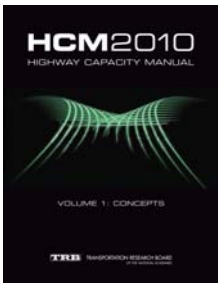

Highway Capacity Manual 2010 Overview

Mark Vandehey, P.E.
Kittelson & Associates, Inc.

TRB TRANSPORTATION RESEARCH BOARD

Professional development program

Housekeeping

- All participant phone lines are muted to avoid distractions during presentations.
- Questions can be asked via the Question Pod/Chat Pod.
- Questions & answer session at the end of the presentation or at specific time during the presentation.
- Citrix /Go-To-Webinar Customer Service: 1-800-263-6317. Select Go-to-Webinar (#2) Technical Support for login assistance or help during the Webinar.

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Instructor

4

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Overview of Webinar Series

5

- HCM 2010 Overview: Now in four volumes
- New Active Traffic Management chapter
- Changes to the unsignalized intersection methods
- New multimodal urban streets method: ped, bike, transit modes
- New signalized intersection method

Overview of Webinar Series

6

- New multimodal urban streets method: auto mode
- New material on the use of alternative tools
- New freeway weaving method
- Enhancements to the freeway facilities method
- Enhanced planning methods and applications

Presentation Overview

7

- Summary of significant changes
- HCM organization
- Chapter details
- Navigating Volume 4

Webinar Objectives

8

- Learn about what's new in the HCM 2010
- Familiarize users with the four-volume organization
- Learn how to navigate Volume 4

Summary of Significant Changes

9

- Incorporation of new research
- Integrated multimodal approach
- Increased emphasis on alternative tools
- Four-volume presentation

Incorporation of New Research

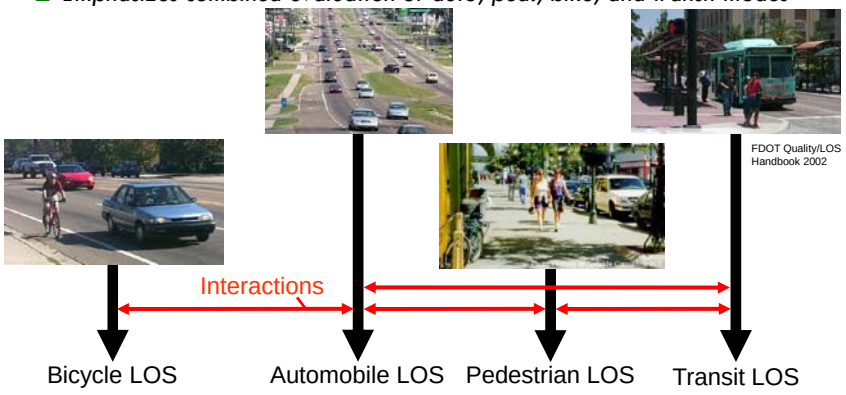
10

- More than $5 million of funded research results
  - NCHRP 3-65 (Roundabouts in the United States)
  - NCHRP 3-70 (Multimodal Arterial Level of Service)
  - NCHRP 3-75 (Analysis of Freeway Weaving)
  - NCHRP 3-79 (Predicting Travel Speeds for Urban Streets)
  - NCHRP 3-82 (Default Values for HCM)
  - NCHRP 3-85 (Guidelines for the Use of Alternative Traffic Analysis Tools)
  - NCHRP 3-92 (HCM 2010 Production)

Multimodal Approach

11

- Multimodal evaluation for urban streets
  - *Emphasizes combined evaluation of auto, ped., bike, and transit modes*



More Emphasis on Alternative Tools

12

- Recognition that HCM analytical procedures may not always be the best choice
- Range of alternative tools
  - Deterministic tools (e.g., TRANSYT-7F for arterial performance)
  - Stochastic tools (e.g., CORSIM or VISSIM for network performance)
- Example applications

