

Construction Academy 2022

Asphalt Issues

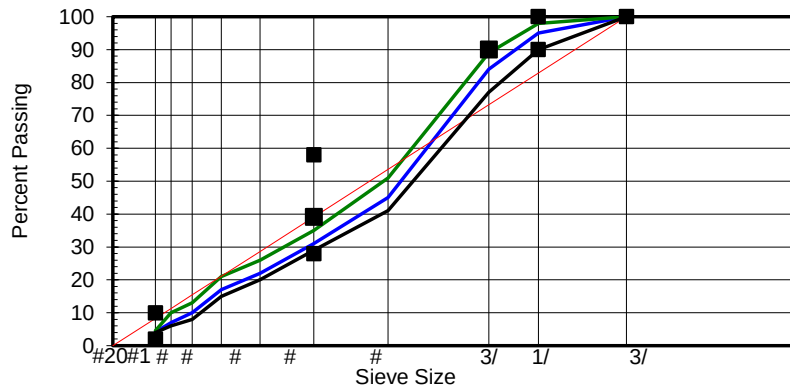
Wayne A. Rilko, P.E.
State Materials Office
August 2, 2022

Asphalt ~~Issues~~ Topics

Asphalt 101



12.5 mm Superpave Gradation Chart



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)



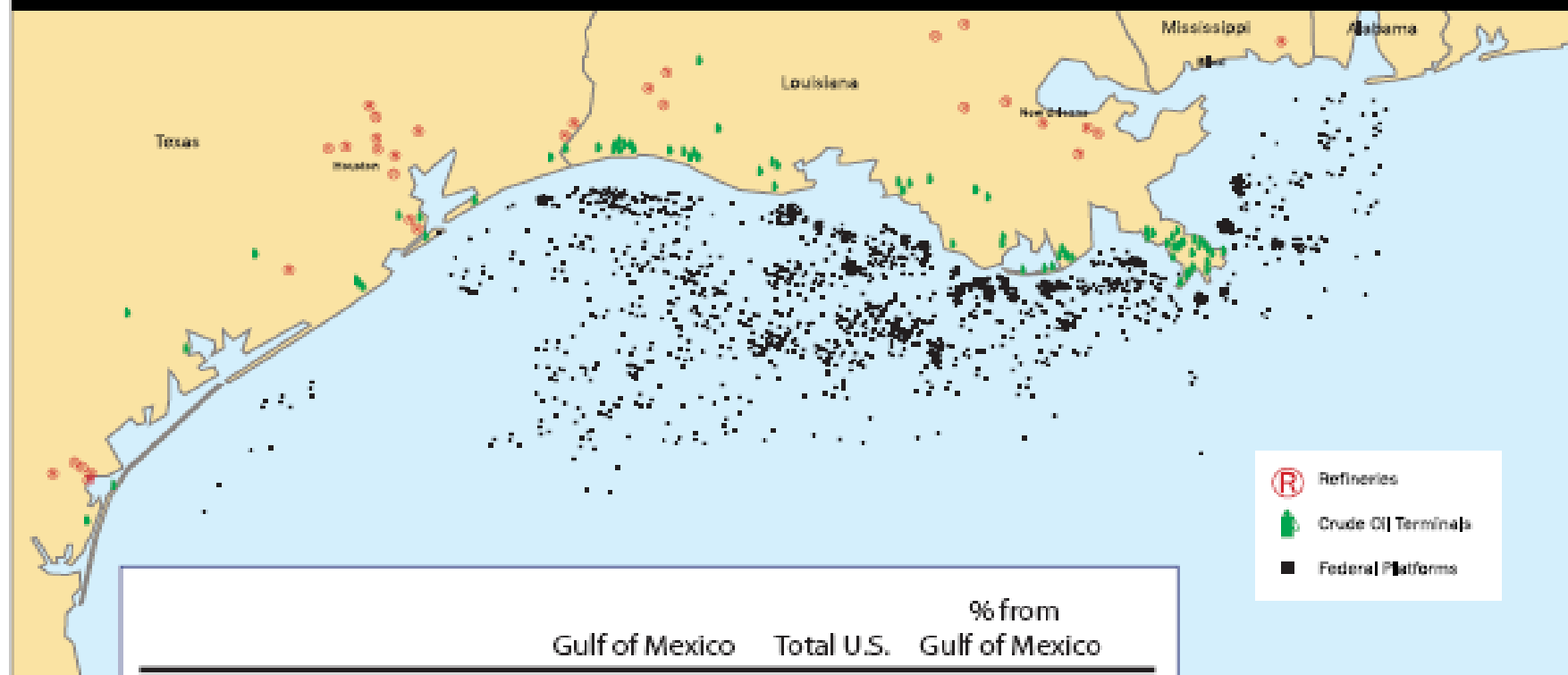
Where Does Asphalt Come From?



