Road Safety Audits

100th Purdue Road School

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Presentation Outline

• Overview of RSAs
• Procedures for RSAs
• RSA Example
What is an RSA?

- Formal safety performance examination
- Existing or Future Road Segment or Intersection
- Independent, multidisciplinary team
Why do we need RSAs?

✓ Relatively few road-related safety issues are identified in collision reports.
✓ Road designs need to anticipate and accommodate common driver errors.
✓ Easier to design and build safer roads than to modify some entrenched driver behaviors.
RSA Benefits

😊Reduce the number and severity of crashes
😊Promote awareness of safe practices
😊Process to identify and address problems
😊Considers human factors and multimodal issues
😊Low cost
When do we conduct RSAs?
Procedures

The Eight Step RSA Process
Responsibilities

1 Identify project
2 Select RSA team
3 Start-up meeting
4 Field reviews
5 Analysis & Report
6 Present findings
7 Prepare response
8 Implement findings

RSA Team
Design Team / Project Owner
Identify Project

High-crash sites

High-profile sites

Changed traffic characteristics
Select RSA Team

- Independent
- Experienced
- Multi-disciplinary
- Core skills:
  - Geometry
  - Operations
  - Road Users/Human Factors
Start-Up Meeting: Provide Project Information

- Crash history
- Traffic volumes
- Aerial photographs
- Design drawings
- Background reports
- Design criteria
Field Review: **Identify Safety Issues**

Safety analysis considers three elements concurrently:

- geometry
- operations
- user characteristics and interactions
Identify Safety Issues: Geometry

Use of design standards and guidelines:
• a sound starting point
• cumulative effect of minimum/maximum values
• supplement with human factors analysis and project-specific concerns (such as maintenance concerns)
**Identify Safety Issues:**

**Operations**

- congestion and delay
- signal operation
- operating speeds
- turning movements
- queueing
- driveways
Identify Safety Issues: User Characteristics and Interactions

- school buses
- farm vehicles
- trucks
- cyclists
- school children
- driver age
Analysis and Report

• Prioritization of safety issues may be based on crash frequency and severity
• Short term solutions include: maintenance, vegetation, changing signage or pavement markings, Enforcement & Education
• Long term solutions include: flattening a curve or modifying a roadway’s vertical alignment, Enforcement & Education
Proven Safety Countermeasures

These nine countermeasures address crashes that occur in the focus areas of intersections, pedestrians, and roadway departure.

- Roundabouts
- Corridor Access Management
- Backplates with Retroreflective Borders
- Longitudinal Rumble Strips and Stripes on Two-Lane Roads
- Enhanced Delineation and Friction for Horizontal Curves
- Safety Edges SM
- Medians and Pedestrian Crossing Islands in Urban and Suburban Areas
- Pedestrian Hybrid Beacon
- Road Diet
Roundabout story an April Fool's joke

An internal report obtained by the Winnipeg Sun reveals the city's public works department is poised to introduce traffic circles — also known as roundabouts — on nine intersections along Portage Avenue. (From a City of Winnipeg report)
Roundabouts

“If the politicians really go ahead with this, they’ll pay at the ballot box,” driver Turner Lane warned. “What goes around comes around.”

(Winnipeg Sun: April 1, 2013)
The RSA Findings: Formal Report

- Summarizes the project
- Identifies team
- Documents site visits
- Documents results
- Identifies and prioritizes safety concerns
- May include suggestions for improvements
Present Findings

- Discussion of safety concerns
- Clarify findings and suggestions
- Assist project owner in making best choices
Inadequate Response

“We will not realign the intersection at Jefferson Road. We do not feel that it is needed.”
Implement Findings

**Pre-construction RSAs:**

- Design changes

**Post-construction RSAs:**

- Incorporate improvements in operating budgets or maintenance programs
Examples: What to Look For
Curve Radius
Sight Distance

SR42 Before
Sight Distance

SR42 Before
Sight Distance

SR42
After
Roadside Safety
Pavement Considerations
Pavement Markings and Signs
NO HORN BLOWING EXCEPT FOR ANGER
Example RSA:
Chillicothe, MO (US 36 and S. Mitchell Ave.)
US 36 at S. Mitchell Avenue: Overview
US 36 at S. Mitchell Avenue: Overview
US 36 at S. Mitchell Avenue: RSA Team

- Mo-Kan Regional Council
- MoDOT
- City of Chillicothe
- Green Hills RPC
- Delaware Valley RPC
- Chillicothe Police Department
- Missouri Highway Patrol
- Northwest Missouri Regional Council of Governments
US 36 at S. Mitchell Avenue: Statistics

- 21 Reported Crashes 2006-2011
- 2 Fatalities
- AADT
  - US 36: 4,300 vpd
  - Mitchell Ave.: 1,000 vpd
- Speed Limit
  - US 36: 65 mph
  - Mitchell Ave.: 35 mph
US 36 at S. Mitchell Avenue: Sight Distance
US 36 at S. Mitchell Avenue: Signs

Clustered Non-Essential Signs
US 36 at S. Mitchell Avenue: Operations
US 36 at S. Mitchell Avenue: Suggested Improvements

• Increase Size of Essential Signs
• Relocate Industrial Park Sign
• Paint Yield Line, Stop Bar, Turn Arrows
• Increase Lighting
• Add Intersection Ahead Signs
• Reconfigure Intersection
• Extend Turn Lanes
• Re-route Truck Traffic to US 65 Interchange
US 36 at S. Mitchell Avenue: Suggested Pavement Markings
Additional Resources

• *NCHRP Synthesis 336: Road Safety Audits* (TRB)
• *Road Safety Audit Guidelines* (FHWA)
• FHWA Website: http://safety.fhwa.dot.gov/rsa
• *Bicycle Road Safety Audit Guidelines and Prompt Lists* (FHWA)
• RSA Newsletter (FHWA)
Questions?

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