NW-ACPA/WSDOT Meeting Minutes
Thursday May 12, 2016 9:30 AM – 1:30
WSDOT Cle Elum Maintenance Conference Room, I-90 Exit 80

Present	Name	Company	Present	Name	Company	Present	Name	Company
x	Berg, Gary	Salinas		Erickson, D	WSDOT	x	Powell, Jim	NW
x	Clark, Steve	Acme	x	Jones, Dave	WSDOT	x	Russell, Mark	WSDOT
x	Dyer, Bob	WSDOT	x	Larson, Larry	WSDOT	x	Salinas, John II	Salinas
	Davari, Moe	WSDOT	x	Pipinich, Bob	GMCC	x	Uhlmeyer, Jeff	WSDOT

Old Business:

13-01 Time of placement for end dump trucks needs to be extended to match 6-02.3(4)D.

4/15/2013 – The time constraint is in Section 5-05.3(3)B. This specification allows the concrete to be delivered to the job site in nonagitator trucks provided it is fully discharged no later than 45 minutes after the introduction of mixing water to the cement and aggregates. Section 5-05.3(8)C, states that when a pour is discontinued for more than 45 minutes a transverse construction joint shall be installed. The goal is to insure the concrete is plastic enough when placed to prevent a cold joint from forming. The real issue is not the time in the nonagitator truck but the travel distance. The longer you travel the more likely you are going to have segregation, caused by vibration of the concrete. It was asked if a conveyor system between the truck and the paving machine would remix the concrete. There are some screws in the hopper to move the material, but they were not meant to remix the concrete. It was decided that the Industry would come back with a proposal for change to the time limit.

10/7/2013 - Wisconsin has developed a specification that Jim Powell handed out. This specification is based on concrete temperature at the time of placement. It suggests that you could place concrete pavement up to 60 minutes after batching when a retarder is used. ACPA has no guide lines on this issue. It was noted that we would rarely have a problem placing concrete within 60 minutes.

10/20/2014–It was agreed that the next step to move this issue forward is for Industry to propose spec changes. WSDOT was inclined to like the example from Wisconsin provided at the last meeting. It allows added time for placement (1) if the temperature (concrete or air?) is below a specified temperature or (2) if a set retarder is approved in the mix design.

4/6/2015 – Agreed that if the mix stays below certain temperatures we could extend the time. Jim Powell provided a draft of a proposed spec (attached). Dyer agreed to prepare a draft spec to extend time if temperatures are low enough.

10/21/2015 – WSDOT is OK with extending the time to 60 minutes provided the mix is 60° F or lower. Attachment #1 is the handout from our previous meeting. Bob Dyer provided another draft spec for discussion, allowing up to 75 minutes conditioned on the concrete being less than 75 degrees F at the time of placement, a set retarder is used, and the contractor accepts the risk. (attach #2) It seemed that there was agreement that 60 minutes, rather than 75 minutes, is where we want the revised spec to be. Jim Powell will review the drafts and provide a revised version at the next meeting.

May 12, 2016 – Jim Powell provided a draft revised spec (attach #13-01a). After discussion, consensus was reached that Jim's proposal was acceptable. Bob Dyer will get the revision into the August 2016 Amendments. (Actual revision attach 13-01b)

13-02 The requirement for ~~that~~ the ~~asphalt~~ base surface temperature not exceed 90ºF needs to be examined. It was believed that this relates to placing concrete pavement over the top of recently placed Hot mix Asphalt (HMA) and that the temperature of the HMA should cool down to 90ºF before the concrete is placed.

4/15/2013 – The group wasn't sure there is a problem here, there are options paving at night, or using water to cool down the surface temperature. Pavecool was mentioned as a tool that can be used to predict HMA pavement cooling rates. The concern is with early age cracking. Jim Powell and Jeff Uhlmeyer agreed to use HIPERPAV and determine if we are being too conservative.

