UFGS 32 12 15.13 PROPOSED/ANTICIPATED REVISIONS

Transportation Research Board ’25

DoD/FAA and Industry Review Meeting: Airfield Asphalt User/Producer Meeting

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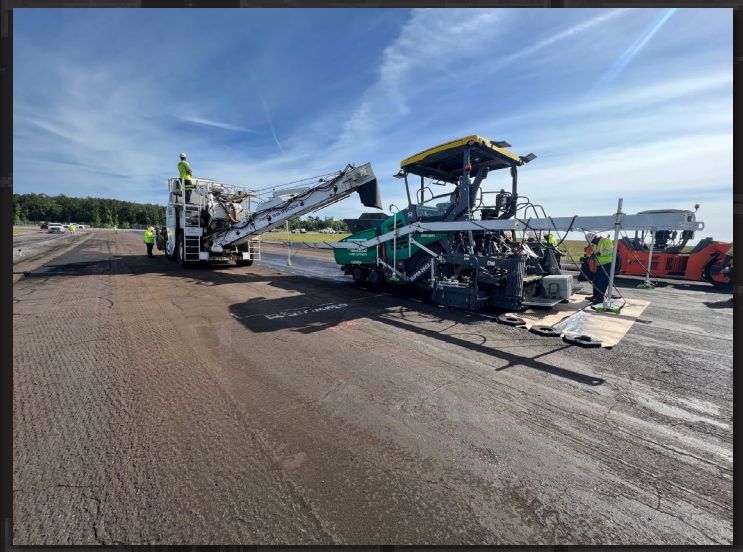

NEW DEFINITIONS SECTION

1.3 DEFINITIONS

See ASTM D8 for more definitions relating to this specification. If there are conflicts between definitions in ASTM D8 and this section, this section supersedes.

1.3.1 Theoretical Maximum Density (TMD)

This section uses the terms TMD and theoretical maximum specific gravity of the asphalt mixture (G_{mm}). G_{mm} is the specific gravity of the asphalt mixture excluding air voids. TMD is determined by multiplying G_{mm} by the unit weight of water at a stated temperature. G_{mm} is often referred to as the "Rice" value.

1.3.2 Bulk (dry) Specific Gravity of the Aggregate (G_{sb})

Ratio of the mass in air of a unit volume of a permeable material (including both permeable and impermeable voids normal to the material) at a stated temperature to the mass in air of equal density of an equal volume of gas-free distilled water at a stated temperature.

1.3.3 Effective Specific Gravity of the Aggregate (G_{se})

Ratio of the mass in air of a unit volume of a porous material (excluding voids permeable to asphalt) at a stated temperature to the mass in air of an equal volume of gas-free distilled water at a stated temperature.

1.3.4 Echelon Paving

Constructed lanes with multiple slightly staggered pavers which are executed concurrently, where each paver is operated by a separate crew.

1.3.5 Certificate of Analysis (COA)

The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.

1.3.6 Certificate of Compliance (COC)

AIRFIELD ASPHALT CERTIFICATION PROGRAM

c. Airfield Asphalt Pavement Laboratory Technician(1): The airfield asphalt pavement laboratory technician (AAPLT) will be responsible for conducting all necessary laboratory tests. The following personnel are required to obtain or possess the AAPLT certification:

Asphalt Mix Designer

Quality Control Laboratory Technicians

Acceptance Testing Laboratory Technicians

Clarified intent to have the asphalt mix designer AND acceptance laboratory technician AND QC lab technician be certified as AAPLT.

ASPHALT ACCEPTANCE TESTING

Acceptance testing includes laboratory air voids, in-place density, longitudinal smoothness, and plan grade. Laboratory air voids and in-place density will be determined by the independent commercial laboratory. Determine smoothness by an independent commercial laboratory, or may be self-performed. Plan grade is to be determined by hiring a professional land surveyor licensed in the [state][region] the work is being performed.

Specification now requires an independent laboratory hired to perform ACCEPTANCE Testing. Separates ACCEPTANCE and QUALITY CONTROL.

[The Government will acquire an independent commercial laboratory that will perform laboratory air voids and in-place density determinations for this section. Plan grade and smoothness acceptance tests will be the responsibility of the Contractor in accordance with paragraph ACCEPTANCE.][Acquire the services of an independent commercial laboratory to perform laboratory air voids and in-place density determinations. Determine plan grade and smoothness acceptance tests in accordance with paragraph ACCEPTANCE.]

