Future of Traffic Signal Timing Training

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National Traffic Signal Timing Report Card

Figure 1 National Report Card

Score

Management: 60
Coordinated Systems: 61
Individual Intersections: 72
Specialized Operations: 50
Detection: 59
Maintenance: 67
Overall: 62

Indicators
National Traffic Signal Timing Report Card

• **We scored a D-!**

• Why such a low score?
  – Signals turn green, yellow and red
  – BUT,
  – Not operating as an efficient, well-integrated system
  – Proactive management is limited
  – Few have needed skill set
Signal Timing Payoff

- Orlando Florida $2.2m fuel savings
- LADOT fuel consumption reduced 18%
- VDOT fuel consumption reduced 4%
- California FETSIM B/C 17:1
- National Report Card B/C 40:1
How do we get there?

- Funding is key but,
- Equipment in good working order
- People that understand how to operate it efficiently
Existing Training Programs

• National Highway Institute
  – Computerized Traffic Signal Systems
  – Traffic Signal Design and Operations
• Consortium for ITS Training and Education (CITE) on line training
• Vendors and Suppliers
  – Hardware Vendors
  – Software Vendors
• State/University Programs
• On the Job
Publications

- FHWA Products
  - Signal Timing Practices and Procedures (with ITE)
  - Signal Timing on a Shoe String
  - Traffic Signal Timing Manual (in progress)
- A few local manuals exist
  - Minnesota DOT
  - Alabama DOT (in progress)
Conclusion!

- Most traffic signal timing training is
  - Paper Exercise
  - Anecdotal
  - Not in your neighborhood
  - Expensive
MOST to the Rescue!
Mobile Signal Timing Training

• Basic Needs
  – Bring training to the people
  – Make it as real as possible
  – Use real signal hardware
  – Real world exercises

• Mobile Extension of University of Idaho Signal Timing Training Program
The MOST Team

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- FHWA Resource Center
- Econolite Traffic Control Products
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MOST Goals

- Increase engineers knowledge of the controller timing issues not addressed in optimization models.
- Increase engineers knowledge of field implementation issues relating to traffic signal timing.
- Increase technicians knowledge of efficiency and safety issues relating to traffic signal timing.
- Increase understanding of the effect of traffic variation on performance.
- Improve understanding of the interaction of detector design parameters and signal timing parameters.
The Concept

- Detection Data
- Traffic Signal Controller Software (or Hardware)
- Traffic Signal Controller Software (or Hardware)
- Multiple Controllers
- Micro Simulation Software
-Excercises

Traffic Signal Master Control System
The Tools

- Real or Simulated Traffic Signal Controllers
- Video Clips
- Example problems from real roadways
- Micro simulation package
Constraints

- Must be portable
- Must demonstrate the actual field equipment being used
- Must show impacts of parameter choices
- Must accommodate both Technicians and Engineers
- Run for no more than two days
Prerequisites

• Understand rings and barriers
• Understand and illustrate cycle, split and offset parameters on ring diagram
• Able to interpret output of optimization software such as Synchro, TRANSYT or PASSER.
Exercise 1

• Demonstrate multilane passage time and the MOST system
  – Understand signal performance is based on arrival pattern, detection schema and controller settings.
Exercise 2

• Develop detector and timing parameter design for cross street at isolated intersection.
  – Understand the relationship between detector length, location, gap time and minimum green time.
Exercise 3

• Understand detector and timing parameter for arterial street approach
  – Understand the relationship between small area detection location, mode of operation, passage time and minimum green.
Exercise 4

• Understand signal timing parameters at isolated intersection.
  – Understand full actuated control, soft recall, effects of pedestrians.
Exercise 5

- Understand signal timing for isolated intersections with heavy direction flows or special/unusual events
  - Understand the impacts of high volumes to include such features as dynamic maximum timers
Exercise 6

• Understand individual intersection timing and their effects on coordinated operations at medium volumes
  – Understand Offsets, including fixed and floating force offs
  – Understand programmed offset vs effective offset
  – Understand Permissive periods
  – Coordinated operation in off peak
  – Importance of Proper Offsets
  – Pedestrian operations and impacts
  – Transitioning alternatives and impacts
Exercise 7

• Understand the effect of oversaturated conditions on closely spaced intersections
  – Understand queue management
  – How offset may cause significant oversaturation.
To Be Continued

• Work is proceeding on MOST development
• Pilot offerings in 2006
• This is a totally new approach so expect some kinks along the way
• We welcome your input!