

Montana Department of Transportation  
Research Program  
March 2004

**POST-WINTER EVALUATION REPORT**

**Detectable Warning Devices (Truncated Domes) for use by the Visually Impaired**

Location: Great Falls, 6<sup>th</sup> St. N. W.

Project No.: STPU 5201(11)

Description: Interim experimental evaluation of various detectable warning devices for sidewalk curb ramps

Evaluation Date: March 10, 2004

Participants: Craig Abernathy  
MDT Experimental Project Coordinator

**Objective**

Test the durability of several manufacturer designs in the use of truncated domes as preferred detectable warning device (DWD) for use by the visually impaired. Report on the construction application of each treatment, durability and maintenance requirements of such products. This evaluation is to document the performance of these devices through the 2003-2004-winter season. All treatments were installed during the months of July and August 2003.

**Experimental Design**

Seven similar types of truncated domes were installed at 15 random curb ramp locations in a seven block linear area of 6<sup>th</sup> St. N. W. The following are the names of the chosen manufacturers and the products selected. Refer to attachment 'A' to locate the approximate curb ramp locations of these devices.

**1. ADA Fabricators**

Copolymer Composite Tiles (see page 3)

**2. Disability Devices**

Wet Anchors Box Systems (see page 5)

Polyurethane Detectable Warning Mat (see page 6)

**3. Vanguard ADA Products of America**

Applied Truncated Domes (see page 7)

**4. Strongwarn Industries**

Applied Latex Modified Mortar Domes (see page 9)

**5. Cote-L Industries**

Safty-Trax Plastic Sheets (see page 11)

Safty-Trax New Rubber Mat (see page 13)

## **Preliminary Analysis**

Rating criteria for these products as being good, fair, or poor performance is related to the reviewers experience while participating in the installations of these devices, the initial performance documentation, several 'visual only' visits to these sites and this evaluation. Performance can be based on a combination of quality of adhesion, loss of dome or relief of dome, torn bases and the overall appearance of the feature.

Most all of treatments exhibited some form of distress through this first winter season. The worst performer was the Cote-L Industries Safti-Trax New Rubber Mat. The best performer is the Disability Device Detectable Warning Mat.

Treatments that rely on glues to secure them to the surface showed accelerated loss of adhesion. It can be assumed that this will continue to deteriorate over time. Those treatments that used surface paints or epoxies exhibit the best adhesion.

Dome damage was substantial after only one winter season with several of the systems. None of the tactile devices exhibited any resistance to blade damaged. It is assumed that those treatments (at this time) that displayed no dome damage where not subjected to cleaning by a shovel or blade device, or were not kept cleaned at all which was observed several times during trips to Great Falls. It is the opinion of this reviewer that none of these systems can withstand a blade.

With the amount of damage seen at this evaluation, it may be assumed that we will see continued deterioration through normal use and environmental effect. It is suggested that additional manufactures of these devices be considered for evaluation as well. Research can assist in the selection of new products to test. Some states are now testing detectable warning devices made out of anodized metal. This does show promise for long-range durability.

Research will continue to report on the performance of these systems. The next evaluation will be conducted in the late fall of 2004.

Manufacturer: **ADA Fabricators**  
Treatment: **Three installations of Copolymer Composite Tiles**  
Site Location: **1A, 1B, 1C**

All three site installations were in fair condition at the time of this inspection. Loss of adhesion was observed with the interior seams of treatment 1C. Treatment 1B display blade damage. The following images are the individual treatments with comments.

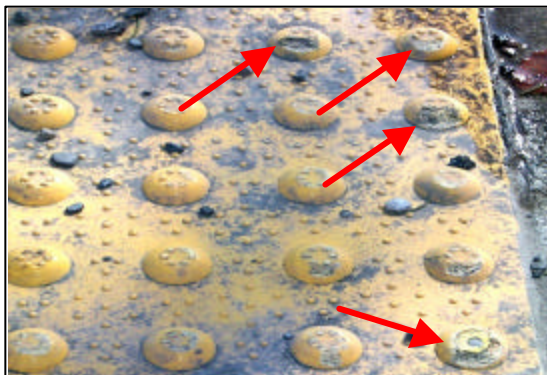


**Installation 1A:** Located on the northeast corner at the intersection of the east entrance to the Expopark adjacent to 5<sup>th</sup> Ave. N. W.

Adhesion tight. No dome loss. No evidence that this product was blade-cleaned during snow events.



