

AASHTO Specifications for Roadside Compost Applications

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MACA Conference, Beltsville MD 9/19/07

DOT 'Soil Amendment' Compost Use Data

- 31 states with compost, or related, specs
- 26 spec for soil amending and topsoil manufacturing, 11 for planting backfill
- Specify by name (compost) or through "special provisions"
- Allow various feedstocks (some restrict)

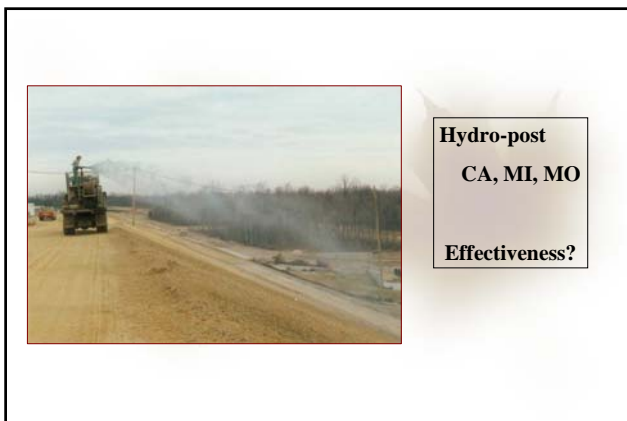
(2001 data)



DOT Erosion Control Compost Use Data

- Allow various feedstocks – yard trimmings #1
- Application rates vary widely, many states do not specify
- 11 states allow compost in erosion control
 - CA, CT, ID, ME, MI, MT, NY, OR, TX, VA, WA
 - 8 states allow soil blankets, 3 states allow berms
 - Several allow use as 'special provision'
 - Gathered compost specification data
- 3 states allow application through hydroseeding

(2001 data)



Compost Usage of Compost in Erosion and Sediment Control



Started with Compost Blanket Applications

Clyde Walton
Maine DOT – Maintenance & Construction responsibilities





US 281 Brownwood District (1/01)

Need for national standards to progress usage

- Has worked....

PROGRESSION...

Successful Compost Erosion Control States

- California
- Iowa
- Maine
- Minnesota
- Oregon
- Texas
- Virginia
- Washington

More states specifying it now

Landmark Dates

- Maine DOT – usage dates back to 1989 (RCS)
- Portland Metro research and report (W&H Pacific) – 1993/4
- University of CT berm research – 1998-2001
- AASHTO blanket and berm specifications (RMRC report) – 2003
- USEPA endorse specifications – 2006
- AASHTO filter sock specification - 2006

Specific Erosion Control Applications

- Compost Blanket
- Filter Berm
- Filter Socks

Benefits

- Reduces soil loss
- Reduces runoff
- Binds/removes toxic substances
- More effective than current methods

3 Dimensional aspect makes techniques ideal for storm water management

RMRC Project Sponsorship

- Grant provided by the Recycled Materials Resource Center, at the University of New Hampshire
- Receive funding from the Federal Highway Administration
- Promote the use of recycled products with State departments of transportation (DOT)

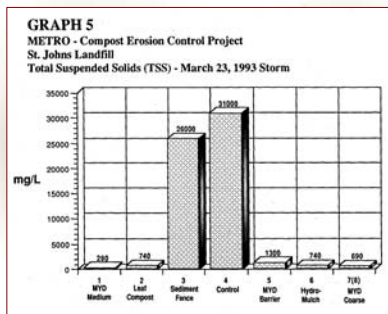
Overall Project Goals

- **Develop product/usage specs for compost used in erosion control applications**
 - Evaluate current DOT practices
- **Gain approval of specifications through American Association of State Highway Transportation Officials (AASHTO)**
- **Distribute specification throughout associated industries**

Project Tasks

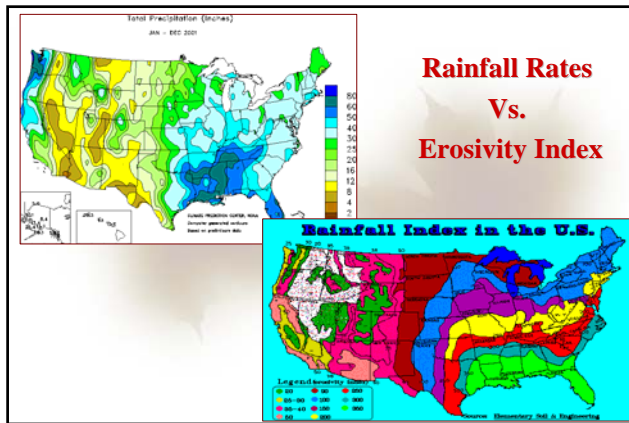
- **Gather and evaluate existing compost erosion control specifications, quantitative research and field demonstration data and experience**
- **Develop draft specifications – end use instructions and numerical standards**
- **Work with AASHTO Subcommittee on Materials to gain approval of specifications**
- **Gather and evaluate nutrient data, use to develop best practices, direct future research**
- **Develop and distribute report to State DOTs**