Crude Oil



Gulf Coast Oil and Natural Gas Operations



- Ⓡ Refineries
- Crude Oil Terminals
- Federal Platforms

	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%
<i>of which in LA and MS</i>	<i>3.1</i>	<i>17</i>	<i>18%</i>
Crude Oil Imports (million b/d)	6.5	10.8	60%
<i>of which into LA and MS ports</i>	<i>2.5</i>	<i>10.8</i>	<i>23%</i>

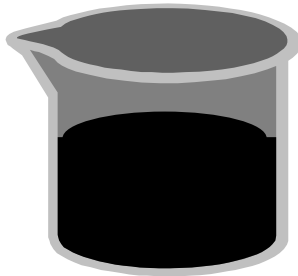
Source: U.S. Energy Information Administration

Superpave Asphalt Binders

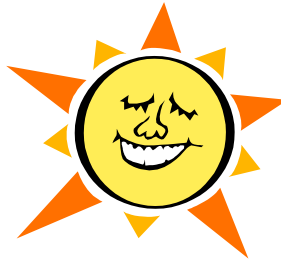
Grading system based on climate

PG 67-22

Performance
Grade



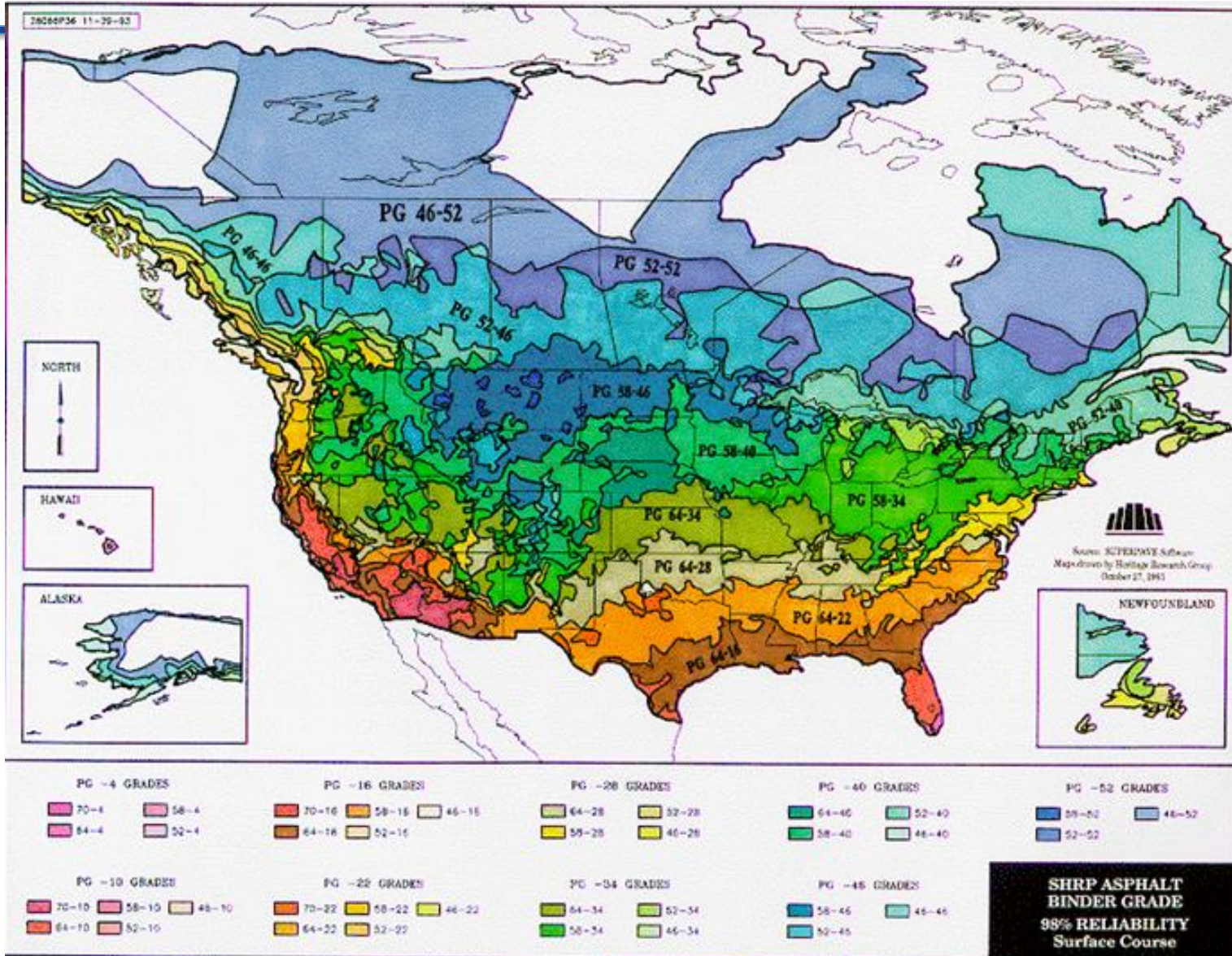
Average 7-day
max pavement
design temp



Min pavement
design temp



