Presentation Guide: Operations in the 21st Century DOT: Meeting Customer Expectations

DETAILS

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SHRP 2 Reliability Project L31

Presentation Guide

Operations in the 21st Century DOT: Meeting Customer Expectations

SHRP 2
STRATEGIC HIGHWAY RESEARCH PROGRAM
Accelerating solutions for highway safety, renewal, reliability, and capacity

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

SHRP 2 Reliability Project L31

Presentation Guide

Operations in the 21st Century DOT: Meeting Customer Expectations

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Kittelson & Associates, Inc.

TRANSPORTATION RESEARCH BOARD
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www.TRB.org

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Contents

Introduction

This document is the presentation guide for SHRP 2 Project L31, Reliability Workshops for State and Public Sector Managers. It contains material for presentation to the chief executive officers (CEOs) and senior managers of state departments of transportation (DOTs) about the value of mainstreaming operations as a core mission and business practice in their respective agencies.

This document is intended to be used by speakers who are preparing to deliver the PowerPoint presentation to state DOT CEOs, chief engineers, and/or members of the state DOT CEOs' executive teams. The presentation is designed to be delivered within a 30-minute period and highlight not just the importance of transportation system operations but also tools that are now available through SHRP 2, the Federal Highway Administration (FHWA), and the American Association of State Highway and Transportation Officials (AASHTO) to assist states in advancing their state of practice in operations.

This presentation has been created to address transportation operations at a high level that is relevant to most, if not all, state DOTs. The presenter should interject personal anecdotes and local examples as appropriate, particularly for topics for which the descriptions provided in this presentation guide are not suitable for the subject audience and presentation environment.

This material is documented in sufficient detail so that it can be effectively presented by individuals outside the original development team. However, the speaker should have a fundamental understanding of transportation systems operations and be familiar with SHRP 2 and the roles of the Transportation Research Board (TRB), AASHTO, and FHWA, as well as with early products from SHRP 2.

The presentation slides are sequentially ordered in this document and include the following information for each:

- *Description of the slide*—a brief narrative containing the key messages to be conveyed that is written in a form that models one possible way for the messages to be delivered;
- *Key points*—a bulleted list of key points to be articulated while the slide is displayed;
- *Sources of information*—references to the sources of the facts, photos, and/or graphics used in the creation of the presentation slide; and
- *Additional resources*—references to related material that was reviewed and considered in the development of the presentation slide and that are available to inform the presenter on the subject topic.

Background

A key issue facing transportation agencies is the ongoing challenge of mainstreaming transportation systems operations activities. Systems operations strategies, especially in combination, can often be implemented more quickly and economically than new construction projects and can achieve similar outcomes in terms of reduced congestion. Institutional barriers can either thwart or considerably slow the effort to mainstream systems operations in many states and across many public transportation agencies.

As SHRP 2 Reliability research moves into the implementation stage, it is highly desirable to provide an orientation workshop on the relevance and value added of products emerging from the SHRP 2 Reliability research program and their integral relationship with systems operations to CEOs and senior managers of state DOTs and other public-sector transportation agencies.

The L31 project was carried out as an extension of SHRP 2 L17, which is developing a knowledge transfer system to aid in the mainstreaming of transportation operations for state DOTs and metropolitan planning organizations (MPOs). The products for L17 include a knowledge transfer website, research reports that address gaps in knowledge identified at the outset of the project, and communications materials to assist state DOTs and MPOs to communicate the importance of transportation operations to different audience segments.

Objectives

The objectives of SHRP 2 L31 are to

- Call further attention to the importance of systems operations to CEOs and executive management of state and public-sector DOTs and encourage the mainstreaming of operations within their agencies;
- Communicate the role of systems operations as one of the agency's core business functions to achieve safety, mobility and accessibility on the transportation network, as well as system preservation;
- Acquaint CEOs and executive management with highlights of the SHRP 2 Reliability research program and help them understand promising ways to improve nonrecurring congestion;
- Provide an overview of systems operations and go over the strategies, tactics, benefits, and costs of incident management, snow and ice control, intelligent transportation systems, arterial traffic control, and other key subjects related to transportation systems management and operations;
- Encourage senior managers to work with their respective internal and external DOT systems operations organizations, which include law enforcement, fire and environment departments, 911, and other public safety organizations;

- Explore and establish relationships with ongoing or future planned efforts at FHWA, AASHTO, the National Transportation Operations Coalition (NTOC), and other such entities to effect a coordinated plan to advance systems operations and SHRP 2 Reliability implementation activities;
- Establish a clear understanding of the robustness and value added features of the SHRP 2 Reliability products as related to the current state of the art and state of the practice at state and public sector DOTs and to explain how improving travel time reliability ought to be an integral part of transportation system management and operations; and
- Discuss, explore, and initiate approaches to incorporate value-added SHRP 2 Reliability products into current agency programs, projects, and educational and training systems.

Presentation Organization and Approach

Through a series of workshops and meetings, the project team developed an approach for presenting information to state CEOs and senior managers that is based on a series of four "acts," as illustrated in Figure 1.

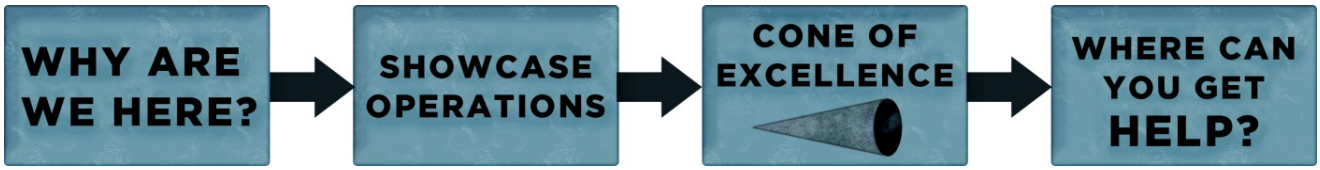


Figure 1. Diagram of a four-act presentation approach to state CEOs.

The presentation slides described in this report follow these four acts, which consist of (I) an introduction and explanation of "why are we here," (II) a showcase of successful transportation system management and operations practices, (III) the "cone of excellence" and case for incremental improvement, and (IV) identification of resources.

Key elements and guiding principles of each act include the following:

Act I: Introduction

- Use the build-operate-renew message as an opening theme.
- Note that while construction adds some new jobs, operating the system efficiently is critical to *all* jobs.
- Consider asking the rhetorical question, "How much time do you spend operating the system after you've built it and/or renewed it?"

Act II: Showcase

- Start with the message that "you're already doing some of this."
- Peel back an example to reveal the many underlying activities, training, and coordination that needs to be taking place behind the scenes.

- Show a listing of benefits for selected examples.

Act III: Cone of Excellence

- Use the cone (or similar concept) to show that there is a continuum of states where DOTs currently operate. The questions they might be asked going into this discussion are
  (1) Where are you?
  (2) Where do you want to go?
  (3) How are you going to get there?
- Identify the dimensions that make up the cone.
- Introduce the AASHTO Subcommittee on Systems Operations and Management Guidebook in this act of the presentation.

