APWA-WA CONSTRUCTION MATERIALS COMMITTEE

SPEAKERS:
Cody R. Hart, P.E.
Jessica Knickerbocker, P.E.
Committee Organization

The Construction Materials Subcommittee for APWA-WA has two co-chairs.

• Cody R. Hart P.E.
  • CRH Engineering
  • Sedro-Woolley, WA

• Eric Jenkin
  • Spokane County
  • Spokane, WA

Members of the Construction Materials Subcommittee include:

• Public works personnel
• Municipal consultants
• Paving contractors
• Material testing representatives
• WSDOT H&LP
FHWA Approved General Special Provisions (GSPs) for local agency use can be found on WSDOT's Website at:
http://www.wsdot.wa.gov/Business/Construction/SpecificationsAmendmentsGSPs.htm
**4-06 ASPHALT TREATED BASE (ATB)**

**4-05 Vacant**

**4-06.1 Description**

Asphalt treated base (ATB) consists of a compacted course of base material which has been weatherproofed and stabilized by treatment with an asphalt binder.

The Work shall consist of one or more courses of asphalt treated base placed on the Subgrade in accordance with these Specifications and in conformity with the lines, grades, thicknesses, and typical cross-sections shown in the Plans or as staked............

**9-03.6 Aggregates for Asphalt Treated Base (ATB)**

- *Multiple page APWA GSP* is available on WSDOT website.
- WSDOT does not provide an ATB specification

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**5-04.3(3)A Material Transfer Device / Vehicle**

The first paragraph of this section is revised to read:

Additionally, a material transfer device or vehicle (MTD/V) is not required at the following locations $$$.

- Many local agency projects do not warrant the use of MTD/V
- Although standard specs may describe areas / types of projects that don’t require MTD/V, the contractor bidding the project may not know and increase the bid amount unnecessarily if the agency is not clear it is not required.
5-04.3(7)A2 Statistical or Nonstatistical Evaluation

Delete this section and replace it with the following:

5-04.3(7)A2 Nonstatistical Evaluation

Mix designs for HMA accepted by Nonstatistical evaluation shall;

- Be submitted to the Project Engineer on WSDOT Form 350-042
- Have the aggregate structure and asphalt binder content determined in accordance with WSDOT Standard Operating Procedure 732 and meet the requirements of Sections 9-03.8(2) and 9-03.8(6).
- Have anti-strip requirements, if any, for the proposed mix design determined in accordance with WSDOT Test Method T 718 or WSDOT FOP for AASHTO T 324 or based on historic anti-strip and aggregate source compatibility from WSDOT lab testing. Anti-strip evaluation of HMA mix designs utilized that include RAP will be completed without the inclusion of the RAP.
- Clearly identifies methods to determine anti-strip requirements and that Hamburg is not the only approved method.

At or prior to the preconstruction meeting, the contractor shall provide one of the following mix design verification certifications for Contracting Agency review;

- The proposed mix design indicated on a WSDOT mix design/anti-strip report that is within one year of the approval date
- The proposed HMA mix design submittal (Form 350-042) with the seal and certification (stamp & signature) of a valid licensed Washington State Professional Engineer.
- The proposed mix design by a qualified City or County laboratory mix design report that is within one year of the approval date.

The mix design will be performed by a lab accredited by a national authority such as Laboratory Accreditation Bureau, L-A-B for Construction Materials Testing, The Construction Materials Engineering Council (CMEC’s) ISO 17025 or AASHTO Accreditation Program (AAP) and shall supply evidence of participation in the AASHTO Material Reference Laboratory (AMRL) program.

At the discretion of the Engineer, agencies may accept mix designs verified beyond the one year verification period with a certification from the Contractor that the materials and sources are the same as those shown on the original mix design.

- Concise mix design acceptance criteria
- Mandates mix design determination prior to bid opening
- Provides an alternate to WSDOT performing mix design verifications
5-04.3(8)A4 Definition of Sampling Lot and Sublot

Section 5-04.3(8)A4 is supplemented with the following:

For HMA in a structural application, sampling and testing for total project quantities less than 400 tons is at the discretion of the engineer. For HMA used in a structural application and with a total project quantity less than 800 tons but more than 400 tons, a minimum of one acceptance test shall be performed:

If test results are found to be within specification requirements, additional testing will be at the engineers discretion.

