A CFO'S HANDBOOK ON
PERFORMANCE MANAGEMENT

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1.0 INTRODUCTION

Current circumstances—an aging transportation system, a recent run-up in construction costs, the most significant economic recession since the Great Depression, overall decreasing revenue streams, and uncertainty on future funding streams—have combined to exacerbate the gap between transportation investment needs and resources. In this context, performance management is an approach to managing transportation systems that improves the efficiency and accountability of investments. Performance management has been in use for over a decade in the field of transportation, and over that time it has evolved from a focus on identifying measures and tracking performance to using performance measures in actual decision-making. This increased focus on managing with performance measures has shifted the basic question from 'How are we doing?' to 'How can we do better?'.

Much literature has been written on the use of performance management among state departments of transportation (DOT) and other agencies, documenting both current best practices and how to improve those processes. This briefing paper, however, focuses narrowly on the question of how performance management techniques can improve the funding and finance activities of state DOTs, addressing needs from the perspective of DOT chief financial officers (CFO). Broadly speaking, there are three basic ways that transportation agencies are making clear links between performance management and funding and finance, including:

- Making the case for increased funding or implementation of new financing options.
- Increasing the efficiency of project, program, and day-to-day staff efficiency, including cost-control efforts, pay for performance, and others.
- Using measures to improve transportation agency financial management.

The first item—making the case for increased funding or implementation of new financing options—has been done successfully by agencies such as Washington State DOT (WSDOT), Minnesota DOT (Mn/DOT), and Florida DOT (FDOT) through the use of performance management. Mn/DOT, for example,

prepares biennial budget requests for the Minnesota Legislature. This request is performance-based, showing the specific impact of funding requests on transportation system performance measure targets. In its 2005 legislative budget proposal, Mn/DOT requested a shift in funds from highway construction to highway maintenance based on the agency's performance measures data. The legislature agreed that a greater investment in maintenance would yield long-term savings. This topic has been covered extensively in *NCHRP 20 24(62): Making the Case for Transportation Funding and Revenues* (http://www.transportation.org/sites/SCOFA/ docs/NCHRP 20-24 (62) FINAL.pdf), and will not be addressed in greater detail in this briefing paper.

After providing a brief overview of the performance management and defining it within the context of funding and financing, this paper addresses the other two areas of interest to CFOs for employing performance management by breaking out more specific performance management needs within those areas and then outlining performance-based processes for addressing those needs. Finally, several examples taken from actual agency practice are described. A survey and several interviews were conducted to help identify CFO needs and current performance management practices beyond what currently exists in the literature (Appendix A).

2.0 OVERVIEW OF PERFORMANCE MANAGEMENT

2.1 State of the Practice

Performance management is a policy-directed, data-driven, performance-based business practice that links organizational goals and objectives to resources and results. The outcomes of performance-based management include more efficient distribution of limited resources and a focus on accountability of decision-making.

Over the last 15 years, there has been a dramatic increase among state departments of transportation (DOT) in the use of performance management principles to plan, prioritize, track, and improve the effectiveness of nearly all DOT functions to achieve the agencies' fundamental goals. Performance information helps to guide decisions about priorities and resource allocation for capital project delivery and internal agency management and operations. The trend towards states adopting performance management has been the result of several factors, including the demand for more accountability from government programs and agencies (both state and Federal), the pressure of scarce financial resources, and the recognition of best business practice. Many states simply started using a simple performance management system with the resources available to them and expanded, developed, and improved the system over time.

At one end of the spectrum are agencies that have limited data mining and reporting capabilities or practices beyond those needed to meet Federal requirements. At the other end are a handful of agencies with well-developed performance management programs that help drive every aspect of the organization, including budgeting and project selection processes. In between are the rest of the state agencies with some level of predictive capability. These agencies have a commitment to using system and agency performance data to improve effectiveness and efficiency but with only some elements of a comprehensive performance management system in place. Progress and improvements in the performance management

process are cyclical and occur incrementally over time, requiring sustained leadership over a number of years to achieve full implementation.

Table 2.1 provides a snapshot of the state of performance measurement among 23 state DOTs that responded to a recent survey. It illustrates the range of differences among states insofar as goals, measures, and targets are concerned. Goal areas such as safety and preservation that are supported by national initiatives and directives, with extensive data already collected, are almost universal in measurement and target-setting by DOTs. Freight and economics, a newer focus area with most DOTs and without much standardized data available, is relatively less common in states' performance management programs.

Table 2.1 Use of Measures and Targets by Goal Area among State DOTs

Goal Area	Measures Only	Measures and Targets	Neither
Preservation	3	19	1
Freight/Economics	6	1	16
Safety	4	19	0
Congestion	8	10	5
System Operations	7	9	7
Environment	5	7	11

Source: State-Driven Performance-Based Management: State of the Practice. Data from unpublished survey conducted for 2009 CEO Leadership Forum, Center for Transportation Studies and Cambridge Systematics, Inc.

Despite institutional differences among agencies, several elements of best practice are frequently noted among the most advanced performance-based systems:
- The application of performance measures throughout the agency that are integrated vertically, horizontally, and among processes;
- The application of performance measurement in a systematic, documented way;
- Strong executive/managerial support (a "champion" is often necessary) and involvement in performance reviews and decisions on reallocating resources, in central and district offices, as well as among program and key business unit managers;
- Recognition that performance measurement can involve a culture change within the agency, with steps taken to focus on the positive aspects of this change while mitigating the potentially negative aspects;
- Transparency of performance results and their implications for transportation customers and stakeholders, as well as the owning/operating agency; and
- Several agencies link organizational performance and transportation system performance. This concept has existed for some time in the private sector, but now is being considered by public sector DOTs.

2.2 A Five-Step Process

A "performance management framework" has been developed to illustrate the basic performance management principles that can be integrated into all of the critical functions and operations of a transportation agency (Figure 1). Actually using performance to drive resource allocation (the fourth box in the framework), such as budgeting, project prioritization, or internal allocation of staff and funding, is the lynchpin of actual performance management.

Figure 2.1 Performance Management Framework

Achieving the best level of performance with this process depends on several factors:

- Consistency in, and understanding of, goals, objectives, performance measures, and targets;
- High-quality data to support performance management decisions;
- The ability of managers, and the availability of analytic tools, to identify performance impacts of projects realistically and efficiently; and
- The ability to use performance information to inform as well as manage expectations among the political leadership, stakeholders, and the public.

While the specific focus of an agency's goals and objectives will vary from state to state, there are several common emphasis areas among state DOTs:

- Safety;
- Transportation system preservation;
- Operational efficiency/productivity;
- Management capacity/organizational effectiveness;
- Environmental stewardship;

- Employee development;
- Transportation system enhancement;
- Relationships with partners and suppliers;
- Customer service and satisfaction;
- Congestion mitigation;
- Economic development;
- Freight movement; and
- Financial viability.

2.3 Challenges

Several high-level issues and challenges have emerged from performance management research and case studies:

- The degree to which state DOTs have influence over what is being measured relative to external factors;
- Data collection resources;
- Integration with, and influence of, external processes, legislative requirements, and other external elements;
- Deciding the "level" for targets, to make sure they're not too easy or impossible to reach, as well as short-term versus long-term targets, and what to do if the targets are met or not met;
- The degree to which targets are made public; and
- Consistency in reporting between regions, districts, departments, or across different stages of project development.

Even though performance management is recognized as a best business practice, it alone will not guarantee that a desired or acceptable level of performance will be achieved. First, it is one of several decision-making tools. Most importantly, total funding available for transportation will limit the performance that is possible to achieve even with a comprehensive performance process in place. As AASHTO has stated, "if sufficient funding is not available, performance management does not make up the difference." What performance management can help to achieve is the best level of performance possible given the resources that are available.

3.0 PERFORMANCE MANAGEMENT NEEDS OF STATE DOT CFOS

The section above summarizes the overall concept of performance management, but how can it be applied to the needs to state DOT CFOs? What types of unique issues do CFOs face that can be improved through performance management processes?

The items below highlight some of the many day-to-day processes and concerns of CFOs, all of which have been addressed in some way by some agencies using performance management. The exact needs differ from agency to agency, as CFOs may have different functions in different organizations. Many of these items are highly integrated and interrelated. Often they constitute one piece of a larger performance-based process: the implementation of these larger processes often addresses some of these specific issues.