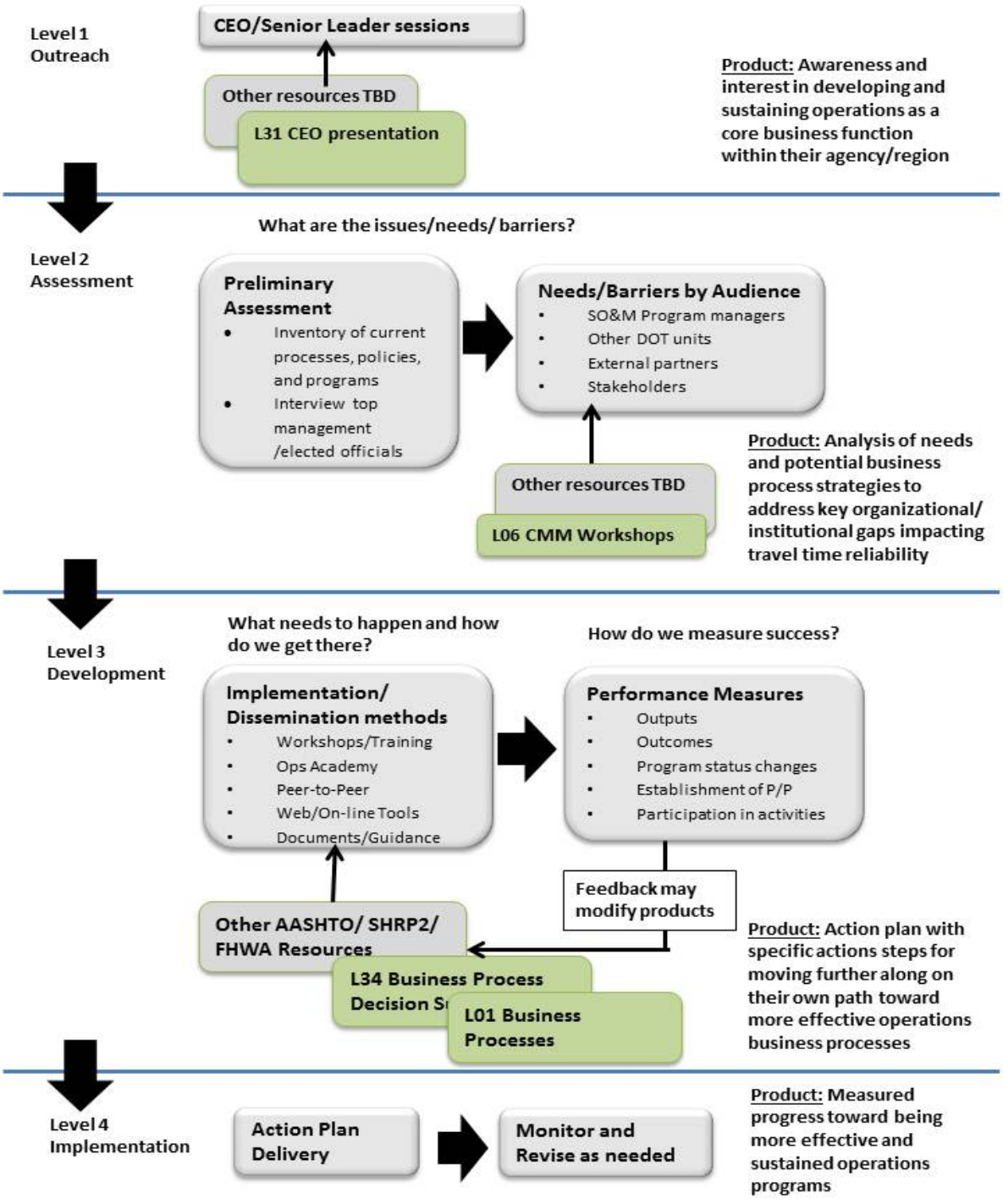
Act IV: Available Resources

- Examples to consider include
  (1) SHRP 2 products
  (2) Scanning tours
  (3) Workshops
  (4) National Operations Academy
  (5) Regional operations forums
- Present the message that of all the states that have embraced operations, not a single state has been able to do it without the CEO's support.
  (1) They do not need to be champions but DO need to be enablers of a proactive formal program.
- Allow for interactive discussion.

The remainder of this report details each of the individual slides developed for the CEO and senior manager presentations.

Conclusion

Figure 2 illustrates a draft conceptual framework for implementing early products from the SHRP 2 Reliability research program. The framework enables AASHTO, TRB, and FHWA to work together along with stakeholder agencies to advance strategies, business processes, and institutional arrangements for achieving a reliable transportation system. The high-level approach is divided into four levels: outreach, assessment, development, and implementation. SHRP 2 Project L31 fits within Level 1, outreach, which is intended to (1) raise awareness in establishing operations as a core function within agencies and (2) identify up to 20 state DOTs and MPOs for conducting targeted outreach.



Source: FHWA Office of Operations

Note: TBD = to be decided; SO&M = systems operations and management; CMM = Capability Maturity Model; Ops = operations; P/P = peer to peer.

Figure 2. Draft conceptual framework for L01/L06 implementation plan.

SLIDE 1: Operations in the 21st Century DOT

Photo: © iStockphoto.com/George Doyle (200393312-001)

Description of the Slide

This presentation is about the increasingly important role of operations in the effective management and delivery of transportation services to our customers. It considers (1) how operations is evolving in a 21st century DOT, (2) the importance of operations as a direct connection to a CEO's customers and their perception of a DOT's performance, and (3) some steps CEOs can take to improve their organizations' operational performance. The SHRP 2 Reliability research program of is working in collaboration with FHWA, AASHTO, and others to develop and deliver products that will be useful to state DOTs in promoting and implementing a transportation systems management and operations approach. Mainstreaming operations into the daily practice of state DOTs is also a high priority of AASHTO's SHRP 2 Implementation Task Force, which means there will be implementable resources available to help CEOs advance the concepts and ideas that are discussed.

Key Points

- Introductions
- This presentation will talk about
    - how operations are evolving in the 21st century,

- importance of operations as a direct connection to a CEO's customers, and
- steps and tools at hand to improve operations performance and secure reliability gains.

Source of Information

Federal Highway Administration, U.S. Department of Transportation. *Creating an Effective Program to Advance Transportation System Management and Operations: Primer.* January 2012. http://www.ops.fhwa.dot.gov/publications/fhwahop12003/. Accessed April 19, 2013.

Additional Resources

American Association of State Highway and Transportation Officials. *AASHTO System Management and Operations Guidance.* http://www.aashtosomguidance.org. Accessed April 19, 2013.

Transportation Research Board. *Institutional Architectures to Advance Systems Operations and Management.* Webinar. http://onlinepubs.trb.org/onlinepubs/webinars/InstitutionalArchitecturesPresentations.pdf. Accessed April 19, 2013.

Federal Highway Administration, U.S. Department of Transportation. *Getting the Most from Your Transportation System Investments: Operating for Peak Performance.* FHWA-HOP-10-030. n.d.

SLIDE 2: Why Are We Here?

Photo: © iStockphoto.com/Alexey Stiop (100071322)

Description of the Slide

The role of the public transportation agency has evolved over the past 75 years in response to the changing needs of customers. From an initial mandate that centered around an almost singular purpose of building the underlying transportation infrastructure that is in use today, the agency's responsibilities have extended to preserving that infrastructure and operating it as effectively as possible.

Several factors have elevated the importance of operations, which is what brings us here today:

- Customer needs for reliable travel are increasing;
- Unreliable travel times result in increased costs of travel for both passenger and freight movements;
- Unreliable travel times may truncate usable time at a trip destination;
- Technology innovations such as smart phones have increased customer expectations of receiving timely information;
- We can no longer afford to build additional capacity in many areas;
- We need to learn to do more with less; and

- Improving operations and safety are national goals.

(Note to presenter: consider interjecting a local example or anecdote to demonstrate why customer needs for reliable travel are increasing.)

Key Points

- Customer needs for reliable travel are increasing.
- Technology innovations and Internet access have increased customer expectations of receiving timely information.
- Increasing financial constraints require agencies to learn to do more with less.
- Improving safety and efficiency are national goals.

Source of Information

ICF International. *Business Case Primer: Communicating the Value of Transportation Systems Management and Operations.* Prepared for SHRP 2 Project L17. 2012. http://demo5.pbid.com/pdf/SHRP_2_L17_Business_Case_Primer_Final.pdf. Accessed June 4, 2013.

Additional Resources

Federal Highway Administration, U.S. Department of Transportation. *Getting the Most from Your Transportation System Investments: Operating for Peak Performance.* FHWA-HOP-10-030. n.d. http://www.mtpa-mi.org/getting_the_most_from. Accessed June 4, 2013.

Cambridge Systematics, Inc. *Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Mitigation*. FHWA, U.S. Department of Transportation, September 2005. http://ops.fhwa.dot.gov/congestion_report/index.htm. Accessed April 19, 2013.

SLIDE 3: Customer Expectations Are Changing

Photo: © iStockphoto.com/Jupiterimages (86542073)

Description of the Slide

In today's connected and information-rich world, customers are regularly introduced to new ways of using real-time information to save time and money. They expect the products they use and the technologies they encounter to be smart and responsive and ultimately to improve their travel experience. They expect that information is accurate and integrated—regardless of who "owns" the road. In this environment, traffic management and control mechanisms that don't seem to be aware of the conditions around them become even more frustrating to transportation system users than they used to be.

The factors above have changed the public's expectations of government and the DOT. Customers have higher expectations for system performance and reliability and lower tolerance for delays. They expect that DOTs will be held accountable for their actions. Not surprisingly, technology is driving many of these changes.

Key Points

- The public's expectations of government are changing.
- Technology is driving many of these changes.

Source of Information

ICF International. *Business Case Primer: Communicating the Value of Transportation Systems Management and Operations.* Prepared for SHRP 2 Project L17. 2012. http://demo5.pbid.com/pdf/SHRP_2_L17_Business_Case_Primer_Final.pdf. Accessed June 4, 2013.

