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CHAPTER FORTY-ONE

HIGHWAY CAPACITY

Special Report 209 *Highway Capacity Manual* (*HCM*) has been adopted by the Department as the basic document for traffic-capacity analysis. This Chapter provides a supplement to the *HCM*. The supplement provides the following:

1. additional information on capacity-analysis procedures not provided in the *HCM*;

2. an elaboration on specific sections of the *HCM*;

3. clarifying information;

4. modifications to the *HCM* where the Department has adopted a different practice; and

5. the Department's adopted practice, where the *HCM* indicates more than one option.

Unless stated otherwise in this Chapter, the Department has fully adopted the *HCM*. This Chapter is organized to follow the sequence shown in the *HCM*.

41-1.0 GENERAL

The *HCM* is the primary reference used to perform the Department's traffic-capacity analysis. Another major source of information on capacity analysis is AASHTO's *A Policy on Geometric Design of Highways and Streets*. Other sources on capacity analysis may be appropriate. However, prior to their use, the designer should first consult with the Production Management Division's Office of Environmental Services and the Highway Operations Division's Office of Traffic Engineering to confirm that these methodologies are applicable or acceptable to the Department.

Most of the methodologies included in the *HCM* are provided on a computerized software package entitled *Highway Capacity Software* (*HCS*). The *HCS* package and the User's Manual can be purchased from McTrans Center, 512 Weil Hall, Gainesville, Florida 32611-2083. The user should contact the Office of Environmental Services to determine which version may be used for capacity analysis. Other software packages which are based on the *HCM* may also be used, only after prior approval by INDOT. This approval will ensure that the software is an acceptable alternative to the *HCS*.

41-2.0 PRINCIPLES OF CAPACITY (*HCM* CHAPTERS 1 AND 2)

The following comment refers to Chapter 2, Traffic Characteristics.

Peak-Hour Factor. Existing traffic data should be used to determine the appropriate peak-hour factor. If the peak-hour factor cannot be determined from the existing traffic data, a peak-hour factor of 0.90 may be used. A factor as low as 0.60 may be used where significant peaking is expected to occur such as at a factory, industrial park, school, etc.

41-3.0 FREEWAY (*HCM* CHAPTERS 3, 4, 5, AND 6)

The following comments refer to Chapter 3, Basic Freeway Segments.

1. Truck-Lane Usage. Trucks are required to use the right lane of each roadway on a 4-lane freeway, or the right two lanes of a freeway of 6 lanes or more. Unless specific counts or observations are available, the truck distribution for a facility of 6 lanes or more can be assumed to be split evenly between the middle and right lanes. These configurations should be considered in making the freeway-capacity-analysis calculations.

2. Heavy-Vehicle Factor. Table 3-9, Adjustment Factor for the Effect of Trucks, Buses, or Recreational Vehicles in the Traffic Stream, should only be used if the traffic stream consists only of trucks, buses, or recreational vehicles, and not a combination of these vehicles. If the traffic stream consists of a combination of these vehicles, Equation 3-4 and the accompanying tables should be used instead.

41-4.0 RURAL HIGHWAY (*HCM* CHAPTERS 7 AND 8)

The following comment refers to Chapter 8, Two-Lane Highways.

Climbing Lane. Chapter Forty-four discusses the warrants for a climbing lane. The warrants described in Chapter Forty-four are different than those described in the *HCM* and AASHTO's *A Policy on Geometric Design of Highways and Streets.*

41-5.0 URBAN STREET (*HCM* CHAPTERS 9, 10, 11, 12, 13, AND 14)

The following comments refer to Part IV, Urban Streets.

1. Urban LOS. For urban-highway elements, especially at a signalized intersection, a LOS of C may be difficult to attain. Often, a LOS of D is more attainable for a 10- to 20-year design. Chapters Fifty-three and Fifty-five provide the design LOS values.

2. 3-Lane Section. The *HCM* does not directly address capacity of a continuous, alternating, or 2-way center left-turn lane. A 3-lane section with many left-turn movements will often have more capacity and greater safety than a 4-lane section without a separate turn lane. National studies are presently being conducted which may provide capacity information on these configurations in the near future.

The following comments refer to Chapter 9, Signalized Intersections.

1. Planning Methodology. Due to possible misapplications, the Planning Analysis should not be used for capacity analysis at a signalized intersection. Instead, the Operational Analysis procedure should be used.

2. Operational Analysis. After using the *HCM* procedure, the user should check this information using one of the signal-timing programs that are available (e.g., Passer II, SOAP84). See Chapter Seventy-seven for additional information.

3. Level of Service (LOS). As a guide, a lane-group LOS or approach LOS should not be more than one LOS below the intersection LOS or design LOS. However, this may not always be practical, especially for a left-turn lane or a group of side streets. Chapters Fifty-three and Fifty-five provide the LOS values required for design.

4. Cycle Length. The cycle length should be at least 60 s, but should not exceed 120 s. The degree of saturation should not be permitted to approach 1.0, especially for a short cycle length.