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Transportation

**TDA at CDOT**

**June 24, 2015**

**Bill Schiebel, Materials and Geotechnical Branch Manager**



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CDOT and M&G Branch Overview

Recent Training on TDA

Potential Geotechnical Applications

Potential Geohazard Applications

Other Potential Applications



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CDOT and M&G Branch Overview

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CDOT has 5 Regions, each has:

- Project Design staff
- Project Construction staff
- Traffic, Hydraulics and Materials Engineering staff
- Responsibility for delivering regional projects

CDOT Materials and Geotechnical Branch has

- Responsibility for Statewide policy, practice and uniformity
- Technical specialty in key programs:  
Asphalt, Concrete/Physical Properties, Pavement Design,  
Pavement Management, **Soils/Geotechnical and Geohazards Programs**
- Project technical support during design and construction statewide



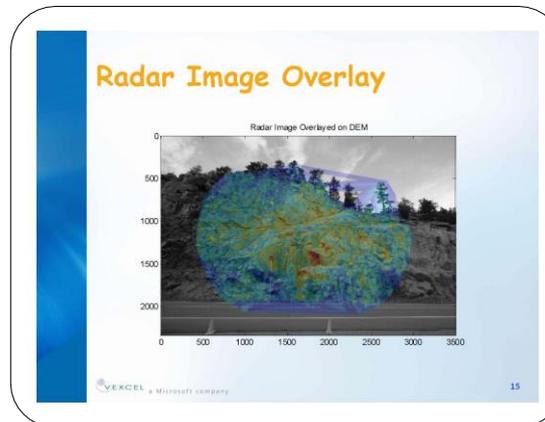
# Soils/Geotechnical Program

- Foundations Field and Technical Support
- Roadway Soils Technical Support
- WAQTC Certification Program
- Design and Construction Support
- Site Exploration/Drilling Services



# Geohazards Program

- Statewide Geohazard Asset Management
- Emergency Response
- Mitigation Design
- Construction Support
- Maintenance Requests
- Instrumentation and monitoring





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Recent Training on TDA

## CIVIL ENGINEERING APPLICATIONS OF TIRE DERIVED AGGREGATE

### Road and Highway Focus - Short Course

Dana N. Humphrey, Ph.D., P.E., Professor of Civil Engineering University of Maine

- Market Perspective
- Use in civil engineering
- Engineering properties of TDA
- Highway embankments and landslide stabilization
- Retaining wall and bridge abutment backfill
- Drainage and insulation layers in roads
- Use of whole tires in highway applications
- Environmental Considerations
- Self-heating reactions

May 2014 to CDOT Regional Materials Engineering and Materials and Geotechnical Branch staff.

June 2015 to Soils/Geotechnical and Geohazards Program staff, CDOT Bridge Branch staff and geotechnical consultants to CDOT.



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Potential Geotechnical Applications



## Mitigation of Wall Settlement

- Wall instability and settlement
- Fill section across an historic natural drainage
- Reduced TDA-fill weight
- Reduced wall bearing capacity for certain types of walls
- Shallow foundations possible
- Excellent drainage
- Reduced earth pressures

State Highway 13 - Region 3



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Potential Geotechnical Applications

## Mitigation of Embankment Settlement



- Select materials are scarce
  - Weak subgrade soils
  - Adjacent ponding saturates embankment
  - Periodic frost heave
- 
- Lightweight TDA fill
  - Reduced surcharge times (if new construction here)
  - Excellent drainage
  - Moisture no impact on TDA
  - Lower cost for TDA than conventional select fill

State Highway 63 - Region 4



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Potential Geotechnical Applications



## Mitigation of Embankment Settlement

- Water flow across/through the embankment
  - Poor initial compaction
  - Loss of fines and settlement
- 
- TDA Excellent drainage
  - No fines to lose within TDA fill
  - Lower cost for TDA than conventional aggregate fill

State Highway 160 Wolf Creek Pass - Region 5



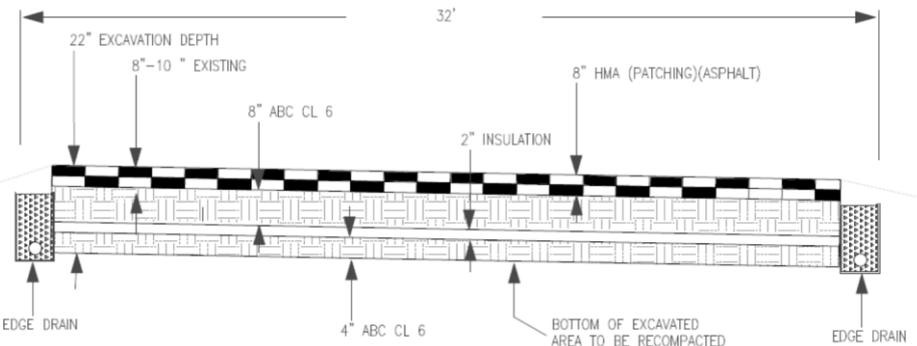
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Potential Geotechnical Applications