Additional Resource

Cambridge Systematics, Inc. *Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Mitigation*. FHWA, U.S. Department of Transportation, September 2005. http://ops.fhwa.dot.gov/congestion_report/index.htm. Accessed April 19, 2013.

SLIDE 4: Technology Transforms Our World

Photo: © iStockphoto.com/Pavel Ilyukhin (141575054)

Description of the Slide

Ubiquitous wireless communication has transformed the way business is done and how value is delivered. Frequent advances in communications technology over the past several decades have conditioned our customers to expect improvements and enhancements of the products and services they use on a very regular basis. Internet connectivity to the cloud is just one of the recent evolutions that have already revolutionized expectations for productivity and efficiency. The customer has always been of prime importance, but now organizations are able to bring added value to their customers as never before.

Key Points

- We are all experiencing rapid changes in the availability of information.

- Customers expect state agencies to take advantage of and use technology for improved efficiencies.
- Increased accountability is needed in how government provides transportation services.

Source of Information

ICF International. *Business Case Primer: Communicating the Value of Transportation Systems Management and Operations.* Prepared for SHRP 2 Project L17. 2012. http://demo5.pbid.com/pdf/SHRP_2_L17_Business_Case_Primer_Final.pdf. Accessed June 4, 2013.

SLIDE 5: Expectations of DOTs Are Changing

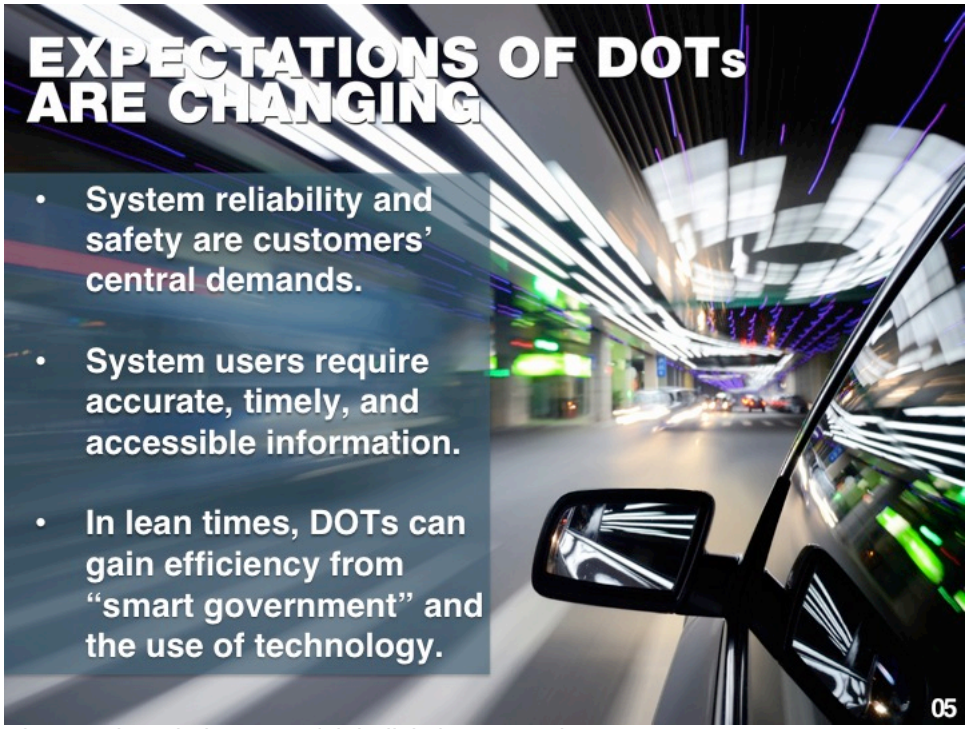


Photo: © iStockphoto.com/alubalish (20084140)

Description of the Slide

Congestion is an accepted and even predictable reality in major urban areas. So the real source of frustration for users and lost productivity for businesses comes from unexpected delays that are encountered because of crashes, special events, unanticipated work zones, extreme weather, and the like. The reliability of the transportation system has come to be at least as important as travel time itself.

As such, customers require timely and accurate travel information to minimize surprises and meet the demands of their hectic schedules. Fortunately, even under financially constrained circumstances, DOTs have the ability to improve efficiencies with cost-effective means by improving the way in which they do business and leveraging technology to better communicate information.

Key Points

- System reliability and safety
- Accurate and timely information

- Increased efficiency

Source of Information

ICF International. *Business Case Primer: Communicating the Value of Transportation Systems Management and Operations.* Prepared for SHRP 2 Project L17. 2012. http://demo5.pbid.com/pdf/SHRP_2_L17_Business_Case_Primer_Final.pdf. Accessed June 4, 2013.

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Federal Highway Administration, U.S. Department of Transportation. *Getting the Most from Your Transportation System Investments: Operating for Peak Performance.* FHWA-HOP-10-030. n.d. http://www.mtpa-mi.org/getting_the_most_from. Accessed June 4, 2013.

Cambridge Systematics, Inc. *Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Mitigation*. FHWA, U.S. Department of Transportation, September 2005. http://ops.fhwa.dot.gov/congestion_report/index.htm. Accessed April 19, 2013.

SLIDE 6: Build It

Photos: © iStockphoto.com/Wesley VanDinter (122886013); *top inset,* Federal Highway Administration; *bottom inset,* Wisconsin Historical Society (image no. 1873)

Description of the Slide

There is no doubt that adding physical capacity to our transportation infrastructure through basic construction projects has been and still remains a significant mission for state DOTs.

Key Points

- The historic role of DOTs has been to build new roadways.
- SHRP 2 is releasing products to improve the quality of decision making and shorten project delivery time.

Sources of Information

American Association of State Highway and Transportation Professionals. *The 21st Century Operations-Oriented State DOT,* July 2006. http://ssom.transportation.org/Documents/21stCenturyStateDOT.pdf. Accessed April 19, 2013.

Strategic Highway Research Program 2 Project Briefs. http://www.trb.org/StrategicHighwayResearchProgram2SHRP2/Pages/Project_Briefs_173.aspx. Accessed April 19, 2013.

SLIDE 7: Renew It

Photos: © iStockphoto.com/Nikola Nastasic (131870908);
top left inset, © iStockphoto.com/Milan Klusacek (97709432);
bottom left inset, © iStockphoto.com/Dmitry Kalinovsky (134551232);
bottom right inset, © iStockphoto.com/blyjak (18870043)

Description of the Slide

Typically, a roadway renewal project or the redeckingof a bridge occurs between 20 and 40 years after construction. Repaving cycles are even shorter. With good asset management strategies, to which much attention has been devoted in recent years, a well-run DOT will keep those assets in working order and see that they're reinvested in and rebuilt when their time comes.

The SHRP 2 Renewal program is developing technologies and institutional solutions to support systematic rehabilitation of highway infrastructure in a way that is rapid, presents minimal disruption to users, and results in long-lasting facilities. These solutions help ensure that scarce DOT dollars are spent efficiently.

Key Points

- State DOTs will continue to focus on rehabilitating infrastructure to extend the useful life of their roads and bridges.

Sources of Information

SHRP 2 Renewal Program Website. http://www.trb.org/StrategicHighwayResearchProgram2SHRP2/Pages/Renewal_156.aspx. Accessed April 19, 2013.

Committee for a Study for a Future Strategic Highway Research Program. *Special Report 260: Strategic Highway Research: Saving Lives, Reducing Congestion, Improving Quality of Life*. Transportation Research Board of the National Academies, Washington, D.C., 2001. http://www.nap.edu/catalog.php?record_id=10223. Accessed April 19, 2013.

SLIDE 8: Operate It

Photo: © iStockphoto.com/Jean Schweitzer (139747439)

Description of the Slide

But today, the big opportunity to build a value proposition for customers lies in the many, many years when construction is not taking place. Over the course of those years, the value to the customer comes in how well your infrastructure performs its job, largely depending on how well you operate and manage it. That is where the real measure of its value will be returned. And the value of operations is no longer being considered just in terms of capacity and delay but also in terms of day-to-day reliability, which is a great source of frustration to the traveling public. For this reason, many network-based companies (e.g., cell phone service providers) generate value to their customers by operating their network efficiently.

Key Points

- The *years* between when roads are built and when they are renewed create an opportunity to provide customer service.

Source of Information

Federal Highway Administration, U.S. Department of Transportation. *Getting the Most from Your Transportation System Investments: Operating for Peak Performance.* FHWA-HOP-10-030. n.d.

