THE INNOVATIVE DOT

Focus Area 8:
Improving DOT
Processes

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Improving DOT Processes

State departments of transportation (DOTs) are well served when they work together to tap into their ingenuity and talent, pool resources, and identify affordable solutions to meet transportation needs. Setting appropriate goals and then working together to achieve them is vital to reforming processes, cutting costs, and strengthening state economies with innovative transportation projects.

In this section:

- Set and Achieve Comprehensive Goals for Transportation Investments
- Streamline Project Development and Delivery Processes
- Improve Agency Organization and Initiate Cultural Change

FOCUS AREA 8: IMPROVING DOT PROCESSES

Set and Achieve Comprehensive Goals for Transportation Investments

The Opportunity

Traditionally, DOTs have defined their mission as facilitating the efficient movement of people and goods, prioritizing mobility over access. The resulting focus on a single mode, the automobile, has limited options for many and created unintended economic, social equity, and environmental consequences. Responding to these consequences, DOTs and state political leaders are broadening their transportation vision to encompass the achievement of multiple goals related to supporting multimodal transportation, economic prosperity, quality of life, and environmental protection and providing better return on taxpayer investment.

What Is It?

For many DOTs, introducing priorities and goals that extend beyond infrastructure construction, condition, and level of service is relatively new territory. Historically, these agencies have not considered the connection between transportation and land use, economic development, and other state concerns. In addition, DOTs typically do not possess the technical resources or the decision-making authority to explore these connections in a meaningful way. Many of the states that are tracking these indicators do not have a means of using the reported outcomes to inform decision-making.

State DOTs can benefit from setting multiple goals related to broader economic, community, and environmental ends to be achieved through transportation investment and identifying and tracking metrics that document how well those goals have been met. The introduction of a goal-driven policy approach recognizes that transportation investments represent too great a share of public resources not to address the larger, more systemic challenges that a state faces. This approach includes evaluating transportation-specific performance measures that truly demonstrate how well state projects meet transportation needs (such as changes in metropolitan area travel times and vehicle miles traveled) as well as non-transportation specific measures (such as the change in tax base for communities along a project corridor, the number of jobs created, or the amount of private investment generated within five years of a project's completion).

Implementation

DOTs currently take advantage of many coordination opportunities to develop transportation plans and programs across their states. By using the structures already in place for coordination, they can start a new process for infrastructure investment planning that takes into account the world of externalities not considered in the past. State DOTs can use these coordination processes to build cross-agency partnerships that achieve a multimodal, financially sustainable vision for our transportation future. The coordination processes can also be used to agree on a set of performance metrics to evaluate results per economic development, social equity, environmental benefits, and multimodal outcomes. The sections below describe three principal levels of partnership that help to make implementation of this initiative successful.

Partnership with local government. State transportation agencies make decisions with significant consequences at the local level, most notably with regard to land use planning, land development and economic development potential, and real property value.

Partnership with metropolitan planning organizations (MPOs). Through the Long-Range Transportation Planning (LRTP) process and the development of MPO Transportation Improvement Programs, DOTs already have a seat at the MPO table. They can take advantage of this presence to shape the conversation, which is increasingly based on visioning, scenario planning, and other regional consensus building to reach desired outcomes. These consensus-building efforts are typically translated into broad goals and indicators for project selection and programming so that the LRTP process yields meaningful projects reflective of community goals.

Partnership with other state agencies. Certain indicators, especially those related to transportation's impacts on environmental resources, large-scale commercial freight movements, and major employment, are probably already tracked by other state cabinet agencies. Partnership with these agencies is a key component of measuring the performance of the transportation system and individual investments against a state's broader goals.

Detailed Steps

Define acceptable and measurable goals, and identify the needed measurement tools. The first step is to determine priorities for state transportation investments and how performance will be tracked empirically against these new metrics. For example, state transportation agencies already monitor the performance of new road projects using a variety of measurements for the traffic they serve, the overall travel speeds they enable, and even their ability to accommodate other travel modes, but they are not always immediately able to understand the degree of private economic or other investments that result from a project. New project-specific goals and performance measurement methods might include the following:

- **Employment and commerce.** Performance measures include job creation, the movement of freight, and estimates of the economic return from policies and investments. To gauge this, state DOTs may wish to create a database where local governments and employers can report on business expansion, new employment, and changes in economic output that are directly related to a state transportation investment. Leaving this to local communities and employers may lead to gaps in reporting activity, but it allows a clearer and less biased assessment of the true economic development results.

- **Equity of access.** States can track how well investments facilitate public transit service or non-motorized travel and accommodate persons with disabilities, and the amount of recreational facilities (such as state and local parks) to which state facilities provide direct access. Tracking can be largely performed by the state agency through transit ridership counts, bicycle and pedestrian traffic counts, or a spatial analysis of recreational resources and commercial centers and how well a state project connects to them. Partnering with transit agencies and transportation advocacy groups can help to identify the strengths and weaknesses of a transportation project with respect to multiple modes of travel.

- **Resource management and environmental responsibility.** Performance measures include fuel usage, transportation-related carbon and other greenhouse gas emissions, and preservation of and impact on ecological systems. Because many transportation projects must assess their environmental impact through the National Environmental Policy Act (NEPA) as a condition of receiving federal funding assistance, some of these indicators are already being assessed during project planning. Some transportation projects in nonattainment areas also involve traffic modeling as part of the air quality conformity process, which can provide additional data.

