Staff summary

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Median Guard Cable Performance in Relation to Median Slope

An In-house Study by Organizational Results

MoDOT Staff Summary Statement

Based upon preliminary crash and slope data collected, the following findings are noted.

There is a high success rate of median guard cable preventing vehicles encroaching into opposing lanes. Missouri experienced an average of 95.2 percent success rate with reported guard cable crashes on five interstate highways over a period of seven years.

From the data collected on Interstate 44, median slope does not have a sole effect on the success or failure of the guard cable. The success rate on medians steeper than 6:1 is 1.4 percent higher than on the flatter medians. Assuming a five percent significance level, statistically there is no difference between the two groups. With a confidence level of 95 percent, it is concluded that the steepness of the slope alone, does not cause the median guard cable to fail any more or less.

Figure 1, Guard Cable Installed on Interstate 44.

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MoDOT Project Overview

Guard cables were first installed in Missouri on I-44 medians in 1999. Currently, MoDOT has median guard cables along Interstate 70 and at some locations on interstates 270, 44, 55 and 435, with more proposed along those routes. Guard cable is intended for use on a maximum of 6:1 (H:V) slope. In practice, however, slopes as flat as 6:1 don't always exist. In the interest of practicality, MoDOT has installed cables in the median with slopes steeper than 6:1. This study determined the performance of guard cables on different slopes.

For the purpose of this study, when a vehicle crashes into a guard cable, the performance of the guard cable is defined either as a "success" or "failure". "Success" means that the vehicle does not make it to the opposing travel lanes. "Failure" means that the vehicle goes through the cable barrier system and reaches the opposing travel lanes.

The investigators identified 1,402 guard cable crashes from year 1999 to 2005. Among the 1402 crashes, 67 of them are considered to be failures, which gives an average 95.2 percent success rate. Field surveys determined the cross section at the accident locations. After collection of geometric data, the investigators conducted data analysis, tying the accidents to cross section data to the performance of guard cables.

With 1,400 potential sites to survey, I-44 was chosen as a sample, because the median slope varies most along the stretches with guard cable installed. 140 sites along I-44 were surveyed to obtain median slope data for 225 crashes. The median slopes surveyed range from 2.7:1 to 24.1:1, with a median value of 6.2:1 and an average of 6.4:1.

MoDOT Staff Findings

Among the 225 guard cable crashes, 103 of them happened on median slopes steeper than 6:1, with 7 failures. This results in success rate of 93.2 percent for the median guard cable on slopes steeper than 6:1. The other 122 crashes happened on median slope equal to or flatter than 6:1, with 10 failures. This results in a success rate of 91.8 percent for the median guard cable on slopes equal or flatter than 6:1. Because the success rate is similar, design guidelines could be revised to allow installation on steeper slopes without re-grading them to a 6:1 slope.