

3460000 PORTLAND CEMENT CONCRETE
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Anonymous

Comments: (6-21-19)

1. 346-4.1 Table 4 "When the use of ultrafine fly ash is used (required), the max..." Sentence before it is "When silica fume or metakaolin is used, the maximum..." Should the change be "When ultrafine fly ash is used, the maximum..." to be consistent?

Response: Agree. The second sentence will be changed to read: "When ultrafine fly ash is used, the maximum"

2. 346-5 Table 6 Compressive Strength of Cylindrical Specimens has *** Below the *** has been deleted.

Response: The footnote related to the size of the of the compressive strength test cylinder has been deleted because this language is repeated (see 346-9.1 General). There is no need for the footnote. No change is needed.

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Comments: (6-21-19)

1. 346-3.1, third paragraph, first sentence - Was the intent here to reference a "ternary concrete mix," rather than a ternary blend "cement"? None of FDOT approved producers are currently making Ternary Blend "Cement, nor are there any on the approved list."

Response: Agree. The terminology "a ternary blend cement is used" will be changed to "a ternary blend is used"

2. Removal of 346-2.5.1 "Water-Reducer/Water-Reducer Retardant Admixtures": – Type D admixtures are very commonly used as mid-range water-reducing and retarding admixtures. Why would this section be removed?

Response: This is repeat of the requirements of Section 924. This Section provides the details of admixtures and it has been referenced in in 346-2.1. No change is needed.

3. 346-2.5.2 New title - Type G, and Type II admixtures are additionally defined as "retarding" admixtures in ASTM C494 and ASTM C1017, respectively.

Response: Agree, the word "retarding" should be added to the title. Changed the title to read: "High Range Water Reducing, Retarding, and Plasticizing Admixtures".

4. (7-10-19) Recommend the following additions to the first paragraph of 346-10.1, and the fourth paragraph of 346-10.2 be included.

346-10.1 General: For standard molded and cured strength cylinders, the compressive strength of concrete is satisfactory provided that the compressive strength of a given LOT is equal to or greater than the specified minimum compressive strength, or the two following criteria are met:

Response: Agree. The concern is valid. Two new sentences in subarticles 9.4 and 10.1 have been added to address this concern.

346-10.2 The Engineer with input from the District Materials Office, will consider the concrete as structurally adequate, in the area represented by core tests at the actual test age, if the average compressive strength of cores of a given LOT is equal to or greater than the specified minimum compressive strength, or does not fall below the specified minimum compressive strength by more than:

Response: There is no need for adding the suggested change. This issue is already addressed with the new two sentences added in 9.4 and 10.1. No change is needed.

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Comments: (6-24-19)

The following statement in 346-7.6 of "Water may be added at the placement site provided the addition of water does not exceed the water to cementitious materials ratio as defined by the mix design" contradicts specification 346-6.4 that states "Reject concrete with slump or air content that does not fall within the specified tolerances.." As I interpret this, if the concrete is delivered below the lower slump tolerance and is not the first truck which requires an initial plastic properties test, then water can be added. Typically once the contractor adds water to the concrete truck, he owns the truck, therefore to ensure he does not go over the maximum slump tolerance and have the truck rejected, the initial slump has to be determined to know how much water to add. The specifications seem to remove the contractors ability to know what the initial slump is and how much water to add. Is the intent to allow water be added to concrete that is below the lower tolerance range to bring it into range? If not then 346-7.6 should be revised.

Response: The concern is valid and the intent is to allow add water to concrete that is below the lower tolerance range, but the comment is not related to the proposed revision. It would be considered during the next revision cycle. No change is needed.

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Comments: (7-3-19)

346-9.1. If there are now going to be two hold cylinders for VT and QC instead of one hold cylinder for resolution this could effect the storage capacities of the laboratories.

Response: After discussing with Districts staff, an additional resolution cylinder should not significantly impact the current storage capacity of testing labs. In addition, a compressive strength based on a single specimen does not meet the requirements of:

- ASTM C94 (article A1.9),
- ACI 214 (article 4.2),
- ACI 301 (articles 1.3, 4.2.2.8(a), 5.3.6.6(b)),
- ACI 318 (articles 26.5.3.2(d), 26.12.1.1(a))

We are correcting this error in the current Specification. A single cylinder strength is part of, but individually does not constitute, a test result. Under the current specification, cases have been reported in which the only "hold" Resolution cylinder shows definitive evidence of improper sampling, handling, curing, or testing which leads to an incorrect Resolution process. A request for an extra "hold cylinder" lessens the liability of the Contractor (QC) and the Department (VT), and drastically reduces the probability of making incorrect decisions in the Resolution process. Also, casting and testing more than one Resolution cylinder may be desirable in case it becomes necessary to discard an outlying individual cylinder strength. No change is needed.