Overall Organization

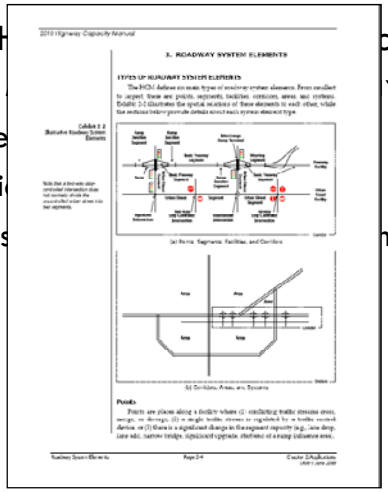
13

- The 2010 HCM will consist of four volumes:
  - Volume 1: Concepts
  - Volume 2: Uninterrupted Flow
  - Volume 3: Interrupted Flow
  - Volume 4: Applications Guide

Style

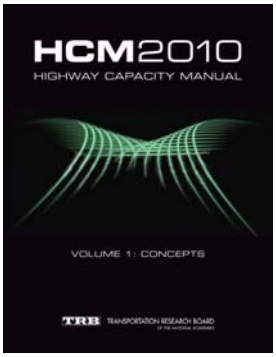
14

- Similar to H ity and Quality of Service y Safety Manual
  - Better use
  - More effi
  - Facilitates hic version



Volume 1: Concepts

15



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

Chapter 1: HCM User's Guide

16

- Starting point for learning how to use the 2010 HCM
- Outline:
  - Evolution of the HCM
  - Purpose, objectives, intended use, target users
  - Format, structure NEW!
  - International use
  - Research basis, methodology changes
  - Companion documents

Chapter 2: Applications

17

- Introduction to the range of analyses that the 2010 HCM can be applied to
- Outline:
  - Levels of analysis
    - Operational, design, planning and preliminary engineering
  - Roadway system elements
    - Points, segments, facilities, corridors, areas, systems
  - Travel modes
  - Operating conditions
    - Interrupted/uninterrupted flow, over/undersaturated
  - HCM analysis as part of a broader process

Chapter 3: Modal Characteristics

18

- Basic characteristics of the four major modes addressed by the 2010 HCM
  - Auto, pedestrian, bike, transit (on urban streets) 
- Outline by mode:
  - Vehicle and human factors
  - Volume and demand characteristics Updated
  - Facility types Updated
  - Interactions with other modes 

Chapter 4:Traffic Flow & Capacity Concepts

19

- Basic speed, flow & capacity concepts by mode
  - Detailed information (e.g., speed-flow curves) for system elements appear in Volume 2 & 3 chapters
- Outline by mode:
  - Flow parameters, operational performance measures
    - For example: volume, flow rate, speed, density, headway, space, saturation flow, delay, queuing
  - Capacity concepts
- Updated material in the ped., bike, and transit sections

Chapter 5: Quality & LOS Concepts

20

- LOS/QOS concepts & service measures
  - LOS tables presented in Volume 2 & 3 chapters
- Outline:
  - Quality of Service (QOS) concept, Level of Service (LOS) concept
  - Service measure types
    - Flow-based, traveler satisfaction/perception-based 
  - Service measures by mode and system element

Chapter 6: HCM & Alternative Tools 

21

- Overviews the range of available analysis tools, from the very generalized to the microscopic
- Incorporates NCHRP 3-85 work
- Outline:
  - HCM-based tools
    - Service volume tables, planning-level (with defaults), operations-level
  - Alternative tools
    - Traffic modeling terminology and concepts
    - Appropriate use, application framework, guidelines
    - Performance measures
    - Tool selection criteria
    - Application guidelines

Chapter 7:Interpreting & Presenting Results

22

- Guidance to analysts on the use of HCM and alternative tool analysis results
- Outline:
  - Uncertainty and variability
  - Overview of performance measures
  - Trajectory analysis 

  - Stochastic aspects of simulation 

  - Comparing HCM results with alternative tools 

  - Results presentation

Chapter 8: HCM Primer

23

- Capacity concepts
- Quality & LOS concepts
- Analysis process
- Decision-making considerations

Audience Interaction

24

- Questions about Volume 1?