## Mitigation of Frost Heaves

- Water flow across/through the embankment
  - Saturated embankments
  - Weak subgrade soils
  - Heavy deep freeze conditions (11,500' elevation)
- TDA very drainable and lightweight
  - TDA good for drainage system installations
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- Lower cost for TDA than historic frost heave materials and labor (e.g. clean aggregate and foam insulator layer)



State Highway 9, Hoosier Pass, Region 3



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Potential Geotechnical Applications

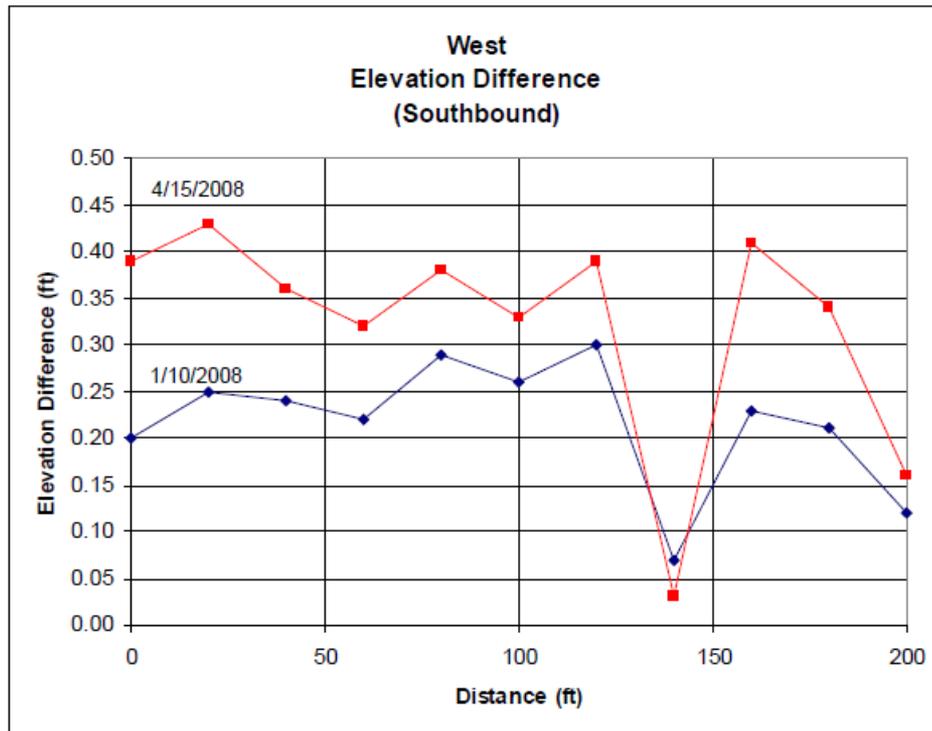
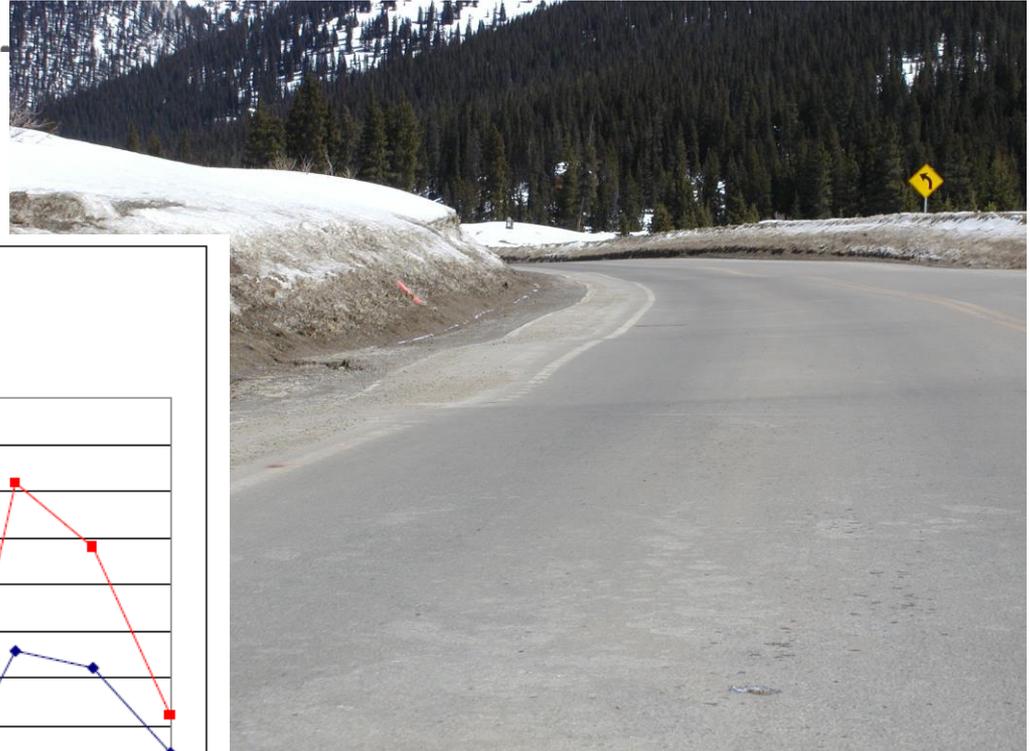


