INTERIM EVALUATION REPORT, FALL 2007
DURABILITY OF TRUNCATED DOME SYSTEMS

at the "AIRPORT ROAD IMPROVEMENT PROJECT", CONCORD, NH

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ACKNOWLEDGEMENTS

The Bureau would like to thank the City of Concord for allowing the installation of the various manufacturers' panels along Airport Road and Regional Drive. Our thanks is also extended to East Jordan Iron Works; Metadome, LLC; and Engineered Plastics, Inc. who provided the detectable warning panels for trial, and SEA Consultants and Weaver Bros. Construction who coordinated and installed the panels.

BACKGROUND

NHDOT issued its report, **EVALUATION REPORT, WINTER 2002/2003 DURABILITY OF TRUNCATED DOMES**, in April 2003. By the spring of 2005, the most durable of the eight evaluated panels had also failed, after only 3 winters. The search continued for a durable product, capable of withstanding the punishment of snow plowing. A number of new products had emerged during this period, constructed of cast iron and stainless steel. In a leap of faith, NHDOT began specifying cast iron panels for its projects in 2005.

The mutual cooperation between the City of Concord and the NHDOT continued when the City agreed to allow NHDOT to install four panel models within its roadway and sidewalk improvement project. This interim report documents the condition of the panels after approximately two years of service.

RESEARCH OBJECTIVE

The evaluation phase of this project consists of visually monitoring installed detectable warning panels for wear and damage primarily caused by snow clearing operations. The evaluated products include:

Product	Materials	Manufacturer
Cast Iron Panels	Uncoated cast iron	East Jordan Iron Works
MetaPanel	Color coated stainless steel	Metadome, LLC
Advantage	Color coated stainless steel	Engineered Plastics, Inc.
Armor-Tile	Vitrified Polymer composite	Engineered Plastics, Inc.

Although not confirmed by physical measurement, each product is claimed by its manufacturer to meet the ADAAG requirements. All of the above-listed products were easily installed at a significant labor savings over the products of the previous study. Each panel was placed on a freshly finished concrete sidewalk, and pressed into position. Minor cleanup was performed around the panel, and the installation was complete. The panels were installed during October and November of 2005.

Typical panel installation sequence

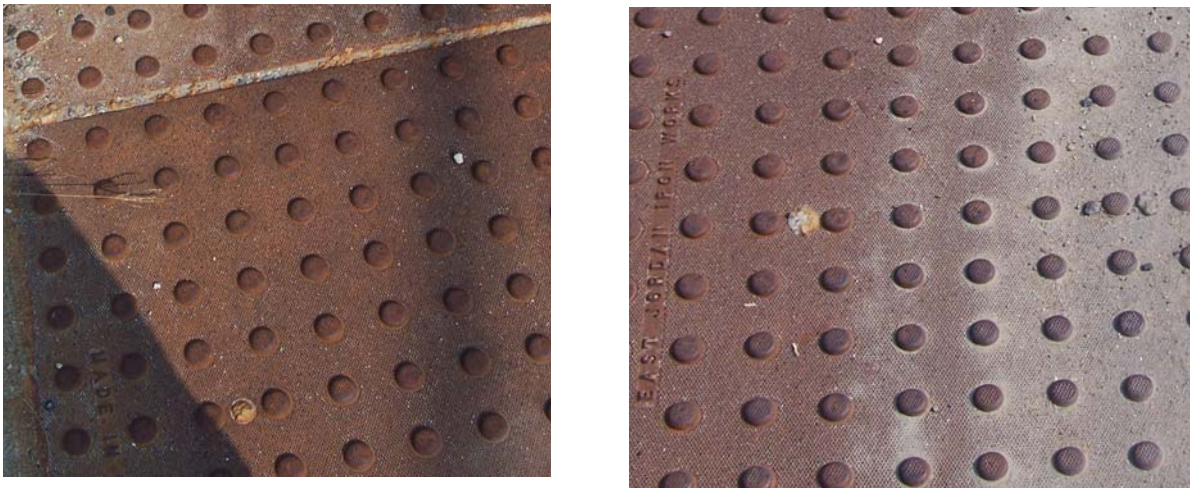
PRODUCTS AND OBSERVATIONS

East Jordan Iron Works panels were installed at the intersection of Regional and Industrial Drives. The cast iron panels have no coatings to damage or peel off. The absence of proprietary coatings and construction materials means that any foundry willing to create the ADAAG-compliant molds can produce them. NHDOT is aware of two at this writing. The only disadvantage of this product is handling the substantial weight of the material at installation; approximately 80 pounds for a 2' x 2' panel. The provided panels have tabs on the bottom through which reinforcing steel can be positioned as an anchoring device. Newer versions have replaced the tabs with vertical ribs with cutouts attached to the panel bottom for this purpose.

