A Practical Approach to Safety Management of County Roads

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Motivation and Objectives

Rural roads are well-documented as having a greater traffic fatality rate than urban roads. For medium- and high-volume rural roads with a considerable crash history, previous studies have focused on the identification of high-crash locations. The majority of rural roads in Indiana are low-volume county roads. However, the methods for identifying safety problems on medium- and high-volume roads are often not suitable for county roads. Such methods may result in improper allocation of resources for safety upgrades to only the particular locations which experienced crashes, not necessarily where the crash risk is greatest. For example, there may be hazards on the road right-of-way that have not yet been manifested through crashes, but still represent a considerable risk should they influence the driver's behavior and/or affect the crash outcome.

❑ Objectives:

- Develop a practical approach to justifying safety improvements on roads that experience a low number of crashes but with a potentially severe outcome
- Develop a tool for estimating the crash and fatality risk on low-volume road elements (segments and intersections) based on their characteristics
- Evaluate a proposed project-oriented safety management framework targeted towards identifying low-cost safety improvements on county roads

Project Flowchart

1. Develop catalog of low-cost safety improvements with associated crash modification factors (CMFs)
2. Collect data and extract information on geometry, roadway infrastructure, roadside, traffic volumes, and crashes for county road elements
3. Create statistical model to estimate crash and fatality risk for county road elements
4. Apply model to identify location(s) with safety deficiencies
5. Organize safety improvement(s) into projects in order to address the deficiencies
6. Determine benefit-cost (B/C) ratios for projects
7. Select the best combinations of projects which address the needs while keeping within the budget

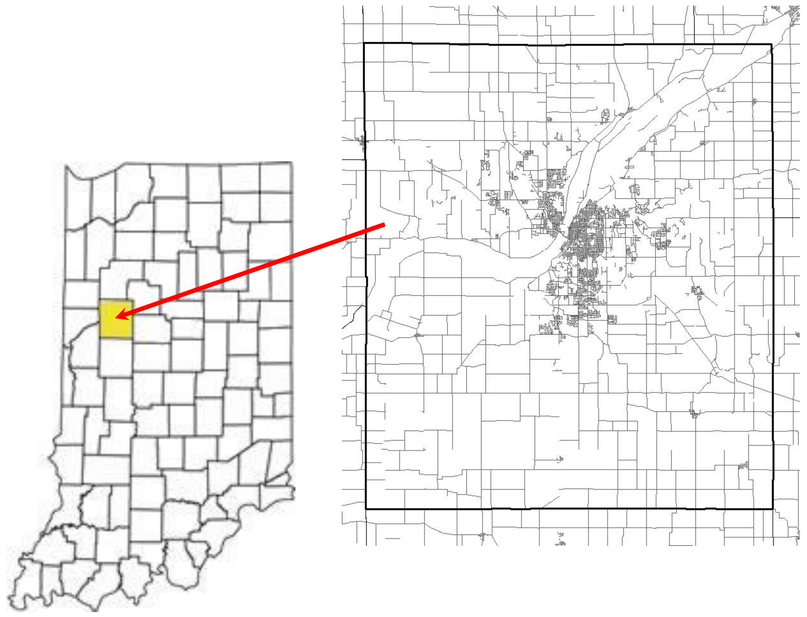
Source:http://suffolktimes.timesreview.com/2012/04/31490/man-taken-to-hospital-after-crashing-into-telephone-pole-in-southold/

Study Scope

❑ Tippecanoe County to be used as a case study:

- 660 crashes on county roads reported annually (5-year average)
- 18.9% of crashes involved injury
- 30% of crashes were run-off-road
- 840 miles of county roads (nearly 60% of total miles)
- Estimated 1,018,000 vehicle miles travelled (VMT) daily on county roads (22% of total VMT)
- **Methodology will be scalable to other counties in the state**

