

Centerline Rumble Stripes as an Alternative to Raised Pavement Markers

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Abstract

Raised Pavement Markers (RPMs) have been used in the United States for decades to improve lane delineation in dry and wet low light conditions. The RPM is simply a retroreflective lens on a substrate attached to the pavement so as to protrude slightly above the pavement surface. In areas subject to winter snowfall, the retroreflective lens is guarded by a cast iron body embedded into the roadway to protect the lens from snowplows. Although designed to withstand snow plow abuse, these cast iron shells can dislodge from the pavement when struck by snow plow or heavy truck and present a very real threat to motorists, resulting in a recent questioning of the practice of using such cast iron shells in the roadway. Indiana is looking for an alternative to RPMs that maintains the lane delineation in dry and wet low light and conditions without jeopardizing the safety of motorists or exposing the state to tort liability.

Shoulder rumble strips have been used for many years to provide vibratory feedback to drivers departing from the roadway. Frequently these rumble strips were placed outside of and adjacent to the marked lines; however, recently agencies have

aligned the markings within the rumble strips. These painted rumble strips, also known as rumble stripes, are emerging as centerline and edge line treatments that provide auditory and vibratory feedback to drivers of vehicles departing the marked lane.

We established three test corridors to compare the nighttime visibility of edge and centerline rumble stripes to the standard painted edge line before and after winter seasons in Central Indiana. A qualitative and quantitative analysis indicated that rumble stripes provide improved retroreflectivity over the standard painted line in both dry and wet conditions. The rumble stripes consistently surpassed the FHWA-research-based repainting thresholds for painted lines after one winter season. A collateral benefit of painting edge and centerlines within the rumble strip is the potential to increase the retroreflective durability of the lines, particularly in areas that have substantial winter plowing operations. The placement of the painted stripe within the rumbles was found to protect a portion of the stripe from the snow plow, providing a more durable stripe that can endure more than one winter season before repainting is necessary. Furthermore, a cost analysis shows that not only are centerline rumble stripes less costly to install than RPMs, but they do not require the regular maintenance necessary to maintain the high retroreflectivity of RPMs.

Based on quantitative, qualitative, and cost analysis the centerline rumble stripes were found to be a cost effective alternative to RPMs in Indiana. Under normal conditions rumble stripes do not require any maintenance outside of the already-scheduled repainting. Due to the inherently paint protective design of the rumble, additional recommendations are made to add the more expensive wet-retro reflective elements to the standard glass beads in areas requiring higher retroreflectivity.