MULTIMODAL ACCESSIBILITY: CONCEPTS, APPLICATIONS, AND BEST PRACTICES

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PRESENTATION OVERVIEW

1. WHAT ACCESSIBILITY IS
2. WHY ACCESSIBILITY MATTERS
3. HOW ACCESSIBILITY IS MEASURED
4. HOW ACCESSIBILITY MEASURES ARE BEING USED
5. HOW TO GET STARTED
1 WHAT ACCESSIBILITY IS
We all have important destinations to get to in our daily life. Accessibility is our ability to get those destinations.
ACCESSIBILITY IS A POWERFUL TOOL

Power in simplicity – based on destinations and options for getting there
Multi-modal comparisons are natural.
Opportunities can be…
- Jobs
- Schools
- Restaurants, coffee shops and nightlife
- Essential goods and services, such as grocers and clinics
Measure of opportunities within reach that varies by…
- mode and purpose of travel
- demographics and lifestyle
- time of day
- etc.
WHY ACCESSIBILITY MATTERS
WHY ARE WE TALKING ABOUT ACCESSIBILITY?

- Accessibility influences and responds to...
  - Travel behavior
  - Transportation infrastructure, technology, and policy
  - Urban development
HOW DOES ACCESSIBILITY INTERACT WITH TRAVEL BEHAVIOR?

Accessibility measures travel possibilities.

Travel possibilities inform travel decisions.
Transportation systems provide connectivity and mobility that enhance accessibility.
Developments bring opportunities closer together to enhance accessibility.
3 HOW ACCESSIBILITY IS MEASURED
Accessibility is measured as the number of destinations reachable in a given travel time.
Accessibility measures can be very simple.
HOW IS ACCESSIBILITY MEASURED?

...or increasingly complex

Network-based buffers
**HOW IS ACCESSIBILITY MEASURED?**

### Origin-destination matrix

<table>
<thead>
<tr>
<th>Origin zone</th>
<th>Destination zone</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>-</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>5.181</td>
</tr>
<tr>
<td>A</td>
<td>C</td>
<td>13.780</td>
</tr>
<tr>
<td>A</td>
<td>D</td>
<td>19.903</td>
</tr>
</tbody>
</table>

...or increasingly complex

*Discrete travel times (O-D matrix)*
HOW IS ACCESSIBILITY MEASURED?

...or increasingly complex

Opportunities can be weighted by type

walkscore.com

alltransit.cnt.org
HOW IS ACCESSIBILITY MEASURED?

...or increasingly complex

Opportunities can be weighted by cost (time, distance, etc.)
4 HOW ACCESSIBILITY MEASURES ARE BEING USED
HOW ARE ACCESSIBILITY MEASURES BEING USED?

- Analysis of travel behavior
- Project alternatives and prioritization
- Equity analysis
- Multimodal placemaking
- Others
Pedestrian travel modeled using walk accessibility
Pedestrian travel modeled using walk accessibility.

Major Attractions

"No-Man's" Land

Major Productions
Pedestrian travel modeled using walk accessibility
Mode choice estimated using combined accessibility scores

- Auto Driver
- Auto Passenger
- Transit
- Walk
VMT modeled using multimodal accessibility and other factors

https://www.slc.gsa.gov/slc/
Accessibility is being used to identify winners (and losers) of transit alternatives.
## What are the factor areas and measures?
*(See Policy Guide Section 3.0 – 3.6 and Appendices 7.0 – 12.0)*

There are six factors required by HB2 legislation. Each factor is made up of several measures that quantify the benefit of a given project for that factor area. The factors with their respective measures are:

<table>
<thead>
<tr>
<th>Factor Area</th>
<th>Measures</th>
</tr>
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<tbody>
<tr>
<td>Safety</td>
<td>- Number of fatal and severe injury crashes</td>
</tr>
<tr>
<td></td>
<td>- Rate of fatal and severe injury crashes</td>
</tr>
<tr>
<td>Congestion Mitigation</td>
<td>- Person throughput</td>
</tr>
<tr>
<td></td>
<td>- Person hours of delay</td>
</tr>
<tr>
<td>Accessibility</td>
<td>- Access to jobs</td>
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<tr>
<td></td>
<td>- Access to jobs for disadvantaged populations</td>
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<tr>
<td></td>
<td>- Access to multimodal choices</td>
</tr>
<tr>
<td>Environmental Quality</td>
<td>- Air quality and energy environmental effect</td>
</tr>
<tr>
<td></td>
<td>- Impact to natural and cultural resources</td>
</tr>
<tr>
<td>Economic Development</td>
<td>- Project support for economic development</td>
</tr>
<tr>
<td></td>
<td>- Intermodal access and efficiency</td>
</tr>
<tr>
<td></td>
<td>- Travel time reliability</td>
</tr>
<tr>
<td>Land Use</td>
<td>- Land use policy consistency</td>
</tr>
</tbody>
</table>

*Only required for MPOs with populations of more than 200,000*
Accessibility by population group has been used to support of Ladders of Opportunity mission.
Accessibility can help answer placemaking questions: “do we have a land use problem or a transportation problem?”
5 HOW TO GET STARTED
RESOURCES

- Accessibility Observatory (Univ. of MN)
- AllTransit (CNT)
- Smart Location Database (EPA)
- WalkScore
CUSTOM/FUTURE ANALYSIS

DATA

- Opportunities
  - LEHD
  - InfoUSA (or similar)
- Travel networks
  - OpenStreetMap
  - HERE, TomTom
  - Model networks
  - GTFS

http://onthemap.ces.census.gov
CUSTOM/FUTURE ANALYSIS

TOOLS

- GIS
  - ArcGIS, PostGIS
- Path solving software
  - Network Analyst
  - Pgrouting
  - OpenTripPlanner
- TransCAD, Cube
- Sugar Access

http://www.citilabs.com/software/sugar/sugar-access
Accessibility is a simple but powerful concept that provides insight into the interactions of travel behavior, transportation systems, and land development.