



Regional Operations in the 21st Century

A Vital Role for MPOs



U.S. Department of Transportation
Federal Highway Administration





Purpose of this Meeting: Share Thoughts & Discuss



- Challenges brought about by the changing transportation environment and MAP 21
- How “operations” and supporting technologies can help address these challenges
- The importance of “mainstreaming” operations into the regional planning and programming processes
 - “Planning for Operations” – an objectives-driven, performance-based approach



What is Operations?

Transportation Systems Management and Operations (TSMO, TSM&O)

- “Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects” (MAP 21)
- Regional integration an important consideration
 - Many strategies are multi-modal
 - All require inter-agency collaboration, including coordinating with enforcement and incident responders

Example Operations Strategies and Solutions

- Work Zone Management
- Traffic Incident Management
- Special Event Management
- Road Weather Management
- Transit Management
- Freight Management
- Traffic Signal Coordination
- Traveler Information
- Ramp Management
- Managed Lanes
- Active Traffic Management
- Integrated Corridor Management

Implemented and operated by transportation agencies (State DOT, transit agency, local DOT) on a day-to-day basis.

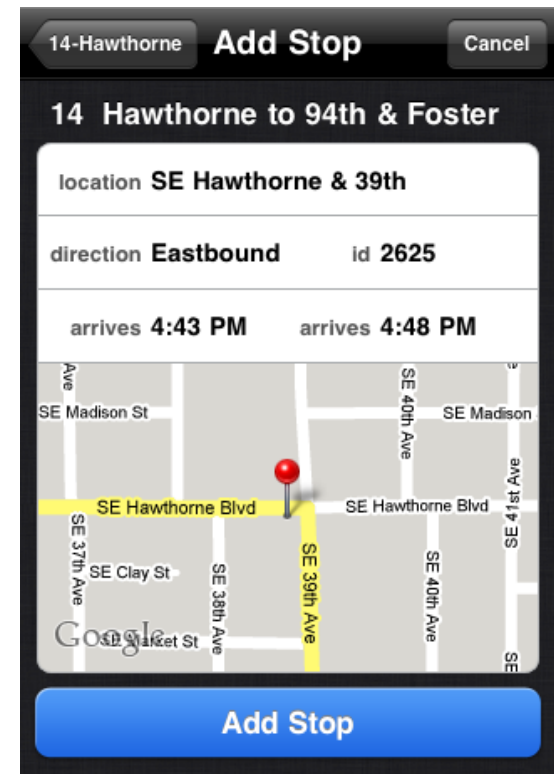
The Transportation Environment is Changing

- Increased reliance on information and technology
- Increasing customer needs and expectations
- Growing emphasis on outcomes and performance measurement
- MAP 21 requirements
- Reduced financial resources
- Technology also offers opportunities – enhanced operations and regional multi-modal integration



Technology Is Transforming Our World

- **Increased availability of information**
 - Internet connectivity, wireless communications, cloud computing
 - Information is available 24/7 on mobile devices
- **Shifting customer expectations:** technology leads to improved efficiencies and service
- **The future** – even more innovative technologies and a shorter shelf life
 - New data services
 - Connected / autonomous vehicles



(Source: Portland TriMet)



Customer Expectations and Needs are Changing



- **Public's expectations of government**
 - Increased productivity and efficiency
 - Greater demand for accountability – value expected from the use of tax dollars and transit fares
 - Transportation network viewed as a “whole”; not concerned with which agency owns the facility
- **Improved performance and services for commuter, freight, recreational, and other trips**
 - Mobility including reduced delays and congestion
 - Safety
 - Accurate, timely, and accessible information
 - Reliability (a focus of SHRP 2 program)



Performance Measures

Element of increased accountability

“The game gets serious when you start to keep score!”

Increasing focus on outcomes – improvements in safety, mobility, reliability, on-time performance, emissions, etc.

Emphasized in MAP 21

Goals and associated measures being established for:

