Testing and Evaluation of Detectable Warning Systems – 2005 NESMEA Meeting
What is a Detectable Warning?

- A surface feature that aids persons with visual impairments in detecting hazards
- Requirement of Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- **Truncated domes** are the **only detectable warning design** that currently meets ADAAG
- Pedestrians with visual impairments **do not reliably detect** grooves, striations or exposed aggregate surfaces
ADA and Truncated Domes

- 1991 - U.S. Access Board publishes ADAAG
- April 1994 - Requirement for detectable warnings on curb ramps suspended
- 1991-2001 - Research conducted on truncated domes
- July 2001 - Suspension expires
- May 2002 - FHWA reinforces required use of truncated domes
- 2003 – VTrans begins evaluating detectable warning products
Where Are they Used?

- Train platforms (requirement never suspended)
- Curb ramps where streets are accessed
- Median islands with pedestrian access
- Refuge islands & slip lanes with pedestrian access
- Railroad crossings
- Generally NOT required at driveway crossings
Truncated Dome Dimensions

- 6-8 inches from edge of street
- 2 ft deep, full width of ramp
- Specified diameter, spacing and alignment of domes
- Slip resistant
- Visual contrast with adjoining surface
Installation on new curb ramp
Detectable Warnings

A detectable warning at the bottom of curb ramps alerts pedestrians with visual impairments about the sidewalk/street transition.
Many Products are Available

- Plastic with adhesive
- Thermoplastic
- Composite cast in place
- Granite pavers mortared
- Cast iron cast in place
Product Types

Surface Applied (retrofit or new)

- Resins
- Thermoplastic
- Plastic/recycled tire
- Rigid composite plastic

Cast-in-place (new)

- Rigid Composite plastic
- Cast iron
- Stainless steel
- Pavers (brick, concrete, granite, composite)
Installation of Surface Applied Product

Surface prep
Position molds
Mix Materials

Create domes
Apply top/sealer coat
Finished ramp
Installation of Surface Applied Product

Surface prep

Adhesive under panel

Hammer drill corners

Place anchors

Seal edges

Finished ramp
Types of Material Failure

- Dome loss
- Delamination
- Tearing
- Spalling/domes crushed
- Dome loss/scraping
- Dome loss/scraping
Types of Material Failure

- Domes sheered off
- Domes chipped
- Delamination/dome loss
- Dome loss/base loses adhesion
- Coating peeled off
Durability Considerations

- Sheer strength of domes - Plows can break domes off
- Resistance to Salt/chemical/sand application
- Adhesion to substrate
- Resistance to UV/sunlight exposure
- Ability to withstand temperature extremes and variability
- Differential expansion and contraction compared to substrate
Testing and Evaluation

• VTrans – Install in “real-world” setting and observe conditions over time (2 reports on Vtrans web site www.aot.state.vt.us)
• NHDOT – Install in lab setting (consistent substrate), submit to “plow rally”
• Wisconsin DOT – Test deck, 50 passes with snow plow
• Other states – Trial and observation
• In general – very subjective and time consuming
Establishing National Standards for Testing and Evaluation

NCHRP Panel D04-33 – Performance Standards for Detectable Warning Materials

- Procedures for testing and evaluating performance and durability
- Guidance on use of procedures for selecting and accepting
- Estimated completion – end of 2008
Current VTrans Construction Spec

- Must meet ADAAG dimensional requirements
- Cannot be stamped concrete
- Must be a contrasting color to surrounding ramp
- Must follow manufacturer installation procedure
- Paid per square yard of material
- Approved product list