Specification now provides agencies (and A-E's) to specify the option for the Government to hire the Acceptance testing laboratory (preferred option in Designer Note).

GOVERNMENT LAB OR CONTRACTOR HIRED I.C.L.

Provide a laboratory facility for the exclusive use of the [Government][independent commerical laboratory]. Provide this facility at the plant site. The dimensions and other requirements specified herein are minimums. The facility may be built by the Contractor for the purposes stated. It is not intended, however, to preclude the use of commercially built trailers or prefabricated buildings that may deviate in minor dimension or detail from the requirements listed but may in some features exceed these requirements and in all major respects be entirely suitable for the purpose intended. The Contractor may furnish, in lieu of a separate building a facility having sufficient space in a building, parts of which are used for other purposes, providing that the facility furnished meets all other requirements of this subsection' is physically separated from the remainder of the building; and has an outside entrance with unrestricted access allowed and reserved for the exclusive use of the Government. Adequate space shall be provided for parking of at least three Government vehicles in the vicinity of the facility. The Government will determine the suitability of any facility furnished.

LAB REQUIREMENTS EXCERPT

General requirements for the laboratory facility are:

a. 35 square meters380 square feet floor space for building widths between 2.5 square meters 8 foot to 3.5 square meters 12 foot or 19 square meters 208 square feet with a width of 3.5 square meters 12-foot or greater.

b. Include designated office space, minimum of 2.8 square meters 30 square feet, in addition to the laboratory square footage.

c. A ceiling height of 2.5 m 8 foot or greater.

d. At least one door with a substantial lock and all keys placed in the possession of the Government. The door must be a minimum of 92 cm 36 inches wide. A second entry door at the end of trailers that are greater than 10 m 30 foot in length will be required for safety reasons.

e. Access to a well maintained restroom, with a functioning sink, within reasonable proximity to the laboratory facility. Portable restrooms are not acceptable.

f. Floored, weatherproof, and reasonably dustproof.

g. Level and stable with substantial/durable structure capable of supporting required laboratory equipment. Movement in the laboratory shall not affect testing operations such as scale readings, etc.

h. At least two glazed screened windows capable of being opened and locked only from the inside.

i. Basic utility services shall be provided year-round.

j. Equip the laboratory with heating and air conditioning units that maintain the ambient air temperature between 18 degrees C 65 degrees F and 27 degrees C 80 degrees F. The laboratory must be climate controlled year-round.

k. A work counter approximately 76 cm 30 inches to 92 cm 36 inch high with a minimum depth of 76 cm 30 inches. The countertop shall be metal capped with a rolled back edge of 50 mm 2 inches if adjacent to the wall of other comparable durable surface. Total length of the work counter shall be approximately 10 m 35 feet with a minimum of 3.5 m 12 foot of counter length 92 cm 36 inches deep.

l. A minimum of 137 cm 54 inch width between parallel work counters.

m. Adequate electric lights suitable for the purposes intended. At least one power outlet every four feet of counter. Provide at least two 220 VAC power outlets.

n. An exhaust fan shall be installed in the laboratory. The exhaust fan shall be equipped with a rheostat control and capable of exhausting in one minute a volume of air equal to the volume of the entire laboratory. The exhaust fan shall be maintained operational.

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NOTE: For projects over 27,000 metric tons 30,000 tons of an asphalt mixture, it is recommended for the acceptance laboratory to perform verificaiton tests of asphalt content and extracted aggregate at the same frequency as the Contractor's QC tests as verification of QC data. Remove the bracketed text for projects less than 30,000 tons.

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[o. An exhaust outlet with at least 75 mm 3 inches inside diameter no farther than 2.5 m 8 foot from the ignition furnace oven shall be included near one of the 220 VAC outlets. Provide a surface for the ignition furnace that is level, sturdy, and fireproof with at least 15 cm 6 inches of clearance between the furnace and other vertical surfaces. The exhaust fumes exiting the furnace exhaust port may reach 270 degrees C 518 degrees F.]