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



MAP 21 and Performance-Based Planning

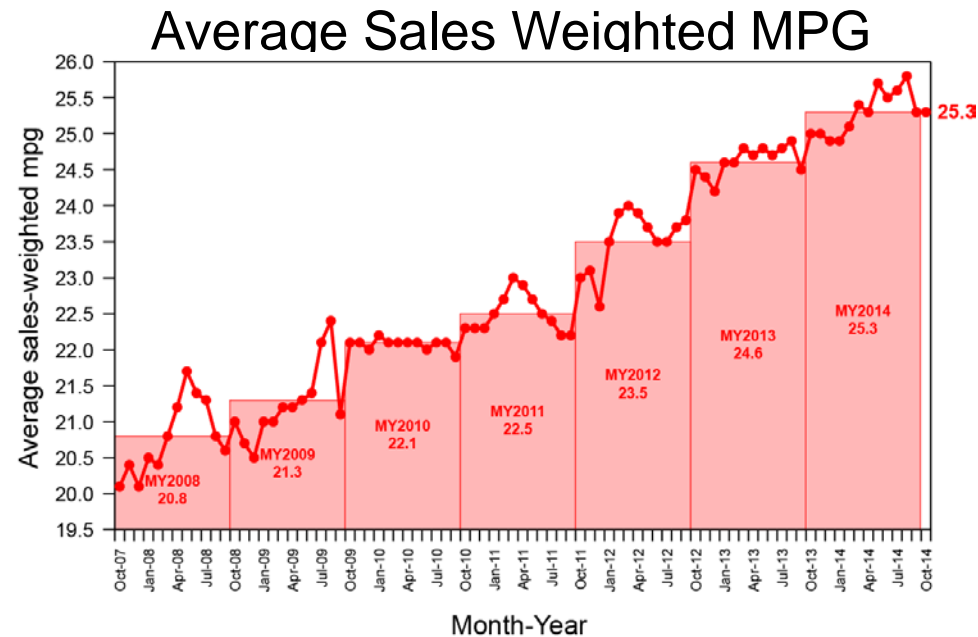
- MPOs and State DOTs must consider projects and strategies as part of their planning process that promote efficient operations.
- Metropolitan planning processes will use a performance-based approach to transportation decision making.
 - Plan will include performance measures, targets, and system performance report.
 - TIP will link investment priorities to performance targets in Plan to extent possible.

Increasing Financial Constraints

Decreasing fuel tax revenues going into Trust Fund

- No change in the federal gas tax since 1993
 - Predictions that fund will become insolvent soon
- Increased fuel efficiency
 - New CAFE standards
 - Emerging fleet of electric vehicles and plug-in hybrids pay no fuel tax

MUST DO MORE WITH LESS



Operations Can Help Address These Challenges

Leverage Technology

- Preserve and maximize existing capacity
- Enhance safety
- Promote mobility and customer outreach
- Improve reliability for commuters and freight
- Enhance sustainability and livability
- Monitor performance
- Implement quickly at relatively low cost
- Help achieve regional goals



Benefits From Operations

Regional Goals	Incident Management	Transit Management	Traffic Signal Coord.	Traveler Information	ATM – Variable Speeds	Managed Lanes	Integrated Corridor
Mobility	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Reliability	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Safety	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Environment	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

Operations in Support of Mobility and Safety

Operations Strategy	Example Benefits
Dynamic Speed Limits	<ul style="list-style-type: none">• Crashes reduced 10% - 30%• Secondary crashes reduced 50%• Improved reliability
Dynamic Shoulder Running	<ul style="list-style-type: none">• Travel times reduced up to 25%• No impact on safety
Ramp Metering	<ul style="list-style-type: none">• Crashes reduced 15% - 40%• Travel times increased 10% +
Transit Signal Priority	<ul style="list-style-type: none">• Bus times improved 2% - 15%• Minimal impact to side streets
Adaptive Signal Control	<ul style="list-style-type: none">• Delay reduced 4% - 40%
Integrated Corridor	<ul style="list-style-type: none">• Estimated B/C of 5-10 : 1



Operations in Support of Sustainability

Promotes the entire “triple bottom line”

- Economic
 - Improved mobility and reliability
- Social
 - Enhanced safety
- Environmental
 - Reduced emissions and GHG

Examples of Environmental Benefits

- Traffic signal control: Emissions reduced 3% - 22%
- Congestion mitigation strategies (e.g., incident management): CO2 reduced 7% - 12%
- Variable speed displays: CO2 reduced 10% - 20%
- Operations and ITS support “eco-driving” measures



Operations in Support of Livability



- Addresses safety
- Helps provide range of transportation choices
 - Multi-modal traveler information
 - Connecting the modal pieces (ICM)
- Supports fast, frequent, and dependable public transportation
- Enhances the environment
 - Reduced emissions including GHG
- Supports travel demand management (TDM) approaches
 - Traveler information, managed lanes, and pricing

Operations in Support of Climate Adaptation

Extreme Weather	Supporting Operations / ITS
Hot Days (buckling pavements, cars overheating, wildfires)	<ul style="list-style-type: none">▪ ATM (variable speed limits)▪ Incident management▪ Work zone management
Rising Sea Levels / Storm Surge	<ul style="list-style-type: none">▪ Traveler information▪ Roadway / transit diversions
Increased number / intensity of precipitation events	<ul style="list-style-type: none">▪ ATM (variable speed limits)▪ Incident management
Increased Hurricane and Super Storm Frequency	<ul style="list-style-type: none">▪ Contra-flow operations▪ Ramp management / closures▪ Integrated Corridor Management along evacuation routes