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Comments: (6-27-19)

1. In the following change "QC hold" to "QR" - 346-9.4 Acceptance of Concrete: For each QC and each QC hold QR cylinder that is lost, missing, damaged or destroyed, payment for that LOT will be reduced by \$750.00 per 1,000 psi of the specified design strength [Example: loss of two Class IV (Drill Shaft) QC cylinders that has no verification VT data will require the element to be cored and a pay reduction will be assessed $(4,000 \text{ psi} / 1,000 \text{ psi}) \times \$750 \times 2 = \$6,000$]. This reduction will be in addition to any pay adjustment for low strength.

Response: Agree. "QC hold cylinder" will be changed to "QR".

2. 346-9.5 6 Resolution Procedure: Suggested change; The Engineer will notify the QC of which resolution laboratory to utilize. The QC and VT laboratories will transport their own QR and VR cylinders to the Engineer designated resolution testing laboratory within three calendar days after the Engineer notifies the Contractor that a resolution procedure is required. In addition, the Engineer will ensure that the QR and VR concrete cylinders are tested within 14 calendar days of the acceptance strength tests. Determine if it should be stated "72 hours" or Three (3) calendar days".

Response: Agree. The sentence was reworded to read: "The Engineer will inform the QC and VT laboratories within three calendar days of the acceptance compressive strength test to transport their QR and VR cylinders to the resolution laboratory".

Deborah Ihsan

Comments: (7-8-19)

1. 346-1 Description, paragraph 2. Last one but sentence may be modified by adding words “because of suspension as above” and deleting “completion dates”, so as to read: There will be no changes in the Contract time because of the suspension as above. remove "or completion dates" Reasoning- The proposed modification explains the context more clear/ easier to understand. o Aggregates-

Response: Agree. The changes will be made as suggested. The second paragraph, third sentence, will be modified to read: There will be no changes in the Contract Time because of the suspension, as described.

2. A new subsection 346-2.4.1 may be introduced to speak about the fine aggregates used for concrete. 346-2.4.1 Fine aggregates: Produce concrete using approved fine aggregates consisting of natural sand or sand manufactured from stone.

Response: The fine aggregate is described in Section 902, as referenced in 346-2.1. No change is needed.

3. 346-3.2 Drilled Shaft Concrete, paragraph 1: Last sentence of this paragraph may be deleted. Remove "Ambient temperature conditions for placement of drilled shaft concrete for summer condition is 85°F or higher, and below 85°F for normal condition." Reasoning- Concreting in hot weather is explained under section 346-7.5

Response: Agree with the suggested changes. The last sentence of the first paragraph will be deleted.

4. 346-6.3 Delivery Certification, paragraph 1: Review this paragraph since it talks about electronic delivery tickets and printed ticket to remove ambiguity.

Response: The paragraph has been reviewed and no further changes are needed. No change is needed.

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Comments: (7-16-19)

The proposed revision 346-9.1 would require both VT and QC to fabricate and store an additional cylinder for resolution testing. This proposal would add an additional data point, but it would only be relevant for approximately 1% of sampling performed. Respectfully, any potential benefit is outweighed by the additional cost, effort, and waste it would introduce. Please reconsider this change.

Response: After discussing with Districts staff, an additional resolution cylinder should not significantly impact the current storage capacity of testing labs. In addition, a compressive strength based on a single specimen does not meet the requirements of:

- ASTM C94 (article A1.9),
- ACI 214 (article 4.2),
- ACI 301 (articles 1.3, 4.2.2.8(a), 5.3.6.6(b)),
- ACI 318 (articles 26.5.3.2(d), 26.12.1.1(a))

We are correcting this error in the current Specification. A single cylinder strength is part of, but individually does not constitute, a test result. Under the current specification, cases have been reported in which the only "hold" Resolution cylinder shows definitive evidence of improper sampling, handling, curing, or testing which leads to an incorrect Resolution process. A request for an extra "hold cylinder" lessens the liability of the Contractor (QC) and the Department (VT), and drastically reduces the probability of making incorrect decisions in the Resolution process. Also, casting and testing more than one Resolution cylinder may be desirable in case it becomes necessary to discard an outlying individual cylinder strength. If there is an incorrect technical concept in the specification, it must be addressed, even if it only impacts a small portion of the concrete testing. No change is needed.

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Comments: (7-16-19)

There is no reason for additional hold cylinders for both QC and VT, what would be a perspective for adding some time and economic increase includes storing will be another argument

Response: A compressive strength based on a single specimen does not meet the requirements of:

- ASTM C94 (article A1.9),
- ACI 214 (article 4.2),
- ACI 301 (articles 1.3, 4.2.2.8(a), 5.3.6.6(b)),
- ACI 318 (articles 26.5.3.2(d), 26.12.1.1(a))

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Comments: (7-16-19)

Since the 300 drum revolution limit is being removed from 346-7.2, will this be changed in the Material Manual 9.2 vII as well?

Response: Agree. Yes, the required change has been made in Section 9.2 Volume II Materials Manual. No change is needed.

