NCHRP 17-87

Guide to Pedestrian Analysis

Pedestrian Quality of Service Analysis

What is Quality of Service?

- QOS is "a description of how well a transportation facility or service operates from a traveler's perspective" (HCM 6th Edition)

- The HCM uses level of service (LOS) as a way to describe QOS
  - One performance measure typically used as the "service measure"
  - Ranges of service measure values stratified into A (best) to F (worst) categories

Factors Influencing Pedestrian QOS

- Facility presence
- Facility condition
- Facility connectivity
- Perceived safety and security
- Comfort
- Delay
- Ability to travel at desired pace
- Wayfinding information, amenities
- Facility and adjacent land use aesthetics

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Measuring Pedestrian QOS

- Surveys
- Operational measures
  - Speed, delay, density, etc.
- Pedestrian satisfaction measures
  - Pedestrian LOS (PLOS)
  - Pedestrian level of traffic stress (PLTS)
- Walkability measures

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Group Exercise

Rate the Pedestrian Crossings

- Information provided:
  - Aerial and street-view images of each crossing
  - AADT
  - Driver yielding rate
  - Average delay to start crossing

- Each person in the group rates the existing crossing on an "A" (best) to "F" (worst) scale and writes their rating down on the provided form (no comparing notes!)

- Group picks a safety countermeasure, new initial crossing delay determined

- Re-rate crossing with the countermeasure

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Measuring QOS

Operational Measures

- Can be directly measured in the field
- Often have motor vehicle counterpart measures
  - Speed, travel time
  - Person delay
  - Density/crowding
- Can relate to safety
  - Crowded sidewalk ➔ people walking in the street
  - Long delays at signals ➔ increased non-compliance with signals
- Can be incorporated into facility design
  - Sidewalk widths, for example

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Satisfaction Measures

- Developed from surveys
  - "Walks for Science" (Florida PLOS)
  - Video labs (NCHRP 03-70/HCM)
  - Intercept surveys (NCHRP 17-87)
- Statistical modeling used to identify factors related to pedestrian satisfaction
- These factors can be field-measured and used as inputs to the model to predict pedestrian satisfaction

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HCM Pedestrian LOS: Sidewalks

- Factors included
  - Traffic volumes, traffic separation & buffering
  - Facility width
  - Facility crowding
- Model predicts a "pedestrian LOS score" (lower = better), which can be converted into a LOS letter and/or compared to other modes' LOS scores

HCM Pedestrian LOS: Intersections

- Factors included
  - Traffic volumes parallel to and turning across crosswalk
  - Parallel traffic speed
  - Pedestrian delay
  - Right-turn channelizing island presence
- Model predicts a pedestrian LOS score and letter

HCM Pedestrian LOS: Off-Street Paths

- Exclusive pedestrian facilities
  - Average pedestrian space

- Shared-use paths
  - Number of times per mile bicycles would meet or overtake an average pedestrian

Oregon DOT Pedestrian Level of Traffic Stress

- Modeled after bicycle LTS
- Factors included
  - Sidewalks
    - Sidewalk width and condition
    - Separation and buffering from traffic
    - Traffic speeds, number of lanes
    - Land use
  - Crossings
    - Traffic volume, speed
    - Roadway functional class, number of lanes
    - Presence of median island, lighting, curb ramps
- PLTS rated on 1 (low/no stress) to 4 (high stress) scale

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NCHRP 17-87: Uncontrolled Crossings

- Factors included
  - AADT
  - Delayed crossing
    - Function of traffic volume, crossing width, median presence, driver yielding
  - Safety countermeasure presence
    - Marked crosswalk, median island, RFFB
- Produces estimates of average pedestrian satisfaction & dissatisfaction, which can be converted into a LOS letter

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- No significant factors when reducing model to satisfied vs. dissatisfied

- Only significant factors with model using "very satisfied," "satisfied," and "(very) dissatisfied" were
  - Location (Portland vs. Chapel Hill)
  - Permitted left-turning volume across crosswalk

- Additional research needed
  - Treated intersections in the study were urban LPIs

Walkability

- Typically considers a broad range of factors
  - Facility as a transportation facility
  - Safety
  - Land use
  - Accessibility & connectivity
- Street-level walkability
  - For example, Pedestrian Environmental Quality Index
- Areawide walkability
  - For example, Pedestrian Index of the Environment

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