




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.



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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



Why Use Tire Shreds?

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



Tire Shreds?



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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

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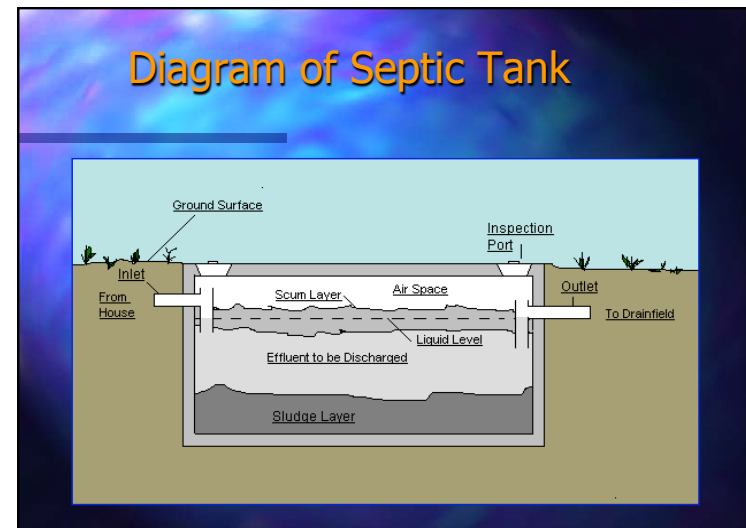
Specifications

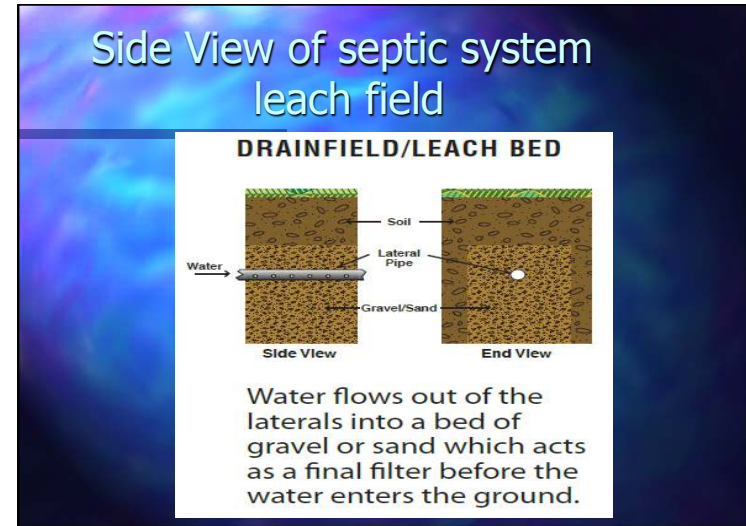
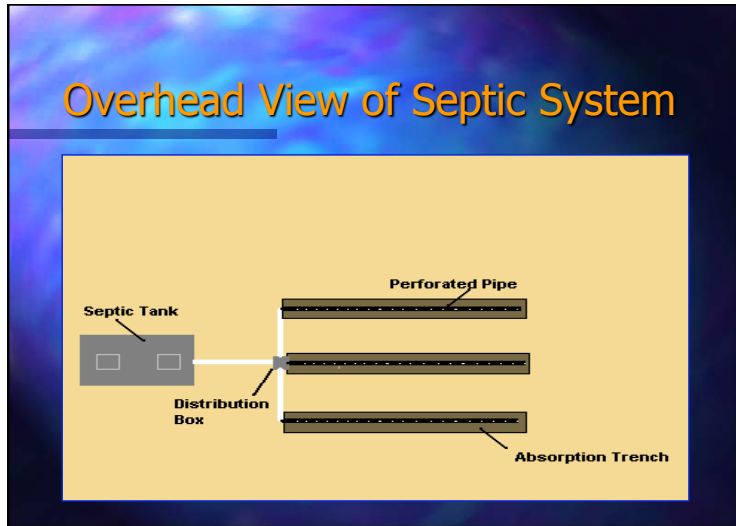
- Type A – drainage and insulation
 - 100% passing 100-mm sieve
 - Minimum of 90% passing 75-mm sieve
 - Maximum of 5% passing 4.75-mm (no. 4) sieve
- Type B – lightweight fill
 - 100% smaller than 450 mm max. dimension
 - 90% smaller than 300 mm max. dimension
 - Maximum of 25% passing 37.5 mm
 - Maximum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

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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





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


<http://www.rma.org/publications/scrap-tire-publications/septic-systems-publications/>
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.htm#septic

<http://ehs.ncpublichealth.com/oswp/docs/approvals/ie/TireChips-R3.pdf>

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