



Transportation Planning Capacity Building Program

North Carolina DOT Peer Exchange on Performance Management

A TPCB Peer Exchange

Location: Raleigh, North Carolina

Date: November 19-20, 2013

Host Agency: North Carolina Department of Transportation (NCDOT)

Peer Agencies: South Carolina Department of Transportation (SCDOT)

Federal Agencies: Federal Highway Administration (FHWA)
Federal Transit Administration (FTA)
Volpe National Transportation Systems Center (Volpe Center)



U.S. Department of Transportation
Federal Highway Administration • Federal Transit Administration

REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE September 2014		3. REPORT TYPE AND DATES COVERED Final Report
4. TITLE AND SUBTITLE North Carolina DOT Peer Exchange on Performance Management			5. FUNDING NUMBERS 51HW2LA300 / MTD77	
6. AUTHOR(S) Terry Regan; Lauren Deaderick				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Department of Transportation Research and Innovative Technology Administration John A. Volpe National Transportation Systems Center 55 Broadway Cambridge, MA 02142			8. PERFORMING ORGANIZATION REPORT NUMBER DOT-VNTSC-FHWA-14-11	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Federal Transit Administration/Federal Highway Administration Office of Planning & Environment/Office of Planning 1200 New Jersey Avenue, SE Washington, DC 20590			10. SPONSORING/MONITORING AGENCY REPORT NUMBER FHWA-HEP-14-050	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This report highlights key recommendations and best practices identified at the peer exchange on Transportation Asset Management Plans (TAMP), held on February 5 and 6, 2014, in Columbia, South Carolina. This event was sponsored by the Transportation Planning Capacity Building (TPCB) Peer Program, which is jointly funded by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA).				
14. SUBJECT TERMS Keywords: performance management, data, mobility, MAP-21			15. NUMBER OF PAGES 24	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unlimited	

Table of Contents

Introduction.....	2
Background and Overview of Peer Event.....	3
Key Themes	4
A. MEASURING MOBILITY	4
B. NEW AND VARYING DATA APPLICATIONS	7
C. PERFORMANCE MANAGEMENT STRUCTURE	10
Next Steps.....	14
About the Transportation Planning Capacity Building (TPCB) Program	15
Appendix.....	16
Appendix A Key Event Contacts.....	16
Appendix B Event Participants	16
Appendix C Event Agenda	18
Links to Additional Resources.....	22

Introduction

This report summarizes the key themes and recommendations identified at a peer exchange on November 19-20, 2013 in Raleigh, North Carolina. North Carolina Department of Transportation (NCDOT) hosted peers from South Carolina Department of Transportation (SCDOT) to exchange best practices surrounding performance management. The peer exchange was sponsored by the Transportation Planning Capacity Building (TPCB) Peer Program, which is jointly funded by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA).

Background and Overview of Peer Event

With the passage of the Moving Ahead for Progress in the 21st Century Act (MAP-21), State Departments of Transportation (DOTs) are required to monitor the performance of their transportation system as well as achieve the national performance goals. Transportation performance management is a systematic and data-driven approach to investment and policy decisions. By monitoring certain performance metrics and setting performance targets for the state transportation system, State DOTs will be more informed when making decisions.

MAP-21 set the following national performance goal areas:

- Safety
- Infrastructure Condition
- Congestion Reduction
- System Reliability
- Freight Movement and Economic Vitality
- Environmental Sustainability
- Reduced Project Delivery Delays

While performance management is not new to either of the peer exchange participants, it is important to continue refining a State DOT's performance management system as well as positioning the State DOT for the future MAP-21 rulemakings that will establish specific performance measures. The North Carolina Department of Transportation (NCDOT) and the South Carolina Department of Transportation (SCDOT) both have established performance management systems and view this peer exchange as an opportunity to share their respective processes in developing and applying their performance management system, and their respective measures. NCDOT requested the peer exchange from the FHWA-FTA TPCB Peer Program for the following reasons:

- To better position the agencies to meet the current MAP-21 performance requirements and address the performance measures that are to be identified through the rulemaking process
- To have SCDOT learn and better understand the project prioritization process of NCDOT
- To demonstrate NCDOT's prioritization scoring model
- To have NCDOT learn the methodology behind SCDOT's congestion management strategies
- To identify the steps that SCDOT uses to produce its corridor studies and recommended solutions

Four representatives from SCDOT were invited to attend this event as peers of NCDOT. The peers included:

- Daniel Campbell, ITS Coordinator
- Michael A. Dennis, PE, Technical Applications Engineer
- Dipak Patel, PE, Technical Applications Director
- Mark Pleasant, Chief of Statewide Planning

Each of the two State DOT agencies saw this two-day peer exchange as an opportunity to learn from an aspect of their peer's performance management system. In learning from each other, NCDOT and SCDOT can strengthen their systems and prepare for the release of MAP-21 rulemakings. This peer report documents the key themes and takeaways highlighted from the two-day peer exchange.

Key Themes

During this peer exchange, NCDOT and SCDOT each took turns presenting their methodologies, experiences, and challenges in developing their performance management systems. The agenda for the two day peer exchange also contained open roundtable discussions. This peer report provides a high level documentation of the key themes that emerged from the sessions and roundtable discussions. The key themes discussed are:

1. Measuring Mobility
2. New and Varying Data Applications
3. Performance Management Structure

A. Measuring Mobility

Both NCDOT and SCDOT noted the difficulty that State DOTs can have in properly quantifying mobility. Measuring mobility is a relatively new responsibility of State DOTs. As participants observed, safety divisions have been measuring and reporting their performance for decades, however congestion was always difficult to measure without the proper data. Now, new data collection efforts are allowing states a new perspective on how to quantify and report mobility. This ability to measure mobility will ideally lead to answering the question of how much benefit is acquired by investing in selected mobility improvement projects. Both DOTs acknowledged the importance of accurately measuring mobility, but developed different approaches to congestion management.

South Carolina's Comprehensive Corridor Management Studies

SCDOT saw the need to go beyond asset management and move to a more comprehensive technique of system management. Instead of spending large amounts of resources studying individual assets in their network, SCDOT decided to evaluate the performance of individual corridors. To better help it identify its needs, SCDOT focuses on identifying and understanding the density of use for each of the segments of its highway system. Using real-time data, SCDOT calculated densities for segments of each interstate based on the Highway Capacity Manual equations¹. The interstates are divided into corridors based on the location of significant change in density. The segment densities of each corridor are added together to create an overall score for the entire corridor. The density index shows where the worst mobility issues are faced and can be ranked accordingly.