MARSHALL HAMMER CALIBRATION/CORRELATION

1.7.8 Laboratory Air Voids

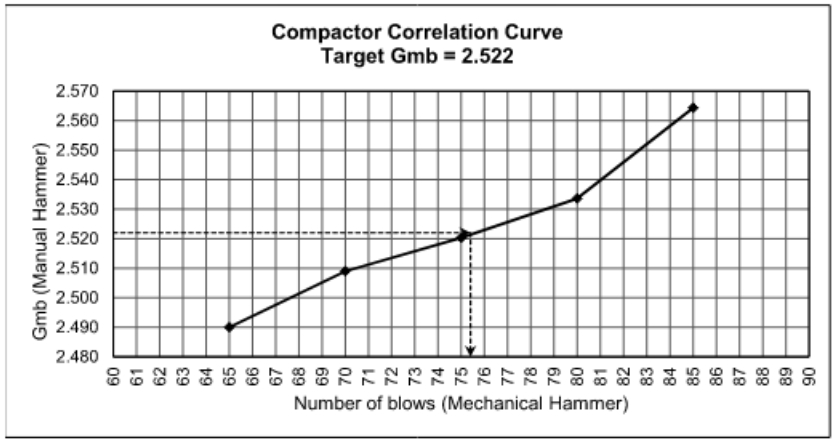
Prepare one set of laboratory compacted specimens for each sublot in accordance with ASTM D6926 using the hand-held hammer for the Marshall Method. The mechanical Marshall hammer can be used only after JMF development and after correlation from hand-held (manual) Marshall hammer to mechanical Marshall hammer. For the correlation, using the mechanical Marshall hammer, compact triplicate specimens at five different blow counts (mix design number of blows, plus and minus 5 blows, plus and minus 10 blows). Graph a number of blows versus bulk specific gravity of the asphalt mixture (G_{mb}) curve and determine the number of blows required to get the same G_{mb} obtained by the manual hammer used to develop the mix design. Prepare one set of laboratory compacted specimens for each sublot in accordance with ASTM D6925 using the Superpave gyratory compactor. Provide three test specimens prepared from the same sample for each set of laboratory compacted specimens. Compact the specimens within 2 hours of the time the mixture was loaded into trucks at the asphalt plant. Do not reheat samples prior to compaction. Provide insulated containers as necessary to maintain the sample temperature. Measure the bulk density of laboratory compacted specimens in accordance with ASTM D2726/D2726M. Determine laboratory air voids from one set (three laboratory compacted specimens) for each sublot sample in accordance with ASTM D3203/D3203M.

Compactor Correlation Curve

Gmb Target (Manual Hammer) = 2.522 @ 6.20 % AC

Correlation (Mechanical Hammer)

No. of blows	Gmb	Avg Gmb
65	2.496	2.490
	2.489	
	2.485	
70	2.514	2.509
	2.509	
	2.504	
75	2.522	2.520
	2.528	
	2.511	
80	2.533	2.534
	2.527	
	2.541	
85	2.559	2.564
	2.563	
	2.571	



Based on the correlation chart, the laboratory will use 75 blows per face.

ACCEPTANCE DATA AND SCHEDULE

Table 6	
Acceptance Reporting Data and Schedule	
Description	To be Reported Within:
In-Place Mat Density[1]	1 working day after completion of the sublot
In-Place Longitudinal Joint Density[1]	
PCC-Asphalt Joint Density[1]	
Laboratory Air Voids[1]	
Longitudinal Surface Smoothness[2]	3 working days after completion of the lot
Plan Grade[2]	5 working days after completion of the lot
Pay Adjustment Summary	2 working days of performing all required tests and receiving all data
Presentation of Acceptance Data	
In-place Mat Density, percent of TMD	For in-place density, plot individual test results stacked within the lot on the x-axis. Also plot average for each lot as a line series. Provide visual on chart showing full acceptance limits (e.g. 93.9 - 96.0 for mat density) and rejection limits (e.g. 92.0 or 97.0 for mat density)
In-place Joint Density, percent of TMD	
PCC-Asphalt Joint Density, percent of TMD	
Laboratory Air Voids, percent deviation from JMF target value	Plot two charts: 1) Individual test results stacked within the lot on the x-axis. Also plot average for each lot as a line series. 2.) Plot mean absolute deviation for each lot. Provide visual identification of full acceptance limits (e.g. mean absolute deviation of less than 0.60) and rejection limits (e.g. mean absolute deviation

INDIVIDUAL AGGREGATES

2.2.1 Individual Aggregates

Define aggregates with 25 percent or less passing the 4.75 mm No. 4 sieve as coarse aggregates. Define aggregates with 75 percent or more passing the 4.75 mm No. 4 sieve as fine aggregates. Define aggregates with between 25 percent and 75 percent passing the 4.75 mm No. 4 sieve as intermediate aggregates. Test intermediate aggregates for both coarse and fine aggregate quality properties by splitting over the 4.75 mm No. 4 sieve and testing each size fraction accordingly.

