Incorporating a User-Based Perspective of Livability Projects in the SF-CHAMP Mode Choice Models

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**Why?**

**V4.3 “Harold”**

Network Continuity: med
Ease of Street Crossing: med
Perception of Safety: med
Urban Vitality: high
Topological Barriers: med

Forecastable, continuous pedestrian utility along walk path

Network Continuity: med
Ease of Street Crossing: low
Perception of Safety: med
Urban Vitality: low
Topological Barriers: low
Updates to SF-CHAMP

- Synthesized Population
- Land Use
- Networks
- Work Location, Destination Choice, Tour Generation
- Tour & Trip Mode Choice
- Road & Transit Assignment/ Skimming
- Initial Road & Transit Assignment/ Skimming
- Mode Choice Logsums
- Path-Based Walk Vars

Core, 3 iterations

V4.3 "Harold"

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY
How do we represent Pedestrian LOS?

Path-Based Walk Vars
How do we represent Pedestrian LOS?

- Employment Density
- Population Density
- Land use mix (entropy)
- Non-work land use mix
- Retail Floor Area Ratio
- Sidewalk Widths
- Sidewalk Amenities
- Crosswalks
- Pedestrian Signals
- Safety (Crime)
- Slope
- Route Indirectness
- Block Length
- Block Size
- Block Density
- Intersection Density
- Percent 4-way Intersections
- Street Density
- Link-Node Ratio
- Roadway Vehicle Capacity
Estimation

Walk to Transit

Walk

Walk from Transit

Walk to Transit
# New Pedestrian and Transit Environment Factors

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</table>
Example: Walking to SFCTA

Work Purpose

- Employment Center
- Escalators
- Road Diet
- New Pedestrian Path
Employment density

- Proxy for amenities present during walk
- Ln(avg employment density along path)
- Diminishing returns

Graph showing reduction in travel time (work tours) vs employment density [jobs/acre]. The graph includes a line for walk and another for transit (Trn) to destination (Dest). The x-axis represents employment density, while the y-axis represents ln vehicle time (mins). The graph indicates diminishing returns as employment density increases.
Employment Density: Walking to SFCTA
Work Purpose
Indirectness

Penalty for poor network connectivity
Indirectness: Walking to SFCTA
Work Purpose
Indirectness: Walking to Inner Sunset Work Purpose
Walking along high traffic volume roads is typically unpleasant.

Interactive term: $Ln(\text{avg capacity}) \times (\text{walk time})$

Penalty grows with travel time.
Elevation: Assistance Climbing Russian Hill
Other Purpose
Transit Walk Access Links: Perceived Weight
Walk-Local-Walk, Destination Ferry Building
Preliminary Results:
Trip Mode Choice Changes with Livability Test

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<tr>
<th>Daily Trips</th>
<th>v4.1 Harold</th>
<th>v4.3 Fury</th>
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<tr>
<td>Total</td>
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</table>

1 global iteration averaged across 5 seeds for Harold, 4 seeds for Fury
Implementation

- Upkeep of these new variables (slope, also used for bikes)
- Extra runtime for Walk Skimming: 2 hours
Next Steps

• Update walk paths to maximize utility for consistency, both for walk skims and for transit walk access
• Add missing walk links, stairways, etc.
• Re-estimate mode choice and possibly route choice using upcoming CHTS 2012 GPS dataset
Questions?

http://www.sfcta.org/Modeling

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Thanks: Matt Bomberg

V4.3 “Fury”