- **Community preservation.** State transportation projects invariably change the nature of the communities they serve. Tracking the performance of a project with regard to the character of the community can include a clear assessment of the costs for additional public right-of-way, the impact on historic properties, and the effect on nearby property values. Partnering with local governments can help to ensure that these changes are understood, especially as local governments are typically responsible for property assessment, zoning and land development review, and general community planning.

- **Providing staff and agency resources to compile and report results.** Many states that do not currently assess the true costs and benefits of transportation investments beyond conventional transportation performance measures, such as changes to traffic congestion or travel speeds, are not equipped with the staff and agency resources needed to establish and maintain a meaningful monitoring program.

Case Studies

Washington
Washington State represents one of the early cases of a broad performance management system using non-transportation-specific indicators such as environmental impact and economic development. The state's development of this performance management system precipitated from a crisis of public confidence in the agency in the early 2000s. Voters passed a ballot measure that rolled back transportation taxes and created a committee whose analysis found that the Washington State Department of Transportation (WSDOT) operated inefficiently and lacked transparency in decision-making.

In order to win back public confidence, WSDOT established the Gray Notebook, in which it notes project status and progress toward specific benchmarks.[1] Within a couple of months, public perception started to change. Due to the reporting in the Notebook, two legislative transportation revenue packages funded $16 billion worth of projects in 2003 and 2005.[2] Increased public confidence also led to the defeat of a statewide initiative to repeal a 2005 gas tax increase.

Missouri
The Missouri Department of Transportation (MoDOT) uses tools developed by the state's Department of Economic Development and the U.S. Department of Commerce's Bureau of Economic Analysis (BEA) to develop detailed estimates on the economic return the state can expect from transportation investments.[3] Although the estimates are used more as a decision-making tool than as a tool to track outcomes, they allow MoDOT to better understand the likely economic benefits that may be generated by its proposed transportation infrastructure projects and policies as well as the estimated return on investment. The state also uses a separate model, developed by the BEA, to estimate job creation by specific industry resulting from transportation investment. Through data it has already been collecting,

1   Washington State Department of Transportation. (Updated 2013, September 30) "The Gray Notebook Quarterly Performance Report Subject Index". Retrieved 9/19/13 from http://www.wsdot.wa.gov/Accountability/GrayNotebook/.
2   Washington State Department of Transportation. (2007, May). "Performance Measurement at WSDOT." Retrieved 9/19/13 from http://www.wsdot.wa.gov/NR/rdonlyres/91089378-E709-49EF-AE42-AE80BC44A91C/0/TRB_Performance_Folio.pdf.
3   Missouri Department of Transportation. (2012, July). *Tracker: Advance Economic Development*. Retrieved 9/19/13 from http://www.modot.org/about/tracker_archive/documents/Tracker_PDF_July12/Chapter_7.pdf. Other sections of the Tracker: Measures of Departmental Performance can be retrieved from http://www.modot.org/about/Tracker.htm.

Missouri reports on transportation indicators related to economic development and commerce, such as freight movements and tonnage. Adding a focus on job creation broadens the focus and better informs decisions about transportation investments.

Michigan

Michigan's statewide transportation plan has set forth a vision for the future development of the state's transportation system and has identified alternative investment packages that will be necessary to move toward that vision.[4] However, Michigan has also invested in evaluating the economic impacts of its transportation vision.[5]

This assessment was used as the basis for a statewide plan, so Michigan evaluated the economic benefits and consequences of transportation decisions in the form of entire transportation scenarios (or project packages), instead of evaluating individual projects as they are planned and programmed. These investment packages include a base package (referred to in the plan as Business as Usual) and three alternative packages based on a variety of conditions in project delivery speed, modal balance, and availability of funding (see Focus Area 3 for more information about this approach to planning).

In order to assess the various investment packages, the Michigan Department of Transportation (MDOT) used the Regional Economic Models, Inc. (REMI) Model to evaluate each investment scenario. This allowed for a better understanding of the level of economic activity, including industrial output, freight and shipping, and job creation, that each of the scenarios would be expected to generate.

Resources

Bremmer, D. & Bryan, J. H., Jr. (2008). Making the Case for Funding Using Performance Management: Experience of the Washington State Department of Transportation. Transportation Research Record: Journal of the Transportation Research Board, No. 2079, 146–153. http://trb.metapress.com/content/pn54367382p71083/.
> This paper shows that information asymmetry and the resulting lack of support for agency funding can be corrected using performance management and measurement and effective, ethical communication.

Pew Center on the States. (2011, May). Measuring Transportation Investments: The Road to Results. http://www.pewstates.org/uploadedFiles/PCS_Assets/2011/Measuring_Transportation_Investments.pdf.
> This report explores transportation funding in various states and gauges accountability with regard to various state goals.

Michigan Department of Transportation. (2010, March). Economic Benefits of the Michigan Department of Transportation's FY 2010-2014 Highway Program. Statewide and Urban Travel Analysis Section, Bureau of Transportation Planning. http://www.michigan.gov/documents/mdot/MDOT_economicbenefitreport_202828_7.pdf.
> This study assesses the economic benefits of the highway and bridge component of MDOT's five-year transportation program and summarizes key findings based on investment levels in the program.

