Signal system Performance Measures – a traffic engineer’s perspective

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A typical day in Portland!
But, the reality has been -

But, how bad is it really?
From Portland Tribune – 1/20/06

Guy gets off the plane at PDX, and it’s raining. … He checks into his hotel, and next morning it’s still raining. … Next day, same thing.

Kid says - “How should I know, I’m only 12.”

He spots a paperboy in the lobby. “Kid,” he says, “doesn’t it ever stop raining around here?”
Outline for Today’s Talk

- Review of TE talk at LV summer meeting
- Putting the “WEE” in Portland
- Measures needed for various audiences
- What do TEs want?
- Summary
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Presentation at summer meeting

Neil Rohleder, Las Vegas system manager

- Freeway & Arterial System of Transportation
- Some quantitative measures in Las Vegas
- Some qualitative / indirect measures
- Challenges, Difficulties, and Opportunities
Some quantitative measures

- Travel time
- Number of stops
- Average travel speed
Some qualitative measures –
(which I call workload and efficiencies)
Challenges, Difficulties, and Opportunities

- Cost and difficulty to collect travel time with floating car studies
- Don’t have good arterial system reliability measures yet
- Need arterial incident mgmt measures
- No link between construction zones and traffic system performance
- Lack good central archived data source
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Who or what is WEE?

- **Workload** – what and how much we do?
- **Efficiencies** – how well do we do it?
- **Effectiveness** – what are the results?
- Our Auditor’s buzz words –
  - “Managing for results”
  - “Budgeting for results”

We need to show that we are effective!
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Who are the measures for?

- System operators and maintenance staff
- Department managers
- Political leaders
- The traveling & general public
Measures for system operators and maintainers

- Is the system operating as designed?
  - Equipment / comm failures - reliability
- Are traffic conditions changing?
- Is the system operating efficiently?
- Do we have incidents to respond to?
- More?
Measures for department managers

- Is the system operating reliably?
- Are we using our resources efficiently?
- Is the public complaining?
- Are we telling our story?
- Is the Commissioner satisfied?
- More?
Measures for political leaders

- What’s a system?
- Are we using public resources efficiently?
- Is the public complaining?
- Can I look good being associated with this?
Measures for the public

• Is the system working as best as can be expected?
• Can I get to work on time?
• Is there a problem that I need to know about today?
• Are those bureaucrats wasting our money?
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What do we want?

• Data collection methods that are low cost and dependable.
  – In a perfect world we wouldn’t need any more instrumentation beyond what we needed for control.
Use existing sensor data to monitor performance.

- Washington State study reported by Mark Hallenback last summer.
- Key point is combining sensor data with controller operation information.
- Also work by Balke at TTI with TSPMS.

Figure 12. Illustration of Queue Service Time Performance Measure.
Use existing sensor data to monitor performance

- Washington State study reported by Mark Hallenback last summer
- Key point is combining sensor data with controller operation information
- Also work by Balke at TTI with TSPMS
- And Gettman with ACS Lite
What do we want?

• Data collection methods that are low cost and dependable.
  – In a perfect world we wouldn’t need any more instrumentation beyond what we needed for control.
• Ways to easily access, analyze and display the data (turning data into information).
Ways to easily access, analyze and display the data

• Have a regional archived data center
  – ADMS in Virginia
  – PeMs in California
  – The “Hallenbeck” in Washington State
  – Portal in Oregon

• Primarily University based, which means –

• I don’t have to do it!
APeMs example showing flow on all four approaches of an intersection
PORTAL –
Portland Oregon Regional Transportation Archive Listing

Figure 9 – Monthly travel time reliability example
What do we want?

• Data collection methods that are low cost and dependable.
  – In a perfect world we wouldn’t need any more instrumentation beyond what we needed for control.
• Ways to easily access, analyze and display the data (turning data into information).
• Ways to get real-time arterial travel time.
Real Time Arterial Travel Time

- Will toll tags work?
- What about cell phones?
- What about a way to analyze all the nodes?
  - More responsive than waiting for probe to traverse entire course

Someday, we will add the major arterials to this region map.
What do we want?

- Data collection methods that are low cost and dependable.
  - In a perfect world we wouldn’t need any more instrumentation beyond what we needed for control.
- Ways to easily access, analyze and display the data (turning data into information).
- Ways to get real-time arterial travel time.
- Some way to then determine “reliability”.
Travel Time Reliability

• Many Definitions
  – Variability of travel time
  – Percent travelers arriving within an acceptable time
  – Range of travel times
  – Extent to which random events increase travel time (in unpredictable manner)
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Summary

• With congestion being a hot topic, we as signal managers have the opportunity to get support for improved operations.
• To get that support, we need to have performance measures that work for us and our customers.
• And, if we do it right, we will have satisfied customers!
Keep our customers smiling!