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Comments: (7-17-19)

1. 346-3.2 Paragraph 3 “Obtain slump loss test results from an approved laboratory or from a field demonstration. Slump loss test results for drilled shafts requiring 30 cubic yards of concrete or less and a maximum elapsed time of five hours or less may be done in a laboratory. Obtain all other slump loss test results in the field. Technicians performing the slump test must be ACI Field Grade I qualified.” What is the intent here? Can the slump testing be done by a non-certified inspector? Is the intent that the mix designer can perform the slump? I can see the potential of the plants using any uncertified person standing around to perform the slump testing.

Response: The slump test shall be only performed by ACI certified testing technician. The sentence was deleted because this is a Concrete Producer responsibility, and it is very clear in Materials Manual 9.2 Volume II. (9.2.8 ... “Perform slump loss testing of the drilled shaft mix using qualified personnel as defined by this section”, and 9.2.13.2 (1) “The ACI Concrete Field Testing Technician - Grade 1 performs concrete plastic properties test, such as slump, temperature, air content, making and curing concrete cylinders, and calculating the water to cementitious materials ratio”. No change is needed.

2. 346-9.1 Paragraph 2 “For each set of QC cylinders verified by the Department, cast one two additional cylinders from the same sample, and identify them as the quality control resolution (QR) test QC “hold” cylinders. The Department will also cast one two additional “hold” verification resolution (VR) test.” What is the reason for this? The additional hold cylinder will force the labs to increase storage space which can be an extra cost with no extra benefit. Additionally, the QC labs will only have to increase the resolution cylinder storage space of their labs to accommodate approximately 17% more resolution cylinders but, the VT labs will have a 25% increase in storage space for their resolution cylinders as all VT sets require resolution cylinders. Example: If the QC Lab Received 24 sets of FDOT cylinders in a month and one of every four sets required resolution. The total before the spec change of the required cylinders in the lab would have been 78 cylinders for the month – 72 cylinders with 6 resolution cylinders. With the new spec change that total would increase to 84 cylinders – 72 cylinders with 12 resolution cylinders which equal a 17% increase in storage space. If you use the same example with the VT labs, this percentage increases. If you have 24 sets at the VT lab in a month before the old spec the storage space for those cylinders would be 96 cylinders. 72 Cylinders for acceptance and 24 hold cylinders. With the new spec, the amount that the lab would store for 24 sets would be 120 cylinders. 72 cylinders for acceptance and 48 cylinders for resolution. That would be a 25 percent increase in storage space. This does not include the time and company money spent to discard the cylinders after testing is complete. Administrative efforts are made to

discard all hold cylinders in the correct time frame to ensure that a resolution cylinder is not accidentally thrown away. If the department upholds the use of two resolution samples per set then the department should not be surprised or caught off guard when the QC and VT labs demand for rate increases on cylinder testing for department projects.

Response: After discussing with Districts staff, an additional resolution cylinder should not significantly impact the current storage capacity of testing labs. In addition, a compressive strength based on a single specimen does not meet the requirements of:

- ASTM C94 (article A1.9),
- ACI 214 (article 4.2),
- ACI 301 (articles 1.3, 4.2.2.8(a), 5.3.6.6(b)),
- ACI 318 (articles 26.5.3.2(d), 26.12.1.1(a))

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3. Table 8 (was changed to 8 from 9) Class IV (Drilled Shaft) Sampling Frequency "50 cubic yards, or two hours between the end of one day's production placement and the start of the next placement, whichever is less** Start a new LOT when there is a gap of more than two hours between the end of one drilled shaft placement and the beginning of the next drilled shaft placement." As a drilled shaft inspector and IA representative I feel this spec could be more rigid. Instead of "Start a new LOT when there is a gap of more than two hours between the end of one drilled shaft placement and the beginning of the next drilled shaft placement." The spec should be changed to sample every structure considered a Miscellaneous Shaft whether two hours has passed or not. In the past I have personally seen an instance where two drilled shafts were poured from the same mix in less than two hours and the QC representative only sampled the first shaft. The next day the first shaft has set up to a hardened state and the second shaft that was not sampled and tested did not reach final set. The result was the department had to make a special trip to the site and perform non-destructive testing to the structure and decide if the structure was acceptable or not. The Department spent more money on having to verify the second shaft was structurally sound than the QC charging anywhere from 35 to 45 dollars for second set of cylinders to verify the strength of the second shaft.

Response: The intent of the proposed change is to clarify LOT size of the drilled shaft whenever there is a delay in the continues pouring process. No change is needed.

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Comments: (7-17-19)

Is there a reason for striking sections 346-2.5.1 and 346-2.5.6 Type S Admixtures. Understanding that Type S admixes are not frequently used, there have been needs for these on FDOT projects. It seems that both should still be defined in the standard specifications.

Response: The reason for deletion is to prevent repeating of the same requirements in two different Sections of the specifications. For example, the admixture requirements have been addressed in detail in Section 924. No change is needed.