2.2.1.1 Aggregate Bulk Specific Gravity and Absorption

Contract with an independent commercial laboratory to perform bulk specific gravity and absorption tested in accordance with ASTM C127 and ASTM C128. Perform two replicate tests on each aggregate used in the JMF as follows. Report both values and use the average of the two replicates for each aggregate. For intermediate aggregates determine a composite specific gravity value in accordance with ASTM C127 and ASTM C128. Wash all fine aggregate fractions prior to testing in accordance with ASTM C128 Appendix X1.

2.2.1.2 Gradation

Perform sieve analysis for individual aggregates tested in accordance with ASTM C117 and ASTM C136/C136M.

INDIVIDUAL AGGREGATES (COARSE AGGREGATE)

2.2.1.3 Coarse Aggregate Quality Properties

Perform the following tests on the individual aggregates:

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NOTE: The requirement for sulfate soundness (requirement b., below) may be deleted in climates where freeze-thaw does not occur. However, in those areas where freeze-thaw does not occur, keep requirement b. if experience has shown that this test separates good performing aggregates from bad performing aggregates. Retain this requirement for all Navy projects.

It is recommended that percentage of Wear (ASTM C131/C131M) not exceed 40. Aggregates with a higher percentage of wear may be specified, provided a satisfactory record under similar conditions of service and exposure has been demonstrated.

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a. The percentage loss not greater than [40][_____] percent after 500 revolutions when tested in accordance with ASTM C131/C131M.

b. The sodium sulfate soundness loss not exceeding 12 percent, or the magnesium sulfate soundness loss not exceeding 18 percent after five cycles when tested in accordance with ASTM C88/C88M.

c. At least 75 percent by weight of coarse aggregate contain at least two or more fractured faces when tested in accordance with ASTM D5821 with fractured faces produced by crushing.

d. The particle shape essentially cubical and the aggregate containing not more than 5 percent, by weight, of flat and elongated particles (5:1 ratio of maximum to minimum) when tested in accordance with ASTM D4791 Method B. Express flat and elongated percentage as a weighted average of the various sieve sizes tested.

e. Slag consisting of air-cooled, blast furnace slag, with a compacted weight of not less than 1200 kg per cubic meter 75 pounds per cubic foot when tested in accordance with ASTM C29/C29M

f. Clay lumps and friable particles not exceeding 0.3 percent, by weight, when tested in accordance with ASTM C142/C142M.

INDIVIDUAL AGGREGATES (FINE AGGREGATE)

2.2.1.4 Fine Aggregate Quality Properties

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NOTE: Set the lower limit for uncompacted void content (requirement c., below) at 45 for fine aggregate angularity unless local experiences indicate that a lower value can be used. There are some aggregates which have a good performance record and have an uncompacted void content less than 45. Do not set the limit at less than 43.

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a. Quantity of natural sand (non-crushed material) added to the aggregate blend not exceeding 15 percent by weight of total aggregate.

b. Sand equivalent value greater than 45 when tested in accordance with ASTM D2419.

c. Clay lumps and friable particles not exceeding 0.3 percent, by weight, when tested in accordance with ASTM C142/C142M, except the minimum test sample size is 500 grams.

COMBINED AGGREGATE

2.2.2 Combined Aggregate Requirements

Combine the aggregates in the proposed proportions. Fractionate the combined aggregate blend on the 4.75 mm No. 4 sieve. Test the percent passing the 4.75 mm No. 4 seive.

a. Uncompacted void content greater than 45.0 percent when tested in accordance with ASTM C1252 Method A.

ASPHALT BINDER

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PG GRADED BINDER

2.3.1 Performance-Graded Asphalt Binder

[Provide asphalt binder that conforms to ASTM D6373 for Performance Grade (PG) [ ], Table 1. Provide asphalt binder PG Plus Test in accordance with Table X.