10/7/2013 – It was suggested that we use HIPERPAV to analyze and allow increases in temperature. It was noted that the risk of cracking is from the bottom up. It is basically a strength gain vs. shrinkage issue. We rarely see pavement cracking outside the contraction joints. The HMA acts as a heat sink. HIPERPAV would allow for condition specific temperatures to be utilized. Kurt suggested using the standard specification temperature of 90° F and allow for HIPERPAV to be utilized to demonstrating that a higher temperature could be allowed. Jim and Jeff will demonstrate HIPERPAV at our next meeting. Action Item: Jim Powell and Jeff Uhlmeyer prepare a demonstration of HIPERPAV.

4/21/2014 – We were not able to demonstrate the HIPERPAV program.

10/20/2014 - It was stated that HIPERPAVE is not useful at this time. It was noted that the 2012 Standard Specifications required that asphalt treated base temperature shall not exceed 90°F and the 2014 Standard Specifications no longer has this requirement. Dave Erickson agreed to review WSDOT records to find out why the maximum temperature of the underlying asphalt treated base was deleted in the 2014 spec book. Industry indicated it would prefer to manage the risk for cracking caused by warm underlying asphalt treated base without a contractually mandated maximum temperature of the underlying asphalt base material.

4/6/2015 – Jim Powell will look at what other States do.

10/21/2015 –Jim Powell update: This issue is about the base material on which the PCCP is placed, and is not limited to only asphalt base material. WSDOT inadvertently removed from the 2014 [and 2016] spec book a spec stating that the max temp of asphalt treated base, when paving on asphalt treated base, is 90°F. Jim reported that Iowa, Pennsylvania, and Minnesota say no paving on any base that has a temp greater than 120°F. Dave Erickson agreed that 120 degrees F is OK based on what other states do and recommended by national research. Jim Powell agreed to provide a draft spec by the next meeting. Attachment #3 shows the spec under consideration.

May 12, 2016 – Jim Powell provided a handout of the Minnesota spec (attach 13-02a) for discussion. He proposed that the 2012 WSDOT spec be used, but the max surface temperature be increased, from the present 90 F, to 120◦ F. No one present expressed any objection. Bob Dyer confirmed after the meeting that this is acceptable to Dave Erickson. Bob Dyer will get this into the August amendments package. The changes submitted are shown in attach 13-02b.

13-03 Smoothness requirements for PCCP rehabilitation

10/7/2013 – The bid item under section 5-05.5 "Ride Smoothness Compliance Adjustment" was recently placed in a PCCP grinding project (section 5-01). This created an issue in that the adjustment is calculated by multiplying the unit contract price for cement concrete pavement, times the volume of concrete, times the Ride Smoothness Profile index. The problem is that we pay for grinding by the square yard not cubic yards. Currently we wouldn't pay an incentive for grinding. The question was asked if we should pay an incentive for grinding. It was concluded that the small panel replacements were not a big deal and would not be considered for incentive. Jim Powell pointed out the International Grooving and Grinding Association (IGGA) is working on a smoothness specification. Jim Powell said he will see if he can get a copy and send it out to the group.

4/21/2014 – Jim reported that the IGGA Specifications were not available yet. The Departments van is being equipped with a line laser that should take out any variability due to tinning. There are two ways to go about smoothness specifications absolute or percent improvement. The Department uses three different schedules of pay factors for the smoothness of HMA. IRI can vary depending on the time of the day. You can

use a lightweight vehicle or a Ride Van. Contractors prefer to have the information collected by the Ride Van when bidding. The walk through worked well on a recent project. Having the ability to get out and look at the road with traffic control in place is great. Action Item: Jim Powell to get a copy of the IGGA smoothness Specifications.

10/20/2014 – The IGGA smoothness spec is still not published. Contractors did not support using IRI for smoothness. They prefer the California Profilograph (CP) for measurements. Dave Erickson said he is drafting a new smoothness specification using IRI and that it will likely be sent to industry committee members for comment before our next meeting.

