

EXECUTIVE SUMMARY

The purpose of this research was to extend the multimodal LOS research effort addressing specific measures that affect the user at the “points” in their journey. For the transit user, this relates to the actual **bus stop**, the point where they embark or disembark on their journey. For the bicyclist and pedestrian, this is the point of transition, from segment to segment or to destination, and generally relates to a crossing point either midblock or at an **intersection**.

Techniques for identifying measures - Through examination of measures identified in an extensive literature review and use of a panel of experts to review and select appropriate measures, the “conceptual frameworks” for point LOS for transit, bike and ped modes were identified. Further, a transit infrastructure (amenities) use survey was distributed to 500 bus riders in Alachua county (RTS system) and analyzed for their weighting of importance of various transit infrastructure.

Note: The steering committee “panel of experts” meetings were rich and often heated debates resulted in a complete thrashing out of each measure for its applicability and appropriateness. Usually the compromise was to include the measure as a “placeholder” for further assessment.



CONCEPTUAL FRAMEWORKS

Transit mode including the primary service measure at the point level is frequency; a secondary measure includes accessibility to the pedestrian, passenger loading, and a comfort convenience measure (transit infrastructure of the bus stop).

Bicycle through movement – While there are three movements to model for intersection performance, we chose to look first at the through movement. This is described by factors included in the combination of **conflicts, exposure, and delay** experienced by the bicyclist. Conflicts include turning movements and may be modified by the g/C ratio and percent of truck volume. Exposure combines crossing distance (width plus 2X intersection radii) possibly modified by pavement condition, presence of exclusive motor vehicle right turn lane (outside lane geometry) and clearance interval (modified by loop detection for cyclists). Delay for signalized intersections is a factor of control delay (g/C ratio modified by outside lane width/configuration); for signalized intersections crossing

delay may be influenced by through movement MV volume from far side cross street plus approach traffic of the near side cross street, plus RT and LTo.

Pedestrian through (side street crossing) movement - Similar to the bicyclist movements, the pedestrian measures incorporate **conflicts, exposure, and delay** factors to determine the functioning of the intersection for the pedestrian. Conflicts (turning movements), exposure (crossing width/intersection radii, presence and type of crosswalk, presence of curb and/or sidewalk at waiting or landing area plus median type) are the factors for both signalized and unsignalized intersections. For Delay, signalized intersection measures are a function of cycle length with ped signal, facility g/C without ped signal; for unsignalized intersections crossing delay is a function of Tfs (cross street volume), turning movement of near side cross street and major streets “platooning” .



Evaluation Methodologies - Several techniques for analysis and model calibration were explored. They include for bike and ped mode, an actual “cross for science” participation study to assess ped and bicyclists comfort level in crossing various selected intersections, a “from the curb” scoring/analysis of intersection crossing factors, a videotape analysis of selected intersections, or a combination of several of these. This study will only recommend various techniques. FDOT will have to decide the efficacy and appropriateness of each. For the transit model, surveys of the point measures by both operators (transit agency) and user groups (bus riders) was suggested. Further the concept of video analysis of bus passengers at transit stops might prove useful. The final report also includes a listing of various “Site Characteristics” for all three modes (transit, bike and ped) to be used in any type of model validation for Point LOS.

Implications of the Point LOS measures – Aside from the obvious use of the point measures to combine with segment analysis in determining multimodal levels of service, there are implications for design features to be recommended or even required. Many of these are even currently in practice such as narrowing turning radii, straight through bike lanes with exclusive rt MV lanes, bus stop headway reductions and benches/shelters, real time GPS informational signage at bus stops and transfer centers, etc. It is the hope that from this research effort will come the validation for use of these various measures, their importance in quantifying the comfort/convenience/safety to the user of various modes, and the format for making transportation system decisions on a larger scale that will effect policy and planning, design, and evaluation.

Making it “user friendly” - In looking at the usefulness of the application of all our Level of Service measures, it is critical that not only are they research based, accurate, in line with HCM methodologies, and purposeful, but they are presented in such a way as to BE USED by various transportation planners, consultants, engineers and those making critical decisions at the local and regional level. Therefore every attempt should be made to present the models and their application in as “user friendly” a way as possible, including the use of visuals to depict concepts and actually SHOW what we are talking about.(Here is a LOS A roadway or intersection from the bicyclist perspective.)

Note: This was a request made at the recent state bicycle/pedestrian coordinators meeting following the LOS presentation. I believe it is valid and quite necessary.

