

Backup Information Slides



WSDOT is considered a leader in congestion measurement and reporting, but faces data challenges

Key Congestion Performance Measures

Measure	Definition
Average Peak Travel Time/Minutes	The average travel time on a route during the peak travel period
95% Reliable Travel Time/Minutes	Travel time with 95% certainty (i.e. on-time 19 out of 20 work days)
Vehicle Throughput	Measures how many vehicles move through a highway segment in an hour
Lost Throughput Productivity/Percent (%)	Percentage of a highway's lost throughput due to congestion
Delay (Hours/Minutes)	The average total daily hours of delay per mile based on maximum throughput speed (51 MPH- 85% of the posted speed, measured annually as cumulative (total) delay
Percent of Days that the Speed Falls Below 35 mph	Percentage of days annually that observed speeds fall below 35 MPH (severe congestion) on key highway segments
Before and After (Travel Time Analysis)	Before and After analysis of performance of selected highway projects and strategies.
Duration of Congestion (Hours/Minutes)	The period when speeds fall below 70% of the posted limits (less than 42 MPH)
Maximum Throughput Travel Time Index (MT ^{3I})	The ratio of peak commute period travel time compared to maximum throughput speed travel time

WSDOT uses multiple congestion measures to evaluate the condition of 37 urban commuter routes, and reports them annually in *Gray Notebook*. Ten key measures that are included in the annual Congestion Report are highlighted in the above textbox.

WSDOT's work measuring congestion has received national recognition:

- National Cooperative Highway Research Program report on Freeway Performance Measurement: "*WSDOT very actively pursues performance measures*", and commended the agency's "*very active public reporting process*" and "*active experimentation in performance measure development.*" (2006).
- Texas Transportation Institute: "*The Washington State DOT has implemented several of the productivity improvement programs and is acknowledged as a leader in the use of operations strategies—both at a technical and policy level.*" (2007)
- FHWA described WSDOT's efforts as "*one of the nation's leading examples of effective statewide performance monitoring. WSDOT continually improves the Gray Notebook to better communicate how it is addressing state transportation issues.*" (2005)

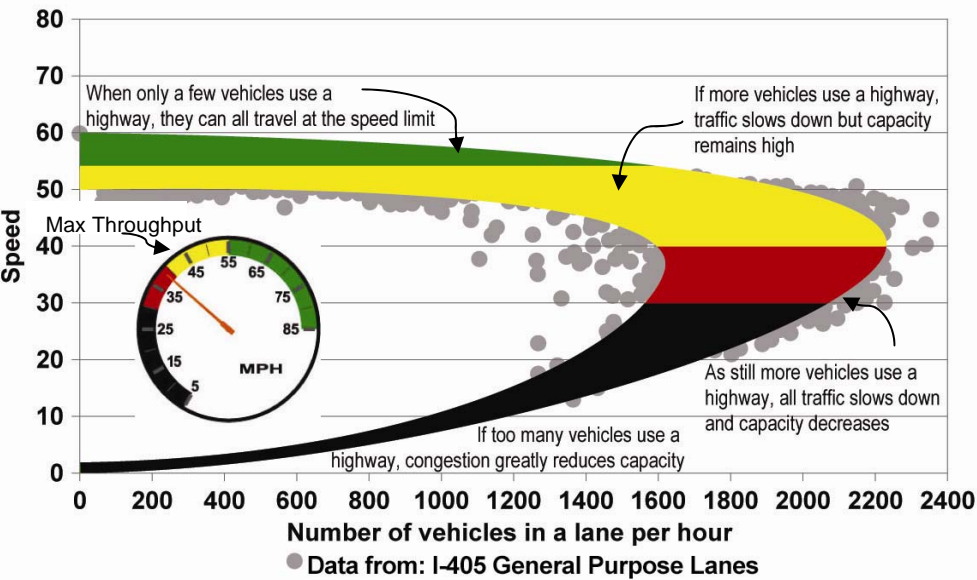
Though WSDOT is recognized as a leader in congestion measurement and reporting, the agency faces challenges in data collection, time consuming data quality control, and time consuming, non-automated analysis.

Actions:

- WSDOT will evaluate the implementation of a comprehensive highway performance measurement tracking and reporting system that captures active travel time data, as well as modeled data and other data sources to provide specific and timely congestion performance information. WSDOT will submit this as a decision package in the 2009-11 biennium.
- To enhance measurement efforts, WSDOT will work to increase the level of analysis done on congestion before and after improvement projects. This effort will require additional funding
- There are currently no simple "roll-up" measures for congestion. WSDOT recognizes the need for such a measure for general communication purposes and will be working toward building one. This is currently being pursued by WSDOT's Congestion Working Group and is on-going.

