

2010 Highway Capacity Manual

2010 HCM Changes

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Production of the fifth edition of the *Highway Capacity Manual* (HCM) is well underway, with over half of its chapters approved for publication by the TRB Committee on Highway Capacity and Quality of Service (HCQS) as of mid-December.

Users of the HCM2000 will find the new manual's look-and-feel familiar, as a number of the stylistic elements introduced in the HCM2000 have been retained in the 2010 HCM. At the same time, users will notice a number of changes in the manual. The most obvious of these is that the 2010 HCM will be published as four volumes—Concepts, Uninterrupted Flow, Interrupted Flow, and Applications Guide—with the last volume being published only electronically.

The 2010 HCM will have more of a multimodal focus than ever before, with pedestrian, bicycle, and transit material provided next to automobile material in many chapters. (Transit material will be presented only in a multimodal context; the 2010 HCM defers to the companion *Transit Capacity and Quality of Service Manual* for transit-specific methodologies.) The 2010 HCM also recognizes the growing role of alternative analysis tools, such as simulation, and devotes most of two concepts chapters, as well as sections within most procedural chapters, to that topic.

The four-volume format was necessitated by the more than \$5 million of funded research that has occurred since 2000 through the National Cooperative Highway Research Program (NCHRP) that needed to be incorporated into the HCM. In addition, two FHWA-sponsored projects on shared-use paths and active traffic management are contributing significant content to the 2010 HCM. The key methodological changes in the 2010 HCM are described on Page 2.

Highway Capacity SoftwareTM (HCS+)TM

Work on *HCS+* to implement the updated procedures coming in the 2010 HCM has been ongoing for over a year. *McTrans*' goal is to be ready with the *HCS+* upgrade to coincide with 2010 HCM publication.

Most *HCS+* modules will not change structurally, even though the computations will be modified (some a little, some a lot) to match the new HCM procedures. However, the Signalized Intersection and Urban Streets modules have a significantly different program architecture to take advantage of the latest programming techniques. While this is necessary to implement these complex procedures in an efficient structure, the "look and feel" to the user will hopefully stay quite familiar.

Even though this is a major upgrade to *HCS+*, the support subscription will cover these changes and provide this new version automatically without cost to all users whose support is current at the time of release.

To honor the National Academies of Science (NAS), the National Cooperative Highway Research Program (NCHRP) and the Transportation Research Board (TRB) ownership of this material, *McTrans* does not plan to distribute software based on these new procedures until the 2010 HCM has been published.

TSIS-CORSIM 6.2TM (TSIS+T7F)TM

With this update to TSIS-CORSIM, *McTrans* will integrate and include TRANSYT-7F in this package. All licensed users with current support subscriptions will be receiving this version automatically, on CD to accommodate the addition of TRANSYT-7F. The ability to interchange files and provide signal timing optimization with one-touch animation from TRANSYT-7F to CORSIM will be another very useful tool for users.

Inside ... 2010 HCM Chapter-by-Chapter (Pages 2-3) Updates, Training & Calendar (Page 4)

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2010 HCM—Chapter by Chapter

The **signalized intersections** procedure will model the operation of an actuated controller. A new incremental queue accumulation (IQA) method has been added to calculate the d_1 delay term and the Q_1 length term. The IQA method is equivalent to the HCM2000 method for the idealized case, but is more flexible to accommodate non-ideal cases, including coordinated arrivals and multiple green periods with differing saturation flow rates (i.e., protected-plus-permitted left turns and sneakers). Also, a left-turn lane overflow check procedure has been added.

The **unsignalized intersections** chapter has been split into three chapters on two-way STOP control (TWSC), all-way STOP control (AWSC), and roundabouts. The TWSC method in the 2010 HCM will be capable of analyzing intersections along six-lane streets, while a queue-estimation procedure has been added to the AWSC method. The roundabout material is completely updated, based on the work of the NCHRP 3-65 project, which developed a comprehensive database of U.S. roundabout operations and developed new methodologies for evaluating roundabout performance. A LOS table for roundabouts has also been added.

The **interchange ramp terminals** chapter has been completely updated, based on the work of the NCHRP 3-60 project.

The **urban street segments** chapter has been completely rewritten. The work of the NCHRP 3-79 project has been incorporated into the chapter, providing improved methods for estimating urban street free-flow speeds and running times, along with a new method for estimating the stop rate along an urban street. In addition, the work of the NCHRP 3-70 project has been incorporated, providing a multimodal level-of-service methodology that can be used to evaluate tradeoffs in how urban street right-of-way is allocated among the modes using the street.

A new **urban street facilities** chapter is provided. The methodology aggregates results from the segment and point levels of analysis into an overall facility assessment. Information on the impact of active traffic management measures on urban street performance will also be provided.