If test results are found not to be within specification requirements, additional testing as needed to determine a CPF shall be performed.

- Clarifies reduced acceptance criteria for small quantities

5-04.3(8)A6 Test Methods

Delete this section and replace it with the following:

Testing of HMA for compliance of $V_a$ will be at the option of the Contracting Agency. If tested, compliance of $V_a$ will be use WSDOT Standard Operating Procedure SOP 731. Testing for compliance of asphalt binder content will be by WSDOT FOP for AASHTO T 308. Testing for compliance of gradation will be by WAQTC FOP for AASHTO T 27/T 11.

- Allows optional testing for compliance with $V_a$
The maximum CPF of a compaction lot is 1.00.

For each compaction lot of HMA when the CPF is less than 1.00, a Nonconforming Compaction Factor (NCCF) will be determined. THE NCCF equals the algebraic difference of CPF minus 1.00 multiplied by 40 percent. The Compaction Price Adjustment will be calculated as the product of the NCCF, the quantity of HMA in the lot in tons and the unit contract price per ton of the mix.

- Clarifies a maximum CPF of 1.0

Summary of APWA GSP

Benefits for Local Agencies

- Provides an ATB spec
- Ability to reduce or eliminated use of MTD/V as deemed appropriated to reduce project costs.
- Provides concise acceptance criteria
- Mandates Anti-strip determination prior to bid opening
- Eliminates Requirement for WSDOT verified Mix!!!
- Eliminates Requirement for Hamburg test
- Clarifies reduced acceptance criteria for small quantities of HMA
- Allows for optional Testing of HMA for compliance of Va
- Establishes a maximum CPF of 1.0
Committee Efforts Looking Forward

• Continue to gather Feedback about existing APWA construction material GSPs
• Coordinate and assist the development of electric vehicle charging station specifications and standards.
• Development of new GSPs that will allow reduced acceptance criteria for driveways.
• Ongoing research and coordination for the possible approval of non-nuclear test gauges (electromagnetic gauges - Currently approved for use by Idaho DOT).
  
  AASHTO T343-12 - “Density of In-Place Hot Mix Asphalt (HMA) Pavement by Electronic Surface Contact Devices.”
  
  ASTM D7713-05 - “Standard Test Method for Density of Bituminous Paving Mixtures in Place by the Electromagnetic Surface Contact Methods”
• Coordinate the development of GSPs for alternate construction methods:
  • Cement Modified Soils
  • Cement Treated Base
  • Full Depth Reclamation

Committee Efforts Looking Forward

• Committee is coordinating with APWA Division 1 committee and coordinating with WSDOT for new recycled construction material law passed in 2015.
• Continue to coordinate with local agencies to determine needed GSP’s.
Permeable Pavement Specifications

- Why? How? Who?
- Materials and Specifications
- What’s Next?

Icon Paving Cheney Stadium
Why do we need a standard spec?

- Puget Sound
- Stormwater Regulations
- Failing Roadways
- $66 Million Grants
- Contractor Complaints
- No Industry Standards

Development of the Standards

- Cross-functional group of leading experts
- Porous Asphalt, Pervious Concrete, Bases & Subbase
- Specification Task Force

May 2014 Focused Groups April 2015
Partners

APWA DIV. 2,4,5 and 9 GSP’s

- 2-06  Subgrade Preparation
- 4-04  Ballast and Crushed Surfacing
- 4-05  Asphalt Treated Permeable Base (ATPB)
- 5-04  Porous Hot Mix Asphalt (pHMA)
- New *5-06  Pervious Concrete Pavement (PCP)
- 9-03.6  Aggregates for Asphalt Treated Permeable Base
- 9-03.1(4)C  PCP Grading
- 9-03.9  Aggregates for Ballast
2-06 Subgrade Preparation

- Compaction Alternative:
  - Uniform & unyielding with a fully loaded dump truck,
  - Maximum 90% standard proctor
- Proof-rolling & Scarification
  - Backdump installation method
  - Geotextile (if required)
- Subgrade Preparation Plan
  - Over-compacted areas
  - Access to private driveways
- Subgrade Infiltration Test

Ballast & Crushed Surfacing

4-04 Ballast and Crushed Surfacing

Shaping and Compaction: Seated until no visible movement, as approved by Engineer.

