



SCAN TEAM REPORT

NCHRP Project 20-68A, Scan 14-02

Successful Intermodal Corridor Management Practices for Sustainable System Performance

Requested by the

American Association of State Highway and Transportation Officials

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SPECIAL NOTE: This report IS NOT an official publication of the National Cooperative Highway Research Program, Transportation Research Board, or the National Academies of Sciences, Engineering, and Medicine.

Executive Summary

Overview

Intermodal corridor management strives to meet transportation demand at the least social and economic cost while maximizing the return on previous and future investments in infrastructure and services. Intermodal corridor management builds on the principles of multimodal corridor planning, integrated corridor management (ICM), and active traffic management. It recognizes that multiple modes can satisfy a variety of travel demands within a corridor and that most movement of people, goods, information, and services in a corridor involves movement between modes. This scan project is intended to produce practical guidance and examples for state departments of transportation and metropolitan planning organizations seeking opportunities to coordinate investments in multiple modal transportation networks within a corridor to maximize capacity and capitalize on investments creating synergies between modes.

The term “intermodal corridor management” as used in this scan project report could lead to confusion if reduced to an acronym. Practitioners of integrated corridor management feel understandable ownership of the acronym ICM so it is not easy to reduce this project’s topic to a simple set of letters. ICM refers to a more tactical approach to operating primarily highways and streets for optimal results. Intermodal corridor management presents a strategic way to determine the best investments in multiple modes to improve a transportation corridor’s productivity to support longer term social goals related to economy, environment, and community development and quality of life. Both concepts rely on collaboration between the owners and operators of transportation facilities within a corridor to integrate operations and supporting technologies. Additionally, the concept of what constitutes a transportation corridor is, in practice, elastic, ranging from short highway segments to longer highway segments to multiple modes of transportation sharing a linear course that may stretch between cities or between states.

The scan team members represent federal, state, and local transportation agencies and academia, all united by an interest in and passion for developing practical, innovative, and sustainable solutions to current and future mobility challenges. Rather than visit a number of agencies at different geographic locations, the team decided that a peer-exchange type of workshop would be the best way to gather information on best practices and enable interaction between practitioners themselves and with the scan team on such topics as:

- Developing a purpose/vision for the management of the corridor(s) and how public input was used
- Identifying relevant modes and linkages
- Determining potential modal capacity and travel market share
- Identifying modal performance parameters and success indicators
- Exploring governance/institutional arrangements
- Describing challenges to improving multimodal and intermodal performance
- Describing implementation, operating and maintenance costs
- Sharing returns on investment
- Exploring sustainable transportation

Scan team biographical sketches are provided in Appendix A; contact information is provided in Appendix B.

Based on a literature search and desk scan of current practices nationwide, the scan team invited the following states and agencies to participate in a weeklong workshop held in San Diego, California, during October 2015:

- Arizona
 - Arizona Department of Transportation (AzDOT)
 - Maricopa County Department of Transportation
 - City of Scottsdale
- California
 - California Department of Transportation (Caltrans)
 - San Diego Association of Governments (SANDAG)
 - Federal Highway Administration (FHWA) California Division
- Florida
 - Florida Department of Transportation (FDOT)
 - Florida Department of Economic Opportunity
 - Space Coast Transportation Planning Organization (SCTPO)
- Maryland State Highway Administration
- Massachusetts Department of Transportation (MassDOT)
- New York
 - New York State Department of Transportation (NYSDOT)
 - New York City Department of Transportation (NYCDOT)
- North Carolina Department of Transportation (NCDOT)
- Oregon Department of Transportation (ODOT)
- Utah
 - Utah Department of Transportation (UDOT)
 - Mountainland Association of Governments (MAG)
 - Wasatch Front Regional Council (WFRC)
- Virginia
 - Virginia Department of Transportation (VDOT)
 - Hampton Roads Transportation Planning Organization (HRTPO)

Prior to the workshop, the team provided workshop participants with a copy of the project desk scan and a set of amplifying questions which each participant group answered in writing. Each participating state team made a formal presentation during the workshop. Most teams were able to observe the other state team presentations and participate in the ensuing discussions. The contributions and input from all participants

throughout the entire workshop enriched the project team’s analysis and interpretation of the information presented.

The amplifying questions are provided in Appendix C, workshop presentation summaries in Appendix D, and host agency contact information in Appendix E.

Findings and Conclusions

This project found no “silver bullets” when it comes to examples of successful, fully developed intermodal corridor management. However, many areas of the country are putting the pieces together to provide best practices that others can use as they move forward.