After creating this mobility measure for each corridor, SCDOT developed corridor management plans that consist of a holistic survey of a particular corridor and a timeline of multi-modal recommendations for specific segments. Using VISSIM² as well as the probe data collected, recommendations are developed and categorized as Travel Demand, Modal, Traffic Operations, and Capacity Improvement Strategies. Each of these strategies NCDOT expressed interest in this approach to project prioritization and moving toward a more holistic view of their transportation system. SCDOT has involved the MPOs as partners in the development of their approach to prioritize interstate needs. Before, South Carolina MPOs had almost no role in planning for improvements to the interstate planning process. Each of the MPOs have the ability to add criteria to the evaluation process.

¹ Highway Capacity Manual density equation: $\text{Density} = \text{Flow (vehicles per hour)} / \text{Speed (miles per hour)}$; Tuesday, Wednesday, Thursday only as sample of weekday

² VISSIM is a multi-modal traffic flow simulator developed by a private company.

I-85 Segment #	Segment Between		Density Index			I-85 Segment Rank	Corridor Density Index		Corridor Name
			I-85 NB	I-85 SB			I-85 Two-Way	Index/Mile	
1	GA State Line	& SC-11/Exit 1	58.5	58.0	116.6	37	1175.0	34.6	I-85 A
2	SC-11/Exit 1	& SC-59/Exit 2	58.5	55.8	114.4	38			
3	SC-59/Exit 2	& Exit 4	56.0	56.7	112.7	40			
4	Exit 4	& SC-24/Exit 11	60.2	60.2	120.4	33			
5	SC-24/Exit 11	& SC-187/Exit 14	67.0	66.7	133.7	27			
6	SC-187/Exit 14	& US-76/SC-28/Exit 19	69.3	70.2	139.6	24			
7	US-76/SC-28/Exit 19	& US-178/Exit 21	58.3	50.8	109.1	41			
8	US-178/Exit 21	& SC-81/Exit 27	54.0	53.5	107.5	43			
9	SC-81/Exit 27	& SC-8/Exit 32	57.1	56.1	113.2	39			
10	SC-8/Exit 32	& US-29/Exit 34	53.6	54.3	107.9	42			
11	US-29/Exit 34	& SC-86/Exit 35	80.8	70.6	151.4	20	3250.5	90.3	I-85 B
12	SC-86/Exit 35	& SC-143/Exit 39	82.2	71.6	153.7	19			
13	SC-143/Exit 39	& SC-153/Exit 40	85.0	75.7	160.7	13			
14	SC-153/Exit 40	& US-29/Exit 42 (Greenville)	109.3	97.4	206.7	4			
15	US-29/Exit 42 (Greenville)	& US-25/SC-20/White Horse Rd/Exit 44	85.9	73.6	159.5	14			
16	US-25/SC-20/White Horse Rd/Exit 44	& US-25 Bus/Augusta Rd/Exit 46	89.8	81.1	170.9	11			
17	US-25 Bus/Augusta Rd/Exit 46	& SC-291/Pleasantburg Dr	84.2	74.2	158.5	16			
18	SC-291/Pleasantburg Dr	& Mauldin Rd/Exit 46	85.8	72.7	158.5	15			
19	Mauldin Rd/Exit 46	& US-276/Exit 48	120.5	102.3	222.8	3			
20	US-276/Exit 48	& I-385/SC-146/Woodruff Rd/Exit 51	96.9	108.9	205.8	5			
21	I-385/SC-146/Woodruff Rd/Exit 51	& Pelham Rd/Exit 54	118.9	146.2	265.2	1			
22	Pelham Rd/Exit 54	& SC-14/Exit 56	95.2	129.6	224.8	2			
23	SC-14/Exit 56	& Aviation Dr/Exit 57	83.0	104.7	187.8	7			
24	Aviation Dr/Exit 57	& SC-101/Exit 60	79.1	93.2	172.3	10			
25	SC-101/Exit 60	& SC-290/Exit 63	81.1	93.6	174.7	9			
26	SC-290/Exit 63	& US-29/Exit 66	93.7	81.8	175.5	8			
27	US-29/Exit 66	& SC-129/Exit 68	91.2	79.4	170.6	12			
28	SC-129/Exit 68	& I-26/Exit 70	70.1	60.9	131.1	29	857.3	65.9	I-85 C
29	I-26/Exit 70	& US-176/Exit 72	64.9	73.7	138.7	26			
30	US-176/Exit 72	& SC-9/Exit 75	61.4	70.6	132.1	28			
31	SC-9/Exit 75	& I-85 Bus/Exit 77	55.0	62.7	117.7	36			
32	I-85 Bus/Exit 77	& US-221/Exit 78	69.2	80.3	149.4	21			
33	US-221/Exit 78	& Gossett Rd/Exit 80	61.2	69.5	130.8	30			
34	Gossett Rd/Exit 80	& SC-110/Exit 83	88.5	100.2	188.7	6	1236.0	53.7	I-85 D
35	SC-110/Exit 83	& Green River Rd/Exit 87	77.1	78.5	155.6	17			
36	Green River Rd/Exit 87	& Hyatt St/Exit 90	76.8	78.2	155.0	18			
37	Hyatt St/Exit 90	& SC-11/Exit 92	71.6	71.3	142.9	23			
38	SC-11/Exit 92	& SC-150/SC-18/Road 82/Exit 95	71.0	72.6	143.6	22			
39	SC-150/SC-18/Road 82/Exit 95	& SC-18/Shelby Hwy/Exit 96	69.8	69.2	139.0	25			
40	SC-18/Shelby Hwy/Exit 96	& SC-5/Exit 99	64.2	65.3	129.5	32			
41	SC-5/Exit 99	& SC-198/Exit 102	67.2	63.4	130.6	31			
42	SC-198/Exit 102	& Exit 104	59.5	59.9	119.5	35			
43	Exit 104	& US-29/Exit 106	59.9	60.3	120.3	34			

Figure 1 SCDOT's Corridor Density Spreadsheet

The main takeaways from South Carolina's presentation on their corridor management studies are the following:

Identification of low-cost alternatives to roadway widening

Through the development of the Corridor Management Plans, alternative projects to roadway widening were identified. Travel Demand, Modal, Traffic Operations, and Capacity Improvement Strategies all work together to find cost efficient issues to congestion on the corridor. By avoiding expensive and time-intensive road construction projects, SCDOT can accomplish more projects that may prove to be more effective at managing congestion. In developing strategies, SCDOT found that travel demand management (TDM) strategies and modal strategies would only cost about 1% of the total cost to provide additional capacity through capital expansion. With budgets constrained and traffic demand increasing, State DOTs need to be innovative in their approaches to improving mobility. Strategies such as improving interchanges, striping, ITS, and transit incentives all contribute to achieving better performance of a transportation network at a low cost. When SCDOT identifies TDM strategies as part of a project, it will assign a specific agency the responsibility of being in charge of implementing the strategy. This has had the effect of bringing in additional partners to the project or program and can help leverage the funding of a project. For example, the expense to operate the state's motor assistance program for a year is equal in cost to four miles of resurfacing a four-lane interstate.

