3460000 PORTLAND CEMENT CONCRETE
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Comment: (10-29-10)
Looks good except that the automated slump test provision might be premature since this technology is still developmental and it may be wise to leave it out until we are more certain of its reliability

Response:

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Bill Sears
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Comments: (11-15-10)
In Section 346-8 it does not make any sense to reject the truck when the slump monitor did its job correctly. For example, when the slump monitor reads 8" and the target is 6", you perform a slump test and rejected a load of 8" slumped concrete. You also do not accept any future loads delivered by the rejected truck until the slump monitoring system is repaired or is turned off. Why reject the truck when the slump monitoring system was correct and verified as correct from the slump test? Suggest adding a sentence that anytime the slump is checked on the jobsite and is found to be more that 1" different than indicated on the slump monitoring system, the truck shall be rejected and do not accept any new loads delivered by the rejected truck until the automated slump monitoring system is repaired or is turned off. Section 346-8 When a truck using an automated slump monitoring system is not within 1 inch of the system target slump, perform a slump test. Reject concrete not meeting the specified tolerance. Do not accept any new loads delivered by the rejected truck until the automated slump monitoring system is repaired or is turned off.

Response:

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Bill Sears
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Comments: (11-16-10)
In Section 346-8, reference is made to trucks with automated slump monitors. Since slump monitors are not required, suggest not addressing them in the specification. The inspectors should not look at them when performing their duties. They are only there for the convenience of the supplier and are not maintained or calibrated. Suggest the following be omitted from the specification section 346-8: When a truck using an automated slump monitoring system is not within 1 inch of the system target slump, perform a slump test. Reject concrete not meeting the specified tolerance. Do not accept any new loads delivered by the rejected truck until the automated slump monitoring system is repaired or is turned off.

Response:

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Troy Whitfield
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Comments: (11-16-10)
The second sentence refers to the concrete temperature being below 45 F. This makes little sense since the concrete as it hydrates produces heat and I have never seen it that cold. I would restore the original sentence in this case.

Response:

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Comments: (11-18-10)
The way Table 1 under "Extremely Aggressive Environment" is displayed, Precast Box Culvert would require Type II (MH). If you could please clarify this change for me.

Response:

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William E. (Ed) Ellis, Jr.
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Comments: (12-3-10)
I note that for mass concrete and Extremely Aggressive Environments, this proposed change stipulates Type II(MH) cement. The requirements for Type II(MH) cement include a maximum Heat of Hydration of 70 cal/g (290 kJ/kg) at 7 days. I would comment that I am not aware of a cement producer in Florida whose normal production Type I/II cement is reported to have a Heat of Hydration less than 70 cal/g. The existing requirement is for 80 cal/g, and this is the normal production used today. A change to 70 cal/g would entail substantial reformulation of cement production (and quite possibly significantly change the strength-gaining properties of cement, particularly at early ages). This would also likely substantially alter concrete production, in that the Type II(MH) cement would generally have to replace other types of cement in typical concrete plants with one cement silo, for the duration of placement of mass or Extremely Aggressive Environment concretes. I would recommend leaving in place the current requirement for Heat of Hydration

Response:

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Ken Zinck
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Comments: (12-8-10)
1. 346-2.2: Recommend Table 1 have a footnote (stronger indicator) that ALL concrete will have Pozzolan / Slag incorporation, in addition to statement in 346-2.3. Suggest “Pozzolans are required in all concrete mix designs.”

Response:

2. 346-2.2: Will previously approved mix designs using Type II cement need re-trialed with Type II (MH) or will a substitution be allowed?

Response:

3. 346-2.3: Section (1)c: Suggest the following adding “Fly Ash and Slag” for consistency with 1(a) and (b). See proposed change highlighted below:

> c. ~~Slightly and Moderately Aggressive Environments~~ *Fly Ash and Slag*- Ensure that there is at least 20% fly ash by weight and 40% portland cement by weight for mixes containing portland cement, fly ash and slag.

Response:

4. 346-2.3: Section (4)b Capitalization of environmental classification is not consistent with Section (3).

Response:

5. 346-2.3: Section (4)c: Suggest the following adding “Fly Ash and Slag” for consistency with 4(a) and (b). See proposed change highlighted below:

> c. ~~As an option for Slightly Moderately Aggressive Environments~~ *Fly Ash and Slag -* Ensure that there is at least 20% fly ash by weight and 40% portland cement by weight for mixes containing portland cement, fly ash and slag.

Response:

6. 346-3.2.1: See proposed changes highlighted below:

> The Engineer may require a new slump loss test in the event that the ambient temperature changes more than plus or minus ~~15°F, the environmental conditions change or the volume increases.~~ *10℉ from the recorded slump loss data. If an adjustment to the admixture dosage is required, then a new slump loss test will be required*.