Corridor Vision and Goals

Several states have undertaken comprehensive efforts to define their core values and describe how they want to grow and develop in the future. This provides a common vision and set of goals that all levels of government, the private sector, and the public can share in identifying and managing transportation decisions and investments. The governor, private sector chief executive officers, legislators, department directors, public opinion leaders, and/or some combination of these can drive vision and goal setting. Who drives the effort is less important than the outcome of developing a guiding vision with clear objectives and quantifiable goals to set the context and coalesce support for subsequent decisions. However, the higher placed and more inclusive the champions of visioning and goal-setting are, the greater the likelihood of future success, particularly when some of those champions will still be there past the next election cycle. As one state’s team said during the scan, engaging the private sector takes some of the fear of planning out of the process.

A statewide vision provides a means for developing desired outcomes (e.g., serving freight to support economic growth goals, providing access to job centers or facilities critical to national defense, and preserving sensitive environmental or cultural areas) that can be used to identify and prioritize transportation corridors and adopt appropriate performance metrics. A unified vision also promotes the intense collaboration needed by multiple public and private agencies to effectively develop and operate multimodal corridors.

Collaboration

Intermodal corridor management requires collaboration at the highest end of the collaboration spectrum. Integrated corridor management efforts provide good examples of the degree of cooperation required to get multiple agencies operating in a coordinated, coherent effort to support common goals. Intermodal corridor management can increase the number of players by expanding geographic territory and increasing the modal facilities and services involved. Additionally, intermodal corridor management increases the time frame for collaboration by starting earlier in the planning stages of corridor development and modal improvements and extending collaborative efforts into operations and maintenance activities. Examples of successful collaboration in multimodal corridor development are characterized by shared goals, resources, and decision-making and by formal agreements.

Leadership

Leadership can focus efforts, break down silos, drive and empower organizational and cultural change, and provide champions. Change can come from legislative action or an Executive’s directive. Leadership and championing from the top are very important; however, to really get results you also need to get buy-in from the bottom up. Several state legislatures have created statutory frameworks for multimodal system development and project evaluation, selection, and prioritization. Several of the departments of transportation participating in this scan project have overtly adopted policies and organizational structures

intended to break down modal and funding silos to support developing intermodal and multimodal transportation systems and corridors. Agency leadership is changing the cultural mindset to focus on moving people and freight and using mode-neutral performance measures; leveraging technology to increase performance; considering operational strategies earlier in planning and project development; and incorporating emerging priorities, such as active transportation, into everyday practices. Leadership is necessary to turn policy statements into action.

Systems Approach

Corridors are defined by more than topography or the location of a highway. They can be shaped by many factors, such as current and projected population growth and economic development areas, multiple modes connecting major urban areas, or connections between port facilities and manufacturing and distribution centers. Travel patterns and multiple modes provide a means of describing corridors along which facility and operational improvements can increase the ability to move people and goods, even in intensely urbanized areas. Successful intermodal corridor management is both locale- and situation-dependent. Not all facilities and services fit everywhere, and not all performance goals can be achieved everywhere. Expectations of system users, such as travel times and mode choice, must be kept realistic. Transportation mode investments should compete in terms of customer-oriented outcomes like time, access/connectivity, price, convenience, reliability, and predictability.

Data

Data is an investment and an asset and must be planned and managed as such, starting when corridor goals are being developed. Data is necessary for planning, improving, and managing intermodal corridors. Data tells the story of a corridor's performance, to support managing the corridor on a daily basis, to justify additional investments, and to sustain support for ongoing operations and maintenance costs. Data requires efficient collection, analysis, storage, and maintenance, and effective reporting. Real-time data collection and use supports managing and adjusting corridor throughput as necessary. The owners and operators of the modal networks within a corridor must coordinate their efforts so that data can be shared, integrated, and, most importantly, used. Data should support different levels of modeling appropriate for improving decisions at different stages of corridor development and management. In any corridor, however, data can be used to improve management and investment decisions, even if they are not perfect, as long as their limitations are recognized.

Customer-Focused Performance Measurement/Management

Gaining and sustaining popular and political support for intermodal corridor management and operation depends on explaining performance goals and results in terms that are meaningful and important to customers. Travelers are concerned about trip safety and affordability, travel time reliability, and being able to get where they want to when they need to be there. Businesses are concerned about timely availability of supplies and their ability to provide goods and services to customers. Customers will choose whatever modes of travel best provide those outcomes. System users will support corridor management efforts and investments that provide practical choices, improve modal performance, and achieve other societal goals, like economic growth, healthy communities, and environmental quality.