9-03.9 Aggregates for Ballast

<table>
<thead>
<tr>
<th>Limits</th>
<th>Test Method</th>
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<tbody>
<tr>
<td>Los Angeles Wear, 500</td>
<td>WSDOT, T96</td>
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<tr>
<td>Rev</td>
<td></td>
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<tr>
<td>Degradation Factor</td>
<td>WSDOT, T113</td>
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<tr>
<td>Min Void</td>
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<td></td>
<td>30% AASHTO T 19 or ASTM C29</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1-1/2 inch</td>
<td>100</td>
</tr>
<tr>
<td>1 inch</td>
<td>95-100</td>
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<tr>
<td>#8</td>
<td>0-5</td>
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<tr>
<td>% Fracture</td>
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Choker Course*

Permeable Ballast

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</tr>
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<td>90-100</td>
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<tr>
<td>100</td>
<td>0-3</td>
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<tr>
<td>% Fracture</td>
<td>95</td>
</tr>
</tbody>
</table>

*Choker Course NOT for Pervious Concrete
5-06 Pervious Concrete Pavement

Mix Design
- Cementitious content, min. of 480 lb/cyd.
- Hydration stabilizing admixture and microfibers at manufacturer’s recommended dosage rate.
- Water/cement ratio shall not exceed 0.35.

Contractor Qualifications
Submittals & Truck tickets

Finishing Equipment
- A smooth surface and shall not cause excess paste to be left on, or drawn to, the surface.
- Compact the pervious concrete to grade without marring the surface. Equipment shall not cause the surface to clog and shall produce a surface that is free of ridges or imperfections.

Placement
1. Wet the subbase with water
2. Curing begins within 20 min. of discharge
3. Completely cover with a polyethylene sheet
4. Cure a min. of 7 uninterrupted days

Acceptance
1. Grade: ¼ inch tolerance
2. Conformance to Test Panel
   - Compacted Thickness and Average Hardened Density
   - Fresh Density
   - Appearance
3. Infiltration Rate: Min. 100 inches per hour.
5-04 Porous Asphalt

PHMA Mix Design
- Class ½ HMA PG 70-22 (Polymer modified)
- Binder content between 6.0% and 7.0%
- Void ratio of 16% to 25%
- % two face fracture greater than 90%

Porous Asphalt Treated Base
- Provides stable base (instead of choker course)
- Temperature
- Ease construction, staged construction
- Provides additional structural strength vs. aggregate

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<th>Percent Passing</th>
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<tr>
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<td>90-100</td>
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<td>3/8” square</td>
<td>55-90</td>
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<td>No. 40</td>
<td>0-13</td>
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<tr>
<td>No. 200</td>
<td>0-5</td>
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Density & Testing
Paving & Acceptance

**Paving**
- Rolling 25°F below dense graded
  - 50°F below for warm mix
- Establish “firm/unyielding” pattern
- Guard against over compaction.

**Acceptance**
- Infiltration rate modified ASTM test (C1701)
  - Average over 100”/hour
- Target 15% to 18% final air voids
  - 82% to 85% of max. theoretical Rice density
- Look for sealed of areas in pavement.

Drain Down

- D6390-05, 0.3% maximum @ 15° above design mix temperature
- ODOT has alternate ODOT TM 318 Drain Down Test-subjective
- Consider adding fiber to mix design if drain down is excessive (aramid likely best)
- Warm Mix
- During Construction
  - Watch for asphalt in the beds of deliver trucks-indicated drain down issue
  - Cooler temperatures are better
What’s Next?

Continued United Improvement

- Specification Task Force
- Improve Pavement Durability (Warm mix, aramid fibers, etc.)
- Looking at alternative tests used throughout the country that better reflect the final product.

Specifications - www.cityoftacoma.org/permeablepavement

Contact Information

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Questions?