Montana Department of Transportation
Research Programs
May 2011

EXPERIMENTAL PROJECT

EVALUATION OF EDGE LINE RUMBLE STRIPS (INFORMAL)

FINAL REPORT

Location:	Cascade County, Interstate 15, C000015; Approximate Mile Point 274
Project name:	Great Falls North & South
Project Number:	IM 15-5(101)270 (UPN 4041)
Type of Project:	Edge Lines on Rumble Strips
Principal Investigator:	Craig Abernathy Experimental Program Manager
Date Constructed:	Summer 2007
Evaluation Date:	June 2007-April 2011

Objective

The Great Falls District elected to install rumble strips covered by edge line pavement marking stripes, either partial or full coverage. Specifically, the rumble strip is moved to the location of where the edge line is and the pavement marking is applied onto the rumble strip.

Potential Benefits

This technique has potential benefits that include allowing greater reaction time for drivers since the placement of the rumble strip closer to the travel lane. There may be an increase in the visibility and reflectivity of the lane edge stripe because reflective beads will collect on the side of the peaks of the rumble strip

facing traffic. Bikes and other pedestrians using the shoulder will have more room. Lastly, placing the edge line over the rumble strip may make the pavement marking stay visible longer.

Documentation

Research will document select areas of the Great Falls N & S in the area of mile point 274 and report on the durability of the edge lines and rumble strips. Visual documentation will consist of noting and photographing the performance of the edge stripe and rumble strip.

The following are images with descriptions of the initial site visit in June 2007 and the follow-up visit on May 2008, June 2009 and April 2011. The images represent the practice per application and examples of procedure may be taken from different locations on the project. The spring of 2009 site visit found the project had been chip sealed and the pavement markings reapplied.

June 2007

↑ Image of newly placed edge stripe with full coverage over rumble strip on inside travel lane

June 2007

↑ Image of newly placed edge stripe with partial coverage over rumble strip on travel lane

