Kentucky Transportation Cabinet Applies Systemic Safety Project Selection Tool on Behalf of Local Agencies

The Kentucky Transportation Cabinet (KYTC) applied the *Systemic Safety Project Selection Tool* (Tool)[1] to a local road system. Through the Federal Highway Administration Focus State Initiative, KYTC staff had previously conducted systemic planning focused on roadway departure crashes on State highways. This planning effort, however, did not analyze or suggest any improvements for rural county roads. KYTC has a separate initiative that focuses on five or six counties each year (selected based on crash data) to assist the county agency staffs with reviewing corridors and identifying specific safety-related improvements. For their 2012 effort, KYTC used the Tool to analyze county roadway corridors on behalf of local agency staff in five counties—Boyle, Bourbon, Franklin, Mercer, and Montgomery.

Process and Results

Based on crash issues identified in previous statewide data analyses, KYTC chose roadway departure crashes on horizontal curves as the focus crash type. Rural county roads were chosen as the focus facility type in recognition of a commitment to increase the level of resources devoted to safety on local systems. There were a total of 92 segments along 217 miles of roadways in the five counties.

Focus crash type: Roadway departure crashes on horizontal curves

Focus facility type: Rural county roads

Identified five risk factors:

- ✓ **Horizontal curve density**
- ✓ **Lane width**
- ✓ **Shoulder type**
- ✓ **Shoulder width**
- ✓ **Speed limit**

Risk Assessment Results:

- ✓ **100 percent of segments had at least risk factors**
- ✓ **45percent of segments had three risk factors**
- ✓ **47percent of segments had four risk factors**
- ✓ **7percent of segments had five risk factors**

KYTC assembled crash data for the 2007-to-2011 timeframe and roadway attribute information from photo logs. KYTC referenced their Highway Pavement Management System (HPMS) database to identify appropriate roadway attributes. KYTC then assembled a list of potential risk factors from information presented in the American Association of State Highway and Transportation Officials' *Highway Safety Manual*[2]. Five risk factors representing roadway attributes were selected from this initial list: horizontal curve density (number of curves per mile with a radius between 500 and 1,200 feet); lane width; shoulder type; shoulder width; and posted speed limit. Then, each risk factor was associated with a threshold value that was subjectively determined: horizontal curve density greater than the median density; lane width less than 10.5 feet; unpaved shoulders; shoulder width less than 6 feet; and posted speed limit greater than 30 miles per hour. For a given risk factor, a road segment received a score of "1" if it had attributes beyond the threshold value or a score of "0" otherwise.

The number of risk factors present was tallied for each segment. Results show that every segment but two (90 segments) had at least three risk factors present. Eighty-three of 90 segments had the same three risk factors (lane width, shoulder width, and speed limit). Therefore, the other two risk factors (curve density and shoulder type) were generally the determining factors for risk scores greater than three.

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[1] FHWA. 2013. *Systemic Safety Project Selection Tool.* U. S. Department of Transportation. Federal Highway Administration. http://safety.fhwa.dot.gov/systemic/.

[2] AASHTO. *Highway Safety Manual.* http://www.highwaysafetymanual.org/Pages/default.aspx. American Association of State Highway Transportation Officials. 2010.

As a check of the risk assessment results, KYTC compared the risk rating with the crash data to determine whether there was an association between the two. Table 1 shows that fatal, serious injury, and severe (fatal plus serious injury) crash rates (crashes per one million vehicle miles traveled) generally increase with the number of risk factors present for the segments analyzed with the Tool. The evaluation also suggests that the 15 miles of segments with all risk factors present had the highest crash rates.

Table 1. Kentucky Comparison of Risk Rating and Crash Rates for Roads with Annual Average Daily Traffic Less Than or Equal to 400

Number of Risk Factors Present	Roadway Miles	Sum of Vehicle Miles of Travel	Fatal Crash Rate	Serious Injury Crash Rate	Severe (fatal plus serious injury) Crash Rate
3	98	12,658,000	0.063	0.095	0.158
4	101	14,127,000	0.099	0.071	0.170
5	15	910,600	0.220	0.220	0.439

Benefits

The Tool proved beneficial for KYTC because it provided an easy-to-apply process to evaluate locally owned and operated roads. Applying the Tool did not require additional data gathering; all the data used in the analysis were based on available photo logs.

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