Figure 2 - Change in Elevation Along Southbound Shoulder



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Potential Geohazard Applications



**Glad this one didn't make it to the road!**



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Maybe this will help. Wonder how much energy TDA will absorb?

Type 7 barrier with fence extension



Impact attenuator

**TDA**

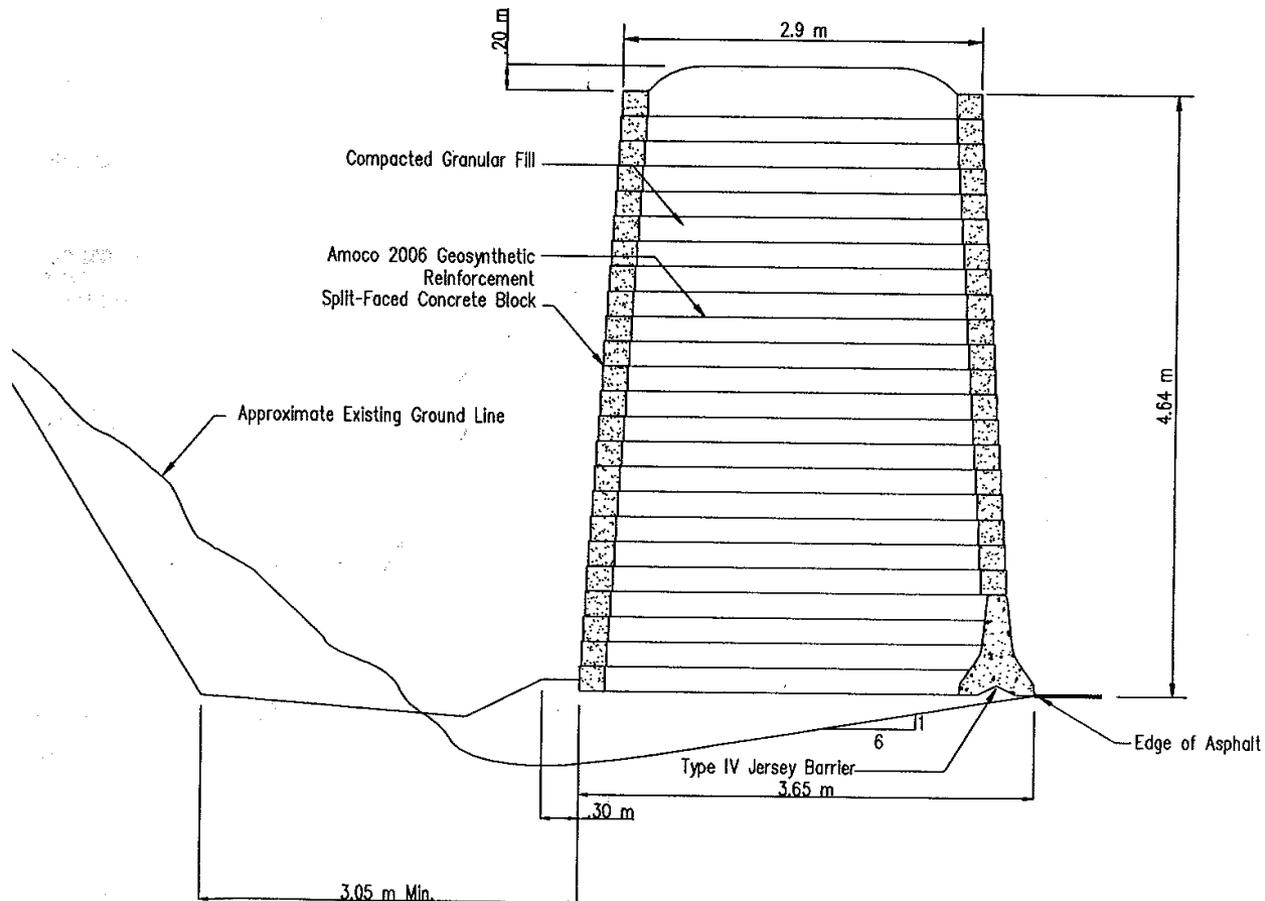
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Potential Geohazard Applications