Peer reviewed and grey research



Real World Issues in Specification Development

- **Berm sizing, blanket application rates based on:**
 - Rainfall Rates and Erosivity Index
 - Slope severity and length
 - Product characteristics - particle sizing
 - Vegetation



Real World Issues in Specification Development

- Many composts have too many ‘fines’ to be highly effective as a filter berm media
- Intensity of rainfall is more critical than the volume of rainfall
- Coarser compost particles absorb the energy of rain, finer particles absorb more moisture – a good product requires a combination of sizes
- Feedstock of compost (nutrient content) may be an issue in specific applications

AASHTO Specification

- Develop ‘boiler plate’ product application language – application rates
- Develop model (numerical) product standards
- Follow specific AASHTO spec format
- Expect state DOTs to modify the Model Specs



Dallas/Spur 408 Demonstration (8/99 to 5/00)

Compost Blanket Application Rates

| Rainfall/Flow Rate | Total Precipitation & Rainfall Erosivity Index | Application Rates | |
|--------------------|--|-------------------|-----------|
| | | Veg'd | Un-Veg'd |
| Low | 1-25", 20-90 | ½ - ¾" | 1" – 1 ½" |
| Average | 26-50" 91-200 | ¾ - 1" | 1 ½" – 2" |
| High | 51" and above, 201 and above | 1-2" | 2-4" |

Model Compost Specification for Compost Blanket Establishment

| Parameters | Vegetated | Unvegetated |
|----------------|--|-------------|
| pH | 5.0 - 8.5 | N/A |
| Soluble Salt | Max. 5 | Max. 5 |
| Moisture | 30 – 60 | 30-60 |
| Organic Matter | 25 – 65 | 25-100 |
| Particle Size | Minimum 100% pass 3", 90% pass 1", 65% pass ¾", & no more than 75% pass ¼" + max. particle size length of 6" | |

Model Compost Specification for Compost Blanket Establishment

| Parameters | Vegetated | Unvegetated |
|---------------|--|--------------------|
| Stability | < 8 | N/A |
| Phys. Contam. | < 1 | <1 |
| Chem. Contam. | Meet/exceed US EPA standards, plus state standards | Class A standards, |
| Bio. Contam. | Meet/exceed US EPA standards, plus state standards | Class A standard, |



Compost Filter Berms, then Socks

Filter Berms Dimensions

| Rainfall/Flow Rate | Total Precipitation & Rainfall Erosivity Index | Berm Dimensions |
|--------------------|--|--------------------|
| Low | 1-25", 20-90 | 1'x 2' - 1.5' x 3' |
| Average | 26-50" 91-200 | 1'x 2' - 1.5' x 3' |
| High | 51" and above, 201 and above | 1.5'x 3' - 2' x 4' |

Model Compost Specification for Filter Berm Establishment

| Parameters | Vegetated | Unvegetated |
|----------------|--|-------------|
| pH | 5.0 - 8.5 | N/A |
| Soluble Salt | Max. 5 | N/A |
| Moisture | 30 - 60 | 30-60 |
| Organic Matter | 25 - 65 | 25-100 |
| Particle Size | Minimum 100% pass 3", 90% pass 1", 70% pass ¾", & 30-75% pass ¼" + max. particle size length of 6" | |

*in high rainfall situations, no more than:

| | |
|-------------------|-----|
| 60% | 50% |
| passing ¼" screen | |

Model Compost Specification for Filter Berm Establishment

| Parameters | Vegetated | Unvegetated |
|---------------|--|-------------|
| Stability | < 8 | N/A |
| Phys. Contam. | < 1 | <1 |
| Chem. Contam. | Meet/exceed US EPA Class A standards, plus state standards | |
| Bio. Contam. | Meet/exceed US EPA Class A standard, plus state standards | |