Examples of PG Grading System



Neat Asphalt Binders

Table 334-2
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

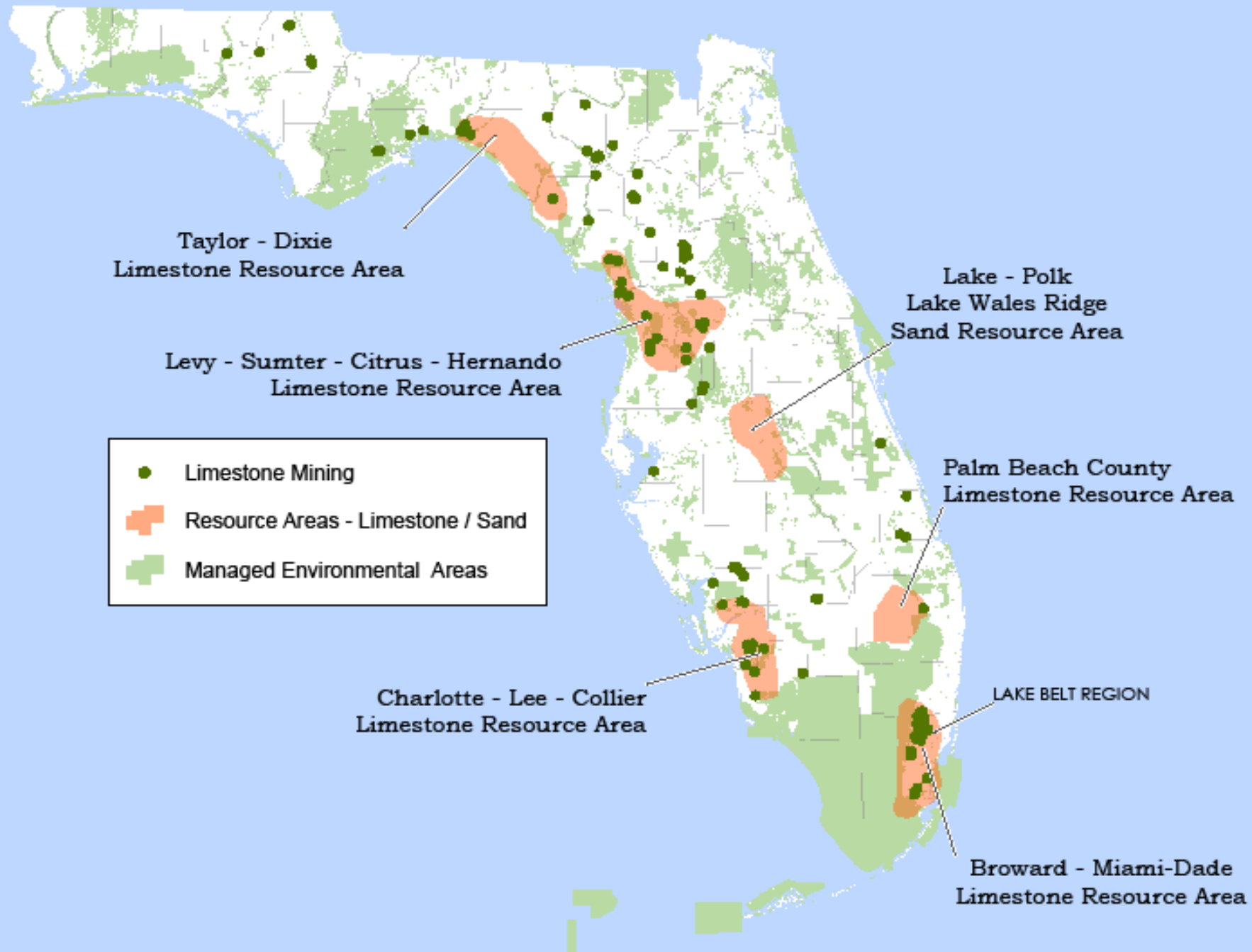
Friction			Structural			Grand Total
FC-5	FC-9.5	FC-12.5	SP-9.5	SP-12.5	SP-19.0	
491,630.47	194,036.63	560,165.60	72,709.13	3,192,895.50	53,893.04	4,565,330.37



Approved Asphalt Binder Terminals

Gulf of Mexico

LIMESTONE AND SAND RESOURCE AREAS



Aggregate Sources Used in Asphalt

- Aggregate mines
- Aggregate terminals



Approved Asphalt Plants



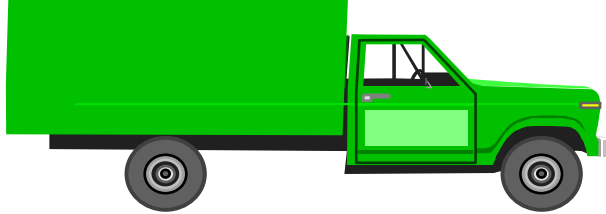
Florida Asphalt Mixtures

- 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

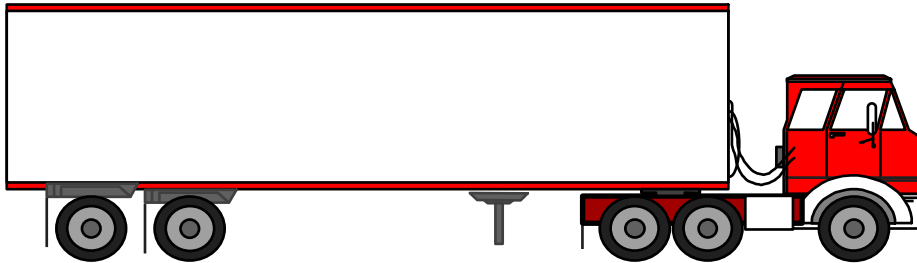
Superpave – Structural (334)