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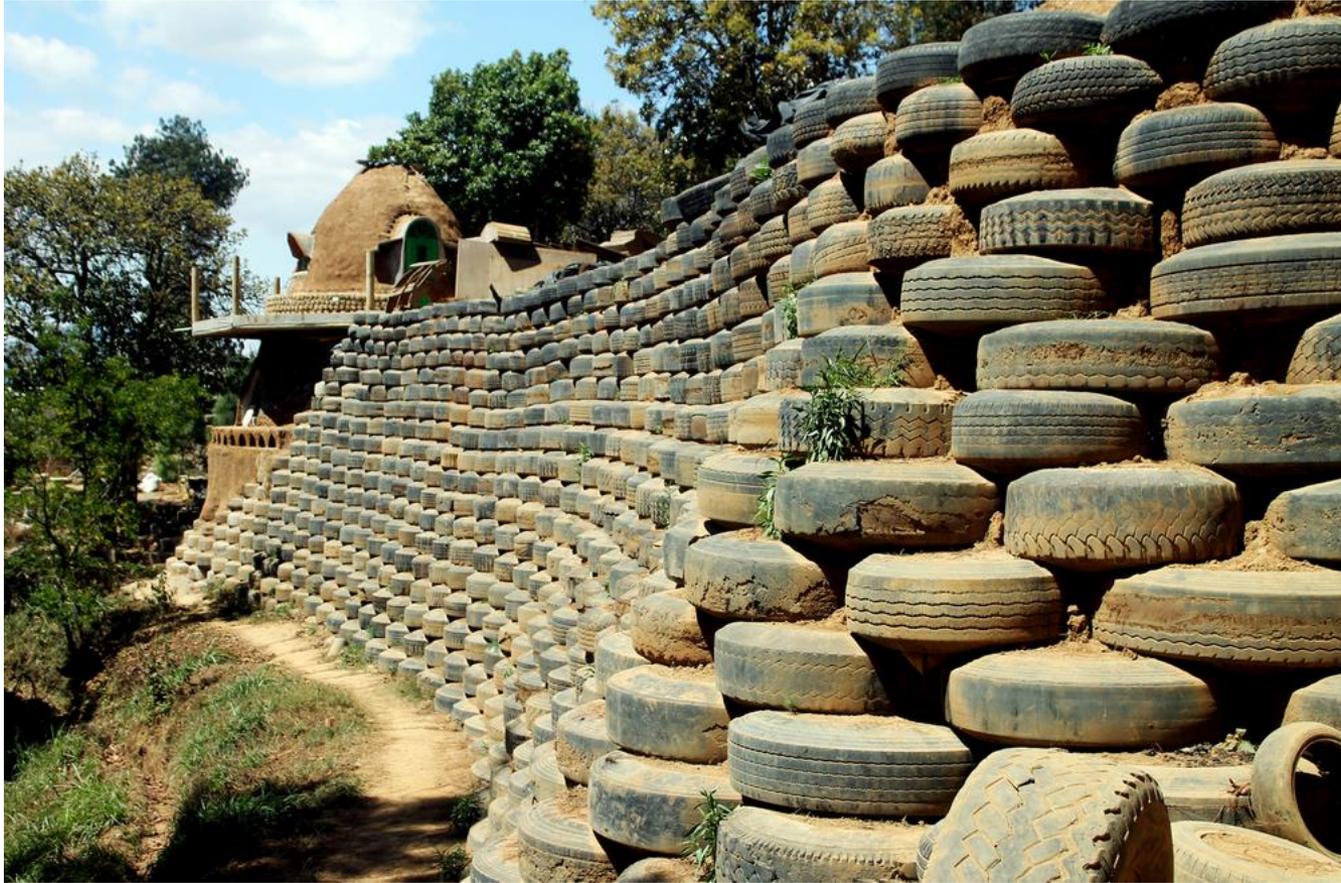
Potential Other DOT Applications





# Questions and Comments?

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Thank you