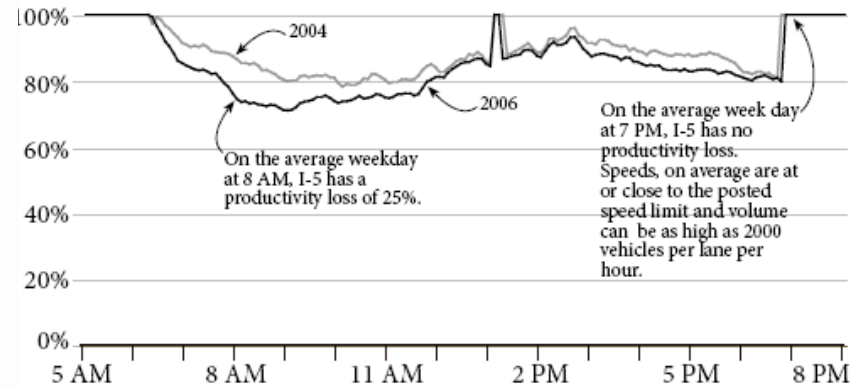


WSDOT's goal is to maximize "throughput" and system efficiency



Lost Vehicle Throughput Productivity: Example

Based on 1938 Vehicles per Lane per Hour (based on highest average five minute flow rate) Intersection of I-5 at I-90 in Seattle



- To operate the highway system as efficiently as possible, the speed that allows the most vehicles to pass through a highway segment (maximum throughput) is the most meaningful basis of measurement.
- This is achieved when vehicles travel between 70-85% of the posted speed, which results in less space between vehicles than is observed at posted speeds and the most efficient use of lane mile capacity.
- WSDOT's goal is to maximize the throughput of our highways by keeping traffic moving between 42-51 mph (the yellow area of the graph).
- When too many cars want to use the highway, the excess demand reduces capacity of the highway. Traffic flow is significantly impeded and the system reaches the black area of the graph and travel is below 30 mph.
- The graph above shows how many cars should be able to use existing lanes capacity (maximum throughput) on I-5 at I-90, but demand is such that only 75% productivity is attained from the lanes in the morning commute.
- WSDOT evaluates eight locations for throughput, all showed a decrease in throughput from 2004 to 2006, with the most apparent losses observed on I-5 and I-405. (see the Gray Notebook congestion report, September 2007 edition)
- Efficiency losses often occur at bottleneck and chokepoint locations, which can severely hinder the entire system's performance.
- Using lanes more efficiently is key to improving system performance.



Add Capacity Strategically (Eastside Corridor Example)

I-405 Projects Funded by Nickel and TPA

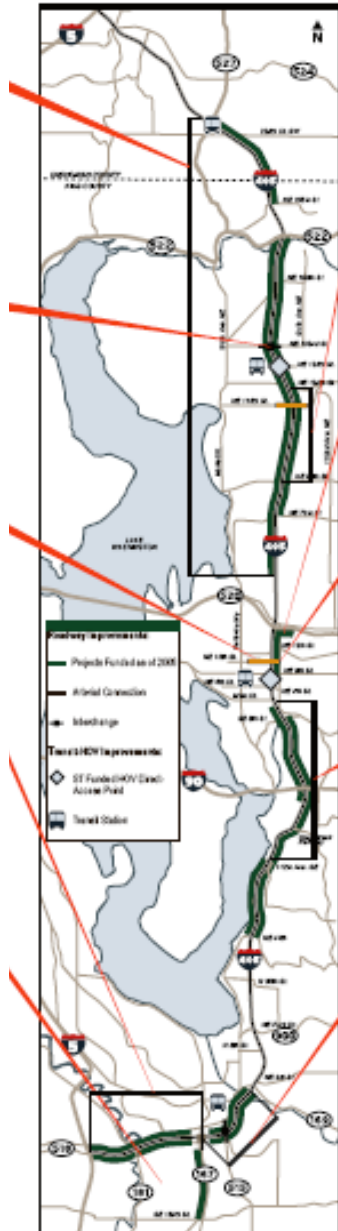
SR 520 to I-5 Widening
 Construction Start: 2010
 Open to traffic: 2012
 Builds one continuous lane in each direction between NE 70th Street in Kirkland and SR 522 in Bothell.
 Anticipated benefit: As much as **10-15 mph increase** in peak speeds

NE 132nd St Interchange
 Construction Start: 2010
 Open to traffic: 2015

NE 10th St Bridge Crossing Phase 2
 Construction Started: 2007
 Open to traffic: 2009

Renton Stage 1 Widening Project
 Construction Start: 2007
 Open to traffic: 2010

Springbrook Creek Wetland Mitigation Bank
 Construction Started: 2006
 Open to traffic: 2008



Kirkland Stage 1 Project
 Construction: Start: 2005
 Open to traffic: Two months ahead of schedule, Oct. 2007
 Improves the NE 116th Street Interchange on I-405 and adds a new lane in each direction from NE 85th Street to NE 124th Street.
 Speeds before construction were between **20-30 mph** and **improved to the 40-50 mph range**.

NE 8th St to SR 520 Northbound Braided Crossing
 Construction Start: 2010
 Open to traffic: 2015
 Currently experiences up to 8 hours of traffic congestion a day. Eliminating weave congestion will reduce congestion and improve safety on SR 520 between traffic entering from I-405 and exiting to 124th Avenue.
 Expected to eliminate weaving and **increase peak speeds by as much as 10-15 mph**.

NE 10th St Bridge Crossing Phase 1
 Construction Start: 2006
 Open to traffic: 2008

South Bellevue Widening Project
 Construction Start: 2007
 Open to traffic: 2009
 Currently one of the worst congestion chokepoints along the I-405 corridor. The project will reduce congestion from Renton north into Bellevue and from Bellevue south to I-90 by increasing general purpose capacity by 50% and improve traffic flow. **Expected to serve as many as 7,000 additional vehicles/day and increase peak speed by as much as 20-30 mph**.

Renton Stage 2 Widening Project and SR 515 Interchange
 Construction Start: 2009
 Open to traffic: 2011
 First stage in a long range plan
 Project will increase the capacity of I-405 between I-5 and SR 167 by 50%. Interchange improvements will also relieve congestion by **servicing as many as 9,000 additional vehicles/day and increase peak speed by as much as 10-20 mph**.