- 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



$$\begin{array}{rcl} 15,000 \text{ lb} & & 6,000 \text{ lb} \\ 0.48 \text{ ESAL} & + & 0.01 \text{ ESAL} \end{array} = 0.49 \text{ ESALs}$$



$$\begin{array}{rcl} 34,000 \text{ lb} & & 34,000 \text{ lb} & & 12,000 \text{ lb} \\ 1.10 & + & 1.10 & + & 0.20 \end{array} = 2.40 \text{ ESALs}$$

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	$300,000 < 3 \text{ million}$ ESAL's
C	$3 \text{ million} < 10 \text{ million}$ ESAL's
D	$10 \text{ million} < 30 \text{ million}$ ESAL's
E	$\geq 30 \text{ million}$ 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



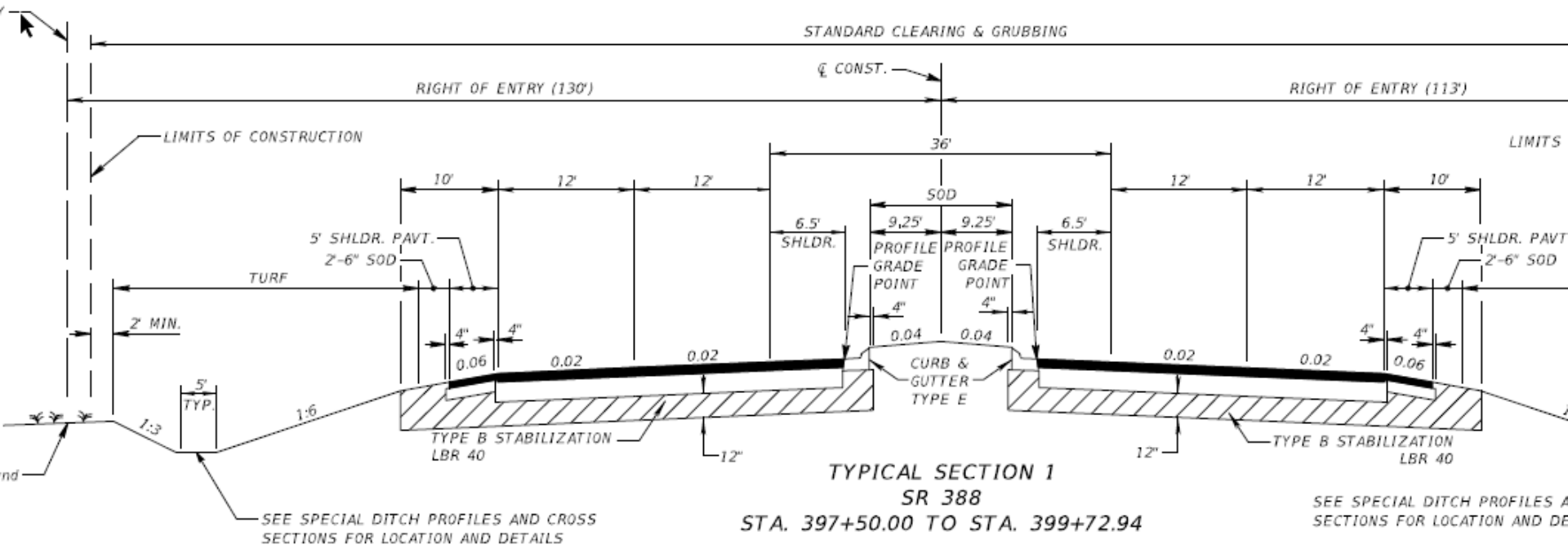
3,000,000 to 10,000,000 ESAL's



10,000,000 ESAL's



SR. 826 N.B. 6/6/2006 4:56 PM
FROM N.W. 36 STREET



NEW CONSTRUCTION

OPTIONAL BASE GROUP 9 WITH
TYPE SP, STRUCTURAL COURSE (TRAFFIC C) ($3\frac{1}{2}"$) (PG 76-22)
AND FRICTION COURSE FC-5 ($\frac{3}{4}"$) (PG 76-22)

SHOULDER PAVEMENT

OPTIONAL BASE GROUP 1 WITH
TYPE SP, STRUCTURAL COURSE (TRAFFIC C) ($1\frac{1}{2}"$) (PG 76-22)
AND FRICTION COURSE FC-5 ($\frac{3}{4}"$) (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) ($3\frac{1}{2}$ ") (PG 76-22)
AND FRICTION COURSE FC-5 ($\frac{3}{4}$ ") (PG 76-22)*

SHOULDER PAVEMENT

*OPTIONAL BASE GROUP 1 WITH
TYPE SP, STRUCTURAL COURSE (TRAFFIC C) ($1\frac{1}{2}$ ") (PG 76-22)
AND FRICTION COURSE FC-5 ($\frac{3}{4}$ ") (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 Fine SP-12.5 Recycle Intended Use of Mix Structural

Design Traffic Level D Gyration @ N₆₀ 100

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

PERCENTAGE BY WEIGHT TOTAL AGGREGATE PASSING SIEVES

Blend	40%	24%	8%	23%	5%		JOB MIX FORMULA	CONTROL POINTS	PRIMARY CONTROL SIEVE
Number	1	2	3	4	5	6			
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. 10 2.0mm	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 _{mm}	2.529	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 19-18003A (TL-D)

