Local Traffic Management

Tools for local agencies
Overview:

- How to assess impacts of new road opening
- How to assess impacts of a large, special event
- How to manage traffic signal systems
Elkhart County
How to assess impacts of new road opening

CR17 Extension:

4-lane divided roadway replacing 2-lane standard county road
CR17 Traffic Study
Before and After 4-Lane Extension
CR17 Traffic Study
Before and After 4-Lane Extension

Questions:
• What are traffic impacts of improved access after construction of new section
  • More traffic?
  • Route changes?

Manufacturing and Commercial areas
CR17 Traffic Study
Before and After 4-Lane Extension

Completed with:
• Tube counters
• Radar counter
• Bluetooth data collectors
Bluetooth Matching

- **Bluetooth**: a wireless protocol utilizing short-range communications technology facilitating data transmission over short distances from fixed and/or mobile devices.

- **MAC Address**: a 48 bit (>28 trillion) unique address assigned to a device by its manufacturer.

- Matches are anonymous, like license plate matching.
CR17 Traffic Study
Before and After 4-Lane Extension

Study Area
CR17 Traffic Study
Before and After 4-Lane Extension

ADT at select locations

Before and After Opening of New Section (2011 vs 2012)
CR17 Traffic Study
Before and After 4-Lane Extension

ADT at select locations

Before and After Opening of New Section (2011 vs 2012)

Even with new road open, just back to 2006 levels at main crossing
CR17 Traffic Study
Before and After 4-Lane Extension

Bluetooth
Origin-Destination Study

Before New Section Complete (2011)

Route Splits of Vehicles Passing Thru Point ‘E’ and SR119 (‘G’), CR38 (‘H’) & CR40 (‘I’)
CR17 Traffic Study
Before and After 4-Lane Extension

Bluetooth
Origin-Destination Study

Route Splits of Vehicles
Passing Thru Point ‘D’ and SR119 (‘G’), CR38 (‘H’) & CR40 (‘I’)
CR17 Traffic Study
Before and After 4-Lane Extension

Bluetooth
Origin-Destination Study

Route Splits of Vehicles
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Route Splits of Vehicles
Passing Thru Point ‘D’ and CR38 (‘H’)
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Route Splits of Vehicles Passing Thru Point ‘D’ and CR40 (‘I’)

2012

52.6%
31.6%
15.8%
How to assess impacts of large, special event

Elkhart County 4-H Fair:

Are visitors to event being well served by transportation infrastructure?
How are they getting to/from the fair?
Can improvements be made?

Average Daily Attendance = 27,200

Total for week = 245,000
Fairs have a historic place in traffic engineering –

Dr. Greenshields measured cars going to the Ohio State Fair in 1933 with a camera system to develop first traffic flow theory.
Elkhart County Fair

Map showing the location of the Elkhart County Fairgrounds.
Data Collection

Vehicle Counts

Time Lapse Camera

Travel Time
Origin/Destination

Device Deployment
Data Collection

Parking

Time Lapse Cameras

Device Deployment
Fair Traffic Directional Splits

4% at CR 17 and CR 18

44%

6%

10%

5%

65%

30%

5%
Findings

Traffic to/from West

Origin/Destination

Signed Route to/from Fair
Findings

Traffic to/from South

Traffic to/from south evenly uses east and west approaches
Findings

Traffic Counts

Peak Inbound Hour (7-21) (vehicles per hour)

Peak inbound hour is typically 4:45 – 5:45 PM, earlier on weekends.
Findings

Peak Outbound Hour (7-21) (vehicles per hour)

Peak outbound hour is typically 9:00 – 10:00 PM, later on weekends.

Traffic Counts
Findings

Traffic Flow

CR 34 - US 33 TO LOGAN ST.

Travel Time
Traffic backups shown as reduction in flow and increase in travel time.
**Findings**

**Traffic Flow**

CR 34 - US 33 TO LOGAN ST.