Can use where concentrated water is expected

Filter Socks Parameters

- 5 mil thick, tubular, HDPE 10mm knitted mesh
- Concentrated flows – under 10 gallons per minute
- 12" socks instead of 24" silt fence
- 18" socks instead of 36" silt fence
- Sleeving of socks
- Discusses requirements for additional socks and seeding

Model Compost Specification for Filter Sock Establishment

| Parameters | Assumes un-vegetated |
|----------------|---------------------------------------|
| pH | 5.0 - 8.5 |
| Soluble Salt | N/A |
| Moisture | < 60 |
| Organic Matter | 25-100 |
| Particle Size | Minimum 99% pass 2", 30-50% pass 3/8" |
| | + max. particle size length of 2" |

Model Compost Specification for Filter Sock Establishment

| Parameters | Un-vegetated |
|---------------|--|
| Stability | N/A |
| Phys. Contam. | <1 |
| Chem. Contam. | Meet/exceed US EPA Class A standards, plus state standards |
| Bio. Contam. | Meet/exceed US EPA Class A standard, plus state standards |

Current Status

- National balloting by AASHTO was completed, both specifications were overwhelmingly approved in 2003 and 2005
- Specs has been adopted by many State DOTs, etc.
- Specifications were released as "provisional"
 - MP-9 Filter Berms/Socks, MP-10 Compost Blankets
 - Published in AASHTO spec manual
 - Need to work on getting the specs to 'full standards'

Standard Specifications for Compost for Erosion/Sediment Control

- Compost Blankets MP-10
- Filter Berms MP-9 & Filter Socks




American Association of State Highway and Transportation Officials
444 North Capitol Street N.W., Suite 249
Washington, D.C. 20001

The Texas Experience *Really Helped... momentum*



Barrie Cogburn
Landscape Architect
TxDOT Design
Division



Scott McCoy
Program
Specialist
TNRC

Item 1027: "Furnishing & Placing Compost"

- Erosion Control Compost
- General Use Compost
- Compost for Manufactured Topsoil

Item 1034: "Mulch/Compost Filter Berm for Erosion & Sedimentation Control"



2001

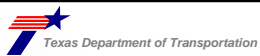
Special Specification Item 1027: "Furnishing & Placing Compost"

- Erosion Control Compost
- General Use Compost
- Compost for Manufactured Topsoil



*Having great success,
and wanted to protect it*

*Completed trials throughout
the state to prove that the
technology worked*



Changes to the TxDOT Specification

- No more Solvita field test
- TMECC test methods
- All compost must be Seal of Testing Assurance certified



Item 1058 Compost 2. Materials.

Provide compost meeting all applicable United States Code of Federal Regulations (CFR), Title 40, Part 503 standards for Class A biosolids and Texas Commission on Environmental Quality (TCEQ) health and safety regulations as defined in the Texas Administrative Code (TAC), Chapter 332, including the time and temperature standards in Subchapter B, Part 23. Meet the requirements of the USCC Seal of Testing Assurance (STA) program.



Before delivery of the compost, provide QC documentation that includes the following:

- the feedstock by percentage in the final compost product,
- a statement that the compost meets federal and state health and safety regulations,
- a statement that the composting process has met time and temperature requirements,
- a copy of the producer's STA certification, and
- a copy of the lab analysis, performed by an STA-certified lab, verifying that the compost meets the requirements of Table 1.

