Montana Department of Transportation
Research Programs
May 2011

EXPERIMENTAL PROJECT

EVALUATION OF RECYCLED PLASTIC MATS AS WEED PREVENTION AND EROSION CONTROL AROUND GUARDRAILS

Final Report

Location:	Interstate 15; Great Falls District, Cascade County, RP approximately 274
Project name:	Great Falls N & S
Project Number:	IM 15-5(101)270, UPN 4041
Type of Project:	Experimental trial using recycled plastic mats as weed prevention and erosion control around guardrails
Principal Investigator:	Craig Abernathy Experimental Program Manager
Date Constructed:	June 2007
Evaluation Date:	August 2009-May 2011

Objective

The Department's current practice of erosion and weed control around guardrails is to pave the area with asphalt cement (AC). The objective of this project is to evaluate recycled plastic mats to determine if this could be a cost effective alternative to paving with AC.

Experimental Design

Initially two types of guardrail weed mat were to be tested; Durotrim Recycled Rubber Tire Mat and the Universal Weed Cover Recycled Plastic Mat (UWC). The District decided to install only the UWC product. The product was installed in the summer of 2007 near the mile point reference 274, Interstate I-15; on both north and southbound guardrails sections at the overpass that connects the Ulm North Frontage road and the Tri Hill Frontage road.

