NCITE Simulation and Capacity Committee (SimCap)

Meeting Date: February 21st, 2017, 1:00PM to 3:00PM
Location: MnDOT Waters Edge, 1500 W County Road B, Roseville, MN

Attendee:
Joe DeVore – SRF – Chair
Derek Lehrke – UMN – Co-Chair
Kevin Sommers – MnDOT
Tyler Krag – Alliant
Yilun Xu - Alliant
Mark Powers – Stantec
Pat Otto – MnDOT Traffic Ops
Kevin Schwartz – MnDOT Traffic
Kevin Joyce – MnDOT Graduate Engineer
Philip Kulis – SRF
Sudheer Dhulipala – WSB

I. Introductions

II. Presentation by Joe DeVore (SRF Consulting Group) – Two-lane
Highway Passing Lane Assessment using HCS/HCM methodology
compared to VISSIM (Hwy 59/29 MnDOT District 2,4)

- HCS Method
  - “Clunky”
  - A lot of inputs
    - Some inputs have sub-inputs that are more subjective
  - Calculates benefit only in the passing area

- Vissim
  - Can calculate benefits down stream
  - Inputs
    - ¼ - ½ mile look ahead distance
    - Overtaking speed factor = 1.3 (default)
    - Assumed speed of oncoming vehicles = 5mph over Speed
      Limit
  - Able to see benefit down stream
  - Density graph does not show significant savings
  - Around twice the effort as compared to the HCM method
II. RoundTable Discussion – NCITE Geometric Design Committee

• MnDOT design engineers worked with author of 2013 Wisconsin Roundabout Design Guidelines
  o 90% plan published now
  o 100% planned to be published in summer 2017
  o Offer design class May of 2017
• Traffic Design standpoint
  o HCM Methodology was low still using the 1130 capacity
    ▪ Raised to 1400
  o Software choice Rodel or Arcadia
• Traffic operations
  o Shifting to Vissim more, Sidra also used
  o Micro simulation sees benefits vs Marco around V/C~0.8 or LOS D
• Consistent with FHWA NCHRP 572 critical and following gaps for entering vehicles
  o Aligns with newer HCM capacity’s
• Crash Reduction
  o Single lane roundabouts shown to reduce crashes by 60-70% especially in rural setting
  o 2 by 2 Roundabout
    ▪ Increase frequency of crashes
    ▪ Decrease severity
  o Looking for data on 2 by 1
    ▪ Do they increase or decrease crashes?
• Cost of roundabouts
  o Last 10 years – used to be under $1m now to $1.5m - $2m
  o Look at ways to decrease price
  o Cost increasing
    ▪ Longer construction time
    ▪ More truck aprons
    ▪ More median design to standards
    ▪ Signature roundabouts
• Oversized vehicles
  o How to design roundabouts around them
  o WsDOT three cases
    ▪ Case 1 = use both lanes through entire roundabout
    ▪ Case 2 = Will use outside but overlap
    ▪ Case 3 = Can safely use either lane with no overlap
• MnDOT design around Case 1 very few Case 2’s
  ▪ Makes it difficult to model in both micro and macroscopic simulation
  ▪ Higher truck capacity’s may need to designers to look at Case 2 or 3
• High-level analysis of isolated roundabout below V/C~0.8
  o HCM
    ▪ Don’t use default values
    ▪ 4.2 = critical, 3 = following
    ▪ Based roundabouts at Jamaica and 61
2017 Executive Committee

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IV. HCM Updates

• HCM 2010 capacity for single lane roundabout 1130 conflicting veh/hr/ln
  o More linear curve
  o Drivers would accept relatively same gap regardless of flow
• HCM 6th edition capacity for single lane roundabout 1380 conflicting veh/hr/ln
  o Curve are less linear
  o Accept smaller gaps around higher conflicting flows
• HCM 6th edition capacity for two lane roundabout 1420 conflicting veh/hr/ln
  ▪ Round capacity’s may need to designers to look at Case 2 or 3
• Increased capacity has changed LOS
  o HCM2010 LOS F could be LOS B,C in HCM 6th edition
• 2013 WsDOT Traffic Operations safety lab found single lane roundabout capacity at almost 1300 veh/hr/ln
• Continually gaining capacity as more roundabout are implemented
• Microsimulation more changeling to meet HCM capacity’s
  o Vissim
    ▪ Setting conflict area inputs to minimums still not able to get 1400
    ▪ Recommend priority rules
      • Change gap acceptance
      • Reposition conflict markers
    ▪ 3 items to change
      • Driver behavior
      • Reduced speed areas
      • Priority rules
    ▪ Each approach needs to be calibrated separately
    ▪ Higher flows may be unobtainable
      • Roundabout may not be the best choice
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V. Task Group Updates

<table>
<thead>
<tr>
<th>No.</th>
<th>Task Group</th>
<th>Champion</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Calibrate Roundabout to Real Capacity</td>
<td>Phil K</td>
<td>Complete</td>
</tr>
<tr>
<td>2</td>
<td>Mesoscopic (DTA) Modeling</td>
<td>Jim H, Derek L</td>
<td>Joe email Jim for update on MnDOT DTA model. Derek will email a link to MesoDTA report after Final Publish (April 2017)</td>
</tr>
<tr>
<td>3</td>
<td>Freeway Data Collection Strategies and capturing the true demand (CORSIM/VISSIM)</td>
<td>Joe D?</td>
<td>Needs Champion</td>
</tr>
<tr>
<td>4</td>
<td>Arterial Data Collection Strategies (Queue, etc)</td>
<td></td>
<td>Needs Champion</td>
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<tr>
<td>5</td>
<td>Synchro templet for alternative style intersections</td>
<td>Tyler K?</td>
<td>Needs Champion</td>
</tr>
<tr>
<td>6</td>
<td>Standard/Comparisons for roundabout software (Vissim, Aimsun, RODEL, Sidra, Synchro)</td>
<td></td>
<td>Needs Champion</td>
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</tbody>
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VI. Round Robin

- MTO has video from multiple roundabouts
  - Roundabout paper being publish this year
  - 66th & Portland has permanent cameras mounted

VII. Next Meetings

- Tue Apr 18, 2017 1pm – 3pm (CDT)
  - Location: MnDOT Waters Edge
- Tue Jun 20, 2017 1pm – 3pm (CDT)
  - Location: MnDOT Waters Edge