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RE: 2022 Spring 405 HMA Update Memo for ITD Residency and Contractors Reference.

In follow-up to continuous paving quality assurance improvement, and in teamwork with the Idaho AGC/ITD Industry Peer Review Advisory Group, this is a summary of topics on which we have reached consensus and which we plan to incorporate this year by change order.

During the spring of 2022, the Idaho AGC, ITD and other industry stake holders, met regularly as the Technical Advisory Group (TAG) reviewing lessons learned during the 2021 second paving season implementing the new 405 HMA Superpave specifications. The group identified several barriers in meeting ITD’s paving specifications affecting timely approvals, contract administration, and material acceptance. Through collaboration, the TAG recommends the following 10 points of change and clarification for quick implementation and for high effect without compromising quality. Some points are intended to be implemented through change order and others are directed to ITD staff.

**Please note:**

1. As agreed, the 2021 405 Superpave Specification: Mid-Season Adjustments Memo from 7/29/2021 is revoked and will not be used for the 2022 paving season as replaced by the specific updates below.
2. A standard change order will be prepared by HQ Construction and Materials to follow this memo.
3. Two topics should be pursued and finalized by the TAG as a follow up to this memo.
  - a. Use and approval of previously used mix designs and use of mix designs in small quantities.
  - b. Better application of the AAO and the payment B.

1) Issue: Cure time

With 07/02/2021 SP 405 Superpave HMA, ITD implemented a change to Table 405.03-6 – Production Paving Quality Limits.

- Added: (e) Gmm tests must be performed only after a 2-hour oven cure time in accordance to the mix design requirements to limit test result variability.

This change did not result in consistent implementation of sample cure times and was requested to be further clarified.

TAG/PRAG Solution:

- Clarification 405.03.H Pre-paving meeting: The pre-paving meeting is required by 07/02/2021 SP Superpave HMA
- Change order language:
  - On page 10 of 24 405.03.H after the first sentence Add: Establish consistent curing times and facilitate coordination between the QC and the acceptance lab for acceptance lab cure time. Consistent cure times using the laboratory target compaction temperature shown in the mix design must be agreed upon, communicated, and used. Follow a curing protocol for Gmm and Gmb samples. A curing protocol of 3 hours at compaction temperature (+/- 1 hour maximum), unless field conditions dictate otherwise. If the established cure time cannot be met, agree to a plan at the pre-paving meeting. Cure time begins when truck is loaded.
  - On page 10 of 24 405.03.H after the second sentence add: The minutes from this meeting will be signed and agreed to by the Engineer and the Contractor. The intent of the pre-paving meeting and agreement is not to make changes to the contract. Contractual changes must be done by change order.

2) Issue: Clarification is needed on who will be determining and notifying of test strip acceptance.

TAG/PRAG Solution:

- Clarification 405.03.I.5 Test Strip Acceptance Criteria: The Engineer will work in collaboration with the Central Materials Lab and the Construction & Materials Section in evaluation of the acceptance test strip per Idaho IR 125. Test Strip approval will come from the Engineer. The Resident Engineer has the immediate charge of the engineering details of the work and has direct supervision of contract administration as described in Section 105.09.
- The following changes will be made to the ITD 773 form.
  - The test strip form header will include the ITD mix design number and the Contractor's mix design number.
    - Note: Additional boxes for these data will be required on the 888 or 1044.
  - The pass/fail check boxes will remain in place; however, the description will be changed to read: The testing results appear to meet the test strip requirements Yes/No.
  - Once all other test strip requirements are met, the RE will issue the approval notification. (This is typically done by cover letter, email, or indicating on the form.)

3) Issue: There are several versions of the 405 specification that are in use.

TAG/PRAG Solution:

- Updating to the 10/21/2019 QASP and the 2021 SP 405 HMA -7/2/2021 by change order is recommended.
- The QASP and 405 Specification indicated in the contract (unless replaced by change order) is to be followed.
  - The contract must be amended by change order for the exceptions given in this document to supersede the QASP and 405 Specification indicated in the contract.
  - The clarifications provided as TAG/PRAG solutions in this document do not change contract language and are intended to provide context to the intent of the specification for use in consistent implementation of the Standard Specifications.

