Superpave Specifications - Industry Areas of concern

1. **New mix design when RAP Specific Gravity changes by > ± 0.06**

- **39-1.01C(2)(b) Mix Design**

  1. New mix design when RAP Specific Gravity changes by > ± 0.06
  2. Why are we adding Freeze Thaw requirement AASHTO T 283?
  3. VMA for ¾ and ½ inch mixes (13.5/14.5)
  4. Dust Proportion for 3/8" mix (0.9 -2.0)
  5. Requirement for T283 dry strength may be problematic for RHMA-G mixes

- **39-1.01D Quality Control and Assurance**

  6. Temperature for HWT 140 F.

- **39-1.01D(2) Verification and acceptance of Job Mix Formula**

  7. What is significance of the Asphalt Binder Set Point calculation? Is this different than mix design OBC? This calculation is unnecessary.
  8. Is there a 5 day review and 20 day waiting period for an adjusted JMF after a failed verification?

- **39-1.01D(4) Quality Control Testing**

  9. Fracture faces criteria (what is impact on available materials)
  10. Removing the word "consecutive" for QC quality characteristics test for 1 days production is counter to the FHWA peer review teams recommendations
  11. New language regarding 3 consecutive quality characteristics may be problematic

  12. Language regarding 2 consecutive quality tests, as it is written, production has been stopped and this is not the case. Bullet #3 should be removed or at least the wording "before resuming production and placement on the State highway"
  13. . In the table for Miscellaneous Minimum Quality Control, Do we really need to test Asphalt rubber binder viscosity for all OGFC? The table in 39-1.01D does not specify

- **39-1.01D(5) Asphalt Rubber Binder**

  14. Reference to AASHTO Certified Laboratory, are technicians required to be certified for viscosity test?
  15. Are satellite laboratories considered ASHTO accredited? Need guidance somewhere; QC/QA Manual?

- **39-1.01D(7) Reclaimed Asphalt Pavement**

~~16. New mix design when RAP Specific Gravity changes by > ± 0.06~~
17. Note 2 regarding RAP moisture not clear

- **39-1.01D(10) Production start-Up Evaluation**

18. QA Test Turn-around time should be same as QC test turnaround time

- **39-1.01D(16) Production**

19. To resolve dispute both QC and QA data should be reviewed. Initially by Engineer and Contractor and then ITP, if needed.

- **39-1.02 Materials**

20. Will Engineer be responsible for mixes containing too much binder when request to lower binder content is denied?

- **39-1.02D(2) Asphalt Rubber Binder**

21. Minimum binder content of 7.5 may be a problem. Does Caltrans have data to support this change?

- **39-1.02D(2)(c) Crumb Rubber Modifier**

22. Is cryogenically crumb rubber allowed?

- **39-1.02F Reclaimed Asphalt Pavement**

23. It is very difficult to screen RAP on a ¼" screen. Why is this required? Nearly all state fractionate on the ½" or 5/8" screen.
~~24. Typo~~
25. Can ether size fraction be used without the other? Can ether size fraction be used without the other?
26. There needs to be a statement that both fractions shall be used at the percentages determined by the contractor equal to 25.0 ± 1.0 percent.
27. How is RAS being addressed for use in Superpave? Will RAS be allowed in Superpave?

- **39-1.02J Hot Mix asphalt Production**

28. Can batch weights be accumulative for RAP (and RAS when allowed) at batch Plants

29. Section 39-1.01A: "Final riding surface exclusive of OGFC" This would be clearer if the term OGFC matched what is written for the surface course definition above. Possibly change to "exclusive of HMA-O or RHMA-O" to match the surface course definition?
30. Section 39-1.01C(1): "Submit quality control test results within 2 days of request" This is a very tight time frame since AASHTO T283 takes longer than this to perform…If the

test result is requested on the day of production this is impossible to meet. Also is this business days or regular days?

