# Construction Academy 2022
# Asphalt Issues

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**State Materials Office**
**May 25, 2022**

# Asphalt ~~Issues~~ Topics

# Asphalt 101


**Ground Tire Rubber**


**Styrene-Butadiene-Styrene (SBS)**

# Materials

## Asphalt Binders

- "Binds" the aggregate together
- Provides…
  - the "glue"
  - lubrication for compaction
  - Durability (resistance to cracking)
- The most expensive part of an asphalt mix

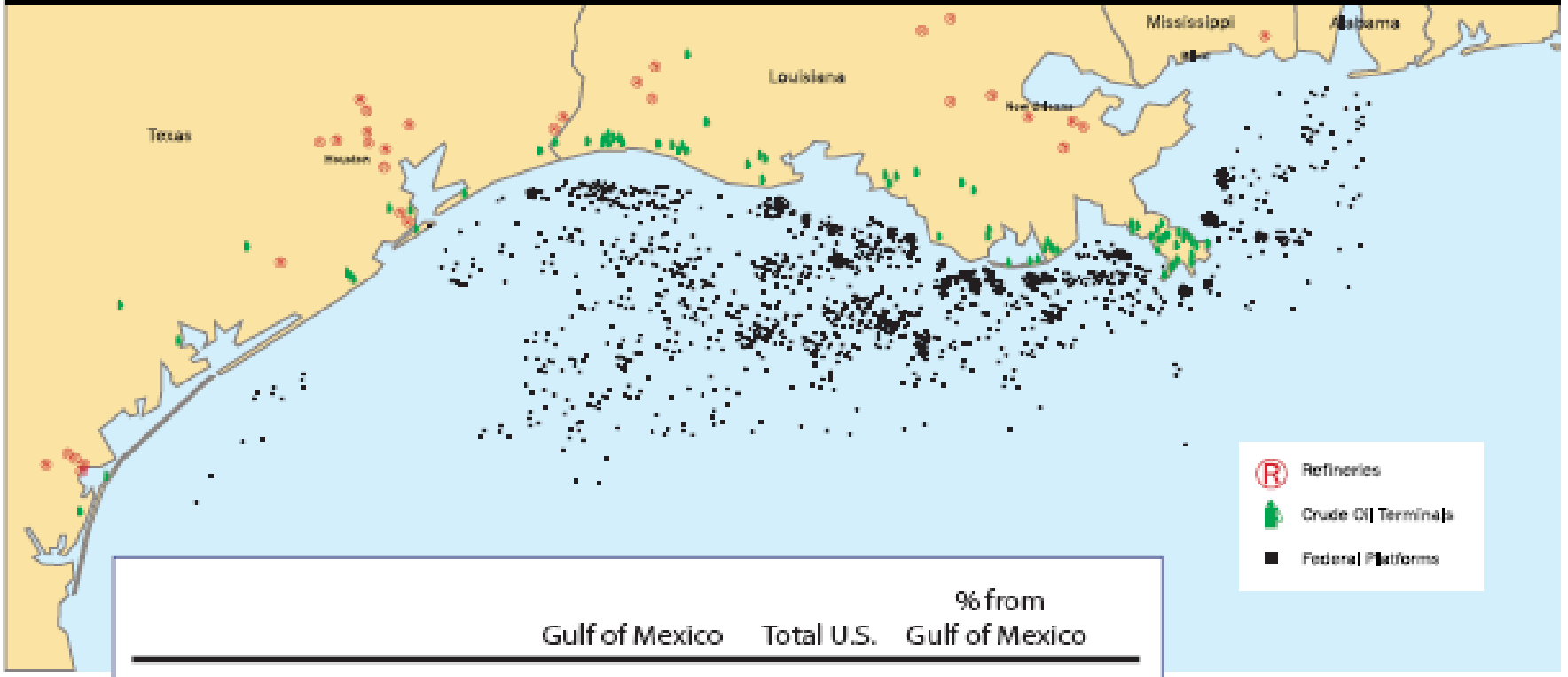
## Aggregate

- Stability, constructability, and moisture resistance
  - Consensus properties (fine aggregate angularity, flat and elongated particles, and clay content)
  - Source properties (toughness, soundness, and deleterious materials)

# Where Does Asphalt Come From?

## Crude Oil

# Gulf Coast Oil and Natural Gas Operations




| | Gulf of Mexico | Total U.S. | % from Gulf of Mexico |
|---|---|---|---|
| Oil production (million b/d) | 1.5 | 5.5 | 27% |
| Natural Gas production (bcf/d) | 10.6 | 52 | 20% |
| Refinery Capacity (million b/d) | 8.1 | 17 | 48% |
| *of which in LA and MS* | *3.1* | *17* | *18%* |
| Crude Oil Imports (million b/d) | 6.5 | 10.8 | 60% |
| *of which into LA and MS ports* | *2.5* | *10.8* | *23%* |

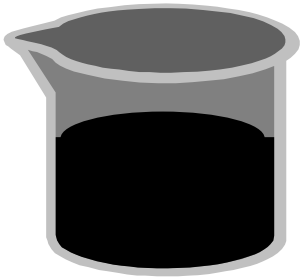
Source: U.S. Energy Information Administration

