Outline

• Safety stats
• Define RSA
• Give Examples
• Process – eval data > problem ID > countermeasures
• Tools > Roadside Design > MUTCD > HSM
• Resources > RSA P2P & SMS Committee > upcoming TTP Safety Program
Road Safety Audit
A formal and independent safety performance review of a road project by an independent, multidisciplinary, experienced team of safety professionals, addressing the safety of all road users.

Transportation Safety Plan
A data-driven plan developed by a multi-disciplinary team to improve safety on the entire road network by prioritizing the activities implemented by a government and communicating these priorities with safety partners.
Transportation Safety Plans
<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane Departure</td>
<td></td>
</tr>
<tr>
<td>Night / Low Light Crashes</td>
<td></td>
</tr>
<tr>
<td>Young Drivers (&lt;20 years old)</td>
<td></td>
</tr>
<tr>
<td>Speed Management</td>
<td></td>
</tr>
<tr>
<td>Restraint Usage</td>
<td></td>
</tr>
<tr>
<td>Impaired Driving</td>
<td></td>
</tr>
<tr>
<td>Special Users: Pedestrians and Bicycles (17% of reservation fatal</td>
<td>compared to 9% statewide)</td>
</tr>
<tr>
<td>Intersection related crashes</td>
<td></td>
</tr>
</tbody>
</table>

**Data Management**

- 10 deaths in 5 years
Emphasis Area:
Roadway Departure in Curves

Why strategic?

Although curves are only 15% of road miles, they contribute to 46% of all fatal crashes.

Strategies / Countermeasures:
- Improved signage
- Improved friction
- Location markers for emergency location
Transportation Safety Plans

FHWA Developing Safety Plans Guidebook

Recorded Webinar
Road Safety Audit
Definition

Road Safety Audit
A formal and independent safety performance review of a road transportation project by an experienced team of safety professionals, addressing the safety of all road users.
Key Points

• **Formal**: Procedures & Documentation
• **Independent**: Auditors Detached from Road Agency & Design Team, No Bias
• **Safety Performance**: Focus on Substantative Safety
• **Experienced Team**: Audit work is based on experience and knowledge
• **All Road Users**: All relevant human travel modes are considered
# Risk Assessment Scale

<table>
<thead>
<tr>
<th>RISK CATEGORY</th>
<th>SEVERITY</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crash Frequency</td>
<td>Frequent</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Occasional</td>
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<td></td>
<td>Rare</td>
<td>A</td>
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</tr>
</tbody>
</table>

## Risk Levels

<table>
<thead>
<tr>
<th>A</th>
<th>Minimal</th>
<th>D</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Low</td>
<td>E</td>
<td>High</td>
</tr>
<tr>
<td>C</td>
<td>Moderate</td>
<td>F</td>
<td>Extreme</td>
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</table>
An RSA is **NOT**....

... a simple standards check for adherence to design guidelines.

**BUT...**

An RSA is a process that looks beyond normal design guidelines to improve the substantive safety performance.
Nominal vs. Substantive Safety

Nominal Safety

Nominal safety is meeting the standards.

Substantive Safety

Substantive safety is doing what works for the site.
Nominal vs. Substantive Safety
<table>
<thead>
<tr>
<th>Type of Horizontal Alignment Sign</th>
<th>5 mph</th>
<th>10 mph</th>
<th>15 mph</th>
<th>20 mph</th>
<th>25 mph or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), and Combination Horizontal Alignment/Intersection (W10-1) (see Section 2C.07 to determine which sign to use)</td>
<td>Recommended</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Advisory Speed Plaque (W13-1P)</td>
<td>Recommended</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Chevrons (W1-8) and/or One Direction Large Arrow (W1-6)</td>
<td>Optional</td>
<td>Recommended</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Exit Speed (W13-2) and Ramp Speed (W13-3) on exit ramp</td>
<td>Optional</td>
<td>Optional</td>
<td>Recommended</td>
<td>Required</td>
<td>Required</td>
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</table>
Costs and Benefits

The following are typical values…

• **Audit Costs:** $5k to $30k per audit stage
• **Design Costs:** vary (change drawings)
• **Construction Costs:** vary (to build accepted audit suggestions)
• **Benefits:** Lives saved, crashes prevented, or severity decrease
• **Benefit / Cost ratio:** 10:1 or better
• **Crash reductions up to 60%**
When should an RSA be done?

- RSAs can be done at any stage in a project’s life:
  - A pre-construction RSA (planning and design stages) examines a road before it is built, at the planning/feasibility stage or the design (preliminary or detailed design) stage. An RSA at this stage identifies potential safety issues before crashes occur. The earlier a pre-construction RSA is conducted, the more potential it has to efficiently remedy possible safety concerns.
  - Construction RSAs (work zone, changes in design during construction, and preopening) examine temporary traffic management plans associated with construction or other roadwork, and changes in design during construction. RSAs at this stage can also be conducted when construction is completed but before the roadway is opened to traffic.
  - A post-construction or operational RSA (existing road) examines a road that is operating, and is usually conducted to address a demonstrated crash problem.
Why Do We Need Audits?