4/6/2015 – Jim Powell provided the IGGA Guide Specification: Conventional Diamond Grinding for Pavement Preservation (Attached). WSDOT indicated it is waiting for a new PCCP contract to obtain data. WSDOT has a line laser for PCCP. WSDOT has a draft of a draft spec that is waiting on data from the Snoqualmie Pass contract before sharing the draft outside the department.

10/21/2015 – Discussion – Jim Powell focused the discussion by reminding the group that his concern is in regard to an incentive/disincentive for smoothness on grinding projects. There is currently no bid item for a smoothness penalty for pavement placed under the Section 5-01 specs. Jeff Uhlmeyer is working on a spec similar to the HMA smoothness spec – this will eliminate the issue of Section 5-01 not having a unit price for concrete. Further discussion at next meeting.

May 12, 2016 – After some discussion it was agreed that Jeff Uhlmeyer, Mark Russel, and Bob Dyer would develop a draft spec and issue it as soon as possible this spring.

14-02 Stringless/laser control for slip-forming

April 21, 2014 Section 5-05.3(7)A Slip-Form Construction is kind of bland on this issue. As of now it says "The alignment and elevation of the paver shall be regulated form outside reference lines establish for this purpose". With todays advancement in slip-form paving the move to laser/stringless controls need to be addressed. I would propose something like this. "If the Contractor proposes to use any type of automatic laser controls, submit a detailed description of the system and perform a trial field demonstration in the presence of the Engineer at least one week prior to start of paving. Approval of the control system will be based on the results of the demonstration and on continuing satisfactory operation during paving." Johnnie Zabel of Salinas Construction reported that they completed a one hundred percent string less job by change order. They used a Leica product. They basically generated a 3 D model of the job, set up two total stations that sent information to the paver, and used GPS rovers behind the paver as a check. The project was 500 foot section of flat ground. Jim Powell noted that the industries uses laser screeds to produce super flat floors fast.

10/20/2014 – It was suggested that stringless technology be allowed by the specifications. WSDOT seemed to have no objection. Bob Dyer will provide a draft of the change before the next meeting.

4/6/2015 – Bob Dyer – Nothing to report.

10/21/2015 – Bob Dyer provided a draft spec (attachment #2). It was suggested that the options in the draft be expanded to include robotic technology, and wireless or stringless technology. Jim Powell will provide a draft at the next meeting consolidating the ideas.

May 12, 2016 – Jim Powell provided a draft proposed spec (attach 14-02). No objections heard. Bob Dyer will get this change into the August 2016 Amendments.

14-03 Alternate material for the installation of dowel bars and tiebars in existing PCCP

4/21/2014 – Jim Allen of ACME Paving brought samples of and discussed using AMBEX Cementitious Anchoring Capsule for tie bars and dowels. This is a dry pre-mixed cement grout that is contained in a water permeable wrapping. Once the grout capsule is saturated in water it becomes a fast setting grout. The system was reported as being used in Minnesota, New York and Idaho. It was suggested that we contact Mark Gaines, The Bridge Construction Engineer to see if the structural side of the house had any experience with the

