Washington State Department of Transportation

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Low Cost, High Benefit Congestion Relief from Better Highway Management

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Washington State Department of Transportation (WSDOT)

"Tried And True" Solutions Are At Hand And Can Produce More Benefits Than We Often Get From Them Today

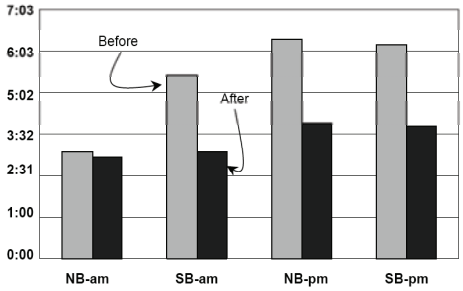
Traffic Signal Timing and Synchronization

Traffic signal synchronization has long been recognized as one of the most effective techniques for cutting traffic congestion on arterials and on the arterials network. Some studies show that the benefit of reduced delay compared to the cost of synchronization may be as high as forty to one. Traffic signal synchronization works, but it must be constantly adjusted and refined as traffic patterns change. Very few states or cities adequately fund traffic synchronization work because it provides no "ribbon-cutting" opportunities. Full funding of traffic synchronization work is one of the easiest and cheapest ways to help relieve traffic congestion.

Ramp Meters

The unpaced, disorganized merging of freeway ramp traffic into the freeway mainline is a chronic contributor to traffic breakdown. Mainline flow collapses as merging vehicles try to squeeze into the flow. Braking and accelerating, no one moves easily and the situation is worsened by frequent minor collision taps and fender benders. Ramp meters pace the incoming flow, so the merging takes on the quality of a smoothly functioning zipper. Mainline flows improve and overall volumes increase both on the mainline and the ramp and their blocking accidents decrease.

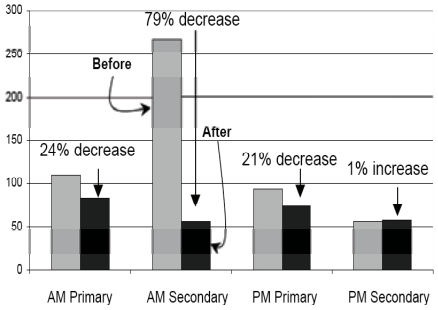
Traffic light re-timing probably has the best cost/benefit ratio of any dollar spent (min.sec)



Before and after peak hour travel times

Study conducted by the City of Bothell on retiming traffic signals on SR 527 between 228th Street SE and SR 524.

Ramp meters improve traffic flow
Tally of observed braking actions



Merging conflicts at ramp to SR 167

Frequency of braking to avoid other cars at ramp from S 214th Street to NB SR 167.

Transit Helps Takes Cars off the Road and Eases Congestion

The transit strategies that work best differ from community to community. Depending on land use and travel patterns, bus service may be useful. But many communities are exploring van pool services to best reduce drive alone commuting congestion that builds rush-hour traffic jams.

Safe walking and bicycling routes can also provide convenient, healthy and attractive ways for people to get to work without being stuck in traffic.

Leading States Are Aggressively Pushing Highway Incident Response Programs

Clearing Roads Helping Drivers

Programs like WSDOT's ***"Clearing Roads, Helping Drivers"*** are springing up everywhere.

Accidents and disabled vehicles disrupt traffic. Much worse than "regular" congestion, traffic disruptions from incidents destroy "reliable travel times". Even a patrol car parking on the shoulder with its lights flashing can cause a significant capacity loss).

Percent of Lost Throughput Capacity Due to Lane or Shoulder Blocking Incidents

Based on 2000 vehicles per lane per hour highway capacity

# of lanes	Shoulder Blocked	Lanes Blocked		
		1	2	3
2	19%	65%	0%	n/a
3	17%	51%	83%	0%
4	15%	42%	74%	87%
5	13%	35%	60%	80%
6	11%	29%	50%	74%

Our program began by improving coordination between State Patrol Troopers and WSDOT's roving incident response drivers. The WSDOT team sets up traffic control, assists in highway clearance and helps coordinate pro-opening clean up operations. Disabled motorists even on the shoulderget help with a tire change or a couple of gallons of gas. The incident response drivers also pick-up on-roadway debris.

As the program expands, it has reached into:

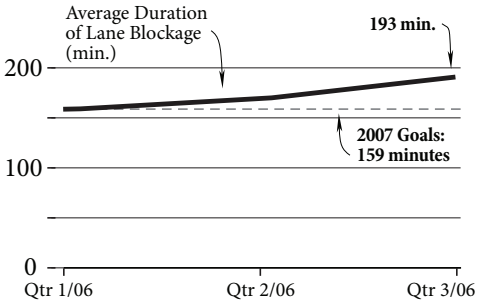
- Training and drills with local EMS, fire and hazmat responders.
- Implementation of new technologies like digital computer-aided photogrammetry to help state troopers expedite on-scene accidents investigation, sometimes taking hours off closure times
- Improved communication, coordination and contracting with tow truck operators, local law enforcement and even county coroners.