A close examination of these panels in the spring of 2006 revealed that plow contact had scuffed the textured pattern from the top of a few of the domes. The absence of a coating does not call attention to minor damage by casual observation. The panels appear generally unchanged since their installation.

Additional examination on September 26, 2007 indicated little change in the **East Jordan Iron Works** panels, since the 2006 observations. There is some uneven scuffing along the top of some of the domes and there is minor rust staining on the concrete.

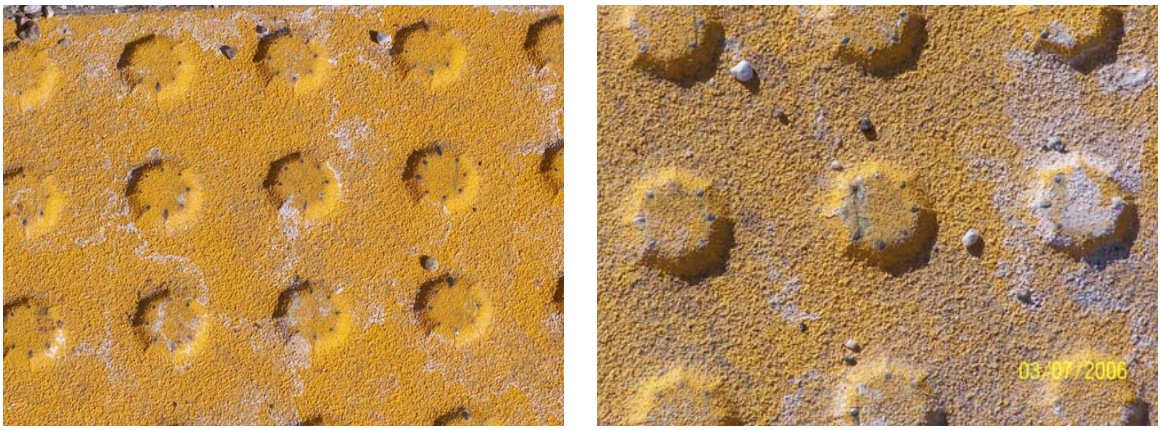
Cast Iron Panels - East Jordan Iron Works in 2006



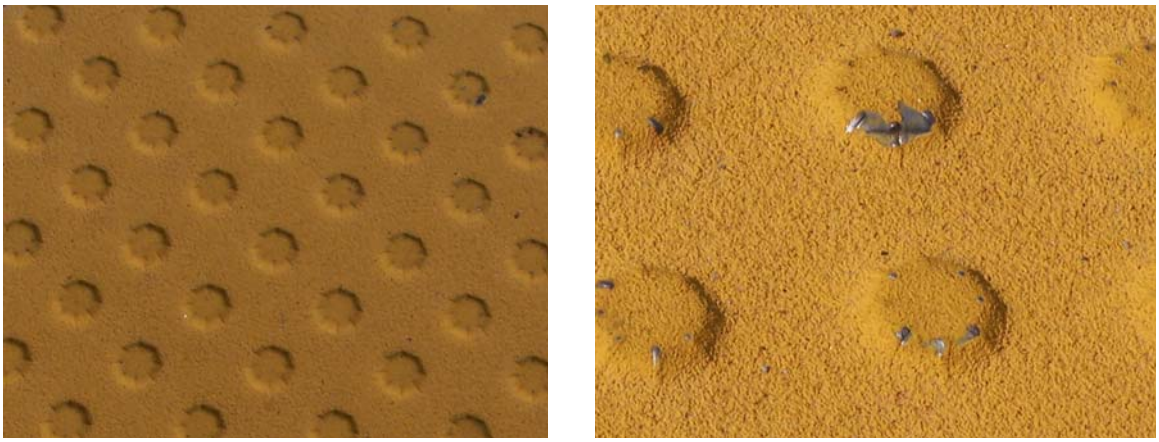
Cast Iron Panels - East Jordan Iron Works in 2007

MetaPanel units were installed at the intersection of Regional Drive and Barrell Court. They are constructed of stainless steel and coated in yellow paint. The bottom side is made up of sheet metal shapes that interlock with the concrete to anchor the panel. The domes are shaped with vertical ribs along their sides as a means of prolonging the life of the coating. The two panels were in good general condition after one winter. No domes were chipped, broken or removed. However, about 10 percent of the domes were missing paint at the top of the dome ribs.

Examination of the **MetaPanel** units in September of 2007 indicated some minor changes in these stainless steel panels, since the spring of 2006. There are now a few dents and chips along the top of some of the domes and minor rust staining is visible.



