Adapting to Adaptive Traffic Signals

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Abstract

Louisiana’s first adaptive traffic signal system was turned on September 25, 2017 but getting there was a dynamic undertaking. Here’s the chronicle...
Objectives

- To present an overview of recent traffic signals operation advancement.
  - Sasol Lake Charles Chemicals
  - Why Adaptive
  - History of Adaptive
  - Life Experiences
Sasol Lake Charles Chemical Project

Statistics

* 1.5 Million Ton of Ethylene Annually
* $11 Billion Investment in Louisiana
* Anticipated Beneficial Operation: 2019
LCCP System A (Sampson St.)

Statistics

* 6 Signalized Intersections
* 3 At Grade Railroad Crossings
* 6,600+ Plant Workers, 50% using Sampson St.
* I-10 Calcasieu River Bridge
Trains & Bridges... Oh My

* Tight Spacings
* UP RR – Average 25 crossings per day
Trains & Bridges...
Oh My
440-ft
Adaptive Signals

* Around for 30-years
* 20-years in USA
* Benefits (per FHWA):
  * Distribute Green Light Time Equitably
  * Improve Travel Time
  * Reduce Congestion by Smoother Flow
  * Prolong Effectiveness of Signal Timing

FHWA Traffic Control Systems Handbook: Chapter 8. System Control
Table 8-4. Advantages and Disadvantages of Traffic Responsive and Traffic Adaptive Control Systems

**Advantages**
- May be significant advantages in stops, delays and emissions compared to pretimed systems (Level 2). Probably somewhat less improvement compared to conventional traffic responsive systems (Level 3).
- No need to periodically update timing plans.

**Disadvantages**
- Higher initial cost for both field equipment and traffic management center software. Higher maintenance cost for field components.
- More difficult initial system setup and tuning process.
Corridor Optimization which adjusts:
- Splits (Phase Allocations)
- Cycles (Periods)
- Offsets (Start Times)
Congestion cost US drivers $305 Billion in 2017 (INRIX Traffic Scorecard)

- Why? What? How?
- How long???
Technologies

- Controller – Trafficware 980 ATC
- Detection – Trafficware PODs
- Communications – Verizon Private Cellular Network
- Monitoring – TrafficCast BlueTOAD
- Monitoring – Cohu PTZ
- Supports – Hinged Mast Arms
Hinged Mast Arm Locking Bracket

Pre-Bracket Hinged Mast Arm Operation
Cool Video – Rotating Mast Arms
Results
Northbound - S. Frontage Rd. to John Stine

Note, Pre Adaptive data – 8/1/17-9/24/17; Post Adaptive data – 9/27/17-10/19/17
Cycle Length – Pre & Post
Realizations

* Cellular Comm. – Consistent (3 resets, 2 due to weather events)
* Complex Network – Baton Rouge and Fiber Path Affects LC
* Volumes – Continuously Fluctuating
* Data Collection – Only a Sample, Physical Aspects
* Capacity – I-10 EB Merge on Bridge
Questions???

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