Outreach

Effectively engaging the public and elected officials to understand their needs and increase their knowledge of, and support for, improving the effective management and operation of multimodal transportation corridors has taken a variety of approaches across the country. These efforts range from deliberately reaching out to environmental justice communities and media approaches targeted at specific demographic

groups to using surveys and social media to inform and effectively engage and educate the public and elected officials.

Funding

Sustained funding for intermodal corridor management is a challenge. Then again, sustained funding for transportation system improvement, operation, maintenance, and rehabilitation in general is a challenge. At least one state is planning corridor development with the assumption that all new capacity will be tolled. Even where funding is insufficient for fully carrying out intermodal and multimodal corridor management plans, states are finding creative ways to make incremental progress. Integrated corridor management is an important component of intermodal corridor management, and one that requires adequate funding to provide technical resources and staff operations 24/7. These funding challenges reinforce the need to make the business case about outcomes the public understands, cares about, and is willing to pay for.

Sustainability

Traditionally, sustainability in transportation has been defined in terms of striking a balance in the economic, environmental, and social benefits of transportation improvements while minimizing the projects costs in those same three dimensions. Embracing the concepts of the Brundtland Report¹, sustainable transportation would be that which meets the multiple needs of the present to safely and reliably provide access to people, goods, information, and services without compromising the ability of future generations to meet their own mobility needs. States are undertaking various efforts to promote sustainability in intermodal transportation system and corridor management and development ranging from scenario planning and design flexibility to minimizing climate change-related impacts to looking at multigenerational transportation and land-use planning horizons.

Recommendations

The findings of this domestic scan suggest recommendations related to dissemination of the information collected, workforce development, and further research.

- Model efforts to disseminate the results of this scan after the climate change adaptation pilot program working with both FHWA and the Federal Transit Administration (FTA) (acting as “one USDOT”).
- The United States Department of Transportation (USDOT), the American Association of State Highway and Transportation Planning Officials (AASHTO), the Association of Metropolitan Planning Officials (AMPO), and the Transportation Research Board (TRB) should work with the academic community to provide the workforce needed to develop, build, and operate the intermodal corridors of the future:
 - Improve planning and engineering curricula to merge the disciplines and emphasize operations strategies, intelligent transportation system (ITS)/ICM technology applications, data management and analysis, and visualization techniques for operations and planning applications.
 - Develop new job classifications relevant to multimodal corridor operations that go beyond traditional operations and planning.
 - Develop certification and recertification programs for the hands-on operators and managers of

¹ Report of the World Commission on Environment and Development: Our Common Future, 1987, <http://www.un-documents.net/our-common-future.pdf>

integrated and intermodal corridors.

- USDOT should continue to use Transportation Investment Generating Economic Recovery (TIGER), ICM pre-implementation and implementation grants, and other discretionary or targeted funding opportunities to incentivize and promote collaborative efforts to develop and operate managed multimodal corridors, and consider developing a specific pilot program similar to past and current ICM efforts to promote intermodal corridor planning and development.
- USDOT, AASHTO, and AMPO should be proactive in mainstreaming the concept of multimodal managed corridors and support efforts to make the argument for adequately funding planning, data acquisition, and maintenance of corridor operations.
- AASHTO should incorporate the findings and recommendations of this project into its National Operations Center of Excellence activities.
- FHWA, FTA, and AASHTO should continue to work with other stakeholders to update design manuals and guidelines—being sensitive to facility type, place type, and location—to accommodate both multimodal network facilities and operations components.
- AASHTO’s Standing Committee on Planning should prepare a research proposal for developing a capability maturity model for integrated multimodal corridor management to promote state and local improvement efforts. Such models provide agencies with a clear picture of what they want to be able to accomplish; they provide a means to evaluate their current strengths and identify specific areas where they need to develop staff and institutional abilities; and they provide a way to measure progress toward being able to achieve their goals.
- Future research in multimodal and intermodal corridor development and management should consider:
 - The role served by intermodal transition points as throughput capacity enhancers or limiters
 - The potential impacts of disruptive technologies such as unmanned aerial vehicles for freight delivery
 - The potential for both enhanced operations and data acquisition presented by autonomous and connected vehicles
 - Better tools for measuring mode share for ride share and active transportation modes
- USDOT and the National Cooperative Highway Research Program (NCHRP) should support a synthesis of best practices or support research into better measuring and forecasting person throughput via multiple modes in corridors to justify appropriate investments.