

4002100, Disposition of Cracked Concrete

Comments from Industry Review

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**Comment**

Text: New decks require grinding and grooving. Would the disposition (PS or M) be applied before or after grooving?

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John Previte

Are we using the specifications to instruct the engineer or the contractor? My understanding is that specifications are written to the contractor. I would recommend that this paragraph and similar ones be written directly to the contractor telling him what to expect, receive and do, of and for the engineer.

The reference to ‘all’ cracks leaves me unclear as to what is expected with, for example, fine map-cracking. We may be asking the (FDOT) Engineer to provide the ‘precise’ location of a huge number of structurally insignificant cracks.

The Engineer will inspect concrete surfaces as soon as surfaces are fully visible after casting, between 7 and 31 days after the component has been burdened with full dead load, and a minimum of 7 days after the bridge has been opened to full unrestricted traffic. The Engineer will measure the width, length, *and depth of each crack and establish* termination points and *the precise location of the crack termination points relative to permanent reference points on the member.* all cracks and display, to scale, the results on a drawing referred to as a crack map. *The Engineer will determine if coring of the concrete is necessary when an accurate measurement of crack depth cannot be determined by use of a mechanical probe. The Engineer will monitor and document the growth of individual cracks at an inspection interval determined by the Engineer to determine if cracks are active or dormant after initial inspection. The Engineer will perform all final bridge deck crack measurements once the deck is free of all debris and before transverse grooves are cut and after planing is complete for decks that require planing. Provide the access,*

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**John S. “Jack” Knowlton, P.E.**  
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Comments:

We specify that the Engineer inspect the cracks a minimum of 7 days after full unrestricted traffic has been placed on the bridge. Unless we also make a change in the specification for Final Completion of the project, this is after many projects are completed. We need to make sure that this is included in the specifications (like we do for the 14 days between applying FC and allowing thermoplastic striping) and accounted for in the project schedules.

Also, that is an open ended time frame for the Engineer to perform the inspection...."a minimum of 7 days after traffic is placed on the bridge...". We need an end date such as before Final Acceptance of the project.

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**Tom Andres**  
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Comment:

The concrete may not obtain the necessary 5,500 psi compressive strength when Class II concrete (4,500 psi) is specified in the plans. I recommend that the section be reworded to say "...or the minimum required 28 day compressive strength as shown in the plans, concrete bridge decks..."

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**Duane Brautigam**

Comment:

In the first sentence: "The disposition of cracked concrete is described in this Section" - Suggest leaving "herein" or using "Article", not changing to "Section". Either would be more accurate, since "Section" would refer to all of Section 400, and the clear intent is within 400-21. In the last sentence of 400-21.1, provide more accurate cross reference(s) instead of "See other Sections". For example, if the correct reference is within Section 450, please provide that specific reference.

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Comments:

1. The specification should describe that the disposition of cracks in concrete structures are applicable prior to final acceptance of the project or during the warranty period. After the final acceptance of the project, contractor is not obligated to provide personnel and equipment for the

department to perform the crack survey review or perform the repair, unless the contract has a warranty period. 2. The survey of the cracks should have been done by the contractor and verified by the department. It will make it complicated that the work and evaluation are done by the department. The contractor can review the crack survey and evaluation and the department will make the final determination. It is not indicated if there is going to be a resolution in case of disagreement between the department and contractor's evaluations. Specific Review Comments: 1. 400-21.3, Sentence 2 Change to read, "...the Engineer will determine if the crack greater than ½ inch deep for the particular structure and particular location belongs to the category of nonstructural cracks." 2. 400-21.4, Title Change "Cracking Significance of Nonstructural Cracks" to "Intensity of Nonstructural Cracks". The word, crack or cracking, have been repeated two times in same title. In my opinion, the word "Intensity" is more appropriate to describe the crack survey than "Significance". The word "Intensity" describes the magnitude and extent of the crack. The word "significance" describes the importance of crack. In case of agreement with this suggestion, replace the word "significance" with "Intensity" throughout the document. 3. 4.-21.4, Last Paragraph Explain the reason for contractor's comment. If the engineer will make final determination, what is the reason for contractor's review? 4. 400-21.5.1, Last Sentence "Reject and Replace" in Table 1 or 2 means there is no acceptable repair method." Move this note to the footnote of the table.

