Transportation System Operations Plan (TSOP)

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The Issue:
Land use and Transportation

Traffic Engineering

Road widened

Residents call for road widening

No congestion on roadway

Congestion develops

Land further out become accessible

More residents and shoppers now traveling further

Land prices rise, and farmers request rezonings to residential and commercial

Subdivisions and businesses develop and people move out to larger, cheaper homes

Under political and development pressure, land is rezoned
Forces Affecting Mobility

- Economic Development
- CVO/Freight
- Land-Use Patterns
- Jobs
- Population Growth/Shift

Congestion
Transportation Options

Conventional Approach

- More Lanes
- More Roads
- More Pavement
- More Efficiency
- ITS

Lateral Approach

- More Cars
- More People, Not Cars
- More Efficiency
- Improve Quality of Travel
- Move People, Fewer Miles
- More Pavement
- Move Less People, Fewer Miles

Manage, Not “Solve”

- Transit
- Bicycling
- Walking
- HOV/HOT Lanes
- Traffic Calming
- Access, Not Mobility
- Business Friendly
- Streets as Centerpiece
- Land Use
- Road Network
- Pricing
- Telecommuting/E-Commerce
- Lane Limits
- Change Standards

Transportation Options
PennDOT Executive Goal # 6

Effectively and efficiently operate the transportation system
Mobility Plan and Congestion

Mobility Plan

Congestion Strategies

Build Capacity
Reduce Demand

Manage Capacity
Transportation Operations
## Congestion Breakdown

<table>
<thead>
<tr>
<th>Sources of Congestion</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Bottlenecks <em>(physical, recurring congestion)</em></td>
<td>40%</td>
</tr>
<tr>
<td>Incidents <em>(crashes, breakdowns, special events)</em></td>
<td>25%</td>
</tr>
<tr>
<td>Weather</td>
<td>15%</td>
</tr>
<tr>
<td>Work Zones</td>
<td>10%</td>
</tr>
<tr>
<td>Signals</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
</tbody>
</table>

Non-Recurring Congestion

• Responsible for 55-65% of Delay
  – Urban Areas; 58-67%
  – Small Urban Areas; 67%
  – Rural Areas; 98%

• Impact on Safety
  – 10-30% of all fatalities result from secondary incidents
  – 1,490 total fatalities in 2004

• Causes:
  – Crashes
  – Breakdowns
  – Construction
  – Weather
  – Special Events
AASHTO Operations Definition

“An integrated program designed to make the best use of existing highway infrastructure through provision of systems and services that preserve and improve performance”
TSOP:
TSOP Vision

Provide the best performing transportation system for people, businesses, and places
TSOP Purpose

- Sets statewide direction for Transportation System Management and Operations

- Provides for PennDOT Districts, MPO’s and RPO’s discretion to custom-tailor statewide priorities to the specialized needs of their regions
TSOP Goals

1. Build and maintain a transportation operations foundation
2. Improve highway operational performance
3. Improve safety
4. Improve security

*Incident management and traveler information have applicability to all four goals*
TSOP Priorities

• Traveler Information

• Improved Incident Management

• Standardization
  – Hardware
  – Software
  – Shared Services
    » Telecommunications
With TSOP We Are:

- Providing and supporting foundational transportation operations uniformly in all engineering districts
- Providing consistent interstate incident response on all sections of the interstate system
- Sharing incident information for all hazards among state, federal and responsible regional/local emergency management agencies
- Providing timely, reliable traveler information through low-cost/no-cost media
- Managing the transportation system cost-effectively through linked management centers, sized to suit regional needs
With TSOP We Are:

• Using standard incident management and reporting software and device control software in use in every TMC

• Managing traffic signals actively during incidents on key corridors

• Improving arterial performance through inter-municipal traffic signal operation and maintenance agreements

• Using and improving metrics to manage operations and to guide planning and funding

• Providing effective programs and services through properly trained and classified staff and balanced use of consultant support
TSOP Projects

- TSOP-01: Inter-Agency Incident Reporting System
- TSOP-02: Road Closure Reporting System
- TSOP-03: Interstate Incident Management Program
- TSOP-04: IM Traveler Information
- TSOP-05: Incident Management Processes and Procedures
- TSOP-06: Roadway Weather Management
- TSOP-07: Crash Prevention/Safety
- TSOP-08: TAC Signal Study Implementation
- TSOP-09: STMC and TMC’s
- TSOP-10: ITS Equipment Maintenance
- TSOP-11: Technology-Assisted Enforcement
- TSOP-12: Mobility in Work Zones
- TSOP-13: ITS and IT
- TSOP-14: Operations Mainstreaming
- TSOP-15: Advanced Planning and Strategy
- TSOP-16: Data-Acquisition and Archiving
- TSOP-17: Statewide Transit Operations
- TSOP-18: Freight Movements Assessment
- TSOP-19: CVO Partnership with PSP
TSOP-01: Inter-Agency Incident Reporting System

- Defines Incident reporting requirements and software options
- Deploys software and provides for training
- Links agencies in Publish and Subscribe Model
TSOP-02: Road Closure Reporting System

- Pilot deployment for Winter Operations
- Includes Construction and Lanes Out-of-Service
TSOP-03: Interstate Incident Management Program

- Defines interstate equipment requirements
- Identifies equipment deployment gaps
- Encourages deployment through cooperative effort with PennDOT, MPOs and RPOs
**TSOP-04: IM Traveler Information**