| ABC Compost Specialist 123 Compost Way Anyplace Texas 12345 | | Seal of Testing Assurance Date Sampled/Received: 04 Nov 02 09:00 AM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--------------|--|---------------------|-------------------|--------------|-------------------------|--------------------|------------------------|------|----------------------|---------------------|----|------|----------------------|---------------------|---------------|------|----------------------|---------------------|-----------|------|----------------------|---------------------|-------------|-------|----------------------|---------------------|------|-------|----------------------|---------------------|---------|-----|----------------------|---------------------|-------|--|--|--|
| Dear Sir/Madam, In accordance with the Texas Department of Transportation (TxDOT) Special Specification Item 1027, "Furnishing and Placing Compost", I affirm the following information: (3) Documentation. | | COMPOST TECHNICAL DATA SHEET for Texas DOT <table border="1"> <thead> <tr> <th>Compost Parameter</th> <th>Test Results</th> <th>Applied as per standard</th> <th>FIND/C Test Method</th> </tr> </thead> <tbody> <tr> <td>Organic Matter Content</td> <td>62.4</td> <td>As per specification</td> <td>22.01 or equivalent</td> </tr> <tr> <td>pH</td> <td>6.28</td> <td>As per specification</td> <td>22.02 or equivalent</td> </tr> <tr> <td>Particle Size</td> <td>10.0</td> <td>As per specification</td> <td>22.03 or equivalent</td> </tr> <tr> <td>Stability</td> <td>95.0</td> <td>As per specification</td> <td>22.04 or equivalent</td> </tr> <tr> <td>Temperature</td> <td>160.0</td> <td>As per specification</td> <td>22.05 or equivalent</td> </tr> <tr> <td>Time</td> <td>120.0</td> <td>As per specification</td> <td>22.06 or equivalent</td> </tr> <tr> <td>Residue</td> <td>0.0</td> <td>As per specification</td> <td>22.07 or equivalent</td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | | Compost Parameter | Test Results | Applied as per standard | FIND/C Test Method | Organic Matter Content | 62.4 | As per specification | 22.01 or equivalent | pH | 6.28 | As per specification | 22.02 or equivalent | Particle Size | 10.0 | As per specification | 22.03 or equivalent | Stability | 95.0 | As per specification | 22.04 or equivalent | Temperature | 160.0 | As per specification | 22.05 or equivalent | Time | 120.0 | As per specification | 22.06 or equivalent | Residue | 0.0 | As per specification | 22.07 or equivalent | Other | | | |
| Compost Parameter | Test Results | Applied as per standard | FIND/C Test Method | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Organic Matter Content | 62.4 | As per specification | 22.01 or equivalent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | 6.28 | As per specification | 22.02 or equivalent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Particle Size | 10.0 | As per specification | 22.03 or equivalent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stability | 95.0 | As per specification | 22.04 or equivalent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature | 160.0 | As per specification | 22.05 or equivalent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Time | 120.0 | As per specification | 22.06 or equivalent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Residue | 0.0 | As per specification | 22.07 or equivalent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Other | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (A) The compost contains a minimum of 65% by volume of recycled materials. (B) A list of feedstock by percentage in the final compost product: 1. 2. 3. 4. | | (C) The compost meets federal and state health and safety regulations. (D) The compost meets time and temperature requirements. (E) A copy of the lab analysis less than 3 months old and that the compost meets all physical requirements described in Table 1 in Special Specification Item 1027. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scott Compost, President ABC Compost Specialist Signature Before a Notary Public | | Date: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Notary Public Signature and Seal | | Date: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Texas Department of Transportation

Took care up supply

STA Certified Compost Suppliers in Texas

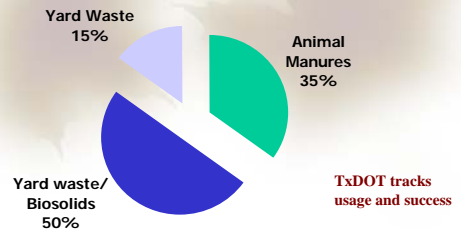
| | |
|-----------------------------------|------------------------------------|
| Angelina & Neches River Authority | Geosource, Inc. |
| Back to Nature, Inc. | Living Earth Technologies |
| Black Gold Compost | Natural Fertilizer Company |
| City of Denton | New Earth LLC |
| City of Plano | O'Neal's Compost |
| Garden Success, Inc. | Organic Residuals Reclamation, LLC |
| Garden-Ville | R.J. Smelley Company |
| | Texarkana Water Utilities |

*Composter Certification is Tracked by TxDOT on USCC/STA websites

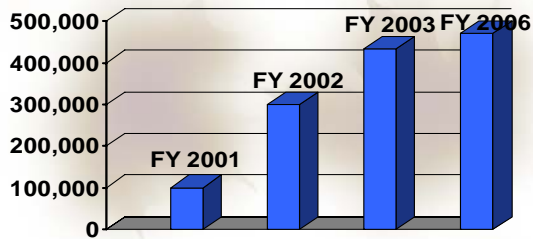


Texas Department of Transportation

Types of Composts Being Utilized by TxDOT



Texas Department of Transportation



Cubic Yards of Compost Specified (FY)

Seal of Testing Assurance Program

TEXAS GROWTH

2000 – 2002

- 4 composters

2003

- 19 new
- 23 total

2004

- 8 new
- 31 total

2006

- 8 new
- 39 total



2002 AASHTO President's Transportation Award

Build it and they come (join)

Have to 'work it'