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**Anjani Girwarr**  
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**Comment:**

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**400-21.2**

The Engineer will determine if coring of the concrete is necessary when an accurate measurement of crack depth cannot be determined by use of a mechanical probe. The Engineer will monitor and document the growth of individual cracks at an inspection interval determined by the Engineer to determine if cracks are active or dormant after initial inspection. The Engineer will perform all final bridge deck crack measurements once the deck is free of all debris and before transverse grooves are cut and after planing is complete for decks that require planing.

**Comment:**

Use of word "determined" and "determine" in the same sentence is awkward.

Suggest: "The Engineer will monitor and document the growth of individual cracks at inspection intervals within Engineer's discretion to determine whether cracks are active or dormant after initial inspection."

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**400-21.3 Classification of Cracks:** The Engineer will classify cracks as either nonstructural or structural *and determine the cause. In general, nonstructural cracks are cracks 1/2 inch or less deep from the surface of the concrete; however, the Engineer may determine that a crack greater than 1/2 inch deep is nonstructural.*

Comment:

It does not make sense to say 1/2" cracks or less are non-structural, but later you give the Engineer discretion to classify cracks <1/2" as non-structural. Why? Under what circumstances would a crack <1/2" be non-structural?

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**Christopher Wood**  
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Comments:

This ONLY applies to STRUCTURAL CONCRETE right? Not CONCRETE PAVEMENT or INCIDENTAL CONCRETE right? How about precast drainage structures?

**400-21.5.1 Nonstructural Cracks:** *Repair each crack using the method as determined by the Engineer for each LOT in accordance with Table 1 or 2. When further investigation is required to determine repair or rejection, either remove and replace the cracked concrete or provide a structural evaluation signed and sealed by the Contractor's Engineer of Record (is this the Design EOR or any PE the contractor gets?) If it is just any PE then say "Registered Professional Engineer", otherwise, just say Design Engineer of Record, not Contractor's Engineer of Record - that includes recommended repair methods and a determination of structural capacity and durability to the Engineer. ~~Upon approval by the Engineer, repair the cracked concrete. Upon approval by the Engineer use epoxy injection in accordance with Section 411 to repair cracks in a member inside a dry cofferdam prior to flooding of the cofferdam.~~ Upon approval by the Engineer, repair the cracked concrete in accordance with Section 411 using epoxy injection. When repairing cracks in a member inside a dry cofferdam do so prior to flooding the cofferdam. (why mandate epoxy injection when treatment really depends on criteria shown in Tables 1 and 2?) "Reject and Replace" in Table 1 or 2 means there is no acceptable repair method.*

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**400-21.5.2 Structural Cracks: Provide a structural evaluation signed and sealed by the Contractor's Engineer of Record (is this the Design EOR or any PE the contractor gets?) If it is just any PE then say "Registered Professional Engineer", otherwise, just say Design Engineer of Record, not Contractor's Engineer of Record - that includes recommended repair methods and a determination of structural capacity and durability to the Engineer. Upon approval by the Engineer, repair the cracked concrete. Complete all repairs to cracks in a member inside a cofferdam prior to flooding the cofferdam.**

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**Comments:**

Per correspondence with the State Office of Construction, it is our understanding that the proposed specification 4002100 changes are not intended to apply to evaluation of cracks in reinforced concrete pipe (RCP). During the review period, we contacted Engineer Plotkin, whom indicated that precast RCP was not considered during the development of this specification change. The Department has acknowledged, however, that the specification language could be possibly misinterpreted to apply to RCP. We are therefore requesting clarification that this specification change is not to be applied to precast RCP.

Of concern is Section 400-21.1 General where it is stated "*this Section, and applies to all cast-in-place concrete members and to all precast and prestressed concrete members after installation.*"

We are concerned that the reference to "all precast" will be easily misinterpreted by Engineers in the field to apply to precast RCP.

So as to prevent confusion in the field and to ensure "institutional knowledge," we request a statement in the specification that advises that this specification is not to apply to pipe.

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