf.

42 *Ibid.*

planning purposes and to prioritize corridors for acquisition or preservation. The database has been a valuable resource for regional and local planning authorities to identify and prioritize segments for acquisition and preservation. The database is a good example for other states interested in better understanding their rail assets and investing in the system to spur economic development.

Chicago Region: Environmental and Transportation Efficiency (CREATE) Program

Chicago is the nation's preeminent rail hub, where six of the nation's seven Class I rail lines converge and through which nearly one-quarter of all freight in the nation passes. Millions of passengers also rely on the region's rail system for their daily commute and for longer intercity trips. Rail conflicts have hampered the productivity of both passenger and freight rail, however, as demand has outpaced capacity over the last few decades.

Since 1983, when Metra, the regional commuter rail system, began service, ridership has grown nearly 50 percent, with the system now carrying more than 300,000 passengers per day.⁴³ Freight rail volumes have been growing as well, and are expected to double over the next 30 years.⁴⁴ As volumes have grown, service has suffered—freight trains that make the trip to Chicago from Los Angeles in 48 hours often take 30 hours just to pass through the Chicago region.⁴⁵

Recognizing the problem of rail congestion in the region, in 2003 the State of Illinois, the City of Chicago, and the private rail operators announced the CREATE program: a long-term, \$3 billion public-private partnership designed to address these rail conflicts in order to improve efficiency and productivity for the region, the state, and the nation.⁴⁶

So far, 19 of 75 major planned CREATE projects have been completed. An additional ten are under construction, six are in final design, and 13 are undergoing preliminary engineering and environmental review. A majority of completed projects (including track construction and new control towers) have occurred in existing privately owned rail corridors with private railroads acting as the lead agency.⁴⁷ In addition, the Chicago DOT Viaduct Improvement Program (VIP) has corrected deficiencies at 58 rail viaducts.⁴⁸ Projects involving new grade separations have been slower to progress, due mainly to funding issues and environmental review, but promise large dividends in terms of rail efficiency public safety, local development, and environmental goals.⁴⁹

Not all of the proposed CREATE projects involve infrastructure improvements. The Common Operational Picture (COP) project involves development of a multi-railroad dispatch monitoring system for monitoring all train movements by all railroads operating in the region (including eight private freight railroads, Metra, and Amtrak). The system will have an open interface for integrating relevant information from the individual railroad dispatch systems into a single display. The expected benefit of COP is the ability to identify congestion and reroute trains as needed to improve travel times for the 1,300 daily freight and passenger trains in the region. A COP prototype has been developed and tested and final design of a district-wide system is underway.⁵⁰

43 CREATE program website. Retrieved 7/11/12 from <http://www.createprogram.org/>.

44 *Ibid.*

45 *Ibid.*

46 Federal Highway Administration. "Project Profile: Chicago Region Environmental and Transportation Efficiency Program." Retrieved 5/26/12 from http://www.fhwa.dot.gov/ipd/project_profiles/il_create.htm.

47 CREATE. (2013, November). "Status of CREATE Projects." Retrieved on 11/26/13 at http://www.createprogram.org/linked_files/status_map.pdf.

48 CREATE. (2013). "City of Chicago Viaduct Improvement Projects." Retrieved on 10/16/13 at <http://www.createprogram.org/factsheets/viaduct.pdf>.

49 CREATE. (2013, November). "Status of CREATE Projects." Retrieved on 11/26/13 at http://www.createprogram.org/linked_files/status_map.pdf.

50 CREATE. (2013). "Common Operational Picture Project Fact Sheet." Retrieved 11/18/13 from http://www.createprogram.org/factsheets/Common_Operational_Picture.pdf

The benefits of the projects completed thus far are substantial, with an estimated 28 percent reduction in freight rail delay and a 33 percent reduction in passenger delay.⁵¹ However, many other CREATE projects remain to be completed. Simulations suggest that, without the completion of these projects, freight train delay will climb from 46 to 143 minutes per 100 train miles and passenger delay will climb from 0.6 to 3.1 minutes per 100 train miles.⁵² Although delays are expected to grow even with the completion of the remaining CREATE projects due to increasing passenger and freight volumes, the impacts are expected to be much less severe, with total freight train delay expected to peak at roughly 76 minutes per 100 train miles in 2030 while passenger delay climbs to one minute per 100 train miles.⁵³

Resources

Association of American Railroads. (2011). Freight and Passenger Rail: Finding the Right Balance. <https://www.aar.org/keyissues/Documents/Background-Papers/Freight-and-Passenger-Rail.pdf>.