Table X

Asphalt Binder PG Plus Test Requirement

Useful Temperature Interval (UTI) (2)	Minimum Percent Recovery (1)
Less than 92	No Requirement
Equal to 92	55
Greater than 92	75

(1) Tested per ASTM D7405, except use the base binder grade high temperature listed for the state and county found at the following link: https://aaptp-vercel-zeta.vercel.app/

(2) For PG asphalt binders, the useful temperature interval (UTI) is defined as the range between the PG high temperature and the PG low temperature. For example, a PG 64-22 has a UTI of 86 {64 - (-22) = 86}. Another example is for a PG 70-28, which has a UTI of 98 {70 - (-28) = 98}.

Removing Elastic Recovery on RTFO residue.

PARTIALLY ADOPTION OF MSCR GRADING

2.3.2 Performance-Graded Asphalt Binder Using the Multiple Stress Creep and Recovery (MSCR) Test

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NOTE: Specify Performance-Graded MSCR asphalt binders using terminology found in ASTM D8239 (e.g. PG 64E-22), except only specify "S" and "E" Grades. For stressed asphalt pavements, specify "E" grades. For non-stressed pavements (e.g. shoulder, overruns), specify "S" grades. When specifying "E' grades, select bracketed text. When specifying "S" grades, delete second bracketed text sentence regarding percent recovery.

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Provide asphalt binder that conforms to ASTM D8239 for Performance Grade using MSCR test [_____].[Provide percent recovery of 75 when tested in accordance with ASTM D7405.]

→ PLEASE NOTE: Designer Note only allows “S’ and “E” grade binders.

MIX DESIGN CHANGES

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TWO AC G_{MM} MEASUREMENTS TO CALCULATE G_{SE}

hammers with slanted foot with rotating base(s) are not permitted during JMF development. Design the asphalt mixture using the Superpave gyratory compactor set at [50] [75] gyrations using the procedures contained in AI MS-2 and the criteria shown in Table 9. Prepare samples at various asphalt contents and compacted in accordance with ASTM D6925 ASTM D6926. When developing the mix design, measure G_{mm} at a minimum of two trial asphalt contents. Calculate G_{se} from each G_{mm} measurement and report the average as the JMF G_{se}. Use laboratory mixing and compaction temperatures for Polymer Modified Asphalts as recommended by the asphalt binder supplier. Perform tensile strength ratio (TSR) testing on the laboratory mixed, laboratory compacted asphalt mixture in accordance with ASTM D4867/D4867M, except adjust the compactive effort to provide specimens with an air void content

MIX VERIFICATION

[2.8 ASPHALT MIXTURE VERIFICATION

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NOTE: It is recommended for projects where a single asphalt JMF quantity is estimated to exceed 27,000 metric tons 30,000 tons of an asphalt mixture, mix verification be performed. Mix verification is the responsibility of the Government. The Government project team will need to include the mix verification in the project budget. Reach out to the Corps of Engineers Transportation Systems Center (TSMCX), the Air Force Civil Engineer Center (AFCEC) pavement subject matter expert (SME), or the Naval Facilities Engineering Systems Command (NAVFAC) for additional guidance on mix verification. Include this paragraph if asphalt mixture verification will be performed by the Government.

****

Sample individual aggregate materials in accordance with ASTM D75/D75M and provide enough material in respective proportions to produce 90 kg 200 pounds 181 kg 400 pounds of blended mixture. Sample 20 L 5 gallon of asphalt binder in accordance with ASTM D140/D140M and provide to the Government for verification testing. Quantities apply to each mix design required in the Contract. Sampling for asphalt mixture verification will occur simultaneously when the mix designer obtains the material. If any necessary anti-strip additive or warm-mix technology (for use as a compaction aid) is proposed for use and is not blended into the asphalt binder at the terminal, provide a proportional quantity of anti-strip agent or warm-mix additive. If certain aggregates or asphalt binder properties fail to meet the requirements of this section prior to preliminary approval of the JMF, notification is required, along with resubmission of new proposed aggregates and/or asphalt binder.]

