Presenter

Presented by:
Erik Ruehr, VRPA Technologies

With Thanks To:
☆ Paul Ryus, Kittelso & Associates
☆ Bastian Schroeder, Kittelso & Associates
☆ Lee Rodegerdts, Kittelso & Associates

HCM production team:
Outline

- Introduction and Overview
- Volume 1: Concepts
- Volume 2: Uninterrupted Flow
- Volume 3: Interrupted Flow
- Volume 4: Applications Guides
- Planning & Preliminary Engineering
  - Applications Guide to the HCM
- Questions
A Brief History of the HCM

- 1950: focus on capacity
- 1965: LOS concept, bus transit chapter
- 1985: new research, pedestrians, bicycles
  - 1994 & 1997 updates
- 2000: new research, multiple parts
- 2010: new research, multimodal focus, four volumes
The Need for New Research

- Changes in driver behavior
- Changes in vehicle fleet mix & capabilities
- Increasing use of certain roadway features in the U.S.
  - Roundabouts, alternative intersections, managed lanes
- Greater methodological sensitivity to factors influencing roadway performance
- Broader range of performance measures
National Research Since HCM 2010

- NCFRP 41: truck analysis
- NCHRP 03-96: managed lanes
- NCHRP 03-100: roundabouts in corridors
- NCHRP 03-107: work zone capacity
- NCHRP 03-115: HCM production
- NCHRP 07-22: planning guide to HCM
- SHRP 2 L08: travel time reliability
- FHWA: ATDM, roundabouts, alternative intersections
Arriving in late July
...But Significant Changes on the Inside

- New Chapters 11 and 17 on travel time reliability
- Basic freeway segment and multilane highway methods combined
- Many new and updated methods
  - Managed lanes, work zones, alternative intersections and interchanges, urban street queue spillback, truck effects on freeway operations, and more
- Greater focus on providing the information users need to apply HCM methods in software and interpret the results
Chapter 10: Freeway Facilities
Chapter 11: Freeway Reliability Analysis
Chapter 12: Basic Freeway and Multilane Highway Segments
Chapter 13: Freeway Weaving Segments
Chapter 14: Freeway Merge and Diverge Segments
Chapter 25: Freeway Facilities Supplemental
Chapter 26: Freeway and Highway Segments Supplemental
Chapter 27: Freeway Weaving Supplemental
Chapter 28: Freeway Merges and Diverges Supplemental
Chapter 10 - Freeway Facility Methodology

- Revised presentation of method and computational steps (NCHRP 03-115)
- Improved segmentation guidance for freeway facilities (NCHRP 03-115)
- New generic speed-flow models (NCHRP 03-115)
- New heavy vehicle impact estimation methods (NCFRP 41)
- Integration of materials on manages lanes (NCHRP 3-96)
- Integration of materials on work zones (NCHRP 03-107)
- Planning methodology for freeway facilities (NCHRP 07-22)
- New guidance for method calibration and validation (NCHRP 03-115)
- FREEVAL Computational Engine Updated in JAVA code (NCHRP 03-115)
Chapter 11 – Freeway Reliability Analysis

- Standalone, new chapter in HCM 6th Edition
- Updates the freeway travel time reliability materials from former Chap 36 & 37 in HCM2010 (SHRP-2, L08)
- Description of the computational steps has been revised to more clearly present individual steps
- Scenario generation process for freeway reliability analysis has been revised
  - Reduce number of scenarios and runtime
  - Improve modeling and using a Java Platform for computational engine
Volume 3: Interrupted Flow Chapters

Printed Chapters

16. Urban Street Facilities
17. Urban Street Reliability and ATDM
18. Urban Street Segments
19. Signalized Intersections
20. Two-Way Stop-Controlled Intersections
21. All-Way Stop-Controlled Intersections
22. Roundabouts
23. Ramp Terminals and Alternative Intersections
24. Off-Street Pedestrian and Bicycle Facilities
Signalized Intersections:
Planning Application Comparison

Quick Estimation Method (QEM) (HCM 2010)
- Requires calculation of delay to complete evaluation

Planning-Level Analysis Application (HCM 6th Edition)
- Two-part procedure
  - First part produces estimate of “sufficiency”
    - “Under”, “Near”, or “Over” capacity
  - Second part produces delay estimate and LOS
    - This part is used if delay and LOS are desired
Ramp Terminals

New Interchange Configuration

- Diverging diamond interchange (DDI)
  - Crossover at each terminal

DDI
Alternative Intersections

β Restricted Crossing U-Turn
  • Four-legged RCUT with signals

Signals on one side of
arterial are independent
of signals on other side

Cross street through traffic turns right
Cross street left turn traffic moves through

Arterial traffic no
different than
conventional intersection

Cross street traffic
must turn right

Cross street left turn and
through traffic makes a U-
turn in the wide median
Alternative Intersections

Restricted Crossing U-Turn

- Four-legged RCUT w/merges and diverges
Alternative Intersections

Median U-Turn

- Four-legged MUT with signals
  - Can also have stop signs
Alternative Intersections

Displaced Left Turn

- Configurations
  - Partial DLT
  - Full DLT

Full DLT

Partial DLT
### Modified Capacity Equations

- New coefficients for existing equations
- Calibrated to recently collected data
- Predicted capacity tends to be higher

| Entry Lanes | Opposing Lanes | Capacity by HCM Version and Conflicting Volume, veh/h |  
|-------------|----------------|---------------------------------------------------|---|
|             |                | HCM 2010                                            | HCM 6<sup>th</sup> Edition |
|             |                | $V_c = 0$ vph $V_c = 1000$ vph $V_c = 0$ vph $V_c = 1000$ vph |
| 1           | 2              | 1130 561                                            | 1420 607 |
| Right       | 2              | 1130 561                                            | 1420 607 |
| Left        | 2              | 1130 534                                            | 1350 538 |
| 1           | 1              | 1130 416                                            | 1380 498 |
| R or L      | 1              | 1130 416                                            | 1420 572 |
Roundabout Segment

- New addition to the HCM 6th Edition
- Based largely on NCHRP Report 772, Evaluating the Performance of Corridors with Roundabouts
- Objective
  - Evaluate the operation of vehicles traveling along a segment bounded by roundabouts
HCM Volume 4

Will be online at hcm.trb.org

Open to all, including those who don’t have a personal copy of the HCM

- Must sign up for a free user account to get access

Until the 6th Edition is released, continue to access Volume 4 at www.hcm2010.org
NCHRP Project 07-22 was funded to develop a planning counterpart to the HCMAG that would describe:

- Appropriate use of the HCM to a broad spectrum of planning applications
- Use of default values and other HCM tools
- Use of the HCM in scenario planning
- Coordinated use of HCM with planning models
- Use of the HCM in evaluating oversaturated conditions in a planning context
Arriving in late August