system. Mark's comments were " I am not familiar with Ambex AAC and don't believe we have ever used a product like this for bridge or structure applications. Based on the data sheet, it seems like a good product with documented pull-out capacities. While you aren't looking for pull-out capacity, a high pull-out capacity provides some indication that the hole has been completely filled with a high-quality material. A couple things that could be concerns. I would imagine that dowel bars see considerable cyclic loading as heavy vehicles pass over the joints. I'd have some concern that this product would not hold up as well as an epoxy to repeated cyclic loading over a number of years. Cementitious products are likely more brittle and less pliable than epoxy-based product. The other thing you may want to look at is whether this product is suitable for horizontal anchoring like you would have with dowel bars. The data sheet doesn't identify if this is appropriate for only downward vertical anchors or if it works for horizontal anchors. Epoxy product data sheets are usually very specific with respect to what applications that are suitable for. I have not heard anything about 9-20 products bonding better to dry surfaces. However, I very quickly took a look at three of the products covered by QPL 9-20.2 (SikaQuick 2500, Tamms Express Repair and Quikrete FastSet DOT Mix). All three of these products require saturated surface dry conditions before placement. I assume the other products do as well, but I didn't check. From my experience, we would always rely on following the manufacturer's recommendations for proprietary products like these. Deviating from these recommendations could product a product that doesn't achieve the properties identified in the data sheets. If there is research on this, could you have NW-ACPA forward it on to us/me?" Action Item: Jeff Uhlmeyer to check with other states and then possibly look for a job to try them on.

10/20/2014 – No discussion at today's meeting. Robert Seghetti agreed to follow up at next meeting.

4/6/2015 – No discussion.

10/21/2015 – Steve Clark will follow up.

May 12, 2016 – Steve Clark explained that the problem needing to be fixed is that industry is looking for a more economical means s to anchor tie bars than by using epoxy - for projects with small quantities of tie bars. This issue relates to tie bars only, and not to dowels. Industry is seeking approval to use grout to anchor the tie bars, as an option to the epoxy that is currently required. Messrs. Uhlmeyer and Russell indicated that they would be OK with grout in this application as long as the annular space is completely filled. Bob Dyer agreed to draft a spec and send it out for review as soon as possible this spring.

15-01 Resurrecting the NW-ACPA/WSDOT Joint Training for PCCP

4/6/2015 Jim Powell introduced this topic. Jim Powell and Jeff Uhlmeyer will discuss the potential for setting up joint training.

10/21/2015 – Jim Powell and Jeff Uhlmeyer reported they are working on it. They hope to propose date at the next meeting. They are currently thinking that one class on each side of the state might be best.

May 12, 2016 – Jim Powell and Jeff Uhlmeyer agreed that the target date of the next training is spring 2017. One class will be in eastern WA, one in western. Jim and Jeff will work together to develop specifics and agenda items.

15-02 Recycled Concrete Aggregate

4/6/2015 – Dave Jones reported that WSDOT is looking at using recycled concrete aggregate in Commercial Concrete, and looking into using recycled concrete aggregate in concrete pavement. Jim agreed to send Dave an example spec.

10-21-2015 Jim Powell provided several handouts: "Guidelines for Using RCA in Concrete Paving Mixtures" by ACPA (attache #4); "Aggregate for Use in Portland Cement Concrete Pavement " from South Carolina DOT (attach #5); Powerpoint presentation "PCC Recycling – I-95 Florence, S.C. " from South Carolina DOT (attach #6). Other handouts are: draft of changes to the WSDOT Standard Specs and Construction Manual regarding recycled concrete aggregate that will become effective April 4, 1016 (attach #7).

May 12, 2016 – Dave Jones provided a handout (attach15-02) showing changes that will be made to the standard specs which will allow recycled coarse concrete aggregate to be used in cement concrete pavement. Item closed.

New Business

16-01 Smoothness requirements when paving next to existing pavement.

May 12, 2016 – Industry is concerned that it is impossible to match a pre-existing joint (or newly-paved HMA joint) and simultaneously meet specs for PCCP pavement smoothness, and this is becoming a more common WSDOT expectation with projects that have stages and traffic switches.

16-02 Thickness measurement.

May 12, 2016 – ACPA's concern is that measuring cores cannot be done as accurately as needed, given the large area each core represents. Industry's preference would be to use a precision survey, done before and after paving, to form the basis for calculating pavement depth. It was acknowledged that we will still need to take cores for density measurement. Bob Dyer agreed to research other owner's methods for measuring PCCP pavement depth.

16-03 Limits on changes to mix design aggregate weights.