This two-page document summarizes key principles for expanding passenger rail service without harming the freight rail industry.

California Department of Transportation. (2005). Rail Right-of-Way and Abandoned Corridors Study. http://149.136.20.80/rail/dor/assets/File/Report_Files/rowreport.pdf.

This study evaluates the potential for combined passenger and freight service on active freight rail segments, resumption of service on out-of-operation lines, “rails with trails” along rail corridors, and new uses for out-of-operation lines. Segments across the state were rated based on their potential for joint use or re-use. A key component described in the study is the production of both rail right-of-way and bicycle/pedestrian trail databases.

CREATE Program Website. <http://www.createprogram.org/index.htm>.

This website provides information about CREATE’s projects, program goals, and partners, as well as additional information about the program.

Jolanda, P. (2006, March). Passenger Rail Sharing Freight Infrastructure: Creating Win-Win Agreements. Center for Transportation Research. The University of Texas at Austin. http://www.utexas.edu/research/ctr/pdf_reports/0_5022_1.pdf.

This report is a summary of the environments in which public agencies and private railroads operate and negotiation issues and concerns regarding passenger trains operating on freight railroad infrastructure.

National Coordinated Highway Research Program. (2010). NCHRP Report 657: Guidebook for Implementing Passenger Rail Service on Shared Passenger and Freight Corridors. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_657.pdf.

This guidebook provides support and guidance for passenger rail authorities seeking to initiate, expand, and operate passenger rail services on shared passenger and freight corridors.

Young, E. & Kresge, J. (2003). Building Planning Capacity Between Public and Private Sector Partners in the Freight Industry. The Federal Highway Administration and National Association of Regional

51 *Ibid.*

52 *Ibid.*

53 *Ibid.*

Councils. http://narc.org/uploads/freightresourcesmanual_final.pdf.

This resource manual compiles best practices and critical issues in freight planning for regional transportation planners throughout the United States.

FOCUS AREA 6: PROVIDING EFFICIENT, SAFE FREIGHT ACCESS

Encourage Innovative Freight Delivery

The Opportunity

Getting freight to customers requires moving trucks through urbanized areas where multiple users compete for valuable street space. In many cities, land prices have caused warehouses and distribution centers to move away from freight consumers, such as shops, restaurants, and stores. Getting goods from ports or terminals to market often means long hauls by vehicles too large to easily move through congested urban settings. Delivery trucks also compete with other road users for limited on-street parking space to unload their goods, sometimes double parking their vehicles and blocking vehicle traffic and bicycle lanes.

By taking a leadership role in facilitating efficient freight delivery and integrating freight, land use, and broader transportation policies, states can reduce congestion and the need for increased capacity, stimulate economic development, and reduce air pollution.

What Is It?

While freight delivery is absolutely crucial to state economies, it is generally uncoordinated and not normally integrated into land use plans. When major freight hubs like ports become clogged with truck traffic, businesses face expensive product delays and higher transportation costs. However, better planning and coordination through initiatives such as intermodal freight villages, real-time information sharing across the distribution chain, and congestion management can increase the efficiency of freight delivery, create jobs, and support economic growth. States recognize the challenges associated with freight delivery and have taken a variety of approaches to improving freight mobility.

One statewide freight plan, the Freight, Goods, and Services Mobility Strategy Plan in Florida, called for clustering freight and making better use of intermodal facilities. In California, a state mandate to produce a congestion plan at the choked Ports of Long Beach and Los Angeles resulted in a successful private sector effort to increase port hours and decrease peak period truck trips by 24% in a one-year span. (See case studies below.)

