Project Title: Safety Performance Enhancement Analysis of Rumble Stripes with Elements: A Case Study on Rural Highway US 285 in New Mexico

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Abstract:

Poor visibility of outside lane shoulders on rural highways has been identified as one of leading causes to lane departure crashes under nighttime and inferior weather conditions. There were 32,367 fatal crashes in the United States, among which, 10,414 crashes were identified as single-vehicle run-off-road crashes in 2011, due to inattentive driving and lack of alert countermeasures to avoid vehicle lane departure. Rumble strip has been an effective safety countermeasure for inattentive drivers against potential lane departure crashes by generating audible rumbling sound and tactile vibration. However, due to infrastructure deterioration that can be attributed to aging, traffic loading, rainfall, and temperature variation, lane shoulder striping on some highway segments becomes less visible to provide the motorist with adequate information of the edge of the outside driving and lead to an increase in run-off-road crash occurrences. Many cost-effective solutions have been proposed to improve the visibility and retroreflectivity of the outside lane shoulder stripes on rural highways under nighttime and wet weather conditions. For example, New Mexico Department of Transportation (NMDOT) proposed to employ rumble stripes with elements to improve roadway edge visibility and retroreflectivity by painting
retroreflective pavement striping over the existing rumble strips on highway U.S. 285 from Vaughn to State Line. This project aims to evaluate and analyze safety performance improvements of rumble stripes with elements in order to enhance their effectiveness on rural highways. In this study, the visibility improvements of the edge striping will be evaluated under dark lighting and wet weather conditions based on onsite before-and-after observations and interviews. Crash data from the existing crash record database and new police crash reports will be used to conduct statistical analyses to compare run-off-road crash occurrences based on a before-and-after study. Cost-effective and applicable signing and marking countermeasures will be recommended to reduce crash risks and severities on rural highways based on the research findings.