May 12, 2016 – Regarding the question of whether or not the tolerances for batch weight adjustments on fine and coarse aggregate (in part 3 of Section 5-05.3(1)) are reasonable or not and why they changed from the 2014 specs, Dave Jones provided a spreadsheet handout (attach #16-03) that shows sample calcs that various limits on mix design adjustments would make on bin weights. After discussion it was decided that Dave will consider this issue further.

16-04 Proposed changes to 3 foot minimum width in 5-05.3(6).

May 12, 2016 – ACPA noted that the tracks on paving machines have gotten wider over recent years, and the three foot minimum width of prepared subgrade beyond the area to be paved (in 5-05.3(6) is sometimes not enough – requesting WSDOT to increase the minimum to 4 feet.

16-05 Restrictions on vibrations caused by adjacent work on early cure of PCCP.

May 12, 2016 – ACPA voiced concerns that WSDOT specs have no restriction on vibrations caused by nearby equipment during the early cure of PCCP, which can lead to cracks in the panels.

Next meeting: October 27, 2016 at Bullfrog. Start at 10:00 AM.

#13-01a

4. Nonagitator Trucks – Bodies of nonagitating hauling equipment for concrete shall be smooth, mortar-tight, metal containers and shall be capable of discharging the concrete at a satisfactory controlled rate without segregation. Covers shall be provided when needed for protection. Plant-mixed concrete may be transported in nonagitated vehicles provided that the concrete is delivered to the site of the Work and discharge is completed within 45 minutes after the introduction of mixing water to the cement and aggregates, and provided the concrete is in a workable condition when placed. The time to discharge may be extended to 60 minutes provided the concrete mix temperature is 70° F or below, or the mix contains an approved set retarder at the manufacturers recommended minimum dosage rate.

#13-01 b

5-05.3(3)B Mixing Equipment

1. **General** – Concrete may be mixed at a batching plant or wholly or in part in truck mixers. Each mixer shall have attached in a prominent place a manufacturer's plate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades.
2. **Batching Plant** – Mixing shall be in an approved mixer capable of combining the aggregates, cement, and water into a thoroughly mixed and uniform weight within the specified mixing period.

   Mixers shall be cleaned at suitable intervals. The pickup and throw-over blades in the drum shall be repaired or replaced when they are worn down ¾ inch or more. The Contractor shall have available at the jobsite a copy of the manufacturer's design, showing dimensions and arrangements of the blades in reference to original height and depth, or provide permanent marks on blades to show points of ¾ inch wear from new conditions. Drilled holes ¼ inch in diameter near each end and at midpoint of each blade are recommended.
3. **Truck Mixers and Truck Agitators** – Truck mixers used for mixing and hauling concrete, and truck agitators used for hauling plant-mixed concrete, shall conform to the requirements of Section 6-02.3(4)A.
4. **Nonagitator Trucks** – Bodies of nonagitating hauling equipment for concrete shall be smooth, mortar-tight, metal containers and shall be capable of discharging the concrete at a satisfactory controlled rate without segregation. Covers shall be provided when needed for protection. Plant-mixed concrete may be transported in nonagitated vehicles provided that the concrete is in a workable condition when placed and:

   (a) ~~the concrete is delivered to the site of the Work and~~ discharge is completed within 45 minutes after the introduction of mixing water to the cement and aggregates, or~~and provided the concrete is in a workable condition when placed~~

   (b) discharge is completed within 60 minutes after the introduction of mixing water to the cement and aggregates, provided the concrete mix temperature is 70 F or below during placement, or

   (c) discharge is completed within 60 minutes after the introduction of mixing water to the cement and aggregates, provided the mix contains an approved set retarder at the manufacturer's minimum dosage rate.

13-02a

Strike-off concrete with a clary screed, unless otherwise approved by the Engineer. Finish small or irregular areas that are inaccessible to finishing equipment using other methods as approved by the Engineer.

