Local Road Safety Plans

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April 19, 2017
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 implementation that supplements 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:
  - Nebraska
  - Kansas
  - California
  - FHWA (for 4 counties)
2 – Issues/Challenges
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
- Engineering
- Education
- Emergency Response
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
Success Stories

- Bike helmets
Success Stories

- School bus routing
Success Stories

- Retroreflective posts on signs
Success Stories

- Mowing program
4 – LRSP Process
LRSP Process Overview

- Document Review
- Data Collection
- Data Analysis
- Countermeasure Selection (and workshop)
- Develop Projects (and workshop)
- Develop LRSPs
- Stakeholder Outreach
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
Database Development

- Segment database
- Intersection database
- Curve database
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
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
Develop Project Sheets

Location of Project with respect to County, on a Zoomed in Map, and Aerial of Project Location

Summary of Systemic Ranking for the Location

Brief Crash Data Summary for the Location

Opinion of Probable Cost for the Identified Improvements

Additional Information/Notes

Kimley-Horn

PROJECT SHEET LAYOUT

Icon Displaying Project Type (Intersection, Curve, or Segment)

Unique GPS Identification Number

Key Emphasis Area Crashes that the Project is anticipated to Address (from the Iowa Strategic Highway Safety Plan)

Other Information at this Location that is Important for Developing the Recommendations within the Decision Tree

Opinion of Probable Cost Disclaimer, Project Description Form Disclaimer, Project Location Map Sources

Opinion of Probable Construction Cost Disclaimer:

Kimley-Horn has no control over the cost of labor, material, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Kimley-Horn at this time and represent only the Kimley-Horn's judgment as a design professional familiar with the construction industry. The Kimley-Horn cannot and does not guarantee that proposed, bids, or actual construction costs will not vary from its opinions of probable costs.

Project Description Form Disclaimer:

The recommended improvements contained in this project description form were developed through a Design Information System (DIS) database risk assessment and project decision tree selection process as specifically stated in our scope of services. Kimley-Horn has no control over the accuracy of the DIS database nor the suitability of the specific improvements for the location, and it has provided recommendations for the County Engineer. The County Engineer may use this project description form in whole or in part as the basis for the County Engineer's decision making process. The Kimley-Horn uses the project description form to aid in the selection and development of projects. This project description form should not be used, as the sole basis for the County Engineer's decision making process, without any due diligence by the County Engineer. The County Engineer may use the project description form in whole or in part as the basis for the County Engineer's decision making process. The developer, or the developer's consultant, should review the project description form and make any necessary changes based on the developer's specific requirements and the developer's own due diligence. The developer, or the developer's consultant, should also review the project description form and make any necessary changes based on the developer's specific requirements and the developer's own due diligence. The developer, or the developer's consultant, should also review the project description form and make any necessary changes based on the developer's specific requirements and the developer's own due diligence. The developer, or the developer's consultant, should also review the project description form and make any necessary changes based on the developer's specific requirements and the developer's own due diligence. The developer, or the developer's consultant, should also review the project description form and make any necessary changes based on the developer's specific requirements and the developer's own due diligence.
SEGMENTS
Segments – Potential Risk Factors

- Volume
- Lane width
- Shoulder type
- Access density
- Lane departure crashes
## Segments – Example of Risk Factor Scoring

<table>
<thead>
<tr>
<th>Segment</th>
<th>ADT</th>
<th>Lane Width</th>
<th>Shoulder Type</th>
<th>Access Density</th>
<th>Lane Departure Crash Rate</th>
<th>Total Score</th>
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<td>1</td>
<td>2</td>
<td>7</td>
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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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<tr>
<td>Wider (6-inch) Pavement Markings</td>
<td>0.825</td>
<td>$2,000/mile</td>
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<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>
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<tr>
<td></td>
<td>0.61 – 0.67 “Edge Rumble Strip”</td>
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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
      - Are lanes 11’ or wider?
        - Yes
          - PROJECT: Edgeline rumble strips, new pavement markings, clear and grub
        - No
          - PROJECT: Centerline rumble strips, edgeline rumble strips, new pavement markings, clear and grub
    - No
      - PROJECT: Pave shoulder with Safety Edge, edgeline rumble strips, edgeline rumble strips, new pavement markings, clear and grub

- ADT ≥ 1,000
  - Paved shoulder?
    - Yes
      - PROJECT: Pave shoulder with Safety Edge, edgeline rumble strips, 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’.
Segments – Example Recommendation Map

Legend
- Segments with Project Recommendations
- State Roads
- County Paved Roads
- County Unpaved Roads
- Corporation Limits
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>
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<tr>
<th></th>
<th>Iowa DOT DRSPs</th>
<th>Iowa DOT LRSPs Phase 1</th>
<th>Iowa DOT LRSPs Phase 2</th>
<th>KDOT LRSPs Phase 1</th>
<th>NDOR LRSPs Phase 1</th>
<th>Total</th>
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<tr>
<td>Miles of Paved Roads</td>
<td>9,521</td>
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<td>2,204</td>
<td>1,340</td>
<td>973</td>
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<td>Intersections</td>
<td>15,540</td>
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<td>TBD</td>
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<td>Curves</td>
<td>N/A</td>
<td>1,263</td>
<td>1,805</td>
<td>TBD</td>
<td>318</td>
<td>3,386</td>
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</tbody>
</table>
5 – Questions
Thank You!

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