MONITORING G_{SE} DURING PRODUCTION (ACTION/SUSPENSION)

3.1.5.1 Determining the Production Effective Specific Gravity of the Aggregate (G_{se})

Calculate and report the effective specific gravity of the aggregate (G_{se}) in accordance with ASTM D6995 for each sublot. Report per Table 12. Begin plotting production G_{se} starting from lot 1. If the production G_{se} exceeds any action or suspension limit with respect to the established G_{se} (use the JMF G_{se} as the initial established G_{se}), then measure the bulk specific gravity of the aggregate G_{sb}. Measure G_{sb} by obtaining a combined aggregate sample from the cold feed belt in accordance with ASTM D75/D75M and split on the 4.75 mm No. 4 sieve. Wash the fine aggregate fraction in accordance with ASTM C128 Appendix X1. Perform two replicate tests per size fraction in accordance with ASTM C127 and ASTM C128 and determine a composite G_{sb}. If G_{sb} has deviated by 0.018 or more from the established G_{sb} (use the JMF G_{sb} as the intial established G_{sb}), update the established G_{sb}. If a new G_{sb} is established, update the established G_{se} to be the current running average of the last four samples, and use the new established G_{sb} for all subsequent volumetric calculations.

Primary goal is to reestablish a Gsb for VMA calculations

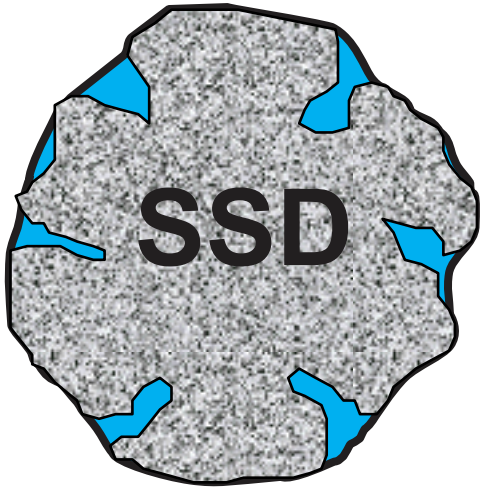
Table 12

Action and Suspension Limits for the Parameters to be Plotted on Individual and Running Average Control Charts

	Individual Samples		Running Average of Last Four Samples	
Parameter to be Plotted	Action Limit	Suspension Limit	Action Limit	Suspension Limit
4.75 mm No. 4 sieve, Percent Passing, deviation from JMF target; plus or minus values	6	8	4	5
0.6 mm No. 30 sieve, Percent Passing, deviation from JMF target; plus or minus values	4	6	3	4
0.075 mm No. 200 sieve, Percent Passing, deviation from JMF target; plus or minus values	1.4	2.0	1.1	1.5
Asphalt content, percent deviation from JMF target; plus or minus value	0.4	0.5	0.2	0.3
G_{se} of combined aggregate, deviation from JMF [1,2,3]	0.024	0.036	.018	0.030
VMA, percent deviation from JMF target				
Gradation 1, 2 & 3; minus values	0.5	1.0	0.25	0.5
+++ADD information for what superscript 1,2,3 is meaning in Gse row+++				

