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
Measuring Pedestrian QOS

- Surveys
- Operational measures
  - Speed, delay, density, etc.
- Pedestrian satisfaction measures
  - Pedestrian LOS (PLOS)
  - Pedestrian level of traffic stress (PLTS)
- Walkability measures
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
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
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
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
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
NCHRP 17-87: Signalized Crossings

• 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