

3530000 CONCRETE PAVEMENT SLAB REPLACEMENT  
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Comments: (11-24-15)

Multiple instances within the proposed verbiage in 3530000 use the word "provide". Substitution should be made to "submit" from "provide" . This occurs in the following subsections: 353-1 "Provide a strength-maturity relationship curve...", 353-10 "Provide a maturity value record...", 353-10.2 "Provide a strength-maturity relationship curve" and "Provide the mix design supporting data..."

Response:

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Ken Shartle  
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Comments: (11-25-15)

Suggest restricting the length-to-width ratio of slab replacements to prevent cracking. Maybe 1.5-to-1 or 2-to-1 ratio. Thank you.

Response:

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Karen Byram  
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Comments: (12-1-15)

In section 353-2 Materials, Curing Compounds, Epoxy compounds, and Dowel Bar Assemblies - need to have a double asterisk with a comment to denote they need to use products from the APL. Nowhere else in the Specification is this requirement identified.

Response:

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Ivan Hay (via Mario Cabrera)

Comments: (11-18-15)

Felipe's comments address several of my concerns; however, our most important concern was not addressed; that is, changing the way in which the pay item is paid. We had proposed paying for the item on a "slab length" basis and not per CY. That is, the contractor would bid the various concrete slab length separately (i.e., 6-foot, 8-foot, 10-foot, 12-foot, 20-foot, etc.). In that way, if there is an overrun on any of these slab lengths, there is already a bid price associated with each slab length. This would take away the usual contractors' claim argument that he has incurred additional cost as a result of an overrun on a particular concrete replacement slab length.

Response:

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Felipe P. Gonzalez (via Mario Cabrera)

Comments: (11-18-15)

The proposed revisions take care of the main issues that we have dealt with on the I-95 rehab projects. This proposal allows for the slabs to be accepted once they achieve 1,600 PSI instead of the current 2,200 PSI, but contractors can only use the maturity curve method. In the past, contractors had the choice to either break cylinders or to use the maturity curve. Also, these revisions take care of the issue of the 1/8 inch slope deviation across the board (no more room for 1/4 inch thus reducing complaints from the public). Finally, they changed the language for uncontrolled cracks, and although it looks better I think that the expression **“at no expense to the Department”** should remain (see below). Please do not hesitate to contact me in case you need additional information

**Proposed language for section 353-6**

**353-6 Concrete Slab Acceptance.....**

Controlled cracks are cracks designed to occur at specific locations based on the pavement design. All other cracks in the pavement are uncontrolled cracks. **Repair uncontrolled cracked slabs, which occur during the life of the Contract,** by removing and replacing the pavement across the full width of all affected lanes or shoulders and to the nearest transverse joint in each direction. Investigate and implement immediate effective solutions to eliminate further cracks, in consultation with, and subject to the approval of, the Engineer.

**Existing language for section 353-6**

**353-6 Concrete Slab Acceptance.....**

**If any uncontrolled cracks appear during the life of the contract, remove and replace the cracked slab at no expense to the Department.** Repair by removing and replacing the pavement across the full width of all affected lanes or shoulders and to the nearest transverse joint in each direction. Investigate and implement immediate effective solutions to eliminate further cracks, in consultation with, and subject to the approval of, the Engineer.

**Response:**

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Bert Woerner  
Metric Engineering

Comments: (11-20-15)

353-3: the reduced strength will allow contractors to perform the work in a reduced lane closure restriction. It will also aide in preventing producers from adding so much cement and accelerator to achieve the 2200 psi in 6 hours. The “hot mix” was difficult for contractors to work with and may have contributed to the poor riding surface (Curling of the slabs).

353-5.2: Please consider adding the following language to the last statement: ”Use the maturity method specified in this Section to determine if the concrete has achieved 1,600 psi and can be opened to traffic. Use the maturity value to verify the strength of the last slab of each day’s placement. **Additional maturity meters may be used to open other locations to traffic prior to the last slab of each day as needed as long as each of those location have also achieved the minimum strength.**”

This is to allow the contractor to install additional maturity meters as necessary to open additional lanes in a multiple lane closure project.

353-5.3: Consider allowing or requiring a set of 2 compressive strength test cylinders (Protection cylinders) to be cast per shift as a fail-safe for when the maturity meter fails to work. I have had at least one instance on each project I have worked on where the maturity meter failed to work and the contractor had no way of knowing when it was safe to open the slab to traffic. It is beneficial to the department to have good confidence in the slab regardless. The cylinders could be throw away and never tested as long as the maturity meter performed. Yes the bid prices may be an additional \$15 per concrete placement shift, but it will prevent the contractor from having to unnecessarily hold the lane closed or to remove and replace a slab that we have no way of knowing if the slab was opened too soon.

353-6: There should be some way of accessing the penalty with the quantity of concrete represented. There is a big difference between 50 CY or 5 CY when the strength is low. The LOT size should be a consideration in accessing a penalty. \$4500 seems a bit high for a small quantity. For example: the contractor only performs 2 joint replacement slabs for a total of 5 CY placed. The bid unit price for the contract is \$500 per CY. The contractor payment for the work is \$2,500 total. The contractor damaged the 2 acceptance test cylinders the penalty is \$4500. This does not appear to represent fairly.

353-7: When a manhole or valve box or any fixed items are cast into a slab the straight edging to determine the surface irregularities has to include the fixed item. Grinding will not address surface irregularities for these items.