**Installation 1B:** Located on the southwest corner of the intersection 4<sup>th</sup> Ave. N. W. & 6<sup>th</sup> St. N. W.



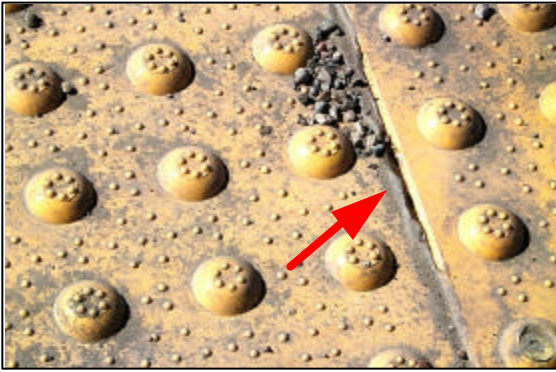
**Installation 1B:** Example close-up of damaged domes.

Evidence of blade being used to remove snow. Some of the setting pins are missing



**Installation 1C:** Located on the southwest corner of the intersection 5<sup>th</sup> Ave. N. W. & 6<sup>th</sup> St. N. W. This treatment connects the east-west pedestrian walkway.

Interior seams losing adhesion.



**Installation 1C:** Close-up of interior seam losing adhesion. Debris collecting in the gap.

Manufacturer: **Disability Devices**  
Treatment: **One installation of the Wet Anchor Box system**  
Site Location: **2**

This treatment performed poorly since construction. Substantial amounts of domes have been sheared off through use of a shovel or blade apparatus when removing snow. The edges within the treatment and perimeter are beginning to loose adhesion. The setting pins are breaking off.



**Installation 2:** Located on the southwest corner at the intersection of 6<sup>th</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.



**Installation 2:** Close-ups of sheared domes and example image of edges losing adhesion.



Manufacturer: **Disability Devices**  
Treatment: **Two installations of the Polyurethane Detectable Warning Mat**  
Site Location: **3A, 3B**

Both installations were in fair condition at the time of this inspection. No loss of domes. Panel edges in the interior and perimeter are beginning to loose adhesion. Many of the plastic setting pins have broken off.



**Installation 3A:** Located on the northwest corner of the intersection of 5<sup>th</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.

This treatment connects the north-south pedestrian walkway.



**Installation 3A:** Close-up of edge with loss of adhesion to PCCP.

This scenario is the same with 3B.



**Installation 3A:** Close-up of broken setting pins.

This scenario is the same with 3B.



**Installation 3B:** Located on the southwest corner of the intersection of 1<sup>st</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.

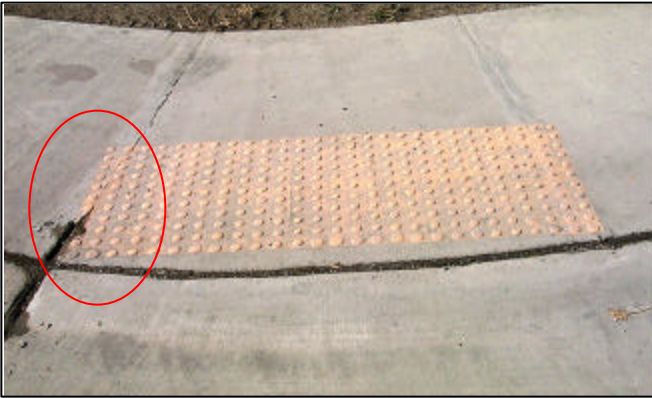
Manufacturer: **Vanguard ADA Systems**  
Treatment: **Three installations of the Applied Truncated Domes**  
Site Location: **4A, 4B, 4C**

All installations were in fair condition at the time of inspection. Treatment 4A displayed no deterioration. Treatment 4B & 4C have cracked at the mortar sidewalk joint. Treatment 4C has lost one dome.



**Installation 4A:** Located on the southwest corner of 5<sup>th</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.

This treatment connects the north-south pedestrian walkway.



**Installation 4B:** Located on the northwest corner of 5<sup>th</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.

This treatment connects the east-west pedestrian walkway.