Sharing freight policy and infrastructure information. In order to implement delivery time restrictions or incentives, designate or revise a truck route network, or foster freight intensive land uses in appropriate locations without generating land use and transportation conflicts, decision makers need to understand freight transportation patterns and the freight policy landscape. The first step is to understand where key freight nodes and transportation corridors are located. Next, because freight crosses jurisdictional boundaries, it is important to understand policies in nearby jurisdictions that impact freight movement. Regional planning agencies and states are well positioned to collect and distribute this type of information to their constituent jurisdictions and to take the lead in efforts to harmonize regional freight land use and transportation policies.⁵⁴

Two MPOs embracing a leadership role in this area are the Delaware Valley Regional Planning Commission (DVRPC), in the Philadelphia area, and the Chicago Metropolitan Agency for Planning (CMAP). To help planners, businesses, and individuals understand the multimodal freight transportation

54 Holloway, B., and Spahr, C. (2013, September). *Getting the Goods without the Bads: Freight Transportation Demand Management Strategies to Reduce Urban Impacts*. Retrieved 11/25/2013 from <http://www.ssti.us/wp/wp-content/uploads/2013/10/Final-FreightReport1.pdf>.

network in the Philadelphia region, DVRPC has developed the Philly Freight Finder⁵⁵, an online freight mapping and data platform that identifies key freight centers and transportation corridors. In order to improve interjurisdictional coordination in the Chicago area, where locally designated truck routes sometimes dead end at municipal boundaries, CMAP is compiling a comprehensive freight policy database that will facilitate better policy coordination.

Clustering freight land uses. Freight villages are clusters of freight infrastructure such as warehouses and logistics centers with access to intermodal facilities. Storing goods near intermodal centers reduces truck travel because freight can be moved onto other modes, such as rail, for portions of the trip. Since distribution centers experience economies of scale, clustering many companies decreases the number of distribution centers needed.

In many communities, large swaths of land are zoned as industrial without any efficient land use planning specifically geared toward freight. In other cities, industrial land designations are disappearing. Having a clear plan for consolidating major freight facilities in places with excellent—and, ideally, intermodal—access to target markets lowers costs to the private market by achieving greater economies of scale. Creating a special zoning designation at freight hubs, particularly those accessible by rail or waterways, can encourage investment and prevent the loss of unique freight assets and associated jobs.

Managing Congestion. Congestion management tools such as freight curb allocation or pricing to shift delivery windows to uncongested periods makes loading and unloading more efficient, reduces backups at retail docks, and saves time and money for the trucker and all travelers on the system. Many cities control when and where trucks may travel. For example, Boston bans commercial vehicles from the downtown hub except from 6 p.m. to 11 a.m. Los Angeles DOT's Tiger Teams Curbside Management Program had been targeting specific corridors for enforcement and towing repeat offenders, but after speaking with the offenders and learning the challenges truck drivers face, the city established new loading zones.⁵⁶ These programs at the city level reduce congestion and speed delivery. At the state level, similar principles can be applied to major hubs. For example, upon concerns that the state of California would mandate fees on containers moved during traffic periods, the terminal operators at the Ports of Los Angeles and Long Beach formed a non-profit company, PierPass, to administer a program to promote off-peak delivery. As a result, nearly 60% of container moves now take place during off-peak hours.⁵⁷

Efficient and coordinated freight management. The movement of a good from its manufacturing place to the retailer often involves transport to numerous distribution centers, which, in many cases, don't know when to expect a shipment.⁵⁸ However, sharing real-time information on the whereabouts of containers, port delays, and traffic updates with manufacturers and shippers along the chain of distribution can decrease congestion and lower freight travel time. Shippers and carriers value transit time for truck shipments at \$25 to \$200 per hour, depending on the product being carried. However, travel time reliability is often just as important. The FHWA estimates that shipment delays impose per-hour costs on businesses that are 50 to 250 percent higher than standard transit time values.⁵⁹

55 Delaware Valley Regional Planning Commission. (Updated 2013, April). "Philly Freight Finder" website. Retrieved 11/25/13 from <http://www.dvrpc.org/webmaps/phillyfreightfinder/>.

56 Better Market Street. (2011, December). "Part 2.4: Loading and Delivery Management." *Better Market Street: Existing Conditions and Best Practices* (Part 2: Best Practices). Retrieved 11/25/13 from http://www.bettermarketstreetsf.org/docs/BMS_P2-4_BestPractices_12072011.pdf.