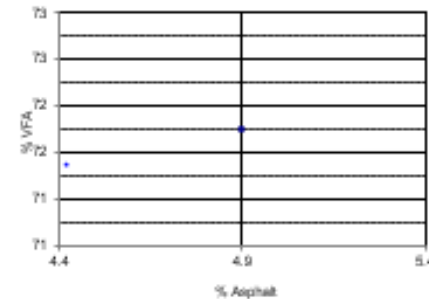
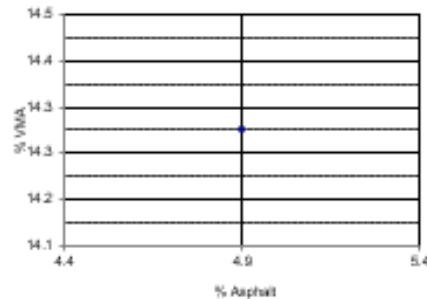
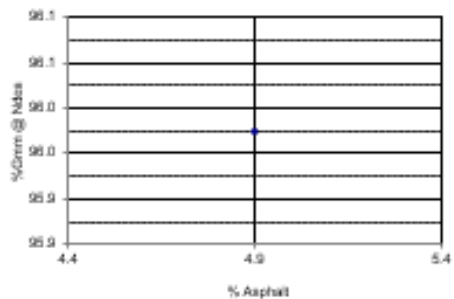


Florida Department of Transportation

Asphalt Mix Design

SP 19-18008A (TL-D)

P _t	G _{mm} @ N _{mm}	G _{mb}	V _a	VMA	VFA	P _{bb}	P _{bbss} / P _{bb}	%G _{mb} @ N _{mm}	%G _{mb} @ N _{mm}
4.9	2.399	2.499	4.0	14.3	72	4.4	12	89.8	



Total Binder Content 4.9 %

FAA 45.1 %

Mixing Temperature 300 °F 149 °C

Spread Rate @ 1" 108 lbs/yd²

%G_{mb} @ N_{mm} 96.0

Compaction Temperature 300 °F 149 °C

VMA 14.3 %

Ignition Oven -0.09

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

G_{mb} Corr. Factor -0.004

Calibration Factor
(1-T_o Or Add'l)/(1-T_o Or Subtracted)