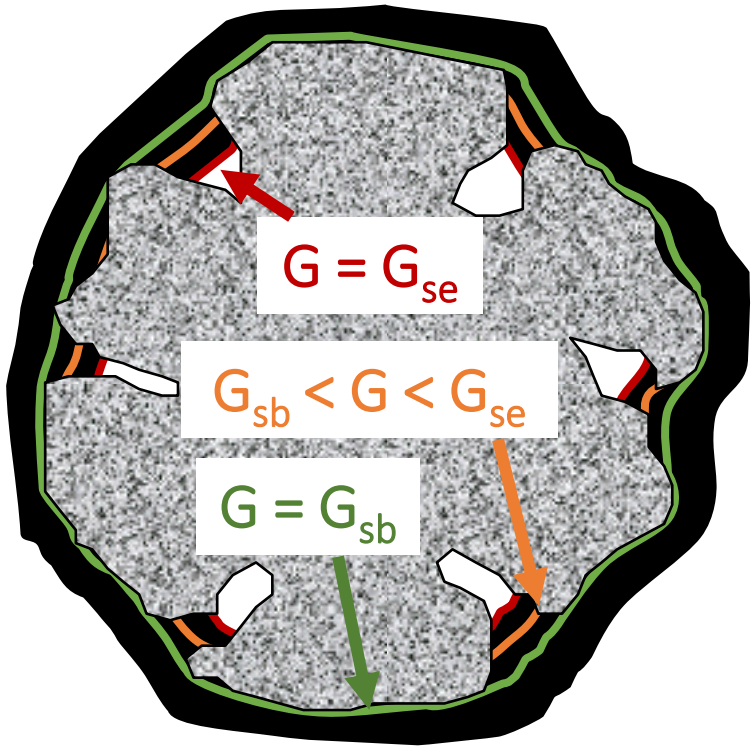
VMA DEPENDENCY ON G_{SB}

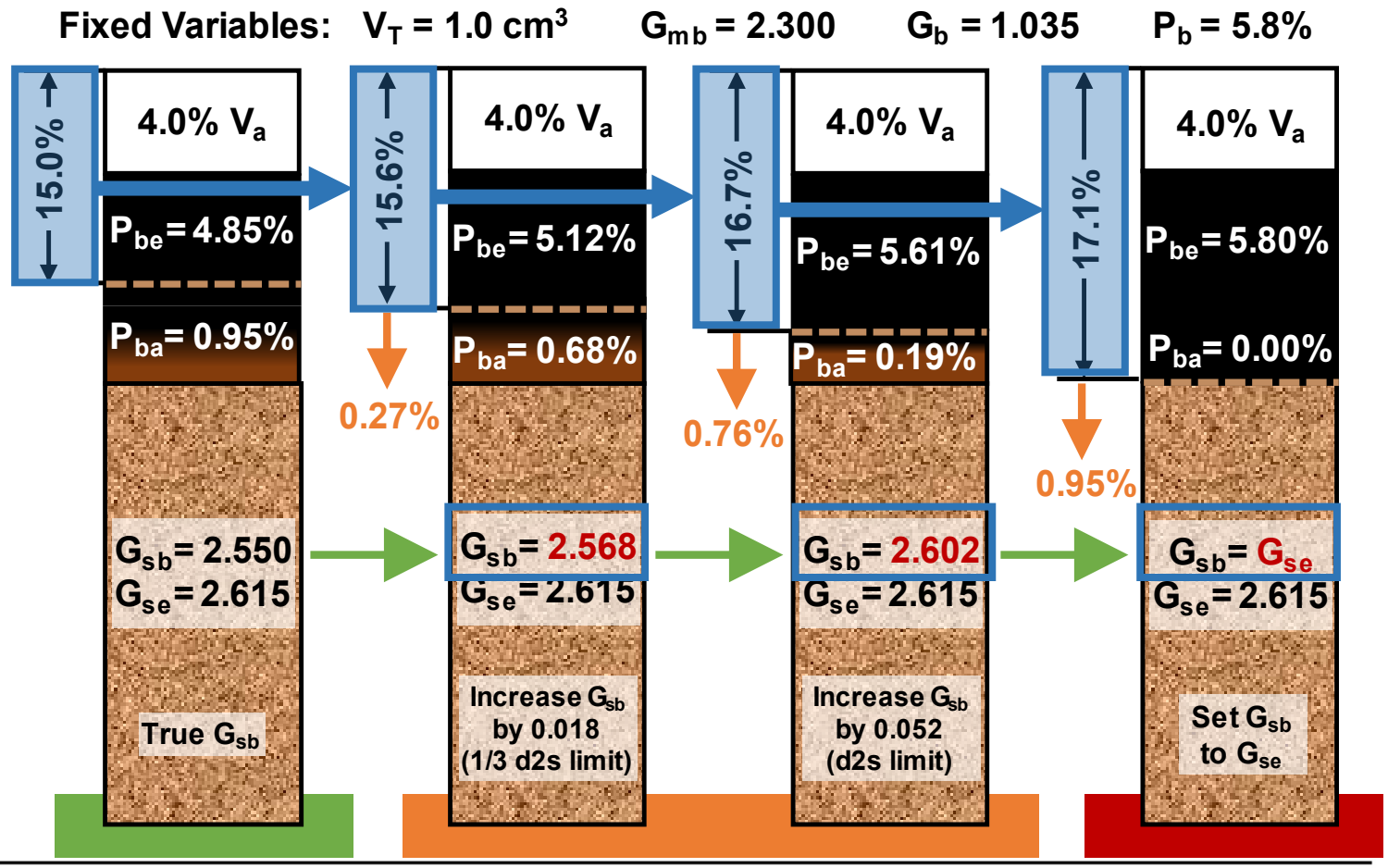
- Concern with VMA trend is that VMA depends on G_{sb} (inherently operator dependent and variable)
- AASHTO d2*s* for 50/50 coarse/fine agg. blend: 0.052
- High d2*s* provides room to find a “favorable” G_{sb} that is the “same” as the true G_{sb} by d2*s* standards
- Primary concern is with inflated G_{sb} values (achieved by drying agg. past SSD condition)