# Superpave Asphalt Binders

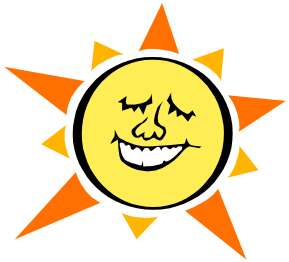
## Grading system based on climate

**PG 67-22**

**Performance Grade**

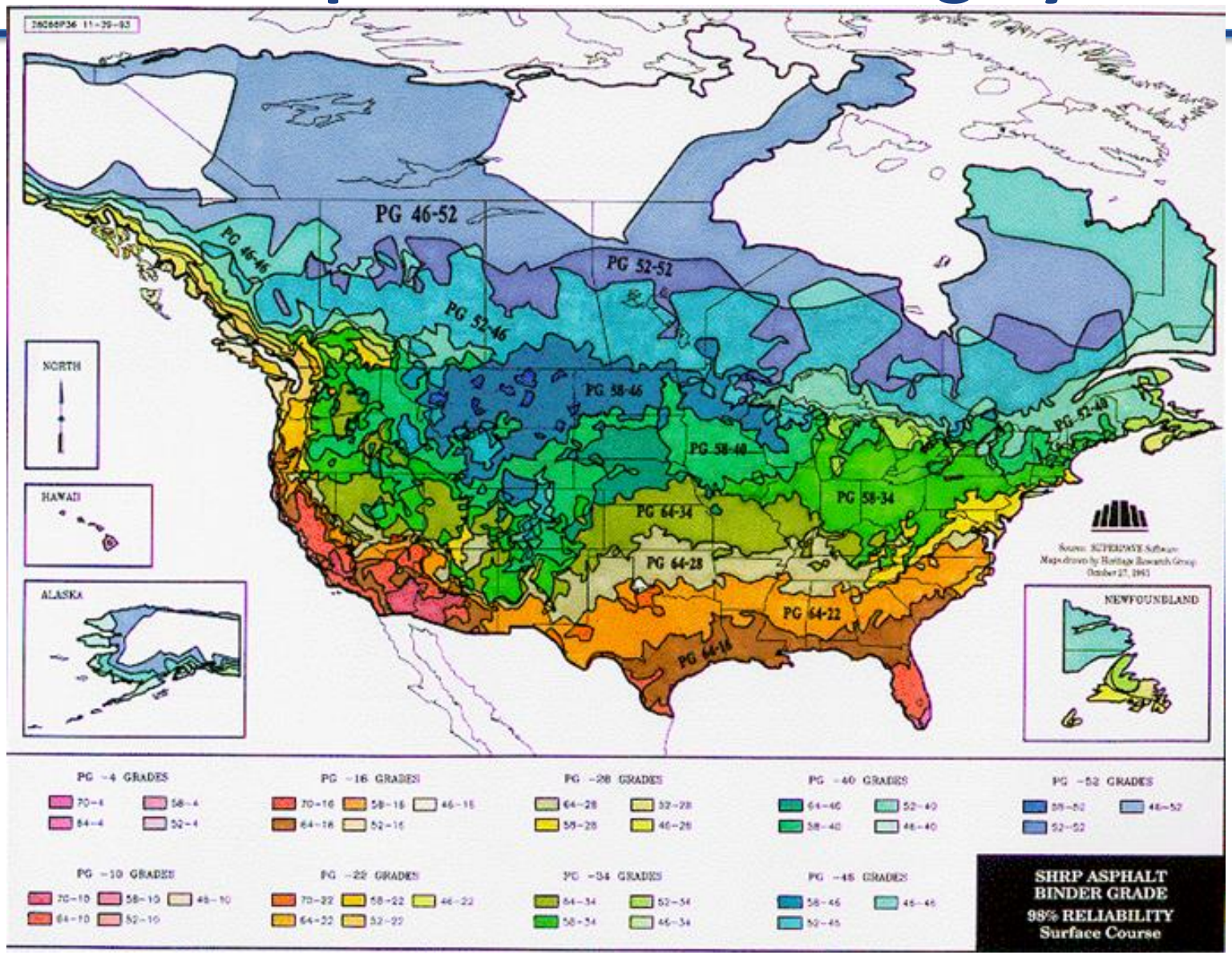


**Average 7-day max pavement design temp**



**Min pavement design temp**

# Examples of PG Grading System



# Neat Asphalt Binders

| Table 334-2<br>Asphalt Binder Grade for Mixes Contains RAP | |
|---|---|
| **Percent RAP** | **Asphalt Binder Grade** |
| 0 – 15 | PG 67-22 |
| 16 – 30 | PG 58-22 |
| >30 | PG 52-28 |

The bituminous material specification requirements are outlined in Section 916.

# Modified Asphalt Binders (916)

- PG 76-22 (PMA)
  - PG 67-22 base asphalt
  - Polymer Modified Asphalt (SB or SBS Polymer)
- PG 76-22 (ARB)
  - PG 67-22 base asphalt
  - Minimum 7% ground tire rubber (GTR)
  - Polymer modification optional
- High Polymer (PMA)
  - PG 58-22 base asphalt
  - Polymer Modified Asphalt (SB or SBS Polymer)


South Florida Limestone


Granite

# RAP Usage (2021)


| FRAP_Course | RAP | FRAP_Fine | MM | RAS | Total Recycled Material Tonnage |
|---|---|---|---|---|---|
| 29,474.31 | 766,068.57 | 33,703.48 | 94,952.08 | - | 924,198.44 tons |

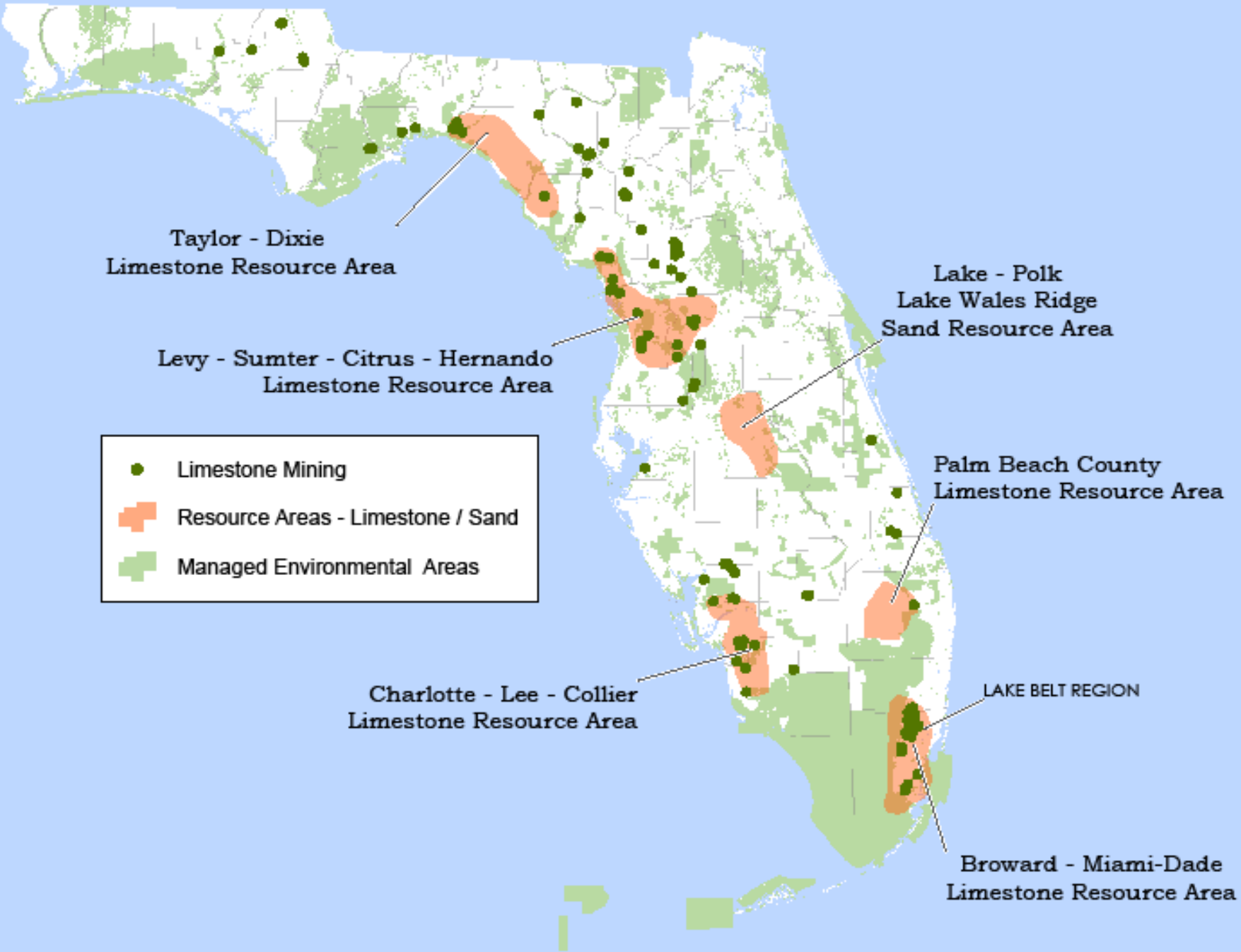
# Asphalt Mix Tonnage (2021)

| Calendar Year 2021 | |
|---|---|
| Mix type | Tonnage |
| FC-12.5 | 560,165.60 |
| FC-5 | 491,630.47 |
| FC-9.5 | 194,036.63 |
| SP-12.5 | 3,192,895.50 |
| SP-19.0 | 53,893.04 |
| SP-9.5 | 72,709.13 |
| Grand Total | 4,565,330.37 |

| Friction | | | Structural | | | Grand Total |
|---|---|---|---|---|---|---|
| FC-5 | FC-9.5 | FC-12.5 | SP-9.5 | SP-12.5 | SP-19.0 | |
| 491,630.47 | 194,036.63 | 560,165.60 | 72,709.13 | 3,192,895.50 | 53,893.04 | 4,565,330.37 |


# Approved Asphalt Binder Terminals

# LIMESTONE AND SAND RESOURCE AREAS



# Aggregate Sources Used in Asphalt

- Aggregate mines
- Aggregate terminals


# Approved Asphalt Plants

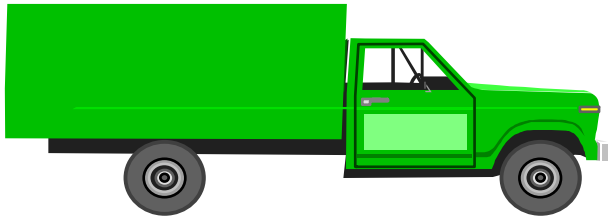
# Florida Asphalt Mixtures

- Superpave Asphalt Concrete (334)
  - Structural asphalt mixtures
  - SP-9.5, SP-12.5, SP-19.0
- Asphalt Concrete Friction Courses (337)
  - FC-9.5, FC-12.5, FC-5 (OGFC)
- Superpave Asphalt Base (234)
  - B-12.5
- Asphalt Treated Permeable Base (ATPB) (287)
  - Used under PCC pavements