MetaPanel units - in 2006



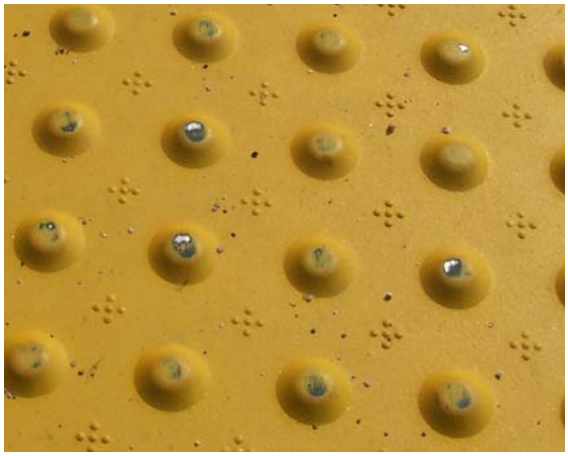
MetaPanel units - in 2007

Advantage panels by Engineered Plastics, Inc. are also constructed of coated stainless steel. One of the four provided panels was installed at Regional and Chenell Drives and three were installed at the signalized Regional Drive/Airport Road intersection. Similar to the MetaPanels, a system of sheet metal fabrication on the bottom of the panel attaches it to the concrete.

All of the panels were in good general condition with no broken or disfigured domes in 2006. Damage was limited to a wear pattern at the top of approximately 10 percent of the domes. The wear exposed the stainless steel surface.

Examination of the **Advantage** panels in September of 2007 indicated some additional scuffing of the paint on these stainless steel panels, since the spring of 2006. Where this occurs, the sheet metal has become exposed.

Advantage panels - in 2006

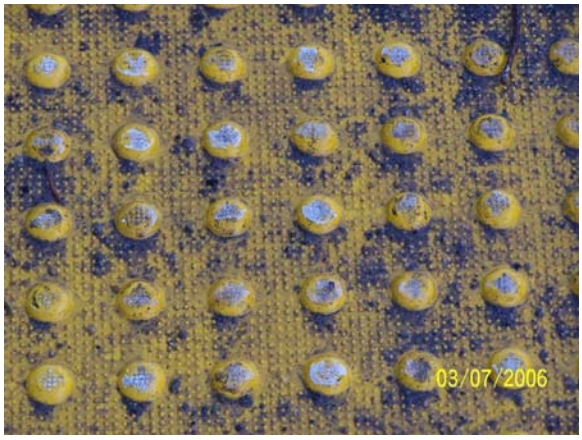


Advantage panels - in 2007

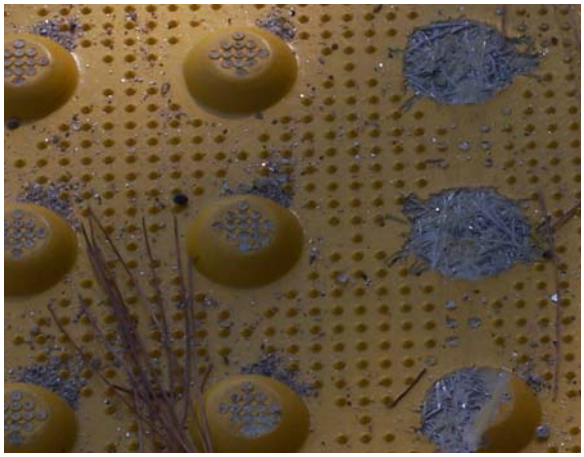
Armor-Tile panels were installed at the Regional Drive/Russell Street intersection. The polymer composite panels are of similar composition to the ADA Fabricators Thin Pavers (the most durable, although short-lived product of our 2003 evaluation).

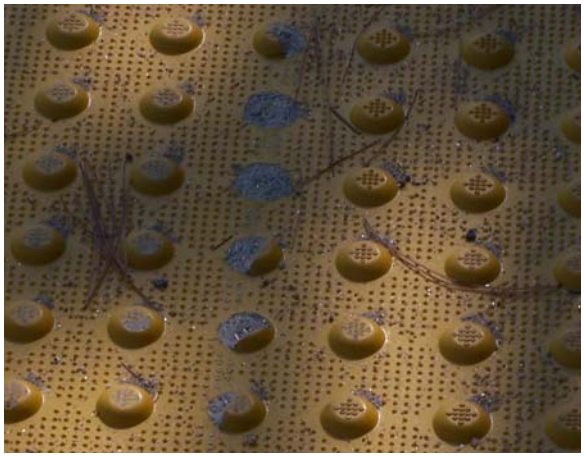
The **Armor-Tile** panels suffered no loss of domes after the first winter, but lost the yellow outer coating from the top of about 40 percent of the domes. The loss results in exposure of the white natural material color beneath the surface.

Examination of the **Armor-Tile** panels in September of 2007 indicated some additional loss of the yellow outer coating from these polymer composite panels, since the spring of 2006. There were five domes that had totally broken off, and one that was broken in half.



Armor-Tile panels - in 2006





Armor-Tile panels - in 2007

Summary
Early observations indicated that cast iron detectable warning panels were outperforming the other tested products. The September 2007 observations showed us that the trend continues.