Overview of Florida Asphalt Pavements

2019 Southeastern States Pavement Conference

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Overview

- Florida Facts
- Pavement Design History
- Factors Contributing to Durability
- Example
Florida

- Nickname: Sunshine State
- Capital: Tallahassee
- Counties: 67
- 2018 Population: 21,299,325
  - 3rd most populous state
  - > 100 people move here every day
  - 20% of population is over 65 years old
- 14 million registered vehicles
- Known For: Sunshine, Heat, Oranges, Hurricanes, Space Shuttles, Beaches, Theme Parks, Race Cars
- 127 million visitors in 2018
Florida’s State Roads

• As of 2019:
  – Arterials – 33,700 lane miles
  – Interstate – 8,500 lane miles
  – Turnpike – 2,300 lane miles

• Of those miles:
  – Rigid – 1,200 lane miles
  – Flexible – 43,300 lane miles

Total Lane Miles: 44,500
(Flexible and Rigid Combined)
FDOT Pavement Design Background

- **1960’s** – Hubbard-Field mix design
- **1970** – Marshall mix design
- **1980’s** – FDOT Milling & Resurfacing Program Introduced
- **1990’s** – Superpave mix design
Benefits Resulting from Superpave

• Improved Specifications
  – Stronger, more rut resistant mixes
    • Better Aggregate
    • Less Sand
    • Better Binders
  – Mixture Consistency
    • 9.5 mm
    • 12.5 mm
    • 19.0 mm
Friction Courses

• Highway Safety Act of 1966
  – 1967, FHWA required high skid resistance
• FDOT developed several wearing courses, finalized in 1975
• Meanwhile… FHWA published new guidelines in 1974 for Open Graded Friction Course
Friction Courses

• 1979: FC-2 Open Graded Friction Course

• 1998, FDOT began development of FC-5
  – Based on GDOT’s D-Modified OGFC

• 2000, FDOT Specs for FC-5 were finalized & implemented
Other Factors

• Demand for Quality:
  – Contractor Quality Control (CQC) Specs
  – Construction Training and Qualification Program (CTQP)
• Warranty Specifications
• Pavement Management
  – Florida Statute
  – Pavement Condition Survey
• Florida’s Geology and Climate
PCS data has been collected since 1976.

The PCS rates pavements using three indices:

- CRACK
- RUT
- RIDE

The rating scale for the PCS is from 0 (worst) to 10 (best).

A rating under 6.5 in most cases is considered deficient.

Since 2006 FDOT has surpassed the 80% performance standard per Florida Statute.

Averages: OGFC ~ 15 years; DGFC ~ 20 years
Example: High Volume Pavement Design

- **Asphalt**
  - 0.75” FC-5
  - 5” Asphalt Structural Course
  - 12” Limerock Base
  - 12” Stabilization
  - 12,000 psi subgrade

- **Concrete**
  - 12” Concrete
  - 4” Asphalt Base
  - 12” Stabilization
Friction Courses

- Dense Graded
  - FC-9.5
  - FC-12.5
- Open Graded
  - FC-5

Diagram:
- 0.75” FC-5
- 5” Asphalt Structural Course
- 12” Limerock Base
- 12” Stabilization
• Layer Thicknesses
  – SP-9.5: 1” – 1½”
  – SP-12.5: 1½” – 2 ½”
  – SP-19.0: 2” – 4”

• Restricted Uses:
  – SP-9.5:
    • 2 layers max. & only used in top 2 structural layers
    • Not for ESAL > 10 million
  – SP-19.0:
    • Not beneath FC-5
Base Courses

GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS (inches)

- Optional Base Groups
  - Material Type
  - Thickness
  - Strength

- 0.75" FC-5
- 5" Asphalt Structural Course
- 12" Limerock Base
- 12" Stabilization

TYPICAL SECTION
I-10 (SR 8)
STA. 567+25.67 TO STA. 1056+84.35

TRAVEL LANES
- Optional Base Group 9 with Type Sb Structural Course (Traffic D) (4") and Friction Course FC-5 (1") (PG 76 22)
- Shoulder Pavement
- Optional Base Group 1 with Type Sb Structural Course (Traffic D) (1 1/2")

TRAFFIC DATA
- Current Year = 2018 ADT = 22,396
- Estimated Opening Year = 2020 ADT = 23,300
- Estimated Design Year = 2040 ADT = 33,300
- K = 0.9
- D = 50%
- T = 10%
- Design Hour = 5%
- Design Speed = 70 MPH

SHOULDER PAVEMENT DETAIL
- This area may be constructed of optional base material at no additional compensation

Exhibit 306-1
4-Lane Limited Access Facility
Date: 1/1/18
Stabilization

- Materials:
  - Limerock, Shell Rock, Cemented Coquina, Shell Base

SECTION 914
STABILIZATION MATERIALS

914-1 General.
This Section governs materials to be used in subgrade stabilization. Meet the following requirements:

<table>
<thead>
<tr>
<th>Plasticity Index (AASHTO T90)</th>
<th>Maximum 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid Limit (AASHTO T89)</td>
<td>Maximum 40</td>
</tr>
<tr>
<td>Passing a 3-1/2 inch screen (AASHTO T27)</td>
<td>Minimum 97%</td>
</tr>
<tr>
<td>LBR</td>
<td>No Requirement</td>
</tr>
</tbody>
</table>
Summary

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• Pavement Design History

• Factors Contributing to Durability

• Example
Thank you!

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