Presentation Overview

• SHRP 2 background and four focus areas
• Safety focus: the Naturalistic Driving Study
• Reliability focus: overview and the “rural angle”
Authorization for SHRP 2

• Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005
• A 7 year $170M program- original funding $150M- with 4 focus research areas
• Managed/staffed at TRB, a unit of the National Academy of Sciences
• Program is finite- ends March 31, 2013, but with possible extension due to late re-authorization
Four SHRP 2 Focus Areas

• **Safety**: to improve highway safety through better understanding of driver behavior and associated crash risks

• **Reliability**: to provide more reliable travel times by reducing the impacts of non-recurring congestion

• **Capacity**: to develop approaches and tools to systematically integrate environmental, economic and community requirements into new capacity decisions

• **Renewal**: to develop methods that are rapid, cause minimal disruption and produce long-lasting facilities
FOUR FOCUS AREAS

Safety
($51M)

Safe Highways

Capacity
($21M)

Better Transport Decisions

Rapid Renewal and Lasting Facilities

Reliability
($20M)

Reliable Travel Time

Great Customer Service

Renewal
($34M)
Safety:

*Understanding Driver Behavior And Crash Risk*

- How the driver interacts with and adapts to the vehicle, roadway characteristics, traffic environment, traffic controls, weather, etc.
- Differences in crash risk associated with these interactions
- Proposed countermeasures based on the findings
Safety Focus Area Themes

- **Naturalistic Driving Study** - instrument vehicles of about 3000 volunteer drivers (6000+ total drivers?) with cameras and other sensors, in 6 US locations over 2+ years
  - **Road Data Inventory** - capture road features and geometry via mobile data collection technology
  - **Data analysis methodologies**

- **Site-Based Video System** - develop a portable, automated video system prototype that is able to track vehicle trajectories at an intersection or on a road segment
SHRP 2 NDS Study Sites

Seattle, WA
Bloomington, IN
Raleigh-Durham, NC
Tampa Bay, FL
Central PA
Erie County, NY
Participants

• Men and women in several age groups:
  • Teen (16-20) SPLIT
  • Young Adult (21-35)
  • Middle Adult (36-50)
  • Younger Older Driver (51-65)
  • Middle Older Driver (66-75)
  • Older Older Driver (76+)

1950 instrumentation packages 2 years

• 3100 participants
• 3900 data years
• 6 sites
• Passenger cars, vans, SUVs, pick ups
Camera Views
In-Vehicle Video
Use of NDS Data: Examples

- Distracted driving: policies, laws on use of hand-held devices, texting, etc., for teens or broader population
- Drowsiness: policies, regulations for commercial drivers
- Vehicle design/technologies: integrate advanced technologies to minimize or reduce distraction, evaluate crash warning algorithms
- Education: feedback to teens and parents
- Roadway: improved design, operations, signage, hardware, etc.
- Other: planning, highway operations/reliability, fuel efficiency (drive cycles), environmental impacts
CAPACITY RESEARCH
Tackles *recurring* congestion from inadequate base capacity

CONGESTION

Reliability Research
Tackles *nonrecurring* congestion resulting from incidents, special events, weather, etc.
The Major Sources of Traffic Congestion

- Bottlenecks are places with *recurring congestion*
  - The Capacity focus area aims to help address these “everyday” problems through collaborative decision-making
  - Rural bottlenecks will become more common on cross-country freight corridors

- The other five sources generate *non-recurring congestion*
  - The Reliability focus area addresses these problems of *variability in performance*
  - *The “Rural Angle”: Weather, Work Zones, and Incidents*
What Is Travel Time Reliability?

The consistency or dependability in travel times, as measured from day to day and/or across different times of the day.

Sources: Federal Highway Administration and Texas Transportation Institute
Effects of Incidents and Weather on Reliability

Weekday Travel Times
5:00-6:00 P.M., on State Route 520 Eastbound, Seattle, WA

Travel Time (in Minutes)

- 2 Incidents with Rain
- 3 Incidents
- 1 Incident with Rain
- 4 Incidents
- Rain
- 1 Incident

Martin Luther King Day
Presidents Day

Number of Incidents

Jan 3  Feb 2  Mar 4  Apr 3

2003
Expected Rural Congestion
This Was Not an Issue in 2000

Note: High-volume truck portions of the National Highway System carry more than 10,000 trucks per day, including freight-hauling long-distance trucks, freight-hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95.

Reliability Research Goals

• Research program targets variation in travel time—that frustrating characteristic that prompts motorists to allow an hour to make a trip that normally takes 30 minutes

• The aim is to make this variability more visible and to begin to address it.