Faster clearance not only opens travel lanes, but reduces the risk of secondary accidents (rear-enders in the back-ups) that block the roads all over again.

Progress Toward Gregoire Administration Strategic Goal of Reducing Average Clearance Time for 90 Minute and Longer" Blocking Incidents in 2007 by 5% to 159 minutes

January 2006 - September 2006 (Baseline Trend)

Minutes to clear blocking incident



* *Selected Key Highway Segments*--I-5 (Oregon to Canadian Border), I-90 to North Bend, I-405, SR 18 to I-90, SR 16 to Purdy, SR 167, SR 520, SR 512, and I-205.

Our State Has Received Hundreds Of Comments From Motorists Commending This Program As A Good Use Of Tax Payers Funds.

"The WSDOT person above was outstanding and ensured my safety. Gladly pay taxes to ensure this service."

Work Zone Safety/Traffic Management Planning Can Ease Congestion In Construction Zones

Highway construction and repair zones are big causes of congestion. Lanes are narrowed, or even closed, and traffic detours and neckdowns are frequent accident locations, making matters worse. Today, program-wide impacts require strategies to be considered starting at the planning stage. In major metropolitan areas it is essential that mobility impacts of all projects be considered at a system level, including coordination between jurisdictions.

- Incentives for contractors to minimize highway traffic disruptions
- Enhanced law enforcement to reduce inattentive driving and speeding that causes work zone accidents.
- Off peak construction work hours to avoid peak period traffic
- Total corridor closure for expedited project completion

In four out of five work zone accidents, it is the driver or passenger that gets seriously injured or killed not the construction worker in the work zones.

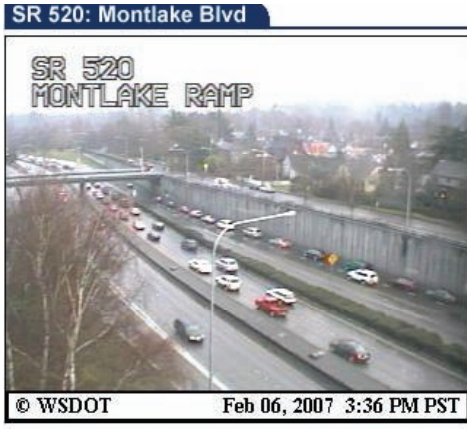
Good Information For Travelers Is A Big Help... The Opportunities Are Growing All The Time

Web Based Travel Information

Metropolitan traffic centers are developing sophisticated web based traffic information to help travelers anticipate traffic conditions and avoid backups.

- Cameras to check on travelers conditions
- Flow maps for real time depiction of to understand where blockages and congestion
- Real travel time information for trip planning

Traffic Cameras in Real Time



Flow Maps in Real Time

Strong Media Relations

Sgt. Johnny Alexander, WSP, provides drivers WSDOT traffic information on KOMO's morning news show.

Travel Times

Travel times in real time information on 36 major corridors is updated every 5 minutes to provide the public up-to-the-minute information for trip planning.

The popular service is widely used by commuters, either directly from WSDOT's web sites or indirectly through media that link to WSDOT's information. Television and radio stations use the information daily in their own traffic reports — television news programs scroll the travel times along the bottom of the screen. Newspaper, radio, and television web sites publish the information as well, taking a live feed direct from WSDOT's servers and using their own web sites to link to WSDOT.

Highway Advisory Radios (HAR)

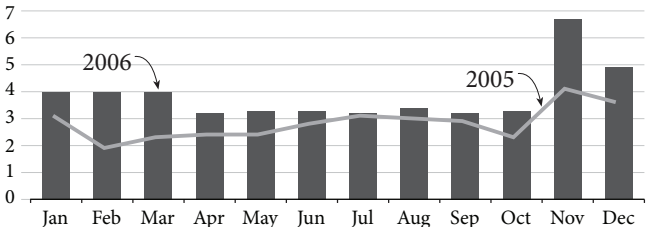
Highway advisory radio are licensed low-power AM radio stations installed along the roadway to provide alerts and general information regarding traffic and travel. The presences of a HAR transmitter is marked by a roadway sign instructing motorist to "Tune to 530 AM".

511 Service

511 can be vital in providing useful and "real time" information on how traffic conditions can better serve drivers in Washington.

Messages can be updated by WSDOT personnel with the ease of re-programming your voice personal greeting. Weather related road conditions created higher than normal demand on the 511 system. An average day in November and December 2006 generated approximately 12,000 calls. Weather conditions on November 26 generated over 46,000 calls.

Average Daily Page Views *In Millions*, to WSDOT Cameras, Flow Maps and Travel Time Sites



- On busy days WSDOT estimates 100,000 people access travel information on WSDOT's website.
- On one day in November 2006 the site recorded 14 million page views.

An Explosion Of New Technology And New Applications Is On The Way

- ***In-vehicle applications***
- ***Better and broader coverage of traffic movement***
- ***Fleet operations to optimize routings***
- ***Predictive applications***

Future Challenges Need Bolder Solutions

As population and the economy grow, traffic congestion will get even worse. Dramatic solutions are needed.