Background Resources

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SLIDE 9: The Payoffs from Strengthened Operations

Photo: © iStockphoto.com/Comstock (78458856)

Description of the Slide

The biggest selling points for all the new attention on operations go to the heart of what DOTs want and need to deliver today. Operations programs are investments not only of money but also of focus, energy, and leadership. And these things matter because they lead to

- A safer system for travelers and responders to traffic incidents,
- More-efficient use of expensive facilities, and
- More-reliable service for commuters and shippers.

Ultimately, this all comes back to meeting customer needs.

What is the fundamental reason to have good infrastructure? It's for economic competitiveness for your state, your region, and the country. This is the theme that every leader is talking about today. Also, the talk everywhere today is on measuring and maximizing return on investment. We're here today to put the spotlight on operations because that is where most DOTs and their executives have the best chance to add the greatest economic value (the biggest bang for the buck) to their users and taxpayers.

Key Points

- Alignment with customers
- Safety for travelers
- Efficient use of the existing system
- More-reliable service for commuters and shippers
- Meeting customer needs!

Source of Information

Federal Highway Administration, U.S. Department of Transportation. *Getting the Most from Your Transportation System Investments: Operating for Peak Performance.* FHWA-HOP-10-030. n.d. http://www.mtpa-mi.org/getting_the_most_from. Accessed June 4, 2013.

Additional Resources

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SLIDE 10: Benefits of Operations

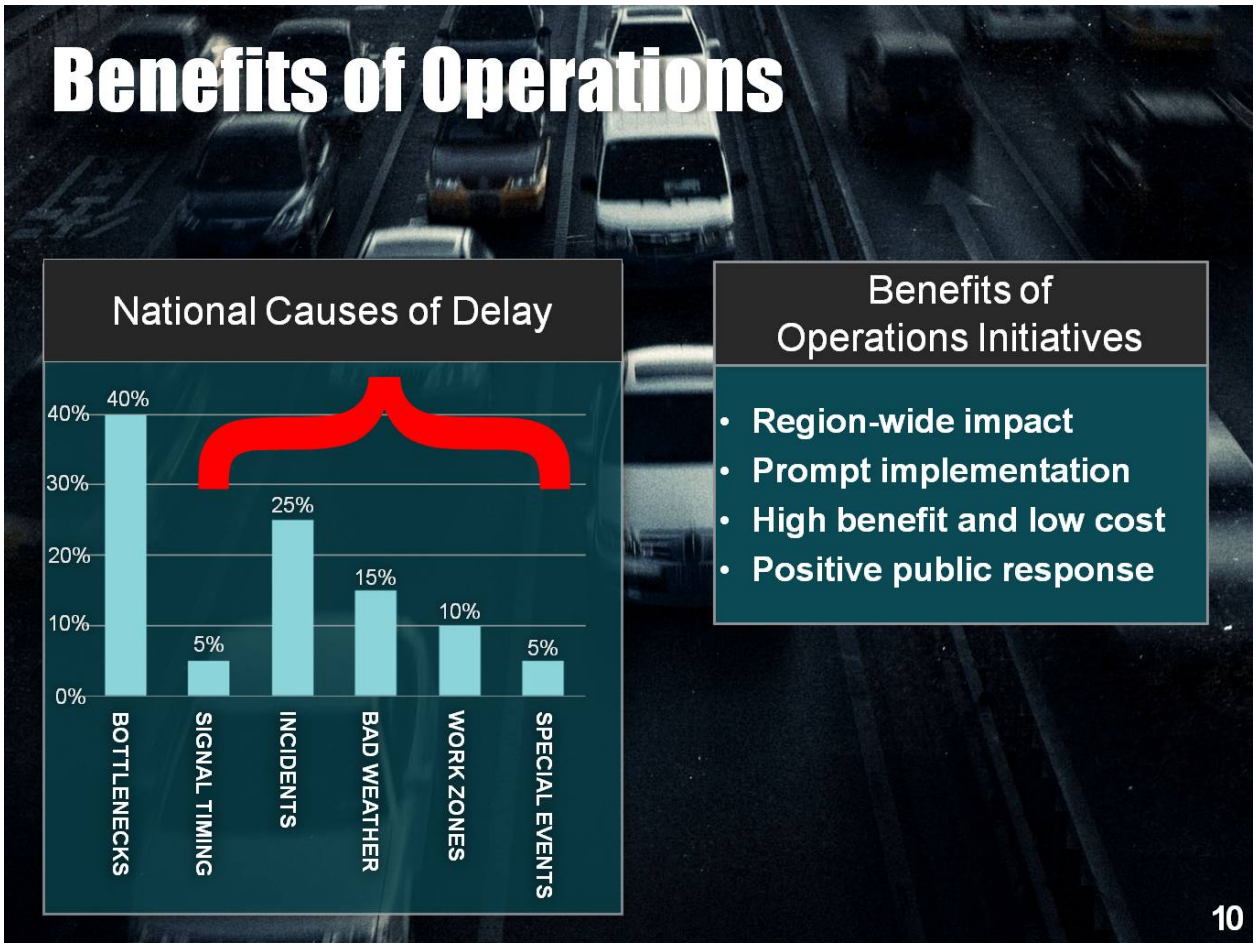

Photo: © iStockphoto.com/ben yong you (137958298)

Description of the Slide

Operational improvements can have multiple benefits. It is not just about helping with congestion, but helping with congestion is a major benefit. These strategies address problem areas that have long been recognized as big contributors to traffic congestion and traveler and shipper delay. The bar chart on the left of the slide is an FHWA analysis of what causes congestion from a national perspective. Traffic incidents, bad weather, and work zones account for more than one-half of the congestion on our roadways. This is congestion that you address not by building new lanes but by improving system operations.

The results can reach a whole region, not just one location. The results happen more quickly than from planning and building new lanes, have great benefit–cost ratios, and have big

potential political upside with very low exposure to political downside. Customers will understand what you are doing to help with congestion.

Key Points

- A focus on operations is not just about congestion, but minimizing congestion and reducing delay are big areas for potential benefits.
- The information provided by FHWA on the causes of delay shows that from a national perspective over one-half of congestion is due to nonrecurring activities. These causes can be addressed through operational improvements.
- Operations initiatives have great attractiveness for DOTs because of their regionwide impacts, the short time required for implementation, their low cost, and the positive public response that is generated.

Source of Information

Cambridge Systematics, Inc. *Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Mitigation*. FHWA, U.S. Department of Transportation, September 2005. http://ops.fhwa.dot.gov/congestion_report/index.htm. Accessed April 19, 2013.

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Washington State Department of Transportation. *Smarter Highways.* http://www.wsdot.wa.gov/smarterhighways. Accessed April 19, 2013.

SLIDE 11: Operations Opportunities

Photo: © iStockphoto.com/Digital Vision (dv797002-1)

Description of the Slide

Here are a few examples of operations activities that states are already engaged in. whether or not they are called by that name. Many of these examples are applied in both rural and urban areas.

In recent years, many state DOTs have been upping their game in operations or trying very hard to do so. No state has yet perfected all of its operations opportunities. No two states are or probably should be alike. Most likely there is room to do more in every state.

Key Points

There is an array of opportunities from everyday activities to cutting-edge possibilities:

- Opportunities exist in rural and urban areas.
- Every state is doing something.
- No state is doing everything to the maximum.

There are huge opportunities through upping the game to improve state and national highway system performance.

Sources of Information

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SLIDE 12: Smarter Maintenance Operations

Photos: © iStockphoto.com/Jupiterimages (86521201);
inset, © iStockphoto.com/BanksPhotos (20026694)

Description of the Slide

Maintenance decision support systems are good examples of the fact that every state is already doing very basic elements of an operations program. This program may for years have been labeled "maintenance." But how it's done today is a true measure of how improved operations thinking is taking root in your DOT. Many of these maintenance activities must be completed in off-peak hours because of their impact on the traveling public.

This, however, is just the beginning.

Key Points

- Operations permeate throughout all DOT activities, even routine ones such as maintenance.
- An operations-centered mentality brings new and better ways for DOTs to do things that they have done for years.

- A maintenance decision support system provides efficiencies in snow and ice control as well as other maintenance strategies.

Source of Information

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SLIDE 13: Work Zone Management

Photos: © iStockphoto.com/Trevor Smith (117812988);
top inset,© iStockphoto.com/Mike Clarke (6336691);
bottom inset, © iStockphoto.com/BanksPhotos (16140025)

Note: ADT = average daily traffic.

