Automated Traffic Signal Performance Measures

AASHTO Innovation Initiative (formally TIG) 2013 Focus Technology

Mission: Investing time and money to accelerate technology adoption by agencies nationwide

- Each year the program selects highly valuable technologies, processes, software, or other innovations that have been adopted by at least one agency, are proven in use, and will be a significant benefit to other agencies.
Automated Traffic Signal Performance Measures

AASHTO Innovation Initiative (formally TIG)
2013 Focus Technology

Accomplishments

✓ Presented at several conferences nationwide.
✓ ITE Journal article & series of webinars.
✓ Worked with equipment vendors incorporating hi-def.
✓ Improved the source-code & added additional SPM’s.
✓ Installed SPMs for several jurisdictions.
✓ SPM Workshop.
SPM Workshop
State & Federal Agencies

Representation from 20 State & Federal Agencies
SPM Workshop
Public Agencies

Representation from 25 Public Agencies
SPM Workshop
Private Sector

Representation from 35 Private Sector Locations
SPM Workshop Participants

169 Representatives from 85 Different Organizations, 28 States, DC, & Canada
Obtaining SPMs

- Everyone should have SPMs!
- In process of hiring a technical writer for improved source code documentation.
  - Document logic on building algorithms.
  - How the difference pieces work together.
    - Database to web server; services to website, etc.
- We are committed in making available our source code for free to anyone who wants it.
  - Why reinvent the wheel?
Obtaining SPM Source Code

http://udottraffic.utah.gov/signalperformancemetrics/

Links

1. Udot Performance Measure (PDF)
2. World-Class Signals QIT report (PDF)
3. Utah.gov
4. UDOT
5. UDOT Traffic
6. Minnesota DOT Signal Performance Measures
7. Indiana Hi Resolution Data Logger Enumerations
8. Presentations

Download Source Code
SPM Source Code Free to Public

Signal Performance Metrics

Download Agreement

Company Name

Address

Phone Number

Email Address

Accept □ You accept and agree to the terms of this Waiver by free to the public. UDOT makes no representations completeness of the data. UDOT is providing the initial employees from all claims, damages (including action of every kind, nature and character, known or you have the authority to agree to this Waiver.

Download
Obtaining SPMs

- Installations take 1-2 days
  - It’s equivalent to setting up a central system
  - Upgrades take just as long

- We request the private sector integrate and support SPM’s.
  - We will provide private sector training (as needed)
  - If demand for private sector support becomes burdensome, we may schedule a set time & location for training and support.
    - Semi-annual?, In Utah?
  - May consider a link on our SPM site of qualified consultants who can provide the support.
D Grade = Headaches for Commuters

UDOT (2005): C- Overall
Delays at traffic signals contribute 5% to 10% of all traffic delay on major roadways alone.

Benefit-Cost Ratios exceed 40:1

- What else is higher?
- These are inexpensive solutions
Before & After Signal Coordination Results

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Benefit / Cost Ratio</th>
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<tbody>
<tr>
<td>FY 2007</td>
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<td>FY 2008</td>
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<td>FY 2013</td>
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Delay vs Time in Retiming Signals

• Signals should be retimed more frequently
“What would it take for UDOT’s traffic signals to be World-Class?”

“What’s the trend – are signal operations improving, staying the same or getting worse?”

“What are our areas of most need?”

John Njord

Carlos Braceras
UDOT Asset Management (A.M.) Tiers

• A.M. Tiers range from 1 to 3

• Tier 1 assets:
  • Highest value combined with highest risk of negative financial impact for poor management.
  • Very important to UDOT.
  • Receive separate funding source.
  • Targets and measures are set and tracked.

<table>
<thead>
<tr>
<th>Tier 1 Assets</th>
<th>Tier 2 Assets</th>
<th>Tier 3 Assets</th>
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<tbody>
<tr>
<td>Pavement</td>
<td>Pipe Culverts</td>
<td>Cattle Guards</td>
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<tr>
<td>Bridges</td>
<td>Signs</td>
<td>Interstate Lighting</td>
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<tr>
<td>ATMS / Signal Devices</td>
<td>Barriers &amp; Walls</td>
<td>Fences</td>
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<tr>
<td></td>
<td>Rumble Strips</td>
<td>Curb &amp; Gutter</td>
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<td></td>
<td>Pavement Markings</td>
<td>Rest Areas</td>
</tr>
</tbody>
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UDOT Signal Timing Focus Group (July 2014)

- Two 2-hour groups

- Participants
  - Mix of ages 25-55
  - Drive 3 or more times per week
  - Have driven outside of Utah

- Group 1: Female drivers
- Group 2: Male drivers
Focus Group Key Findings (July 2014)

UDOT is perceived positively, with innovation as the primary driver of positive impressions.

Drivers believe traffic signal synchronization is improving.

Drivers feel UDOT should be open about its accomplishments in a way that protects its credibility.
60 S Commercial – Green Lights
Questions?

Rob Clayton