- 4) Issue: 10/21/2019 QASP section 106.03.B.3.a paragraph two seems to contradict section 109.09 Pay Factor Equations second paragraph (All versions) for 301, 303, and 635 Materials. There appears to be no contradiction with 405 acceptance and payment specification language.

TAG/PRAG Solution:

- Clarification 106.03.B.3.a paragraph 2: The intent is to accept material based on the lowest PWL computed for any 1 sieve. If all sieves are above 40 PWL, the material is accepted, and payment will be based on the average PWL of all sieves.
- Clarification 109.09 Pay Factor Equation paragraph 2: The intent is to calculate pay based on the lowest unrounded PWL if any quality characteristic falls below 60 PWL. This does not include items listed in 106.03.B.3.a. or 405 items.
- Calculations performed in ITD 1037 are correct. Acceptance and payment should be based on the results provided by the official ITD form.
- ITD: We believe the worksheet is calculating correctly. If there are issues with the worksheets, please contact the Construction/Materials/Central Lab as soon as possible.

- 5) Issue: The Districts and the AGC have raised concerns over the timeliness of Mix Design approvals. It has been stated that ITD has implemented new requirements for mix design approval.

ITD has requested complete packets for review (to include source documents per QA Manual 210.03, AASHTO R35 and AASHTO R18). ITD acknowledges a more thorough review of this documentation is currently being performed than has been done in the past. A thorough analysis of testing data is required to provide mutual confidence in the data, confidence in the material it represents, and to ensure that ITD and mix designers are complying with Department requirements. This effort will be conducted in cooperation with the contracting community, the mix designers, and the mix testing labs.

Members of the AGC have stated mix designers believe this is a change in requirements and will not provide the required documentation. Others have stated Mix Designers do not

possess the referenced documentation as they believe it is not required per the contract. The AGC requested a contract document listing all documents that may be required for mix design approval.

ITD Decision: ITD will not provide an itemized list of all possible source documents at this time. ITD will further explain what is expected after following up with AASHTO re:source for clarification on the intent of source documentation, reporting requirements, and record retention standards.

Follow-up: AASHTO re:source has no source document requirement per se. However, ITD contract documents define Source Documents and the requirements.

Mix Design Review Strategic Goal: ITD's goal to ensure the Department receives and reviews a comprehensive mix design with supporting documentation that allows for a thorough review, meets the federal and state requirements, and allows for competency audits that moves us towards expedited/paper review of asphalt mix designs in the future.

- 6) Issue: The Districts and the AGC have raised concerns over the timeliness of the Asphalt Analyzer Offset (AAO) results and plant calibration bricks (used prior to test strip).

The AGC has concerns over potential aggregate breakdown in the asphalt analyzer exacerbating issues with dust-to-binder ratio and aggregate correction factors.

ITD performed research testing the potential breakdown of aggregates within the asphalt analyzer. It appears the established samples were statistically coarser after being run through the analyzer. The Department will continue research in this area and is finalizing the report with review by the TAG and PRAG groups.

ITD asked the TAG if the AAO was still needed, and the response was the AAO bricks are necessary for calibration of the hot plant (prior to test strip).

TAG/PRAG Solution:

- Contractors will provide 3 quarts of binder for the AAO process at the time of Gsb testing.
- The Central Material Lab will make all efforts to perform the AAO concurrently with the mix design review.
  - Since the AAO must physically be completed before the test strip production, this will increase the likelihood the test strip may proceed on the projected date following mix design approval.
- Contractors will provide an estimated test strip date with the mix design submittal.
- The Central Materials Lab will provide an additional correction factor sample for the acceptance lab prior to the test strip for informational purposes only. Acceptance testing performed will be done with correction factor samples following IR 157.

ITD Decision:

- Idaho IR 157 will continue to be used to calibrate NCAT ovens for all Acceptance Labs.

- ITD will evaluate the need for hot plant calibration bricks (used prior to test strip) after the 2022 construction season.

7) Issue: There is a need to clarify allowable JMF adjustments prior to the Test Strip.