Vehicles Per 15 Minute Period

Time

Outbound flow also restricted at peak release time

**Travel Time**

Travel Time (s)

Time of Day
Findings

Average of 6 cars parked per minute (approx. 360 cars per hour) per parking crew

Peak daily inbound flow is approx. 700 cars per hour
Findings

Video

Time Lapse
Based on origin/destination study: new link traffic estimated to gain all CR31 traffic, as well as half of southbound traffic now using CR34 to US33. Numbers are just to give idea of relative potential, actual usage will depend on many factors including visitor knowledge of route and signage.
Suggestions

Link to CR36

Link to CR36 has potential to reduce traffic on CR34 toward Goshen by ~ 10%
• Good signage and dissemination of information to public about the new route will help it to succeed

Signed Alternate Route to Fair using CR38

• Only 6% of people going to/from fair from the west use signed route along CR38.
CR34 (Monroe Street)

CR34 will still see bulk of traffic, dealing with traffic issues there will remain important

- CR34 is not at ‘theoretical’ capacity
- Conflicting traffic movements and backups from parking lots reduce this capacity
  - Left turn’s into parking lots
  - Right turn’s waiting to enter fair grounds backing onto CR34 during peaks
- Blackport Road
- Slow vehicles and pedestrians
CR34 (Monroe Street)

- No place to pass slow vehicles
- Traffic turning left into parking lots can’t be passed
- Occasional right turn traffic into parking lots spills back to road

Right turn lane to Gate 5, may need more lanes like this at Gates 1 and 2
CR34 (Monroe Street) Selective Areas of Widening

Suggestions

- Right turn lane at Gate 2
- Position permit checkers at distance from CR34 to keep queues from backing up
- Blister to allow passing of left turn traffic at Gate 1
- Future option: Re-align Gate 1 with Blackport
CR34 (Monroe Street) Selective Areas of Widening

Blister to allow passing of left turn traffic at Gate 5
CR34 (Monroe Street) Add 10’ (min) Shoulders Along Fairgrounds

Shoulders provide:
- space to pass turning and slow vehicles
- room for emergency vehicles to bypass traffic
- effective right-turn lanes near gates
Traffic Signal Performance Measures

Originally developed for use by INDOT
Adapted to local agencies through an LTAP project

Primarily 7 basic measures to help ensure signals are operating well—engineering level analysis tools

- Coordination
- Cycle timings
- Volumes
- Split Failures
- Etc...

![Pulse Coordination Diagram](image)
How Current PM Systems work:

Replace second cabinet/hardwired logging system

With a smart controller
Elkhart County, IN

15 miles of fiber optic along CR17
14 county signals on fiber network
4 INDOT signals on fiber network
1 microwave link
4 signals on broadband radio
7 signals with no data connection
1 Centracs system
10 FLIR thermal sensors
3 full time linux bluetooth stations
5 PTZ cameras

Performance Measures
Even Useful on a Small System
Elkhart County, IN

Performance Measures

Even Useful on a Small System

- 15 miles of fiber optic along CR17
- 14 county signals on fiber network
- 4 INDOT signals on fiber network
- 1 microwave link
- 4 signals on broadband radio
- 7 signals with no data connection
- 1 Centracs system
- 10 FLIR thermal sensors
- 3 full time linux bluetooth stations
- 5 PTZ cameras
Cycle Length

- C=75
- C=90

Plan Change At 0500
Plan Change At 1300
Plan Change At 2000
Cycle Length
Cycle Length
Cycle Lengths Mismatched

Cycle Lengths:
- 60
- 75
Performance Measures

Next Step:
Adapt Performance Measures, now mostly Engineering Analysis Tools, to Maintenance functions.

Possibilities include:

- Detection Failures
- Changes in traffic patterns
  - arrival on green
  - change in volumes on an approach
- Loss of communication
This research sponsored by: