

Recurring Special Provisions
Division 500 – Concrete Pavement
City of Fort Wayne
Public Works

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DIVISION 500 – CONCRETE PAVEMENT

SECTION 501 – QC/QA PORTLAND CEMENT CONCRETE PAVEMENT, PCCP

ENTIRE SECTION 501 IS NOT USED

SECTION 502 – PORTLAND CEMENT CONCRETE PAVEMENT, PCCP

502.04 Concrete Mix Criteria

60 The fine aggregate shall be at least 35% but not more than 45% of the total weight of the aggregate in each cubic yard. Proportions will be based upon saturated surface dry aggregates.

(a) Portland Cement Concrete

The CMD shall produce workable concrete mixtures, with the minimum amount of water, and having the following properties.

	Portland cement content.....	564 lbs/cu yd
	Maximum water/cementitious ratio	0.450
70	Maximum cement reduction for GGBFS replacement	30%
	Fly Ash/portland cement substitution ratio.....	1.25 by weight
	Maximum cement reduction for fly ash replacement	20%
	GGBFS/portland cement substitution ratio	1.00 by weight
	Slump, formed.....	2 to 6 in. 4" MAX
	Slump, slipformed.....	1.25 to 3 in.
	Air	5.0% to 8.0%
	Minimum flexural strength, third point loading, with fly ash.....	550 psi at 28 days or 14 days
	Relative yield	0.98 to 1.02

80 Class C concrete in accordance with 702 using Class AP coarse aggregate may be substituted in PCCP.

Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed with prior written approval.

90 ~~Fly ash or GGBFS used as an additive, or blended cements may only be incorporated in the concrete mix between April 1 and October 15 of the same calendar year. If type IP, type IP-A, type IS or type IS-A cements are to be used, the portland cement content shall be increased to 598 lbs/cu yd. The use of fly ash or GGBFS as an additive will not be allowed when blended cement types IP, IP-A, IS, or IS-A are used. Mid-range water reducer up to 9 oz. per 100 pounds of cement, up to 2% non-chloride~~

(b) High-Early Strength Concrete

The Contractor shall submit, along with the CMDS, all supporting test results for approval to the DTE prior to placing concrete. Testing shall be conducted by an American Concrete Institute, ACI, certified concrete field testing technician, grade 1. The supporting test results shall be signed by the technician and include air content, slump, relative yield, water cement ratio, and the flexural strengths at 1 day, 2 days, and 7 days.

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The CMD shall produce workable concrete mixtures, with the minimum amount of water, and having the following properties.

	Minimum portland cement content (types I, IL or III) ..	564 658 lbs/cu yd
	Maximum fly ash addition.....	10% of cement content
	Maximum water/cementitious ratio (types I or IL)	0.42
	Maximum water/cementitious ratio (type III)	0.45
	Maximum GGBFS addition	15% of cement content
	Slump, formed	2 to 6 in. 4"MAX
110	Slump, slipformed.....	1.25 to 3 in.
	Air content.....	5.0% to 8.0%
	Minimum flexural strength, third point loading.....	550 psi at 2 days or 14 days
	Relative yield	0.98 to 1.02

~~Fly ash or GGBFS used as an additive may only be incorporated in the concrete mix between April 1 and October 15 of the same calendar year.~~

~~Chemical admixtures type A, type B, type C, type D, type E, and type F may be allowed with prior written approval.~~

~~Mid-range water reducer up to 9 oz. per 100 pounds of cement, up to 2% non-chloride~~

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502.05 Job Control

Control of PCCP for air content, slump, or relative yield will be determined on the basis of tests performed by the ~~Engineer~~ Field Inspector in accordance with 505. Concrete and necessary labor for sampling shall be furnished as required by the ~~Engineer~~ Project Manager. Testing will be in accordance with the Frequency Manual.

The ~~Engineer~~ City of Fort Wayne Representative will notify the Contractor when test results for air content, slump, or relative yield are outside the requirements of 502.04. Rounding will be in accordance with 109.01(a). The Contractor shall adjust the mixture such that it is in accordance with 502.04.

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502.09 Placement

Forms shall be staked into place with a minimum of three pins for each 10 ft section. A pin shall be placed at each side of every joint. Form sections shall be locked tightly and be free from play or movement in any direction. No excessive settlement or springing of forms under the finishing machine will be allowed. Forms shall be cleaned and oiled prior to the placing of concrete. Forms shall be placed to allow for the pavement to be placed with a Monolithic Curb or an Inverted Crown as shown in the details.

190 Forms shall be kept a minimum of 500 ft ahead of concrete placement when distance allows. Any material displaced during form setting operations shall be thoroughly compacted. If material under the forms becomes unstable before concrete is placed, the forms shall be removed, the grade corrected, and the forms reset.

CONSTRUCTION REQUIREMENTS

502.10 Concrete Mixing and Transportation

210 Concrete shall be uniformly mixed when delivered to the job site. Batch tickets for each load of PCC shall indicate the weight of cement, pozzolan, and aggregates, volume or weight of water, and the type and volume of admixtures. The weight of the cement shall be within 1% of the CMDP, the saturated surface dry weight of the aggregates shall be within 2% of the CMDP, and the volume or weight of water shall be within 1% of the required amount.

