USE OF TDA IN FOUNDATION ENGINEERING
TDA APPLICATIONS FOR RESIDENTIAL CONSTRUCTION

- SEPTIC
- UTILITIES BACKFILL
- RETAINING WALLS
- BASEMENT WALL
- FPSF
Basement Wall

10" REINFORCED CONCRETE WALL
9' HEIGHT

4" CONCRETE SLAB

SLAB SET @ 1' ABOVE FOOTER
6" MUD V.B.
4" GRAVEL BED

TIRE CHIP BACKFILL
(WRAPPED IN FABRIC)

FILTER MEMBRANE
GRAVEL

VIRGIN SOIL

4" DRAIN TO DAYLIGHT

BASEMENT WALL TYP.

SECTION 3
Properties & Characteristics

- Controlled Material
- Ease of Placement
- Sources ???
- Cost ???
**Advantages**

- Low lateral EP
- Drainage
- Thermal Insulation – necessity??
- Ease of placement – all weather conditions

**Disadvantages**

- High Compressibility
- Discharge – iron, zinc, manganese
- BUD Requirement
- Not directly addressed by building codes
Class I Fills:

-TDA placed in layers less than 1m (~3’) thick.

Have a maximum of 50% (by weight) passing the 38 mm (~1.5”) sieve.

Have a maximum of 5% (by weight) passing the 4.75 mm (~.19”) sieve.

Sample Applications of Class I Fills are typically utilized in landfill leachate and gas control applications.
**ASTM D 6270-98 Fill Types**

**Class II Fills:**

- TDA placed in layers ranging from 1m (~3’) to 3m (~10’) thick.

  Have a maximum of 25% (by weight) passing the 38 mm (1.5”) sieve.

  Have a maximum of 1% (by weight) passing the 4.75 mm (~.19”) sieve.

  Sample applications of Class II Fills are retaining wall back fills, embankment fills, and slope repairs.
RELEVANT STUDIES

Lab Tests – Material Properties
Prototype Retaining Wall
Demonstration Projects
Wall 119, TDA Placement
FROST PROTECTED SHALLOW FOUNDATION

*Increasing floor insulation will decrease heat flow to the foundation, and more perimeter (FPSF) insulation is required.
Relevant Studies

Laboratory Measurements
Demo – Pavement Frost Protection
Thermal Conductivity

- The thermal conductivity of tire shreds is lower than typical soils and varies depending on the size of the tire shreds.
- For insulation projects, tire shreds with a maximum size of 3 inches should be used.
- A 1’ thick blanket of TDA is expected to provide the same insulation value as a 1” thick EPS insulation board.
- Cost and ease of placement.
Witter Farm Road, Typical Cross Section
TEST BEDS
- UB TEST SITE
  - STRUCTURAL FILL
  - UTILITY BACKFILL
  - DRAINAGE
  - INSULATION
- FORT DRUM
  - INSULATION

FIELD/PROTOYPES
- MODEL CITY
  - SEPTIC
- FORT DRUM
  - FPSF
- SENECA MEADOWS
  - BASEMENT WALLS
  - RETAINING WALLS
  - UTILITY BACKFILL
UB TEST SITE AND ACCESS
Full-Size Basement
TEST BED BASEMENT “MOCK-UP”
EXCAVATION & SUBDRAIN DETAILS

- TDA Subdrain
- CBF Subdrain
- Sump Pit
- Floor Drain

Dimensions:
- 9' 8" - 1/2"
- 2' 0" min
- 1' 0" min

El. 579
El. 582
El. 585

Boundary between backfill types
ELEVATION VIEW & INSTRUMENTS

Precast Basement Mock-up

- Earth Pressure Cell
- Settlement Plate
- Thermistor
- Thermistor Pair
- Sister Bar

Elevation View & Instrument Layout
ANTICIPATED RESULTS

- Gain more confidence on use of TDA for Residential Construction
- Validate Model for Heat Flow
- Data in support of BUD Application
- Improved Basement Performance in areas with problem soils that may be used as BF
Summary

- TDA has potential applications in residential foundation construction.
- Desirable properties of TDA and applications as retaining wall backfill and for frost protection have already been demonstrated.
- Prototype construction and case studies are underway to facilitate transfer of this technology to residential construction applications.
QUESTIONS?

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THANK YOU