Optimum Asphalt
Asphalt using 40% Crushed R.A.P. @ 5.6%
PG 52-28 to be added

= 4.90%
= 2.24%
= 2.66%



Florida Department of Transportation

Asphalt Mix Design

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

Effective Date 11/30/2017

Expiration Date 11/30/2020



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

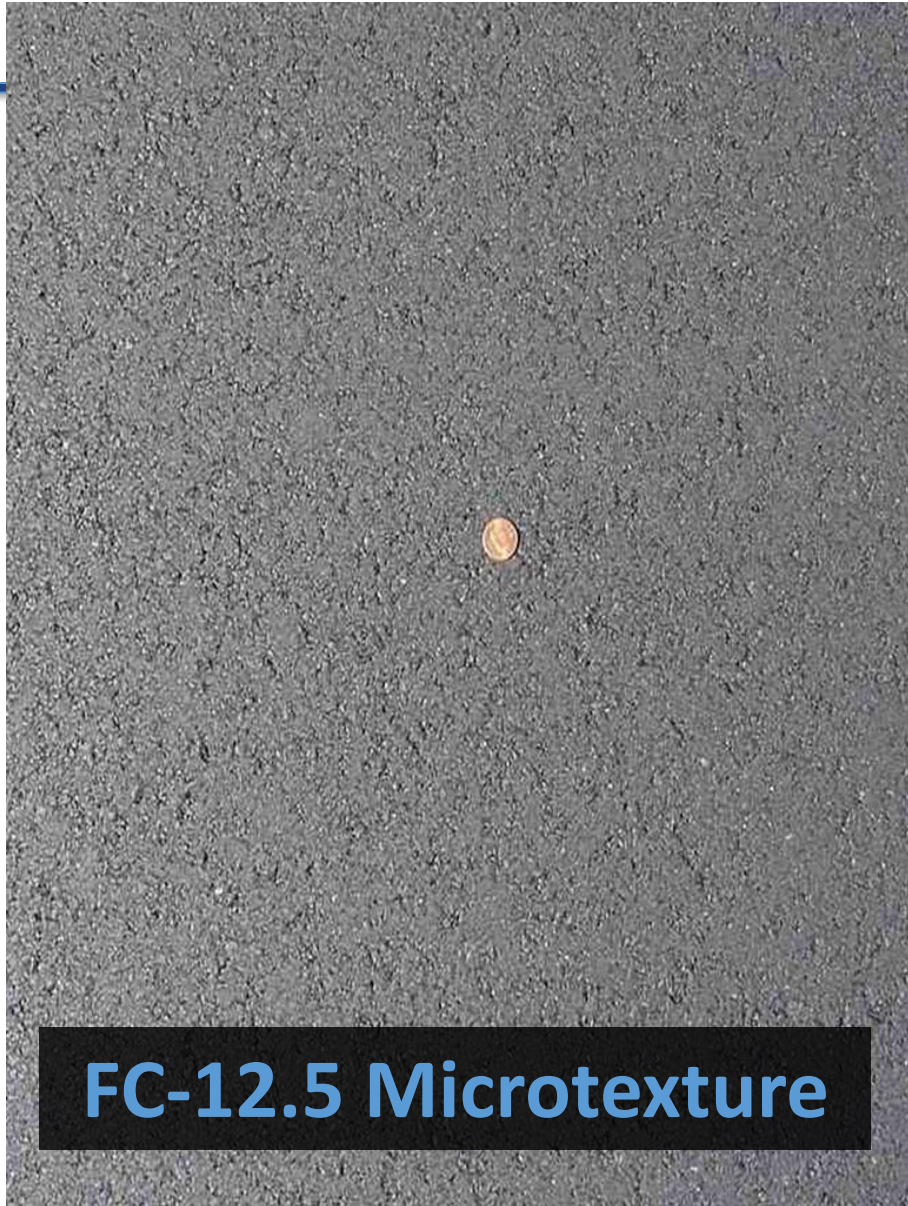


Open-Graded Friction Courses, FC-5 (337)

- Required on high-speed multi-lane facilities
 - Design Speed $\geq$ 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





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
 - $\frac{3}{4}$ " 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.

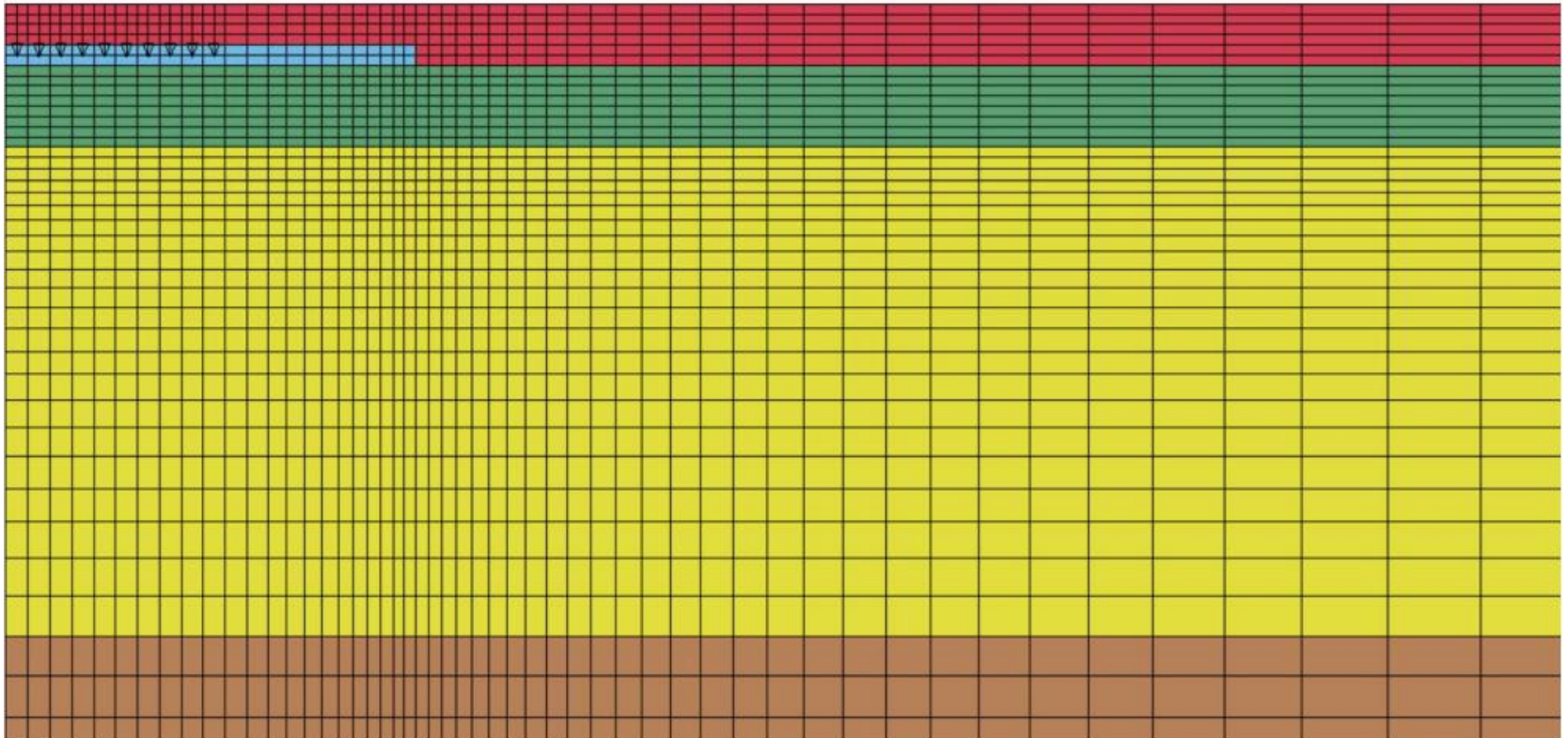


Active Contracted Research

Bond Strength of Thin (scab) Layers cont.