Volume 2: Uninterrupted Flow

25

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

Chapter 10: Freeway Facilities

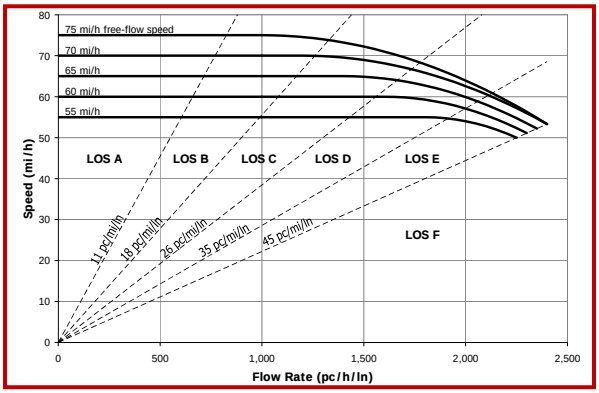
26

- Incorporates new NCHRP 3-75 weaving segment procedure Updated
- LOS measure and table NEW!
- Impacts of weather and work zones Updated
- Analysis of oversaturated conditions
  - Multi-period analysis

Chapter 11: Basic Freeway Segments

27

- Revised speed-flow curves NEW!
- Improved free-flow speed prediction model Updated



Chapter 12: Freeway Weaving Segments

28

- Incorporates NCHRP 3-75 research NEW!
- New ways to consider length, width and configuration
- Lane-changing used as a measure of turbulence; methodology predicts total lane-changing activity
- New speed-prediction algorithms
- New approach to weaving capacity

Chapter 13: Merge & Diverge Segments

29

- No major changes to base methodology
- "Reasonableness check" added to initial predictions of flow in Lanes 1 and 2
- Two minor changes in predictive equations for v_{12} to avoid discrepancies in extreme cases Updated

Chapter 14: Multilane Highways

30

- No major changes in base methodology
- Added analysis procedure for bicycles on multilane highways NEW!

Photo: Lee Rodegerdts

Chapter 15: Two-Lane Highways

31

- Two-way analysis methodology deleted
- Some basic characteristic curves and tables were revised and updated Updated
- Third class of two-lane highway added as an alternative procedure: two-lane highways in built-up areas (FDOT procedure used) NEW!
- Bicycle LOS procedure added NEW!

Photo: Lee Rodegerdts

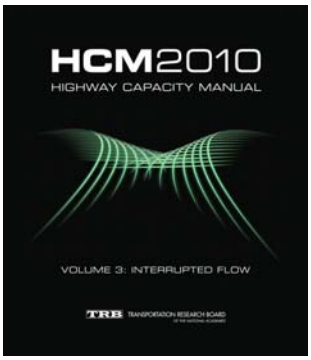
Audience interaction

32

- Questions about Volume 2?

Volume 3: Interrupted Flow

33



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

Chapter 16: Urban Street Facilities

34

- Separate analysis for auto, ped, bike & transit modes
- Aggregates key segment performance measures
- Demonstrates integrated multimodal evaluation process

Chapter 17: Urban Street Segments

35

- Incorporates NCHRP 3-79 operational methodologies NEW!
  - Improved prediction of average travel speed
- Incorporates NCHRP 3-70 LOS methodologies NEW!
  - Multi-modal LOS methodology
- Segment (= link + boundary intersection)
  - Signal, TWSC, AWSC, or roundabout boundary intersection
- Separate methodology for each travel mode

Chapter 18: Signalized Intersections

36

- New method for calculating uniform delay term NEW!
- Actuated controller operation modeling procedure added NEW!
- Left-turn pocket overflow check added NEW!
- Ped & bike LOS incorporates NCHRP 3-70 research NEW!