57 Windes & McClaughry Accountancy Corporation. (2013, April). *PierPass 2012 Financial Report*. Retrieved 11/23/2013 from <https://www.pierpass-tmf.org/Documents/pierpass-2012-financial-report.pdf>.

58 Butler, R. W. (2009, February). "Electronic Freight Management" *Public Roads* Vol. 72, No. 4. Federal Highway Administration. Retrieved 9/19/13 from <http://www.fhwa.dot.gov/publications/publicroads/09janfeb/06.cfm>.

59 Federal Highway Administration. (2004). *Freight Transportation: Improvements and the Economy*. Retrieved 9/19/13 from http://ops.fhwa.dot.gov/freight/documents/improve_econ.pdf.

Most major carriers track their shipments electronically, and many communicate electronically with customers, distribution centers, or other partners. However, the freight industry does not always openly communicate about goods movement⁶⁰ and, as a result, freight does not achieve the speed and accuracy that it could.⁶¹ The fact that UPS and Fed-Ex, two companies whose bottom line depends on speed and accuracy, utilize end-to-end electronic tracking shows the efficiencies to be gained from getting data online. The FHWA explored the concept of web-based, near real-time information and found that the freight industry could save an estimated \$2 billion annually through electronic supply chain management.⁶² Currently Kansas City leads the pack with its economic development non-profit, SmartPort.⁶³ SmartPort's web-based portal Trade Data Exchange helps make the supply chain transparent from the initial order to customer delivery. In February 2010, test runs of the program showed reductions in back orders due to improved knowledge of shipment arrival. Reduced back orders save companies money because back orders arrive in special shipments. With better knowledge of when shipments will arrive, retailers do not need to place a special back order. Multiplied over tens of thousands of shipments, reducing back orders creates significant savings.⁶⁴

Implementation

States can encourage innovative freight delivery and implement the strategies outlined above through the following activities.

Create a regional plan. Some freight villages and real-time information sharing efforts have started as a result of public sector strategy plans or feasibility studies. One of the key building blocks of a coordinated regional plan is a shared understanding of where and how freight is moving and the current policies that affect regional freight movement.

Develop public-private partnerships. Freight initiatives need buy-in from both the public and private side. Freight travels on public infrastructure (such as highways), but freight handlers work in the private market. A public agency like an MPO or a DOT has little sway with shipping companies, ports, airports, or other freight carriers. Inviting collaboration with shippers and carriers from the outset and emphasizing that reform can improve business profits through decreased delays can help bring the private sector on board.

Enable reform. Vocal state support for innovation can spur change, even when action is required by other levels of government or private industry. For example, the California assembly introduced a bill requiring the Ports of Long Beach and Los Angeles to develop a way to reduce congestion. The possibility of this bill becoming law motivated private sector stakeholders to create their own solution to congestion, as described below.

Create new policies. Some freight management initiatives consist of policy changes. For example, reducing freight congestion through curb management requires cities to change parking policies, and developing freight villages may require the planning board to create a new zoning category.

60 Butler, R. W. (2009, February). "Electronic Freight Management" Public Roads Vol. 72. No. 4. Federal Highway Administration. Retrieved 9/19/13 from <http://www.fhwa.dot.gov/publications/publicroads/09janfeb/06.cfm>.

61 Federal Highway Administration. (2006). "Electronic Freight Management Initiative." Retrieved 9/19/2013 from <http://ops.fhwa.dot.gov/freight/intermodal/efmi/index.htm>.

62 *Ibid.*

63 For more information, see "KC SmartPort" website at <http://www.kcsmartport.com/>.

64 Twiddy, D. (2010, February 28). "Kansas City SmartPort's shipment tracking system moves closer to delivering." *Kansas City Business Journal*. Retrieved 8/9/12 from <http://www.bizjournals.com/kansascity/stories/2010/03/01/story6.html>.

