

## I. RESEARCH PROJECT TITLE

Study of KDOT Policy on Lane and Shoulder Minimum Width for Application of CLRS

## II. RESEARCH PROBLEM STATEMENT

Traffic deaths are caused by a number of different factors and more than half of the roadway fatalities are caused by roadway departures. In 2003, there were 25,562 roadway departure fatalities, accounting for 55 % of all roadway fatalities in the United States. Also in 2003, 16,700 people died in run-off-the- road accidents (39% of all roadway fatalities) and head-on accidents represented 12% of all roadway fatalities. On average, one roadway departure fatality occurs every 23 minutes, and a roadway departure injury occurs every 43 seconds. It is estimated that the annual cost of roadway departure is 100 billion. Two of the countermeasures used to increase roadway safety by deterring roadway departures are Rumble Strips (shoulder and centerline) and Rumble Stripes – rumble strips combined with edge line markings. Shoulder Rumble Strips (SRS) and Centerline Rumble Strips (CLRS) have demonstrated effectiveness in reducing lane-departure crashes on rural roadways. A comprehensive before-and-after study conducted by Persaud et al. (2004) concluded that head-on and opposing direction sideswipe crashes, the primary target of CLRS, were reduced by the estimated 21% and head-on and opposing-direction sideswipe crashes involving injuries by an estimated 25%. Preliminary results of the accident data from US 50 and US 40 in Kansas show similar results and indicate that installing CLRS is an effective method of reducing head-on and opposite direction sideswipe type of accidents. Rumble strips are new but are reported to have great potential of increasing safety of rural roadways users.

According to the KDOT 2007 Policy on Longitudinal Milled-in Shoulder and Centerline Rumble Strips “*Centerline rumble strips may be used on two-lane, Class B and C, rural highways with asphalt pavement surfaces 1.5 inch or more in depth having paved shoulder width of at least 3 feet.*” Unfortunately there is a good number of two-lane rural roadways in Kansas that do not meet that requirement, but could potentially benefit from the installation of CLRS and/or rumble stripes. Some of the states (Washington, Pennsylvania) experimented with installation of CLRS where combined shoulder and lane width was 12 feet with positive results.

The KSU team would like to address the issue of the minimum lane and shoulder width requirements for the installation of CLRS and/or rumble stripes.

## III. RESEARCH OBJECTIVE

The main objective of this research will be to compare the KDOT 2007 policy on the minimum lane and shoulder requirements for the installations of CLRS with other states policies. The minimum lane and shoulder width requirements could prevent widespread installations of CLRS on two-lane rural roadways in Kansas and potentially reduced the safety benefits for Kansas motorists. The alternative of using edge line rumble stripes

with or without CLRS will also be investigated, particularly on rural roads with no shoulder.

#### Tasks

1. Update literature.
2. Conduct a survey of States to find out their most current policies, including the minimum lane and shoulder width requirement, for application of CLRS. Also, questions will be asked to gather the information about the states experiences with edge lines and rumble stripes.
3. Conduct field research on experimental sites with installations of CLRS with shoulder width of less than 3 feet.
4. Study the lateral positioning of vehicles travelling on the experimental sites.
5. Study and analyze the before and after accident data obtained from the experimental sites.
6. Distribute survey questionnaire to the road users to learn their responses to the installation of the CLRS and/or rumble stripes on the experimental sites.
7. Write and present draft report.
8. Finalize report.

#### **IV. ESTIMATES OF FUNDING AND RESEARCH PERIOD**

*Period:* 18 months

*Funding:* \$59,000

#### **V. URGENCY AND POTENTIAL PAYOFF**

CLRS appear to be low-cost, effective safety countermeasure for reducing overall and injury cross-over crashes on two-lane, two-way roadways. However, according to the KDOT 2007 policy on longitudinal mill-in rumble strip the CLRS can be installed only on the roadways with the shoulder width of minimum 3 feet. This requirement is keeping KDOT from installing extensive miles of CLRS and thus reducing cross-over crashes and saving lives. In this study the KSU team will look into the policies of different states and conduct field experiments to determine the optimum lane and shoulder width.

Reducing overall and injury cross-over crashes on two-lane, two-way roadways is always an urgent priority with very high payoff. However, the current KDOT policy may eliminate hundreds of mile of Kansas rural highways from potential life savings treatment. On roads with no shoulder, edge line rumble stripes may be the answer to save lives.

#### **VI. IMPLEMENTATION STRATEGY**

The results will be disseminated in the form of guidelines by KDOT and the Kansas County Highway Association.

## **VII. PROJECT PERSONNEL**

Since fall 1999, Drs. Rys and Russell have been conducting research on SRS and CLRS and their use on highways in the United States. They have successfully conducted several studies of this type for KDOT and FHWA, including the 2005 NCHRP Synthesis 339 on Centerline Rumble Strips.

## **VIII. SUBMISSION INFORMATION**

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