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4   Michigan Department of Transportation. (revised 2012). *Michigan Transportation Plan*. Retrieved 9/19/13 from www.michigan.gov/slrp.
5   Michigan Department of Transportation. (2011, March). *Economic Benefits of the Michigan Department of Transportation's FY 2011-2015 Highway Program*. Retrieved 9/19/13 from http://www.michigan.gov/documents/mdot/MDOT_EcnBen_2011-2015_363646_7.pdf.

Michigan Department of Transportation. (2007, June). Economic Impact Analysis of the Michigan Transportation Investment Packages. http://www.michigan.gov/documents/mdot/MDOT_SLRP_Economic_Impact_Analysis_200445_7.pdf.
> This report evaluates the economic impacts of and implications resulting from the transportation investment alternatives developed by MDOT.

Michigan Transportation Dashboard. http://www.michigan.gov/midashboard/0,4624,7-256-59297---,00.html.
> This site tracks the performance of state transportation infrastructure across modes. The dashboard uses performance metrics such as economic development, safety, mobility, accountability, and condition.

Missouri Department of Transportation. MoDOT Tracker. Measures of Performance. http://www.modot.org/about/Tracker.htm.
> MoDOT's Tracker is a tool to assess how well the state delivers services and products to customers. MoDOT uses this tool to determine if it is going in the right direction to best serve its customers.

Washington State Department of Transportation. (2007, May). "Performance Measurement at WSDOT." http://www.wsdot.wa.gov/NR/rdonlyres/91089378-E709-49EF-AE42-AE80BC44A91C/0/TRB_Performance_Folio.pdf.
> This report documents WSDOT's multimodal system performance measures. The agency uses well over 100 specific performance measures in its accountability reporting.

Streamline Project Development and Delivery Processes

The Opportunity

Transportation agencies are expected to deliver more projects than ever before, and the environment in which projects must be delivered is increasingly challenging. The project development process used by most state agencies today is outdated, inefficient, and unpredictable. Although the federal process, especially NEPA and the environmental impact statement (EIS), is often blamed for project delivery, in fact, more than 90 percent of projects do not require an EIS, and those that do can be often be managed more efficiently.[6] Simply put, in the majority of cases, states create many project delivery problems on their own—and the fixes for these internal problems are the opportunity.

Streamlining the project development process can help demonstrate to the public that the agency feels a sense of urgency when it comes to addressing existing problems, and that the DOT and political leadership are leading efforts to improve government efficiency and accountability. Modern project development processes tend to have more predictable outcomes, with more projects being implemented as they were planned and in the timeframe anticipated. This predictability is a result of knowing the expectations of the community and agency stakeholders from the beginning, designing solutions that meet these expectations, and ensuring that appropriate funding is available to implement the project.

What Is It?

Most agencies' project decision-making and delivery processes can be revamped to make better transportation decisions that can be implemented in less time with less money.

Decisions about transportation solutions are often pre-determined before the full range of potential solutions is fully understood and, as a result, sometimes default to big, expensive projects (see the Pennsylvania case study below). This approach often leads to projects that lack full funding, with resulting long delays in project implementation that postpone project benefits, increase project costs, and—if the delay is long enough—make the project obsolete. Although it may seem counterintuitive, the most effective way to streamline this process is to spend more time in up-front planning, identifying the full range of potential solutions that meet the project's needs so that less time (and money) is spent designing solutions that may not be permitted, that exceed project budgets, or that do not have community support. If upfront work can identify a smaller project with fewer negative impacts and costs, everyone wins.

National Cooperative Highway Research Program (NCHRP) Report 662 studies DOTs that have addressed these challenges and summarizes how they built the internal capacity to do so:

> "The DOTs of today and their leaders see the transportation environment in a very different light than they did two decades ago. First, loyalty in the new paradigm is not as much between the agency (DOT) and the client (stakeholder); it has shifted more to the problem at hand. Whether it be a capacity issue or a safety concern, a congestion problem or an operational challenge, the transformed DOT culture focuses on solving the problem with swift conviction, within the real constraints being faced.

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6   American Association of State Highway and Transportation Officials. Center for Environmental Excellence. *NEPA Process—NEPA Process and Documentation Options.* Retrieved 8/7/12 from **http://environment.transportation.org/ environmental_issues/nepa_process/#bookmarkNEPAProcessandDocumentationOptions**.

"Second, the studied DOTS exhibited some form of sustained capability that emphasized greater accountability on the part of their managers. Accountability was closely linked to a kaizen-like evolution that encourages a continuous improvement of processes, materials, and personnel. State DOTs are implementing programs that reward individuals who think outside the box and improve processes to achieve greater efficiencies and commending those who meet and exceed established goals. This approach promotes highly motivated individuals and fosters a balanced growth environment in which employees can experiment, take prudent calculated risks, develop new ideas, and implement practical solutions to solve problems. Principles of ingenuity and accountability are interwoven into the new paradigm.

"Third, this new paradigm values economies of scale in the execution of projects and programs as much as it does paying individualized attention to the smaller "meat and potatoes"—type projects that fall under its umbrella.