Discontinue any operation that causes displacement of the side forms from the line or grade or causes undue delay, as determined by the Engineer, due to mechanical difficulties.

E.3.c Removal of Forms

Do not remove side forms of pavement and back forms on integrant curb earlier than 12 h after placing the concrete, unless otherwise approved by the Engineer. Remove forms without exerting shock or strain, including temperature variations, on the pavement or curb. Cure concrete in accordance with 2301.3.M.1.a, "Membrane Curing Method."

F Placing Concrete

Construct mainline pavement in a single layer of concrete. Place the concrete pavement in one complete pass of the paving machine to minimize the need for hand finishing.

Coordinate paving operations for mixing, delivering, spreading, and extruding the concrete to provide uniform progress of the paver. Use sufficient trucks to ensure a steady forward progress of the paver. If the forward movement of the paver stops for a period long enough to create a cold joint or honeycombing, construct a header joint in accordance with 2301.3.F.4, "Constructing Headers."

Set manhole and catch basin frames or rings to the elevation shown on the plans during the paving operations. Do not form "box-outs" of castings unless approved by the Engineer.

Dump or discharge concrete without causing grade displacement or damage to the existing asphalt or bond breaker layer. Repair damage to the grade in accordance with 2301.3.D, "Subgrade and Aggregate Base Preparations," existing asphalt or bond breaker layer as approved by the Engineer at no additional cost to the Department. Provide protection for turning concrete trucks.

F.1 Placement on Aggregate Base

Maintain the base in a moist condition until placement of concrete.

F.2 Placement on Asphalt or Asphalt Bond Breaker

When placing concrete on asphalt or asphalt bond beakers, comply with the following:

(1) Do not place concrete on an asphalt surface with an asphalt surface temperature greater than 120 °F [50 °C].
(2) Maintain the asphalt surface in a moist condition and at a surface temperature not greater than 120 °F [50 °C] before placing the concrete. The Engineer will allow the Contractor to apply water, whitewash of hydrated lime and water, or both to cool the asphalt surface, or other methods allowed by the Engineer.
(3) Before placing concrete on a milled asphalt surface, clean the milled surface by sweeping and patch as shown on the plans in accordance with 2231, "Bituminous Surface Reconditioning," or as directed by the Engineer.

F.3 Placement Adjacent to In-Place Concrete Pavement

Stake preformed joint filler material for expansion joints in place to maintain the position shown on the plans during concrete placement.

When placing concrete adjacent to in-place concrete pavement, protect the following:

(1) All ends of transverse joints $^{3}/_{16}$ in [5 mm] or wider to the satisfaction of the Engineer. The Engineer will allow sawing through the existing joint when sawing the newly placed concrete, and
(2) The in-place pavement to prevent damage.

Do not allow the edges of the pavement, including longitudinal joints, to deviate from the line shown on the plans by greater than ½ in [13 mm] at any point.

Set manhole and catch basin frames or rings to the elevation shown on the plans during the paving operations.

F.4 Constructing Headers

Construct construction headers, temporary headers, and permanent headers as shown on the plans.

The Engineer will not allow incorporating any concrete accumulated in the grout box of the paver into the pavement. Construct all headers such that the concrete contained in the grout box is removed from the project. Use any approved construction header method as shown in the Standard Plate 1150.

Use internal vibration to consolidate the concrete along header joints before final finishing.

#13-02b

This will be in Aug 2016 Amendments

5-05.3(6) Surface Preparation

The Subgrade surface shall be prepared and compacted a minimum of 3 feet beyond each edge of the area which is to receive concrete pavement in order to accommodate the slip-form equipment.

