ANALYSIS TECHNIQUE DIFFERENCES - 2010 HCM VS. FDOT 2012 Q/LOS HANDBOOK (AND LOSPLAN)

Although the methodologies used in the Q/LOS Handbook are consistent with those found in the 2010 HCM and the TCQSM, in some circumstances, it is necessary to deviate from these methodologies. Both the HCM and the TCQSM outline detailed operational models that are not appropriate in all cases for planning applications. Thus, FDOT needed to develop some planning applications of the methodologies (LOSPLAN). In all cases, the extensions or variations were coordinated with leaders of the source documents to be as consistent as possible with the methodologies.

FREEPLAN

Major features of FREEPLAN are:

- Use of the HCM as the primary resource document for the methodology such that the FREEPLAN methodology should not be inconsistent with the HCM, but, as appropriate, extend the HCM for planning and preliminary engineering purposes;
- Concentration on the through vehicle, while being sensitive to the analysis of other vehicles on the freeway and on segments of the freeway;
- The approach is structured towards combining segments (e.g., interchange areas, toll plaza influence areas), rather than combining point analyses (e.g., ramps);
- LOS thresholds based on density;
- Capacity reductions in interchange areas;
- Capacity considerations associated with auxiliary lanes, ramp metering, length of acceleration and deceleration lanes, and ramp terminals;
- Use of a local adjustment factor or driver population factor based primarily on area type;
- Use of the most recent national research on weaving areas from the 2010 HCM; and
- Resulting volumes matching reasonably well with actual Florida traffic counts.

Interchange Influence Areas

Within interchange influence areas, the base saturation flow rate for the two outside lanes is reduced by:

- 200 passenger cars per hour per lane for off-ramp influence area; and
- 100 passenger cars per hour per lane for on-ramp influence area.

Auxiliary Lanes

Auxiliary lanes are additional lanes on freeways that connect on-ramps and off-ramps of adjacent interchanges. Consistent with the HCM 2010 methodology, auxiliary lane adjustments are handled completely within the weaving segment analysis, and no capacity reductions are made for auxiliary lanes within segments too long for weaving analysis to be performed.

Ramp Metering

Freeway ramp metering has the positive benefit of smoothing out traffic demand on to a freeway during peak travel times. This positive benefit is reflected by increasing the volumes shown on the Generalized Service Volume Tables by 5 percent.

Measured Freeway Volumes

Actual Florida traffic volumes seldom exceed an average of 2,100 vehicles per lane per hour in urbanized areas and 1,750 vehicles per hour per lane in rural areas. By applying the interchange capacity reductions and statewide defaults for the peak hour factor, heavy vehicle percentage, and local adjustment factor, the calculated volumes match very well with actual volumes.

HIGHPLAN

Passing Lanes

The HCM does not adequately address the effectiveness of passing lanes when taking into account the length of facility. After discussions with key members of the committee overseeing the HCM, FDOT has established their effectiveness based on the proportion of passing lane coverage.

ARTPLAN

Adjusted Saturation Flow Rate

Research in Florida indicates that an area's population size, number of lanes, and speed limit have effects on adjusted saturation flow rates [Bonneson, 2006]. Furthermore, as traffic queues get longer, traffic pressure affects capacity. Although not currently in the HCM, these effects are included in FDOT's planning and preliminary engineering software program ARTPLAN.

Add-On/Drop-Off Lanes

The HCM does not directly address the situation where lanes that carry through traffic are added before a signalized intersection and dropped after the intersection. The add-on/drop-off lane (or expanded intersection) will contribute to intersection capacity, but likely not to the extent of a full through lane.

One-Way Streets

For the evaluation of one-way streets, the Generalized Service Volume Tables include a factor that has been approved by the LOS Task Team, but not contained within the HCM. Essentially, one-way pairs are assumed to have a 20 percent higher service volumes than corresponding two-way roadways with the same number of lanes.

Rural LOS Criteria

The LOS service thresholds found in the HCM are primarily determined by urbanized area conditions. For example, the maximum control delay at a signalized intersection for LOS D is 55 seconds. While that value may be reasonable based on user perception in an urbanized area, in a small town or at an isolated intersection on a rural highway, that delay would surely be considered F. To overcome this difference in user perception, FDOT has adopted different control delay criteria in rural undeveloped and rural developed areas. The criteria are one-half, rounded up, of the urbanized area criteria. For arterials in rural developed areas, arterial Class I LOS thresholds apply. These revised LOS criteria are directly imbedded in FDOT's rural undeveloped and rural developed Generalized Service Volume Tables and software. The LOS criteria appear on the back of the tables.

Bicycle LOS Model

Facility LOS

The HCM's Bicycle LOS Model was developed and calibrated at a roadway segment level. However, from the beginning of FDOT's planning LOS program, facilities (e.g., 4 miles of an arterial or freeway) not segments or points (e.g., signalized intersections) have been emphasized. For example, the Generalized Service Volume Tables are applicable for automobile LOS at a facility level, not for a given segment or intersection/interchange along those facilities.

Pedestrian LOS Model

Much like the bicycle LOS model, the HCM's Pedestrian LOS Model was developed and calibrated at a roadway segment level. However, for consistency, a method was needed to aggregate the individual segment pedestrian analyses into a facility analysis. The aggregation method is especially important when the sidewalk coverage is not continuous over the entire facility. Portions of the facility may offer reasonably good quality of service, but other portions may be so poor that many pedestrians are discouraged from walking along the facility altogether.

TCQSM

Although pedestrian access to transit is recognized as important in the TCQSM, it did not provide guidance on how to incorporate pedestrian factors. The methodology in this Handbook makes use of pedestrian considerations as the second most important determinant of bus LOS along a transit route segment or facility. The Generalized Service Volume Tables use sidewalk coverage along a facility as the factor for pedestrian access to transit. At the preliminary engineering level and within ARTPLAN, several important pedestrian considerations are included to determine an adjusted bus frequency and bus LOS. These considerations include pedestrian LOS, roadway crossing difficulty, passenger load factor, and bus stop amenities. Favorable pedestrian conditions have multiplicative factors greater than 1.0 and unfavorable conditions have values less than 1.0 and are applied to bus frequency to determine the adjusted bus frequency.