June 2007

↑ Close up of edge line on rumble strip

June 2007

↑ Overview of full coverage edge line rumble strips – view north

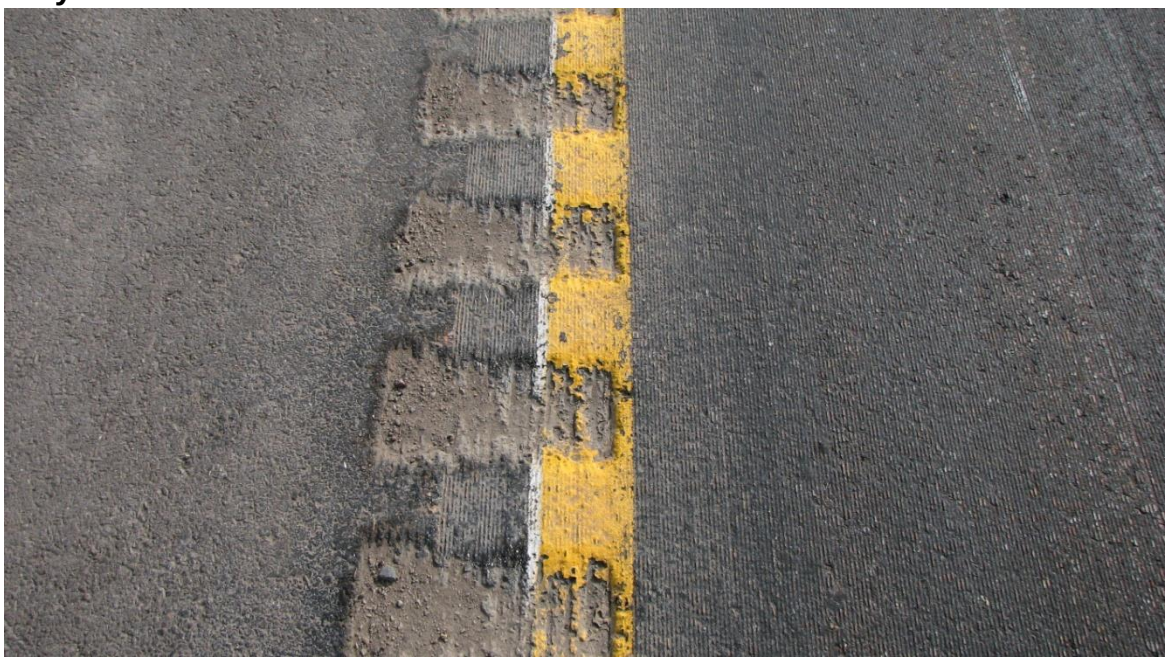
May 2008

↑ Condition of outside passing lane rumble strip and edge line in spring of 2008

May 2008

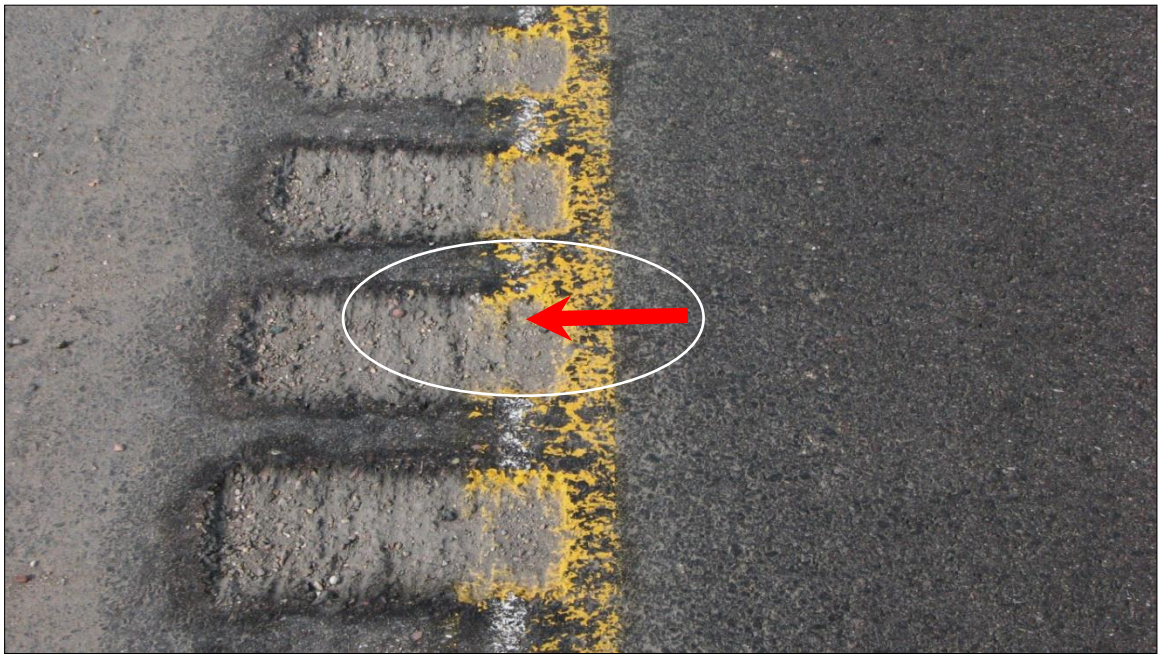
↑ Condition of edge line in the travel lane

May 2008



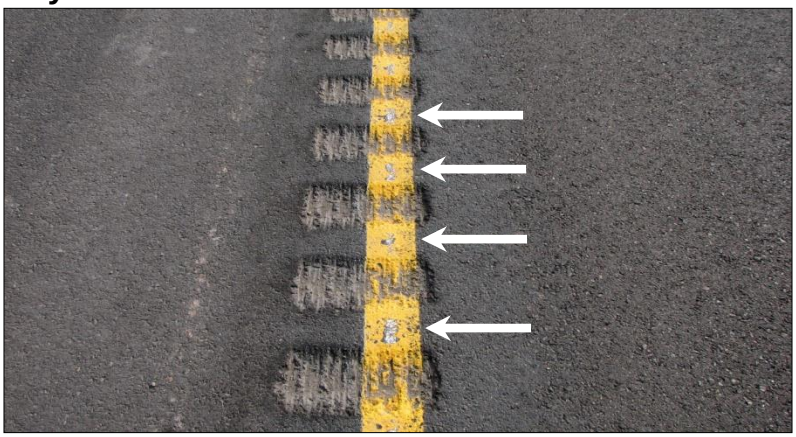
↑ This shows a section where the edge line paint within the rumble strip has popped out of the recess of the strip. It is unclear at this time what mechanism of debonding may have caused this condition.