Effective management of the entire corridor

In examining the corridor as a whole, SCDOT can see how particular projects will affect not just a particular segment, but also the rest of the corridor. Widening a small portion of the highway might fix the congestion at that location however it might move the problem further along the corridor. The strategies developed by SCDOT aim to avoid this issue by creating a schedule of projects that balance the corridor needs and the available funding for that fiscal year. The repercussions of not adhering to the timeline are shown in SCDOT's corridor plans.

Early and continuous interaction with stakeholders

The corridor management plans were coordinated with a large and diverse stakeholder group of environmental organizations, local business leaders, and many others affected by the corridor. Although it requires a great amount of effort, including diverse stakeholder groups assisted SCDOT in gaining early political support for their plan and the proposed projects. It was even mentioned that an environmental group offered to assist in funding projects because the projects were more environmentally responsible than the typical highway expansions. Through this coordination and collaboration, stakeholders realized their responsibility in assisting SCDOT accomplish the timeline of projects and the benefit they would gain by efficiently fixing the corridor.

Generating Statewide and Regional Mobility Reports

Both agencies discussed the need to develop better ways to commute complex information on mobility to the public in a way that made sense. SCDOT has started attaching colors to each of its metrics to better help the traveling public understand the meaning of the numbers. NCDOT approached SCDOT with the question of how to best report mobility to the public in one clear story. NCDOT currently uses Travel Time Index (TTI), but this number is hard to explain to the public and policymakers. TTI is calculated by dividing the speed limit by actual speeds. Through target setting and their public-facing dashboard, NCDOT tried to explain and conceptualize the metric to the public; however TTI is an unfamiliar metric to those beyond the transportation industry. TTI is a useful measure internally for NCDOT and they were able to evaluate the effectiveness of interstate projects using that metric, but in expressing mobility to the public it may not be the best choice.

NCDOT thought about developing a measurement calculating percentage of the transportation system congested, but have yet to apply and publicize it. Another method NCDOT uses to explain

improved mobility to the public and policymakers is by comparing before and after average travel times. NCDOT showed a sample of mobility improvement projects and their application of real-time INRIX data to quantify better traffic flow. One project was re-striping an eight-mile portion of a highway from three-lanes to two-lanes. NCDOT found that speeds increased by four miles per hour over the eight-mile segment, decreasing average travel times for commuters. Additionally, traffic volume remained the same. A second project displayed similar positive results from a roadway widening project. The segment was increased from a four-lane to six-lane highway. NCDOT calculated that average travel time decreased from 15 minutes to 10 minutes. They are still working on understanding and communicating average travel time reliability.

A discussion followed surrounding the concern with using the probe data to calculate TTI and the reliability of it as a performance indicator. So far, NCDOT noticed it is consistent with transportation users' experiences and aligns with their project prioritization. Nevertheless, the data and calculation methodology may have its drawbacks. Further research needs to be done in order to discover the best methodologies for calculating and analyzing mobility. While no conclusion was reached on how to best measure and report mobility, NCDOT found SCDOT's input useful and expressed interest in trying their density calculation methods.

B. New and Varying Data Applications

Availability of Real- Time Data

Presently real-time data is available on a scale it never was before. Both State DOTs noted the importance of this shift in improving the ability to measure and report the performance of their transportation system. In the past, data collection processes involved surveying particular locations and creating traffic projection models based on that limited data. Real-time data collection provides a much larger perspective on how the entire transportation network is actually performing. With these new automated data collection efforts, millions of pieces of data can be processed in a variety of ways. SCDOT is now able to use probe data to provide real time data that is used to develop criteria to rank and prioritize projects for planning and programming. In the past, they would rely on modeling to predict future conditions, but now they rely more on real-time data.

Additionally, State DOTs are able to better understand how their system works and translate that into making more effective decisions. Both South Carolina and North Carolina are part of the I-95 Coalition that subscribes members to INRIX data. To collect data, the probes must be purchased and installed by the State DOT. While real-time data certainly comes with many benefits, it is still important that State DOTs check and confirm the quality of the data being collected. As seen with North Carolina and South Carolina's different approaches to measuring mobility, the best applications of real-time data are still being discovered and tested and need to be tailored to meet the needs of their own state.