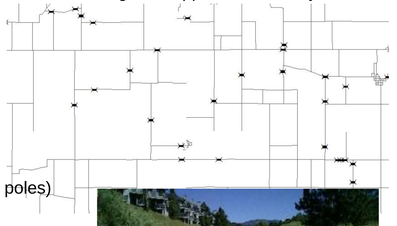
Sources: *Tippecanoe County Highway Department Crash Analysis* (Parks, 2015); INDOT Mileage and DVMT by County (2014)



Road Element Characteristics

❑ Horizontal and vertical curves
❑ Lane width
❑ Shoulders
❑ Roadside barriers
❑ Pavement
❑ Bridges
❑ Signs
❑ Lighting
❑ Roadside obstructions (such as culverts and utility poles)
❑ Annual average daily traffic (AADT)

Bridges in Tippecanoe County



Source: http://www.bceo.org/images/projects/MillikinRdClv00.636_12c.jpg

Source: http://www.eptrail.com/ci_16514507

Improvements

❑ Culvert improvements
- Removing extruding concrete
- Installing guardrails to protect vehicles from exposed concrete
- Installing object markers

❑ Pavement
- Adding additional shoulder pavement on curves
- Performing skid resistance treatment

❑ Roadside
- Removing trees, dangerous mailboxes, and other hazards in right-of-way (ROW)
- Increasing sight distance at intersections
- Installing guardrails along non-removable hazards in ROW
- Adding reflective tape to hazards in ROW
- Mowing ROW
- Flattening slopes

❑ Shoulders
- Maintaining shoulders
- Painting edgelines
- Adding rumble striping

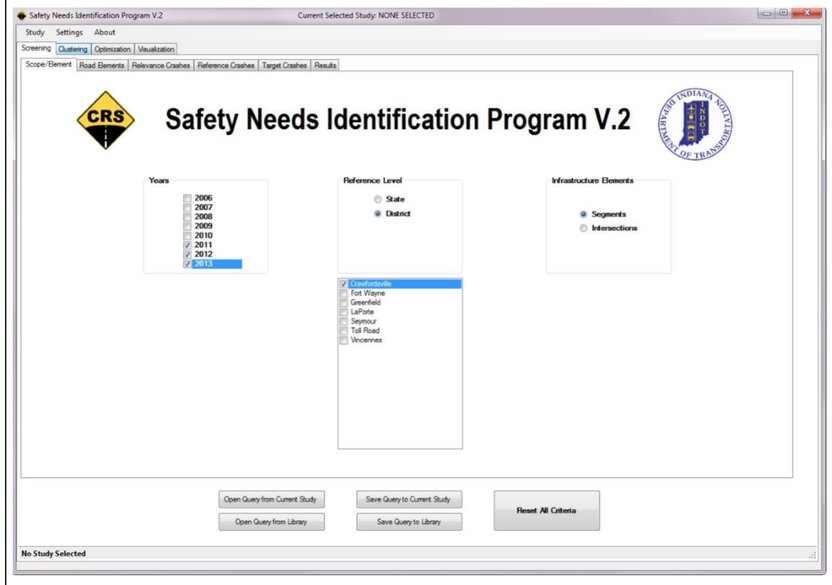
❑ Signing
- Increasing retroreflectivity of signs
- Improving curve delineation (advance warning signs, chevron signs, etc.)
- Replacing yield signs with stop signs at intersections (where applicable)
- Adding flags on warning and/or stop signs
- Installing flashing LED stop signs
- Increasing size of street name signs

Source: *Best Practices for Low-Cost Safety Improvements on Iowa's Local Roads* (Sperry et al., 2008)

Source: Traffic & Parking Control Company

Implementation

❑ Project-oriented safety management tool
- The Safety Needs Identification Program (SNIP2) is a network screening tool developed at the Center for Road Safety to identify safety problems on individual roads within a region
- A modified version of SNIP2 will be produced, capable of selecting the best combinations of low-cost safety improvements applied to multiple roadway elements
- This tool will provide better economic justification of safety improvements on county roads than the methods based on individual high-crash locations



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