"Fourth, because most transportation challenges cannot be solved through singular relationships, today's DOTs seek to collaborate and partner with the many stakeholders involved. This collaboration is sought not only for financial stability and leverage, but also for planning and execution. External relationships are cultivated and honored; under the new paradigm, stakeholders are brought in early as participants in a partnership set up to solve the transportation problem, rather than as "clients" whom the DOT as "vendor" is tasked with satisfying. Transparency and accountability on the part of the DOT go far to help stakeholders see the complexities and ramifications inherent in a project; they are less likely to clamor for costly embellishments when they see that trade-offs, compromises, and negotiations are required from all quarters to reach the best solution…

"Fifth, the new paradigm takes into account the advent of an emerging global economy in which technology and communication are central pillars in any organization that wants to compete in the global marketplace. Many states have invested in advanced technologies, allowing their DOTs to operate more efficiently, obtain real-time data, communicate instantaneously, and disseminate information more rapidly than ever before."[7]

Implementation

Keys to successfully designing and implementing a streamlined project development and delivery process are to:

1. **Engage federal, state, regional, and local partners in revising the project delivery process.** Start with a clear understanding of what each stakeholder needs to achieve with the project development process. For example, regional partners often are responsible for some or all of the planning phase of project development. If MPOs and state DOTs have common goals, projects that meet these collective goals advance more smoothly; the project development process can be used to outline these common goals and set the criteria for project selection and prioritization. Local communities must live with the results of this process; ensuring that it provides the opportunity to offer input during the early stages of a project, before solutions are chosen, is critical to community support and successful implementation.

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7   National Cooperative Highway Research Program. Transportation Research Board. (2010). *Accelerating Transportation Project and Program Delivery: Conception to Completion (NCHRP Report 662)*. Retrieved from http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_662.pdf.

2. **Have clear state goals, and align the programs and projects that are to be funded with these state goals.** A key aspect of this approach involves having clear goals and objectives to guide day-to-day and long-term work. It is also important that goals and objectives are publicly available and understandable. For example, if an agency has goals of improving the transportation network and minimizing costs (as many do today), it might require projects to be evaluated using a cost-effectiveness or value-to-price ratio method prior to choosing a solution. Agencies can determine when and how this information is generated through their project development process.

3. **Set clear criteria for state transportation projects.** A state's goals and objectives are the underlying rationale in determining where the transportation dollars go. Developing criteria for project selection and directly tying decision-making to these criteria helps to sanction a state DOT's method for allocating funds. This adds predictability to the process of determining projects eligible for state funding and prioritizes an outcomes-based approach. For example, one of Pennsylvania DOT's (PennDOT) goals was to accommodate multimodal travel. This was implemented through project screening that required the identification at the beginning of a project of all modes to be served. The measure of how well an alternative meets this goal (such as the number of pedestrian crossings per mile or the number of miles of bicycle or pedestrian facilities provided) is used to compare project alternatives.[8]

4. **Evaluate the current project delivery process.** An important step is to determine how long a project is really taking and where it is getting bogged down. Evaluate how often the desired solution at the beginning of a project is actually implemented, and what it costs compared to the estimates. PennDOT, for example, was struggling with replacing or repairing small bridges. It analyzed where these projects were getting stuck and determined that a lack of community and agency engagement up front and a lack of design flexibility were causing these projects to take an average of 12 years to complete.[9]

5. **Ensure that problems are well defined before deciding on solutions to solve them.** Community or transportation agency desires for a specific solution often pre-determine the outcome. Exploring and assessing a full range of potential solutions (such as multimodal investments rather than just automobile investments) prior to making a decision can ensure that DOTs address challenges at the least cost. For instance, if a problem can be solved via a system management solution or land use changes, that may forgo the need for the extensive review processes that would be required by a capacity addition project, saving both time and money.

6. **Evaluate how projects are funded at every phase of project delivery.** If a problem or project is determined to be multimodal at the planning stages of project delivery, then funds that can be used for multimodal investments should be included in the construction phase of the project.

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8   State Smart Transportation Initiative. *Review of PennDOT's Smart Transportation*. Retrieved 11/19/13 from **http://ssti.us/wp/wp-content/uploads/2011/02/SSTI_Review_of_PennDOT_Smart_Transportation.pdf**.

9   *Ibid.*

Case Studies

Pennsylvania

In 2003, PennDOT was attempting to deliver a program that was woefully underfunded. The program included many high-cost transportation solutions (26 major capital projects at a cost of $5 billion) that could not be funded in the short or long term.[10] PennDOT's leaders cut the program dramatically, then set out to revamp their decision-making process so that the problem would not recur. The revised process strengthened the planning phase of project development and instituted screening methods to choose projects that were high priorities for the region and the state, that met agency goals, and that were constructible with available revenues. The process they developed is called Linking Planning and NEPA (LPN) because it initially responded to changes in SAFETEA-LU legislation regarding the connection between the planning and NEPA phases of project delivery.[11]

PennDOT engaged its federal, state, and regional partners in developing its project delivery process. Representatives of the end users of this guidance, including MPOs, rural planning organizations (RPOs), local municipalities, and state and federal regulatory agencies, worked closely with PennDOT over a nine-month period and developed a process that was implementable by MPOs, RPOs, and PennDOT itself. Critical elements of this new process included a planning level asset management tool that MPOs and RPOs could use to better estimate life-cycle costs, a firm understanding of a problem and community and agency expectations before choosing a project or a particular design option, a project delivery process that is tailored to the complexity of the problem or project, and project selection criteria that are linked to state and regional goals and objectives.[12]

One of the major challenges in implementing the new process was that some of the critical skills needed for more comprehensive decision-making were not necessarily housed within PennDOT. PennDOT's core strengths were in engineering and design, and it relied on the MPOs and RPOs to conduct most of the planning activities. PennDOT is now working with MPOs and RPOs to better determine how more comprehensive and effective planning can be accomplished.

