The Use of Tire-Derived Aggregate as a Drainage Medium in Septic Fields

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Rubber Manufacturers Association
• Represents the 8 US tire manufacturers
• Created scrap tire program in 1990
• Focus on development of sound markets and management for 100% of annually generated scrap tires
• Elimination of all scrap tire piles in an environmentally and economically sound manner

Using TDA in Septic Systems
“Next Generation of Sewage Treatment: Flushing in the New Millennium”
University of Minnesota Video

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Septic Systems in Vegetative Roofs, the Green Wave of the Future.
Using TDA in Septic Systems

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Septic Systems in Vegetative Roofs, the Green Wave of the Future.
Indoor Odor Reduction from Green Roof Septic Systems

Why Use Tire Shreds?

• Tire shreds have properties that civil engineers need
  – Lightweight (1/3 weight of soil)
  – Low earth pressure (1/2 of soil)
  – Good thermal insulation (8 times better soil)
  – Good drainage (10 time better than soil)
  – Compressible

• Tire shreds can improve engineering performance
• Tire shreds are often the least cost alternative if you need their unique properties

Tire Shreds?
Guidelines

- ASTM D6270 “Civil Engineering Applications of Scrap Tires”
- Guidelines to limit heating
- Water quality studies: Above & below ground water table + comprehensive compendium of all leachate reports

Specifications

- Type A – drainage and insulation
  - 100% passing 100-mm sieve
  - Minimum of 90% passing 75-mm sieve
  - Maximum of 5% passing 4.75-mm (no. 4) sieve
- Type B – lightweight fill
  - 100% smaller than 450 mm max. dimension
  - 90% smaller than 300 mm max. dimension
  - Maximum of 25% passing 37.5 mm
  - Maximum of 1% passing 4.75-mm (no. 4) sieve

Leachate from Tire Shreds Above/Below Water Table

- Primary drinking water standards
  - No effect
- Secondary drinking water standards
  - Manganese & iron
  - Not significant
- Organics
  - No effect
John Sheerin - Tire Aggregate as Septic Medium
**Percent Volume Void Space**

- Tire Chips = 62%
- #5 Stone = 44%

**Weight Comparison**

5 Gallon Container

- Tire Chips = 25 lbs
- #5 Stone = 70 lbs

**Examination of Septic System with Tire Chip Aggregate**

**Five Year Old Tire Chip System**
Scientist Examines Effluent For Nematodes

System Ecology

- Normal Gravel Trenches
  - Little to No Protozoa or Metazoa

- Normal Tire Chip Trenches
  - Abundant Forms Present
    - Protozoa - 3 Types of Ciliates
    - Metazoa - Aquatic/Segmented Worms
    - Metazoa - Nematodes
    - Metazoa - Insect Larva

Advantages of Tire Chips Over Stone

- More Storage Volume/Good Conductivity/Equal wastewater dispersal
- Equal waste treatment efficiency
- Lighter
- Less Expensive (lower freight and material costs)
- Easier to Use
- Stable, keeps its structure
- Reuse & Recycle
- Saves Natural Resources
- Saves Windshields

Issues with Tire Chips

- Exposed Wire in the Shreds
- Quality Control
- Availability
- Clean up
- Public Acceptance of New Products
Cautions

- Avoid clogging by using a geotextile membrane above the TDA layer. NO fines, dirt or foreign material in the TDA
- Settling? Tire chips in this application did not settle or compact

Acceptance of Tires Shreds

- 1st used in South Carolina; specifications developed
- Arkansas, Florida, New York have specifications for tires shreds as medium
- Late 1990s through mid-2000’s tires shreds as septic medium very popular in the South/Southeast
- Market forces took tires to TDF and ground rubber: better return on investment

Additional Resources

has five relevant publications.

www.rma.org also has leachate studies for tire chips above and below water table.

http://www.epa.gov/solidwaste/conserve/materials/tires/civil_eng.html#septic


More information is readily available on the internet.
And Video: http://www.epa.gov/wastes/conserve/materials/tires/basic.html#video

Conclusions

- Tire shreds have properties that engineers need
- Tire shreds are cost effective
- Civil engineering applications can use large quantity of tires & can be quickly done
- Specifications and guidelines exist
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