The **freeway facilities** chapter will provide a level of service (LOS) table for the first time, based on density. Other changes to this chapter include updates to the material on the impact of weather and work zones on free-

way facility capacity, along with new information on the impact of active traffic management measures on freeway operations.

The **freeway weaving** chapter has been completely updated, based on the work of the NCHRP 3-75 project. Although the general process for analyzing weaving segments is similar to that given in the HCM2000, the 2010 HCM models are based on an up-to-date set of weaving data. The two major differences in how the methodology is applied are: (a) there is now a single algorithm for predicting weaving speeds and a single algorithm for predicting non-weaving speeds, regardless of the weaving configuration, and (b) the LOS F threshold has changed.

Most other procedural chapters have had smaller changes. For example, the speed-flow curves in the **basic freeway segments** chapter have been updated, based on an expanded database, and a 75-mph speed-flow curve will be provided. Small changes have been made to the ramps and ramp junctions material (now called **freeway merges and diverges**) to check and correct for unreasonable lane distributions. The **two-lane highways** chapter will provide only a one-directional methodology and several key tables and curves have been updated. Finally, the **off-street shared-use path** procedures have been updated based on U.S. data.

The 2010 HCM's organization provides information at several levels of detail. Volume 1: Concepts provides basic information that all HCM users should be familiar with. The chapters in Volume 2: Uninterrupted Flow and Volume 3: Interrupted Flow explain each methodology in sufficient detail that an analyst can apply the method in software and properly interpret the results. Those users wishing a greater depth of understanding can turn to the supplemental chapters in the electronic Volume 4, where (in most cases) all of the computations involved in a methodology are presented. In a few instances, where methodologies involve an iterative set of calculations, a computational engine provides the most detailed description of the methodology. Finally, a Technical Reference Library in Volume 4 will house many of the original research reports that form the foundation of HCM procedures.

Production of the HCM is on schedule, and it is anticipated to be published by the Transportation Research Board by the end of 2010.

2010 HCM—Chapter Listing

2010 Highway Capacity Manual

5th Edition

VOLUME 1: CONCEPTS

1. HCM User's Guide
2. Applications
3. Modal Characteristics
4. Traffic Flow and Capacity Concepts
5. Quality and Level of Service Concepts
6. HCM and Alternative Analysis Tools
7. Interpreting HCM and Alternative Tool Results
8. HCM Primer
9. Glossary & Symbols

VOLUME 2: UNINTERRUPTED FLOW

10. Freeway Facilities
11. Basic Freeway Segments
12. Freeway Weaving Segments
13. Freeway Merge and Diverge Segments
14. Multilane Highways
15. Two-Lane Highways

VOLUME 3: INTERRUPTED FLOW

16. Urban Street Facilities
17. Urban Street Segments
18. Signalized Intersections
19. Two-Way STOP-Controlled Intersections
20. All-Way STOP-Controlled Intersections
21. Roundabouts
22. Interchange Ramp Terminals
23. Off-Street Pedestrian and Bicycle Facilities

VOLUME 4: APPLICATIONS GUIDE

Methodological Details

24. Concepts: Supplemental
25. Freeway Facilities: Supplemental
26. Freeway & Highway Segments: Supplemental
27. Freeway Weaving: Supplemental
28. Freeway Merges and Diverges: Supplemental
29. Urban Street Facilities: Supplemental
30. Urban Street Segments: Supplemental
31. Signalized Intersections: Supplemental
32. STOP-Controlled Intersections: Supplemental
33. Roundabouts: Supplemental
34. Interchange Ramp Terminals: Supplemental
35. Active Traffic Management

Interpretations

Case Studies

Technical Reference Library

TRB

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Update Watch

Package	Version	Status	Target	Distribution
HCS+	5.5	Target	January	HCS+T7F Patch Download
TRANSYT-7F	11.31	Target	January	HCS+T7F Patch Download
TSIS+T7F	6.2	Target	January	Sent to Registered Users
DYNASMART-P	1.3.0	Complete	Available	Sent to Registered Users
IDAS	2.3	Complete	Available	Sent to Registered Users
QuickZone	2.0	Complete	Available	Sent to Registered Users
TNM	2.5	Complete	Available	Sent to Registered Users

Calendar

Training

Highway Capacity Analysis February 9-10, 2010 TBD

Conferences

ITE Annual Meeting August 8-11, 2010 Vancouver, BC

Online Catalog	http://mctrans.ce.ufl.edu/catalog/	(Searching and ordering software)
Order Form	http://mctrans.ce.ufl.edu/orderform/	(For purchase orders and checks)
Training	http://mctrans.ce.ufl.edu/training/	(HCS+, TRANSYT-7F & CORSIM)