- Axisymmetric finite element model in LS-DYNA

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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 useplace 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)

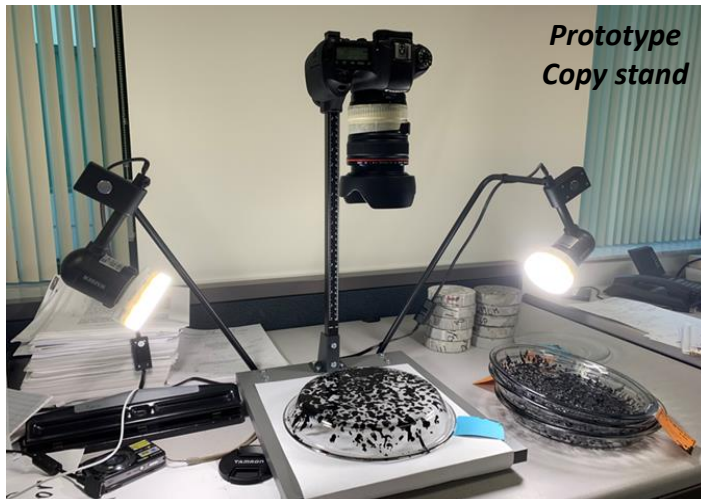
In-house Research

Pie Plate Imaging

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

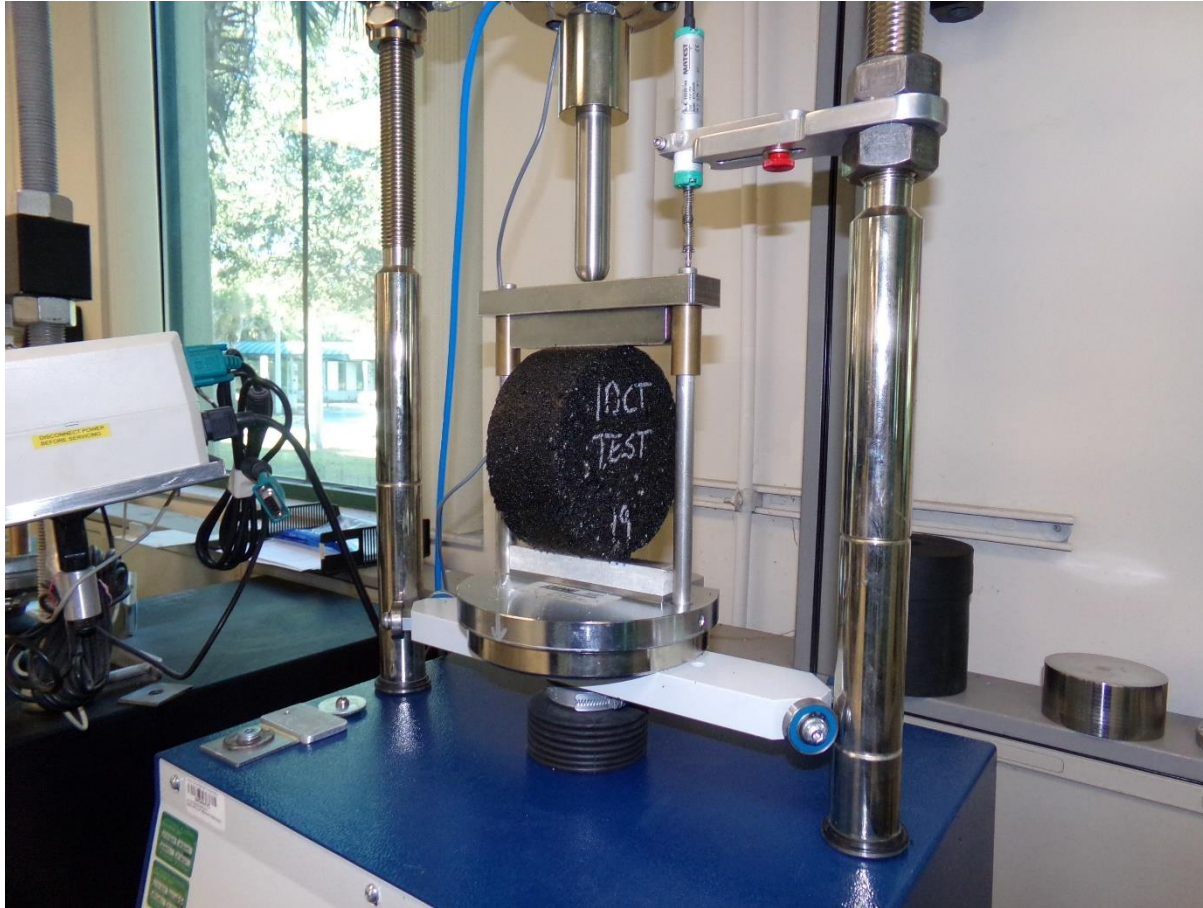
Alternative Quantification: Pie Plate Image Processing

