Measuring Impossible Behavior

How Do System Performance Metrics Need to Change When Using Modeling Tools with Hard Capacity Limitations

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Outline

• Background – SF and DTA
• The capacity conundrum
• DTA-appropriate metrics
• Sharing time
Modeling Framework

- ABM w/ Static Assignment (CHAMP)
- Dynamic Assignment Model (Dynameq)
- Microsimulation (VISSIM)
- Analytical Traffic Assessment (Synchro)

Land Use

Transportation System

Auto Demand in Subarea

Transit & Non Motorized Demand

Intersection Volumes

Auto Demand

Roadway Performance

Roadway Performance

Transit Performance
DTA Applications

- Freeway replacement
- Bus rapid transit
- Road closure
- HOV ramps and lanes conversion
- Congestion pricing (model dev. scenario test)
Reflections on Experiences

• **The good**
  - More realistic assignment (you can’t jam unrealistic traffic through bottlenecks)
  - Backups that impact nearby links are represented
  - Traffic patterns/paths change at different times in response to varying traffic conditions
  - Understands congestion for individual lanes and intersections
  - Dynamic demand, even if we don’t fully use it
Reflections on Experiences

- The so-so or not so good
  - Demand from ABM may not be appropriate
  - Metrics used to interpret results provide different answers
  - Travel demand modelers may lack traffic operations experience
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Hypothetical Project

- Project to convert one freeway lane to HOV-only
- Will traffic diversions from the freeway affect transit?
Static Model Results

- HOV lane pushes auto trips to the arterial
- Transit speeds and reliability worsen
- Indicates need for bus-only lane
Dynamic Traffic Assignment Results

- More traffic stays on freeway
- Freeway speeds decline
- Some diversions go elsewhere
- Transit not impacted
• Bottleneck at signal causes long queues on Connector St
• Connector St has short green phase because volumes are currently low
• In practice traffic engineers would adjust signal capacity as travel changes
Circular Feedback

- Capacity (signal timing)
- Traffic volumes
- Policy decisions
- Congestion
What Are We Trying to Accomplish?

LMFAO music video via Youtube
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Do’s and Don’ts of Interpreting DTA Results

Don’t only...
- rely on V/C ratios or volumes alone as a metric
- assume that travel times tell the whole story

Do consider...
- queuing and its effects on the whole network
- bottlenecks (assumptions or real constraints)
- alternate routes
- travel time and delay outside of the analysis period
Queuing

- Queues blocking intersections = poorly functioning network
- Possible measures
  - Tot length of all queues
  - Blocked intersections
Vehicle Delay
Waiting Vehicles
Gridlock
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Sharing is Caring
Thank you!

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