- Investigates incident management traveler information, including 511 technical feasibility
- Pilots traveler information/511 deployment and website
- Develops traveler information performance metrics and implement Q/A Program
TSOP-05: Incident Management Processes and Procedures

- Forms incident management advisory panel & regional response teams
- Develops processes and procedures for road closures during emergencies
- Develops processes and procedures for construction lane closures
- Finalizes processes and procedures, including metrics
TSOP-06: Roadway Weather Management

- Reviews National best practices for RWIS
- Develops institutional recommendations for RWIS in PennDOT
- Develops an RWIS plan for program revisions and implementation
TSOP-07: Crash Prevention/Safety

- Identifies best practices
- Develops priorities, plans and deployment schedule
TSOP-08: TAC Signal Study Implementation

- Forms project advisory panel for TAC study recommendations
- Develops traffic signal asset management system
- Pilot active traffic signal control during emergencies
- Promote/pilot cross-jurisdictional traffic signal O&M agreements
- Develops performance metrics
- Updates traffic signal standards, specifications, policies, and publications
TSOP-09: STMC and TMC’s

- Develops STMC Concept of Operations/ Statewide TMC Strategy
- Statewide ATMS Systems Manager
  - D9/D2 - D4 - D8 – other Districts
- Develops Concept of Operations for each District TMC/RTMC
TSOP-10: ITS Equipment Maintenance

- Reviews maintenance agreements
- Standardizes maintenance practices and standards
- Deploys asset management system for ITS devices
- Creates standard program for ITS O&M funding
TSOP-11: Technology-Assisted Enforcement

- Develops and pilot technology assisted enforcement
TSOP-12: Mobility in Work Zones

- Implements FHWA final work zone rule
- Pilot "instrumentation" of work zones and develops work zone performance metrics
- Develops work zone playbook of ITS work zone strategies
- Implements procedures for informing motorists of work zone delays and detours
TSOP-13: ITS and IT

- Develops telecommunications plan
- Develops network infrastructure for linking STMC, RTMC's/TMC's
- Mainstreams ITS' IT devices into maintenance and replacement cycles (hardware & software)
TSOP-14: Operations Mainstreaming

• Institutionalizes regional ITS architecture conformity/systems engineering approach into project delivery processes
TSOP-15: Advanced Planning and Strategy

• Monitors technology advancements and trends; integrates into planning
TSOP-16: Data-Acquisition and Archiving

- Forms a project panel and develops a plan for acquiring, archiving and using operational data
TSOP-17: Statewide Transit Operations

- Partners with appropriate stakeholders to support and enhance transit operations
TSOP-18: Freight Movements Assessment

• Partners with appropriate stakeholders to support and enhance freight movement and operations
TSOP-19: CVO Partnership with PSP

- Partners with appropriate stakeholders to support and enhance commercial vehicle operations
Goal #1: Build and Maintain Transportation Operations Foundation

Goal #2 Improve Highway Operational Performance

Goal #3: Improve Safety

Goal #4: Improve Security

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Goal #3: Improve Safety

Goal #4: Improve Security
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## Operations Benefits

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<th>Type of System</th>
<th>Measured Benefit</th>
<th>Improvement Level</th>
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<tr>
<td><strong>Traveler Information Systems</strong></td>
<td>Changing to better routes</td>
<td>50% of users</td>
</tr>
<tr>
<td></td>
<td>Changing departure times</td>
<td>45% of users</td>
</tr>
<tr>
<td></td>
<td>Changing mode of travel</td>
<td>5% to 10% of users</td>
</tr>
<tr>
<td><strong>Adaptive Arterial Traffic Signals</strong></td>
<td>Stops at signals</td>
<td>Reduced 22% to 41%</td>
</tr>
<tr>
<td></td>
<td>Travel time</td>
<td>Lower by 8% to 20%</td>
</tr>
<tr>
<td></td>
<td>Delay</td>
<td>Down 15% to 44%</td>
</tr>
<tr>
<td><strong>Incident Management Programs</strong></td>
<td>Incident clearance time</td>
<td>Lower by 66%</td>
</tr>
<tr>
<td></td>
<td>Accident rates</td>
<td>Reduced 41%</td>
</tr>
<tr>
<td></td>
<td>Delay hours</td>
<td>Down between 95,000 to 255,000 annually</td>
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[http://www.telematics.com/itsbenefits.htm](http://www.telematics.com/itsbenefits.htm)
Next Steps:
PennDOT Next Steps

• Statewide Mobility Plan
  • One of the components of the Mobility Plan is TSOP

• TSOP
  • Draft Final completed
  • Adopted by PennDOT DE’s
  • Coordinated with PennDOT Goal Owners
  • Review with Executive Management On-going
  • Review with Secretary - Soon
  • Outreach to Districts, MPO’s and RPO’s – Fall ‘05
Regional Next Steps

• Adopt Architectures at Each MPO/RPO
  – Completed
• Regionally prioritize projects documented in Architecture
• Incorporate into regional long range plans
• Incorporate into regional transportation improvement programs (TIP)
• Incorporate Operations into Project “Right-Sizing” Decisions
TSOP Dynamic Planning Process

- Continual Guidance from Executive Owners
- Alignment through Annual Business Plans
- On-going Planning and Prioritization
- 2-year update in coordination with LRP & TIP
LRPs and TIPs

- System Preservation
- Capacity Additions
- Modal Alternatives
- Transportation Operations

- Safety Conscious
- Right-sized
- Aging Population
- Limited $'s
- Land Use
- Economic Development
- Quality of Life
- Freight Movement
Thank you.

Planning lies with men, success lies with heaven.

Chinese Proverb