Planning / Design / Operations / Maintenance involve Complexity, Constraints, and Trade-Offs:

– Cost
– Right of Way
– Environment
– Geotech Conditions
– Socio Economics
– Capacity / Efficiency
– Politics
Road Safety Audits (RSA)
Responsibilities

RSA Team
Design Team / Project Owner

1. Identify project
2. Select RSA team
3. Conduct Kick-off meeting
4. Perform data & field reviews
5. Conduct analysis and prepare report
6. Present findings to Project Owner
7. Prepare formal response
8. Incorporate findings
**Responsibilities**

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RSA Team
Design Team / Project Owner
10 June 2011

Mr. Steve Titus, P.E.
Regional Director – Northern Region
Alaska Department of Transportation & Public Facilities
2301 Peger Rd.
Fairbanks, AK 99709

Dear Mr. Titus,

The Federal Highway Administration is requesting permission from the State of Alaska Department of Transportation to conduct a Road Safety Assessment (RSA) on the Elliott Highway from the Dalton Highway Junction to Manley Hot Springs. The goal of this assessment would be to identify risk factors that have or may contribute to fatal and incapacitating injury crashes on this roadway and strategies to address these risks. A range of strategies will be provided but the recommendations will focus on low cost safety improvements. The Manley Village Council requested the proposed RSA because of concerns in their community concerning the safety performance of this roadway.

Travel expenses for the RSA Team would be funded by the Manley Village Council. In addition, the council has indicated that they may be willing to participate financially in any infrastructure improvements that are identified by the study. However, the RSA team recommendations will not be biased by the funding source and the team members will be independent from the council.

The RSA process has been used around the United States, including in Alaska, and has been proven a valuable tool for improving roadway safety. An RSA examines historical information, existing site conditions, and crash data to determine the risk factors that have or may contribute to poor safety performance. The risk factors are then addressed in a report from the team with recommendations of reasonable safety improvements. The RSA team will be a multi-disciplinary group of highway safety professionals who are not intimately familiar with the site.
Road Safety Audit Team

- Independent
- Typically Safety Specialists
- Typically Multi-disciplinary
Road Safety Audit
Identify project
Select RSA team
Conduct Kick-off meeting
Perform data & field reviews
Conduct analysis and prepare report
Present findings to Project Owner
Prepare formal response
Incorporate findings

Responsibilities
RSA Team
Design Team / Project Owner
Objectives

• Input from owner/operator
• Questions from team on Road’s History
• Inform everyone of RSA process
• Coordinate available resources
Responsibilities

1. Identify project
2. Select RSA team
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RSA Team
Design Team / Project Owner
What problems exist?

Do Not Assume
RSA Team Review

- **Data Review**
  - Planned projects, construction history
  - Traffic volumes
  - Existing Infrastructure
  - Crash Reports
  - Crash Statistics

- **Field Review**
  - Day / Night
  - Observe Intersections/turn-outs
  - Field review of serious crash sites
Crash Data
Idea Parking Lot

- Identified Risks are documented/photographed
- Potential countermeasures discussed in next step
Field Review = Brainstorm

No Question or observation is stupid
1. Identify project
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Responsibilities
- RSA Team
- Design Team / Project Owner
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Risk 1: Sight Distance @ Farmingdale

- **Description of Risk:**
  - Vehicles turning left from Farmingdale to SR-125 WB have obstructed sight distance due to embankment and vertical profile on SR-125. Vehicles pull past stop bar to turn left.

- **Collision types experienced:**
  - Turning, Angle, Rear-End, Intersection related

- **Location:**
  - SR-125 & Farmingdale Rd Intersection

- **Solutions:**
  - **Low Cost:** Move stop bar closer to SR-125 while avoiding turning path of trucks/buses.
  - **Intermediate Cost:** Reduce embankment height in Southeast corner.
  - **Ultimate:** Reconstruct SR-125 with vertical profile that allows for proper sight distance.

Severity: High
Frequency: Occasional
Risk Level: D
Trooper & Public Identified issues
Pull out in curve = Alignment difficult to detect in winter
Reverse Super in pullout
Trooper & Public Identified issues
Pull out in curve = Alignment difficult to detect in winter
Reverse Super in pullout
Responsibilities

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RSA Team
Design Team / Project Owner
RSA Report

• Presentation to owner
• Written Report
• Request for feedback
Responsibilities

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RSA Team
Design Team / Project Owner
RSA Report is not for the Round File!
Owner’s Response

- Written response
- Improvements to be made
- Reasons for non-implementation
Responsibilities

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RSA Team
Design Team / Project Owner
Questions?
Questions?

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