

Topic: Mumble Strips

What are Mumble Strips?

The intended purpose of a rumble strip is to provide drivers with both an audible and a tactile warning that they are approaching a potentially hazardous condition – the road edge, opposing traffic etc. Traditional rumble strips accomplish this task but also provide an undesirable side effect for adjacent landowners – increased traffic noise levels. Unlike the traditional rumble strips, “mumble” strips produce lower exterior noise levels when vehicles pass over them. Depending on the design, mumble strips could also reduce interior noise levels. However, reduced interior noise level, to a certain degree, is undesirable since the noise created is supposed to warn the drivers of errors. The most significant difference between a traditional rumble strip design and a mumble strip design is the sinusoidal pattern. This relatively new pattern of pavement grooving has not been widely deployed around the country due to the minimal research available. MnDOT and the Local Road Research Board (LRRB) have recently completed a study that compared three different rumble strip designs near the City of Crookston Minnesota on a rural 2-lane section of CSAH 11 in Polk County. This study utilized three vehicle types (passenger car, small truck and semi-tractor trailer) to pass over the different designs at low (30mph), medium (45mph) and high (60mph) speeds.

Key Points

- Maintains interior noise and vibration
- Reduced exterior noise translating to satisfied nearby residents
- Potentially as effective in alerting drivers of potential conflicts as traditional rumble strips

What is the difference between Mumble and Rumble Strips?

To create a mumble strip instead of a traditional rumble strip, a different pattern is cut into the pavement. Figure 1 shows the general shape of rumble strip designs in California, Minnesota and Pennsylvania. The three designs were analyzed in the *Rumble Strip Noise Evaluation* study published by the LRRB. Traditional rumble strip designs, similar to Minnesota’s, are rectangular in shape and are typically cut into the pavement once the surface has hardened. The study compared the noise levels by recording the A-weighted decibel (dBA) readings both inside and outside of the different vehicles and different designs. Additionally, an A-weighted decibel reading was recorded for vehicles passing over the pavement absent rumble strips. The rectangular pattern produced the highest noise levels in and outside of the vehicle whereas the Pennsylvania design, which most closely represents a sine wave, was the quietest overall. There is concern considering that lower levels of interior noise may not be enough to warn drivers of the lane departure.

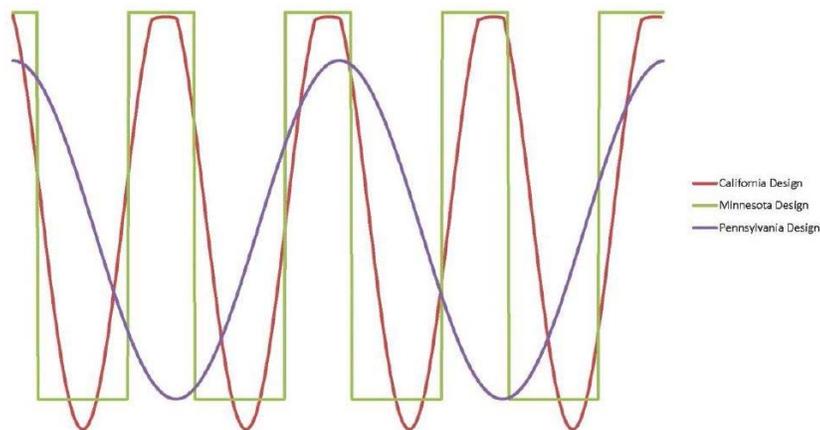


Figure 1: Three Rumble Strip Designs
Source: *Rumble Strip Noise Evaluation*. LRRB, February 2015.

How do Mumble Strips operate?

Mumble strips operate the same way that traditional rumble strips operate. They still provide an audible and tactile sensation that alerts drivers when they are departing the traveled way. However, quieter exterior noise produced by passing vehicles benefits residents who are near them and the mumble strips could potentially provide equivalent safety benefits.

Where is the best place for Mumble Strips?

Mumble strips would ideally replace traditional rumble strips in rural areas with adjacent residential development or in urban environments where addressing lane departure crashes has been identified as a priority. Another location where mumble strips might be appropriate are on highways that pass through or near smaller rural towns. One of the intended outcomes of this new design is to reduce the amount of noise produced by vehicles passing over them. Residents who live near patches of rumble strips could actively hear the noise produced by vehicles striking them from over one-half mile away. To many at this distance, the level of noise could be considered ambient noise and would not be considered a nuisance.

How expensive are Transverse Rumble Strips?

Since there has not been wide use of sinusoidal rumble strips, the cost associated with them is undetermined. The overall cost of mumble strips would be comparable to traditional rumble strips but perhaps with a slight increase due to the unique shape carved into the pavement as well the proprietary machinery that may not be readily available to contractors.

What are some design differences?

The type of sine wave cut into pavements is an important factor when designing reduced noise rumble strips. The depth and center-on-center spacing of the rumble strips are a significant factor when producing the appropriate interior noise level to alert drivers, but also reducing the exterior noise when installed near residents. Additionally, design variations could take the form of increased width of the mumble strip to address heavy commercial tire bridging with the 8-inch strips, and also considering centerline mumble strip studies as well.

Other Considerations

Other agencies have tried reducing roadside noise in populated areas with alternative techniques. One option that is used in areas with low snowfall is thermoplastic profile pavement markings or raised pavement markings. Even though this alternative has been proven to reduce roadside noise levels, it would not be a viable option in Minnesota due to snowplowing during winter weather.

References

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