Future steps will be neither cheap nor politically easy. The best are aimed at increasing the efficiency of the facilities we already have and the new facilities that need to be built.

- HOV Lanes and HOT Lanes.
- HOV to HOT conversions.
- Pricing the use of highway capacity to make traffic flow smoother and faster.

Laying the foundations today, WSDOT like other states is exploring ways for getting more cars through the system.

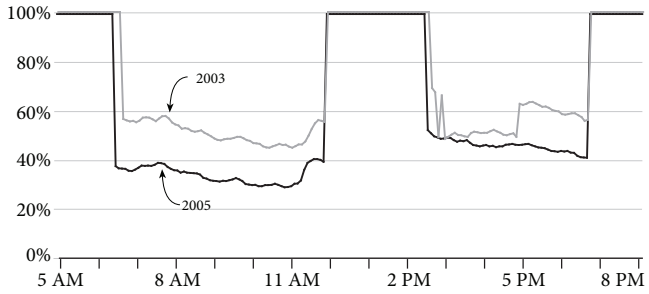
Open Road Tolling Technology/New Toll Bridge

With the opening of the Tacoma Narrows Bridge in 2007, WSDOT will begin tolling operations for the first time in nearly two decades. This project features electronic toll collection, which is new to Washington. *Good To Go* - transponders will link the customer's vehicle to back office accounts and allow non-stop, high speed toll collection.

The Shocking Case of Failing Productivity for US Highway Infrastructure Investment

Percent of Lost Throughput Capacity Due to Lane or Shoulder Blocking Incidents Near the I-90 Merge in Seattle

100% equals 2,000 Vehicles Per Lane Per Hour Highway Capacity



SR 167 Hot Lane Pilot Project

Piloting a HOT Lane business. WSDOT is working on the development and delivery of the SR 167 HOT Lanes project expected to open in 2008.

Exploration of Value Pricing Options for Upcoming Projects

WSDOT is examining several future projects for system management strategies that are expected to include value pricing to improve and assure roadway use efficiency. These projects include, the Alaskan Way Viaduct, SR 520 Floating Bridge, Columbia River Crossing and perhaps others. These projects were also identified as part of the Washington Transportation Commission's 2006 Comprehensive Tolling Study as projects worthy of consideration within the next 10 years.

To contact WSDOT and review its programs: www.wsdot.wa.gov

Valuable information from other states can be obtained from the following:

Washington State Department of Transportation

American Association of State Highway and Transportation Officials (AASHTO)
- *Operations and Management: www.transportation.org/?siteid=42*
- *Mainstreaming Systems Operations in State DOTs: www.transportation.org/sites/ssom/docs/mainstreaming.pdf*
- *The 21st Century Operations-Oriented State DOT www.transportation.org/sites/ssom/docs/OpsOrientedDOT.doc*
- *Optimizing the System (PDF) (2004) http://downloads.transportation.org/OptimizingTheSystem.pdf*

National Transportation Operations Coalition (NTOC)
- *2007 Traffic Signal Operations Self Assessment: www.ite.org/selfassessment/*

Federal Highway Administration (FHWA)
- *Focus on Congestion Relief: www.fhwa.dot.gov/congestion/index.htm*
- *Traffic Congestion and Reliability: Linking Solutions to Problems (2004) (PDF) www.ops.fhwa.dot.gov/congestion_report_04/index.htm*
- *Traffic Congestion and Reliability:Trends and Advanced Strategies for Congestion Mitigation (2005): www.ops.fhwa.dot.gov/congestion_report/index.htm*

USDOT
- *Vehicle Infrastructure Integration (VII): www.its.dot.gov/vii/*
- *Moving the American Economy: National Strategy to Reduce Congestion www.fightgridlocknow.gov/*

Transportation Research Board, National Cooperative Highway Research Program
- *TRB: www.trb.org/*
- *Strategic Highway Research Program: SHRP2 Reliability Program www.trb.org/shrp2/*
- *NCHRP: www.trb.org/CRP/About/DivD.asp*

Washington State Department of Transportation:
- *Annual Congestion Report (2006) (PDF) www.wsdot.wa.gov/accountability/archives/WSDOTCongestionReport.pdf*

Washington State Transportation Commission:
- *Tolling Study www.wstc.wa.gov/Tolling/default.htm*

Minnesota State Department of Transportation
- *Twin Cities Ramp Meter Evaluation (2002) www.dot.state.mn.us/rampmeterstudy/finalreport.html*

Texas Transportation Institute
- *2005 Urban Mobility Study: http://mobility.tamu.edu/ums/*

International:

Victorian Competition & Efficiency Commission (Australia)
- *"Making the Right Choices: Options for managing transport congestion" (2006) (PDF): www.vcec.vic.gov.au/CA256EAF001C7B21/WebObj/VCECMakingtherightchoicesFullReport/$File/VCEC%20Making%20the%20right%20choices%20Full%20Report.pdf*