# Superpave – Structural (334)

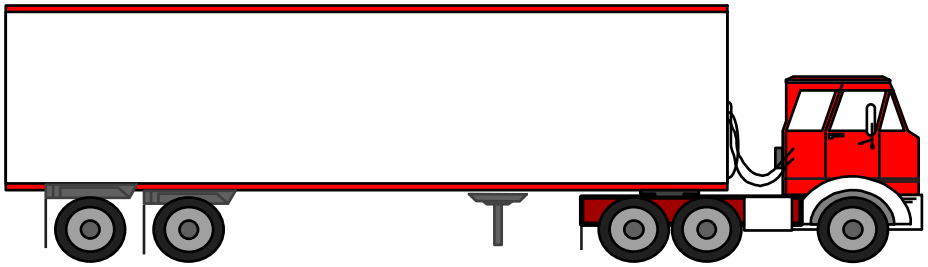
- Purpose: Load carrying portion of pavement
  - Superpave Mix Design
- Three mixes based on maximum aggregate sizes
  - 9.5 mm (SP-9.5)
  - 12.5 mm (SP-12.5)
  - 19.0 mm (SP-19.0)
- Five Traffic Levels (A-E)
  - Based on 18,000 lb. Equivalent Single Axle Loads (ESAL's)
  - Low traffic = A, High traffic = E

# ESAL Examples



15,000 lb 6,000 lb

0.48 ESAL + 0.01 ESAL = **0.49 ESALs**



34,000 lb 34,000 lb 12,000lb

1.10 + 1.10 + 0.20 = **2.40 ESALs**

# Mix Design Traffic Levels

Traffic Levels are found in the Contract

ESALS come from planning

| Traffic Level | ESAL's |
|---|---|
| A | < 300,000 ESAL's |
| B | 300,000 < 3 million ESAL's |
| C | 3 million < 10 million ESAL's |
| D | 10 million < 30 million ESAL's |
| E | ≥ 30 million ESAL's |

Concept: Put the right mix on the right road

Higher traffic level is not necessarily better

# Traffic Levels 2021

| Traffic Level | Tonnage | Percentage |
|---|---|---|
| **A** | 0.00 | 0.00% |
| **B** | 735.62 | 0.02% |
| **C** | 2,211,538.65 | 48.40% |
| **D** | 1,432,213.97 | 31.34% |
| **E** | 429,211.66 | 9.39% |
| **NA** | 495,878.46 | 10.85% |
| **Grand Total** | **4,569,578.36** | 100.00% |

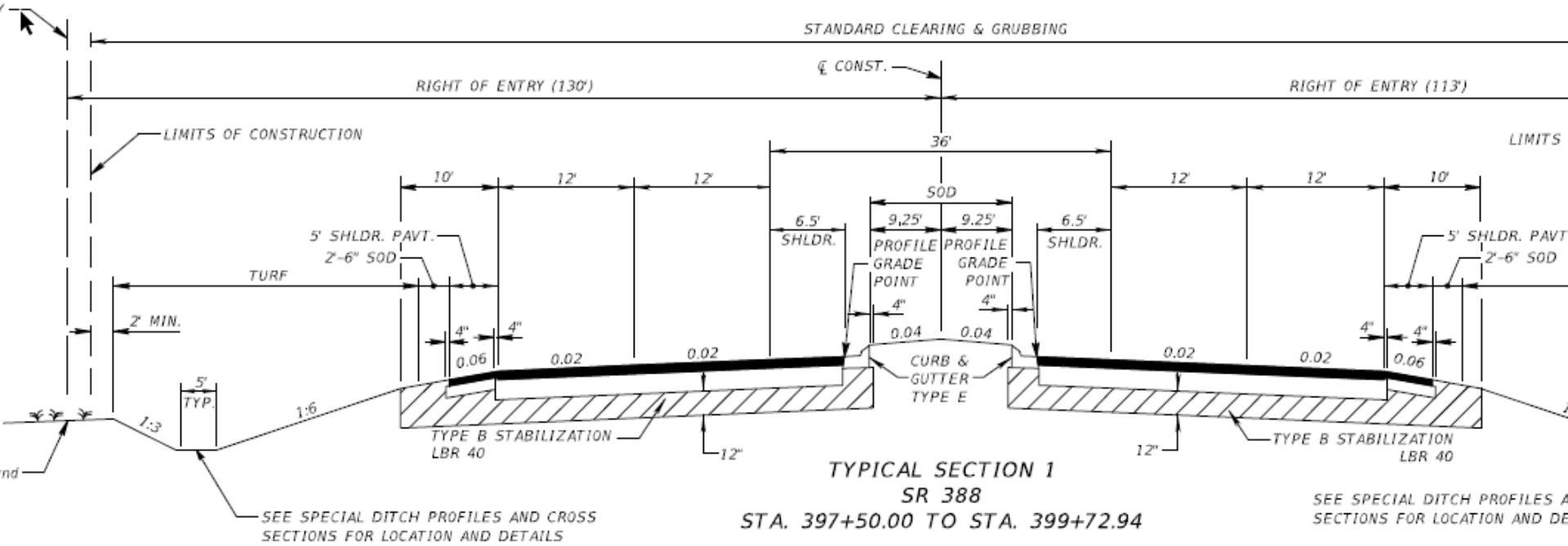
A
<300,000 ESAL's

B
300,000 to 3,000,000 ESAL's

E
>30,000,000 ESAL's


3,000,000 to 10

000,000 ESAL's




## TYPICAL SECTION 1
## SR 388
## STA. 397+50.00 TO STA. 399+72.94

### NEW CONSTRUCTION

OPTIONAL BASE GROUP 9 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3½") (PG 76-22)
AND FRICTION COURSE FC-5 (¾") (PG 76-22)

### SHOULDER PAVEMENT

OPTIONAL BASE GROUP 1 WITH
TYPE SP, STRUCTURAL COURSE (TRAFFIC C) (1½") (PG 76-22)
AND FRICTION COURSE FC-5 (¾") (PG 76-22)

### TRAFFIC DATA

CURRENT YEAR = 2014 AADT = 4,500
ESTIMATED OPENING YEAR = 2020 AADT = 10,500
ESTIMATED DESIGN YEAR = 2040 AADT = 20,600
K = 9.0% D = 55.8% T = 11.7% (24 HOUR)
DESIGN HOUR T = 5.85%

CLEAR ZONE = 24' (50 MPH)
NOTE: DESIGN CLEAR ZONE DOES NOT APPLY TO CLEAR ZONE WIDTHS FOR WORK ZONES.

# Traffic Level and Binder Type Shown on Plans

## NEW CONSTRUCTION

OPTIONAL BASE GROUP 9 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3½") (PG 76-22)
AND FRICTION COURSE FC-5 (¾") (PG 76-22)

## SHOULDER PAVEMENT

OPTIONAL BASE GROUP 1 WITH
TYPE SP, STRUCTURAL COURSE (TRAFFIC C) (1½") (PG 76-22)
AND FRICTION COURSE FC-5 (¾") (PG 76-22)

# Asphalt Mix Design

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

ASPHALT MIX DESIGN

SUBMIT TO THE DIRECTOR, OFFICE OF MATERIALS, CENTRAL ASPHALT LABORATORY, 5007 NE 39TH AVE, GAINESVILLE, FL 32609

Contractor ..... Address ..... District 2 .....

Phone No. ..... Fax No. ..... E-mail .....

Submitted By ..... Type Mix ..... SP-12.5 Recycle Fine ..... Intended Use of Mix ..... Structural .....