Through the use of this process, regional prioritization provides a more realistic picture of the funds available to implement projects. This helps to manage regional and local expectations from the beginning of the process, and drives the development of project solutions that are affordable, have a high value-to-price ratio, and meet community and agency needs.

MPOs and RPOs are currently using this new project development process to develop long-range transportation plans and transportation improvement programs. The process was also used to assess several projects that had been stuck in PennDOT's conventional project delivery process. One example of this was the U.S. 202 Parkway in northwest Philadelphia, which was initially conceived as the U.S. 202 Bypass, a grade-separated, 70-miles-per-hour expressway. The project was delayed and finally stopped because of cost increases, community opposition, and difficulty getting environmental permits. PennDOT re-evaluated the project and determined that a smaller-scale project with more local street connections would also provide traffic relief but with less opposition and at a cost savings of $200 million. PennDOT engaged stakeholders early in the decision-making process and was able to deliver the project (from concept to construction) in just three years.[13]

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10   *Ibid.*

11   Federal Highway Administration. "Linking Planning & NEPA." Retrieved 11/26/13 from **http://www.environment.fhwa. dot.gov/integ/int_pennsylvania.asp**.

12   Pennsylvania Department of Transportation. (2010, September). *Design Manual Part 1–Transportation Program Development and Project Delivery Process*. Publication 10. Retrieved 8/7/12 from **ftp://ftp.dot.state.pa.us/public/ bureaus/design/PUB10/Pub10_Cover.pdf**.

13   State Smart Transportation Initiative. (2011). *Review of PennDOT's Smart Transportation*, pp. 37-38. Retrieved 11/26/13 from **http://www.ssti.us/wp-content/uploads/2011/02/SSTI_Review_of_PennDOT_Smart_ Transportation.pdf**.

North Carolina

The North Carolina Department of Transportation's Merger01 process brings stakeholders together at key points in project development. At each point, all members agree on relevant decisions and pledge not to revisit them as the project moves along unless there is new information or some other change that warrants re-evaluation. The concept is called "concurrence," and Merger01 provides for a process to resolve differences if concurrence cannot be reached.[14]

Concurrence points in a project development process could include:

1. Definition of purpose, need, and study area;
2. Detailed study alternatives, including review of alignments;
3. Selection of a preferred alternative;
4. Review to avoid or minimize impacts to communities and the environment;
5. Hydraulic review; and
6. Permit drawings review.

According to NCHRP Report 662, Merger01 has been shown to shave at least six months off a project's schedule. "As a result of these formal concurrence points," the report finds, "project review in subsequent stages is minimized, approvals are speedy, and re-submissions are practically nonexistent."[15]

Michigan
Construction Program Management
The Michigan State Transportation Commission (STC) set a policy goal for the Michigan Department of Transportation (MDOT) to manage its annual construction program to no more than five percent over the as-bid amount for the total statewide construction program. In order to meet this goal, while also reducing the time needed to approve contract changes, MDOT developed a new three-tiered contract change approval process. MDOT staff worked with the State Administrative Board to approve related regulation changes.

Under the new procedures, engineers are empowered to make and approve rapid contract changes necessary for completing work in the field if they can keep their project budgets within five percent of the contract award. These Tier I contract changes can be approved with just the agreement of the construction engineer in charge of the project and his or her direct manager. Projects that fall within five to ten percent above the awarded contract (Tier II) must be approved in the same way as Tier I changes, but also require additional approval from the Region Construction Engineer. Any projects that exceed 10 percent (Tier III) must be approved by the Construction Field Services Division in MDOT's central office.

This streamlined process gives engineers the flexibility to react to unforeseen changes on projects or changes in conditions, traffic, or other factors, in order to deliver better final project results. It also increases oversight of the contract modification process and has doubled the number of licensed professional engineers reviewing large project changes, while still meeting all attorney general and state regulatory requirements. Prior to the policy changes, contract modifications averaged 311 days to be fully approved. The new statewide policy sets a maximum cap at 64 days. The actual statewide

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14   North Carolina Department of Transportation. "The Merger Process—Concurrence Points." Retrieved 8/7/12 from http://www.ncdot.gov/doh/preconstruct/pe/MERGER01/Meetings.html.
15   National Cooperative Highway Research Program. Transportation Research Board. (2010). *Accelerating Transportation Project and Program Delivery: Conception to Completion (NCHRP Report 662)*. Retrieved 9/19/13 from http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_662.pdf.

average in 2012 for approving large Tier III contract modifications was reduced to only 39 days. The use of digital signatures further reduces average approval time on large projects to less than 5 days. Digital signatures are authentic, time-stamped objects encrypted into PDF files, making them original legal documents.[16]

E-Construction
MDOT has also pioneered paperless construction projects (originally termed "e-Construction") to further streamline project development, delivery, and maintenance. The e-Construction pilot project required contractors to submit all of their construction documents electronically to MDOT's document management system and dramatically increased the use of mobile devices in the field, allowing seamless access to all project data for inspectors, engineers, contractors, and other interested parties. The program incorporates state-of-the-art design and construction surveying, 3D design modeling, electronic document submittals, automated document approval workflows, electronic records storage, and requires the use of digital signatures.