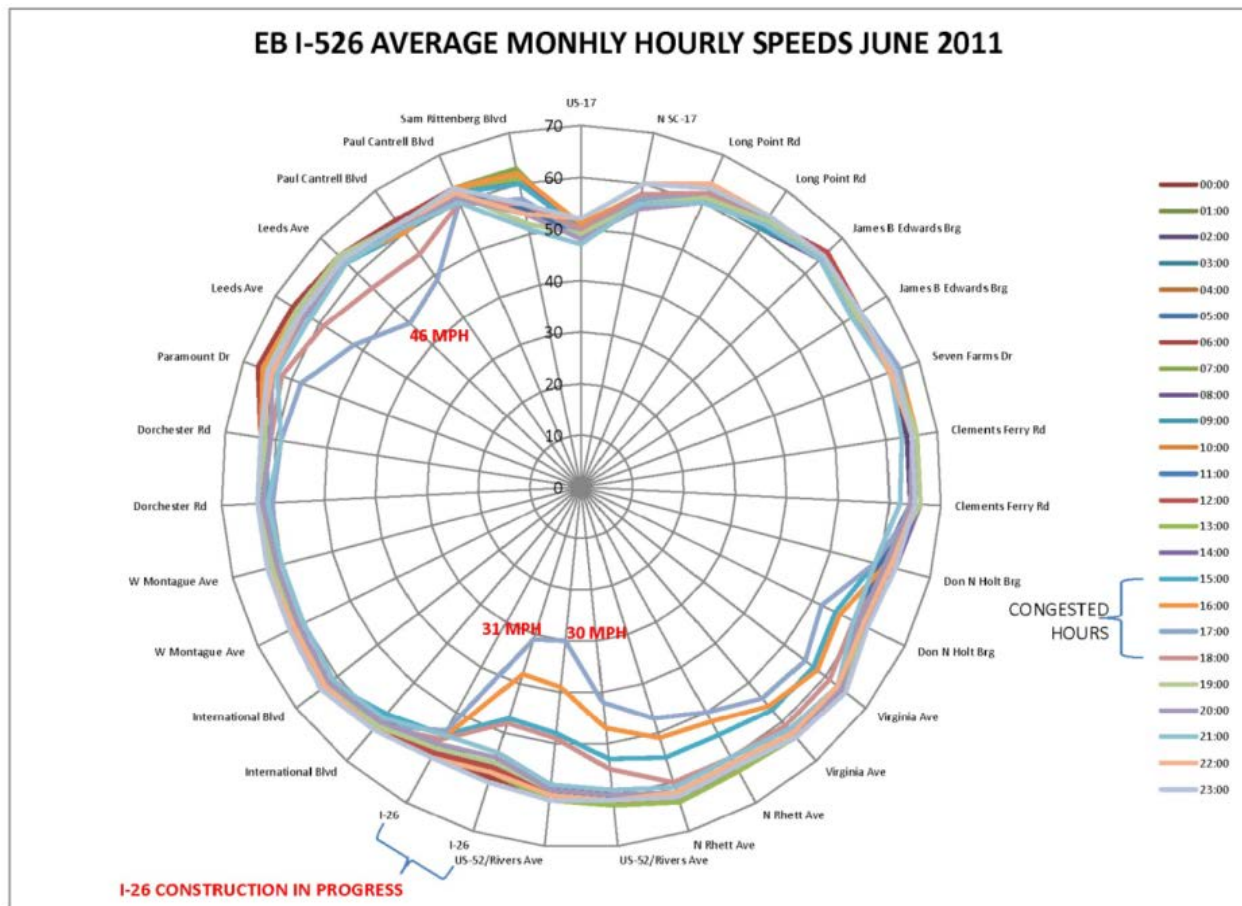
Visualizing and Communicating Data

Performance management supports a data-driven approach to decision making. The decisions being made by transportation professionals affect the public and therefore the reasoning and benefits behind a decision must be communicated clearly to them. Effective communication is essential to being able to earn support and funding for projects. Depending on the audience, data needs to be processed and reported in a comprehensible manner for the public and policymakers to understand. Additionally, looking at data from a variety of perspectives may reveal problems the State had not discovered before and may inspire innovative ways to address problems. Both DOTs expressed challenges with this, but developed unique techniques to display and report their performance data.

Radial Graphs:

SCDOT developed radial graphs to display the before and after effects of their interstate improvements. The graphs provide a more intuitive and comprehensive visual of congestion on the entire corridor than an area graph. Whenever average hourly monthly speed drops below the speed limit, the line representing that time period drop towards the center and there is most likely a problem on that segment. By developing monthly radial graphs, SCDOT shows the effects of a particular project over time and how it affects the rest of the corridor.

This method can help avoid projects that push problems further down an interstate and instead help analyze where the real troubles are occurring. Following one of their corridor studies, funding became available for SCDOT to move forward with a project on the I-526. In evaluating the effectiveness of the project, the radial graphs demonstrated that average hourly monthly speeds increased at the segment that previously showed much congestion. SCDOT presented this information to their policymakers. The easily understandable visuals assisted in earning the support of those lawmakers and other stakeholders involved.



INRIX DATA PROVIDED BY UNIVERSITY OF MARYLAND

Figure 2 SCDOT's Radial Graph for I-526 Project

Dashboards and Scorecards:

NCDOT developed dashboards and scorecards for both internal and external use. These clear and concise visuals are updated automatically with real-time data to show the public as well as the department's employees the performance of the North Carolina transportation system. Different measures are displayed internally and externally as the information needs to be tailored for its intended purpose. Dashboards display the relationship of a performance metric to an overarching agency goal and how NCDOT is currently performing on their public-facing webpage. The public dashboard does not provide as much technical detail and only displays the higher-level performance measures. Unlike the public dashboard, NCDOT developed their Internal Management Dashboard (IMDB) to let employees and managers see a variety of technical performance metrics. The purpose of the IMDB is for employees to be aware of areas that need improvement.

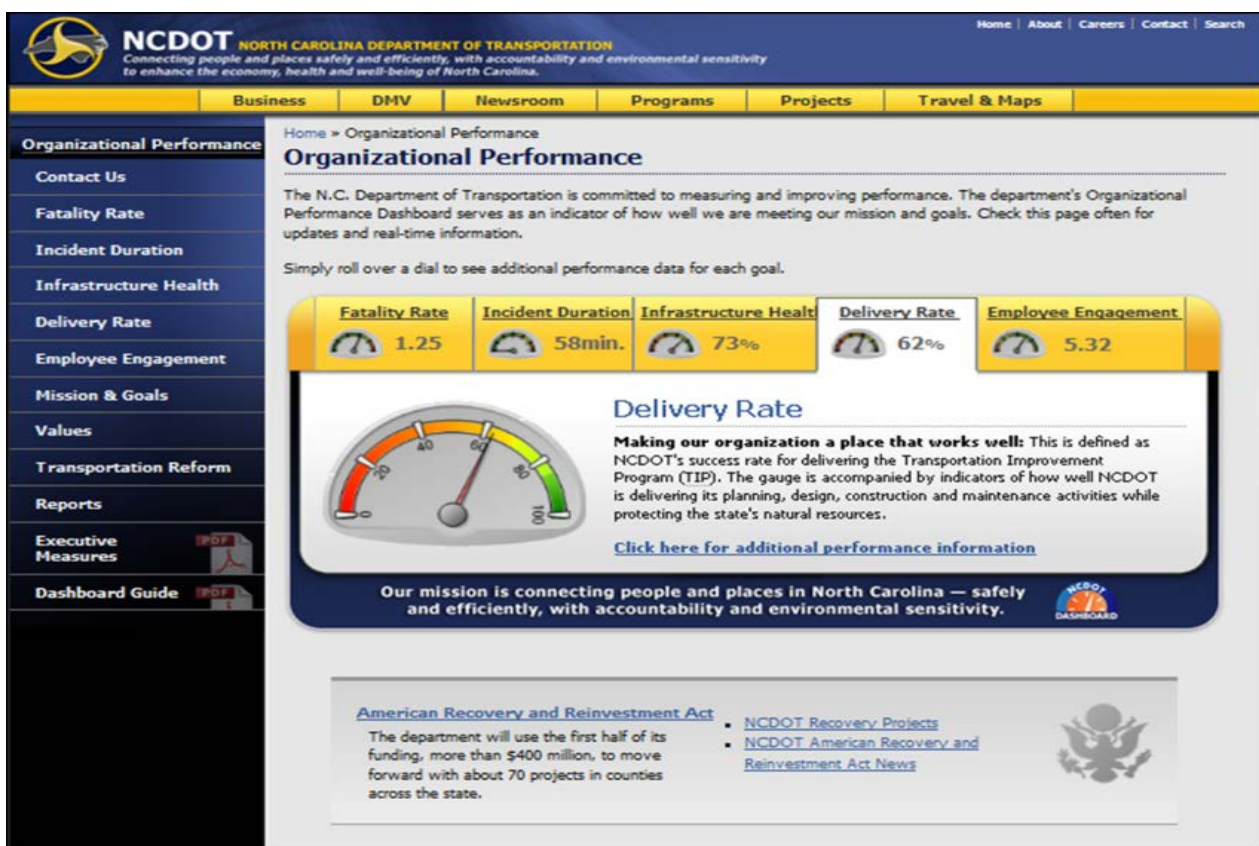


Figure 3 NCDOT's External Dashboard

In addition to the dynamic dashboard, NCDOT developed static quarterly performance scorecards that assist in developing their annual performance report. Using the same data that feeds the dashboards, the scorecards are consolidated documents that display the results of each performance metric and their general trends. This visual gives a quick summation of how the transportation network is performing and the areas on which NCDOT should focus. Both of these visuals assist in NCDOT communicating their performance management system and performance-based decision making to the public, policymakers, and employees.