Design Traffic Level ..... D ..... Gyrations @ Ndes ..... 100 .....

| Product Description | Product Code | Producer Name | Product Name | Plant/Pit Number | Plant/Pit Terminal |
|---|---|---|---|---|---|
| 1. Crushed R.A.P. | 334-CR | | 1-18 | | |
| 2. S1B Stone | C53 | | S1B | | |
| 3. S1B Stone | C52 | | S1B | | |
| 4. Screenings | F21 | | Screenings | | |
| 5. Sand | 334-LS | | Sand | | |
| 6. | | | | | |
| 7. PG Binder | 916-52 | | PG 52-28 | | |

PERCENTAGE BY WEIGHT TOTAL AGGREGATE PASSING SIEVES

| Blend | 40% | 24% | 8% | 23% | 5% | | JOB MIX | CONTROL | PRIMARY |
|---|---|---|---|---|---|---|---|---|---|
| Number | 1 | 2 | 3 | 4 | 5 | 6 | FORMULA | POINTS | CONTROL SIEVE |
| 3/4" 19.0mm | 100 | 100 | 100 | 100 | 100 | | 100 | 100 | |
| 1/2" 12.5mm | 99 | 94 | 100 | 100 | 100 | | 98 | 90 - 100 | |
| 3/8" 9.5mm | 95 | 63 | 98 | 100 | 100 | | 89 | - 89 | |
| No. 4 4.75mm | 80 | 17 | 32 | 100 | 100 | | 67 | | |
| No. 8 2.36mm | 62 | 4 | 5 | 80 | 100 | | 50 | 40 - 58 | 39 |
| No. 16 1.18mm | 51 | 4 | 5 | 53 | 100 | | 39 | 29 - | |
| No. 30 600µm | 43 | 4 | 5 | 33 | 95 | | 31 | 22 - | |
| No. 50 300µm | 34 | 4 | 5 | 22 | 75 | | 24 | 16 - | |
| No. 100 150µm | 19 | 3 | 4 | 12 | 9 | | 12 | | |
| No. 200 75µm | 8.7 | 1.0 | 1.0 | 5.8 | 1.5 | | 5.2 | 2 - 10 | |
| $G_{sb}$ | 2.589 | 2.729 | 2.705 | 2.713 | 2.626 | | 2.661 | | |

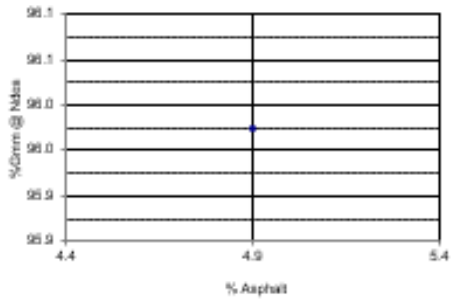
The mix properties of the Job Mix Formula have been conditionally verified, pending successful final verification during production at the assigned plant, the mix design is approved subject to F.D.O.T. specifications.

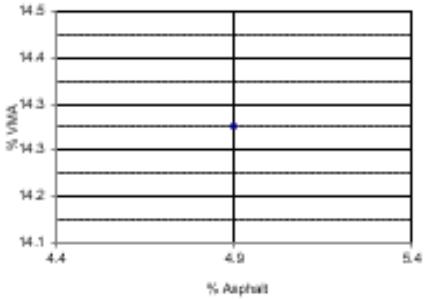
SP 19-18008A (TL-D)

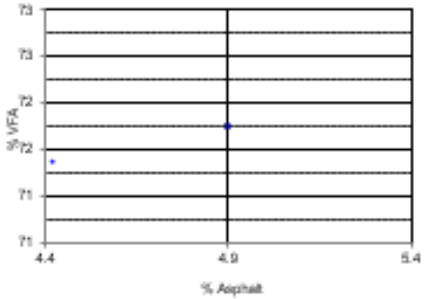
# Asphalt Mix Design

SP 19-18008A (TL-D)

| $P_b$ | $G_{sb}$ @ $N_{des}$ | $G_{se}$ | $V_a$ | VMA | VFA | $P_{be}$ | $P_{be}$ / $P_b$ | %$G_{mm}$ @ $N_{ini}$ | %$G_{mm}$ @ $N_{max}$ |
|---|---|---|---|---|---|---|---|---|---|
| 4.9 | 2.399 | 2.499 | 4.0 | 14.3 | 72 | 4.4 | 1.2 | 89.8 | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |




Total Binder Content 4.9 %

Spread Rate @ 1" 108 lbs/ud²

VMA 14.3 %

$G_{se}$ Corr. Factor -0.004

FAA 45.1 %

%$G_{mm}$ @ $N_{des}$ 96.0

Ignition Oven Calibration Factor -0.09

[Plant] Mixing Temperature 300 °F 149 °C

[Roadway] Compaction Temperature 300 °F 149 °C

Antistrip Additive: See A.P.L. % % %

| | |
|---|---|
| Optimum Asphalt | = 4.90% |
| Asphalt using 40% Crushed R.A.P. @ 5.6% | = 2.24% |
| PG 52-28 to be added | = 2.66% |

# Asphalt Mix Design

| | | | | | |
|---|---|---|---|---|---|
| Total Binder Content | 5.2 | % | Gmb @ Ndes | 2.378 | |
| Ignition Oven Corr. Factor (+ To Be Added)/(- To Be Subtracted) | -0.04 | | Gmm | 2.477 | |
| Gmm Corr. Factor | 0.000 | | Va | 4.0 | |
| Mixing Temp. (Plant) | 305 | °F | VMA | 15.0 | Effective Date 11/30/2017 |
| Compaction Temp. (Roadway) | 300 | °F | VFA | 73 | Expiration Date 11/30/2020 |
| Spread Rate @ 1" | 107 | lb/yd$^2$ | P-200/Pbe | 1.1 | |
| Binder from Recycled Materials | 1.12 | % | | | |
| PG 58-22 to be added | 4.08 | % | Additives | | |

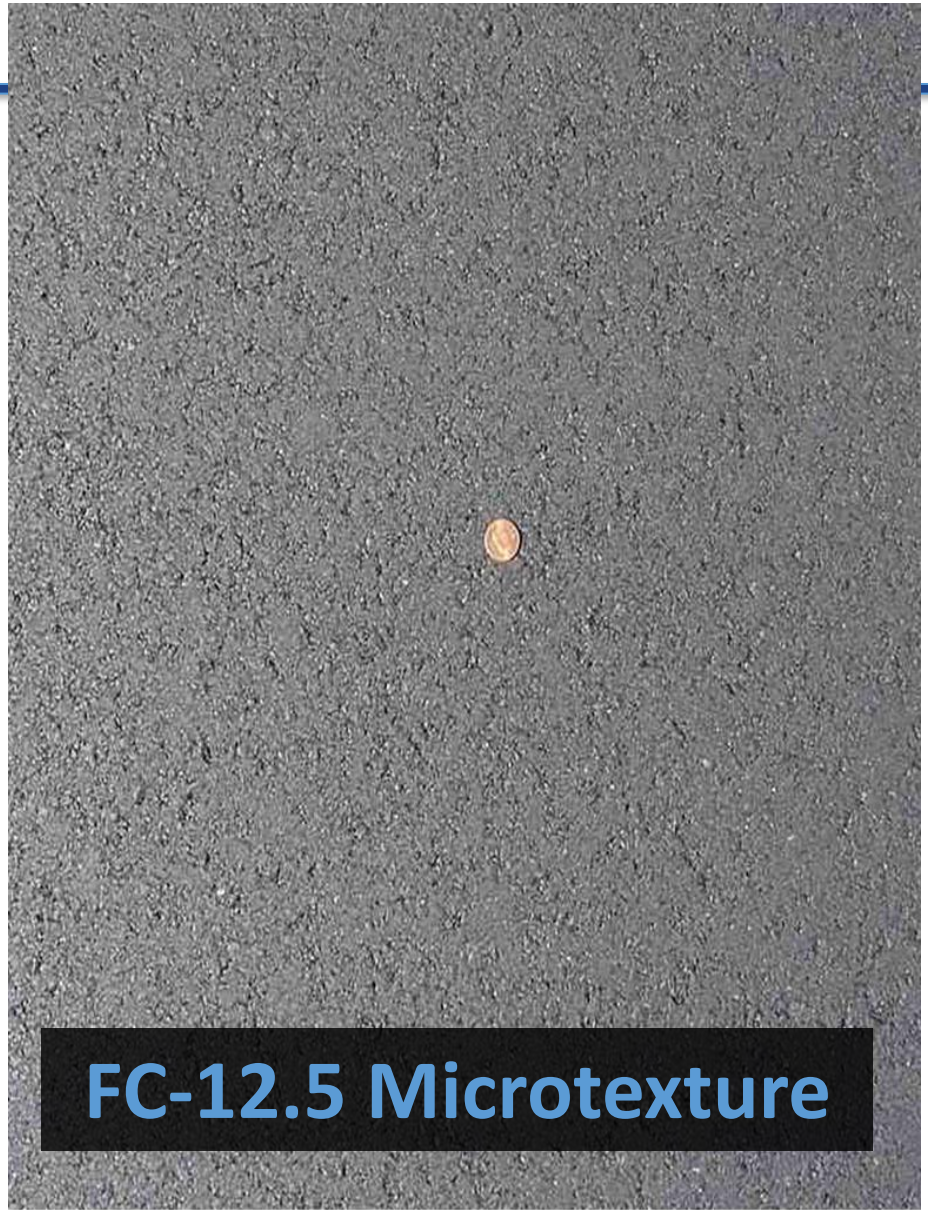
# Dense-Graded Friction Courses (337 / 334)

