INDOT Agency Factoids (System/Comm.)

- Number of signalized intersections- 2570
 - 200 connected by fiber
 - 300 connected by radio
 - 0 connected by twisted pair
 - 225 connected by cellular
 - 1500 not connected to communication
- Number of engineers/technicians devoted to signals. 8 engineers, 32 Technicians
 - **Currently 2 vacant engineer positions (1 Engineer level, 1 Managing Engineer level)**
- Central System Vendor None, Closed loop systems function as central system
- 300 signals collecting high resolution data
- Greater than 10 years collecting high resolution data

Agency Factoids (Detection)

- Length of stop bar detectors on minor movement. 51 ft
- Use of dilemma zone or other detection on arterial main line. Both stop bar detection and dilemma zone detection used (5 seconds in advance of stop bar)
- Detection Technologies used. All in pavement, no above pavement
- “Lane by Lane” or “Lane Group Detection” Lane by lane
- Link to detection standard number scheme
- Detection Testing and Maintenance Practices Testing: Performance based product approvals, Maintenance: Reactive, upon failure
- # of Signals with Emergency Vehicle Preemption. 100 maint. by others
- # of Signals with RR Preemption. 75 with pre-empt

Using Real-Time Probe Vehicle Data to Manage Unplanned Detour Routes

BY MARGARET McNAMARA, HOWELL LI, STEPHEN REMIAS, LUCY RICHARDSON, EDWARD COX, DEBORAH HORTON, AND DARCY M. BULLOCK

The unexpected closure of an interstate is a massive undertaking involving a variety of stakeholders. Such was the case in August 2015, when pier settlement of the Wildcat Creek Bridge on I-65 N in Indiana, USA required an unplanned closure of a 37-mile stretch of the interstate for approximately 31 days. The detour route had little existing intelligent transportation systems (ITS) infrastructure to assist engineers with managing operations. To fill this information need, real-time crowdsourced probe vehicle data were used to create real-time dashboards hosted on a website for use by Indiana Department of Transportation (INDOT) engineers and public safety officials to monitor mobility and queueing on the 62-mile detour route. This paper describes how the real-time dashboards were used to proactively identify congestion problems, as well as measure the impact of mitigation measures.

Route Diversion

The southbound bridge was too narrow to support bidirectional traffic, so the northbound traffic was diverted onto US-52 at mile marker 141 (Lebanon, IN) and returned to I-65 just north of Lafayette at Exit 193 (Figure 1a). This stretch of interstate usually carries an average annual daily traffic of 24,000 vehicles, including about 9,500 trucks, and it is an important connector between Indianapolis, IN and Chicago, IL, USA.

Figure 1 shows the area of the closure and detour, with callout 1 of Figure 1b marking the location of the closed bridge. The detour consisted of US-52, SR-28, and US-231, shown in Figure 1a. INDOT deployed fifteen dynamic message signs (DMS) that were used to direct drivers, advising them of turns and potential queues. Additionally, there were 40 trailblazing signs marking the direction of the detour and 19 other signs, including warning signs for traffic lights and work zones. Figure 1b, callouts ii, iii, and iv, mark temporary signals that were installed, and callout v marks a four-way stop that was converted to a two-way stop, which are discussed later in the article.

Figure 1. Maps of Detour Route

Immediately after the closure, DMS near Indianapolis (and later in adjacent states) were used to advise drivers of the closure and encourage Chicago-bound traffic to take I-74 to I-57 in Illinois.

Interstate Diversion

Northbound I-65 Bridge Closure... Repairs In Progress

Making Real Time Decisions and Separating Fact from Fiction

NIGHTMARE ON INTERSTATE 65

2 years of work to clog Lafayette's major artery

By Hannah Smith Kiefer
hsmith@online.com

What could be worse for drivers than Interstate 65 in the winter? Try I-65 in the summer, fall and spring — for the next two to three years.

Big changes — and big construction headaches — are coming to a stretch of the interstate that passes through Lafayette. It all starts in a few weeks and will continue into fall 2017. Drivers should brace themselves for lane restrictions, ramp closures, narrower lanes, reduced speeds and longer travel times.

Wondering just what will be happening, and how bad it will get? Read on ...

What changes are coming?