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



In-house Research

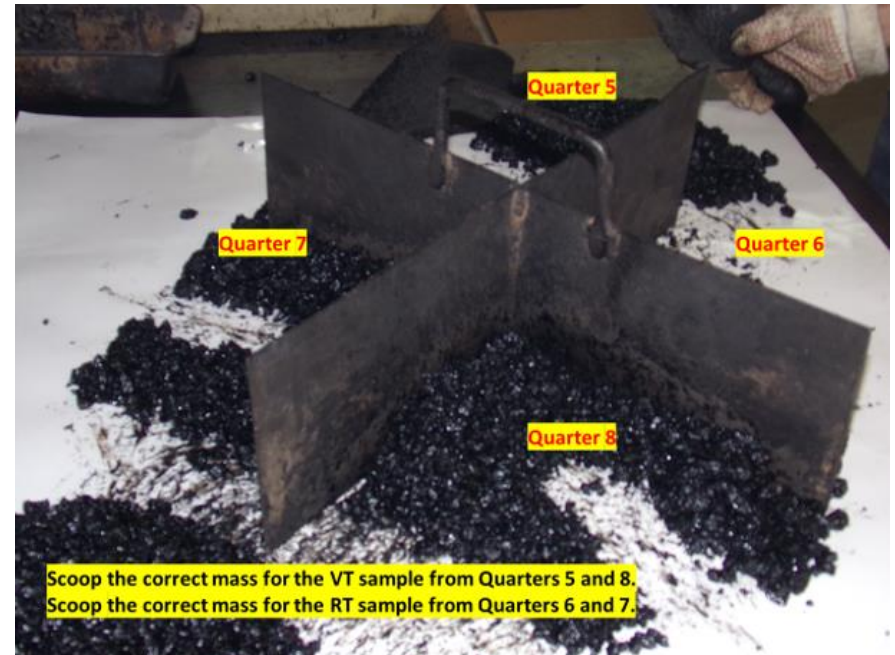
IDEAL-CT



Procedure

Florida Method FM 1-T 168

Sampling Bituminous Paving Mixtures



Procedure

Florida Method FM 5-624

Re-emulsification of Asphalt Emulsions

Between 10 and 15 seconds after applying the drops of water to the broken emulsion, dab the water droplets with a white paper towel using mild pressure. If the emulsion has re-emulsified, the paper towel will show brown to black emulsion staining (see **Figure 2**).

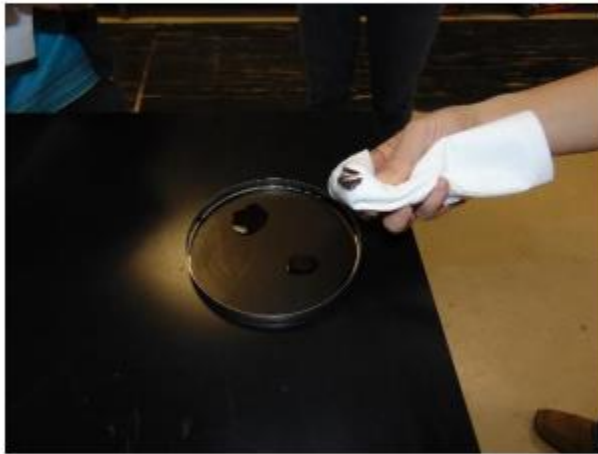


Figure 2 – Testing for Re-emulsification

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.

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.

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.

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.

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.



Florida Department of
TRANSPORTATION

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

Major Specification Change

July 2023 (proposed) Section 334

334-3.2 Mix Design:

~~Do not use more than four mix designs per nominal maximum aggregate size per traffic level per binder grade per year, where the year starts at the Notice to Proceed. Exceeding this limitation will result in a maximum Composite Pay Factor (CPF) of 1.00 as defined in 334-8.2 for all designs used beyond this limit.~~

Major Specification Change

July 2023 (proposed) Section 334

334-5.9.5 Defective Material:

If the defective material is due to a high air void failure, gradation, asphalt binder content or density failure, upon the approval of the Engineer the Contractor may perform delineation tests on roadway cores in lieu of an engineering analysis to determine the limits of the defective material that may require removal and replacement.

Prior to any delineation testing, all sampling locations shall be approved by the Engineer. All delineation sampling and testing shall be monitored and verified by the Engineer.

For materials that are defective due to low air voids, an engineering analysis is required.

Major Specification Changes

July 2023 (proposed) Section 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

Major Specification Changes

July 2023 (proposed) Section 337

Open-Graded Friction Courses

Table 337-2

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

Major Specification Change

July 2023 (proposed) Section 337

Open-Graded Friction Courses

337-4.2 FC-9.5 and FC-12.5: Provide a mix design conforming to the requirements of 334-3.2 unless otherwise designated in the plans. Where the plans call for an FC-12.5, an FC-9.5 may be substituted for the FC-12.5 at no additional cost provided the thickness requirements of 334-1.4.1 are met.

Major Specification Change

July 2023 (proposed) Section 916

Asphalt Emulsions.

916-3.2 Requirements:

For tack products, the minimum testing requirements shall include... re-emulsification (FM 5-624), ...

The time period between scale checks shall not exceed 35 days.
The time period between scale checks shall not exceed 35 days.
The time period between scale checks shall not exceed 35 days.



Minor Specification Change

July 2023 (proposed)

320-3.2.4 Monthly Electronic Weigh System Comparison Checks:

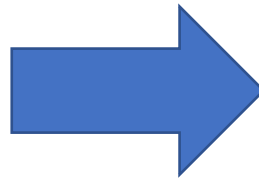
Check the accuracy of the electronic weighing system at the commencement of production and thereafter at least every 30 days during production.

The time period between scale checks shall not exceed 35 days.

Major Change

Specifications Annual Publication Transition

Semiannual
(January and
July)



Annual (July)

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
	Annually – 7
	2 years – 1
	3-5 years – 18
	6-8 years – 5
	9-11 years – 3
	More than 11 years – 2
	Varies Substantially/Not Specified – 9

Questions/Comments?



Thank you!

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