- Good microtexture
  - Function of the aggregate
- Superpave mixes:
  - FC-9.5
  - FC-12.5
- 100% approved south Florida limestone or 60% granite
  - If granite, then can contain 20% RAP, otherwise no RAP
- PG 76-22(ARB) or PG 76-22(PMA), contractor's option
- High Polymer binder when specified in the plans

# Open-Graded Friction Courses, FC-5 (337)

- Required on high-speed multi-lane facilities
  - Design Speed ≥ 50 mph
- Good macrotexture
  - Minimize hydroplaning
- 100% friction approved aggregate (No RAP)
- PG 76-22(ARB) or PG 76-22(PMA), contractor's option
- High Polymer binder when specified in the plans
- Stabilizing fibers (more asphalt, less draindown)
- Granite aggregate requires hydrated lime


FC-5 Nassau County


FC-12.5 Microtexture


FC-5 Macrotexture

# Other Asphalt Mixtures

- Superpave Asphalt Base (234)
  - B-12.5 mm
  - Traffic Level B
  - May substitute an SP-12.5
  - Paid by the square yard (285 – Optional Base)
- Asphalt Treated Permeable Base (ATPB) (287)
  - No. 57 or 67 Stone
  - ¾” Aggregate
  - Approximately 3% asphalt binder
  - Used under PCC Pavement for drainage

# Recently Completed Contracted Research

## Evaluation of FC-5 with High Polymer to Reduce Raveling (Texas A&M Transportation Institute)

Compare the durability of OGFC mixtures: polymer modified PG 76-22 and High Polymer modified binders.

Life-cycle cost analysis determined the advantages of HP binders would translate into cost savings.

# Recently Completed Contracted Research

**Determine the Structural Coefficient for Asphalt Mixes Containing High Polymer Binder** (University of Nevada Reno)

PG 76-22 (PMA) mixtures = 0.44 structural coefficient.

Increasing the polymer content (high polymer mixes) = 0.54 structural coefficient.

Additional testing is planned.

# Recently Completed Contracted Research

## **Enhanced Characterization of RAP for Cracking Performance** (University of Florida)

- Perform additional tests to characterize RAP for PG 76-22 mixture inclusion.
- More specifically, can we put more RAP in structural courses that contain PG 76-22 binder?
- Can RAP be used effectively in high polymer mixes?

# Recently Completed Contracted Research

## Enhanced Characterization of RAP cont.

January 2021 specification change.

Allow structural courses with PG 76-22 asphalt binder to have more than 20% RAP.

| Allowable RAP Percentages[1] in Structural Mixtures with PG 76-22 Asphalt Binder | | | | |
|---|---|---|---|---|
| | | Coarse RAP | Intermediate RAP | Fine RAP |
| Gradation % Passing #16 Sieve[2] | | ≤ 40% | > 40% to ≤ 50% | > 50% |
| $PG_{HT}$[3] > 100.0° C | Allowable RAP Percentage | ≤ 25% | ≤ 20% | ≤ 20% |
| $PG_{HT}$[3] ≤ 100.0° C | | ≤ 30% | ≤ 25% | |

Notes:

1. RAP aggregate by weight of total aggregate or RAP binder by weight of total binder.
2. RAP gradations based on ignition oven extraction of RAP material in accordance with FM 5-563.
3. $PG_{HT}$: asphalt binder high temperature continuous performance grade of RAP in accordance with Section 916.

RAP percentage in dense-graded friction courses remains at a maximum of 20%.

No change for High Polymer mixtures.

# Recently Completed Contracted Research

## Study of the Potential Benefits of Anti-Strip Additives on Granite Based FC-5 Asphalt Mixture (NCAT)

July 2021 specification change

- These mixtures currently contain 1% hydrated lime.
- Determine if adding a liquid anti-strip, additional hydrated lime, or both improves performance and longevity of granite FC-5 mixtures.

# Recently Completed Contracted Research

## Study of the Potential Benefits of Anti-Strip Additives on Granite Based FC-5 Asphalt Mixture (NCAT)

### July 2021 specification change

SUBARTICLE 337-3.2.1.3 is deleted and the following substituted:

**337-3.2.1.3 Hydrated Lime:** Add the lime at a dosage rate of 1.0% by weight of the total dry aggregate to mixes containing granite or granitic gneiss from Georgia or Alabama. Add the lime at a dosage of 1.5% by weight of the total dry aggregate to mixes containing any amount of granite from Nova Scotia.

SUBARTICLE 337-3.2.1.4 is deleted and the following substituted:

**337-3.2.1.4 Liquid Anti-Strip Additive:** Use a liquid anti-strip additive at the approved dosage rate as indicated on the APL for all mixtures ~~containing limestone aggregate~~.

# Recently Completed Contracted Research

## Evaluation of Roadway Worms/Distortions

(Applied Research Associates, Inc.)

- Determine the contributing cause(s) for roadway worms/distortions.
- Identify their impacts on pavement lifespan.
- Develop rehabilitation strategies to prevent these distortions from occurring.

# Recently Completed Contracted Research

## Evaluation of Roadway Worms/Distortions

Many projects require extensive field work by the FDOT's SMO and DMOs and the research consultants.

# Recently Completed Contracted Research

## Evaluation of the Cracking Performance of Asphalt Binders at Intermediate Temperatures (University of Florida)

- Binder plays a critical role in the cracking resistance. Cracks typically initiate and propagate through the binder or the interface between binder and aggregate, as opposed to fracture through the aggregate.
- Load-induced fatigue cracking can be either bottom-up or top-down.

# Recently Completed Contracted Research

## Design and Performance of Open-Graded Friction Course (OGFC) Mixtures Containing Epoxy Asphalt (NCAT)

- Raveling is a durability issue. Once the distress begins, it progresses rapidly.
- Previous research has shown that the properties of asphalt binders can be significantly improved by adding epoxy resins.

# Recently Completed Contracted Research

## Laboratory Testing Protocol to Evaluate Alternative Materials for use in Modifying Asphalt Binders and Asphalt Mixtures

(Texas A&M Transportation Institute)

- A laboratory testing protocol to properly assess new asphalt mixture additives.
- Determine if their performance is equal to or better than SBS modified (PG 76-22) mixtures.
- Both asphalt binder and mixture tests will be used to evaluate asphalt binder additives.

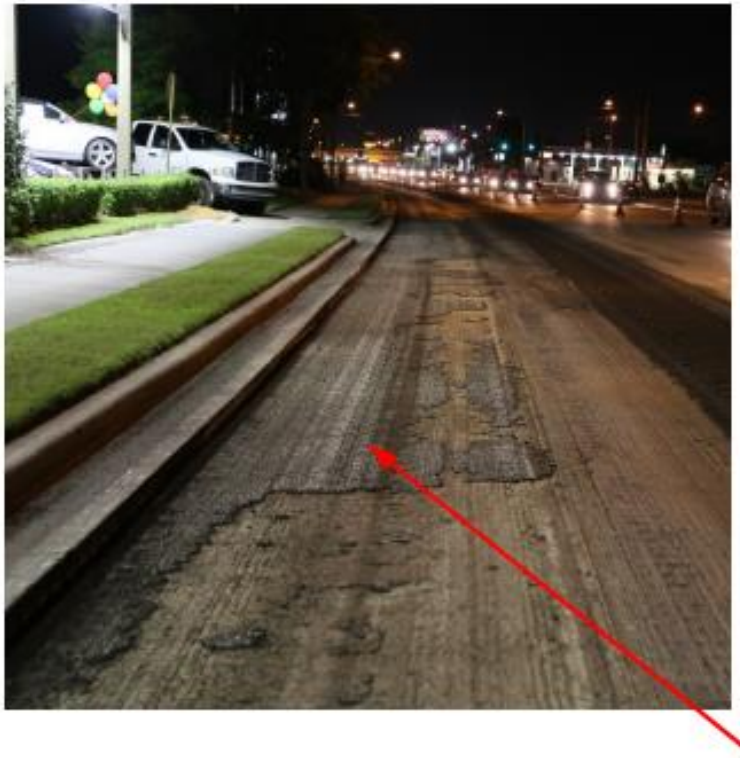
# Active Contracted Research

## Investigation of the Impact of Milling and Construction on Bond Strength of Remaining Thin (scab) Layers (University of Florida)

- If the depth of milling is close to the interface between previously paved HMA lifts, a thin layer of the upper lift may be left behind (scab).
- If these scabbed layers are not removed, will the new HMA be properly bonded to the pavement structure?