VMA Dependency on G_{sb}

Inflating G_{sb} increases *calculated* VMA; gradation can be tweaked to bring *calculated* VMA back near VMA_{min}; *actual* VMA (and V_{be}) are below minimum requirements





TEST SECTION

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TEST SECTION REQUIREMENTS

Table 13	
Test Section Requirements for Material and Mixture Properties	
Property	Specification Limit
Aggregate Gradation-Percent Passing (Individual Test Result)	
4.75 mm No. 4 and larger	JMF plus or minus 8
2.36, 1.18, 0.60, and 0.30 mmNo. 8, No. 16, No. 30, and No. 50	JMF plus or minus 6
0.15 and 0.075 mmNo. 100 and No. 200	JMF plus or minus 2.0
Asphalt Content, Percent (Individual Test Result)	JMF plus or minus 0.5
Laboratory Air Voids, Percent (Average of 3 specimens)	JMF plus or minus 1.0
VMA, Percent (Average of 3 specimens)	JMF minus 1.0
G_{se}	JMF plus or minus 0.036
Tensile Strength Ratio (TSR) (At 7 percent plus/minus 1 percent air void content)	75 percent minimum
Conditioned Strength	415 kPa 60 psi minimum
Mat Density, Percent of TMD (Average of 4 Random Cores)	94.0 - 96.0
Joint Density, Percent of TMD (Average of 4 Random Cores)	92.5 minimum

Current Thoughts:

- What about smoothness and plan grade for surface lift only contracts?

TENSILE STRENGTH RATIO

(IMD), aggregate gradation and asphalt content. Test an additional portion of the sample to determine the TSR. Perform tensile strength ratio (TSR) testing on the plant mixed, laboratory compacted asphalt mixture in accordance with ASTM D4867/D4867M, except adjust the compactive effort to provide specimens with an air void content of 7 plus or minus 0.5 percent and achieve an initial degree of saturation between 70 and 80 percent prior to conditioning. [Use freeze/thaw conditioning in lieu of moisture conditioning per Note 6 of ASTM D4867/D4867M. If freeze/thaw conditioning is used, include that fact on the report.] Obtain four randomly selected

Sound Familiar?

AASHTO T 283

ASPHALT MIXTURE VERIFICATION

[2.8 Asphalt Mixture Verification

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NOTE: It is recommended for projects where a single asphalt JMF quantity is estimated to exceed 27,000 metric tons 30,000 tons of an asphalt mixture, mix verification be performed. Mix verification is the responsibility of the Government. The Government project team will need to include the mix verification in the project budget. Reach out to the Corps of Engineers Transportation Systems Center (TSMCX), the Air Force Civil Engineer Center (AFCEC) pavement subject matter expert (SME), or the Naval Facilities Engineering Systems Command (NAVFAC) for additional guidance on mix verification. Include this paragraph if asphalt mixture verification will be performed by the Government.

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AIRFIELD ASPHALT QUALITY CONTROL PLAN (AAQCP)

a. Stockpile management and procedures to prevent contamination

b. Mixing and transportation+++AASHTO M156 - platform scale, weighing and metering devices and calibration++++

c. Control of mixture volumetrics

d. Moisture content of mixtures

e. Placing and finishing

f. Joints

g. Compaction, including Asphalt Pavement-Portland Cement Concrete joints

h. Surface smoothness

i. Truck bed release agent

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j. QC Testing Plan

k. If using an ignition furnace to determine asphalt content in accordance with ASTM D6307, provide the calibration factor (C_f) for each ignition furnace proposed for use. Provide the ASTM reportable data, including C_f, for each JMF. ++++ACCEPTANCE LAB+++

l. Correlation of mechanical hammer to hand-held (manual) hammer. Determine the number of blows of the mechanical hammer required to provide the same density of the JMF as provided by the hand-held (manual) hammer. Use the average of three specimens per trial blow application.

m. Profilograph Operator(s)

n. Licensed Surveyor

o. Example copy of COC from asphalt binder supplier.

Revised AAQCP Section:

- Inclusion of ignition furnace calibration/correlation for acceptance lab.
- Dedicated spot to submit Marshall hammer correlations.

QUESTIONS?

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