Concrete shall not be placed during a heavy rainfall. Prior to placing concrete:

1. The surface shall be moist;
2. Excess water (e.g., standing, pooling or flowing) shall be removed from the surface.
3. The surface shall be clean and free of any deleterious materials.
4. The surface temperature shall not exceed 120° F or be frozen

1-4-02

5-05.3(7)A Slip-Form Construction

The concrete shall be distributed uniformly into final position by a self-propelled slip-form paver without delay. The alignment and elevation of the paver shall be regulated from outside reference lines established for this purpose, or by an approved electronic control system capable of controlling the line and grade within required tolerances. The paver shall vibrate the concrete for the full width and depth of the strip of pavement being placed and the vibration shall be adequate to provide a consistency of concrete that will stand normal to the surface with sharp well-defined edges. The sliding forms shall be rigidly held together laterally to prevent spreading of the forms.

15-02

9-03.21(1) General Requirements

Hot Mix Asphalt, Concrete Rubble, Recycled Glass (glass cullet), and Steel Furnace Slag may be used as, or blended uniformly with, naturally occurring materials for aggregates. The final blended product and the recycled material component included in a blended product shall meet the specification requirements for the specified type of aggregate. The Contracting Agency may collect verification samples at any time. Blending of more than one type of recycled material into the naturally occurring materials requires approval of the Engineer prior to use

Recycled materials obtained from the Contracting Agency' s roadways will not require toxicity testing or certification for toxicity characteristics.
Reclaimed asphalt shingles samples shall contain less than the maximum percentage of asbestos fibers based on testing procedures and frequencies established in conjunction with the specifying jurisdiction and state or federal environmental regulatory agencies.
Recycled materials that are imported to the job site will require testing and certification for toxicity characteristics. The recycled material supplier shall keep all toxicity test results on file and provide copies to the Engineer upon request. The Contractor shall provide the following:

1. Identification of the recycled materials proposed for use.

2. Sampling documentation no older than 90 days from the date the recycled material is placed on the project. Documentation shall include a minimum of five samples tested for total lead content by EPA Method 6010. Total lead test results shall not exceed 250 ppm. Samples that exceed 100 ppm must then be prepared by EPA Method 1311, the Toxicity Characteristic Leaching Procedure (TCLP), where liquid extract is analyzed by EPA Method 6010B. The TCLP test must be below 5.0 ppm.

3. Certification that the recycled materials are not Washington State Dangerous Wastes per the Dangerous Waste Regulations, WAC 173-303.

4. Certification that the recycled materials are in conformance with the requirements of the *Standard Specifications* prior to delivery. The certification shall include the percent by weight of each recycled material.

9-03.21(1)A Recycled Hot Mix Asphalt

For recycled materials incorporating hot mix asphalt, the product supplier shall certify that the blended material does not exceed the Maximum Allowable Percentage of hot mix asphalt shown in Section 9-03.21(1)E.

9-03.21(1)B Recycled Concrete ~~Rubble~~ Aggregate

Recycled concrete aggregates are coarse aggregates manufactured from hardened concrete mixtures. Recycled concrete aggregate may be used as coarse aggregate or blended with coarse aggregate for Commercial Concrete or Cement Concrete Pavement. The Los Angles Wear and Washington Degradation Tests are not required when the recycled concrete aggregates are obtained from the Contracting Agency' s roadways. Recycled concrete aggregate shall meet all of the requirements for coarse aggregate contained in Section 9-03.1(4) or 9-03.1(5). In addition to the requirements of Section 9-03.1(4) or 9-03.1(5), recycled concrete shall:

1. Contain an aggregated weight of less than 1 percent of adherent fines, vegetable matter, plastics, plaster, paper, gypsum board, metals, fabrics, wood, tile, glass, asphalt (bituminous) materials, brick, porcelain or other deleterious substance(s) not otherwise noted;

15-02

2. Be free of harmful components such as chlorides and reactive materials unless mitigation measures are taken to prevent recurrence in the new concrete;
3. Have an absorption of less than 10 percent when tested in accordance with AASHTO T 85.

