Waste Tires: Changes to End Use Markets & Landfill Application Uses

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Waste Tire Collection Facility requirements

- General operational parameters.
- Submit Annual report to the Department.
- Use only registered waste tire haulers.
- Notification of fire or other emergency involving waste tires.
- Manifest Requirements:
  - Maintain onsite for 3 years.
  - Shipments to or from facility manifest generated by hauler.
  - Shipments of waste tires (10 or more) from unregistered hauler, manifest generated by facility.

How is Colorado doing?*

- Recycling rate was 159% in 2016 (+12,000,000 waste tires end used or reused).
- Overall state waste tire inventory dropped by 4,700,000+ tires in 2016.
- Biggest recycling/end-uses:
  - Alternative daily cover = ~52% of all waste tires end used in the state in 2016
  - Tire-derived fuel of waste tires = ~22%
  - Salvage tires (reuse/retread)= ~13%

Changes in 2018

• January 1, 2018:
  • End Users Fund Program and Market Development Program repealed:
    • End Users Fund- rebates will continue for end use of tire-derived products until December 31, 2017.
    • Market Development Fund- Tetra Tech contract / market development programs will end on December 31, 2017.
  • Waste Tire Fee is reduced from $1.50 to $0.55 per new replacement tire.

What are challenges moving forward?

• Subsidy-based markets to a free market system.
• Replacing end user reimbursement income to allow continuation of a functional industry and markets.
• Increase in the cost of hauling / tipping fees.
• Increase in illegal dumping (maybe).
• Reduction of end uses and markets.
• Increase in waste tire inventories.
• Decrease in processing options / haulers.

What is next for Waste Tire Program

• CDPHE will:
  • Step up inspections of waste tire generators, haulers, processors and dumping sites.
  • Enforce regulations to remove economic benefit of illegal practices.
  • Review current regulations and policies to help minimize storage and illegal dumping issues.
  • Increase public awareness of waste tire issues and proper management of waste tires.

Illegal Waste Tire Cleanup Grants / Waste Tire Collection Events

• Funding for the cleanup of illegal waste tire sites
  • Since Fiscal Year 2011, over 630,000 illegal waste tires have been cleaned up.
  • In Fiscal Year 2017, 125,295 illegal waste tires were cleaned up.

• Waste Tire Collection Events
  • Funds for the hauling of waste tires for residential cleanup days in counties and municipalities.
  • Fourteen collection events completed since 2015 resulting in over 12,000 waste tires being collected.
  • Typically $3,000 per event.
Waste Tire Cleanup – Larimer County

Over 90,000 waste tires removed over 3+ years

Waste Tire Collection Events

Animas Mosquito Control District
3,637 Waste Tires Collected

Montezuma County Public Health
1,000 Waste Tires Collected

What is TDA?

Tire-Derived Aggregate (TDA) is:

- High permeability for many applications.
- Cost savings.
- Recycling (> 90,000 tires/acre – 1 ft. thick).

Why use Tire-Derived Aggregate?

**Leachate Collection Systems Design Considerations**

- Main function: minimize buildup of head on liner by transmitting leachate to collection pipes.
  - Permeability important
  - Resistance to clogging important
- Secondary function: protect liner from damage during operation.

**Effect of vertical stress on void ratio**

- **Void ratio of 0.2 limits vertical stress to 5,000 psf or about 67 feet of solid waste**

**Clogging – Practical Advice**

- Use conventional aggregate in critical areas, such as around collection pipes, esp. if acidogenic, calcium-rich leachate anticipated.
  - Conventional aggregate provides better support to pipes.
  - Select minimum allowable void ratio.

**TDA use in landfills**

- Donovan, et al., 1996

**Design Considerations**

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  - Permeability important
  - Resistance to clogging important
- Secondary function: protect liner from damage during operation.
Use of TDA in Leachate Collection System

Key players:
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Delaware Solid Waste Authority
John J. Wood, P.E.
Camp Dresser and McKee
Joseph R. Matteo
Magnus Environmental Corp.
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TDA in the leachate collection layer

- Use TDA in drainage layer.
- Drainage is important!
- Need to maintain a permeability similar to sand.
- Used more than 1 million tires.

Replace of a portion of the sand in the leachate collection layer

Use of TDA

Area of TDA
Leachate pump
Leachate collection pipe
800 feet
1250 feet
Case History
Frost Protection Layer

- Landfill in southeast Michigan
- Typical section
  - 15 in. leachate collection sand
  - Geocomposite drain
  - Geomembrane
  - 35 in. compacted clay
  - 18 in. Type A TDA

(Benson, et al., 1996)

Conventional Section

Section with TDA

Drainage Layers in Landfill Covers

- Low vertical stress, so permeability high.
- Must use geotextile between TDA and overlying vegetative support layer.
- Place TDA directly on geomembrane?
- If TDA placed on sloped geomembrane, check slope stability.
Case History
Landfill Cover (Andrews and Guay, 1996)

- DSI Landfill Superfund Site, Rockingham, VT
- Cross section of cap
  - 24-in. vegetative support layer
  - Geotextile filter
  - 12-in. sand or TDA with drain tubing
  - 40-mil textured geomembrane
  - 24-in. secondary barrier layer

Case History
Chiquita Landfill, Los Angeles County, CA
Gas Collection Trenches

- 3-ft x 3-ft trenches excavated into existing waste; perforated pipe placed in center.
- TDA covered with geotextile.

Chiquita Landfill

Chiquita Landfill
**Conclusions**

- TDA has properties that engineers need.
- TDA can be cost effective.
- Civil engineering applications an important use for scrap tires.
  - Multiple landfill applications
- Specifications and guidelines available.
- Negligible environmental effects.

**Contact Information**

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**Questions?**