Following its successful e-Construction pilot project, MDOT will implement the program statewide in 2014 and plans to expand electronic document gathering, sharing, and storage to all of its divisions and regions. Projected out across the entire construction program, e-Construction is expected to save as much as $7.5 million in fixed overhead costs. More importantly, however, it offers significant benefits that are difficult to quantify, including greater productivity, the elimination of lost documents, improved transparency (which translates to reduced claims), faster approvals and payments, and more effective collaboration on work sites.[17]

Resources

National Cooperative Highway Research Program. (2010). Accelerating Transportation Project and Program Delivery: Conception to Completion (NCHRP Report 662). http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_662.pdf.
> This study focuses on challenges and DOT responses, providing case studies from California, Maine, Maryland, Missouri, New Jersey, North Carolina, Utah, and Texas.

Pennsylvania and New Jersey Departments of Transportation. (2008). Smart Transportation Guidebook. http://smart-transportation.com/assets/download/Smart%20Transportation%20Guidebook.pdf.
> This document provides a guide to building and maintaining a transportation system that supports community goals. For technical details, see PennDOT design manuals below.

PennDOT Design Manuals. Pennsylvania Department of Transportation. (n.d.) Available at: http://www.dot.state.pa.us/Internet/Bureaus/pdDesign.nsf/DesignHomepage?openframeset&frame=main&src=HQADStandards?OpenForm.
> These manuals detail PennDOT's development process and provide other design guidance.

North Carolina Department of Transportation. The Merger Process. http://www.ncdot.gov/doh/preconstruct/pe/MERGER01.
> The Merger 01 process brings DOT staff and important stakeholders, including federal agencies, together at key points during project development to find compromise solutions and avoid delays and rework.

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16   Based on contributions from Polly Kent, Administrator of Intermodal Policy Division, Michigan DOT (2013, November).
17   *Ibid.*

Improve Agency Organization and Initiate Cultural Change

The Opportunity

This handbook presents a variety of specific measures for addressing the growing responsibilities and challenges facing DOTs, along with strategies for staying viable and competitive over the long term. In many cases, however, actually implementing these measures requires making substantial changes to the organizational structure of each agency and initiating a culture change throughout. While this process can be slow, these changes can be both beneficial and necessary to operate effectively as a modern transportation agency.

Most DOTs began as highway authorities—rich with federal funding to build and expand a national system of freeways—and their approach was heavily oriented toward civil engineering functions such as construction and maintenance. For many agencies, their responsibilities now span a broader range of functions that include operating and managing existing infrastructure, incorporating new technologies, accommodating different modes and travel choices, engaging with communities, and securing unique funding sources to accomplish these tasks. Many agencies already carry out some of these functions, but often in ad hoc ways. Institutional changes can make these new functions integral to agency operations at all levels, thereby improving process efficiency, agency reliability, project outcomes, and public perception.

What Is It?

Now that many DOTs are formally viewed as multimodal transportation agencies charged with long-term planning functions and other responsibilities, they must build the necessary skill sets, repurpose their existing skill sets, and rethink the way they do business in order to carry out these tasks. Making this transition successfully requires making changes throughout the agency, which include:

- Setting new goals, objectives, and performance measures;
- Establishing new processes for conducting day-to-day business;
- Building human capital and setting strategies for succession planning; and
- Exploring new approaches to communicating, reporting, and disseminating information.

Many agencies have already begun taking steps necessary for change based on self-assessment and local external pressures. New rulemaking in MAP-21 tying federal funds to broad goals such as improved safety, system reliability, and project delivery is further impetus for DOTs to review their organizational structure and manage outcomes in new ways.[18] These changes must be based on an overarching vision for the agency with clear, tangible goals established. This vision must be championed at the highest level and steps must be taken to integrate these changes into each process at every level so that every stakeholder understands their role in working toward that vision. Each person involved must be empowered to do their job effectively and held accountable for outcomes.

Implementation

Marked changes in DOT culture and business practices can be initiated at a number of levels, including through middle-management initiative, top-down directive, or external influence. Middle-

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18   Federal Highway Administration. (2012). "MAP-21 Putting Performance into Action." Transportation Performance Management webpage. Retrieved 10/30/13 from https://www.fhwa.dot.gov/tpm/.

management change can occur through excellent regional leadership or individual championship for innovative practices. External factors such as changing travel trends, limited resources, and legislative actions can force change within an agency. Lasting change, however, requires cooperation at all levels, which can include external players, and must be championed by a high-level official within DOT—namely, the CEO. The intent should be made clear through memos, planning documents, and other programs. For example, Massachusetts DOT Secretary Richard Davey launched an innovation campaign encouraging staff to think in new ways, complete with a tagline included in memos and printed on buttons: "But we've always done it this way," with the key being that the phrase is struck out. As important as bold steps like this one are, change is gradual and must be institutionalized in order to have a lasting impact.

Strategic planning and performance measures provide a valuable structure for implementing cultural change throughout an agency.[19] This approach enables an agency to align many key players toward a common goal and to ensure that progress toward meeting that goal can be sustained over the long term. Strategic planning and performance-based project selection have been central components of North Carolina DOT's recent organizational transformation (see Focus Area 2). Generally speaking, this approach requires taking key steps, which include:

- Develop and document a vision for the agency and build support at all levels;
- Select a small number of broad performance measures to guide decision-making and to focus the efforts of different divisions (subsets of performance measures can be chosen for specific functions and processes);
- Garner active involvement among middle-management and staff;
- Hold staff accountable for performance and empower them through training and access to information;
- Seek feedback and assess performance measures on an ongoing basis; and
- Use performance measures to improve transparency, communicate with the public, and build bridges with state legislators.