A third method of communication that NCDOT recently started generating is Situational Reports. Intended for use by executive and senior management within NCDOT, a Situational Report is distributed monthly via email and hardcopy. These one to two page reports display various

performance metrics and quick facts about the department. “Sit Reps,” as they are known, allow senior leaders to quickly pull up essential information about NCDOT in an appealing and easy to understand format. SCDOT was very interested in these reports as they are not complicated to generate and are a useful communication tool within the State DOT. Using Excel and the already automated data collection system, NCDOT’s Office of Performance Metrics requests the information from the other business units and inputs the data. A sample of an internal dashboard is shown in Figure 4.

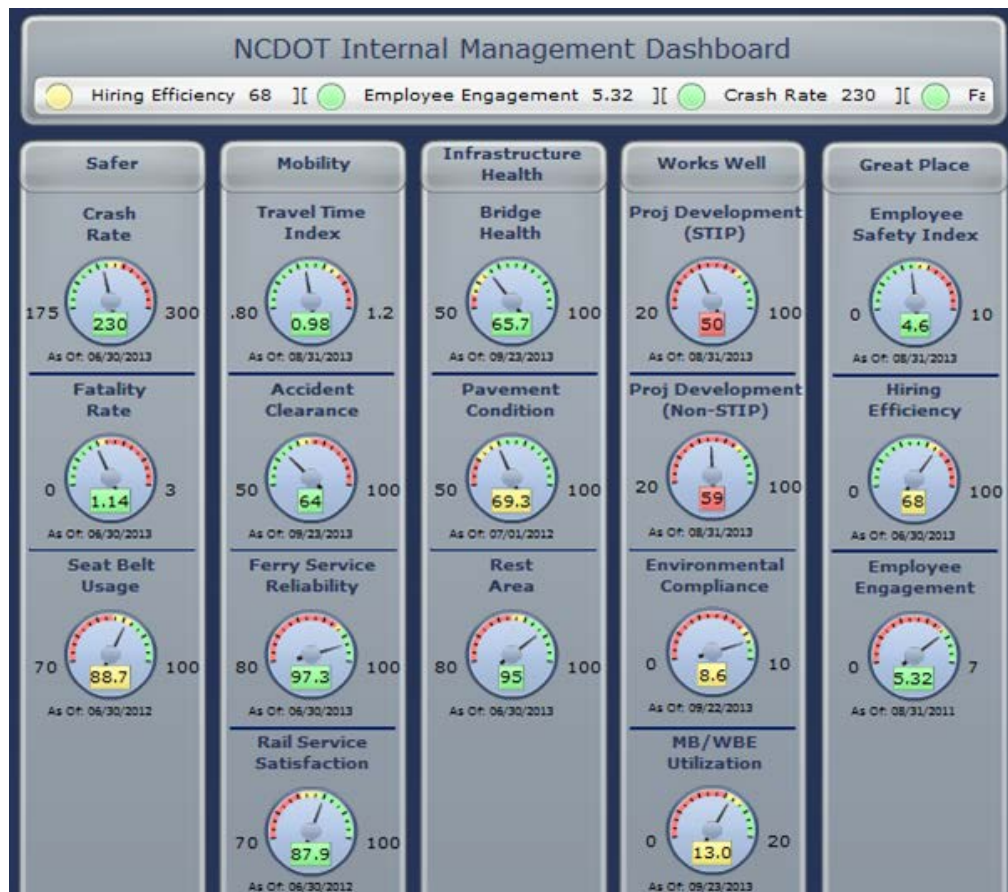


Figure 4 Sample NCDOT Internal Management Dashboard (for illustration purposes)

C. Performance Management Structure

Department Organization

SCDOT stated at the beginning of the peer exchange their interest in understanding how NCDOT included performance management into their organizational structure. NCDOT began implementing performance management prior to the passing of MAP-21 due to state legislation. In 2007, NCDOT enlisted the help of a private consulting company to provide a framework to help transform their department and adopt a data-driven project prioritization system. The final report recommended a new organizational structure to make sure the performance management system was correctly implemented and monitored. The following four offices were created over time to work together to make sure the performance management system functions effectively:

- Transportation Planning Branch

- Strategic Prioritization Office (SPOT)
- Program Development Branch
- Performance Metrics Office (PMO)

Each office relies on one another for particular information. The Transportation Planning Branch plans the projects. SPOT then prioritizes projects according to a scoring model developed by NCDOT. That prioritization is then sent to the Program Development Branch who programs and funds the projects based on the limited financial resources allotted. Finally, PMO measures and reports the performance of the department and the transportation network. Data recommendations and inputs are collected throughout the process from the different analysts and subject matter experts in each division. Additionally, support from other parts of the department, such as Legal Services and IT ensure efficient execution of the performance management process.

NCDOT attributes part of their success to this redirecting of resources and the devotion of full-time staff to implementing and monitoring the performance management system. While the offices are permanent, there is a flexible nature to their structure that allows the department to adapt to changing needs and priorities. This organizational structure worked for NCDOT however, it took time and resources to institutionalize. The structure may not work for all State DOTs. SCDOT appreciated hearing the experience and lessons learned from NCDOT and recognized the need to evaluate their priorities and capabilities to see what structure will work best for them.

Project Prioritization and Scoring

NCDOT is now in their third iteration of their project prioritization system. Prior to 2009, NCDOT was not achieving many of its projects in their Statewide Transportation Improvement Plan (STIP) and could not clearly articulate why they were underperforming. In 2009, SPOT was created to address these problems and to incorporate data-driven results by developing their first strategic prioritization process. Every two years the strategic prioritization process is re-assessed because Metropolitan Planning Organizations (MPOs) and Regional Planning Organizations (RPOs) use the project scores at input into their Transportation Improvement Plans (TIPs). After the second version of the prioritization process was implemented in 2011, the North Carolina legislature saw the process received a high approval rating and so they enacted the Strategic Prioritization Law of 2012. Following the structure NCDOT outlined, it focused on being data-driven and relying on local input.