Case Studies

Orlando, Florida: Developing Freight Villages

The central Florida region, encompassing metropolitan Orlando, relies on tourism to fuel its economy, and the tourism industry relies on on-time and predictable freight deliveries. The Orlando region is especially crucial for freight movement, as 50 to 60 percent of Florida's north-south freight passes through the city. Realizing the economic damage caused by freight congestion, the Orlando region MPO (MetroPlan), the state DOT, Port Canaveral, and the Brevard MPO formed a coalition and created the Freight, Goods, and Services Mobility Strategy Plan in 2003. As part of this process, the coalition created a freight steering committee that included both public and private stakeholders. The coalition appointed MetroPlan to lead freight improvements recommended by the plan. Since MetroPlan, as an MPO, does not have regulatory authority, it was important to include local representatives on the freight steering committee to ensure a willingness to make changes.

The Orlando coalition's Strategy Plan recommended the creation of freight villages, calling on jurisdictions to assess local land use and development patterns and designate a freight village at a location with excellent access to the transportation network. Creating a special zoning destination of Warehousing and Logistics (WL) would include design standards specifically for freight, such as loading dock requirements, signal timing, and geometric standards. By investing in a hub for warehousing and distribution, the region provides intermodal connections for freight and today encourages larger-scale manufacturing. A freight village attracts businesses, which can lower their operating costs by relocating. For example, rather than running its own logistics center, a business that moves to a freight village can use the freight village's logistics center.⁶⁵

MetroPlan also used geographic information system analysis and stakeholder input to pick out 15 freight village locations and adopted the draft locations in its 2030 Long Range Transportation Plan. MetroPlan and its planning partners updated the 2003 Freight, Goods, and Services Study and released a new version in 2013. The emphasis continues to be on the nexus between land use and the transportation system.

Washington, DC: Managing the Curbs

Through a partnership with the district DOT (DDOT), the Department of Public Works, and a local business improvement district, Washington, DC developed a Downtown Curb Space Management Plan with the following objectives:

- Reallocate curb space with regulatory signage;
- Increase loading spaces from 40 to 100 feet if possible—loading was also moved to the ends of the blocks to make parking easier;
- Improve parking technology, using multi-space meters to free up sidewalk space and increase curb occupancy by removing pre-defined spaces and allowing people to park wherever they fit;
- Create metered loading zones to reduce all-day parking in loading zones;
- Improve parking enforcement—after rollout in 2007, increased enforcement in the study zone resulted in double the citations;
- Restrict trucks with more than two axles from parking during peak hours.

The DDOT and its partners also created two pilot locations for off-street loading in rear alleys. When possible, off-street loading and unloading is a great way to reduce congestion and travel time. The plan

⁶⁵ Federal Highway Administration. (2009). "Urban Freight Case Studies: Orlando." Retrieved from <http://ops.fhwa.dot.gov/publications/fhwahop10021/fhwahop10021.pdf>.

eventually aims to provide one commercial loading space for every 100,000 square feet of commercial space. The DDOT evaluated the program along a ten-block stretch of K Street and found statistically significant decreases in travel times for vehicles and cyclists.

While some cities do little to accommodate truck traffic, the district recognized that freight is integral to the city's economy and developed reforms to protect and bolster these economic benefits.⁶⁶

Reducing Congestion—Ports of Long Beach and Los Angeles, California

Freight volumes at the Ports of Long Beach and Los Angeles rose 39 percent from 2000 to 2004. Truck drivers, paid by the number of “turns,” or round trips per day, were losing pay, and increased congestion at the ports sacrificed the ability to complete a trip within a shift, especially since the ports only operated from 8 a.m. to 5 p.m.

The state had been pushing for an extension of port hours for several years, as freight volumes and congestion levels increased. The marine terminal operators (MTOs), however, were opposed to increasing their operating hours because that would raise their operating expenses. Then, in 2004, the state passed Assembly Bill 2041⁶⁷ to create a congestion management district and raise a congestion fee. The MTOs did not like this directive for several reasons: the congestion fee would go to a public authority (the congestion management district); the bill required stricter MTO reporting, which operators felt sacrificed competitiveness; and there was fear that revenues from the fee might be directed elsewhere.⁶⁸