- **Project monitoring.** Project monitoring can entail multiple dimensions: monitoring projects across project development stages, monitoring project implementation in terms of costs and schedule, and before and after project evaluation. How can these processes be improved and even integrated through performance management?

- **Efficiency of service delivery.** What type of performance measures and processes help to monitor and improve the efficiency of service delivery, such as snow removal, accident clearance, or other services with which a public agency might be involved? In general, how cost-effective is the DOT?

- **Successful delivery of capital programs.** Capital programs involve large amounts of money, staff, and other resources, and delivery of these programs entail not only the most intensive tasks of a DOT but also the most visible and subject to scrutiny. Overall, how have performance management processes been used to improve successful delivery? These processes necessarily incorporate many of the other CFO needs identified in this section.

- **Developing investment strategies.** Investment strategies are subject to funding constraints, political priorities, and the unique needs of a specific region. They require planning for the allocation of large amounts of financial resources and could involve both capital planning and programming as well as programs and services. Performance management has been used by many agencies to help develop investment strategies.

- **Allocating financial and human resources.** State DOTs need to determine how to allocate financial and human resources internally in a way that optimizes the agency's internal performance and efficiency, as well as service and project delivery. With increasingly tighter financial resources, the optimal allocation of these resources is ever more critical. Additionally, CFOs need to understand the proper metrics for tracking these allocations, including how to measure "productivity."

- **Cost estimation.** State DOTs face increased scrutiny from the public, legislature, and other stakeholders when project costs are consistently underestimated. Many agencies have improved the accuracy of their cost-estimation processes: what type of performance-based techniques have they used?

- **Planning with inconsistent and unpredictable funding streams.** Most states and regions face some level of variability in funding streams from year to year, due either to the fact that the funding stream varies with economic conditions and other external factors, such as gas taxes or sales taxes, or because of a lack of a dedicated funding source for transportation. Recent delays at the Federal level in reauthorization are causing further uncertainty for states, particularly as agencies try to anticipate what type of funding mechanism will be used and what types of changes in processes, requirements, and funding levels will be included. Nevertheless, CFOs need to continue their long-term and annual financial planning responsibilities, including managing program staffing and support.

- **Continuity of metrics across project development stages.** Some CFOs at agencies with existing performance management processes in place have identified issues with a lack of consistency of performance measures in project planning, programming, project development, implementation, and ex ante review.

- **General accounting.** All DOTs have accounting departments dealing with typical accounting procedures—billing, payments, cost tracking, and other financials. What types of performance-based tools can help improve these processes?

- **Communicating with the legislature, public, and internally.** State DOT CFOs need to communicate all of the information and issues above to stakeholders and decision-makers—how are performance-based processes used to facilitate that?

4.0 WHAT ARE THE PERFORMANCE MANAGEMENT APPROACHES AVAILABLE TO CFOS?

The CFO needs in Section 3.0 are common among most state DOTs and many other public agencies (and private companies). Many organizations have been able to address these needs via performance-based processes, ranging from more basic application of performance measures and consistent tracking to implementation of performance management structures governing all facets of an organization. Table 4.1 lists these approaches and how they can be applied to the needs.

All of the performance-based approaches below available to CFOs, independent of the need they are addressing, have several key lessons to offer based on experience from state DOTs:

- Champions help initiate and institutionalize the process;
- Communication is critical;
- Publish results openly;
- Meet regularly with core team to discuss performance results and progress, and take action;
- Dedicate a department or staff person for overall process and/or specific measures;
- Collect accurate and timely data (with someone responsible for data), but do not wait until the "perfect" data, framework, or IT system is available to get started;
- Develop or purchase tools to help with storing data, collecting data, analyzing data, and providing reports—it is preferable for these tools to be modern, integrated, and easy for all related individuals to access;
- As much as possible, link the process to overarching agency goals/objectives, and vertically and horizontally in organization; and
- Set targets based on historical trends, national benchmarks, or financial realities.

These factors are in addition to the key common elements of best practice among agencies developing more comprehensive, integrated performance management processes for their entire planning processes or entire organizations in Section 2.1.

Table 4.1 Application of Performance-Based Approaches to CFO Needs

CFO Needs	Communicating through performance management	Contract pay-for-performance for service/ project delivery	Reallocation of funding across districts/asset classes based on relative performance	Linking overall agency goals and performance measures to staff performance
Project monitoring	X			
Efficiency of service delivery	X	X		X
Successful delivery of capital programs	X			
Developing investment strategies	X			
Allocating financial and human resources	X	X	X	X
Cost estimation				
Planning with inconsistent and unpredictable funding streams	X			
Continuity of metrics across project development stages	X			
General accounting	X			
Communicating with the legislature, public, and internally	X	X	X	X

4.1 Communicating Through Performance Management

Performance management, by its very nature, helps with communication with the legislature, public, and internally. It provides the framework for an objective, repeatable, consistent process. One of the key components of any performance management process is ultimately reporting what the performance results are. At the very least, making these results available to the audiences with whom an agency wants to communicate is fundamental for improving communication. An agency needs to consider the audience in the presentation of results; however, if the audience and stakeholders have been considered from the first step of any performance management process—developing goals and objectives—the final step of reporting results should follow without difficulty. The goals and objectives should incorporate their perspectives, preferably through direct consultation with these groups, and the performance measures themselves should provide results that address those goals and are provide understandable results to the appropriate

CFO Needs	Tracking on-time/on-budget project performance	Tracking efficient delivery of services	Tracking other accounting measures	Total agency integration of performance management	Performance-based capital programming/TIP
Project monitoring	X			X	
Efficiency of service delivery		X		X	
Successful delivery of capital programs	X	X		X	
Developing investment strategies			X	X	X
Allocating financial and human resources	X	X	X	X	X
Cost estimation	X	X		X	
Planning with inconsistent and unpredictable funding streams			X	X	X
Continuity of metrics across project development stages				X	X
General accounting			X	X	
Communicating with the legislature, public, and internally	X	X	X	X	X

groups. If the process and the measures are intended to be for multiple groups, e.g., for legislative decision-making, for the public, and for internal project programming, then measures can be selected that are capable of being reported at varying levels of detail. For example, a pavement preservation measure could be reported internally at a DOT as a specific index (e.g., PSI or IRI), but be reported in a publicly released document as "good," "fair," or "poor."

While a performance management process can be good PR, it is ultimately intended as a means to improve performance in agency. As such, reporting should include the good, the bad, and the ugly so that actual change can be affected.

There are several commonly used formats for communicating performance results, depending on the frequency of reporting and the audience. Annual reports (or quarterly or monthly reports) are common for presentation to decision-makers outside of an agency, such as governors and legislators, and are often required by

those bodies. Scorecards often report similar information in a more visual and illustrative format. Dashboards tend to display performance measures that are continuously updated, and are good both for public consumption and internal monitoring and decision-making.

4.2 Contract Pay-for-Performance for Service/Project Delivery

Many public agencies have experience with "pay-for-performance" contracts. Recent notable examples were the reconstruction of the I 35W bridge in Minneapolis, administered by Mn/DOT, and the I 80/I 580 ramp reconstruction administered by Caltrans. Both of these agencies were focusing on speed of delivery, and the contracts were oriented around this objective with bonuses and penalties built in for early or late completion.

Both of these cases were individual cases under unusual circumstances. Transit operators, however, often contract out certain services and require certain targets to be met to achieve certain government subsidies or to have their contracts renewed. Transportation agencies in Australia, such as VicRoads, or transit agencies such as Metlink in Melbourne, contract out many of their agency functions, leaving the agencies themselves to function more as contract administrators than as deliverers of services and projects. The agencies' contracts have extensive performance measures and targets for every functional element of service or project delivery which must be met, with predefined bonuses or penalties.

Missouri has instituted a pay-for-performance program focused on construction change orders that has been remarkably successful in reducing costs. The performance measure used to help track this is "percent of change for finalized contracts." The measure tracks the percentage difference of total construction payouts to the original contract award amounts, indicating how many changes are made on projects after they are awarded to the contractor. The overall improvement is a strong emphasis placed on constructing projects within budget, the use of practical design, and value engineering.

4.3 Reallocation of Funding Across Districts and Asset Classes Based on Relative Performance

Traditionally government funds are allocated based on fixed annual budgets, and increase or decrease from there; an agency, district, or program area that used less money than allocated is likely to get less funds in the next budget cycle. It is important that districts understand that performance-based systems do not work the same way as traditional government budget allocation: a district is not being "penalized" by having fewer needs in a given year, and it does not mean that the next budget cycle will be tied to how much the district gets (or uses) this year. It is important to develop a level of trust between the head office and district offices to effectively implement such an approach.