The ~~Engineer~~ City of Fort Wayne Representative(Agency) may conduct additional testing to verify uniformity of the mixture. Additional testing will consist of slump tests taken in accordance with AASHTO T 119 at approximately the 1/4 and 3/4 points of a load. If the slumps differ by more than 1 in. when the average slump is 3 in. or less, or by more than 2 in. when the average slump is greater than 3 in., paving operations may be suspended while the mixing process is jointly reviewed and problems resolved by the ~~Engineer~~ City of Fort Wayne Representative(Agency) and the Contractor.

320 **502.15 Curing**

PCCP shall be cured with an approved white pigmented liquid membrane forming compound. Alternative methods of curing may be approved by the ~~Engineer~~ City of Fort Wayne Representative(Agency). Curing shall be in accordance with 504. For formed PCCP, immediately after the forms are removed, the sides of the PCCP shall be cured.

502.18 Opening to Traffic

340 — ~~When fly ash, GGBFS, or cement type IP, type IS, type IP-A, or type IS-A is incorporated into the PCCP, traffic shall not be allowed on the PCCP until the test beams indicate a modulus of rupture of 550 psi or greater. Opening to traffic of PCCP not containing the above additives shall be based on the following.~~

(a) Construction

350 Construction vehicles or equipment may be allowed on the PCCP after ~~40~~14 days or when the test beams indicate a modulus of rupture of 550 psi or greater. Any construction vehicle or equipment that may damage the PCCP shall not be used on the PCCP unless adequate protection is provided. Approved joint cutting saws may be operated on the PCCP as determined by the Contractor.

(b) Non-Construction

PCCP may be opened to traffic after 14 days or when test beams indicate a modulus of rupture of 550 psi or greater. ~~Prior to opening to traffic, cracks and joints shall be sealed in accordance with 503.05 and the PCCP shall be cleaned.~~

502.20 Pavement Smoothness

360 ~~Pavement smoothness will be in accordance with 501.25 except profilograph requirements will not apply.~~ Pavement smoothness shall be in accordance with the Agency, any pavement smoothness deemed unfit by Agency shall be removed and replaced at contractors cost.

502.21 Pavement Thickness

Replace section 502.21 with the following:

Pavement thickness may be determined by the agency. If pavement cores are outside the specification, the contractor shall remove and replace at their cost.

502.22 Method of Measurement

450 PCCP will be measured by the square yard of the thickness specified. The area of PCCP will be the planned width of the pavement multiplied by the length of the pavement, or as directed in writing. The width of the pavement will be as shown on the typical cross section of the plans. The length of the pavement will be measured parallel to the surface of the pavement along the centerline of the roadway or ramp, excluding paving exceptions as shown on the plans.

~~Milled pavement corrugations will be measured in accordance with 606.02.~~

502.23 Basis of Payment

460 The accepted quantities of PCCP will be paid for at the contract unit price per square yard for the thickness specified, complete in place.

~~Milled pavement corrugations will be paid for in accordance with 606.03.~~

Payment will be made for portland cement content of more than 564 lbs/cu yd when ordered in writing. Additional payment for the quantity used will be at the net unit price of portland cement as shown by certified vouchers for the quantity used in accordance with 109.05.

470 ~~The quality assurance adjustment quantity for thickness will be determined in accordance with 502.21(c).~~

~~An adjustment to the contract payment with respect to thickness will be made utilizing the quality assurance adjustment pay item. The unit price for this pay item will be \$1.00. The quantity is the total calculated in accordance with 502.21(c). A change order developed in accordance with 109.05 will be prepared to reflect contract adjustments.~~

480 ~~Payment for pavement thickness determinations will be made at the contract lump sum price for coring, PCCP in accordance with 501.31. A change order in accordance with 109.05 will be developed to adjust the cost of PCCP when the final PCCP quantity differs from the bid quantity by more than 2,400 sq yd. This adjustment covers the cost of cores for the adjusted quantity of PCCP. The adjustment, plus or minus, will be based on the difference in the number of subsections, rounded to the nearest full subsection, times \$100.~~

Payment will be made under:

	Pay Item	Pay Unit Symbol
490	PCCP, _____, in..... thickness	SYS
	Quality Assurance Adjustment	DOL

No additional payment will be made for PCCP which has an average thickness above that shown on the plans.

~~The cost of trial batch demonstrations shall be included in the cost of PCCP.~~

~~The cost of corrections for pavement smoothness and re-texturing shall be~~

500 ~~included in the cost of PCCP.~~

Removal and replacement of PCCP found to be deficient or damaged by freezing shall be completed with no additional payment.

The cost of coring and refilling of the pavement holes for appeals shall be included in the cost of PCCP.