Resiliency Operations Critical Before and After Weather Event

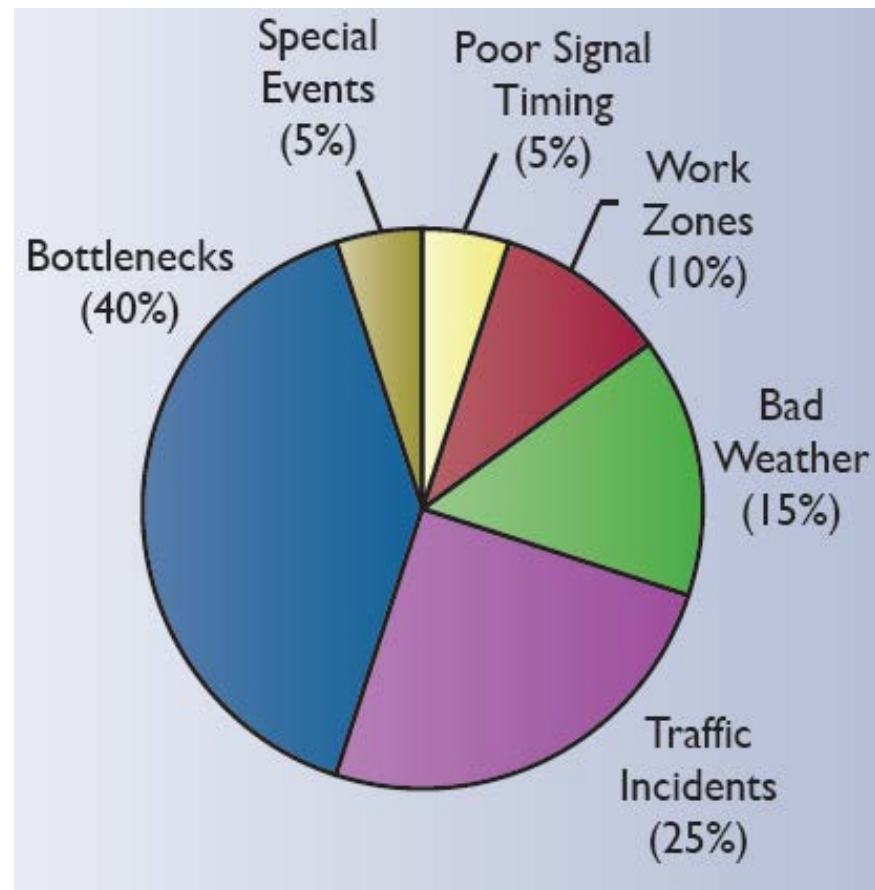
Traditional Approach to Managing Transportation

- Predict future (long-range) traffic volumes
- Fund major capital projects to provide additional capacity

This only addresses 40% of the congestion problem.

- Also becoming more and more difficult to provide new capacity

Causes of Congestion (Source: FHWA, 2005)



Providing Effective, Safe and Reliable Transportation

- Building the necessary infrastructure
- Keeping in a state of good repair (maintenance and reconstruction)
- Operating and managing the infrastructure on a day-to-day basis

Core attributes of planning process for decades (LRTP, TIP)

Operations should be integrated into the traditional planning and programming processes

“Mainstreaming”

**New construction will continue to be important.
But we can't build our way out of congestion!**

Mainstreaming Operations

“Planning for Operations” – a joint effort between planners and operators to merge operations into traditional planning and programming

- Develop and program operations strategies based on regional goals, objectives and performance measures.
- Enhance the process so that operations investments are on par with construction and preservation funding.
- Help meet requirements of MAP 21 (e.g., “promote efficient operations”).





Key Attributes of Planning for Operations



“Objectives – Driven Performance-Based Approach”

- Multi-modal collaboration between agencies and jurisdictions, and between planners and operators
- Focus on regional goals, objectives and specific outcomes
 - Not just implement a project or solve a location-specific problem.
- Prioritize investments to achieve operations objectives and improve transportation system performance
- Include operations strategies and supporting technologies in Transportation Plans and TIP
- Demonstrate accountability through performance measures

Objectives – Driven, Performance-Based Approach





SMART Operations Objectives

Operations objectives are developed through collaboration with a broad range of regional participants and reflect regional values.

Specific. Sufficient to guide approaches.

Measurable. Quantitative/qualitative measurement.

Agreed. Consensus among partners.