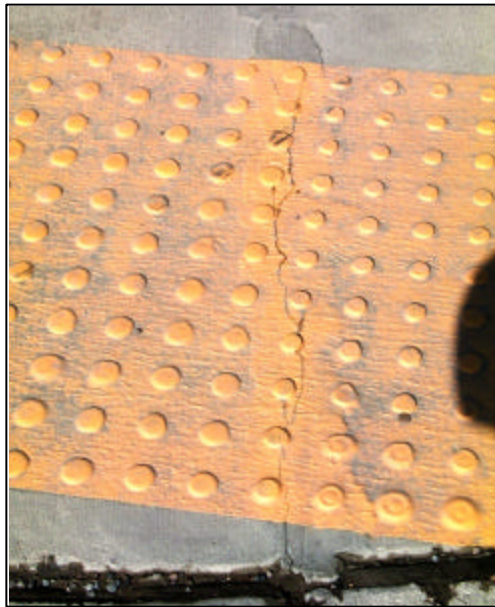
South end of treatment deteriorating at mortar joint.



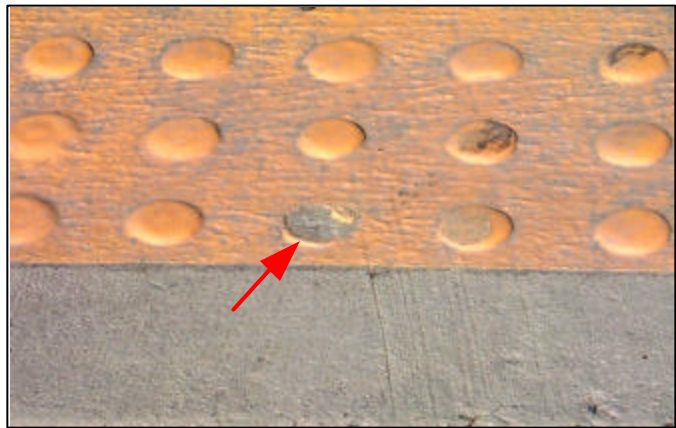
**Installation 4B:** Close-up of deteriorating mortar joint.



**Installation 4C:** Located on the northwest corner of 2<sup>nd</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.



**Installation 4C:** Close-ups of cracked mortar joint and dome loss.



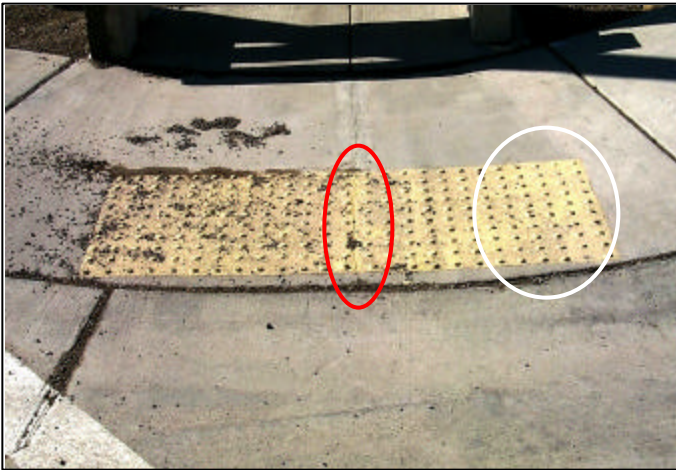


Manufacturer: **Strongwarn Industries**  
Treatment: **Three installations of the Applied Latex Modified Mortar Domes**  
Site Location: **5A, 5B, 5C**

These installations are performing well, although at this time there is dome loss and dome shear with installation 5B, apparently from blade scraping.

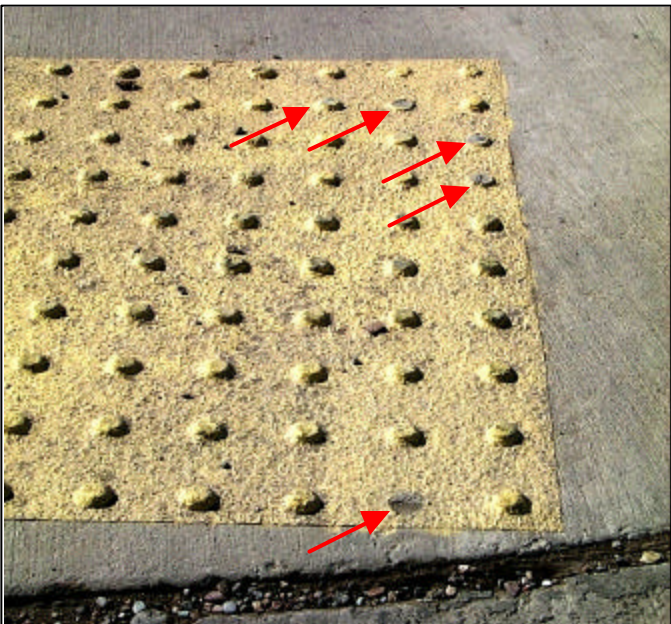


**Installation 5A:** located at northwest intersection of 1<sup>st</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.