~~Backfilling at the edges of PCCP shall be in accordance with Section 212 – Stockpiled Selected Materials.~~

SECTION 503 – PCCP JOINTS

503.01 Description

This work shall consist of the construction of joints in PCC pavements, placing dowel bar assemblies ~~and joint sealing operations in accordance with 105.03.~~

MATERIALS

503.02 Materials

10 Materials shall be in accordance with the following:

Chemical Anchor System.....	901.05
Dowel Bars.....	910.01(b)10
Epoxy Coated Reinforcing Bars	910.01(b)9
Joint Filler.....	906.01
Joint Materials.....	906
PCC Sealer/Healers	901.06
Reinforcing Bars	910.01

20 Tie bars shall be epoxy coated ~~(pre-bent) reinforcing bars or uncoated reinforcing bars if to be field bent.~~

Bent tie bars shall be deformed billet steel in accordance with 910.01 and ASTM A 615, grade 40.

The epoxy coating on the bent and straight tie bars shall be protected in accordance with 703.04.

CONSTRUCTION REQUIREMENTS

503.05 Sealing Cracks and Joints

Cracks and joints in the PCCP shall be cleaned and sealed in accordance with the sealant manufacturer's recommendations. Water blasting shall not be applied under pressure which may damage the concrete. All cracks and joints shall be sealed prior to discontinuing work for the winter.

210 When preformed elastomeric joint seals are used, the material shall be installed in one continuous piece by means of an approved machine. The seal shall not be stretched more than 5% while being placed and show no twisting, rollover, folding, cutting, or excess lubricant-adhesive on the top of the seal. Elastomeric joint seal may be installed in two separate pieces for phased construction with the splice point occurring at the

highest point of the joint. The splicing method used shall be in accordance with the seal manufacturer's recommendations.

503.06 Random Crack Remediation

Random cracks shall be corrected.

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(a) Transverse

Random transverse cracks shall be corrected by PCCP replacement. The replacement shall be full lane width and a minimum of 6 ft in length. Transverse PCCP removal limits shall be perpendicular to the centerline and shall include the entire random crack. Load transfer for the replacement PCCP shall be obtained by using dowel bars and retrofit epoxy coated tie bars. PCCP replacement areas shall have dowel bars which match contraction joints in any adjacent panels. All remaining panels shall be a minimum of 6 ft in length.

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(b) Longitudinal

Random longitudinal and skewed cracks within 18 in. of a longitudinal joint shall be routed and sealed. All longitudinal saw cuts in areas of random cracks shall be sealed with a sealer/healer or a bonding agent in accordance with ASTM C 881, grade 1. Full Slab or Half Slab

Random longitudinal and skewed cracks outside 18 in. of a longitudinal joint shall be corrected by PCCP replacement in accordance with 503.06(a).

503.07 Method of Measurement

240 D-1 contraction joints and terminal joints will be measured by the linear foot as measured along the centerline of the joint.

Retrofitted tie bars will be measured by the number of units installed.

503.08 Basis of Payment

~~D-1 contraction joints and terminal joints will be paid for at the contract unit price~~

per linear foot, complete in place.

250 ~~Retrofitted tie bars will be paid for at the contract unit price per each, complete in place.~~

Payment will be made under:

Pay Item	Pay Unit Symbol
D-1 Contraction Joint.....	LFT
Retrofitted Tie Bars.....	EACH
Terminal Joint.....	LFT

260 ~~The cost of furnishing and placing all materials, not specified as a pay item, shall be included in the cost of PCCP.~~

~~The cost of dowels, dowel bar assemblies, backer rod, joint sealants and all necessary incidentals shall be included in the cost of D-1 contraction joints.~~

~~The cost of the sleeper slab, reinforcing bars, bond breaker, and HMA mixtures shall be included in the cost of the terminal joint.~~

270 ~~The cost of retrofitted tie bars or PCCP replacement used to repair damaged PCCP due to fault or negligence, remediation of random cracking, or the replacement of broken deformed bars shall be included in the cost of the PCCP.~~

SECTION 504 – PCCP FINISHING AND CURING

504.04 Curing

(d) Straw

110 ~~The PCCP shall be covered with wet burlap, laid directly on the surface, that is kept wet with a fine spray of water. The burlap shall be removed by 9:00 a.m. the day following its placement and the surface immediately covered with straw no less than 3 in. deep. The straw shall be thoroughly saturated immediately after being placed, and kept wet for the required curing period. After the cure period, the straw shall be removed from the pavement and disposed of properly.~~

~~Straw curing shall not be used in cities or towns unless written permission is obtained.~~

SECTION 505 – TESTS AND PROCEDURES

NO CHANGES TO SECTION 505

SECTION 506 – PCCP PATCHING

NO CHANGES TO SECTION 506

SECTION 507 – PCCP RESTORATION

ENTIRE SECTION 507 IS NOT USED

SECTION 508 – EQUIPMENT

508.02 Mixing Plant

(a) Plant Inspection

- 10 The concrete production equipment shall be capable of producing a uniform mixture. A plant inspection in accordance with 106.03 will be made by the ~~Engineer~~ the Agency annually, after a plant is moved, or as deemed necessary.
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