Utilizing Video Collection for Improved Traffic Analysis

NATMEC 2014 Conference

TERRA ENGINEERING LTD.

Welcome!

Today's Presenters:

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Today's Presentation

- General count types
  - Axle-based counts
  - Length-based counts
  - Observation-based counts
    - Manual
    - Video
- Case studies
- Conclusions

Axle-Based Traffic Counts

- Road tubes, infra-red beam
- Classifies by number and spacing of axle strikes
- Axle correction factor or additional monitoring required to derive accurate count data

Length-Based Traffic Counts

- Magnetic counters, radar, etc.
- Classifies vehicles based on calculated length and can also classify speed
- Requires minimum rate of speed to properly count and classify vehicles

Observation Traffic Counts - Manual

- Lowest technology option
- Highest cost option, due to cost of labor
- Count duration often limited due to costs
- High-volume intersections require multiple personnel
  - "Human factor" becomes a larger issue with multiple staff members performing the count

Observation Traffic Counts - Video

- Staff costs are drastically reduced
  - Processing costs are significantly higher
- 95% or greater accuracy
- Ability to record multiple days up to a week on one deployment
- Retain full record of count after processing
- Equipment setup outside of traveled way

Observation Traffic Counts - Video

- Capable of counting full range of roadway users
  - Vehicles by Classification
  - Motorcycles
  - Buses
  - Pedestrians
  - Bikes (on road and on sidewalk)

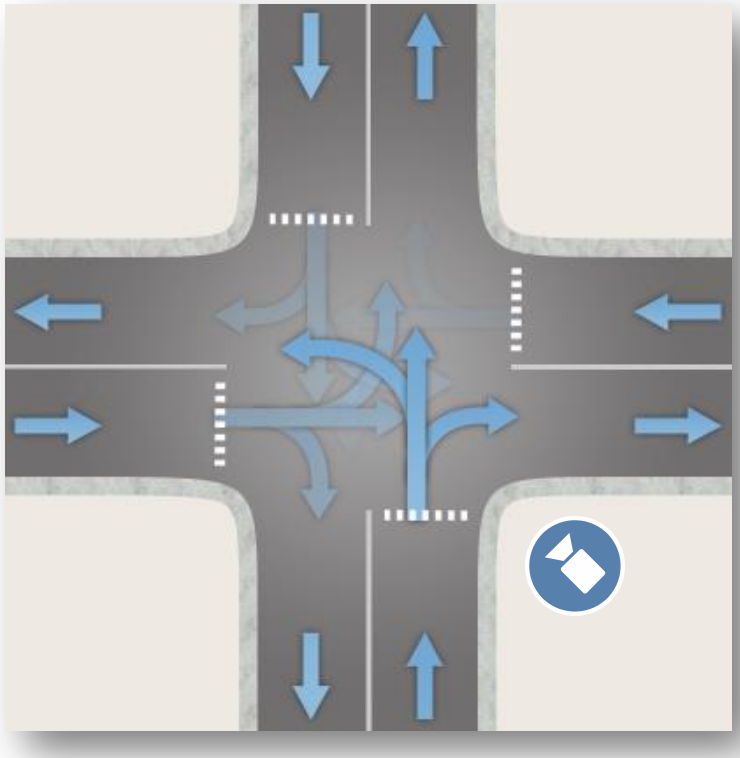
- Newer technology also allows for license plate recognition

Case Study I: State AADT

- Performing traffic data collection for IDOT since 2006
- Cameras began being integrated in 2011 count season
  - "ATR" deployment at high-volume arterials, some Interstates, and urban locations where traffic does not flow smooth enough for magnetic lane counter deployment

Illinois Department of Transportation

Case Study I: State AADT



- Worked with IDOT to use cameras for turning movement counts at intersections of state highways
  - Higher accuracy
  - More data (TMC) than four ATR counts
  - Cheaper for us and for them

Case Study II: Peoria Warehouse District

CITY OF PEORIA

- TERRA's first video deployment
- 21-intersection study (6a-9a, 11a-1p, 4p-6p)
- Short one week window for data collection
- Truck license plate study at three locations