This law was updated in 2013 to the Strategic Transportation Investments (STI) Law. The new governor wanted to build off of the success of strategic prioritization and reform transportation funding in the state. In a historical change, STI eliminates North Carolina's equity formula used since 1989 to distribute transportation funding among areas of the state. The old equity formula split North Carolina into seven funding regions and funding was distributed equally among them. STI now has all modes competing for the same capital funding source. While funding strategies differ for every state, this state legislation shows that the data-driven approach adopted by NCDOT influenced the state to pursue and codify the same concept.

With STI now in place, NCDOT created their third version of the strategic prioritization process. A workgroup comprised of MPO, RPO, advocacy group, NCDOT, and FHWA staff provided recommendations on scoring criteria and their associated weights. There are three categories of funding projects may fall under. Figure 5 shows how the categories are determined and the cascading effect if projects are not selected for Statewide Mobility then they are eligible under Regional Impact and so forth. Each project is evaluated based on some mixture of Travel Time Benefit/ Cost, Congestion, Economic Competitiveness, Safety and Mobility data with varying weights

depending on the funding category. Following the establishment of the formula, NCDOT went about creating an automated, GIS-based scoring system called SPOT OnLine.³

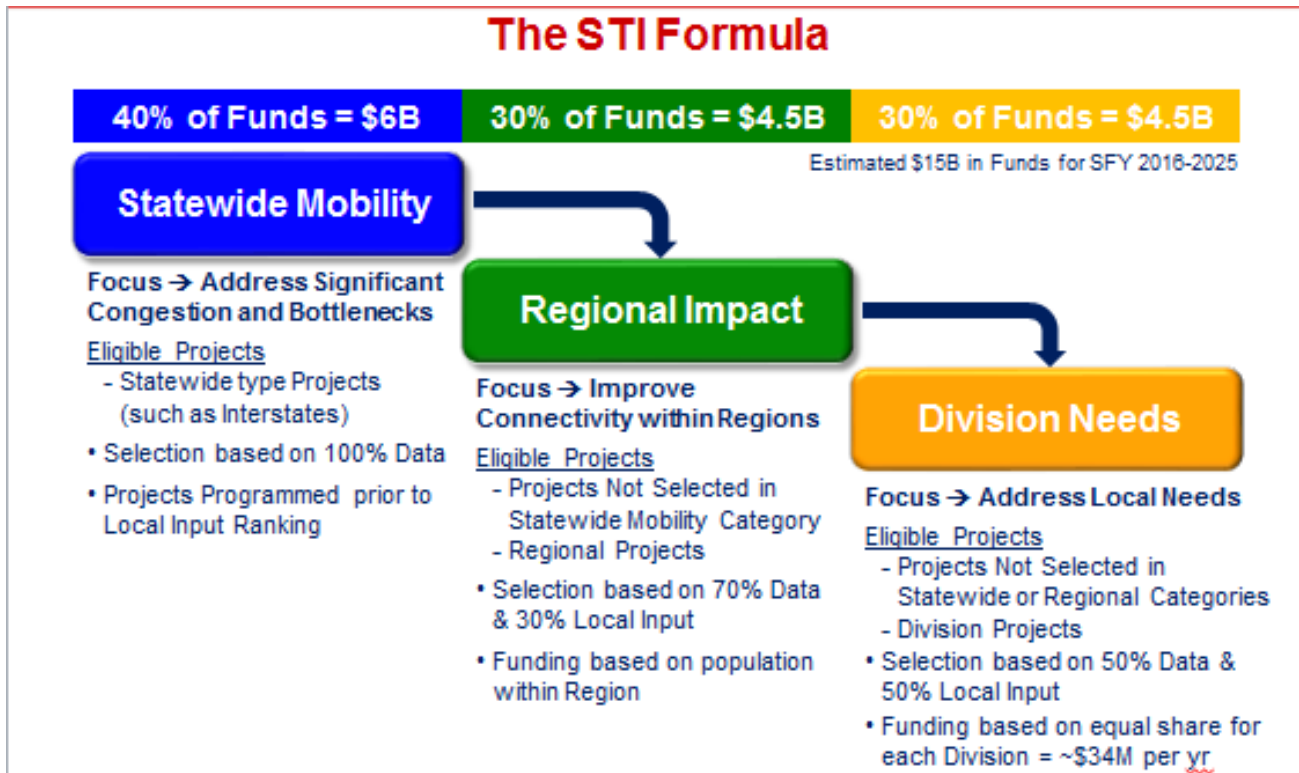


Figure 5 North Carolina's Strategic Transportation Investments Formula

A few key highlights from NCDOT's project prioritization process are outlined below:

Local and Regional Input:

NCDOT noted that without the Local Input factor in their funding formula, the STI law would not have garnered as much support and may not have passed. The Local Input portion of the STI Formula allows MPOs and RPOs to assign points to and rank their various local projects to make sure their contributions are equitably included in the prioritization process. Local Input allows organizations to feel involved in the process, but does not let politics outweigh performance data-driven results. Additionally, the Local Input scoring is checked by NCDOT as every MPO and RPO needs their point-assigning methodology approved by the department. Each MPO, RPO, and regional division receives a minimum of 1000 points and may receive additional points based on their area's population. Between May 1st and July 31st, the organizations must assign their points to local highway and non-highway projects. A maximum of 100 points is allowed for any one project and points can be donated across regions.

As SCDOT experienced with the development of their Corridor Management plans, stakeholder involvement is crucial to a performance management system. When removing the politics from policy, there will always be some amount of opposition and lack of trust. Nonetheless, the NCDOT experience proves that positive results backed with straightforward data are hard to argue against. SCDOT mentioned they are undergoing efforts to reformat their funding and may borrow elements of NCDOT's prioritization process as it fits with their different financial allocation structure. NCDOT

³ For more information on North Carolina's Strategic Prioritization look at their website:

<https://connect.ncdot.gov/projects/planning/Pages/StrategicPrioritization.aspx>

recommended getting the state legislature's support to pass legislation that codifies a competitive funding scheme rather than guaranteed annual funding for certain project types.