**Installation 5B:** Located at the southwest intersection of 3<sup>rd</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.

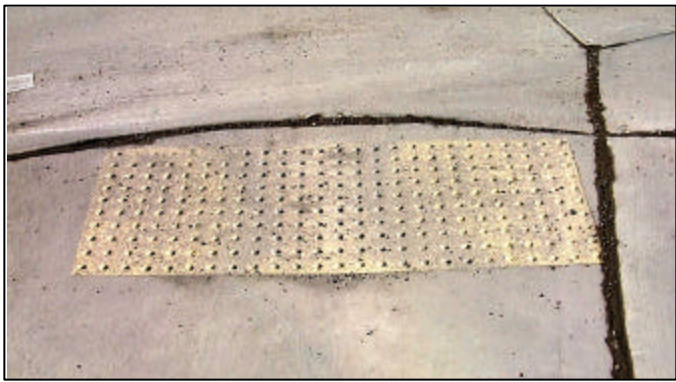
This treatment has suffered dome loss and dome shear in the northeast quadrant of the mat (white circle) and has a reflective crack appearing through the base from the underlying mortar joint (red circle)



**Installation 5B:** Close-up of missing and sheared domes.



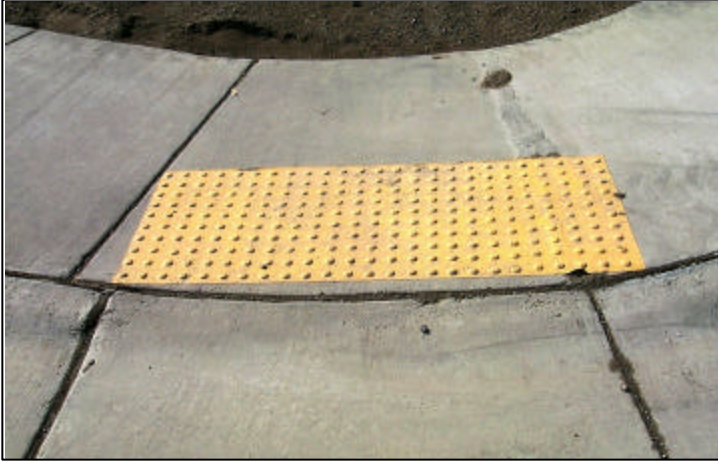
**Installation 5B:** Close-up of mortar crack through mat.



**Installation 5C:** Located on the southeast corner of the east Expopark entrance and 6<sup>th</sup> St. N. W.

Manufacturer: **Cote-L Industries**  
Treatment: **Two installations of Safti-Trax Plastic Sheets**  
Site Location: **6A, 6B**

All installations were in fair to poor condition at the time of inspection. Treatment 6A is losing adhesion around the edges of the mat. Treatment 6B is losing the anti-skid coating over the top of the domes. It is unsure if this is a result of blade damage or through the action of freeze and thaw.



**Installation 6A:** located on the southwest corner of the intersection 2<sup>nd</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.



**Installation 6A:** Example close-up of edge losing adhesion from PCCP.



**Installation 6B:** located on the northwest corner of the intersection 4<sup>th</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.



**Installation 6B:** Example close-up of delaminating and cracking surface cover of the rubber domes.

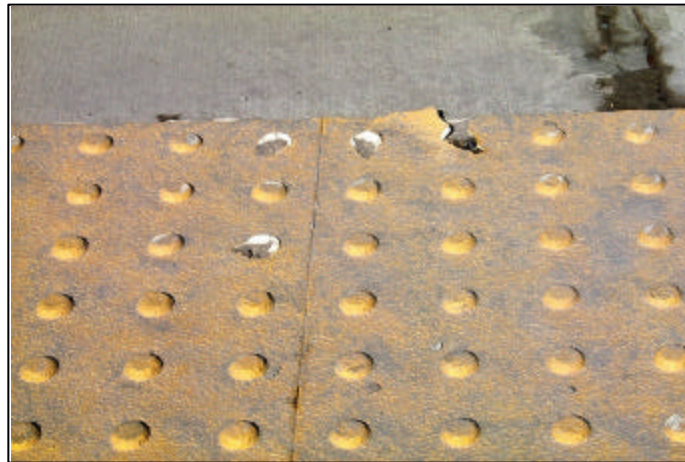
This will facilitate future loss of domes.