Instead, the private sector created the non-profit PierPASS to meet the requirements of AB 2041 on the MTOs' terms and address emissions, congestion, and security issues. PierPASS created the OffPeak PierPASS program, which charges a traffic mitigation fee of \$66.50 per 20-foot container and \$133 per 40-foot container for imports and exports from 3 a.m. to 6 p.m. The fee pays for opening the port on four weeknights plus Saturday night, and is collected by ACS, the same company that operates E-ZPass, the electronic toll collection system. The fee increases annually, based on labor rates from the Pacific Maritime Association. The Beneficial Cargo Owners are responsible for paying the fee, instead of the trucking companies or ocean carriers. There was widespread support for the OffPeak PierPASS program, from policymakers to adjacent neighborhoods to business groups.⁶⁹ In 2007, an opinion survey of truck drivers reported reduced congestion (66 percent), increased delivery trips (45 percent), and higher earnings (37 percent).⁷⁰ Increased operating hours also created jobs. The program has managed to shift approximately 60,000 trips per week to off-peak hours.

The MTOs would not have opened their doors to off-peak business without legislative pressure, which pushed businesses to form their own solution. The program has been widely embraced by the MTOs, the truck companies, and the local community.

66 Federal Highway Administration. (2009, January). FHWA Operations Support—Port Peak Pricing Program Evaluation. Retrieved 8/9/12 from <http://ops.fhwa.dot.gov/publications/fhwahop09014/sect2.htm>.

67 California State Legislature. (2004). Assembly Bill 2041. Retrieved 9/19/13 from ftp://www.leginfo.ca.gov/pub/03-04/bill/asm/ab_2001-2050/ab_2041_cfa_20040625_152408_sen_comm.html.

68 Federal Highway Administration. (2009, January). FHWA Operations Support—Port Peak Pricing Program Evaluation. Retrieved 8/9/12 from <http://ops.fhwa.dot.gov/publications/fhwahop09014/sect2.htm>.

69 *Business Wire*. (2005, July 23). “PierPASS Launches OffPeak Program Today at Los Angeles and Long Beach Ports; Port-Wide Saturday and Night Shifts Tackle Congestion and Pollution.” Retrieved 8/9/12 from <http://www.businesswire.com/news/home/20050723005006/en/PierPASS-Launches-OffPeak-Program-Today-Los-Angeles>.

70 *Business Wire*. (2007, February 6). “PierPASS Survey Shows Port Truck Drivers Stay Positive on OffPeak.” Retrieved 8/9/12 from <http://www.businesswire.com/news/home/20070206005478/en/PierPASS-Survey-Shows-Port-Truck-Drivers-Stay>.

Figure 1
Port of Long Beach Truck Traffic Trends, 2005

Time period	Daytime Weekday Truck Traffic	Nighttime Weekday Truck Traffic	Weekend Truck Traffic	Total
January—July	90%	3%	7%	100%
August—December	66%	24%	10%	100%

Source: <http://ops.fhwa.dot.gov/publications/fhwahop09014/sect2.htm>

Resources

The Federal Highway Administration. (2009). Urban Freight Case Studies: Orlando. <http://ops.fhwa.dot.gov/publications/fhwahop10021/fhwahop10021.pdf>.

This report provides background on Florida's freight village initiative and lessons learned.

The Federal Highway Administration. (2009). Urban Freight Case Studies: Washington, DC. <http://ops.fhwa.dot.gov/publications/fhwahop10018/fhwahop10018.pdf>.

This summary provides a description and evaluation of Washington, DC's freight management activities, including the Downtown Curb-Space Management Plan.

The Federal Highway Administration. (2012). FHWA Freight and Land Use Handbook. <http://ops.fhwa.dot.gov/publications/fhwahop12006/fhwahop12006.pdf>.

This handbook identifies freight-related land use issues, key considerations, and available resources, and includes examples and case studies from a range of urban and rural areas.

The Federal Highway Administration. (2009). FHWA Operations Support—Port Peak Pricing Program Evaluation. <http://ops.fhwa.dot.gov/publications/fhwahop09014/index.htm>.

This report provides a detailed evaluation of the PierPASS OffPeak program at the Ports of Los Angeles and Long Beach.

Holloway, B., and Spahr, C. (2013). Getting the Goods without the Bads: Freight Transportation. State Smart Transportation Initiative. <http://www.ssti.us/wp/wp-content/uploads/2013/10/Final-FreightReport1.pdf>.

This report offers strategies to maximize freight efficiency on existing infrastructure, as sustainable, cost-effective alternatives to increasing physical capacity.