# Active Contracted Research

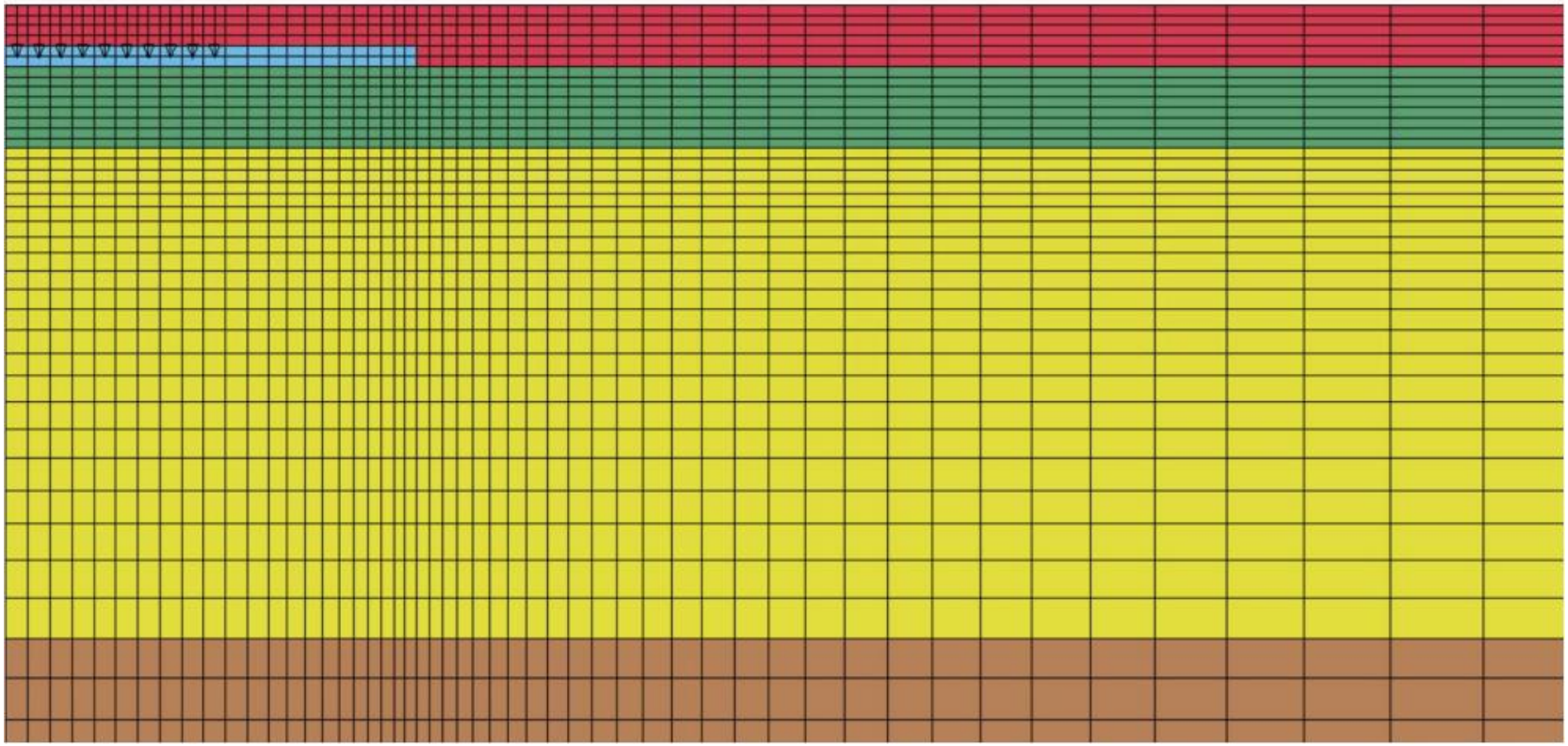
## Bond Strength of Thin (scab) Layers cont.



# Active Contracted Research

## Bond Strength of Thin (scab) Layers cont.

- Axisymmetric finite element model in LS-DYNA



# Active Contracted Research

## Performance Evaluation of SP-9.5 and SP-12.5 Superpave Mixtures (Texas A&M Transportation Institute)

Granite and Limestone SP-9.5 mixtures show equivalent or better performance (rutting, cracking, and durability) than the corresponding SP-12.5 mixtures.

# Active Contracted Research

## Performance Evaluation of SP-9.5 and SP-12.5 Superpave Mixtures cont.

July 2023 proposed specification change

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on mixes when used as a structural course:

Type SP-9.5 - Limited to the top two structural layers, two layers maximum.

Type SP-9.5 - Do not ~~use~~place for Traffic Level E applications less than 1-1/4 inches thick.

Type SP-19.0 - Do not use for the final (top) structural layer below FC-5 mixtures. Type SP-19.0 mixtures are permissible for the layer directly below FC-9.5 and FC-12.5 mixtures. Do not use for the final (top) layer of shoulders.

# New Research Projects

## Improved Resilience of Asphalt Pavements due to Flooding (University of Florida)

- Evaluate the resilience of an asphalt mixture that is loaded while inundated with water.
- Improve asphalt mixture properties to resist the impacts of flooding.

# New Research Projects

## Improved Resilience of Asphalt Pavements due to Flooding cont.

# New Research Projects

## Open-Graded Friction Courses Suitable for Suburban Environments

(Auburn University, National Center for Asphalt Technology)

As Florida urbanizes more rapidly, friction courses will be subjected to traffic movements associated with signalized intersections and turn lanes.

- The objective of this research is to determine alternative friction courses that are more durable in suburban environments while providing adequate friction and texture properties.

# In-house Research

## Heavy Vehicle Simulator (HVS) 10 Studies (Phase 1, 2020 ~ 2021)

- Single Lift Deep Mill/Fill (6-inch)
- 9.5/12.5 mm Mix Study
  - ✓ $N_{des}$ = 50, VMA > 14.5 @ higher density (93-94%)
  - ✓ $N_{des}$ = 50, VMA > 14.5 @ lower density (90-91%)
  - ✓ Air voids = 4%

# In-house Research

## HVS 10 Studies (Phase 1, 2020 ~ 2021)

- Binder Study (alternative modifier, terpolymer)
- Scabbing Study
  - ✓Scabbing impact on interlayer bonding strength: (0.25 in, 0.5 in, 1 in thicknesses)

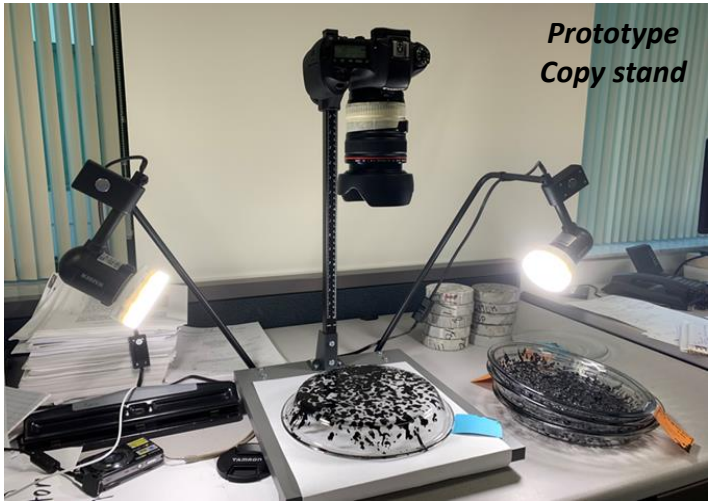
# In-house Research

## Pie Plate Imaging

Florida Method FM 5-588 is currently done by visual examination to determine the optimum asphalt binder content of OGFC mixes.