Description of the Slide

Work zone management is a bit trickier, but it can have huge payoffs. Even a guardrail repair by one of your maintenance crews demands careful thought for safety and minimal traffic impact on rural roads as well as on busy freeways. And, if a big construction or reconstruction project is involved, work zone management turns up as a part of your capital project delivery planning to protect everybody's safety, keep traffic moving, and minimize hated backups.

When you build a freeway or arterial street project, your performance is judged every day by the people who use the system over the months when it is affected by the construction—not just on the day that some officials come to cut the ribbon.

Proactively applying work zone management strategies can result in significant benefits. In one state, the use of message signs to display alternate route information reduced traffic through a work zone by 19% and increased the volume of traffic on an alternate freeway route by 15%.

Key Points

- Work zone management provides a significant improvement in safety that translates into smoother traffic flow and less construction impact.
- Customers are very sensitive in this area.

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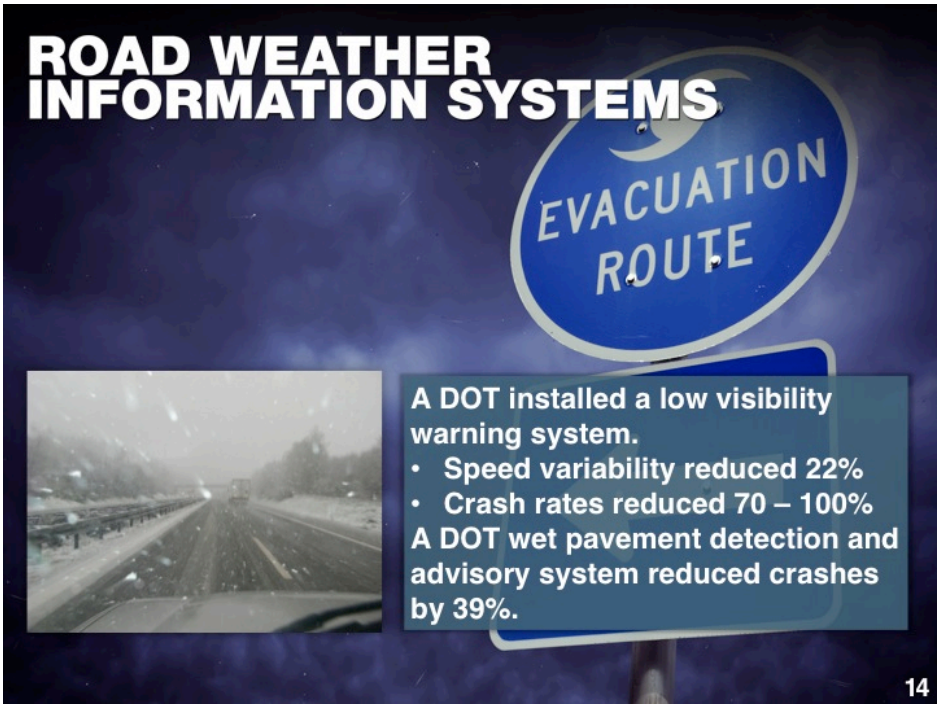
SLIDE 14: Road Weather Information Systems



Photos: © iStockphoto.com/Craig Neil McCausland (20673463);
inset, © iStockphoto.com/Altrendo Travel (90206760)

Description of the Slide

Now we're getting a bit more sophisticated. Good operations mean providing the best-functioning highway that you can deliver, even under the adverse conditions that always threaten to haunt public perception of DOT performance. Weather events, such as snowstorms and hurricanes, require good event planning. Here's a clear example of rural areas depending on operations just as much as do congested urban areas.

Road weather information systems have proven themselves to be very effective in reducing crashes and delay. One state that installed a low visibility warning system reports that speed variability was reduced by 22% and crash rates were reduced by more than 70%. A similar wet pavement detection and advisory system was found to reduce crashes on that highway section by about 40%.

Key Points

- Road weather information systems have been proven to be very effective in reducing crashes under adverse weather conditions

- Good operations mean providing the best-functioning highway that can be delivered under prevailing conditions.
- This is a clear example of rural areas depending on operations just as much as do congested urban areas.

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SLIDE 15: Event Management

Photos: © iStockphoto.com/Shane Michael (4519294);
top inset, © iStockphoto.com/dennisjim (21410333);
bottom inset, © iStockphoto.com/S.W. Krull (4519294)

Description of the Slide

Does your DOT take proactive measures when Game 7 or the Bluegrass Festival threatens to back up ramps or intersections and block lanes on your highways? The biggest payoff from good event planning is the practice that it gives to your staff for the worst event, such as an unexpected natural disaster, when the stakes may even be life and death in your communities.

The concept of managing event traffic to minimize delay and disruption is a time-tested powerful tool that usually brings a lot of good publicity and visibility to the transportation agency at the same time. Travel time between Phoenix and a major raceway was reduced by 1.5 hours or more than 70% through application of event management strategies.

Today's new technologies and communication capabilities make it feasible for agencies to achieve similar results for events that are not nearly as well-known or publicized. Successful actions and strategies that have been documented in past event management activities include partnering and coordination, technology applications, incident management, and traveler information using radio, and variable message signs on both freeways and arterials.

Preplanning and "day of" execution for events is good operations. Doing it well versus not doing it well is about customer service. This almost always enters into the arena of

collaboration with sister agencies, one of the big challenges in most of the expanding dimensions of operations thinking.

Key Points

- Managing traffic for sports, festivals, civic events, and weather events is critical.
- Effective event management usually involves the combined use of multiple operational improvement strategies.
- This is an area in which collaboration with other agencies is especially critical and collaboration payoffs are high.

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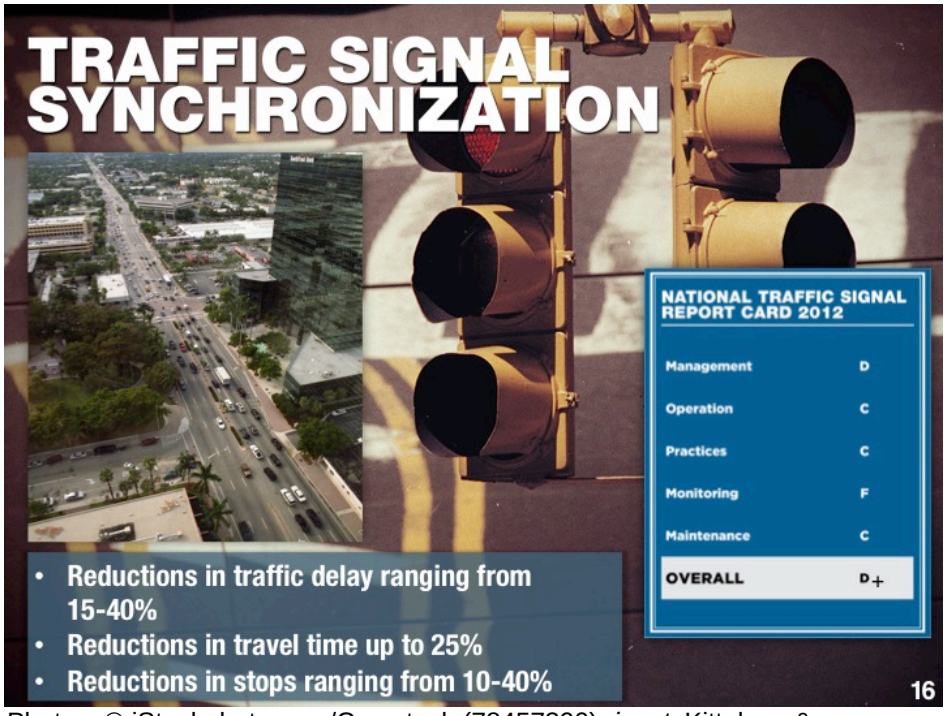
SLIDE 16: Traffic Signal Synchronization



Photos: © iStockphoto.com/Comstock (78457390); *inset,* Kittelson & Associates, Inc.

Description of the Slide

Smooth traffic flow along arterials is at the heart of what good operations can deliver. Customers appreciate synchronized traffic signals and can be very vocal when they are not getting them. But achieving good traffic signal synchronization is a challenge, not only in installation but also in operation and maintenance. It is not as easy as the customer thinks, for sure, but it is what the customer expects. Signal synchronization achieves some of the highest benefit–cost ratios of any operations strategy. Results from before-and-after studies show that improved signal timing reduces delay by up to 40%. And there is industrywide information that shows that we are not doing as well as we should, as demonstrated by the National Traffic Signal Report Card, which in 2012 reported a grade of D+.