Crews will widen I-65 from two lanes in each direction to three lanes in each direction. To do this, workers will place the two new lanes in the current median space and add a concrete barrier to replace the median. With this plan, the shoulder of the road won't have to be widened, although it will be reinforced during the first few weeks of the project so lanes can be temporarily shifted.

See NIGHTMARE, Page 4A

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PROVIDED BY KYLE MARTIN
Lafayette police and Tippecanoe County Sheriff's deputies staged in the area of a home on South Third Street in Lafayette. Sheriff Barry Richard confirmed that the fugitive jail escapee, Marcus Alan Bramlett, had been holed up inside the house.

Fugitive surrenders

Suspect apprehended without incident after crime spree

By Hannah Smith Kiefer
hsmith@online.com

A dangerous fugitive holed up inside a Lafayette house surrendered to police late Saturday night after a chaotic 24-hour crime spree that started when the suspect overpowered a sheriff's deputy transporting him from the hospital and stole her squad car and rifle.

Shortly after 11 p.m., the suspect, Marcus Alan Bramlett, 25, peacefully exited the back door of a small brown wood-frame house in the 1000 block of South Third Street in Lafayette. Police had been negotiating with him by telephone for hours to persuade him to surrender.

"This concludes a horrible situation," declared Tippecanoe County Sheriff

See FUGITIVE, Page 6A

USA TODAY

ISIL leader killed

U.S. troops carried out a raid inside eastern Syria. USA TODAY, 1B

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WEST LAFAYETTE • Open Daily 8 am - 8 pm
915 Sagamore Pkwy West (Across from WL Police Dept.)

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How Bad? Ineffective, Absurd...

Using Metrics to change the narrative.

4A Thursday, August 6, 2013 www.journalandcourier.com Journal & Courier

Detour Diary: How bad was the detour really?

By Hannah Smith Kiefer
hannah@journalandcourier.com

As the queen of construction stories at the Journal & Courier, I report on detour routes and road closures a lot. That includes, of course, the Interstate 65 detour caused by the closure of the Wildcat Creek Bridge on Wednesday. So I decided to drive that route. I thought it would take two hours tops.

I was wrong. It took four. I documented the experience on Twitter, through tweets, photos and videos. I laughed. I yelled. I called a towworker multiple times asking if I could turn around. But I did not — I drove the whole way, from U.S. 52 in Lebanon, Indiana 28 to U.S. 231. Here's my experience living the kind of detour I write about every day.

Check out the whole, maddening journey on my Twitter feed @hannsmk.

10:29 a.m. About to go drive the I-65 detour for myself! Follow along here to see how the drive goes. Will be tweeting via Siri when safe.

11:54 a.m. Made it to Lebanon, about to embark on the detour.

12:19 p.m. First standstill. Didn't take long.

12:20 p.m. The true test in all this will be on my poor Jeep's gas tank. #threequarters tank

12:44 p.m. See y'all in like ten hours when I get through this detour.

1:53 p.m. I'm going to kick something.

2:03 p.m. FYI @journal editors, don't think I'm making that 2:30 meeting today. Even though I left at like ELEVEN THIRTY.

2:33 p.m. It would be faster to take one of these guys

2:58 p.m. If someone told me I'd post a video of myself singing to the #desperate housewife today

3:11 p.m. Oh my made it to Romney

3:27 p.m. Thank just saw a welcome fayette sign!

3:50 p.m. HON

2:11 P.M. Out behind me ju turned around TAKE ME WITH YOU. #65 #tourlife

- Reporter drove official detour right after the closure, wrote article for local newspaper
- Took 4 hours to drive ~60 miles
- Said “Moral of the story is that the INDOT detour route is essentially ineffective.”
- “Plan for it to take an absurd amount of time.”

Traffic Summary

US-52 N (I-65 to SR-28)

Segment Speed Profile

Cumulative Traffic Ticker

Traffic Summary

SR-28 (US-52 to SR-231)

Segment Speed Profile

Cumulative Traffic Ticker

Traffic Summary

US-231 (SR-28 to US-52)

Segment Speed Profile

Cumulative Traffic Ticker

Traffic Summary

US-52 N (US-231 to US-231)

Segment Speed Profile

Cumulative Traffic Ticker

Traffic Summary

US-231 N (US-52 to SR-18)

Segment Speed Profile

Cumulative Traffic Ticker

Traffic Summary

US-231 N (SR-18 to I-65)