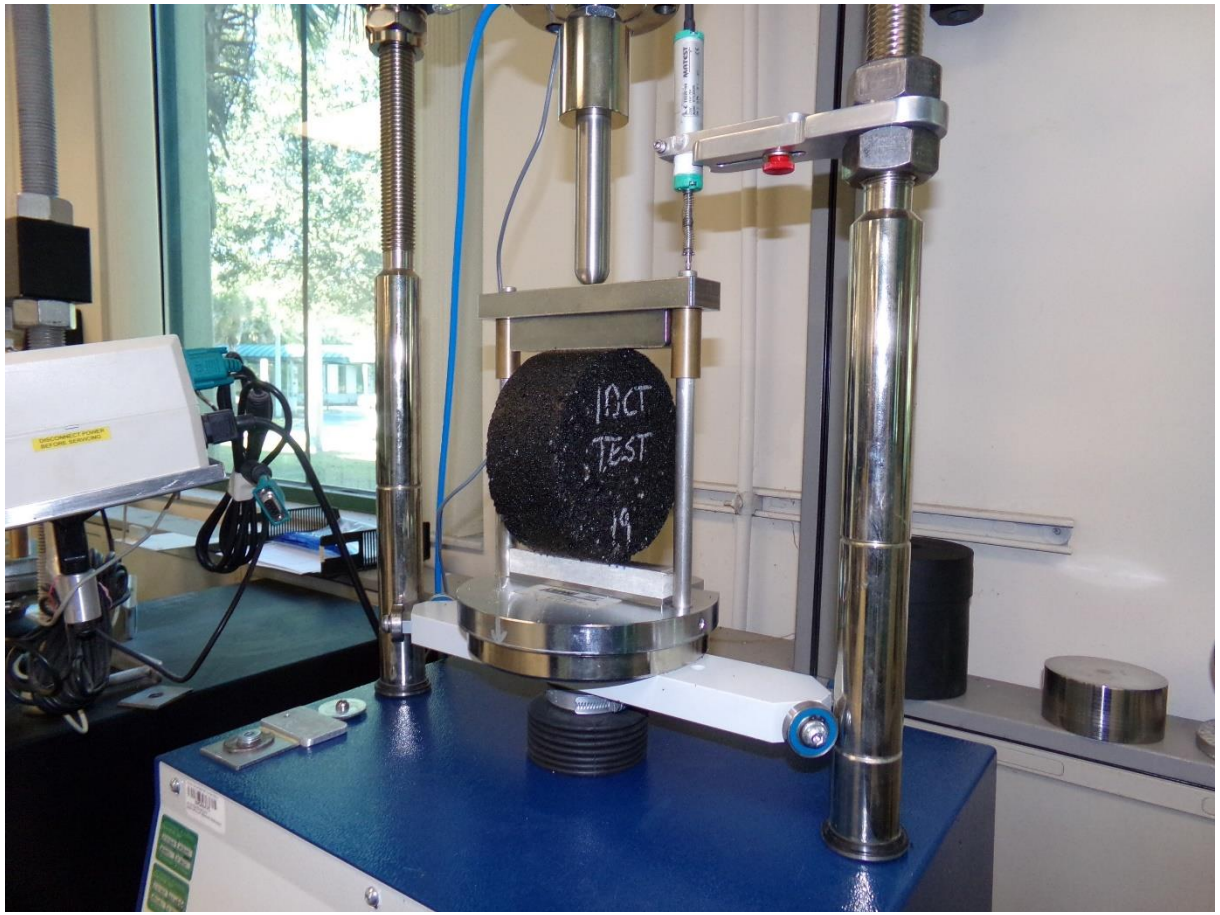
**Alternative Quantification: Pie Plate Image Processing**

- ✓Optimum asphalt binder %. Area, aggregate type, and sampling error adjustment.




# In-house Research

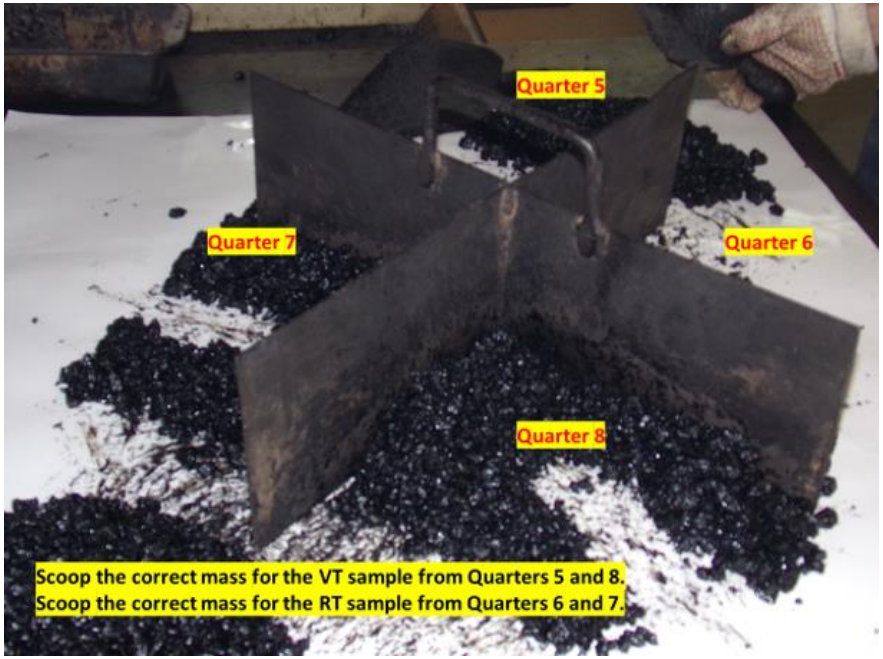
## IDEAL-CT



# Procedure

## Florida Method FM 1-T 168

## Sampling Bituminous Paving Mixtures

Florida Department of TRANSPORTATION

# Major Specification Changes

## January 2022 Section 300

### Tack Coat Application Rates

| Tack Coat Application Rates | | |
|---|---|---|
| **Asphalt Mixture Type** | **Underlying Pavement Surface** | **Target Tack Rate ($gal/yd^2$)[1]** |
| Base Course, Structural Course, Dense-Graded Friction Course, Open-Graded Friction Course | Newly Constructed Asphalt Layers | 0.06 |
| | Milled Asphalt Pavement Surface, Oxidized and Cracked Asphalt Pavement, Concrete Pavement | 0.09 |
| Note 1: Target tack application rates greater than those specified may be used upon approval of the Engineer. | | |

# Major Specification Changes

## January 2022 Section 300

### Prime Coat, Tack Coat, and Equipment

A trailer-mounted pressure distributor can be used for non-mainline applications, if approved by the Engineer.

A copy of the Bill of Lading representing the prime coat or tack coat material in the distributor tank must be in the truck or available at all times.

- What is actually in the tank?
- Shipment and production data.

# Major Specification Changes

## January 2022 Section 334

### Mix Designs for only three traffic levels.

### No TL-A or TL-D.

| Gyratory Compaction Requirements | |
|---|---|
| Traffic Level | $N_{design}$ Number of Gyrations |
| ~~A~~ | ~~50~~ |
| B | 65 |
| C | 75 |
| ~~D~~ | ~~100~~ |
| E | 100 |

Florida Department of TRANSPORTATION

# Major Specification Changes

## January 2022 Section 916 Tack Sampling

- Sample tack from the distributor, once per project per product. Tested by the Department.
- Failing test results:
  - Not to be used on Department projects.
  - May require three 6” diameter roadway cores from the day of production.
  - Tested for bond strength.
  - Individual bond strength results less than 80 psi will require removal and replacement.
  - May result in bond strength testing in additional areas with failing tack material.

# Major Specification Changes

## July 2022 (approved) Section 300

**Curing and Time of Application:** When using a distributor, apply tack coat sufficiently in advance of placing the mix to permit drying but not so far in advance that it might lose its adhesiveness as a result of being covered with dust or other foreign material. When using a spray paver, the requirements above do not apply.

Florida Department of TRANSPORTATION

# Major Specification Changes

## July 2022 (approved) Section 330

Maximum temperature of 355°F for any load of mixture containing PG 76-22 PMA or High Polymer binder, regardless of the target mixing or compaction temperatures.