Chapter 19: TWSC Intersections

37

- Gap acceptance parameters for six-lane streets added NEW!
- Interface with urban street segment methodology for upstream signal effects NEW!
- Pedestrian crossing LOS method NEW!
  - Considers various types of crossing treatments and associated driver yielding behavior

Chapter 20: AWSC Intersections

38

- Restructured to improve user understanding
- Explicit incorporation of details to calculate AWSC operation with three-lane approaches NEW!
- Queuing model added NEW!

Photo: Lee Rodegerdts

Chapter 21: Roundabouts NEW!

39

- Incorporates NCHRP 3-65 methodologies for evaluating roundabout performance
- LOS table for roundabouts
- Lane-by-lane analysis of multilane roundabouts

Photo: Casey Bergh

Chapter 22: Interchange Ramp Terminals

40

- Chapter completely updated, based on NCHRP 3-60 results Updated
- Operational evaluation of signalized & roundabout ramp-crossroad intersections
- Quick estimation method for interchange type selection NEW!
- Methodology addresses auto mode only

Chapter 23: Off-Street Pedestrian & Bicycle Facilities

41

- New bicycle and multi-use path procedures based on FHWA research NEW!
- Guidance on applying pedestrian methodologies to a wider variety of facility types

Photo: Lee Rodegerdts

Audience interaction

42

- Questions about Volume 3?

Volume 4: Applications Guide

43

- Methodological Details
- Interpretations & Errata
- Technical Reference Library
- HCM Applications Guidebook
- Discussion Forum

Methodological Details

44

- Supplemental chapters
- Emerging topics chapters
- Computational engines

Chapters 24-34

45

- Supplemental material for HCM chapters in Volumes 1–3
- Supplemental chapters may include:
  - Greater level of detail regarding certain methods (useful for advanced users, researchers, or software developers)
  - Additional example problems
  - Alternative tool application examples

Chapter 35: Active Traffic Management NEW!

46

- Emerging topics chapter focusing on:
  - Ramp metering
  - Congestion pricing
  - Traveler information systems
  - Managed lanes
  - Traffic signal control
  - Speed harmonization

- Other chapters may be added in the future as research is completed (e.g., travel time variability)

Interpretations & Errata

47

- Frequently asked questions
- Interpretations & clarifications
  - Official Highway Capacity Committee responses to questions of interest to a broad range of users
- Errata
  - Official corrections to the HCM
- Also see the Discussion Forum section of the website
  - Unofficial, but quicker, answers to questions

Technical Reference Library

48

- Provides electronic versions of selected documents referenced by the HCM
  - For example, original research reports for HCM methodologies

HCM Applications Guidebook

49

- Case study examples of HCM & alternative tool applications to real-world issues
  - Focus is on process, not computational steps
  - Developed by NCHRP 3-64 & 3-85 projects
- Case studies consist of:
  - Intersection analysis
  - Traffic impact analysis
  - Rural/suburban roadway
  - Freeway
  - Urban street
  - Freeway corridor, using simulation

Navigating Volume 4

50

Demonstrate features of Volume 4

www.hcm2010.org

Summary

51

- HCM 2010 incorporates the results of more than $5 million in funded research since the HCM2000
- It incorporates a number of changes desired by the user community
- It continues the HCM's evolution toward a more multimodal approach to addressing transportation issues
- It is designed to continue to be relevant to users in an age of increasing reliance on software tools

Questions?

52

- Please send your additional questions and comments to:
  - Mark Vandehey (mvandehey@kittelson.com)

Thank You

53

Please provide your feedback. A link to an online evaluation will follow in an e-mail to site registrants. Please distribute this email to participants at your site. The assessment and evaluation will close in one week.

Questions/Comments

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