Response:

7. 346-3.2.1 (1): See proposed changes in highlighted below:

> (1) Begin all elapsed times when water is initially introduced into the mixer. Ensure that the initial slump is between 8.5 inches to ~~10~~ *9.5* inches.

Response:

8. 346-3.2.1 (3): See proposed changes highlighted below:

> (3) Ensure that the mix is at least 3 cubic yards and is mixed in a truck mixer *with a valid mixer identification card.*

Response:

9. 346-4.1: See proposed changes highlighted below:

346-4.1 Master Proportion Table: Proportion the materials used to produce the various classes of concrete in accordance with Table 3~~:~~ *using 3% air*.

Response:

10. 346-4.2.2 Certification: Recommend this section remain.

Response:

11. 346-4.2.~~3~~2 Control Level for Corrective Action: See proposed changes highlighted below:

If chloride test results exceed the limits of Table 4, suspend concrete placement immediately for every mix design represented by the failing test results, until corrective measures are made. *Treat all concrete represented by the failing test as a defective material, in accordance with 6-4*. Perform an engineering analysis to demonstrate that the material meets the intended service life of the structure on all concrete represented by the failing chloride test results. Supply ~~this information the engineering analysis to the Engineer~~ within 30 business days of the failing test results from a Professional Engineer, registered in the State of Florida and knowledgeable in the areas of corrosion and corrosion control.

Response:

12. 346-5 Table 5: Suggest adding "(for water to cementitious materials calculations)" after "Early Sampling of Fresh Concrete from Revolving Drum Truck Mixers or Agitators."

Response:

13. 346-5 Table 5: FDOT should be determining which size cylinders are being used. Some specifications reference 346 (i.e., 353, 547) that need certain size molds for proper test values. Suggest proposed change in black below:

**Use 4 x 8 or 6 x 12 inch cylinders for determination of the compressive strength *as directed by the Engineer.*

Response:

14. 346-6.3: See proposed changes highlighted below:

Verify batch weights are within the required limits of the mix design *daily at the end of concrete placement. Suspend production if* ~~*Reject any*~~ concrete not within the required limits. *Do not place the mix design until the Engineer approves corrective action.*

Response:

15. 346-7.4: See proposed changes highlighted below:

346-7.4 Concreting in Cold Weather: Do not mix concrete when the air temperature is

below 45ºF ~~and falling~~. Do not place.....

Response:

16. 346-7.7: See proposed changes highlighted below (last sentence):

> Include water missing from the ~~saddle~~ *water storage* tanks upon arrival at the project site in the jobsite water added.

Response:

17. 346-7.8 (d): Recommend changing the temperature to 10 F degree. A fifteen degree tolerance 7leave a 30 degree range which is too wide as it covers all seasons.

Response:

18. 346-8, 8th paragraph: Most placement operations are 1 day; so we recommend suspending operations when 3 loads in one day are outside tolerances.

Response:

19. 346-9.1: (1st paragraph) 6x12 or 4x8 language not needed, repeat from 346-5.

Response:

20. 346-9.1 last sentence: QC cylinders should be same as VT (Department) … not vice versa, some spec section that reference 346 need 6x12, [see 353, 547, MM 8.4 SCC, etc.]

Response:

21. 346-11.6.2 and -11.6.3: The font used in the equations makes the multiplication sign look identical to the variable "x" representing the number of days. Suggest removing the multiplication sign (second x) as it is implied.

Response:

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Comment: (12-13-10)
Specification Article 346-8 has addressed automated slump monitoring system without any description of the test method or its correlation with ASTM C 143 test method. I recommend that the test method should be included or referenced in 346-8.

Response:

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Katie Bettman
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Comment: (12-13-10)

1. 346-2.3 now requires fly ash or slag materials as a cement replacement in all classes of concrete. In (4) d, it states that, “Class I and Class II concrete, excluding Class II (Bridge Deck), are not required to meet the minimum fly ash or slag requirements.” Is this a conflict? Are they allowed to have no fly ash or slag?

Response:

2. 346-3.2.1 Slump Loss Test Requirements:

> “The Engineer may require a new slump loss test in the event that the ambient temperature changes more than plus or minus 15 F, the environmental conditions change or the volume increases.”

The addition of the word “ambient” clarifies which temperature this refers to, but the “may” implies that the Engineer may not require a new slump loss test if the ambient temperature only changes 14F. This section needs further modifications. The slump loss data depends on a lot of different variables and in many cases is no longer valid before the ambient temperature reaches +/- 15F.