Some common initiatives, while less comprehensive in their scope or impact, can send a strong message of change throughout an agency when championed by a CEO. Many can serve the necessary function of aligning multiple divisions and processes toward a specific common goal. These initiatives, which often overlap, include context sensitive solutions, complete streets policies, asset management, new project selection criteria, and sustainability. The GreenDOT initiative and subsequent Healthy Transportation Policy Directive both serve that function within the Massachusetts DOT. The GreenDOT policy embeds sustainability goals within the agency's core principles and outlines specific targets pertaining to greenhouse gas emissions reductions, travel mode shares, and smart growth development patterns.[20] The Healthy Transportation Policy Directive, issued in September 2013, orders all staff to take specific steps for increasing and encouraging pedestrian, bicycle, and transit travel in association with every project.[21]

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19   Barker, J. B. (2010). *NCHRP Report 660 – Transportation Performance Management: Insight from Practitioners*. Retrieved 11/26/13 from **http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_660.pdf.**

20   Massachusetts Department of Transportation. (2010, June 2). *GreenDOT Policy Directive*. Retrieved 11/6/13 from **http://www.massdot.state.ma.us/portals/0/docs/P-10-002.pdf.**

21   Massachusetts Department of Transportation. (2013, September 9). *Healthy Transportation Policy Directive*. Retrieved 11/6/2013 from **http://www.massdot.state.ma.us/Portals/0/docs/GreenDOT/DirectiveHealthyTransportation.pdf**.

Cultural change also commonly requires an agency to improve its capacity for performing a range of functions such as operations, system management, planning, and communication. Research conducted as part of the Strategic Highway Research Program (SHRP 2) offers guidance for integrating new programs within existing transportation agencies. This work focuses specifically on system operations and management (SO&M) strategies, but is based on a *capability maturity model*, which has broad applications for improving organizational architecture. This model provides a framework that allows agencies to incrementally improve the way they implement new programs from ad hoc to mainstreamed, by focusing on four key institutional elements: leadership, organization and staffing, resource allocation, and partnerships. New technical and business processes (such as those necessary for improved SO&M) depend on a formal commitment to supportive programs in each of the institutional areas above.

Case Studies

Missouri

During the 1980s and 1990s, performance management at Missouri DOT (MoDOT) was ad hoc and largely ineffective. A new approach began taking shape in early 2000, beginning with a series of statewide rallies to solicit input from road users, which was used to develop new performance measures geared toward customer satisfaction rather than engineering standards. This change also led to a new approach for revenue allocation that was geared more toward managing existing assets, in addition to adding new capacity.[22]

Performance management became a guiding principle beginning in 2004 when Pete Rahn was appointed Director of MoDOT. This new "data-driven and results-focused approach" depended on four implementation strategies similar to those outlined above. These strategies include empowering staff (particularly middle-management leaders), encouraging innovation, demanding measurable results and cost savings, and holding staff accountable for results.[23]

MoDOT's new institutional culture is manifested in key programs such as practical design, new asset management strategies, and improved customer relations. Practical design (see Focus Area 4) leads to substantial cost savings by discouraging overdesign and relying instead on "right-sized" design solutions and improved system performance. Asset management strategies include MoDOT's successful Better Roads, Brighter Futures plan, which was launched in 2007 to improve conditions of the state's most heavily traveled roadways in a five-year period.[24] The agency's efforts to improve transparency, accountability, and customer relations include a quarterly publication called *Tracker*,[25] which highlights progress made toward seven tangible goals, and other major public outreach and customer service efforts.[26] As a result of these new efforts, the agency has met highway improvement goals ahead of schedule, reinvested more than $400 million in project cost savings, and saw considerable increases in customer satisfaction. Performance management is now viewed as a standard approach for conducting business at MoDOT.

22   Cambell, M. (2010). "Driving Asset Management Through Performance: Culture Change and Proven Results at the Missouri Department of Transportation." *TR News 270*. Retrieved 11/16/13 at http://onlinepubs.trb.org/onlinepubs/trnews/trnews270AssetManagement.pdf.

23   *Ibid.*

24   Briggs, J. (2007, February). "MoDOT Launches Better Roads, Brighter Future Program." *Connections (publication for MoDOT employees).* Retrieved 10/19/13 from http://www.modot.org/Connections/archives/2007/feb07.pdf.

25   Missouri Department of Transportation. (2012). "About MoDOT Tracker Performance Measures." Retrieved 10/29/13 from http://www.modot.org/about/Tracker.htm.

26   Missouri Department of Transportation. (2006). "Newsroom" webpage. Retrieved 10/29/2013 from http://www.modot.org/newsroom/.

Minnesota

Integrating all available transportation modes into a cohesive, cost-effective system is a key function of modern transportation agencies. Recognizing this, the Minnesota DOT (MnDOT) recently restructured its Modal Planning and Program Management Division (MPPM) in order to better support modal integration.

Previously one office within MPPM had been acting as the highway modal office as well as performing a number of additional services for MPPM and the department as a whole, leading to the perception, both inside MnDOT and externally, that planning at MnDOT was highway-centric, rather than multimodal. In February 2010, that office was divided into two offices, the Office of Statewide Multimodal Planning and the Office of Capital Programs and Performance Measurement.

The Office of Capital Programs and Performance Measurement now acts as the highway modal office and leads the development and implementation of MnDOT's performance-based capital improvement program for the highway system. The office is also responsible for conducting investment analysis and performance measurement for other modes, and providing expertise in those areas to the entire department.