The first step in determining how to allocate funding across districts is for the central office to develop a formula in consultation with districts and possibly other state decision-makers. This formula should be tied to measurable performance needs that reflect previously developed and agreed-to goals and objectives. The Mn/DOT case in Section 5.0 provides an example of a district allocation formula. Efficiency of district usage of money, measured via agreed-to performance measures, should help to determine how well a district is performing and actions should be taken if a district is underperforming.

Addressing multiple assets simultaneously requires integrating the analysis from various program areas and comparing them side by side. AssetManagerNT, a tool originally developed through NCHRP Project 20 57 and recently adopted by AASHTO, is designed to support this type of integrated analysis. The system enables agencies to integrate results from various management systems in a manner that facilitates program-level tradeoffs between programs and asset classes. For example, SEMCOG used AssetManagerNT to explore the relationship between funding and performance in five program areas: pavement preservation, bridge preservation, capacity expansion, safety and nonmotorized transportation.

4.4 Linking Overall Agency Goals and Performance Measures to Staff Performance

Linking overall agency goals and performance measures to staff performance helps to focus 100 percent of an agency's human resources towards its mission. It helps ensure understanding among all staff of an agency's goals and what actions are necessary to make progress towards those goals. This structure also helps to improve the nimbleness of an agency: changes in high-level goals and performance measures (e.g., due to legislative directives) will quickly filter down to every level of the organization, helping to drive performance in the new direction.

A link between staff performance and agency goals and performance measures should only be made after an overall performance management structure as outlined in Section 2.2 dominates agency functions: goals, measures, and targets should be well established, appropriate data collected and understood, and funding decisions (e.g., capital programming) should be based on the process.

Even without a formal link, all staff should understand the goals, objectives, and performance measures of an organization, and how they affect them through their duties and their own level of performance in their duties. This requires staff

education and should be done before any formal link is created. Education also helps to institutionalize the process.

After staff education, data or reports on performance measure progress should be made available to staff; in particular, the staff whose duties affect a particular measure should be able to see the agency's progress in that measure on a regular basis. For example, NCDOT (https://apps.dot.state.nc.us/dot/dashboard) and Virginia DOT (http://dashboard.virginiadot.org/) have on-line dashboards that are updated regularly, showing progress towards targets.

An actual link can begin to be created by first running a pilot: some agencies start with a particular department, or begin with only senior managers. After one or two iterations, refinements can be made and the performance-linked evaluations expanded to all staff.

The exact structure of the review, such as to what extent the "performance-based" component of the review counts towards overall employee performance and the precise way of monitoring the contribution of an individual or group towards performance, should be developed from a top down approach, allowing for some variability between departments.

Generally, anybody related to a measure or goal should have their performance related to that measure and goal as a part of one's evaluation. Appropriate submeasures could be attributed to an individual and personal targets for those submeasures set, as long as they fit within the larger agency measures being evaluated. At the Maryland DOT Maryland Transportation Authority, managers assess and evaluate each employee's contribution to the division work plan goal and/or performance measure that is most closely related to the employee's job description (i.e., invoice processing time). The goal is to link each employee to the division work plan, which illustrates their link to agencywide goals and plans (i.e., *MDTA Business Plan*), statewide goals and plans (i.e., *Annual Attainment Report* (http://www.mdot.maryland.gov/Planning/CTP_10-15/Documents/2010_Attainment_Report.pdf)), and eventually to the *State Long-Range Transportation Plan* (http://www.mdot.maryland.gov/Planning/Plans_Programs_Reports/Reports/MTP/2009MTP.pdf) goals.

Finally, linking agency goals and performance to staff performance can be more effective when performance-related meetings between staff and managers occur more frequently (e.g., quarterly).

Challenges in this process experienced by DOTs include needing to renegotiate labor agreements with unionized staff due to changes in review procedures, avoiding the creation of a "penalty-based" system, and general push-back from staff due

to changes in how they are evaluated—staff that had previously been evaluated annually without issue could now be told that their performance must improve based on the new system.

4.5 Tracking On-Time and On-Budget Performance of Projects

Most state DOTs track on-time and on-budget performance of projects in some way. However, the exact metrics, the reliability and frequency of data, the types of management systems used, and the integration of these data with other systems and overall agency operations differ from agency to agency. Due to the importance of this particular application of performance management, many agencies are looking to improve their processes in this area.

The basic performance-based approach is to first understand the agency objectives in this area (e.g., reduce cost overruns) and to identify what the agency can measure on a consistent basis to address the objectives.

Sample measures include:
- Percent of construction project exceeding X percent of the original contract amount;
- ROW cost to process versus cost per acquisition;
- Number of construction contract addenda per year;
- Change orders by year;
- Comparison of cumulative difference of bids versus estimates over time;
- Comparisons of engineer's estimate to low bid;
- Contract award amount to as built amount;
- Material and workmanship warranty performance;
- Project completed on time; and
- Average number of years it takes to go from the programmed commitment in the Statewide Transportation Improvement Program to construction completion.

See Table 5.1 for a list of Missouri DOT's measures for tracking on-time and on-budget performance of projects, with explanations of types of changes each measure has driven and how each measure is calculated. Missouri tracks many different facets of project implementation as part of its agency-wide comprehensive performance management structure. These measures address implementation progress of individual projects as well as across all projects in a given year. MoDOT compares trends, and it benchmarks against national averages and other states.

These measures need to be measured and reported on a continuous basis due to the nature of project implementation. This requires education of those involved in project implementation so that every staff knows their responsibility in inputting data and in affecting the performance measures. It also is important to make information available to all staff and managers who can affect the on-time and on-budget performance of projects. The Louisiana DOTD posts performance data

on project implementation on its web site for all target audiences and on internal monitors within its headquarters.

Most importantly, whatever the level of measuring and reporting sophistication and integration with a larger performance management system, corrective action must be taken based on performance monitoring. This requires regular meetings of managers to review performance, and understanding of what actions can affect each measure.

Once any performance-based system is in place for tracking project implementation, improving data management is the next crucial step. Management of financial resources can be significantly hindered due to the inability to retrieve project-level and fund source financial status data on a timely basis from older, legacy systems. Implementation of integrated financial systems greatly improves an agency's ability to more effectively and efficiently manage financial resources. Internally, Kansas DOT has been working towards implementing a Cash Availability Forecasting Environment (CAFE) which systematically links project information and cash forecasting processes.

4.6 Tracking Efficient Delivery of Services

The performance-based approach to tracking efficient delivery of services is similar and closely linked to tracking on-time and on-budget performance of projects, though the specific types of performance measures differ slightly and address slightly different objectives. Efficiency and cost-effectiveness are measured generally around the number of employees doing various functions and dollar measures associated with systems operations and DOT services. Measures can even be related to project delivery and implementation if they are structured as ratios of productivity, i.e., number of employees or employee-hours per implemented project cost.

Missouri DOT (http://www.modot.mo.gov/about/general_info/documents/Tracker_April10/Chapter15.pdf) uses measures such as "ratio of lane-miles per full-time equivalency (FTE)," "percent of work capacity based on average hours worked," and "cost and usage of utilities for facilities" (Table 5.2). These measures have helped MoDOT reallocate staffing and increase or decrease staffing-levels based on past history and benchmarking against other states and industries, as well as improve staff efficiency and reduce overall costs.

4.7 Tracking Other Accounting Measures

Tracking typical accounting measures related to costs, expenditures, cash flow, transactions, billing, and others are core functions for any CFO's department. These measures are critical not only for day to day operations of an agency, but also

for informing other processes within an agency. Sample measures include:

- Financial Measures
  - ❱ Number of transactions;
  - ❱ Financial ratios;
  - ❱ National ranking in revenue per mile;
  - ❱ Accuracy of state revenue projections; and
  - ❱ On-time performance of paying invoices.
- Money/resources used for various operations, e.g., snow removal.

Agencies found that better models and tools were extremely helpful in this area. NCDOT, for example, operates on a cash-flow basis and required the development of a robust cash-flow model. The Maryland Transportation Authority finds it necessary to integrate its financial system with other systems.

Like the previous two performance-based approaches, this approach requires continuous reporting and frequent meetings among administrators. Subsequent adjustments based on progress towards targets among each performance measure should be made, not only on past performance but forecast performance. These data also are often requested by outside decision-makers, such as legislatures and governors, who ultimately may make funding or other resource-related decisions based on it.