Manufacturer: **Cote-L Industries**  
Treatment: **One installation of Safti-Trax New Rubber Mat**  
Site Location: **7**

This treatment is failing rapidly. The surface of the mat has ripped, sheared and torn domes. Edges are losing adhesion.



**Installation 7:** Located on the northwest corner of the intersection of 3<sup>rd</sup> Ave. N. W. and 6<sup>th</sup> St. N. W.

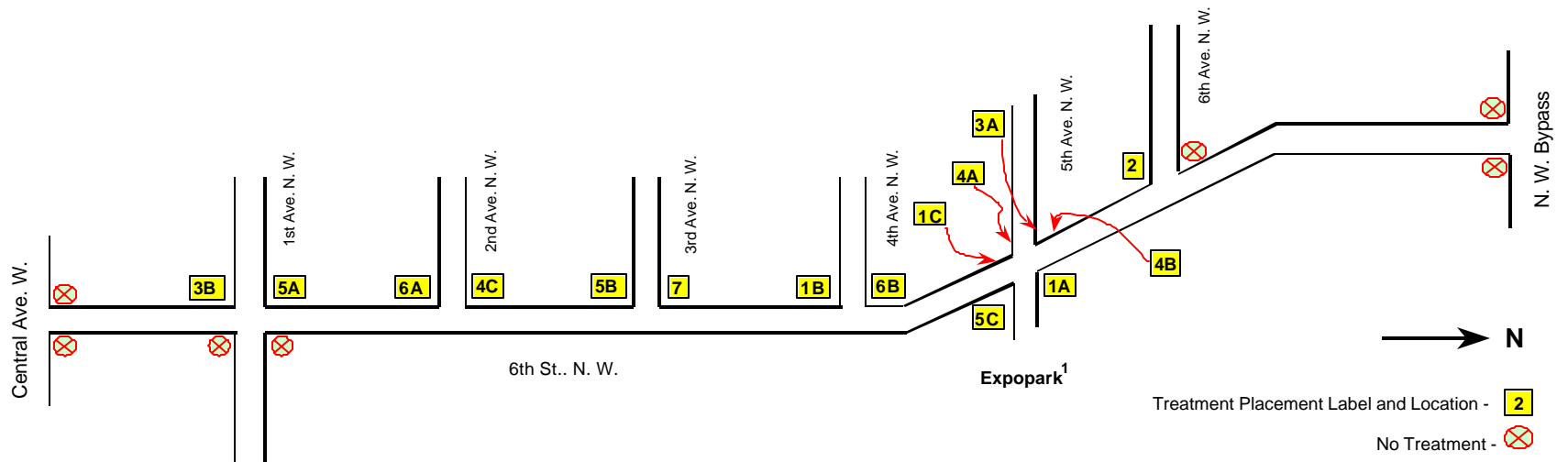




**Installation 7:** Close-up of damaged mat. Loss of domes and ripped mat.



**Installation 7:** Additional close-up of damaged mat. Sheared domes from blade damage.

<u>Treatment Type</u>	<u>Manufacturers</u>	<u>Label</u>	<u>Frequency</u>
Copolymer Composite Tiles	ADA Fabricators	1	3 (a, b & c)
Wet Anchor Box System	Disability Devices	2	1
Polyurethane Detectable Warning Mat	Disability Devices	3	2 (a & b)
Applied Truncated Domes	Vanguard ADA Systems	4	3 (a, b & c)
Applied Latex Modified Mortar Domes	Strongwarn Industries	5	3 (a, b & c)
Safti-Trax Plastic Sheets	Cote-L	6	2 (a & b)
Safti-Trax New Rubber Mat	Cote-L	7	1



Treatment Placement Label and Location -   
 No Treatment -   
 Expopark<sup>1</sup> - No N. East or S. East treatment on east-side of 5<sup>th</sup> Ave. at Expopark entrance

**Experimental Layout**  
**Detectable Warning Devices**  
**Truncated Domes for Curb Ramps**  
**Project STPU 5201(11)**  
**Great Falls**