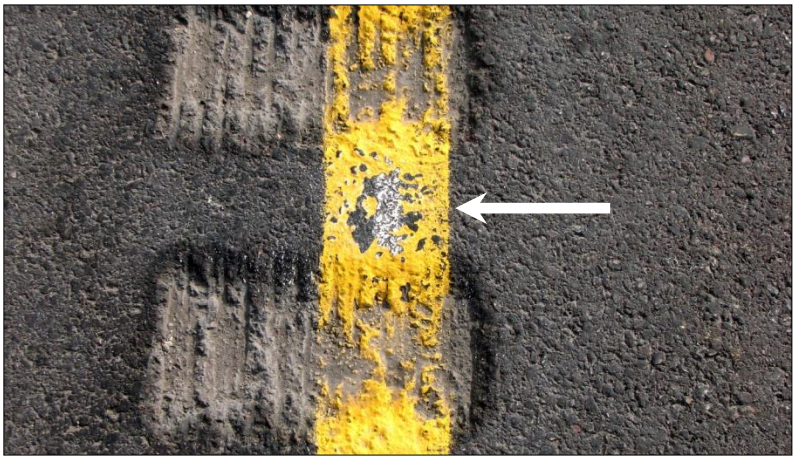
May 2008



🡅 The pavement stripe in the recess of the rumble strip is intact; however sediment has collected within the indent of the strip and may diminish the retroreflectivity of the paint on the peak side of the strip (red arrow)

May 2008





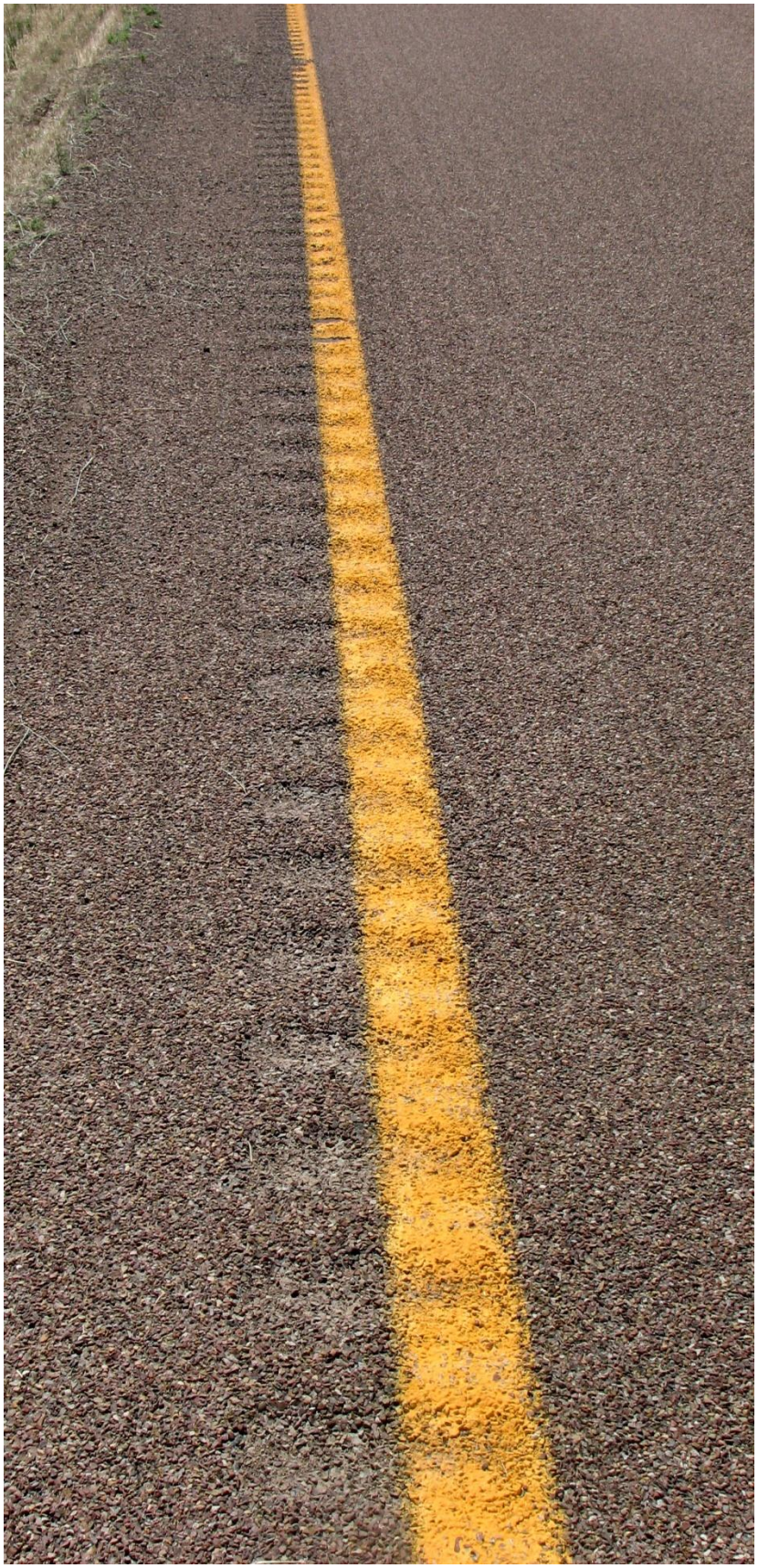
🡄 These two images represent several areas where the paint is in fair condition relative to other locations, but have lost paint between the strips. As seen by the images on the left, the paint loss seems to be at or near the center of the stripe area between the strip lines (arrows). It is difficult to account for a reaction like this. Harmonics of the plow blade passing over the recessed area and then onto the painted pavement section may be a factor, or the frequency of plow passes has yet to degrade the rest of the area.