Florida Department of TRANSPORTATION

# Major Specification Changes

## July 2022 (approved) Section 334

## Defective Material

Any additional PC samples obtained in the same work shift after an IV sample has been obtained shall include enough material for three complete sets of tests (PC, IV and IV check samples) in the event the Contractor requests using the PC test results for engineering analysis or delineation. These additional PC samples must compare with verified IV test results as determined by the comparison process of 334-5.7.1 in order to be used for engineering analysis or delineation.

Florida Department of TRANSPORTATION

# Major Specification Changes

## July 2022 (approved) Section 337

**Fiber and Hydrated Lime Supply Systems:** Provide flow indicators or sensing devices, interlocked with plant controls so that ~~the mixture production will be interrupted~~ an alarm will be activated if fiber or lime introduction fails. Stop production of the asphalt mixture. Resume production once the supply system is operating correctly.

Florida Department of
TRANSPORTATION

# Major Specification Changes

## July 2022 (approved) Section 337

Up to a 1.05 Pay Factor for small quantities of open-graded friction course (FC-5).

See next slide.

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# Major Specification Changes

| Small Quantity Pay Table for FC-5 | | |
|---|---|---|
| Pay Factor | 1-Test Deviation | 2-Test Average Deviation |
| Asphalt Binder Content (%) | | |
| 1.05 | 0.00-0.25 | 0.00-0.18 |
| 1.00 | 0.26-0.50 | 0.19-0.35 |
| 0.90 | 0.51-0.60 | 0.36-0.42 |
| 0.80 | >0.60 | >0.42 |
| 3/8 inch Sieve (%) | | |
| 1.05 | 0.00-3.25 | 0.00-2.30 |
| 1.00 | 3.26-6.50 | 2.31-4.60 |
| 0.90 | 6.51-7.50 | 4.61-5.30 |
| 0.80 | >7.50 | >5.30 |
| No. 4 Sieve (%) | | |
| 1.05 | 0.00-2.50 | 0.00-1.77 |
| 1.00 | 2.51-5.00 | 1.78-3.54 |
| 0.90 | 5.01-6.00 | 3.55-4.24 |
| 0.80 | >6.00 | >4.24 |
| No. 8 Sieve (%) | | |
| 1.05 | 0.00-1.50 | 0.00-1.06 |
| 1.00 | 1.51-3.00 | 1.07-2.12 |
| 0.90 | 3.01-3.50 | 2.13-2.47 |
| 0.80 | >3.50 | >2.47 |

Florida Department of
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# Major Specification Changes

## July 2023 (proposed)

### 337 Open-Graded Friction Courses

Table 337-1
FC-5 Gradation Design Range

| 3/4 inch | 1/2 inch | 3/8 inch | No. 4 | No. 8 | No. 16 | No. 30 | No. 50 | No. 100 | No. 200 |
|---|---|---|---|---|---|---|---|---|---|
| 100 | 85-100 | ~~55~~60-75 | 15-25 | 5-10 | -- | -- | -- | -- | 2-5 |

Florida Department of
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# Major Specification Changes

## July 2023 (proposed)

### 337 Open-Graded Friction Courses

| Table 337-2<br>FC-5 Percent Binder Content | |
|---|---|
| Aggregate Type | Percent Binder Content |
| Crushed Granite and/or Granitic Gneiss | ~~5.5~~6.0 - 7.5 |
| Crushed Limestone and/or Shell Rock | ~~6.0~~6.5 - 8.0 |

Florida Department of
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# Minor Specification Change

## July 2023 (suggest 35 days)

**320-3.2.4 Monthly Electronic Weigh System Comparison Checks:** Check the accuracy of the electronic weighing system at the commencement of production and thereafter at least every 30 days.

**320-3.2 Electronic Weigh Systems**: Equip the asphalt plant with an electronic weigh system…, and meets monthly comparison checks with certified truck scales.

Florida Department of
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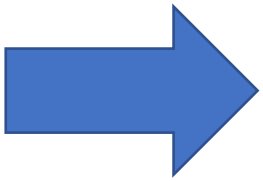
# Major Change

## Specifications Annual Publication Transition

Semiannual (January and July)



Annual (July)

Florida Department of
TRANSPORTATION

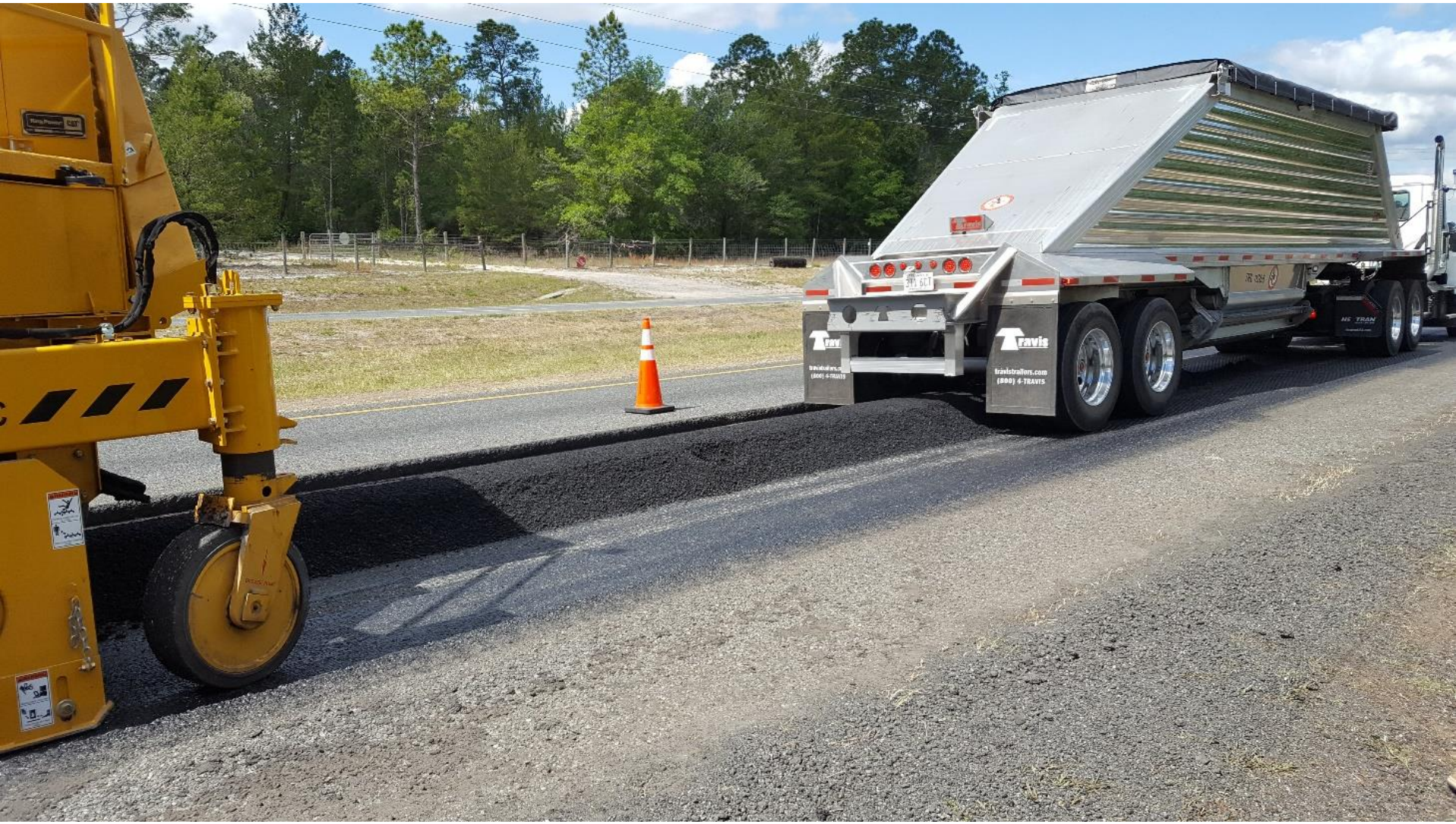
# Major Change

## Specifications Annual Publication Transition

Florida is the only state to publish specifications semiannually

| | |
|---|---|
| Frequency of Publishing a New Spec Book (In theory if not reality) | Every 6 months – 1 ✓<br>Annually – 7<br>2 years – 1<br>3-5 years – 18<br>6-8 years – 5<br>9-11 years – 3<br>More than 11 years – 2<br>Varies Substantially/Not Specified – 9 |

# Questions/Comments?



# Thank you!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