Case Study II: Peoria Warehouse District

- "Platooned" 8 cameras to count 7 intersections concurrently
  - 48 man-hours total to deploy and pick up cameras for entire project
  - Compared with at least 168 manhours for manual turning movement counts at each intersection

Case Study II: Peoria Warehouse District

- Manual truck Origin-Destination study
  - 2010 (before TERRA had ALPR technology)
  - Set up three "checkpoints" along major street through study area, each staffed with two people (one northbound, one southbound)
  - Challenges
    - Manhours required
    - Consistency of data

Case Study III: Main and University

- Busy Intersection in Peoria near Bradley University
- High Pedestrian Volumes
- Pedestrian/ Vehicle Conflicts
- Pre-, During and Post-Construction counts

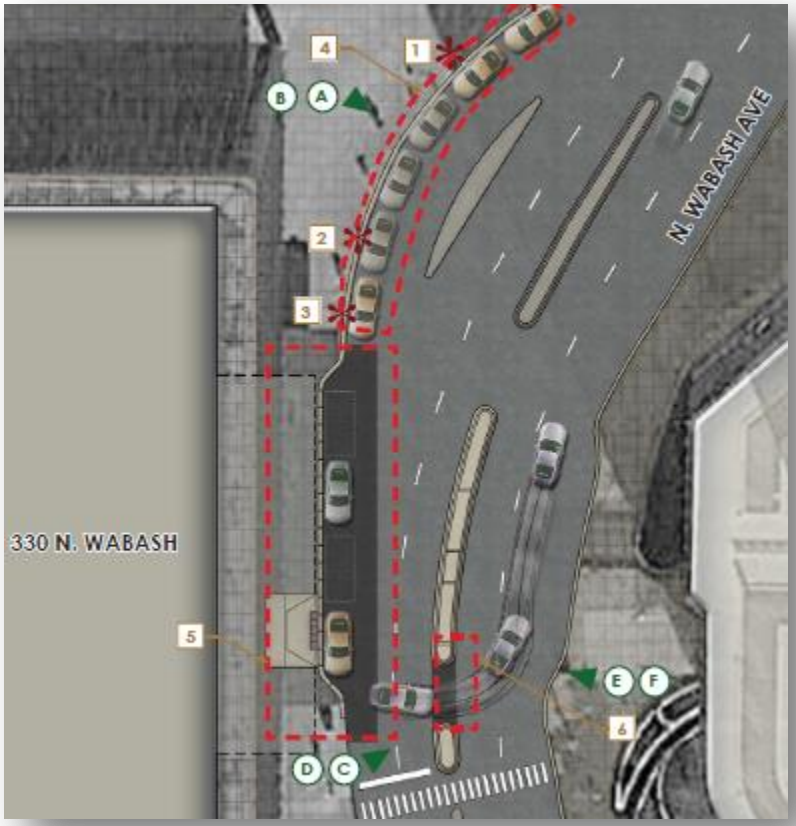
Case Study IV: 330 N. Wabash

- Very urban environment
- New hotel with valet lanes on both sides
- Pedestrian signal east of building along river
- Unsignalized ped crossing on west side