Realistic. Can be accomplished with available resources.

Time-Bound. Identified time-frame for accomplishment.

Associated performance measures are **outcome**-based.



Summary



- Operations is a critical component for managing the transportation network on a daily basis.
 - Enhances mobility, reliability, safety, and environment;
 - Provides a sustainable transportation network;
 - Supports a performance-based approach, focusing on outcomes; and,
 - Achieves quick and cost-effective implementation.
- To be successful, operations needs to be “mainstreamed” into the regional planning and programming processes and documentation

You have an important role to play.

Help Mainstream Operations into the Planning Process

Traditional Focus

- Long term
- Capital investment
- Project orientation
- Capacity deficiencies
- Link improvements
- Environmental impacts
- Recurring congestion (from forecasts)



Needed (In Addition)

- Significant collaboration
- Consideration on non-recurring congestion and operations
- An objectives-driven approach
- Performance-based focus on outcomes
- Network and region-wide applications
- On-going funding for operations and maintenance

A New Source of Information on TSM&O

National Operations Center of Excellence



- Partnership of AASHTO, ITE, and ITS America with support from the FHWA
- Offers a document library, peer exchanges, webinars, on-call assistance, assessments, and other TSM&O support via the Operations Technical Services Program.
 - A place to share information as well as receive it
- www.transportationops.org



Next Steps



- Demonstrate commitment and involvement – today's issues require regional approaches
- Support the mainstreaming of operations
 - Develop a Regional Operations Plan and objectives
 - Integrate operations into the CMP and TIP
- Empower the people in your respective agencies who can make it happen and give them the resources they need.

If you need assistance – Contact:

- FHWA: Steve Clinger (Stephen.Clinger@dot.gov)
- AASHTO: Gummada Murthy (gmurthy@aashto.org)



Questions



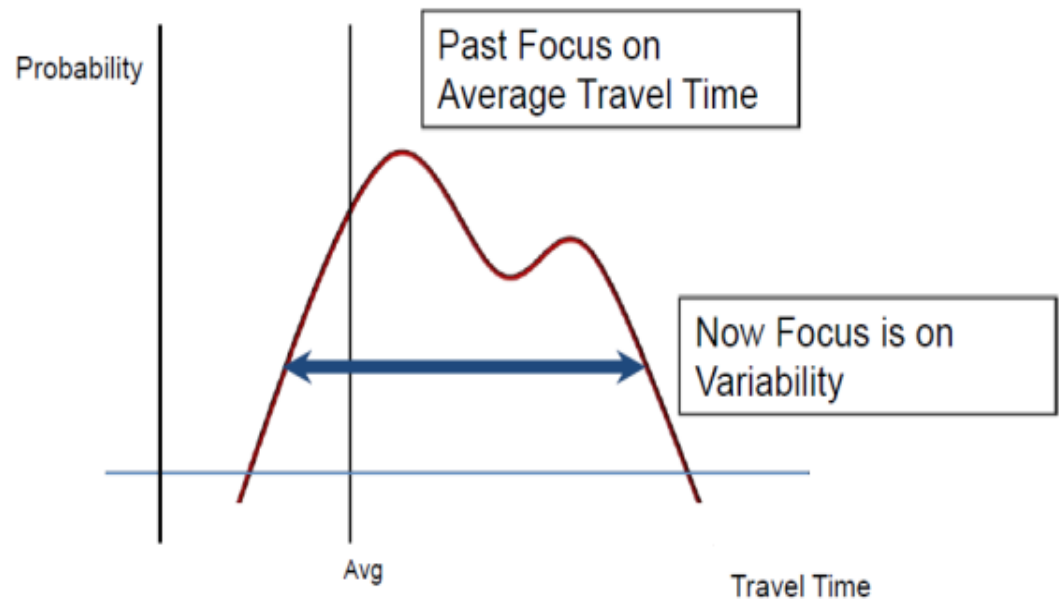


ADDITIONAL SLIDES AS APPROPRIATE



What is “Reliability”?

- **Consistency** or **dependability** in travel times.
 - As measured from day to day, or across different times of day.
- Less tolerance for unexpected delays.
- Planning for travel variability has costs for users, including individuals, transit operators, freight and their end users.



Transit Management



Example Benefits

- AVL / CAD improved schedule adherence by 9% – 23%
- TSP improved bus travel times by 2% – 15% (minimal impact on side street traffic)

- Automated Vehicle Location (AVL)
- Computer Aided Dispatch (CAD)
- Automatic Passenger Counting (APC)
- Bus Rapid Transit (BRT)
- Transit Signal Priority (TSP)
- Transfer Connection Protection
- Automated Fare Media

