Elevating Rural Road Safety: the Local Road Safety Plan

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“In 2015, 19% of the US population lived in rural areas but rural road fatalities accounted for 49% of all fatalities. Even with reductions in the number of fatalities on the roadways, the fatality rate in rural areas is 2.6 times higher than the fatality rate in urban areas.”

FHWA – Office of Traffic Safety

“In Iowa, more than 50% of K&A crashes occurred on rural roads from 2007-2016, resulting in crash rates on rural roads more than twice that of state-maintained roads.”

Iowa Local Road Safety Plans (Phase 3)
Agenda

- Review of LRSP Background and Purpose
- Issues/Challenges
- Success Stories
- LRSP Process
- Questions
1 - Review of LRSP Background and Purpose
LRSP Background and Purpose

What is a LRSP?

- Coordination between agencies on driver-related countermeasures
- Proactive safety improvements based on systemic risk factor assessment
- Define a focused plan for practitioners to make informed, prioritized safety decisions
- Use results of the analysis to leverage and apply for funding

Goal – Proactive safety improvement projects and programs that can be implemented by the agency
LRSP Background and Purpose

- Driver-related countermeasures
  - Survey for driver-related countermeasures
  - Workshop with representation from 5E’s of safety
    - Engineering
    - Education
    - Enforcement
    - Emergency Response
    - Everyone

- Engineering countermeasures
  - List of proactive safety projects
**LRSPs per the Feds:**

“The **systemic approach** to safety involves widely implemented improvements based on high-risk roadway features correlated with specific severe crash types.

The approach provides a more comprehensive method for safety planning and complements traditional site analysis. It helps agencies broaden their traffic safety efforts and consider risk as well as crash history when identifying where to make low cost safety improvements.”

*FHWA – Office of Traffic Safety*
Where have LRSPs been done?

- Minnesota (2009 - 2013)
- North Dakota (2012-2015)
- Iowa (2015 – ongoing)

- Under Development in:
  - Kansas
  - California
  - FHWA (for 4 counties)
2 - Issues/Challenges

- Proactive versus reactive safety
- Involvement from other E’s
- Data availability
- Implementation
Proactive versus Reactive Safety

Crash Severity
- Fatal (19)
- Serious Injury (56)
- Minor Injury (152)
- Possible/Unknown Injury (278)
- Property Damage Only (672)

Highways
- State
- County Paved
- County Unpaved
Driver-Related Crashes

- Over 90% of Crashes Involve Driver Error (NHTSA)
  - Inattention
  - Internal and External Distractions
  - Driving too Fast
  - False Assumption of Others’ Actions
  - Illegal Maneuvers
  - Sleep
  - Impairment
Driver-Related Emphasis Areas

- Unprotected Persons
- Younger Drivers
- Impaired Driving
- Inattentive/ Distracted Driving
- Speed-Related
Who can Improve Rural Road Safety?

- Enforcement
- Enforcement
- Engineering
- Engineering
- Education
- Education
- Emergency Response
- Emergency Response
- Everyone
Involvement of the 5E’s
Data Availability

- It’s all about the data
  - Crash data
  - Roadway data
  - Intersection data
  - Curve data
Implementation

- Maintenance
- HSIP Applications
- Incorporation of safety countermeasures into other planned projects
- Continuing discussions in County between 5E’s
3 - Success Stories

- Bike helmets
Success Stories

› School bus routing
Success Stories

- Retroreflective posts on signs
Success Stories

- Mowing program
4 - LRSP Process Overview

- Document Review
- Data Collection
- Data Analysis
- Countermeasure Selection (and workshop)
- Develop Projects (and workshop)
- Develop LRSPs
Data Collection

- Crash data
- Roadway features
  - Lane width
  - Shoulder width/type
  - Speed limit
  - Pavement condition
  - Etc.
- Volume data
Data Collection from Agencies

- 911 address database
- Shoulder width and type
- Intersection lighting
- Curve chevron signage
- Centerline rumble strips
- Edgeline and/or shoulder rumble strips
- Transverse rumble strips
Data Analysis

- The KABCO injury severity scale (National Safety Council, 1990) is used to summarize crash data.
- The KABCO scale is used by the investigating officer on the scene to classify injury severity for occupants with five categories:
  - K – killed/fatal injury
  - A – disabling/serious injury
  - B – evident/minor injury
  - C – possible/unknown injury
  - O – no apparent injury/Property Damage Only (PDO)
Data Analysis

- Crash maps
  - K and A in rural areas (Fatal and Serious Injury)
  - KABCO in rural areas (all crashes)
- Comparison of crashes to Strategic Highway Safety Plan (SHSP) emphasis areas
- Crash analysis breakdowns (crash trees)
  - Urban roads
  - Paved roads
  - Unpaved roads
- High-crash location list
Data Collection from Counties

- Questionnaire on driver-related emphasis areas
  - Distributed prior to the first workshop
  - Countermeasures discussed at the first workshop

Diagram: Driver-related emphasis areas

- Speed-related
- Unprotected persons
- Younger drivers
- Impaired driving
- Inattentive/distracted driving
Data Collection from Counties