Response:

3. 346-4.2 Chloride Content Limits for Concrete Construction:

> “~~Ensure that the chloride content of all produced reinforced concrete does not exceed the maximum allowable limits specified in Table 4. When the source of any component material, including admixtures, for the concrete is changed, sampling for chloride determination shall restart the first day of production of the mix with the new component material.~~
> ~~Ensure the chloride test results from the testing lab are submitted to the concrete production facility within fourteen calendar days.”~~

Why was this language, which did not have to do with certification, also removed? It is difficult to comment on what was removed without knowing what was added in Materials Manual 9.2.

Response:

4. 346-6.3 Delivery Certification:

> “Verify that the chloride test results on the delivery ticket meet the requirements of Table 4.”

If the chloride results are being removed from the tickets, this statement needs to also be removed.

Response:

5. 346-7.3 Mixing at the Site:

> “Include provisions in the QCP for the mixing at the site. Use a mixer of sufficient

capacity to prevent delays that may be detrimental to the quality of the work. Ensure that the accuracy of batching equipment is in accordance with requirements of this Section."

This section is still vague. It is confusing what is meant by this section, what is allowed, and what isn't.

Response:

6. 346-7.4 Concreting in Cold Weather:

"Do not mix concrete when the air temperature is below 45ºF and falling."

The requirement to take the ambient temperature in the shade, and away from artificial heat has been removed. Was this done intentionally? Should this still be a requirement?

Response:

7. 346-8 Plastic Concrete Sampling and Testing: (8th paragraph)

"Suspend production when any five loads in two days of production of the same design mix are outside the specified tolerances."

Why was the suspension for 3 loads on one day removed? After 3 consecutive loads, I would think production should be suspended. How will the 5 loads for a mix be kept track of? If this is for more than one project, I would think this is a producer responsibility and may need to be in the Materials Manual.

Response:

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Ron Holcomb
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Comments: (12-13-10)

1. 346-4.2.~~3~~2 Control Level for Corrective Action**:**

If chloride test results exceed the limits of Table 4, suspend concrete placement immediately for every mix design represented by the failing test results, until corrective measures are made. Perform an engineering analysis to demonstrate that the material meets the intended service life of the structure on all concrete represented by the failing chloride test results. Supply this information within 30 business days of the failing test results from a Professional Engineer, knowledgeable in the areas of corrosion and corrosion control.

We would like better clarification on what type of engineering analysis. Need better clarification on what is "all concrete represented by the failing…..". Is this all concrete from the mixes listed on the test report? Is it from the date of sample or from the date of the test results?

Response:

2. 346-6.3 Delivery Certification:

……. Verify batch weights are within the required limits of the mix design. Reject any concrete not within the required limits

This needs to be changed or removed. There is no latitude given and loads that were just slightly out of tolerance would have to be rejected. Procedures for out of limit weights are covered by other standards (9.2.6.5), and this requirement is contrary to this other standard. Current Materials Manual requirement; 9.2.6.5 Batching Accuracy The failure to maintain batching operations of the plastic concrete within the tolerance for each component material requires immediate investigation and corrective action by the concrete producer. A failure to immediately investigate and implement corrective measures may be cause for suspension of the QCP. If there was an insistence to add a sentence about the weights, then maybe it should just state wording similar to 9.2.15: "Verify the recorded information is compliant with the approved design mix".

Response:

3. 346-7.4 Concreting in Cold Weather:

Do not mix concrete when the air temperature is below 45ºF and falling. Mix and Do not place concrete when the air concrete temperature in the shade, and away from artificial heat, is below 450 °F and rising.

Since there is no longer guidance for what air temperature we can resume mixing and placing, shouldn't we either remove the air temperature restriction, or remove the phrase "and falling"?

Response:

4. 346-8 Plastic Concrete Sampling and Testing:

……. Remove the mixer identification cards when a truck mixer is discovered to be in noncompliance with the mixer card deficiencies. When the mixer identification card is removed for noncompliance, make note of the deficiency or deficiencies found, and forward the card to the District Materials and Research Engineer that has Producer QC Plan acceptance authority.

As noted in review of Material Manual 9.2- The change from "may remove" to "remove" does not allow latitude for any issue other than a non-working counter. This will only result in additional project delays and result in additional demand on FDOT personnel to visit the assigned plant to re-inspect the truck. With the current method of noting deficiencies on the DOT card the FDOT inspector can allow a minor repair without need to mail the card off, such as if a rating plate became unattached from the vehicle, a pinched water sight tube, other minor, easily repairable issue that does not affect the quality of the concrete after repair on subsequent deliveries.

Response:

5. Also, what does the term "with the mixer card deficiencies" mean? The wording in Materials Manual 9.2.9.3 (5th paragraph) states this similarly, but without this phrase. This should be re-worded to match the 9.2.9.3 wording.

9.2.9.3 **Truck Mixers**

The Contractor will remove the identification cards when a truck mixer is discovered to be in noncompliance. When the identification card is removed for noncompliance, the Contractor shall note the deficiency on the identification card and forward…….

Response:

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