Recycled concrete aggregate shall be in a saturated condition prior to mixing.
Recycled concrete aggregate, ~~rubble~~ in any form, shall not be placed below the ordinary high water mark of any water of the State.

9-03.21(1)E Table on Maximum Allowable Percent (By Weight) of Recycled Material

Maximum Allowable Percent (by weight) of Recycled Material					
		Hot Mix Asphalt	Recycled Concrete Aggregate	Recycled Glass (glass cullet)	Steel Furnace Slag
Fine Aggregate for Portland Cement Concrete	9-03.1(2)	0	0	0	0
Coarse Aggregates for Portland Cement Concrete	9-03.1(4)	0	0	0	0
Coarse Aggregate for Cement Concrete Pavement	9-03.1(4)	0	100	0	0
CoarseAggregateforCommercialConcrete	9-03.1(4)	0	100	0	0
Aggregates for Hot Mix Asphalt	9-03.8	See 5-04.2	0	0	20
Ballast	9-03.9(1)	20	100	20	20
Permeable Ballast	9-03.9(2)	20	100	20	20
Crushed Surfacing	9-03.9(3)	20	100	20	20
Aggregate for Gravel Base	9-03.10	20	100	20	20
Gravel Backfill for Foundations – Class A	9-03.12(1)A	20	100	20	20
Gravel Backfill for Foundations – Class B	9-03.12(1)B	20	100	20	20
Gravel Backfill for Walls	9-03.12(2)	0	100	20	20
Gravel Backfill for Pipe Zone Bedding	9-03.12(3)	0	100	20	20
Gravel Backfill for Drains	9-03.12(4)	0	0	20	0
Gravel Backfill for Drywells	9-03.12(5)	0	0	20	0
Backfill for Sand Drains	9-03.13	0	0	20	0
Sand Drainage Blanket	9-03.13(1)	0	0	20	0
Gravel Borrow	9-03.14(1)	20	100	20	20
Select Borrow	9-03.14(2)	20	100	20	20
Select Borrow (greater than 3 feet below Subgrade and side slopes)	9-03.14(2)	100	100	20	20
Common Borrow	9-03.14(3)	20	100	20	20
Common Borrow (greater than 3 feet below Subgrade and side slopes)	9-03.14(3)	100	100	20	20
Foundation Material Class A and Class B	9-03.17	0	100	20	20
Foundation Material Class C	9-03.18	0	100	20	20
Bank Run Gravel for Trench Backfill	9-03.19	20	100	20	20

16-03

Mix Design	28 day compressive Strength (PSI)	Fine aggregates (lbs./cy) Class 1	Class 2	Course Aggregates (lbs./cy) #4	#8	#57	#67	1 3/8"	Total CA	Fine Aggregate SG	Course Aggregate SG #4	#8	#57	#67	1 3/8"	Maximum SG
4000	6,233		1,240		380	1,520			1,900	2.62		2.65	2.71			2.71
4000A	4,890		1,270			1,860			1,860	2.65			2.69			2.69
4000D	6,070		1,060	455	510	1,130			2,095	2.67	2.65	2.72	2.71			2.72
4000D	5,890		1,100		500	1,040		480	2,020	2.65		2.68	2.69		2.71	2.71
4000D	5,500		1,100	480	500	1,040			2,020	2.65	2.71	2.68	2.69			2.71
6000	7,380		1,190		1,800				1,800	2.65		2.69				2.69
Average			1,160						1,949	2.65						2.72

	Fine Aggregates	Structural >=4cy +10%	>=4cy -2%	<4cy +2%	<4cy -2%	PCCP +30 lbs.	PCCP -30 lbs.
Weight (lbs.)	1,160	116	-23	23	-23	30	30

	Course Aggregates	Structural >=4cy +10%	>=4cy -2%	<4cy +2%	<4cy -2%	PCCP +30 lbs.	PCCP -30 lbs.
	1,949	195	-39	39	-39	30	-30