31. Section 39-1.01C(1): "For tests performed under AASHTO T324 (Modified) as specified in section 39-1.01D(1), submit test data and 1 tested sample set within 72 hours of sampling." Is this business hours or regular hours?
32. Section 39-1.01C(2)(b) On the chart for Air Voids Content: The test method is shown as AASHTO T 269 but on the CEM-3512SP it is shown as SP-2. These should match.
33. Section 39-1.01C(2)(b) On the chart for Air Voids Content: Why are there values for $N_{initial}$ and N_{max}? This format is extremely confusing. The number of gyrations don't seem to apply to this section.
34. Section 39-1.01C(2)(b) On the chart for Gyration Compaction: "N_{max}=130" According to the N_{max} calculation in SP2, for the N_{des} of 85 the N_{max} should be 133 (with one decimal it is 132.5).
35. Section 39-1.01C(2)(b) On the chart for Gyration Compaction: "N_{ini}=8" According to the N_{max} calculation in SP2, for the N_{des} of 85 the N_{ini} should be 7 (with one decimal it is 7.4).
36. Section 39-1.01C(2)(b) On the chart for VMA: All of our other volumetrics are matched up with the typical Superpave specs (i.e. VFA, air voids, dust proportion, etc.) If our VMA is required to be higher we will not necessarily have the same success in results as the rest of the country that is using Superpave. Superpave specifies 13.0 for ¾", 14.0 for ½", and 15.0 for 3/8". Why are we not matching our VMA requirements with SP2?
37. Section 39-1.01C(2)(b) On the chart for Hamburg Wheel Track, note c: "Test plant produced HMA" Since this chart is for mix design this requires the supplier to do a full mix design and run it through the plant prior to verification just to get test results for the Hamburg test. If there is fear of there being a difference between lab compacted and plant produced this should be tested at the verification, not on plant produced material during the mix design phase.
38. Section 39-1.01C(2)(b) On the chart for Hamburg Wheel Track (inflection point minimum number of passes): it indicates that there is a footnote "f" however there is no footnote f below the table.
39. Section 39-1.01C(2)(c): "For each job site delivery of LAS" Is this supposed to mean delivery to the plant?
40. Section 39-1.01C(2)(c) 1.5 under Batch Mixing: "of the dry aggregate weight" Everything else in the new specification is TWM, why is this TWA?
41. Section 39-1.01C(2)(c) 2.8 under Continuous Mixing: "of the dry aggregate weight" same issue as #6
42. Section 39-1.01D(1): "the engineer re-verifies the JMF if HMA production has stopped for longer than 30 days and the verified JMF is older than 12 months". The way this reads, as long as we are producing off of the verified JMF once every 30 days we do not have to reverify, even if the JMF is older than 12 months.
43. Section 39-1.01D(3): "3. HMA Plant Manager" Is it really necessary to have the plant manager present? In most cases it would be just as useful if not more useful to have the plant's QC manager, superintendent, foreman, or operator there. Maybe re-word to say plant operations representative?
44. Section 39-1.01D(4): the minimum sampling and testing frequency for agg moisture is 2 per day… if the day only consists of 200 tons this is extreme overkill. Revise to have specific tonnage as another option. This issue is also present in section 39-1.01D(6).
45. Section 39-1.02E: "Aggregate shaking time must not exceed 10 minutes for both course and fine aggregate portions" Determining how long to shake aggregate for in your

mechanical shaker is part of the calibration process and AASHTO T27 requires you to continue sieving past 10minutes if the appropriate mass is not passing a sieve in a given time period in order to achieve adequate sieving. This requirement should be removed from section 39.

46. Section 39-1.02J(1): "must have 25 ± 3 percent RAP", section 39-1.02F specifies that you must have 25 ±1 percent RAP. These should match.
47. Section 39-1.02J(4): "LAS must be from 0.5 to 1.0%" The last line of Section 39-1.01C(2)(b) specifies that you must use 0.5% LAS on RHMA-SP-G. Can we change one or the other to match each other?

- **39-1.01D(9) Aggregate Lime Treatment**

48. If a contractor is lime treating aggregates they are required to perform AASHTO T 335, T 96, T 304 and ASTM D4791 will these tests be waived under 39-1.01D(4) Quality Control Testing during HMA production? Seems very redundant.

- **39-1.01D(11) Nuclear Gauge Density**

49. For the gauge bias it will be as per 375, 10 locations, 20 cores? I know that some testing firms only doing 5 to 10 cores. Will the density paperwork need to be submitted to Caltrans (CEM-3502 or equivalent)

50. Where is the data? Several projects have been put out on a 'pilot' basis. There are rumors that not all the criteria have been met and 'concessions' have been made. Information gathered on these projects need to be shared with industry and other Caltrans Districts.
51. Majority of producers/labs that have been polled that are looking at purchasing Superpave equipment that Caltrans has purchased to eliminate any future testing issues. This will lead us to the same position that we are in now – a single manufacturer that does not have the ability to upgrade and supply equipment.
52. A round robin would help us understand both equipment and testing issues.
53. Superpave designed mixes end up with different asphalt contents. Does this mean that the millions of tons produced with the Hveem method were no designed properly. Are we really getting a better product.
54. For RHMA the minimum AC% has been increased by 1%. Do we really want RHMA mixes with so much binder that there may be a stability, bleeding and rutting issue?
55. Can one Caltrans person really drive the Superpave program and come up with the best program for the State?