Mn/DOT is in the process of developing a new financial accounting and management structure. Lessons from Mn/DOT indicate the following should be taken into consideration when developing performance-based systems for accounting and financial tracking:

- Does an activity need to be measured from a business perspective, and what is the lowest level at which the activity should be measured in order to direct behavior?
- Is the capturing of the performance data understandable to users, thereby ensuring accuracy of inputs?
- Is the financial system aligned with the agency's overall performance management systems? Do the items being measured help to support overall agency goals and objectives? Are the measures correlated to Mn/DOT's "Scorecards" (http://www.dot.state.mn.us/measures/pdf/Scorecard 6-29.pdf)?
- Is the system measuring what division directors want to know in order to make decisions?
- Is the system as simple as possible, with a minimum number of performance measures and only a few accounting codes?

4.8 Total Agency Integration of Performance Management

Total agency integration of performance management is very difficult to achieve without a very strong internal champion at the upper management-level as well as political support. While some of the above approaches may permeate an organization in advance of total integration, this level of performance management often requires a wholesale audit of the agency and somewhat involved restructuring of fundamental organization and processes. Ultimately, agencies that have integrated performance management into all facets of their organization, horizontally and vertically, are based around the basic five-step process outlined in Section 2.2 and incorporate all of the approaches outlined above.

Examples in Section 5.0 of Missouri DOT, North Carolina DOT, and Maryland DOT briefly describe how these agencies evolved into their current level of performance integration. Additional information on the exact design of each state's performance management system, from top to bottom, as well as the exact steps taken to achieve such a system, can be found at the Missouri DOT web site (http://www.modot.mo.gov/about/general_info/Tracker.htm), the North Carolina DOT web site (http://www.ncdot.gov/performance/reports/default.html), and for Maryland, an extensive case study has been developed in Volume III of *NCHRP Report 666* (http://www.trb.org/Publications/Blurbs/164178.aspx).

4.9 Performance-Based Capital Programming/TIP

Capital programming and the development of the state transportation investment plan (TIP) is the lynchpin of a truly performance-based resource allocation process: it involves the actual prioritization and selection of projects and therefore the actual allocation and commitment of money to these projects and programs. The TIP should emerge from the long-range planning process, i.e., the *State Long-Range Transportation Plan* (LRTP), which should conform to a performance-based process. Utilizing a performance-based process for project selection, such as in the case of NCDOT, helps to more efficiently utilize large financial resources, meet agency goals, and effectively deliver the necessary services to the public.

This topic is discussed in much greater detail in reports such as *NCHRP Report 666*.

5.0 PUTTING THE APPROACHES TO WORK

The following state DOTs have successfully implemented rigorous performance management systems containing some or all of the approaches outlined in Table 5.1. Each of these states have experienced increased financial efficiency, improved system operations, and generally improvements across performance in their agencies. These DOTs have found an improved relationship with their partners and stakeholders as a result of these performance-based processes.

Table 5.1 Application of Approaches

DOT	Key Approaches Highlighted in This Report
Maryland	• Total agency integration of performance management • Linking overall agency goals and performance to staff performance • Tracking other accounting measures
Missouri	• Total agency integration of performance management • Tracking on-time/on-budget project performance • Tracking efficient delivery of services
Minnesota	• Reallocation of funding across districts/asset classes based on relative performance • Tracking efficient delivery of services • Tracking other accounting measures
Ohio	• Reallocation of funding across districts/asset classes based on relative performance
North Carolina	• Total agency integration of performance management • Linking overall agency goals and performance to staff performance • Communicating through performance management

5.1 Maryland DOT

MDOT provides oversight to and coordination with five Administrations that have unique functional responsibilities for the transportation facilities and services in Maryland: the Maryland Aviation Administration (MAA), the Maryland Port Administration (MPA), the Maryland Transit Administration (MTA), the Motor Vehicle Administration (MVA), and the State Highway Administration (SHA). The Secretary's Office (TSO) establishes the department's transportation policy and oversees the Modal Administrations. The Secretary of Transportation also serves as Chairman of the Maryland Transportation Authority (MDTA), an independent agency responsible for Maryland's seven toll facilities and for financing new revenue producing projects for MDOT.

MDOT exhibits "total agency integration of performance management," with the entire agency, horizontally and vertically, integrated into the system. MDOT itself is integrated into the state's performance management process: All state agencies participate in performance reporting and are encouraged to practice target setting and performance monitoring to identify and implement management and operational strategies that achieve strategic goals, promote transparency, and support decision-making that maximizes return on the State's investments.

MDOT and its Modal Administrations first formally adopted performance-based management after the passage of Maryland's Managing for Results (MFR) statute (http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2147) in 1996. MFR in Maryland requires that state agencies report performance data with their annual budget request.

As part of every MTP update (http://www.mdot.maryland.gov/Planning/Plans_Programs_Reports/Reports/MTP/2009MTP.pdf), a governor-appointed advisory committee is assembled to provide guidance to MDOT in the development of the *Annual Attainment Report* (http://www.mdot.maryland.gov/Planning/CTP_10-15/Documents/2010_Attainment_Report.pdf). These recommendations are guided by the following criteria for selecting performance measures:

- Clear linkage to the MTP;
- Relevance to policy-makers and the public;
- Easy to understand;
- Outcome influenced by MDOT program and policy decisions;
- Reliable data available; and
- Manageable number of measures.

Having performance measures tied to budget appropriations has ensured that there is active participation and involvement in performance management, especially in regard to the specific performance-based activity that is measured.

The individual modal agencies have each had their own histories with performance management, and though integrated with the overarching structure, have their own customized variations of performance management that suits their needs.

The SHA, for example, started with Total Quality Management, then Continuous Process Improvement, and now, Performance Excellence. Performance Excellence is based on a modified version of the *Malcolm Baldrige Criteria* (http://www.baldrige. nist.gov/PDF_files/2009_2010_Business_Nonprofit_Criteria.pdf), and combines the seven Baldrige criteria into five Vision Areas:

- Leadership;
- Workforce Planning;
- Business Planning;
- Process Improvement; and
- Customer Satisfaction.

State-Level Performance Management

StateStat is a performance measurement and management tool to enable the Maryland State government to be more accountable and efficient. StateStat focuses on operational performance measures that point to specific products and services that need attention to achieve quick improvements.

The goal of the StateStat program is to allow state administrators to continually evaluate and improve state performance at the highest levels—not just during annual budget reviews. State managers meet with the Governor and his executive staff at biweekly meetings to report and answer questions on agency performance and priority initiatives. Each week a comprehensive executive briefing based on key performance indicators is prepared for each agency that highlights areas of concern. Over 100 SHA performance measures currently are being reported during StateStat meetings.

Target-Setting and Linking to Resources

MVA develops targets only for those measures that are directly influenced by performance activities. Performance data should be available or easily obtainable if a target is to be used. The MVA strives to achieve long-term goals through short-term performance targets. This is accomplished by establishing realistic targets based on projected resources, the availability of funding, and accounting for future challenges and needs for services and products.

SHA uses outside data, trends, and best practices to assist in the target setting process whenever possible. For example, some targets are benchmarked against data from other Northeastern states for which AASHTO data is available.

If targets are consistently not met, performance activities are reviewed and evaluated for effectiveness. Additional resources (financial, personnel, assets) may be applied to meet the performance target or the target itself may be adjusted/eliminated if proven not feasible for the agency. If targets continue to go unmet, those controlling funding are made aware and actions are taken given budget constraints. Conversely, if a target is consistently met, it will also be reviewed and evaluated for its feasibility and appropriateness. It may be determined that the target was too low to begin with or, if the target is appropriate, resources may be redirected to other challenged areas.

Dedicated Staff and Ownership

SHA created a separate, staffed Performance Excellence Division to drive the performance processes. Additionally, *SHA's Business Plan* (http://www.marylandroads. com/oc/shabusinessetnl.pdf), which tracks 450 performance measures, is based on six

Key Performance Areas (KPA), each managed by a KPA council. The six KPAs are:

- Safety;
- Mobility;
- System Preservation and Maintenance;
- Environmental Stewardship;
- Organizational Effectiveness; and
- Customer Communication, Satisfaction, and Service.

KPA Councils are composed of a "vertical slice" of SHA staff. Objectives and targets for the most recent 2008 Business Plan were developed by the KPA Councils using a facilitated strategic planning framework. The KPA Councils review performance data quarterly and are involved in all performance reporting at the agency.