- Example driver-related countermeasures
  - Younger drivers
    - Conduct additional training in schools
    - “Operation Prom” mock disaster
    - Enforcement of graduated driver’s license laws
  - Inattentive/distracted driving
    - Incorporate information on distracted driving into education programs for young drivers
    - Conduct education and awareness campaigns
    - Visibly enforce existing statutes to deter distracted driving
Project Selection Methodology

1. GIS data
2. Risk factor ranking
3. Decision tree
4. Draft project sheets
5. County Input
6. Project sheets
Risk Factors and Ranking

- Identification of systemic safety improvements
  - Risk factors can include:
    - Roadway features
    - Intersection features
    - Traffic volumes
  - Risk factor ranking will be conducted for:
    - Roadway segments
    - Intersections
    - Curves
Decision Trees

- Develop decision trees to aid in systematic selection of safety improvement projects for each:
  - Roadway segment
  - Intersection
  - Curve
SEGMENTS
Segments – Potential Risk Factors

- Volume
- Lane width
- Shoulder type
- Access density
- Lane departure crashes
Segments – Example Risk Score Map

Legend
Segment Score
- High
- Medium - High
- Medium - Low
- Low

Roadways
- State Roads
- County Paved Roads
- County Unpaved Roads
- Corporate Limits
## Segments – Potential Countermeasures and CMFs

<table>
<thead>
<tr>
<th>Safety Countermeasure</th>
<th>Crash Modification Factor</th>
<th>Estimated Cost</th>
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<tbody>
<tr>
<td>Wider (6-inch) Pavement Markings</td>
<td>0.825</td>
<td>$2,000/mile</td>
</tr>
<tr>
<td>Clear and Grub</td>
<td>0.78</td>
<td>$5,000 - $20,000/mile</td>
</tr>
<tr>
<td>Edgeline Rumble Strips</td>
<td>0.61 – 0.67</td>
<td>$2,000/mile</td>
</tr>
<tr>
<td>Centerline Rumble Strips</td>
<td>0.55 – 0.91</td>
<td>$1,000/mile</td>
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<tr>
<td>Pave 2-ft Shoulder with Rumble Strips</td>
<td>0.75 – 0.99 “Pave Shoulder”</td>
<td>$65,000/mile</td>
</tr>
<tr>
<td></td>
<td>0.61 – 0.67 “Edge Rumble Strip”</td>
<td></td>
</tr>
</tbody>
</table>
Segments – Potential Countermeasures

New Pavement Markings:
- Edgelines
- Centerlines

Edgeline Rumble Strips

Centerline Rumble Strips

Clear and Grub within 15 feet of Each Side of Road

Pave Shoulder with Safety Edge

Note: All Improvements Shall Conform with the Latest Version of the MUTCD and/or Applicable Standards
Segments – Example Countermeasure Selection

Decision Tree

Paved Roadway Segments with Speed Limit ≥ 40 mph

- ADT < 200
  - PROJECT: New pavement markings, clear and grub

- 200 ≤ ADT < 1,000
  - Paved shoulder?
    - Yes
      - PROJECT: Edgeline rumble strips, new pavement markings, clear and grub
    - No
      - Are lanes 11’ or wider?
        - Yes
          - PROJECT: Centerline rumble strips, edgeline rumble strips, new pavement markings, clear and grub
        - No
          - PROJECT: Pave shoulder with Safety Edge, edgeline rumble strips, new pavement markings, clear and grub

- ADT ≥ 1,000
  - Paved shoulder?
    - Yes
      - PROJECT: Pave shoulder with Safety Edge, edgeline rumble strips, new pavement markings, clear and grub
    - No
      - PROJECT: Edgeline rumble strips, new pavement markings, clear and grub

Notes:
- New edgeline pavement markings of 6” if lanes are 12’ or wider; otherwise, 4” pavement markings. Paved shoulder only recommended if existing shoulder width is greater than 2’.

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Segments – Example Recommendation Map
Segments – Site Specific Countermeasures

- Provide safer slopes and ditches
- Modify horizontal alignment
- Remove/relocate objects in hazardous locations
- On-pavement markings for speed control
- Post-mounted delineators
- Guardrail
- Curve treatments along segment
INTERSECTIONS

CURVES
# Summary of LRSPs

<table>
<thead>
<tr>
<th></th>
<th>Iowa DOT DRSPs</th>
<th>Iowa DOT LRSPs Phase 1</th>
<th>Iowa DOT LRSPs Phase 2</th>
<th>Iowa DOT LRSPs Phase 3</th>
<th>KDOT LRSPs Phase 1</th>
<th>Total</th>
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<tbody>
<tr>
<td><strong>Miles of Paved Roads</strong></td>
<td>9,521</td>
<td>2,334</td>
<td>2,204</td>
<td>3,777</td>
<td>1,340</td>
<td>19,176</td>
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<td><strong>Intersections</strong></td>
<td>15,540</td>
<td>3,644</td>
<td>3,393</td>
<td>5,492</td>
<td>1,505</td>
<td>29,574</td>
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<td><strong>Curves</strong></td>
<td>N/A</td>
<td>1,263</td>
<td>1,805</td>
<td>1,861</td>
<td>278</td>
<td>5,207</td>
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Questions?

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