SPOT On!line:

NCDOT demonstrated their new strategic prioritization tool at the peer exchange. The still under-development web-based application allows MPOs, RPOs, regional engineers, and NCDOT staff to see what score a project would receive using the STI formula. Using a GIS-based platform, geospatial data is gathered on a particular project location that calculates the score and weight of the certain criteria depending on the type of improvement project. SPOT On!line requires several project data inputs in order to score a project and generate a planning level cost estimate. The inputs vary based on the specific improvement type which ranges from widening an existing roadway, improving an interchange to upgrading a freeway to interstate standards. For an interchange or intersection improvement project has a set of 31 different types of improvements and 12 options for the addition of turn lanes that the project sponsor can select for scoring. Currently, economic competitiveness is not included in the model as NCDOT generates this number using the Transportation Economic Development Impact System (TREDIS) and it is challenging to integrate. In generating an automatic score, the stakeholders can determine which projects will have a better chance of getting funded. SPOT Online is an innovative reference tool that will help with project documentation, stakeholder involvement, and communication of the project prioritization process.

Normalization across Modes:

The biggest challenge NCDOT is facing with the new strategic project prioritization process is comparing the quantitative project scores across all modes. The new STI formula only provides one source of capital funding and therefore highway projects are being compared with other modes (public transit, aviation, rail, port, and bicycle/pedestrian projects). Each mode requires a different set of criteria and weights and therefore a score of 50 for rail is not equivalent to a 50 for highway. NCDOT tried looking to other states for any guidance, but did not find any information of a state successfully implementing a multi-modal comparison of proposed projects. NCDOT explored several options such as qualitative value judgment or weight benefit/cost analysis. None of the proposed options worked well enough, and so NCDOT settled on no normalization and letting the scores stand alone for each mode. Based on historical investment data, they decided to split the funding with highway projects being allocated 90 percent of funds and non-highway projects budgeted for 4 percent. This leaves 6 percent to be allocated among the five modes as the fiscal year progresses. NCDOT will continue to talk to national experts to determine if there is a better approach to comparing across modes and normalizing the modal scores. If NCDOT does find a better approach it will be included in the fourth iteration of their strategic project prioritization process.

Next Steps

Each agency expressed that the information learned during the peer exchange was applicable to improving their current work of their performance management system. The State DOTs identified the following initial next steps:

SCDOT:

- Use format of NCDOT's monthly Situational Reports and start distributing it among senior management
- See how NCDOT's performance structure fits into SCDOT's existing organizational structure
- Review the target setting of NCDOT and determine how it can apply to SCDOT efforts
- Familiarize self with internal and external reporting methods
- Examine other state leaders in performance management (Utah, Washington, Missouri were State DOTs noted)
- Look at NCDOT's SPOT program and explore how SCDOT can reform their MPO/RPO coordination process to better involve the MPOs in project planning and programming

NCDOT:

- Examine how SCDOT calculates density on highways and how this measure compares to the use of a travel time index
- Develop a pilot interstate corridor study similar to SCDOT
- Look at congestion statistics on a Tuesday- Thursday basis and compare to Monday- Friday calculations
- See how the holistic corridor approach can be applied to SPOT in the next iteration
- Learn how to prioritize projects from corridor plans rather than individual project level

In conclusion, the two state DOTs agreed to meet again with staff within the next several months to review what was learned and put into practice.

About the Transportation Planning Capacity Building (TPCB) Program

The [Transportation Planning Capacity Building \(TPCB\) Program](http://www.planning.dot.gov) is a joint venture of the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) that delivers products and services to provide information, training, and technical assistance to the transportation professionals responsible for planning for the capital, operating, and maintenance needs of our nation's surface transportation system. The TPCB Program website (www.planning.dot.gov) serves as a one-stop clearinghouse for state-of-the-practice transportation planning information and resources. This includes over 70 peer exchange reports covering a wide range of transportation planning topics.

The [TPCB Peer Program](http://www.planning.dot.gov/peer_app.asp) advances the state of the practice in multimodal transportation planning nationwide by organizing, facilitating, and documenting peer events to share noteworthy practices among State DOTs, MPOs, transit agencies, and local and Tribal transportation planning agencies. During peer events, transportation planning staff interact with one another to share information, accomplishments, and lessons learned from the field and help one another overcome shared transportation planning challenges. More information about the Peer Program, including the application, is accessible at the TPCB Peer Program website (www.planning.dot.gov/peer_app.asp).

Appendix

Appendix A Key Event Contacts

North Carolina Department of Transportation Contacts

Ehren Meister
Manager of Performance Metrics
NCDOT Division of Strategic Planning
Emeister@ncdot.gov
919-707-2903

Don Voelker
Director
NCDOT Strategic Prioritization Office of Transportation
Djvoelker@ncdot.gov
919-707-4740

Kelly Wells, P.E.
Mobility Program Manager
NCDOT Traffic Systems Operations
Kwells@ncdot.gov
919-825-2615

South Carolina Department of Transportation Contacts

Michael A. Dennis, P.E.
Technical Applications Engineer
SCDOT Office of Planning
DennisMA@scdot.org
803-737-1445

Mark Pleasant
Chief of Statewide Planning
SCDOT Office of Planning
Pleasantmd@scdot.org
803-737-1437

Dipak Patel
Technical Applications Director
SCDOT Office of Planning
Pateldm@scdot.org
803-737-1825

Federal TPCB Contacts

Michelle Noch
Community Planner
FHWA Office of Planning
Michelle.noch@dot.gov
202-366-9206

Terrance Regan
Community Planner
USDOT Volpe Center
Terry.regan@dot.gov
617-494-3628

Appendix B Event Participants

FHWA- North Carolina Division

- John F. Sullivan III, P.E., Division Administrator
- William Beatty, Asset Management Program Manager
- Joe Geigle, Congestion/ ITS Management Specialist
- Bill Marley, Transportation Planner
- Unwanna Dabney, PhD, Planning and Program Development Manager

FHWA- South Carolina Division

- Jessica Hekter, Community Planner and Realty Manager
- Yolonda Morris, Community Planner

North Carolina Department of Transportation

- Ehren Meister, Manager of Performance Metrics
- Don Voelker, Director of Strategic Prioritization
- David Wasserman, Strategic Prioritization Office
- Alpesh Patel, Strategic Prioritization Office
- Kelly Wells, P.E., Mobility Program Manager
- Shawn Troy, Safety Evaluation Engineer
- Tony Ku, P.E., Traffic Safety Project Engineer
- Brian Mayhew, P.E., Traffic Safety Systems Engineer

South Carolina Department of Transportation

- Daniel Campbell
- Michael A. Dennis, PE, Technical Applications Engineer
- Dipak Patel, PE, Technical Applications Director
- Mark Pleasant, Chief of Statewide Planning

North Carolina Capital Area Metropolitan Planning Organization (CAMPO)

- Kenneth Withrow, Senior Transportation Planner

USDOT Volpe Center

- Terrance Regan, Community Planner
- Lauren Deaderick, Economist

Appendix C Event Agenda

Location: Day 1: Federal Building, Room 418, 310 New Bern Avenue Raleigh, North Carolina