TAG/PRAG Solution

ITD Decision, agree with TAG/PRAG solution:

- Clarification 405.03.I Acceptance Test Strip (Lot 1): Adjustments to the JMF may be made prior to the Test Strip providing:
  - The changes are allowed that meet 405.03.K.1.a.
  - The change needs to be documented per IR 150 Section 8.1.1 and submitted to [MixDesigns@itd.idaho.gov](mailto:MixDesigns@itd.idaho.gov) prior to test strip.
  - The adjustment will be approved by the Resident Engineer (in coordination with HQ Construction & Materials) prior to the test strip.
  - The Contractor has produced HMA prior to the test strip and submits QC testing to show adequate control over the mixture and provides plant recordation justifying the need for the JMF adjustment.

8) Issue: Due to AGC low confidence in the -#200 sieve results established by the asphalt analyzer, the AGC believes the aggregate correction factors established in Idaho IR 157 do not represent produced material and should not be used in determining aggregate correction factors.

TAG/PRAG Solution:

- At Contractors' request, ITD will deduct the Allowable Difference from Idaho IR 157 Table 8.1 No. 200 sieve Permitted Sieve Difference Size.
- Change order language:
  - On page 3 of 3 Idaho IR 157 – 07/02/2021 Section 8.4 add to the end of the paragraph: If the 75 µm (No. 200) or smaller are outside the limits in Table 2, deduct the tolerance of  $\pm 0.5\%$  from the calculated correction factor for that sieve only. The Department may reevaluate the tolerance deduction from the aggregate correction factors, if hotplant reconciliation, material testing, plant calibration, and plant printouts do not support the deduction of the tolerance.
    - Example: If the difference on the No. 200 sieve is 0.8 %, and the tolerance is  $\pm 0.5\%$ , the correction factor will be 0.3% on the No. 200 sieve alone.

9) Issue: Recycled Asphalt Paving:

- Section 720.07 requires the standard deviation of the correlation test results be 0.07 or less. If correlation exceeds 0.07, additional testing is required until the values fall below 0.07. This metric is being questioned if it is achievable or if it is acceptable. Since these values come from the Contractors' quality control testing, and the history and value of this index is not understood, it is proposed to remove this requirement until a better understanding is gained from the data.

- Change order language:
  - On page 570 of 571 of the 2018 Standard Specifications, in the paragraph beginning with “Asphalt Binder Aggregate Correlation Factor.” Remove the following two sentences: “The standard deviation of the correlation test results must be less than 0.07. If the standard deviation of the correlation test results exceeds 0.07, the Engineer will require additional AASHTO T164 or AASHTO T 319 and AASHTO T 308 testing until the standard deviation for the correlation testing falls below 0.07.”

10) Issue: Both ITD and AGC have requested provisions for small quantities. The following two provisions have been previously vetted by FHWA, the TAG/PRAG, and the Department.

Change Order Language: To the end of sub-section 270.04 of the QA Manual (2019 and later versions) insert the following:

270.04.01 Acceptance of Small Quantities – Asphalt Mix

General. Contractor will sample loose mix and cores in the presence of the State. The State will complete acceptance testing.

1) Plan Quantity Less than 750 tons

For bridge approaches see 270.05.01 *Non-standard Acceptance of Materials - Asphalt Mix*. For other applications use this subsection. Contractor may use a commercial (non-Superpave) mix design. Aggregate shall come from an ITD-approved source. The mix design will be submitted for information only.

Establish paving location compared to travel path:

- i. Within travel path - cores and Gmm are required. Numbers of samples will be established in ITD 862 Sample Schedule. Compaction must be 92.0% or greater. Failing work will be removed and replaced.
- ii) Outside travel path accept by RE Letter of Inspection. The inspector will use ITD form 891 for density observation and will include equipment used and compaction temperatures. Gauge readings are not required.