Significant benefits can be achieved through a regionwide approach to signal operations that requires strong partnerships across multiple agencies. These partnerships are needed to overcome barriers and challenges associated with decision making and integration across different hardware and software platforms.

Key Points

- Customers understand that it can be done. They are happy when they see it and grumpy when they don't.
- The benefit–cost returns in this area are very favorable. But well-synchronized signals need close attention and the ability to make dynamic adjustments!
- The national report card should give us pause. The industry is *not* delivering at the level it should be.

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SLIDE 17: Traveler Information Systems

Photo: Kittelson & Associates, Inc.

Description of the Slide

Not so long ago, your counterparts were beginning to hear about ITS, or intelligent transportation systems, and the role they play in traveler information systems. Your agency probably has an ITS program in place today. But traveler information systems are hardly old hat. The field is exploding with the emergence of smart phone applications, private vendors, social media, and visualization tools.

Customers expect to receive information that is current and accurate, and they will let you know when it isn't. Traveler information systems have a high value payoff. Research has shown that travel information can influence not only the choice of routes but the choice of modes, which in some cases saves 20 minutes in travel time. Dynamic message signs that identify alternate routes (using arterial streets) coupled with ramp closures have been shown to reduce traffic queues by 50% during high travel conditions.

Key Points

- There has been a virtual explosion in customer interest, acceptance, and expectations in this area.
- New technologies enter the field almost daily.
- DOTs have been partnering—like it or not and for better or worse—with radio and TV traffic reports for years. Now, private vendors are seizing the opportunity.
- And social media are taking over this communications world like every other!

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SLIDE 18: Ramp Meters, Lane Operations, and Control

Photos: © iStockphoto.com/Mark Hatfield (137316743);
left and top right insets, courtesy of Florida Department of Transportation;
bottom right inset, courtesy of Washington State Department of Transportation

Description of the Slide

Active traffic management (or ATM) is the new frontier of operations. Many European countries are leading the way. A number of state DOTs, such as in Washington, Florida, and Minnesota, have already put systems in place, and others are working on ATM now. ATM utilizes state-of-the-art technology to monitor and analyze traffic conditions and take immediate actions to change speed limits, control lane usage, and meter the flow of vehicles onto a freeway. It takes some upfront investment and public education, but the benefits of ATM are better traffic flow, less stop-and-go congestion, fewer incidents, and lower incident-caused delay. On the left of this slide is a photo of the 95 Express Managed Lane project in Miami. In addition to providing a reliable trip for travelers who use the express lanes, you can see on the chart that travel speeds and throughput have improved significantly in the general purpose lanes. In the upper-right

photo, you can see a ramp meter, which controls access to the I-95 general purpose lanes. These ramp meters help to create smoother flow in these lanes. And transit ridership has improved because buses travel in uncongested conditions in the express lanes with travel times that are the same as for private autos.

The overhead speed limit signs in the lower-right photo are implemented in the Seattle area. By varying the speed limit, these signs reduce stop-and-go traffic and reduce the probability of an accident by giving drivers more time to react to changing road conditions. As drivers approach congestion, they slow down and pass through the problem area at a slower but more consistent speed. This helps drivers avoid the need to brake sharply as they approach congestion.

Key Points

- Active traffic management takes the process of smoothing traffic flow a step further.
- Ramp meters have demonstrated the ability to smooth traffic flow. Their implementation is now widespread.
- Managed lanes provide drivers with the option to pay for a more-reliable trip during times of congestion.
- Variable speed limits are set by traffic sensors located along the roadway. These sensors collect vehicle speeds, congestion information, and traffic flow rates.

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SLIDE 19: Safety Service Patrols/Incident Response Trucks

Photo: Courtesy of Florida Department of Transportation

Description of the Slide

Incident response trucks are among the most visible goodwill ambassadors an agency can have. What citizen won't say that tax money is well spent when a service truck operator comes along to help fix a flat tire or give a couple of gallons of gas? Their presence and obstruction-clearing activities are comforting and beneficial to individual customers, and they are hugely beneficial to the road system. In addition, the proper management of traffic incidents enhances safety for responders. An evaluation of existing service patrols found that 80% of incidents were cleared within 10 minutes. And a benefit–cost analysis showed that a $1.25 million investment in an incident response program produced $9.8 million in benefits for a benefit–cost ratio of 7.8:1.

Key Points

- Service patrols prevent collisions through prompt response and clearance of stalled vehicles and other minor incidents.
- Improved incident management traffic control enhances safety for stranded motorists and motorists approaching the scene.
- Improved communication and cooperation among responding agencies improves responder safety.
- The key to success is to foster cooperation among agencies.

Source of Information

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SLIDE 20: Traffic Incident Management

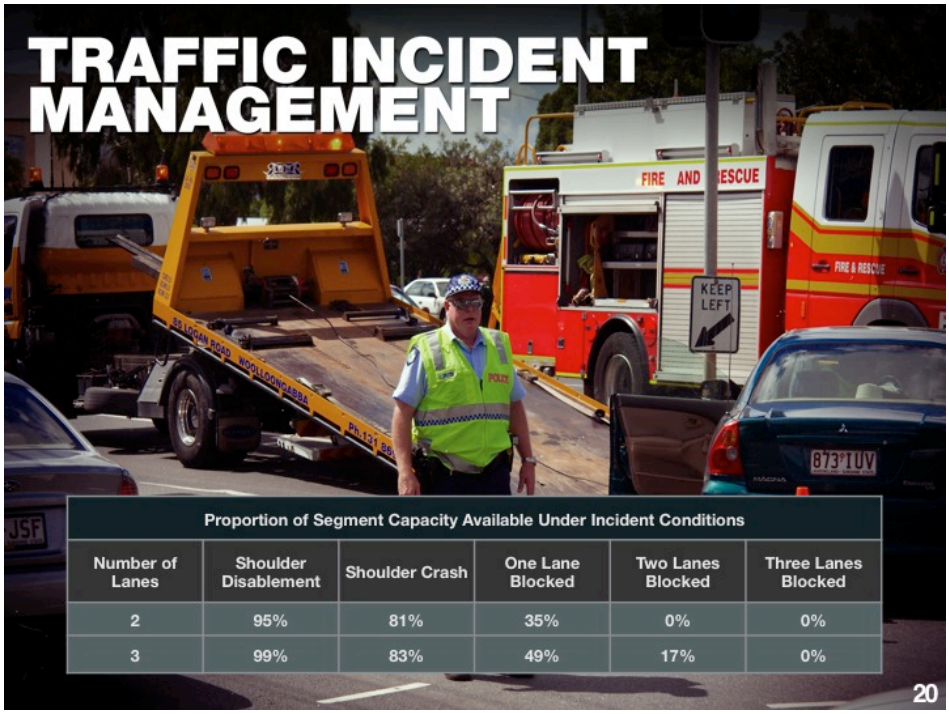

Photo: © iStockphoto.com/hereswendy (16131368)

Description of the Slide

Of course, traffic incident management involves a lot more than just the incident response truck that the customer sees. Traffic incident management marries your agency to first responders and brings together all of the tools needed to successfully operate the system. It also draws upon strong partnerships across multiple departments and agencies in both rural and urban areas. Doing this effectively requires a shrewd investment of DOT dollars and skills, as well as building relationships and joint training with police, fire, and emergency service agencies.

The very essence of incident management is complicated and nonrepetitive, but the rewards to be gained are huge, both in system performance and in the standing of a DOT with its customers. The table at the bottom of the slide shows that over 50% of a three-lane freeway's capacity is lost when one lane is blocked because of a crash or incident. Traffic incident management has proven time and again to be one of the easiest and most direct paths to significant reduction in delay, an improvement in travel time reliability, and customer appreciation. Incident management also offers significant benefits in terms of reducing the potential for secondary crashes and the significant delay that they cause.

Key Points

- This work is complicated, nonrepetitive, and collaborative.

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SLIDE 21: Connected Vehicles

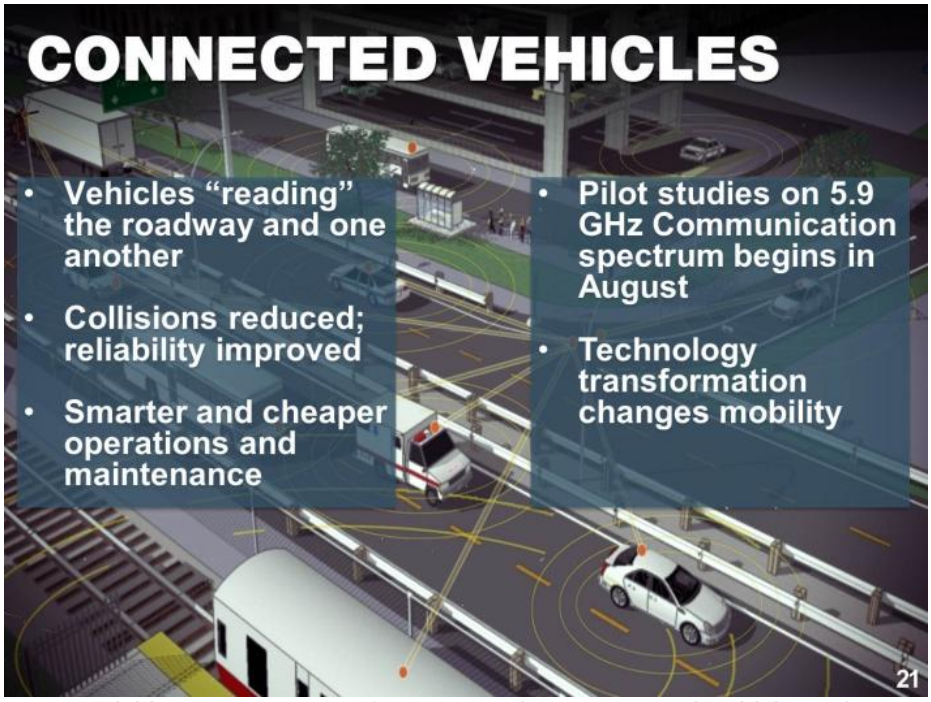

Image: Michigan Department of Transportation, Connected Vehicle Update, October 2011, Vol. 4, No. 1, courtesy of U.S. Department of Transportation

Description of the Slide

"Connected vehicles" is a phrase being used to describe technology that makes vehicles aware of one another as well as important roadway features so they can work together to avoid crashes and improve traffic flow. The long-term payoff is almost beyond estimation, and even the near-term benefits are amazing. Rear-end collisions, blind intersections, abrupt lane changing, and red light running are just some of the significant risks drivers face today that can be dramatically reduced with connected vehicles. Connected vehicles provide DOTs with the opportunity to leverage their resources. Auto makers believe they can start offering connected vehicle capabilities in their cars before the end of the decade. With widespread implementation, this technology will have significant safety payoff for motorists and incident responders long into the future. So, transportation agencies ought to be aggressive in preparing for this future.

Key Points

- This is the new frontier where the Internet and wireless technologies will have major transformative effects in how traffic operates and how DOTs leverage resources into better maintenance and asset management practices.

- This is a “frontier” that is not very far away in time. Many connected vehicle components are already being tested and implemented.

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SLIDE 22: The Path to Excellence in Operations for a State DOT

Photo: © iStockphoto.com/Jupiterimages (86522038)

Description of the Slide

Every state DOT will have its own unique mix of needs and opportunities for its operations program that makes sense for that particular state. No matter how good you are, you can always improve.

To determine where to go, you need to start by asking two simple questions:

- What areas should this DOT target for improvement?
- Which capabilities does the DOT have to improve to get there?

We can all learn from one another.

Key Points

- The objective across the country is to improve operations performance.
- Each DOT will have unique challenges and opportunities.

- A simple management approach lays the foundation for all else.

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SLIDE 23: How to Move Forward

Photo: © iStockphoto.com/seraficus (118347093)

Description of the Slide

To enhance the contribution of operations to your organization, you must address five basic questions as matters of executive leadership:

- What are your customer's expectations?
- Who is responsible for managing operations?
- Where are you today?
- Where do you want to go?
- How are you going to get there?

This is simple to say, but not so simple to do. At the same time, it will be a very rewarding investment of your leadership time and energy.

Key Points

- What are your customer's expectations?
- Who is responsible for managing operations?
- Where are you today?
- Where do you want to go?
- How are you going to get there?

Sources of Information

American Association of State Highway and Transportation Officials. *AASHTO System Management and Operations Guidance.* http://www.aashtosomguidance.org. Accessed April 19, 2013.

Transportation Research Board. *Institutional Architectures to Advance Systems Operations and Management*. Webinar. *http://onlinepubs.trb.org/onlinepubs/webinars/InstitutionalArchitecturesPresentations.pdf.* Accessed April 19, 2013.

Additional Resources

ICF International. *Business Case Primer: Communicating the Value of Transportation Systems Management and Operations.* Prepared for SHRP 2 Project L17. 2012. http://demo5.pbid.com/pdf/SHRP_2_L17_Business_Case_Primer_Final.pdf. Accessed June 4, 2013.

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Parsons Brinckerhoff, Delcan, Philip J. Tarnoff, George Mason University School of Public Policy, and Housman and Associates. *Institutional Architectures to Improve Systems Operations and Management*. SHRP 2 Report S2-L06-RR-1. Transportation Research Board of the National Academies, Washington, D.C., 2012.

Parsons Brinckerhoff, Delcan, George Mason University School of Public Policy, and Housman and Associates.*Guide to Improving Capability for Systems Operations and Management*. SHRP 2 Report S2-L06-RR-2. Transportation Research Board of the National Academies, Washington, D.C., 2011.

SLIDE 24: These Areas Need Your Focus

Photo: © iStockphoto.com/Johnny Greig (19953920)

Description of the Slide

The ball is in your court as a DOT CEO or senior manager. You need to go through an assessment of your organization, demonstrate your own commitment to change, establish responsibility and allocate resources, and empower the people on your team who you will rely on for results.

This slide illustrates eight areas of your organization that need to be assessed and that are the focus of the SHRP 2 L06 Operations Opportunity workshops.

It truly is a challenge. The mission is so important that it is not enough to just leave it to each CEO and each DOT to figure it out alone. That's why this presentation is intended to let you know that there are excellent resources to help you and to let you know how to get to them.

Key Point

- Progress in these eight areas will require your leadership.

Sources of Information

American Association of State Highway and Transportation Officials. *AASHTO System Management and Operations Guidance.* http://www.aashtosomguidance.org. Accessed April 19, 2013.

Transportation Research Board. *Institutional Architectures to Advance Systems Operations and Management*. Webinar. http://onlinepubs.trb.org/onlinepubs/webinars/InstitutionalArchitecturesPresentations.pdf. Accessed April 19, 2013.

Additional Resources

Kittelson & Associates, Inc. *CEO Briefing Book on Effective Operations Improvement Strategies.* Prepared for SHRP 2 Project L17. 2012. http://demo5.pbid.com/pdf/success_stories.pdf. Relevant information from this document can also be found online at http://www.mvfast.org.

Federal Highway Administration, U.S. Department of Transportation. *Creating an Effective Program to Advance Transportation System Management and Operations: Primer*. January 2012. http://www.ops.fhwa.dot.gov/publications/fhwahop12003/. Accessed April 19, 2013.

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and Management. SHRP 2 Report S2-L06-RR-1. Transportation Research Board of the National Academies, Washington, D.C., 2012.

Parsons Brinckerhoff, Delcan, George Mason University School of Public Policy, and Housman and Associates. *Guide to Improving Capability for Systems Operations and Management*. SHRP 2 Report S2-L06-RR-2. Transportation Research Board of the National Academies, Washington, D.C., 2011.

SLIDE 25: What Training Tools Are Available Now?

Photo: © iStockphoto.com/Maciej Korzekwa (92972777)

Description of the Slide

The resources and resource agencies that you see here are available for your use in implementing an effective systems operations and management program. For example, training courses are available for these areas:

- Facilitating the improvement of processes and institutional architecture to support more effective operations. A 1-day workshop is available to assist your staff in developing a blueprint for action built around your agency's particular situation and needs.
- Specialized incident management techniques for managers and responders.
- AASHTO Guidebook for Systems Operations and Management.

Key Points

- SHRP 2 and AASHTO currently have three workshops available and ready to deliver in the areas of institutional architecture (operations opportunities), incident management training, and transportation systems management and operations.

Source of Information

American Association of State Highway and Transportation Officials. *AASHTO System Management and Operations Guidance.* http://www.aashtosomguidance.org. Accessed April 19, 2013.

Additional Resource

Transportation Research Board. *Institutional Architectures to Advance Systems Operations and Management*. Webinar. http://onlinepubs.trb.org/onlinepubs/webinars/InstitutionalArchitecturesPresentations.pdf. Accessed April 19, 2013.