56. My primary concern is still with increasing the VMA from AI SP-2 requirements by half a percent and then requiring this to be met during production with a -1% +3 % requirement. We have difficulty meeting the VMA requirement today, when it is increased and then incorporated into production requirements, this will be a problem. The VFA for Caltrans Super Pave is identical to AI SP-2, why not follow the VMA guidelines, these two volumetric properties are very much related.

57. During the JMF verification the HMA Plant binder set point should not have to be at the OBC target. The Binder target during verification can remain the JMF OBC but allow the supplier to set the Plant as he sees fit to achieve the Binder target.

58. RHMA-SP-G: When the minimum target is raised from 7% of DWA to the new minimum of 7.5% of TWM this is a net increase of .9% binder. What positive goal is achieved by increasing the cost of the mix this dramatically? Volumetrics could be difficult to achieve at the higher binder content for ¾" mixes.

59. T283; Will 120 dry strength be difficult to meet with RHMA-SP (with some aggregate).

60. I see added back the freeze cycle when initially Caltrans removed it.

61. Caltrans believes that the Hamburg inflection point and the TSR are not redundant tests. But he is wrong and the TSR should be eliminated with the adoption of the Hamburg inflection point testing.

- **39-1.01C(2)(d) Lime Treatment**

62. 4.9 *Authorized lime ratio for each aggregate size being treated.* Why have we changed to "Authorized" from Approved? It's still the contractor that is determining the exact lime proportions correct? Authorized makes it sound like we are being directed by Caltrans on what proportions to use.

- **39-1.01D(1) General**

63. Under Hamburg Wheel-Track testing what is the benefit of measuring for impression every 100 passes as opposed to the 400 passes as per AASHTO T324?
64. Why is there a requirement to notify the Engineer at least 2 business days in advance of sampling materials for QC testing?

- **39-1.02D(2) Asphalt Rubber Binder**

65. I know this has nothing to do with Superpave but this was my Christmas wish out of the Sears Christmas catalog this year…Caltrans needs to start specifying WMA in RHMA for some of their Districts, not contractor's option. As most of the RHMA in District 4 is placed at night it would be in everyone's best interest to use a WMA technology in this cool, moist environment.
66. Minimum binder content of 7.5 may be a problem. Does Caltrans have data to support this change? Is 7.5% by TWM correct? Seems like Caltrans would make a 0.5% TWA bump first before moving a full percent.

- **39-1.02e Aggregate**

67. **STOP SPECIFYING 1/2-INCH AGGREGATE WHEN PAVING 0.10 FT THICKNESS!!!!**
68. Is the Thickness Range table an Industry proposal? If not I guess Caltrans is in agreement that 1/2" should not be placed at a 0.10'.

- **39-1.02J(3) Asphalt Rubber Binder**

69. Why is the premix of asphalt binder and modifier now needed to be mixed for 20 minutes?

- **39-1.03B(3) Tack Coat**

70. The tack coat on the vertical surface of a construction joint should be allowed to be omitted if new HMA is placed during the same shift (as allowed between HMA layers, bullet #2). If 2.1 and 2.2 are met.

71. Variability of the Hamburg test

72. AC content of Rubber

73. Gyratory Compaction Temp – PM binders and Higher RAP mixes.

74. Where is the data? Several projects have been put out on a 'pilot' basis. There are rumors that not all the criteria have been met and 'concessions' have been made. Information gathered on these projects need to be shared with industry and other Caltrans Districts.

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production requirements, this will be a problem. The VFA for Caltrans Super Pave is identical to AI SP-2, why not follow the VMA guidelines, these two volumetric properties are very much related.

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83. T283; Will 120 dry strength be difficult to meet with RHMA-SP (with some aggregate). I see added back the freeze cycle when initially Caltrans removed it.