Segment Speed Profile

Cumulative Traffic Ticker

Traffic Summary

Total

Segment Speed Profile

Cumulative Traffic Ticker

Daily Northbound Volumes –US-231 NB approaching Lafayette

US-231 @ River Road – Typical Week Before and After (Week of 7/25 vs. Week of 8/15)

Detour Route Dashboard

Temp
Signals

Cong
shifts to
231

I-65 N Detour Route

231/18
Flasher
change

231 Signal
Timing

Several
Incidents

Temp Signals
Installed

Cong shifts to
231

231/18
Flasher
change

231 Signal
Timing

Boone
County Fatal

Exit 193
Tanker Roll
Over

Boone
County
Mobile Home

I-65 Detour Route

Routes

- ✓ US-52 N (I-65 to SR-28)
- ✓ SR-28 (US-52 to US-231)
- ✓ US-231 (SR-28 to US-52)
- ✓ US-52 N (US-231 to US-231)
- ✓ US-231 (US-52 to SR-18)
- ✓ US-231 (SR-18 to I-65)
- ✓ US-52 N (SR-28 to SR-38)
- ✓ US-52 N (SR-38 to US-231)
- ✓ US-231 (I-74 to SR-28)
- ✓ SR-28 (I-65 to US-52)
- ✓ US-231 (I-65 to SR-18)
- ✓ US-231 (SR-18 to US-52)
- ✓ US-52 (US-231 to US-231)
- ✓ US-231 (US-52 to SR-28)
- ✓ SR-28 (US-231 to US-52)
- ✓ US-52 (SR-28 to I-65)

Display

- Miles
- Percentage

Axis Maximum

Set y-axis maximum: 50

Congested Speed

Speed limit for congestion:

> 45 mph

Date Range

2015-08-07 to 2015-08-26

Refresh

15 Minute Summary:

2015-08-26 22:15
UTC

Highcharts.com

Highcharts.com

Signalization Impact

SR 28/US 231 Temporary Signal

Sunday, August 9, 2015
Ed Cox / Jim Sturdevant @ 231/28

SR 28/US 52 Temporary Signal

Temporary Signal at US 231 & SR 28- Romney

- 2 phase signal
- Installed cell modem for remote access
- Monitored remotely and adjusted splits based on INRIX/Google traffic queuing

Temporary Signal at US 231 & SR 28

“All roads lead to Romney”

Temporary Signal at US 231 & SR 28

Temporary Signal at US 52 & SR 47

- Safety concern at US 52 & SR 47
 - 2 way stop controlled E/W
 - High crash history prior to closure
- Signal installed to increase safety
 - Constructed overnight, ~12 hours
- Special detection installed to limit dilemma zone issues, red light running

Temporary Signal at US 52 & SR 47

- Installed speed sieve detection to extend phase safely for all vehicles travelling 40-70mph
- NB phase ran free with long min and longer max
- Eventually would gap out when no vehicles were approaching, serve SR 47 vehicles safely

Before the Detour

During the Detour

Coordinated all signals and ran same plan 24/7. 150 second cycle, large split for NB. Offsets were aligned solely for northbound progression

Temporary signal was programmed with progressive splits allowing more time for WB interstate volume, changed during day based on traffic monitored remotely

I-65 Detour Route

○ = signal on detour

Retiming the Greater Lafayette Corridor

- All signals were retimed during the first week of the closure
- Coordinated every signal, only caring about northbound progression
- 150 second cycle length, heavily favoring northbound phase, (or westbound on north end)
- Adjusted offsets with goal of all signals having $> 90\%$ arrivals on green

Before Retiming

No data*
Free with 75s NB Max

No data*
Free with 75s NB Max

No data*
Free with 75s NB Max

*Old controller prior to retiming

After Retiming

Before Retiming

After Retiming

Before Retiming

After Retiming

No data*

*Data logging issue corrected after retiming

○ = signal on detour

Public Safety Dialog

I-65 N Detour Route

Public Safety Workshop: August 13, 2015

I-65 Diversion Scenario

Blue Tooth Data Collection Locations...

Did Motorists Favor the Detour Route?

Using Metrics to change the narrative.

- Improvement to drive ~60 miles from 4 hours to about 64 minutes
- Bad news stories stopped being published
- Many reports of driving detour with zero to one stop!
- Media advocating use of the detour.

Questions?

Thank you!!

- Contact:
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