SLIDE 26: What Training Tools Are Available Now? (FHWA)

Photo: © iStockphoto.com/Maciej Korzekwa (92972777)

Description of the Slide

Some of the tools are also available from FHWA. These tools include a series of workshops and webinars that will enhance the capabilities of your staff to more effectively deliver operational improvements. They include

- SHRP 2 L06 Workshop on Operations Opportunities
- Operations workshops on
  - planning for operations,
  - bottleneck reduction,
  - managed lanes,
  - work zones, and
  - performance management.
- Webinars on
  - real-time management,
  - work zone analysis,
  - evacuation planning, and

- weather-responsive traffic management.

Key Point

- Briefly describe the workshops and webinars.

Sources of Information

American Association of State Highway and Transportation Officials. *AASHTO System Management and Operations Guidance.* http://www.aashtosomguidance.org. Accessed April 19, 2013.

Federal Highway Administration, U.S. Department of Transportation. Current Program Activities Report. http://ops.fhwa.dot.gov/program_areas/progmactiv.htm. Accessed April 19, 2013.

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Additional Resources

National Transportation Operations Coalition. *NTOC News.* http://www.ntoctalks.com/icdn/index.php3. Accessed April 19, 2013.

Grant, M., Bauer, J., Plaskon, T., and J. Mason. *Advancing Metropolitan Planning for Operations: An Objectives-Driven, Performance-Based Approach—A Guidebook.* FHWA-HOP-10-026. FHWA, U.S. Department of Transportation, February 2010.

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Federal Highway Administration, U.S. Department of Transportation. *Using Highways during Evacuation Operations for Events with Advance Notice*. FHWA-HOP-06-109. December 2006.

Scientific Applications International Corporation. *Work Zone Operations Best Practices Guidebook 2011*. FHWA-HOP-07-131. FHWA, U.S. Department of Transportation, October 2007.

SLIDE 27: What Training Tools Are Forthcoming?

Photo: © iStockphoto.com/Zoonar RF (126814493)

Description of the Slide

Much more is coming, so this is precisely the time to get on board and be part of the national conversation. SHRP 2, which has been under way for several years, is delivering some very useful tools and guidance documents focusing on such things as what design features and operational treatments to implement where in order to receive the greatest return on investment, how to streamline the data collection and modeling activities, and best approaches for effectively disseminating traveler information.

Specific products that are soon to be released include

- Regional operations forums (SHRP 2 L36),
- Cost-effectiveness of design features that improve reliability (SHRP 2 L07),
- Incorporating reliability into planning and programming (SHRP 2 L05),
- Incorporating reliability into the *Highway Capacity Manual* (SHRP 2 L08),
- Data collection and modeling (SHRP 2 L02 and L04), and
- Best approaches to provide traveler information (SHRP 2 L14).

Much of this information will be available on the Knowledge Transfer System website. It will also include communication materials and gap-filling research reports on transportation system management and operations (SHRP 2 L17)

Key Point

- SHRP 2 is releasing products in the coming months that cover a broad range of topics including training, design, planning, operations, data collection, and traveler information.

Source of Information

Transportation Research Board. *Regional Operations Forum for Advancing Systems Operations, Management, and Reliability Project Snapshot.* http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3343. Accessed April 19, 2013.

Additional Resource

American Association of State Highway and Transportation Officials. *AASHTO System Management and Operations Guidance.* http://www.aashtosomguidance.org. Accessed April 19, 2013.

SLIDE 28: Next Steps?

Photo: © iStockphoto.com/Andrey Zyk (92246334)

Description of the Slide

As a DOT CEO or senior manager, the ball is in your court:

(1) Demonstrate your own commitment.

(2) Empower the people on your team who you will rely on for results.

(3) Provide top direction and insist on accountability.

Key Point

- Get engaged and develop champions within your organization.

Source of Information

ICF International. *Business Case Primer: Communicating the Value of Transportation Systems Management and Operations.* Prepared for SHRP 2 Project L17. 2012. http://demo5.pbid.com/pdf/SHRP_2_L17_Business_Case_Primer_Final.pdf. Accessed June 4, 2013.

Additional Resource

Transportation Research Board. *Institutional Architectures to Advance Systems Operations and Management*. Webinar. http://onlinepubs.trb.org/onlinepubs/webinars/InstitutionalArchitecturesPresentations.pdf. Accessed April 19, 2013.

SLIDE 29: Ask for Help

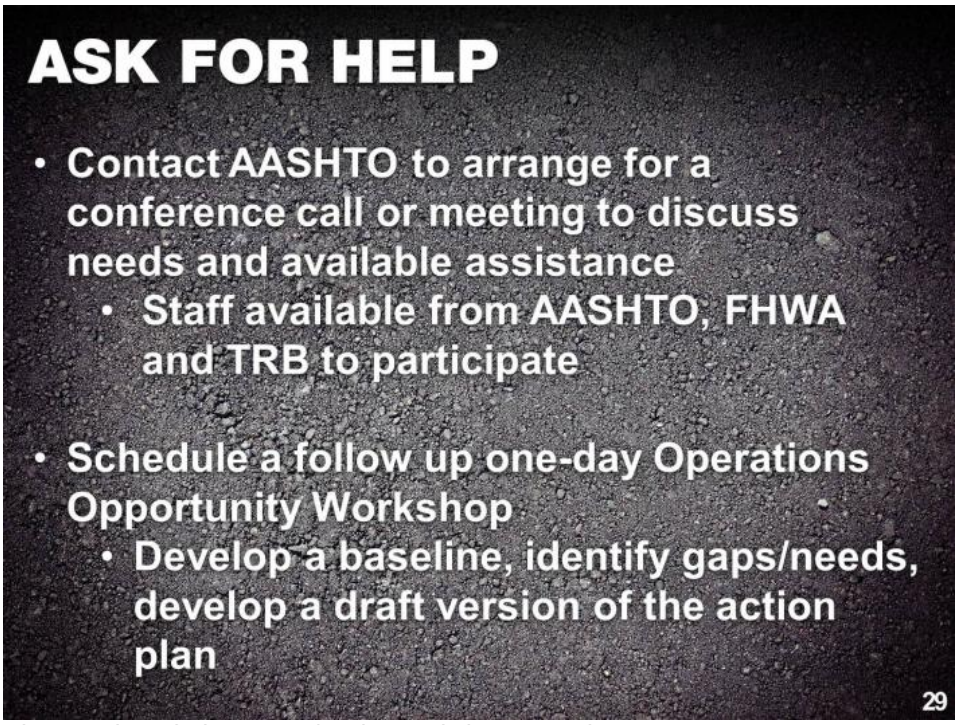

Photo: © iStockphoto.com/Andrey Zyk (92246334)

Description of the Slide

The good news is that you will be building upon what you are already doing and using the new resources that are available to you from SHRP 2 to advance your organization. Knowledgeable and connected staff at AASHTO, FHWA, and TRB will be more than willing to talk with you by phone or meet with you in person. Specifically, you can contact AASHTO to

- Arrange a conference call or meeting to discuss needs and approaches; and
- Schedule a 1-day Operations Opportunity Workshop at which your mid- and senior- level staff can develop an action plan through a gap-and-needs assessment of baseline conditions.

Key Points

- Knowledgeable individuals are available to talk with you personally.
- A 1-day Operations Opportunity Workshop would be a great way to develop an action blueprint.

Sources of Information

American Association of State Highway and Transportation Officials. *AASHTO System Management and Operations Guidance.* http://www.aashtosomguidance.org. Accessed April 19, 2013.

Transportation Research Board. *Institutional Architectures to Advance Systems Operations and Management*. Webinar. http://onlinepubs.trb.org/onlinepubs/webinars/InstitutionalArchitecturesPresentations.pdf. Accessed April 19, 2013.

SLIDE 30: Where Is Support Available?

Photo: © iStockphoto.com/David De Lossy (200225959-001)

Description of the Slide

There are agencies that are available to help: AASHTO, FHWA, and TRB.Thank you and good luck.

Key Point

This slide can also serve as a placeholder for testimonials from other state DOT CEOs and leadership executives.

Source of Information

American Association of State Highway and Transportation Officials. *AASHTO System Management and Operations Guidance.* http://www.aashtosomguidance.org. Accessed April 19, 2013.

Additional Resource

Transportation Research Board. *Institutional Architectures to Advance Systems Operations and Management*. Webinar. http://onlinepubs.trb.org/onlinepubs/webinars/InstitutionalArchitecturesPresentations.pdf. Accessed April 19, 2013.