DDI Signal Timing – Lessons Learned

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NCHRP 3-113

Guidance for Traffic Signals at Diverging Diamond Interchanges and Adjacent Intersections

- Part A addressed traffic signal design and operation
- Simulation testing and field implementation

Field Implementation

- I-85 and Poplar Tent Road – Concord, NC
  - Low volume
- I-85 and NC-73 – Concord, NC
  - Low volume, progression of left from adjacent minor roadway
- I-77 and Catawba Avenue – Cornelius, NC
  - 330 foot crossover spacing, closely spaced adjacent intersections
- I-15 and West Main Street – American Fork, UT
  - Severe queue spillback from ramp onto freeway

Travel Time, Travel Time, Travel Time

- When possible, travel time between crossovers should drive your cycle length
- For new signals, do not assume FFS
  - 25 MPH was representative
- Consider a cycle length which is a multiple of the travel time

Splits

- If the minimum splits (based on volume) for the DDI are low enough, set the split equal to the travel time
  - Can create challenges with the minimum pedestrian timing
- If the minimum split is greater than the travel time, try a multiple
  - Catawba Avenue has a travel time of 20 seconds and splits of 60 seconds

Offsets

- Dynamic Bandwidth Assessment Tool
  - Uses coordinated phase early return to green and extension data
  - Exhaustively searches for offsets which create the largest bandwidth
- Reduced delays
  - 3.5% - 13.9% for all movements through the interchange
  - 46.8% - 52.8% for through movements on the corridor

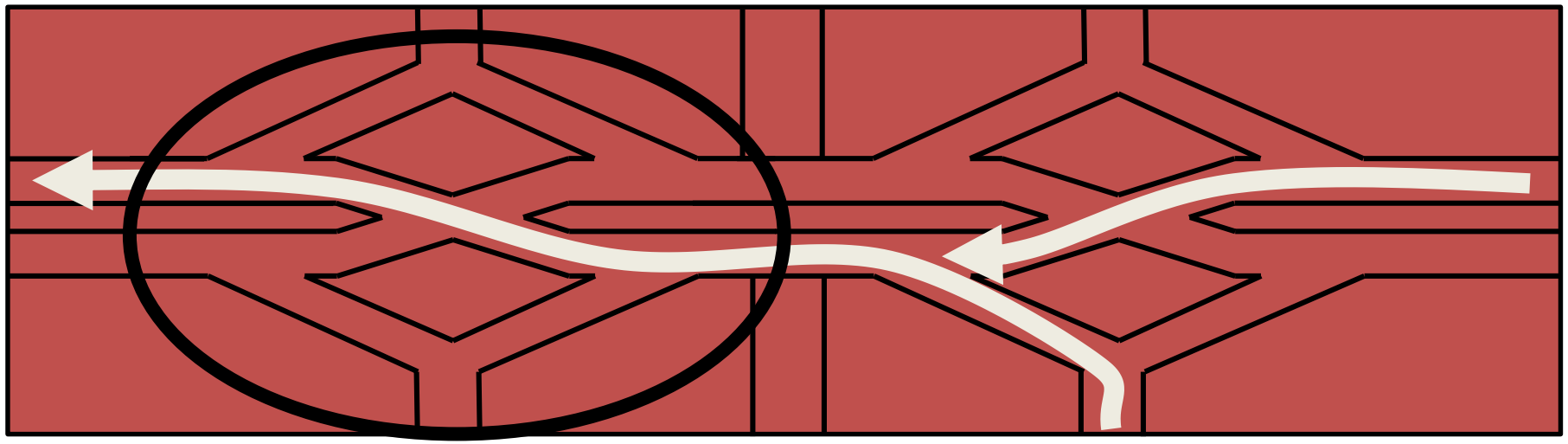
Kim et al. "Innovative Method for Remotely Fine-Tuning Offsets Along a Diverging Diamond Interchange Corridor." *Transportation Research Record: Journal of the Transportation Research Board* 2557 (2016): 33-43.

Half Cycling Against the Corridor

- Low volume DDIs
- Allows for progression of multiple heavy movements from the adjacent intersection

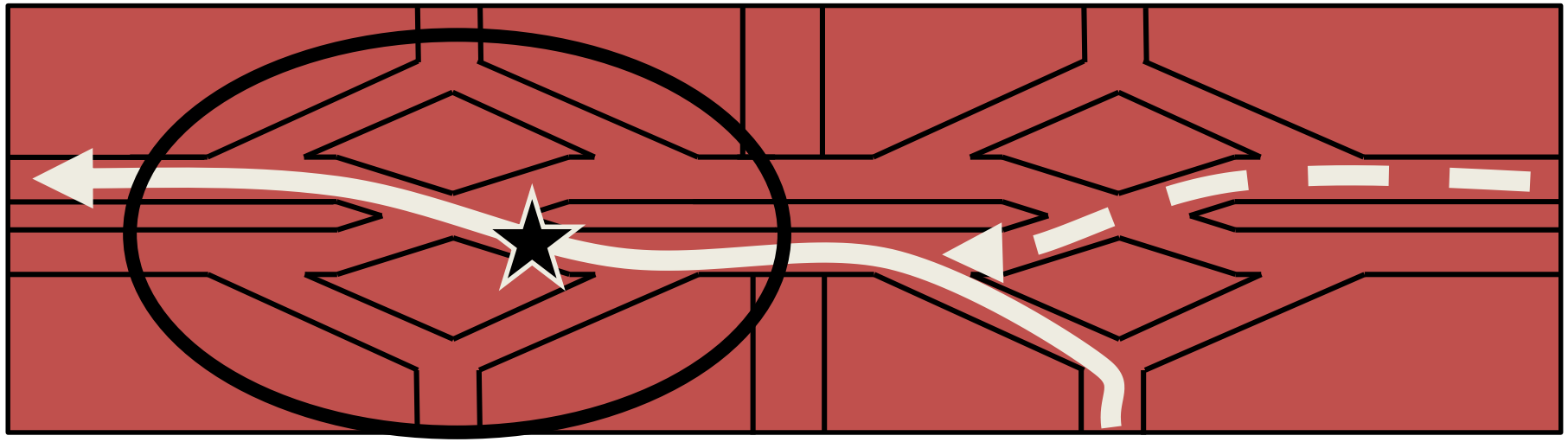
Half Cycling Within the DDI

- Half cycle one crossover
  - Heavy left turn off of the freeway + heavy through movement
  - Half cycle the outbound crossover



Actuation

- Actuate one crossover
- For a heavy off-ramp left turn (with or without heavy through movement in the same direction):
  - Actuate outbound crossover
  - Coordinate the outbound movement



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