353-8: Please add the desired type of curing compound instead of Type ID.

353-10: As described above it would be beneficial to have some language requiring the contractor to cast a set of 2 cylinders to use in the even the maturity meter fails. I appreciate the ability to accept the slabs in the event that the maturity meter fails, but it would be more beneficial to accept based on objective results.

Also consider adding a contingency pay item for variability in slab replacement quantities. This is especially critical where existing slab thickness varies or where known leaking drainage pipes exist.

**Response:**

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Pat McCann  
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Comments: (12-7-15)

353-3.3 Demonstration Slab: Suggest: 1. explaining whether this slab can be one of the permanent locations for repair. 2. Explaining that no permanent repairs can take place until satisfactory results take place on the demonstration slab. 353-5.1 Field Delivered Mix Consistency: "If failing concrete is not rejected or adjustments are not implemented, the Engineer may reject the concrete...." Suggest defining what is considered "failing concrete". 353-9.2.3 Dowel Bar Installation: "Position each dowel such that its final deviation from

centered on the joint does not exceed 2 inches." Is 2" the correct tolerance. This seems to be very generous.

**Response:**

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Katie Bettman  
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Comments: (12-22-15)

353-3.1 requires the concrete to meet 1,600 psi at the time period specified in the Contract Documents. Will our new mix designs be similar to drilled shafts and specify a time limit for use? I'm not sure how this will work with mix design trials or mix design approvals.

**Response:**

The following sentence should be removed from 353-3.2 Delivery Certification, "When an accelerating admixture is used, note the amount of accelerating admixture on the delivery ticket for each load of concrete placed." This makes more sense in the later section where concrete is delivered to the job site.

**Response:**

This sentence doesn't make sense in the section where the batch plant operator is certifying the original material. 353-3.3 Demonstration Slab requires a demonstration slab on site prior to batching production concrete. I think "on site" needs to be clarified.

**Response:**

353-5 Test Requirements states, "Perform concrete sampling and testing in accordance with Section 346. Unit weight testing is required. Perform the plastic property tests in accordance with Section 346, except when the mix design contains an accelerator; perform the plastic property tests prior to the addition of the accelerator." I understand why the specific sections are being removed so that they don't have to keep getting updated, but this is confusing of what's being required. We reference Section 346 so many times in this Specification. In the above instance, Section 346 was referenced twice in a row, in 2 out of the 3 sentences. This requirement to test in accordance with 346 except to test before accelerator is added was already stated in 353-3. Does 353-5.1 reference just the initial testing? Do we need a Unit Weight tolerance in this section? Do we need to update the air requirement to less than or equal to 6% to match Section 346?

**Response:**

353-5.2 Verification of Maturity Curve Data states, "A new maturity curve will be required should any of the plastic properties or the unit weight measure results exceed the tolerances specified in Table 1." Is this for the initial testing or acceptance testing? What happens with the concrete that was already placed? What curve is used for the concrete placed?

**Response:**

353-5.3 Cylinder Fabrication and Testing states, "The requirements of Section 346 apply to this Section." I don't think the reference of what is required is clear.

**Response:**

353-5.3 Cylinder Fabrication and Testing states, “The compressive strength cylinders and maturity curve correlation testing will be performed for the first production day, when the mix design is changed to another mix design, at the discretion of the Engineer for each remaining placement week, or until terminated by the Engineer.” At the discretion of the Engineer and until terminated by the Engineer seem to be the same out. Does this also need to be done when the plastic properties are out of tolerance and the curve must be redone?

**Response:**

353-6 Concrete Slab Acceptance states, “Reject any Concrete not meeting the plastic property requirements of this Section.” There are two sections in 353 that give tolerances for plastic properties. It isn’t clear what requirement is for acceptance.

**Response:**

353-6 Concrete Slab Acceptance states, “Strength deficiencies will be addressed in accordance with Section 346.” Is this only referencing the 28 day compressive strengths? What happens if the concrete is opened to traffic without the maturity value meeting the 1,600 psi? This isn’t addressed in 346.

**Response:**

353-7 used to reference 350-3.6, but now just references 350. I think this reference along with others need to be clear of what is being referenced and what is being required.

**Response:**

353-7 states, “Fill any depressions immediately with freshly mixed concrete, strike-off, consolidate and refinish.” This should state consolidate, strike-off, and refinish.

**Response:**

353-8 Curing requires a Type ID curing compound. The APL has a Type 1 and a Type 2. 353-9 requires the following: “Apply a bond breaker to all vertical faces of the adjacent slabs. Submit the proposed bond breaker to the Engineer for approval.” What are the requirements of the bond breaker? Does it need to be on the APL?

**Response:**

353-9.2.3 Dowel Bar Installation requires, “Use epoxy compounds in accordance with Section 937. Dispense the epoxy from a cartridge or from metered equipment that indicates the amount of each component material being dispensed.” How does this need to be indicated? Is there an accuracy requirement? Does this meet the requirements of Section 937?

**Response:**

353-10 Protection and Opening to Traffic states, “The Engineer may allow opening to traffic should the maturity equipment fail to provide a reading.” This may not require any additional language if the other section clearly states what takes place when traffic is allowed on the slabs prior to reaching the 1,600 psi strength. I think the Specification needs to indicate that the concrete isn’t acceptable. By allowing the opening to traffic, the Engineer isn’t accepting the concrete.

**Response:**

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