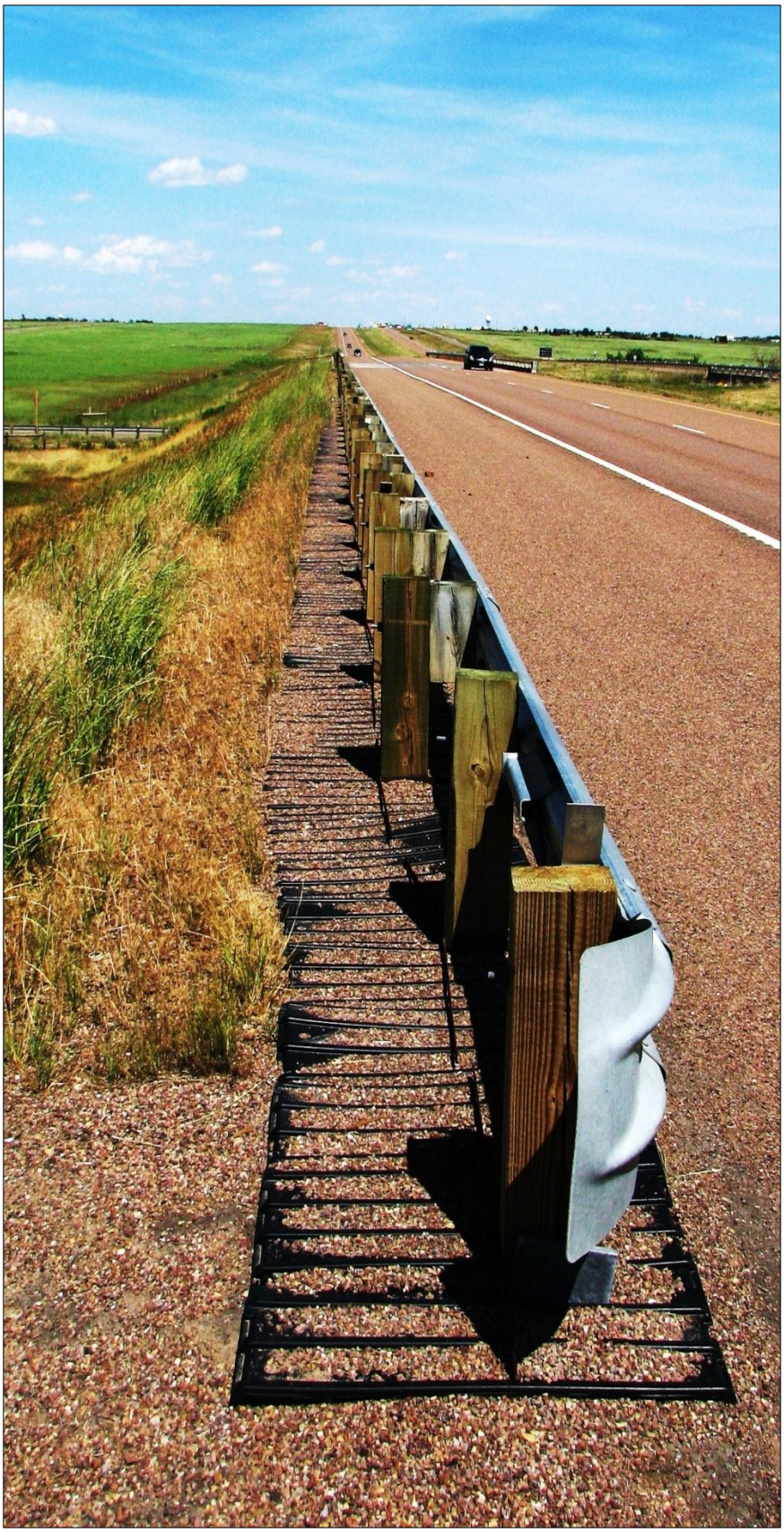
Analysis

The main objective of the research is to monitor the effectiveness of the device in limiting the spread and growth of weeds around the guardrail structure. In addition to erosion control, and to the durability of the product itself. The following images will detail the efficacy of the product up to spring of 2011. If conducted the next analysis will take place in the spring of 2012.

August 2009

🡸 Overview of weed mat installation; northbound lanes, looking south. Image shows that the product to date is effective in weed control around guardrails.

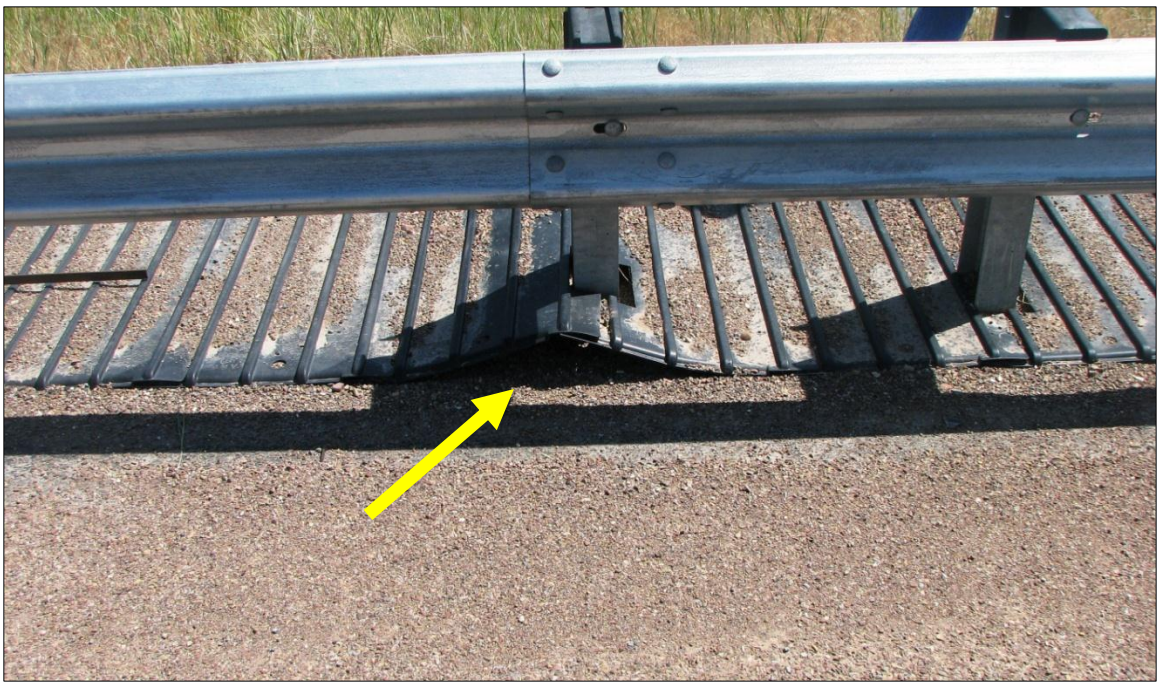
Damage seen in bottom of image is from earlier (assumed) snow-plow damage documented in the August 2008 report.



🡐 Overview of weed mat installation; southbound lanes, looking north. Image shows that the product to date is effective in weed control around guardrails. No erosion is visible to date.

- Fragmentation of the leading edge of mat (to roadway) still continues. This condition affects to date approximately about 15% of the project. It is speculated that accumulated sanding material, road debris, etc.; in addition to snow and ice while being cleared by a snow plow; may be forcing that mass against the mats and supporting brackets creating back pressure that are fracturing the UWC and deforming the brackets without the plow blade coming in contact with the UWC.

- As seen in the image below. The mats are well behind the rear of the guardrail where a snow plow blade would be unable to come in contact with the mat and cause damage.



🡸🡹 Another issue with durability is the excessive curling (or warping) of the UWM edges (yellow arrows). This may be the result of temperature extremes or sunlight degradation or a combination of both. This condition may also promote further cracking of the mats or allow road debris to accumulate under the UWM reducing its effectiveness.

As seen in these images, small mammals have discovered that the UWM offers a convenient burrowing habitat due to the warping issue. This occurrence is predominate on the southbound lane installation. This use of habitat may promote erosion of the shoulder and slope reducing the integrity if the roadbed due to the potential of runoff entering the burrows.