June 2009

🡸 Image shows the application of a seal and cover (chip seal) and the reapplication of the travel lane pavement stripe.

At the time of site visit, the overall condition of the travel line stripe is in good condition.

June 2009



🡸 Overall condition of the passing lane stripe.

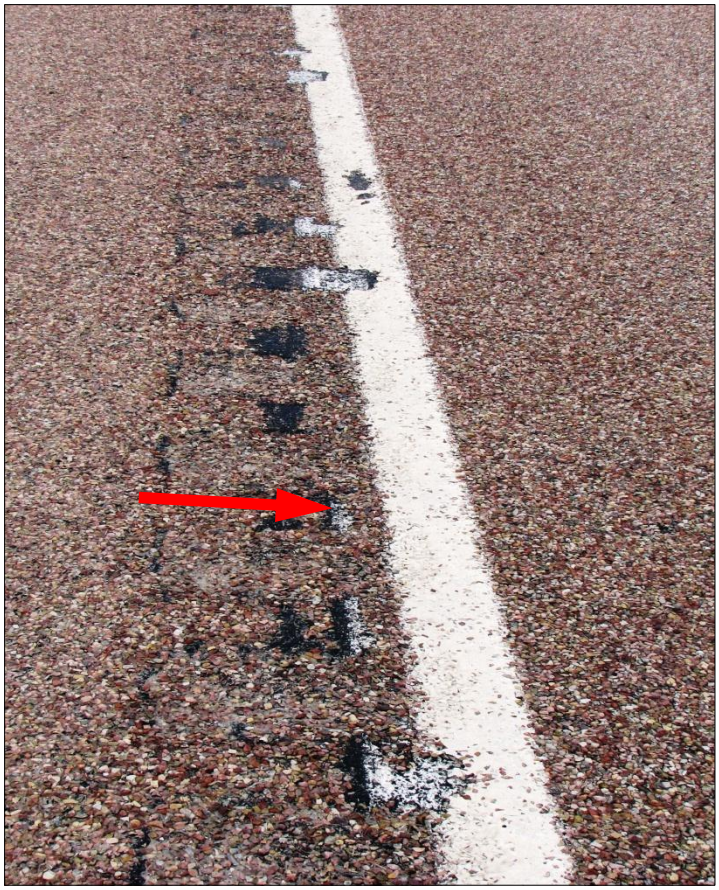
June 2009

🡅 Close-up image of passing lane strip/stripe.

April 2011

🡅 Sample image of edge line over rumble strip travel lane. Note that debris/particulates accumulated in the recess of the rumble strip may reduce retroreflectivity.

🡅 Sample image of edge line over rumble strip passing lane. Note that debris/particulates accumulated in the recess of the rumble strip may reduce retroreflectivity.



🡸🡻 Both these images show that after the seal and cover. The restriping was applied away from the rumble strip. The arrows show the location of the original striping.

🡅 Example image of areas where the pavement stripes have been scrapped off by plowing activity between the rumble indents.

Analysis

The area of analysis is centered on mile point 274. The information displayed in this report represents the average condition of the edge line in relationship with being placed partially or directly over rumble strips.

Condition of the edge stripes (as documented in May 2008) ranged from fair to poor. It is difficult at this time to determine durability of the stripe between full or partial coverage with the rumble strip since there as a substantial range of performance for both practices. With the caveat that winter plowing activities historically are rough on pavement markings. The 2009 summer inspection documented only the recent chip seal and reapplication of the pavement markings. A 2010 inspection was not conducted.

One of reasons to place edge line over the strips is the potential for gained retroreflectivity due to the fact the edge line is on angle (or upward peak) within the strip facing toward oncoming traffic. Past research from other states has supported that supposition. However the debris and particulates that have accumulated in the recesses of the strips may diminish that potential added reflectivity. It should be noted that the travel lane strip indent had less accumulated particulates than the passing lane side. Possibly due to the majority of traffic using the travel lane versus the passing lane; with the action of passing traffic may assist in keeping the strip recess cleaner.

It was observed at the transition of traditional placement of stripe to strip and the new design on the inside travel lane, that a large majority of trucks hit the rumble strips at that delineation with no difference of frequency of contact between full or partial edge stripe over strip. Once the trucks were audibly aware they were on the strip they corrected themselves away from the edgeline.