84. The draft Superpave spec shows a gradation for 1" mixes but there are no design requirements listed for this mix.

85. I thought we were going to be looking at a SuperPave specification, but it appears as though we are just changing from kneading compactor to gyratory. Using only one gyration level (125) and not looking at traffic levels to determine # of gyrations. We're also not evaluating volumetrics of 3 different blends and selecting the blend with the most favorable properties. I'm glad they've included Ninit & Nmax. As you all know, lower gyration levels on less heavily traveled roadways would produce higher VMA & correspondingly higher OBCs, and therefore a more durable pavement. With lower traffic & lighter loads, permanent deformation is less of a concern. Perhaps this specification (with some revisions) will be easier to implement and IS a place to start.
86. It will be interesting to see how VMA @ 125 gyrations compares to that at 150 kneading compaction tamps. Are the shear stresses exerted on HMA in the gyratory >, <, or = to the kneading compactor? Will VMA be more difficult to achieve?
87. Mandatory 25 +/- 1%? Perhaps ok for the few pilot projects, but I believe it should be contractor option and allow "up to" 25%, with guidelines on how to deal with the asphalt binder at the different RAP contents.
88. In Section 39.1.01C Submittals (page 2 of document): "Submit proportions for LAS as part of the JMF submittal. If you change the brand or type of LAS, submit a new JMF". **NO!! Shouldn't be.** Since JMF is created without the LAS, a new JMF should not be necessary. Should only need to submit new AASHTO T283 & Hamburg test results using the new LAS.
89. AASHTO T283 every 10,000 tons during production. GOOD
90. AASHTO T324, Hamburg results within 48 hours of sampling, is not realistic, and perhaps not necessary.
91. References to the SE test in Sections 39-1.01D(1)(h) Aggregate Lime Treat table & 39-1.01D(1)(i) QC Testing-Minimum QC table shown as AASHTO T166, should be T176. Check elsewhere.
92. Lower LA Abrasion loss requirement - GOOD. Will there be aggregate sources excluded?
93. Semantics: Should be Theoretical Max Density, and not Maximum Theoretical Density. Is that too picky?
94. Tighter Va tolerance of +/-1.5%?

95. VMA requirement @ mix design, 0.5% higher, and during production 0.5% lower than previous. Are we saying that we will be allowed a 1% drop in VMA from mix design to production?
96. % of Theoretical Max Density shown as 92%-97% for QC, and 91%-97% for acceptance. Why? Either way, pay factor is determined based on Eng'r's cores. Shouldn't they be the same anyway?
97. Is the minimum dry Indirect Tensile Strength requirement of 125psi for AASHTO T283 appropriate? I've seen numerous HMA mixes perform well at lower dry strengths, as long as the ratio is achieved. I believe a minimum strength is appropriate, but is 125psi the right value? Perhaps 100psi?
98. Section 39-1.01D(2)(a) Engineer Acceptance - General: Does the Eng'r sample at the same location as the contractor (truck, behind paver)? Should they? i.e. if contractor takes his random QC samples from a truck at the plant, and the Eng'r behind the paver, is that acceptable? It appears to read that sampling from different locations could be done.
99. Both the contractor & the Eng'r "prepare 3 briquettes for air voids & VMA determination". Are new G_{sbs} performed? If not, which should be used to calculate VMA? And If so, we need to be mindful of the lack of precision in the determination of G_{sb}, especially for the fine portion of the test.
100. Must HMA comply with **BOTH** AASHTO T283 **AND** Hamburg?
101. Section 39-1.02M(4)(d) JMF Verification: The air voids tolerance of +/-1.5% is perhaps ok, but needs to be discussed.
102. Section 39-1.02M(4)(d) JMF Verification: The VFA of Design value +/-1%, **NO WAY**. It should be sufficient for the VFA to be within the design range of 65-75%! We only need to consider a very simple example: assume mix design VMA of 14%, V_a of 4.0% with resulting VFA of 71.4%. Now assume that during production VMA drops by a <u>mere</u> 0.5% to 13.5% & V_a to 3.5%. The corresponding VFA would be 74.1%. An increase of **2.7%** and out of the +/-1% tolerance. A second example: assume VMA <u>increases</u> slightly to 14.5% with V_a staying right at 4% during production (perhaps an ideal mix). VFA would increase to 72.4% and be on the verge of being out of the +/-1% tolerance!
103. Section 39-1.02M(4)(d) JMF Verification: Dust Proportion (DP) (design value +/-0.5%). Not a good idea. Are we saying that if we have a DP design value of 1.1, then we will be allowed 0.6 to 1.6 during production? I'm not sure that's a good idea. Same thing on the low side of the range. EXAMPLE: Let's assume a mix design P_{be} of 4.2%, a P200 of 4.7% and a corresponding DP of 1.1 So if the P200 were to increase to, say 6.0%, using the P_{be} of 4.2%, DP would be 1.43. So a P200 delta of 1.3 would change the DP by 0.33. And a DP tolerance of +/- 0.5 would be a P200 range of ~2%. Though allowed in the gradation tolerance, it would be terrible for volumetrics. A more severe example would be a DP design value of 1.4 with an allowable tolerance of 0.9-1.9? I don't think so! Not many producers will want their P200 to be changing by 1.3% or more from mix design to production. Though we've seen the generation of large amounts of fines during production, we all know this is not a good practice. In addition, it will likely cause VMA to drop more than the allowable 1%. It should be sufficient for the DP to be within the design range of 0.7-1.4.
104. Why are we using a 0.8 factor when considering binder replacement for RAP?