NCHRP Project 03-100: Evaluating the Performance of Corridors with Roundabouts

Status Report

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Session 570
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Presentation overview

• Project objective
• Project panel and team
• Project scope
• Data collection and sample of preliminary findings
• Project products
• Next steps
Project Objective

- Document examples of existing corridors
- Provide evaluation methods for alternatives analysis
- Focus on three or more roundabouts in series

Photo: Lee Rodegerdts
Project Panel

- Phil Demosthenes, consultant (chair)
- Stephen Bass, Kansas DOT
- Wylie Bearup, City of Phoenix, AZ
- Sarah Bowman, Walkable Communities, Inc.
- Robert Fenton, Ohio State University
- Theron Knause, Virginia DOT
- Mark Lenters, Ourston Roundabout Engineering, Inc.
- Avijit Maji, Maryland DOT
- Dina Swires, Washington State DOT
- Rich Cunard, TRB
- Hillary Isebrands, FHWA

- Lori Sundstrom, NCHRP Program Officer
Project Team

- Kittelson & Associates, Inc.
- Institute of Transportation Research and Education (North Carolina State University)
- Texas Transportation Institute (Texas A&M University)
- Write Rhetoric
Project Scope

• Document existing roundabout corridors
  – Collect and evaluate field data
  – Identify “lessons learned” from agencies

• Prepare tools and guidance for alternatives evaluations
  – Prepare predictive tools based on observed field data for incorporation into key resource documents such as HCM
  – Prepare “Corridor Comparison Document” to demonstrate broader evaluation process
Site Selection

• Nine corridors selected
• Geographically dispersed across the U.S., with some grouping for data collection efficiency
• Mix of urban, suburban, and rural environments
• Mix of single-lane and multilane roundabouts
• Wide range of circumstances leading to each corridor
Data Collection Corridors

- MD 216, Scaggsville, MD (pilot study site)
- La Jolla Boulevard, San Diego, CA (pilot study site)
- Old Meridian Street, Carmel, IN
- Spring Mill Road, Carmel, IN
- Borgen Boulevard, Gig Harbor, WA
- SR 539, Whatcom County, WA
- Golden Road, Golden, CO
- Avon Road, Avon, CO
- SR 67, Malta, NY
Data Collection Methods

- Travel time runs using GPS
- Bluetooth™ data collection
- Video recording of intersections (primarily for peak hour turning movement extraction)
- Spot speed samples
- Photographs and field notes
- Interviews with corridor owners/operators

- Data collection methods refined after pilot study locations (focused on GPS instead of Bluetooth)
La Jolla Boulevard, San Diego, California (pilot study site)
Example Time-Space Trajectory
(La Jolla Boulevard SB, San Diego, CA)
Example Speed Profile for Urban Corridor
(La Jolla Boulevard SB, San Diego, CA)
SR 539, Whatcom County, Washington
Example Speed Profile for Rural Corridor (SR 539 NB, Whatcom County, WA)
SR 67, Malta, New York
Example Speed Profile through Interchange (SR 67 EB, Malta, NY)
Corridor Owner/Operator Interviews

- Wide variety of experiences leading to development of corridors
- Reinforces motivation of Corridor Comparison Document to evaluate corridors on case-by-case basis
Modeling

- New predictive tools for estimating operational performance of roundabout corridors
- Planned for incorporation into HCM Chapters 17 (Urban Streets) and 21 (Roundabouts) or their supplements to enable signals-versus-roundabouts predictive comparisons
- Under review by project panel
- Initial briefings provided to HCQS subcommittees
Modeling Framework
Comparisons with “Equivalent Signalized Corridors”

• Intended to be high-level comparison to suggest trends if any
• “Equivalent” signalized corridors developed for each roundabout corridor
• Estimate travel time (TT) performance using HCM-based and simple simulation-based analysis
• Compare estimated TT to field-measured roundabout performance
• Under review by project panel
Corridor Comparison Document

• Chapter 1: Introduction
• Chapter 2: Users of Arterials
• Chapter 3: Project Planning Process
  – 3.1 Project Initiation (incl. understanding of context)
  – 3.2 Concept Development
  – 3.3 Alternatives Analysis
• Chapter 4: Performance Measures
• Chapter 5: Example Applications
• Under review by project panel
Understanding of Context

- Select performance metrics that are important for the corridor being studied
- Develop and evaluate reasonable alternatives
Next Steps

- Incorporate panel feedback on current products
- Complete modeling and HCM components
- Finalize Corridor Comparison Document
- Prepare final report and summary presentation

- Target project completion: Spring 2013
Thank you!

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