2) Plan Quantities between 750 - 2,250 tons and a *continuous operation*, use MTR Table 270 (405-7)

3) Plan Quantities between 750-2,250 tons per year and specific applications use 270.05.01 Non-standard Acceptance of Materials - Miscellaneous Asphalt Mix

To the end of sub-section 270.05 of the QA Manual (2019 and later versions) insert the following:

## 270.05.01 Non-standard Acceptance of Materials – Asphalt Mix.

These acceptance criteria are established for plan quantities between 750 – 2,250 non-continuous tons per year or non-continuous locations such as bridge approaches, cross-overs, patching within travel lanes, gore areas and shoulders. These criteria may apply to projects with intermittent paving schedules spanning multiple months or seasons.

### Acceptance Criteria:

- A Department-approved Superpave mix design is required before paving begins. A test strip will not be required.
- Tack Coat must be applied. Target guidelines for a 1:1 dilution are listed below, with the understanding this work may not be conducive to quantifying application rates:
  - 0.18 gallon per square yard on milled surfaces
  - 0.12 gallon per square yard on existing plant mix surfaces and
  - 0.08 gallon per square yard on newly paved surfaces.
- Acceptance requires 1 random core and 1 loose mix sample (Gmm only) per:
  - Bridge lane-approach (minimum of 1 per bridge quadrant per lift). Contractor has the option for the Department ITD to use composite cores for acceptance (minimum of 1 per bridge quadrant). A composite core is a single core with multiple lifts included in the core. Gmm is determined using the weighted average (based on thickness) of the Gmm for each lift represented by the core. Composite cores will not be split into component lifts for evaluation.
  - Patch with any dimension exceeding 12.0 ft.
  - Shift of production paving (not applicable for bridge approaches)
  - One (1) random sample per 750 tons placed when the daily total exceeds 750 tons.

Compaction must be 92.0% or greater. Failing work will be rejected.

Thank you to the PRAG and TAG members since 2020 for their coordination and industry commitment to continuous quality improvement with practical application and buildable feedback to avoid over designing mixes and a reasonable level of testing.

--Chad Clawson

Acceptance Matrix to be Inserted Into the QA Manual Section 270.

BID ITEM/ MATERIAL	PURPOSE OF TESTING	ITD SPEC. REF.	TEST METHOD	REQUIRED REPORT FORM NO.	MINIMUM REQUIRED FREQUENCY	REMARKS, NOTES, OR ADDITIONAL DIRECTIONS
PE OF CONSTRUCTION		SAMPLED BY	TESTED BY			
<b>Superpave HMA</b>  Production Paving (When an acceptance test strip is not required, regardless of the class of Superpave mix and the total quantity is greater than one frequency.)  Contractor will sample Department will witness sampling and Department will test for acceptance	ACCEPTANCE (Loose Mix from Roadway) Asphalt Content Gradation Moisture	405.03	FOP for AASHTO R 97 FOP for AASHTO R 47 FOP for AASHTO T 329 FOP for AASHTO T 308 FOP for AASHTO T 30	ITD-833	Each 750 tons and at least a minimum of 1 test when daily quantities exceed 50 tons	SP2 Test Strip Limits apply. (Sampling from the plant is not allowed)
		ITD Project Personnel	ITD Project Personnel			
	INDEPENDENT ASSURANCE Sampling Asphalt Content Gradation Moisture	IA Inspector	IA Inspector	ITD-857	1 observation each project of more than 2,250 tons.	
ACCEPTANCE  Density (Percent Compaction)	405.03 405.03-L	FOP for AASHTO R 67 FOP for AASHTO R 97 FOP for AASHTO T 166 Method A FOP for AASHTO T 331 FOP for AASHTO T 209 Bowl Method ASTM D7227	ITD-773 ITD-892	5 Stratified Random Cores per phase of project	Density (Percent compaction) acceptance will be determined from the average of the cores. The average max. specific gravity, (G <sub>mm</sub> ) from the loose mix samples will be used to determine core density (percent compaction).	
						Contractor
<b>Superpave HMA</b> Production Paving (When an acceptance test strip is not required, regardless of the class of Superpave mix and the total quantity is less than one frequency.)	<b>FOLLOW SECTION 270.04 ACCEPTANCE BY SMALL QUANTITIES</b> Density acceptance will be determined from the average of cores.					

405-7