> *"SHA's Business Plan, which tracks 450 performance measures, is based on six Key Performance Areas (KPAs), each managed by a KPAcouncil."*

Each measure itself is assigned a "measure lead": a staff person responsible for maintaining and reporting data for a particular measure and ensuring data accuracy. Targets are generally set by the measure lead with input from the appropriate KPA Council, managers, data owners, and the Administrator.

The MDTA created a performance management team (PMT) of 10 members—one from each Division of MDTA—although additional staff acts as advisory members or play support roles. PMT membership rotates every 18 months. The group is now on its second cohort of members, but several from the first cohort still attend meetings. The goal of the PMT was to create more regular internal

performance reporting and management. The PMT meets monthly to monitor performance measures and targets within MDTA's Business Plan. Beginning in 2008, with the support of the Executive Secretary, the PMT began reporting during MDTA's Management Committee on a quarterly basis. The quarterly report contains 18 objectives and 20 to 22 performance measures.

Linking to Staff Performance

SHA is leading a pilot on behalf of MDOT to base managers' performance appraisals on performance plans that link to office/district business plans (which coincide with the overarching SHA Business Plan) as well as individual performance targets. SHA has completely changed its assessment forms to incorporate performance management in these personnel reviews. The assessment now consists of two parts: Leadership competencies (40 percent) and an annually updated Performance Plan (60 percent). Performance is now linked to personnel reviews for staff down to the midmanagement level. For these staff, the focus is on output measures as opposed to outcome (longer-term strategic) measures. Overall, SHA is hoping to increase the prominence of the office/ district business plans across all levels of the agency so that each employee can see how performance measures are used as a management tool and identify how their work supports the larger goals of the organization.

In the MDTA, one of the PMT's charges included changing the employee annual evaluation process and linking personnel reviews to performance. During the calendar year, every employee meets with his/her manager quarterly. MDTA (http://www.mdot.maryland.gov/Planning/CTP_10-15/Documents/2010_Attainment_Report.pdf) piloted an evaluation process that assesses and evaluates each employee's contribution to the division work plan goal and/or performance measure that is most closely related to the employee's job description (i.e., invoice processing time). The goal is to link each employee to the division work plan, which illustrates their link to agency-wide goals and plans (i.e., *MDTA Business Plan*), statewide goals and plans (i.e., *Annual Attainment Report*), and eventually to the *State Long-Range Transportation Plan* goals.

Several challenges have arisen in relating staff performance to agency performance goals, objectives, and measures. First, where staff are unionized, changes to the review process must be negotiated into a new labor agreement. Second, agencies must be careful not to create a penalty-based system. In harsher economic times, there may be no budget for bonuses that staff formerly received for exceptional performance. MVA management is trying to develop other creative incentives, including agency

> *"MDTA piloted an evaluation process that assesses and evaluates each employee's contribution to the division work plan goal and/or performance measure that is most closely related to the employee's job description. The goal is to link each employee to…the State Long-Range Transportation Plan goals."*

level programs that provide an extra day of administrative leave or a premium parking space, or division level events such as pizza parties and barbeques.

Finance and Accounting

One of MDTA's major performance-based resource allocation initiatives includes integrating MDTA's financial system with other systems. Key performance metrics currently used to allocate MDTA's resources include:

- Financial Measures
  - Number of transactions,
  - Amount (in dollars) of tolls collected, and
  - Financial ratios.
- Operational Measures
  - Money/resources utilized for snow removal to determine estimated budget needs for the following fiscal year.

The MAA's performance is based on its ability to:

- Manage appropriations so that the MAA comes in under budget yet fully funded;
- Manage the MAA on a profit and loss (P&L) basis so that the operating budget is fully recouped through revenues and as much of the capital budget as possible is recouped through revenues (http://www.dbm.maryland.gov/agencies/Pages/ManagingResultsMaryland.aspx);
- Manage the payment of funds due to vendors so that less than one percent of the invoices are greater than 30 days late; and
- Keep to a minimum legislative, MDOT and internal MAA audit findings and ability to resolve any open findings.

Performance data is used externally for resource allocation through the MFR, Annual Attainment Report on Transportation System Performance, and status reports requested by the Legislature, MDOT, and the Governor's Office. Performance data is used for internal resource allocation by the PMT at monthly Management meetings, and at Facility Administrator and Division Director's budget meetings with the Executive Secretary and the CFO.

5.2 Missouri DOT

Based on the range of performance measures that it has developed to address funding and financial issues, it is clear that MoDOT has experienced the same types of needs expressed by CFOs at DOTs across the nation.

Some of the lynchpins in MoDOT's performance-based process include:
- Frequent meetings to assess progress and suggest changes in action (i.e., "resource allocation");
- Targets in the form of benchmarks against national standards or other states; and
- Designated people "in charge" of each measure, both in terms of data and calculations and in terms of progress on the measure.

For the past six years, MoDOT's performance management system has evolved and matured into agency culture, with performance management reaching down to all levels of the department. Over 100 high-level performance measures are published in the *Tracker* (http://www.modot.mo.gov/about/general_info/Tracker.htm), MoDOT's departmental performance report. A review and accountability meeting, attended by over 150 managers and employees, is held quarterly to report and discuss the results of the metrics. These high-level performance measures are built around 18 Tangible Results identified as MoDOT's customer's expectations. Measures, data and calculations, and ways in which the measures have affected change toward the Tangible Results are highlighted in Tables 5.2 and 5.3 for two Tangible Results directly addressing CFO needs. The first and last measures in Table 5.3 provide particularly unique ways of looking at the agency's staff and revenue levels.

> *"A review and accountability meeting, attended by over 150 managers and employees, is held quarterly to report and discuss the results of the metrics."*

Road construction using warm-mix asphalt
Photo courtesy of Cathy Morrison, Misssouri DOT

Table 5.2 MoDOT "Fast Projects that are of Great Value"
Selected Performance Measures

Measure	How it is Driving Change
Percent of programmed project cost as compared to final project cost	This data is provided to the Missouri Legislature through the Report to the Joint Committee on Transportation Oversight.
Average number of years it takes to go from the programmed commitment in the Statewide Transportation Improvement Program to construction completion	
Percent of projects completed within programmed amount	Emphasis has been placed on scoping projects and developing estimates that represent the true cost of project delivery. MoDOT is striving to deliver quality projects cheaper by using practical design and by encouraging the use of value engineering.
Percent of projects completed on time	MoDOT has focused on reducing the number of days available for construction in order to reduce congestion and inconvenience to the traveling public, while stressing the importance of completing projects on time. To achieve timely completion of improvement projects, an emphasis has been placed on reviewing construction schedules and assessing liquidated damages.
Percent of change for finalized contracts	Strong emphasis placed on constructing projects within budget, the use of practical design and value engineering.
Average construction cost per day by contract type	MoDOT's strategy of utilizing innovative contracting techniques and design-build projects has resulted in faster contract completion and fewer delays to the traveling public. Contract types are reviewed to make a determination of the most effective use of resources for timely completion of projects.
Unit cost of construction expenditures	Customers should be able to gain an understanding of what it costs for a DOT to install an item of work.
Annual dollar amount saved by implementing value engineering	In an effort to increase the number of VE studies being done and thus increase the potential for cost savings, the format of the study has been revised to be more flexible. VE studies now match the size and needs of the project, ranging from two hours to five days. This change has increased the number of VE studies being done during the design phase of the projects.

Source: Cambridge Systematics, Inc., based on MoDOT Tracker.

Table 5.3 MoDOT "Best Value for Every Dollar Spent"
Selected Performance Measures

Measure	How it is Driving Change
Ratio of lane-miles per full-time equivalency (FTE)	Assists management in making efficiency and staffing level comparisons to other transportation departments based upon the total number of lane-miles within each state system.
Number of FTEs	High-level view of overall staffing at MoDOT in relation to budgeted FTEs. Reduced salaried and temporary employees; managed overtime.
Salaried employment levels	Tracks the change in the number of salaried employees compared to current and targeted salaried headcount levels necessary to achieve the cost savings identified as part of MoDOT's workforce reduction plan.
Percent of work capacity based on average hours worked	Assist management in assessing staffing and productivity levels. Average paid leave decreased.
Rate of employee turnover	Tracks the percentage of employees who leave MoDOT annually and benchmarks the department's turnover rate to national data across a wide variety of industries.
Number of lost workdays	Implemented safety related initiatives, involve risk management personal with workplace injuries, and assign light duty work to injured employees.
Rate and total of OSHA recordable incidents	Implemented safety related initiatives.
Number of claims for general liability	Overall decrease in claims.
Cost and usage of utilities for facilities	Captures the impact of energy efficient improvements in buildings and operations.
Percent of vendor invoices paid on time	Increase in on-time payments. Development of tools to locate areas for improvement.
Distribution of expenditures	Demonstrate a responsible use of taxpayers' money, with the emphasis of spending on construction and maintenance of transportation system. Emphasis is on expenditures for routine maintenance of the system (maintenance appropriation) and rehabilitation and construction of the system (construction appropriation).
Accuracy of state revenue projections	Projections are used to prepare the budget that funds MoDOT's operations and capital program; adjustments are made as necessary.
MoDOT national ranking in revenue per mile	Helps communicate need for additional funding.

