SR 331 Experimental Project
Performance Evaluation of a Geocomposite Drainage Layer and Black Base

October 2010
SR 331 (Alachua County)

- History of elevated water table
- Design and construction implications
  - Thicker pavement structure required (design resilient modulus reduced if base clearance < 3 ft)
  - Construction problems and additional costs likely
- Experimental sections constructed in 2005
- Objective
  - Evaluate the performance of a geocomposite and black base
**Test Sections**

Diagram showing sections with various road elements and symbols such as 'Asphalt Base', 'Concrete Median', 'Grass Median/Area', 'Box Curve', and 'Portable Traffic Counter'. The diagram includes mileposts and street names like SE 4th Ave, 3rd Ave, and 2nd Ave.
SR 331 (Southbound Passing Lane)
Traffic Data

~1 million ESALs projected at time of 2010 survey
Base Clearance

Construction

1 ft avg base clearance & WT occasionally approaches base
Rainfall History

Typically evaluated in October

Monthly Rainfall, inch

Month

Jan  Feb  March  April  May  June  July  Aug  Sept  Oct  Nov  Dec

25th Percentile  75th Percentile  2010 rainfall
Pavement Sections

**Black Base Section 2 Southbound**
- 1.5 inch FC-12.5, ARB-5
- 1.5 inch SP-12.5, PG67-22
- 7.0 inch Black Base
- 6 to 7 feet of A-3 Sand
- Sandy clay to clayey sand (A-2-6/7, A-7-5/6)

**Geocomposite Section 2 Northbound**
- 1.5 inch FC-12.5, ARB-5
- 1.5 inch SP-12.5, PG67-22
- 7.5 inch Limerock Base
- Geocomposite
- 6 to 7 feet of A-3 Sand
- Sandy clay to clayey sand (A-2-6/7, A-7-5/6)

**Dry Limerock Base Sections 1 & 3 (NB & SB)**
- 1.5 inch FC-12.5, ARB-5
- 1.5 inch SP-12.5, PG67-22
- 7.5 inch Limerock Base
- Geocomposite
- 6 to 7 feet of A-3 Sand
- Sandy clay to clayey sand (A-2-6/7, A-7-5/6)
Geocomposite

- High density polyethylene core
- Approximately 0.3 inches thick
- Aperture area 0.25 in²
- Non-woven geotextile laminated to both sides
Technical Special Provision

- No track equipment allowed to travel directly over geocomposite
- A min of 6 inches of base required before heavy construction equipment allowed to travel over geocomposite
- Slope towards a Type II edgedrain (Index 286, Section 440)
Geocomposite Placement
Elevated Water Table During Construction
Pavement Performance

- Surveyed annually during October since 2005
- Performance measured in terms of:
  - Ride
  - Rut
  - Deflection
  - Crack
2010 Ride and Rut Measurements

- Ride quality is still good
  - ✔ Section 2 NBTL (Geocomposite) has a ride of 3.9
  - ✔ All other sections > 4.0

- Rut depth is acceptable and not significant between sections
  - ✔ The limerock control and black base have similar rut depths of 0.11 inch
  - ✔ The geocomposite section has a rut depth of 0.14 inch
2010 Center Deflections

Station, feet

Center Deflection, mils

Section 1 (Limerock)
Section 2
Section 3 (Limerock)

Intersection

Asphalt Base
Geocomposite

NBTL
NBPL
SBTL
SBPL
2010 Crack Survey

- The first crack was observed in the geocomposite section 3 years after construction.

- The first crack was observed in the dry limerock section 4 years after construction.

- No cracks have been observed in the black base section.

~20% of wheel paths have alligator cracks.

---

<table>
<thead>
<tr>
<th>Measured Cracks, ft² / 1000ft²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Limerock</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>30</td>
</tr>
</tbody>
</table>

No Cracking
Geocomposite Travel Lane

Pumping from cracks observed

Alligator cracks in wheel paths
Testing Summary

- Experimental sections are 5 years old
- Approximately 1 million ESALs have been applied
- The water table has penetrated the base occasionally over the 5 years of monitoring
- Annual monitoring will continue until further notice