• Travel Time Reliability is a new topic: we need vocabulary, data, metrics
Reliability Research Program Status

- 12 active projects- total value $14.05 M
- 7 remaining anticipated projects- total value $6.3 M
- Total approved program $20.35 M
- Early projects starting to deliver products
What Highway Agencies* and Other Stakeholder Communities Need To Improve Travel Reliability

- To organize themselves to be able to better address traffic operations and travel reliability
- To collect the right data and analyze it with the right tools to develop better strategies and projects
- To better understand and influence driver behavior: a key contributor to non-recurring congestion
- To plan, program, design, and deliver the right projects to tackle non-recurring congestion
- New ideas and innovations that help address non-recurring congestion

* State DOTs, Traffic Operations Agencies and MPOs
Key Stakeholder Groups Targeted For Reliability Products

- Highway agency decision-makers
- Highway agency operations professionals
- Highway designers
- Transportation planning and programming professionals
- Incident/emergency responders
- Traffic technology and data providers in the private sector
- Academic researchers
# Product Groupings

## Organizing Agencies to Improve Reliability

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Anticipated Products</th>
<th>Investment ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L01</td>
<td>Guide to transportation agency business processes which will improve reliability</td>
<td>0.40</td>
</tr>
<tr>
<td>L06</td>
<td>Guide to structuring organizations to improve traffic operations</td>
<td>1.00</td>
</tr>
<tr>
<td>L12</td>
<td>Training and certification programs for traffic incident responders to improve safe and quick clearance</td>
<td>1.00</td>
</tr>
<tr>
<td>L17</td>
<td>An overall reliability program framework with specific best practices and outreach materials that make the case for highway agencies focusing on improved travel reliability</td>
<td>1.50</td>
</tr>
</tbody>
</table>

**TOTAL INVESTMENT:** $3.90 Million

**Interested communities:** State DOT and MPO executives, State DOT and MPO traffic operations professionals, Incident responders (police, fire, EMS, towing companies), Traffic technology and service businesses, Researchers and academia
# Product Groupings

## New Data Collection and Analysis Tools

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Anticipated Products</th>
<th>Investment ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L02</td>
<td>Guide and tools for developing effective travel reliability monitoring programs</td>
<td>1.80</td>
</tr>
<tr>
<td>L03</td>
<td>Methods and tools for analyzing the travel reliability impacts of projects</td>
<td>1.75</td>
</tr>
<tr>
<td>L04</td>
<td>Guide for building reliability considerations into travel demand models and traffic simulation models</td>
<td>1.25</td>
</tr>
<tr>
<td>L13, L13A, L16</td>
<td>Web-based archive of all SHRP 2 reliability research data to support Additional agency and university research</td>
<td>1.85</td>
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</tbody>
</table>

**TOTAL INVESTMENT: $6.65 Million**

**Interested communities:** State DOT and MPO traffic operations professionals, State DOT and MPO planners, Travel demand and simulation modelers, Traffic technology and service businesses, Researchers and academia
# Product Groupings

## Understanding and Influencing Driver Behavior

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Anticipated Products</th>
<th>Investment ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L10, L10abc</td>
<td>Strategies to modify driver behaviors that cause non-recurring traffic congestion</td>
<td>1.50</td>
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<tr>
<td>L14</td>
<td>Guide for effectively communicating travel time reliability information to system users</td>
<td>1.00</td>
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</tbody>
</table>

**TOTAL INVESTMENT:** $2.50 Million

*Interested communities:* State DOT and MPO traffic operations professionals, Traffic technology and service businesses, Researchers and academia, Commuters and other highway users
## Product Groupings

**Improving Planning, Programming, and Design**

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Anticipated Products</th>
<th>Investment ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L05</td>
<td>Tools to improve reliability to performance measures and link them to transportation planning and capital programming</td>
<td>1.80</td>
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<tr>
<td>L07</td>
<td>Analysis of cost effective design features that will improve reliability</td>
<td>2.75</td>
</tr>
<tr>
<td>L08</td>
<td>Tools to link reliability to highway capacity calculations and methods (including potential additions to the Highway Capacity Manual)</td>
<td>0.50</td>
</tr>
<tr>
<td>L09</td>
<td>Design guidance on specific roadway features that will improve reliability (including potential additions to the AASHTO Policy on Geometric Design)</td>
<td>0.50</td>
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</tbody>
</table>

**TOTAL INVESTMENT:** $5.55 Million

**Interested communities:** State DOT and MPO executives, State DOT and MPO traffic operations professionals, State DOT and MPO planners, Highway designers, Travel demand modelers, Researchers and academia
Product Groupings

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Anticipated Products</th>
<th>Investment ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L11</td>
<td>Developing innovative future operations strategies to improve reliability</td>
<td>1.00</td>
</tr>
<tr>
<td>L15</td>
<td>Supporting promising innovations to improve travel time reliability</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>TOTAL INVESTMENT: $1.50 Million</td>
<td></td>
</tr>
</tbody>
</table>

**Interested communities:** State DOT and MPO traffic operations professionals, Incident responders (police, fire, EMS, towing companies), Traffic technology and service businesses, Researchers and academia
Rural Focus on Products

• What are the causes of non-recurring congestion and what can be done to address it?
• How to organize to improve reliability
• How to re-engineer business processes to improve reliability
• How to develop an effective monitoring and data collection program
• How to work reliability into planning, modeling, programming, and budgeting
• What geometric design features have positive and negative impacts on reliability?
• How can we train the incident responder community to achieve safe, quick clearance?
• How can we best communicate information about travel reliability to technical staff, decision-makers, and travelers?
Incident Responder Training, Atlanta Georgia Pilot
Communication/Dissemination

• Progress reports and research results available during the program lifespan
• Website [www.trb.org/shrp2/](http://www.trb.org/shrp2/)
• Publications
  ✓ Quarterly and Annual Reports
  ✓ Program briefs for each focus area
  ✓ Project briefs for completed projects
  ✓ Expected products chart