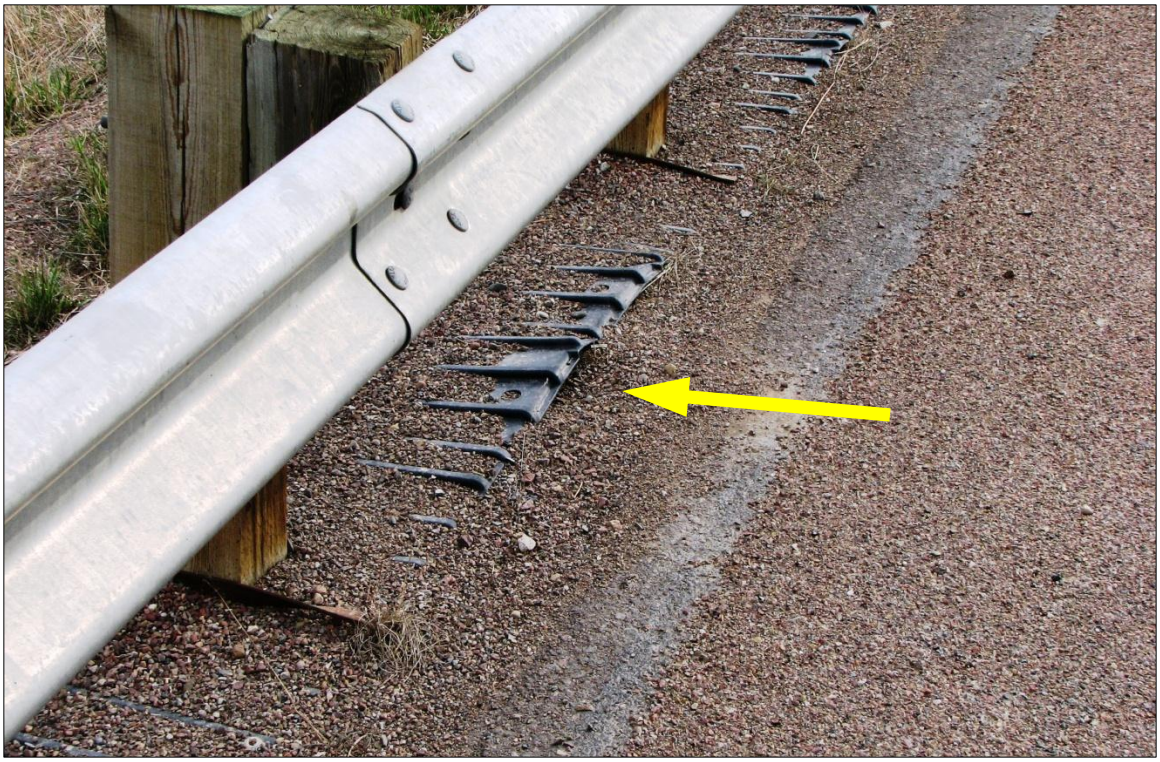
May 2011

🡅 Overview of UWM installation at north end of the northbound lane looking south.

🡅 Overview of south end of UWM treatment of the southbound lane looking north.

🡻🡹 An ongoing problem is the fracturing of the edges of the UMC. As seen in the image below, the mat edge is well inside the interior edge of the guardrail. The current assumption is that during winter snow removal, with accumulated sanding material added to snow and ice; that the action of the passing plow blade inadvertently pushes that mass to the mat causing the damage seen. Currently about 25% of the UMC are affected.

🡅 As seen in this image, vegetation is beginning to broach at the connecting seams of the UMC. This appears mainly on the southbound section.



🡅 As reported in earlier documentation, the curling of the UWM has allowed small mammals to burrow under the mats for habitation. This burrowing may degrade the integrity of the shoulder if water through precipitation and snow melt erode the base. This burrowing has only been seen on the southbound installation.

Conclusion to Date

The objective of using the Universal Weed Cover recycled mat is to inhibit weed growth and to reduce erosion. To date this product is effective in mitigating those elements based on visual documentation.

Long-term durability of the UWM product is the main concern with this application. The damage that was documented in April 2008 is not germane to this analysis since it was caused by an object hitting the exposed edge of the mats due to the reasons explained in earlier reports. However the continued fragmented edges and mat curling observed throughout the installation is an issue of concern that may affect overall performance of the product. In addition, due to the curling edges (attributed to UV damage) of the UWM is promoting small mammals to burrow under the mats which may degrade the slope and adjacent roadbed. Vegetation is minimally beginning to appear between the mat seams.

Based on current performance to date the Department has elected to discontinue the project.

http://www.mdt.mt.gov/research/projects/gtf_rubber.shtml