The separate Office of Statewide Multimodal Planning now focuses on integrating and connecting the modal systems to ensure that transportation planning in MnDOT will be multimodal, customer-based, future-focused, and performance-oriented. By creating a new office with a special focus on multimodal planning, MnDOT has taken an important step toward developing a more truly multimodal transportation system.

In 2011, MnDOT released *Minnesota GO*, a 50-year statewide vision for multimodal transportation based on interviews and input from citizens and stakeholders. The following year, the agency released its *Statewide Multimodal Transportation Plan*,[27] based on that vision. This plan will provide a framework for all subsequent decision-making, including follow-up plans, investment decisions, and internal processes.

Illinois

In 2012, Illinois DOT (IDOT) Secretary Ann Schneider announced *Transforming Transportation for Tomorrow*—a multimodal transportation improvement program (TIP) that provides a vision for the future of the state's transportation network and a framework for achieving cultural change within the agency in order to achieve that vision. Language in the TIP signals an important directional shift for the agency:[28]

"This multi-modal systemic programming approach goes beyond previous individual modal programming efforts to identify and provide needed and dynamic links among various modes where possible, and to encourage public use of those links and all available options. Modal programs now and in future years must be designed as steps toward a comprehensive vision as seen through a multi-modal lens with reasonable and beneficial connections among highways, public transportation, rail, airports and ports serving inland waterways."

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27   Minnesota Department of Transportation. (2012, September). *Minnesota Statewide Multimodal Transportation Plan*. Retrieved 10/29/13 from http://www.dot.state.mn.us/minnesotago/pdf/statewidemultimodaltransportationplan.pdf.

28   Illinois Department of Transportation. (2012, March). *Transforming Transportation for Tomorrow: FY2013-2018 Proposed Multi-Modal Transportation Improvement Program*. Retrieved 11/26/13 from https://www.dot.il.gov/hip1318/html/district/mtip.pdf.

The state's Long-Range Transportation Plan (LRTP), released later that year, builds on the TIP by outlining specific strategies for achieving that vision. Together, these two documents outline 11 guiding policies that provide a framework for building and maintaining a transportation system that meets the state's evolving transportation needs. These policies focus on improving multimodal connections (including bicycle and maritime travel), retaining and diversifying human capital within the agency, improving transportation safety, and preserving the state's existing transportation assets.[29]

Although the process for implementing these policies is still in its early stages, the LRTP has provided a framework for taking a number of key steps. The agency immediately began planning for freight mobility and statewide bicycle connections and it began working with the Department of Natural Resources for maritime planning. The agency developed a sustainability scorecard to evaluate new projects and it has taken early steps to establish a sustainability committee, which includes representatives from all departments from its onset. IDOT intends to improve knowledge-sharing among district offices, partly through additional training which has begun taking place in connection with its existing context sensitive solutions (CSS) program. Eventually, the LRTP is expected to serve as a blueprint to guide any future departmental changes.[30]

Resources

Campbell, M. (2010). "Driving Asset Management Through Performance: Culture Change and Proven Results at the Missouri Department of Transportation." *TR News 270*.
http://onlinepubs.trb.org/onlinepubs/trnews/trnews270AssetManagement.pdf
> This article provides a case study of how the Missouri DOT incorporated performance management (or "asset management") to initiate cultural change, bolster accountablity, and improve agency outcomes.

Federal Highway Administration. *Transportation Performance Management website*. https://www.fhwa.dot.gov/tpm/.
> This webpage provides information on performance requirements outlined in MAP-21 and guidance on implementing performance management strategies.

Parsons Brinckerhoff. (2011). Guide to Improving Capability for Systems Operations and Management, SHRP Report S2-L06-RR-2. Available online at: http://onlinepubs.trb.org/onlinepubs/shrp2/SHRP2_S2-L06-RR-2.pdf.
> This report offers guidance for implementing system management and operations strategies through imrpoved business practices and organizational architecture at state DOTs.

Transportation Research Board. (2010). *NCHRP Report 660 – Transportation Performance Management: Insight from Practitioners*. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_660.pdf
> This report offers guidance for transportation agencies interested in using performance data to guide decision-making and operations.

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29   Illinois Department of Transportation. (2012). *Long Range State Transportation Plan* webpage. Retrieved 11/26/13 from http://www.illinoistransportationplan.org/.

30   Based on interviews with Bola Delano, Deputy Director of Planning and Programming, Illinois Department of Transportation. (2013, October).

This handbook is a product of Smart Growth America and the State Smart Transportation Initiative.

Smart Growth America is the only national organization dedicated to researching, advocating for and leading coalitions to bring smart growth practices to more communities nationwide. From providing more sidewalks to ensuring more homes are built near public transportation or that productive farms remain a part of our communities, smart growth helps make sure people across the nation can live in great neighborhoods. For additional information visit www. smartgrowthamerica.org.

The State Smart Transportation Initiative, a network of 19 state DOTs, promotes transportation policies and practices that advance environmental sustainability and equitable economic development, while maintaining high standards of governmental efficiency and transparency. Housed at the University of Wisconsin, SSTI operates in three ways: as a community of practice, where participating agencies can learn together and share experiences as they implement innovative smart transportation policies; as a source of direct technical assistance to the agencies on transformative and replicable smart transportation efforts; and as a smart transportation resource to the wider transportation community, including local, state, and federal agencies. Learn more at www.ssti.us.