Case Study IV: 330 N. Wabash

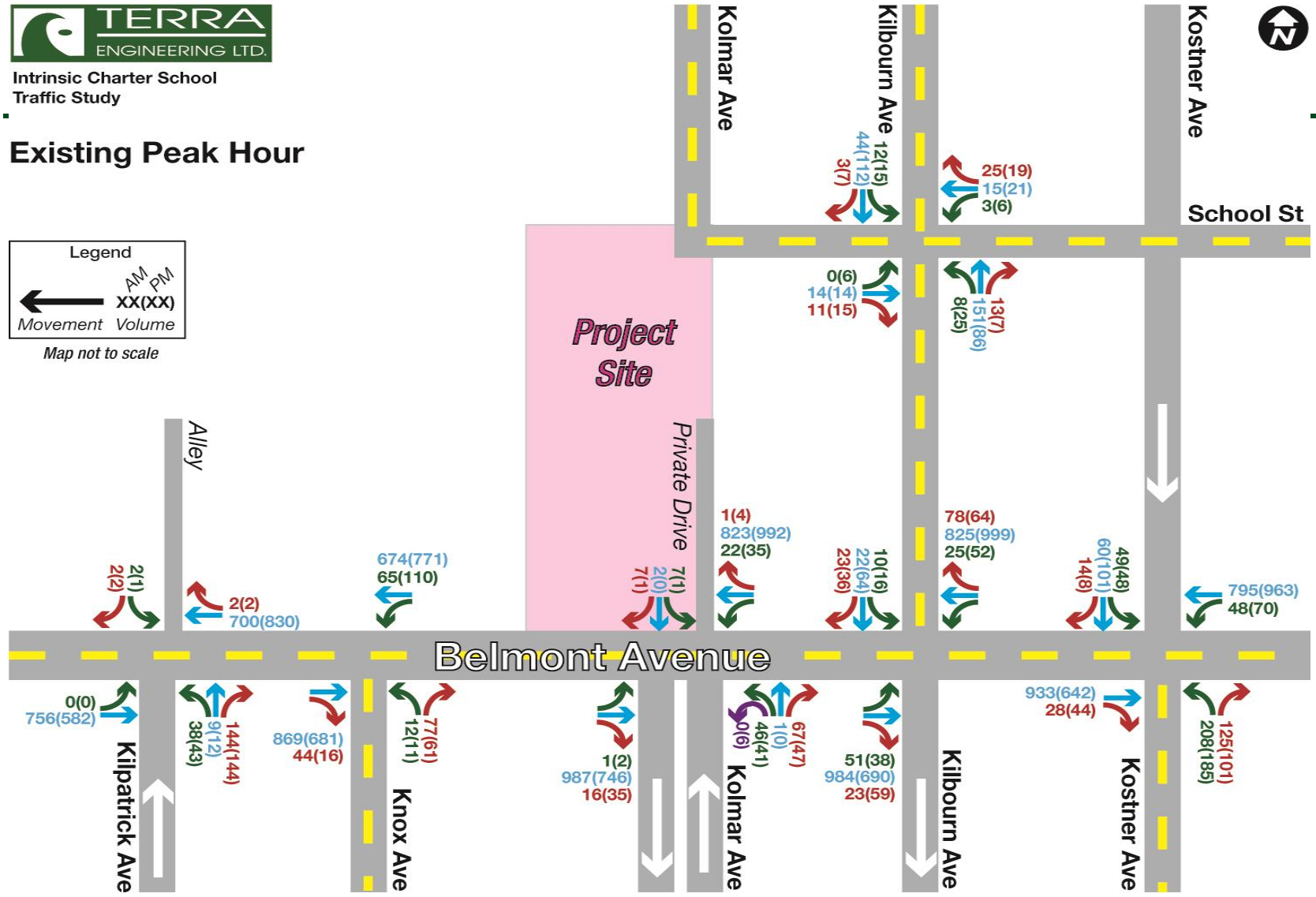
- 1000 pedestrians/hr east
- 350 pedestrians/hr west
- Video showed pedestrians were not using the push-button on east
- Risky crossing behavior at west crossing
- This behavior may not have been observed during a manual count

Case Study IV: 330 N. Wabash



- New median break to allow U-Turns from valet area
- Model similar to 2-way stop controlled minor street
- Used Vehicle Gap Data to evaluate

Case Study V: Intrinsic Charter School



Case Study V: Intrinsic Charter School

- Model showed infinite queue and excessive delay at stop controlled side street
  - Video showed max 4-5 vehicles
  - Model couldn't calibrate correctly
  - Performed a modified queue analysis with video for reference
  - Used video time stamps to calculate actual side street delay

Case Study V: Intrinsic Charter School

- Evaluated Pedestrian LOS at Unsignalized Crossings
- Utilized video to observe pedestrian tendencies
  - Video showed potential to step out in traffic
  - Video showed excessive risk of vehicle/ped conflict

Conclusions

- Does not replace all types of traffic counts
  - Higher processing costs
  - Does not classify by speed
- Ability to count multiple modes and data types without additional labor costs
- Useful record of the count performed
  - Can be referenced after the fact for additional data

Thank You

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