Source: Cambridge Systematics, Inc., based on MoDOT Tracker.

Every division and district within the department also publishes their own unit Tracker, containing lower level metrics related to specific areas of expertise and processes, but they feed into the higher level measures, ensuring the tangible results are a focus for the entire department. In addition, individual employee performance evaluations contain core competencies and expectations related directly and indirectly to specific tangible results, depending upon the employee's job duties.

Each performance measure in the Tracker is required to have a "detail sheet," which includes:

- Who is responsible for the measure;
- Measure definitions and specifications for clarification;
- Mechanism for data collection;
- Frequency of reporting;
- Historical data availability;
- Data limitations;
- Retention guidelines for supporting documentation;
- Benchmarks or comparatives for the data; and
- Who will use the data and what will it tell them.

Every performance measure has an assigned "result driver" and an assigned "measurement driver," with specifically designated data and calculation steps. Many of the measure data collection and calculations are facilitated by tools such as management systems, information systems, national datasets and tools, and standard accounting and human resources software.

"Every performance measure has an assigned "result driver" and an assigned "measurement driver", with specifically designated data and calculation steps."

MoDOT's CFO describes the impacts the program has had financially:

> *For construction projects completed in the five-year period from 2005 to 2009, final project costs of $6.321 billion were 1.02 percent under the programmed amount, or $64.8 million less than the programmed cost of $6.385 billion. Through the use of Practical Design, Value Engineering and an expectation of bringing projects in on time and on budget, project cost overruns have virtually been eliminated in the construction program. By keeping overhead and administration expenses low, MoDOT has been able to expend almost 90 percent of its funds over the last five years on construction and maintenance; on the roads where it's needed most.*

Precast section brought into position Hwy 62 Minneapolis, MN
Photo courtesy of David Gonzalez, Minnesota DOT

5.3 Minnesota DOT

Stimulated by both internal and external interest in developing a more transparent and accountable investment decision process, Mn/DOT applied Quality Management in the maintenance area in the 1990s. As part of this new focus, a Maintenance Business Management Team produced detailed statewide performance measures and targets for snow and ice removal, pavement markings, signing, customer satisfaction, and other measures. This new approach was well received and the department senior staff directed a broader application of the performance measure concept to other areas such as the highway capital program. As the launch point for this broader application, the department developed a performance-based Statewide Transportation Plan under the Direction of the Program Management Division and established a small Performance Measurement Unit in the Office of Program Management to assist in the plan's production and implementation. The department's decision coincided with a new requirement from the Minnesota Legislature and Department of Finance that agencies use performance measures in biennial budget documents.

Mn/DOT hopes to continuously improve service and efficiency in order to give citizens the best value for their tax dollars by:

- Encouraging innovation, competition, privatization, outsourcing, e-government services, and other creative, cost-saving solutions;
- Listening well and being responsive to customers, stakeholders, and employees;
- Managing for results and being accountable for decisions and actions. Investments will be driven by current priorities;
- Recognizing and celebrating innovation, responsible risk-taking, and measurable success; and
- Streamlining decision-making and rightsizing the organization.

Mn/DOT has "Scorecards" comparing performance results to targets it uses to communicate with stakeholders and the public for several areas, such as Construction Project Development.

Finance and Accounting
Mn/DOT is in the process of developing a new financial accounting and management structure that better aligns with the overall performance management structure of the agency. The existing system monitors finances at a very low and detailed level. For example, snow and ice removal is monitored by 30 different accounting codes depending on differences in the nature of the removal. However, it was determined that 80 percent of all snow and ice removal costs were within a single code.

Workzone Coordinator Maurice Neil
Photo courtesy of Cathy Morrison, Misssouri DOT

Mn/DOT determined that the benefit-cost ratio of such a detailed accounting system was lower than desired. Therefore, a new system is being developed under several guiding principles:

- Does an activity need to be measured from a business perspective, and what is the lowest level at which the activity should be measured in order to direct behavior?
- Is the capturing of the performance data understandable to users, thereby ensuring accuracy of inputs?
- Is the financial system aligned with the agency's overall performance management systems? Do the items being measured help to support overall agency goals and objectives? Are the measures correlated to Mn/DOT "Snapshots"?
- Is the system measuring what division directors want to know in order to make decisions?
- Is the system as simple as possible, with a minimum number of performance measures and only a few accounting codes?

"Is the financial system aligned with the agency's overall performance management systems? Do the items being measured help to support overall agency goals and objectives?"

Mn/DOT will spend more front time on defining the appropriate items to measure and the performance measures themselves, and in developing one common platform.

Allocating Amongst Districts

Once highway funding is approved by the State legislature, Mn/DOT funds are distributed to the districts on the basis of a performance-based formula. The formula, illustrated in Figure 5.1, is tied to measurable performance needs on the transportation system that reflect Mn/DOT goals and policies. The formula aligns with Mn/DOT priorities: preservation, safety, and mobility. The statewide list of highway construction projects that emerge from this process constitute Mn/DOT's annual highway construction program. The results of the project investments are monitored against performance targets as the process begins anew each year.

Approved Formula (Percent ATP Share)
Performance-based Variables (Pavement and Bridge Needs, Fatal/A Injury Crashes and Congest VMT)

	SYS	Units	Criteria	Weight	ATP 1	ATP 2	ATP 3	ATP 4	ATP 6	ATP 7	ATP 8	Metro
PRESERVATION 60%	TH	$	Average Bridge Needs	20%	2.19%	0.75%	1.26%	0.38%	2.14%	0.79%	0.32%	12.17%
	TH	VMT	HCVMT	5%	0.41%	0.21%	0.75%	0.48%	0.49%	0.31%	0.80%	1.57%
	TH	$	Average Payment Needs	35%	5.74%	3.89%	4.14%	3.95%	5.86%	3.80%	3.21%	4.42%
SAFETY 10%	TH	Crashes	Fatal/A Injury Crashes (3 Year Average)	10%	0.91%	0.61%	1.61%	0.70%	1.31%	0.61%	0.72%	3.52%
MOBILITY 30%	TH	VMT	Congested VMT	20%	0.17%	0.05%	1.59%	0.10%	0.54%	0.26%	0.07%	17.21%
	All	Buses	Transit	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	All	People	Future VMT	10%	0.67%	0.31%	1.20%	0.45%	0.92%	0.51%	0.39%	5.56%
100%			**TOTAL**	100%	10.1%	5.8%	10.6%	6.1%	11.2%	6.3%	5.5%	44.4%

Definitions

Average Payment Needs	2009 to 2023 Pavement Needs from the Pavement Model in January 2006
Average Bridge Needs	2008 to 2030 Bridge Needs from the District Plans in June 2005
HCVMT	2005 Daily Heavy Commercial Vehicle Miles Traveled from TIS
Fatal/A Injury Crashes	3-Year Average of Statewide Fatal/A-Injury Crashes (2002–2004), Office of Traffic, Security and Operations
Congested VMT	2005 Congested Daily VMT for Trunk Highways using IRC definitions of congestion for moderate and above level of congestion as defined by facility type, December 2005 (Office of Investment Management)
Transit	2004 Minnesota Transit Report
Future VMT	2015 Population, State Demographic Office, 2004

Figure 5.1 Mn/DOT District Allocation Formula

5.4 Ohio DOT

Performance-based management evolved as an outgrowth of ODOT's involvement in the Total Quality Management (TQM) process in the mid-1990s. Using the Xerox model as their basis, all ODOT employees were trained in the TQM process to identify ODOT customers, their needs and requirements, and problem solving processes. An outgrowth of TQM was to identify performance metrics that ODOT could manage their internal processes by. From the comprehensive list, ODOT identified 65 key performance measures that were elevated to define the organization's overall objectives. ODOT also identified measures based on *Malcolm Baldrige Criteria*, using its own state model of Baldrige.

ODOT's process for performance-based resource allocation is based on a Funds Management Process, in which major program areas identify measures that define acceptable performance (e.g., inventory size, condition of inventory, how much funding is necessary to sustain inventory). There are many individual performance measures within major program areas, but ODOT tends to boil them down to specific key measures.

Transportation Engineer Cassandra VanHorn inspects a
culvert outlet grade during a concrete pour on a bridge project
Photo courtesy of Joyce Miller, Ohio DOT

The process is used in day-to-day programming of projects and evaluating how a project will impact overall performance. ODOT's goal is to sustain a certain level of performance over a period of time, and to implement necessary projects and funding to sustain that level.

The resource allocation process for major statewide and regional transportation investments is guided by an appointed body called the Transportation Review Advisory Council (TRAC). ODOT relies on TRAC for all projects that cost more than $5 million and which do one or more of the following: increase mobility, provide connectivity, increase the accessibility of a region for economic development, increase the capacity of a transportation facility, or reduce congestion. The TRAC is a permanent body of predominantly non-ODOT personnel which develops and modifies a project selection process and which approves major new projects for funding.

ODOT attributes their success to the iterative process used to develop and refine their performance-based resource allocation process. The Total Quality Management Process that initiated the program was beneficial in terms of identifying ODOT customers and their needs. The TQM model defined their core processes and identified meaningful output measures that ODOT could manage from.

> *"ODOT attributes their success to the iterative process used to develop and refine their performance-based resource allocation process."*

Institutionalizing the performance management and TQM process was key to the continued success of the program. They trained all of their employees on performance measure definitions (e.g., pavement measures, bridge measures, etc.), and explained how the measures were tied to ODOT's strategic objectives and employees' day-to-day activities. ODOT relieved heavily on training materials to accomplish the institutionalization of the process, and they also tied it to individual performance.

Allocating to Districts

In the past, money was generally allocated to districts based on historical funding. Now, ODOT is able to tie funding to district needs, and they have a way to measure the efficiency of individual districts. For preservation, for example, once ODOT was able to tie bridge and pavement deficiencies to the total number of miles managed by that district, they were able to measure the efficiency of individual districts in applying the funds allocated to them.

> *"ODOT is able to tie funding to district needs, and they have a way to measure the efficiency of individual districts."*

The districts' budgets are driven by the condition of the assets for which they are responsible. Annual monitoring of the road and bridge condition (from the central office) assures that the reported condition information reflects actual conditions. A funds management committee decides the relative distribution of budget to the districts. Expected trends of pavement condition in each of the districts provide the basis for changes in district preservation budgets. Districts are given lump sums and four years to produce changes in condition measures.

Ultimately, districts are evaluated on their ability to manage the process and achieve results over time. If a district is not performing, the managers are taken off the team or reassigned.

Data sharing and benchmarking also are an important part of ODOT's performance management system: the state and district data are shared among the district directors so that they can see how the districts compare to one another. The overall policy framework makes sure that everyone is aiming for the same quality levels.

Tying unit budgets to condition measures has been very effective in focusing organizational resources on the priorities established by ODOT management. The agency maintains a 10-year fiscal forecast which is tied to system conditions and is reviewed biennially in sync with the state budgeting process. However, given recent rise in construction costs and thus less dollars available for projects, ODOT has evaluated the sensitivity of program funding levels to different and lower goal thresholds. The sensitivity analysis informed program/budget decision-making that eventually increased the budget to these programs, but with some districts receiving only an increase to cover inflation and other districts' allocations further increased over inflation to meet their pavement and bridge goals.

5.5 North Carolina DOT

A fully integrated performance-management process at NCDOT started when the DOT requested a wholesale reassessment of the entire agency, how it operated, and how it did business. The self-assessment and resulting strategic plan (http://www.ncdot.gov/_templates/download/external.html?pdf=http%3A//www.ncdot.gov/download/performance/Volume8.pdf), prepared by McKinsey and Company, measured the DOT against global best practices to determine how they were not operating like an efficient business. The management within the DOT were persistent champions in the process, with support from the governor and legislature, despite the potential risk of exposure to scrutiny.

NCDOT initiated the self-assessment to help better deal with external pressures as well as internal needs. External challenges included those faced by most other state DOTs: increasing costs, decreasing revenues, decreasing Federal funding, and increasing demand. Internally, NCDOT felt that it was struggling to build capacity and capability, properly prioritize and fund projects, implement projects and programs well, compensate employees properly and retain talent, and get a balanced performance message to its constituents. As stated in the McKinsey Report, "NCDOT has not been keeping up with the best organizations in the public and private sector, which are increasing their focus on efficiency and strategy to achieve operational excellence."

The assessment resulted in the specific identification of several specific needs within the agency:

- **Lack of direction.** NCDOT had numerous and occasionally inconsistent vision and goal statements. It is important that NCDOT clarify its vision and link it more explicitly to a broader, long-term vision for North Carolina. Goals were not "cascaded" throughout the organization. Further, NCDOT's portfolio of projects and programs were not explicitly linked to or coordinated with NCDOT goals. The diagnostic found NCDOT's portfolio to be near-term-oriented and familiar, and made limited use of innovative funding approaches.

- **Issues with key organizational elements.**
  - **Strategic planning processes** were ad-hoc and reactive.
  - **Funding processes** were not flexible enough to enable NCDOT to align its financial resources against strategic needs.
  - **Project design and delivery processes** had been slowed by a lack of prioritization, accountability, and coordination.
  - **Operational processes** lacked organization-wide, metrics-based management filtered down to all staff.
  - **The organizational structure** "siloed" elements of some key processes, e.g., project delivery, and lacked units to support others, e.g., intermodal, statewide, strategic planning. As a result, employee mindsets also tended to be "siloed."
  - **Talent systems** were failing to sufficiently recruit and retain critical talent, drive employee performance, and develop top managers.
  - **Internal and external communication systems** were not sufficiently proactive and lacked the budget resources needed to be effective.

The assessment resulted in five NCDOT transformation initiatives:
- Align strategic direction with a new mission statement and goals;
- Streamline project design and delivery;
- Design a more productive organization;
- Increase accountability for and visibility of performance; and
- Improve talent management.

As part of item one, the department agreed on five goals:
- Make our transportation network safer;
- Make our transportation network move people and goods more efficiently;
- Make our infrastructure last longer;
- Make our organization a place that works well; and
- Make our organization a great place to work.

In addition to goals, the strategic plan resulted in a process involving the development of priorities via a data-driven prioritization model, taking projects from the bottom up from local governments; setting targets; and tracking and measuring against the targets. Targets are benchmarked against average national performance. The targets are set with some flexibility (and the DOT is still experimenting with the best way to set "stretch goals"), but are basically nonnegotiable.

Overall Strategic Direction

The McKinsey Report summarizes a best-practice strategic planning process:

> …*an initial meeting or group of meetings sets criteria for project selection; several months later, these criteria are provided to managers. Throughout the year, interim check-ins are held to ensure that business unit plans match strategic priorities. Finally, corporate and board reviews are held to validate the strategic planning process.*

Comprehensive one-year, two-year, and eight-year strategic planning processes were designed as a result of the self-assessment and strategic plan, with the intent of enabling the DOT to turn its strategic direction into concrete financial, operating, and talent plans.

Guided by best practices and stakeholder input, a strategic planning calendar was designed; the calendar aligns with the human resources planning calendar and the performance metrics quarterly business review calendar.

Further, the role of the Board of Transportation was restructured. Previously, the Board reviewed and helped select individual projects. The Board's role was refocused to become more strategic, focusing on policy, planning, and performance.

Communicating Through Performance Management

NCDOT's performance measures encompass more than 40 different business units, including the Division of Highways, the Division of Motor Vehicles, the Division of Transit (including ferries, rail, buses, and aviation), and support functions such as IT, finance, and human resources. These individual and business unit measures, which reflect overall agency goals and vision, are translated into top-level metrics for the organization.

Five of these top level metrics are visually displayed on the NCDOT dashboard:

> *"NCDOT's performance measures encompass more than 40 different business units…These individual and business unit measures, which reflect overall agency goals and vision, are translated into top-level metrics for the organization."*
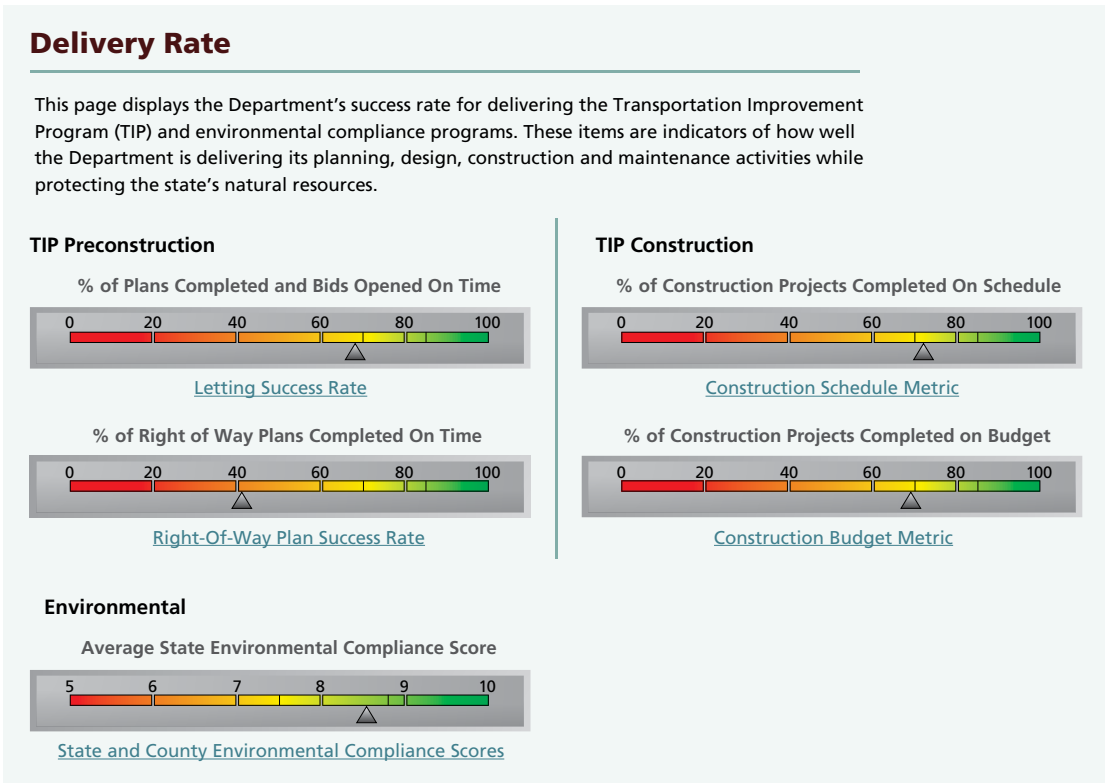
- Fatality rate;
- Incident duration;
- Infrastructure health;
- Delivery rate; and
- Employee engagement.

"Delivery rate" is defined as NCDOT's success rate for delivering the TIP. The gauge is accompanied by more detailed indicators of how well NCDOT is delivering its planning, design, construction and maintenance activities (Figure 5.2). The dashboard also illustrates progress towards targets.

A large focus of the new performance-based process was increasing communication and transparency through intergovernmental partnership. Members of the DOT and a large group of other state and local agencies and governments meet once a month. Through this process, the DOT has been better able to coordinate legislative strategies and leverage the skills and resources of all parties. Another output of the process is an annual performance report to the governor.

Linking to Staff Performance

The DOT intends for goals and performance measures to work their way down to each employee. The McKinsey Report states:

Figure 5.2 NCDOT Dashboard
        Delivery Rate Indicators

Delivery Rate

This page displays the Department's success rate for delivering the Transportation Improvement Program (TIP) and environmental compliance programs. These items are indicators of how well the Department is delivering its planning, design, construction and maintenance activities while protecting the state's natural resources.

TIP Preconstruction

% of Plans Completed and Bids Opened On Time

| 0 | 20 | 40 | 60 | 80 | 100 |

Letting Success Rate

% of Right of Way Plans Completed On Time

| 0 | 20 | 40 | 60 | 80 | 100 |

Right-Of-Way Plan Success Rate

TIP Construction

% of Construction Projects Completed On Schedule

| 0 | 20 | 40 | 60 | 80 | 100 |

Construction Schedule Metric

% of Construction Projects Completed on Budget

| 0 | 20 | 40 | 60 | 80 | 100 |

Construction Budget Metric

Environmental

Average State Environmental Compliance Score

| 5 | 6 | 7 | 8 | 9 | 10 |

State and County Environmental Compliance Scores

> *Successful organizations emphasize accountability for and visibility of performance so that all employees are working effectively toward corporate goals. Each person knows what he or she is responsible for and can use key performance indicators as a tool to prioritize his or her daily activities. Clear metrics also help develop employees, identifying areas of strength and needed improvement, so that supervisors can work as partners with employees to maximize their contribution to the overall mission. This not only leads to improved performance across the organization, but also to increased satisfaction for individuals, who feel rewarded and encouraged in their work.*

Everybody related to a measure and goal has a personal and group goal and is scored on their performance towards that goal. This "performance goal" for an employee is one component of their evaluation. The goal is adjusted depending on the level of the employee.

The first cycle of performance-based reviews were applied to the top 150 managers. The next round is being applied to all employees, with individual and group expectations.

Efficient Delivery of Services

Several delivery processes have been piloted on TIP projects include: creating formal teams to oversee project delivery, with a single team lead; appointing a tri-party lead for end-to-end project delivery, including one person from planning, one from design, and one from operations; and instituting PEF turn-key delivery. The McKinsey Report suggests that formal tracking mechanisms are necessary for tracking the pilot performance, and that it is important to communicate pilot successes.

> *"…every two weeks all administrators meet to discuss the financial performance of the DOT based on metrics related to cash flows, project schedules, and future plan opportunities. This process was used to track the ARRA projects, develop innovative financing techniques, and even helped to successfully anticipate the economic downturn."*

Finance and Accounting

NCDOT is a cash-flow based agency. As such, the agency has specific cash-flow objectives and required the development of a robust cash-flow model. Further, every two weeks all administrators meet to discuss the financial performance of the DOT based on metrics related to cash flows, project schedules, and future plan opportunities. Adjustments are made as necessary at these meetings. This process was used to track the ARRA projects, develop innovative financing techniques, and even helped to successfully anticipate the economic downturn.

A survey was developed as part of this study to assess the state DOT CFO perspective in regards to performance management, thereby helping to guide the development and focus of the briefing paper. The survey also was intended to gather information on current performance-based processes they use to help populate the paper with examples currently in practice.

The survey was sent by AASHTO to the state DOT CFOs via e-mail; 10 states responded. Additionally, CFOs and DOT staff from four states (Kansas, Minnesota, Colorado, and North Carolina) were interviewed by telephone to assess certain CFO issues and performance-based programs in greater detail. Finally, relevant results from surveys and case studies performed by Cambridge Systematics through other completed NCHRP and AASHTO studies were included.

Sections A.1 and A.2 contain the text of the e-mail and the survey questions sent to the CFOs.

A.1 Introduction

The AASHTO Center for Excellence in Project Finance has initiated a research effort on "Using Performance Management Practices to Support Funding and Finance Initiatives." The purpose of this effort is to develop a briefing paper that focuses narrowly on the question of how performance management techniques can improve the funding and finance activities of state DOTs.

In order to most properly orient the direction and perspective of the paper, we are requesting input from state DOT CFOs on typical CFO needs and issues in relation to performance management to support funding and finance. The four questions below will help us understand how you use performance management now and how you think it could be improved to help your agency and department from a finance and funding perspective. Please respond by COB Sunday May 9, 2010 to Erik Cempel of Cambridge Systematics at ECempel@camsys.com.

You can direct any questions about this survey to me at jlee@aashto.org or (202) 624-5818. Thank you in advance for your help with this effort.

A.2 Questions

- How is success gauged in your department? By what metrics are you and your department evaluated by your superiors, the legislature, or others? By what metrics do you evaluate your staff?

- Do you publish any report/data/performance on a regular basis? Who is the audience? Is any action taken based on those numbers?

- How do you get your data for Question 2? Do you use any tools to analyze the data?

- Where do you tend to have the biggest financial challenges: internal agency finances and funding, project costs and overruns, or other areas? Where do you see the most opportunity for improving your DOT's financial management and funding availability?