Day 2: NCDOT Raleigh Headquarters, Room 117, 1 South Wilmington Avenue Raleigh, North Carolina

Dates: November 19, 2013 – November 20, 2013

Length of peer exchange: Two days with a pre-event webinar preceding the exchange

Times: Proposed times for on-site peer exchange are in Eastern Standard Time (EST)

Host Agency: North Carolina Department of Transportation (NCDOT)

Topics of Focus: Performance Management, Project Prioritization, Operations and Planning

Dress Code: Business casual

Web room: <https://connectdot.connectsolutions.com/tpcb-peer-event/>

Facilitator: Terry Regan, Volpe Center

Peers:

- Daniel Campbell
- Michael A. Dennis, PE, South Carolina Department of Transportation
- Dipak Patel, South Carolina Department of Transportation
- Mark Pleasant, South Carolina Department of Transportation

FHWA Representative: William Beatty, FHWA North Carolina Division Office

Day 1: Tuesday, November 19 at Federal Building, 310 New Bern Avenue, Room 418

Time (EST)	Topic	Lead Presenter
12:00 p.m.	Welcome and Overview USDOT Volpe and FHWA staff welcomes attendees, review the agenda, describe documentation/follow-up, and establish ground rules for discussions.	Facilitator and FHWA NC Division DA- John F. Sullivan III, P.E.
12:15 p.m.	NCDOT Welcome and Goals NCDOT welcomes participants and opens the exchange. Provides context on what motivated the peer exchange request and NCDOT's goals for the day.	FHWA- William Beatty
12:30 p.m.	Peer Agency Introduction and Goals SCDOT provides brief summary (less than 5 minutes) of their respective performance management system.	SCDOT Peers

Time (EST)	Topic	Lead Presenter
12:45 p.m.	Session 1: South Carolina's Approach to System (Asset) Management <i>What are the steps and efforts an agency must take to implement successful performance based System Management?</i> <ul style="list-style-type: none"> • System management • Ranking and prioritization • Corridor management plans • Funding identification and incorporation into STIP and TIP • Strategy/ project implementation • Monitory system and strategy effectiveness Question and Answer Session (15 minutes)	SCDOT- Dipak Patel
2:00 p.m.	Break	
2:15 p.m.	Session 2: NCDOT and SCDOT Overview of Approach to Statewide and Regional Mobility Reports <i>How does SCDOT evaluate their statewide system's performance? What is SCDOT's approach to identify and mitigate congestion?</i> <ul style="list-style-type: none"> • Measuring congestion <ul style="list-style-type: none"> ○ Bottleneck Reduction Program • Identifying deficiencies on the systems • Establishing logical limits to corridors • Ranking and prioritizing corridors • Creating Interstate Corridor Management Plans • Developing SMART (Specific, Measurable, Attainable, Timely) and KISS (Keep It Short and Simple) performance measures • Producing State Mobility Performance Reports <i>How did NCDOT try to create a statewide Travel Time Index? What are ways to improve this methodology? How is NCDOT developing monthly statewide and regional mobility reports?</i> <ul style="list-style-type: none"> • Ways to best communicate this information • Other approaches to calculating Travel Time • Challenges to developing mobility reports Question and Answer Session (15 minutes) Highlights and Lessons Learned (5 minutes)	NCDOT- Shawn Troy and Kelly Wells SCDOT- Dipak Patel and Michael Dennis
3:45 p.m.	Break	

Time (EST)	Topic	Lead Presenter
4:00 p.m.	Session 3: Open Roundtable Discussion <i>A longer discussion about what was presented today. How is the traffic operation data applied? What did the hosts learn and what is applicable to their system?</i> <ul style="list-style-type: none"> • Points listed on Charts • MAP 21 General Reliability Index • Proposed Hours of Delay • National Truck Travel Time and Reliability Index. 	Facilitator
5:15 p.m.	Wrap-up and charge for Day 2 (15 minutes)	Facilitator
5:30 p.m.	End of Day 1	

Day 2: Wednesday, November 20 at NCDOT Raleigh Headquarters, 1 South Wilmington, Room 117

Time (EST)	Topic	Lead Presenter
8:00 a.m.	Welcome, Review of Day 1 and Charge for Day 2 Welcome, review of agenda, and recap of previous day discussion	Facilitator
8:30 a.m.	Session 4: Measures, Metrics, and Accountability (NCDOT Overview) <i>What are the key elements an agency must consider when implementing a comprehensive performance management system and strategy?</i> <ul style="list-style-type: none"> • Setting Direction and Vision • Transportation Program Development • Agency Accountability • Division/Unit Accountability • Employee Accountability • Performance Reporting and Dashboards Question and Answer Session (15 minutes) Highlights and Lessons Learned (5 minutes)	NCDOT- Ehren Meister
10:00 a.m.	Break	

Time (EST)	Topic	Lead Presenter
10:15 a.m.	Session 5: Project Prioritization <i>What are the steps and efforts an agency must take to create a performance-based prioritization and programming process? What tools are used for benefit-cost analysis? How does NCDOT align performance measures and targets with MPO recommendations?</i> <ul style="list-style-type: none"> •History and Background •How it all fits together •Strategic Prioritization and Programming Process <ul style="list-style-type: none"> ○ Score ○ Strategize ○ Schedule •Scoring Weights: Quantitative versus Qualitative <ul style="list-style-type: none"> ○ Statewide ○ Regional ○ Sub-regional •Scoring Criteria •Investment Strategy •Performance Level of Service Question and Answer Session (15 minutes) Highlights and Lessons Learned (5 minutes)	NCDOT- Don Voelker
11:45 a.m.	Lunch	
12:45 p.m.	Session 6: Demonstration of IT Scoring Model <i>What does NCDOT's prioritization model actually look like and how does it function?</i> Question and Answer Session (15 minutes)	NCDOT- David Wasserman and Alpesh Patel
2:00 p.m.	Session 7: Open Roundtable Discussion <i>A longer discussion about what was presented today. What did the peers learn and what is applicable to their system?</i>	Facilitator
3:00 p.m.	Wrap-up and Follow-up Actions (30 minutes)	Facilitator
3:30 p.m.	End of Peer Exchange	

Links to Additional Resources

[North Carolina Department of Transportation Dashboard](#)

[North Carolina Department of Transportation Quarterly Performance Measures Scorecard](#)

[FHWA Noteworthy Practice: North Carolina Refining a Performance Management System](#)

[South Carolina Department of Transportation I-85 Corridor Management Plan](#)

[South Carolina Department of Transportation I-526 Corridor Management Plan](#)