Microscopic Simulation Modeling to Evaluate Complete Streets and Tactical Urbanism Strategies

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WHAT IS A COMPLETE STREET?

ACTIVE SIDEWALKS  DEDICATED BIKE Lanes  ACTIVE ROADWAY  SAFE CROSSWALKS  PLANTING STRIP  GREEN SPACES

http://www.gardner-ma.gov/730/Complete-Streets
Illustration of Before and After Complete Street Conversion

Before (Left) and After (Right) Complete Street Conversion (Source: NACTO)
Tactical Urbanism
Major Goals & Objectives

• **Major Goal:** Improve multimodal mobility and public life in downtown San Jose through complete streets and tactical urbanism strategies assessed and demonstrated through microscopic traffic simulation models.

• **Scenario Development:** Model, evaluate, and prioritize corridors in downtown San Jose for complete street conversion.

• **Literature Review/Case Studies:** Identify complete street and tactical urbanism strategies from around the world and examine the transferability of these strategies into the San Jose context.

• **Generalization:** Test and refine scenario development techniques and develop a micro-simulation evaluation framework that can help other cities adopt similar strategies.
Methodology

*Developing microscopic simulation models of the transportation network for various scenarios.*

- Microscopic simulation involves replication of real world transportation system operations to examine the inherent complexity, stochastic, and dynamic nature of these systems.
- VISSIM is a stochastic microscopic, time step, and behavior based simulation package developed to model urban transportation operations.
Why Microsimulation?

• Decision-making tool
  • Time stretching/contraction capability.
  • Cause-effect relations
  • Exploration of possibilities
  • Diagnosing of problems

• Visualization of plans
  • A tool for public engagement
Study Area and the Model
O-D Matrix

• O-D Pairs
  • Parking lots to freeway on-ramps
  • Freeway off-ramps to parking lots

• Origins and Destinations
  • 13 on-ramps, 8 from I-280 and 5 from SR-87
  • 48 parking garage entrance/exits
  • 12 off-ramps, 7 from I-280 and 5 from SR-87
Input Data and Output Metrics

• Input
  • O-D information
  • Transit-line information
  • Traffic volumes by mode on individual streets
  • Signal timing
  • Scenario information

• Output Metrics
  • Travel time
  • Queue information
  • Delays
Calibration and Validation

• VHelper
**Calibration and Validation**

**Expected volumes from VHelper**

<table>
<thead>
<tr>
<th>Expected volumes from VHelper</th>
<th>Actual volumes from simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actual</strong></td>
<td><strong>Model</strong></td>
</tr>
<tr>
<td>EBL</td>
<td>67</td>
</tr>
<tr>
<td>EBF</td>
<td>270</td>
</tr>
<tr>
<td>EBR</td>
<td>180</td>
</tr>
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**Mineta Transportation Institute**

Mineta Consortium for Transportation Mobility
Validation Measures

• Intersection volumes
  • Provided by the City

• Travel time
  • Estimated from Google Maps

• Speed data
  • Provided by the City
Microsimulation Application
Scenarios

• Convert one-way streets into two-way:
  • 3rd & 4th St
  • Almaden St (between Santa Clara St and Carllysle St)
  • Vine St

• Demand Patterns Update
Thank You!

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