

3460301 Portland Cement Concrete – Classification, Strength, Slump and Air Content.
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Comment: (3-28-11) Recommend the following in 3460301:

Substitution of a higher class concrete in lieu of a lower class concrete may be allowed when the substituted concrete mixes are included as part of the Quality Control Plan, ~~if approved by the Engineer.~~ ~~For~~ Ensure that the precast concrete substitution of a higher class concrete in lieu of a lower class concrete ~~shall be~~ is made part of the Producers Quality Control Plan. The substituted higher class concrete must meet or exceed the requirements of the lower class concrete and both classes must contain the same types of mix ingredients. When the compressive strength acceptance data is less than the minimum compressive strength of the higher design mix, notify the Engineer. Acceptance is based on the requirements in Table 2 for the lower class concrete.

From Rudy: Revise the second sentence beginning “For precast concrete, substitution ...” to active voice.

Response: Agree that active voice is needed but I suggest the following text for sentence two: Ensure for precast concrete, that the substitution of a higher class concrete in lieu of a lower class concrete is made part of the Producer’s Quality Control Plan.

Sadler, David A
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Comments: (3-30-11) For 3460301, there is a misplaced comma:

“For precast concrete substitution, of a higher class concrete in lieu of a lower class concrete shall be made part of the Producers Quality Control Plan.” Should be “For precast concrete, substitution.....”

Response: Correction Made.

Michael Bergin, PE
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Comments: (3-30-11) 1) I suggest that we add “approved” in front of Quality Control Plan in the first sentence of the second paragraph.

2) I think the comma is in the wrong place in the second sentence. It should read, “For precast concrete, substitution...”

Response: 1) From the State Specifications Office: This is not needed. Section 105 addresses the need to have an approved QC Plan.

Response: 2) Correction Made.

Rudy Powell

Comments: (4-7-11)

1. The origination form only mentions producers of precast products, but the first sentence of the second paragraph in 346-3.1 does not make that distinction. Is this only for precast producers?
2. "Quality Control Plan" and "Producer's Quality Control Plan" is used. Are these the same or is one the contractor's?
3. What happens if a contractor wants to use a higher strength concrete and it is not in the QC Plan?

Response: 1. The origination form does not address non-precast because the change from "as approved by the Engineer" to "Quality Control Plan" was made after the origination form was submitted as suggested by SMO personnel (Mike Bergin and company).

2. One plan is the Contractor's and the other is the Producer's: two different plans.

3. He has to revise or amend the plan to include the higher strength substitution issue which is not often needed since Contractor's rarely use higher than specified CIP concrete.

Fred McGee
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Comments: (4-8-11) The proposed revision 3460301 says:

"The substituted higher class concrete must meet or exceed the requirements of the lower class concrete and both classes must contain the same types of mix ingredients."

The interpolation could be made that it does not allow for a substitution of a higher class mix that has different ingredients but meets the concrete requirements of the lower class mix. For example, the contract calls for a FDOT class IV mix cement only. If you wanted to substitute a class V mix with silica fume it could be read that you would not be allowed to substitute this mix since the mix ingredients are not the same. The same argument for admixtures with different suppliers OR the higher class mix has slag and not flyash. I propose the following:

"The substituted higher class concrete must meet or exceed the requirements of the lower class concrete and the higher class mix must have all required equivalent ingredients of the lower class mix as per 346-2."

This would allow you to substitute a higher class mix that has any required specialty materials but allows you flexibility of other materials in other approved FDOT mixes.

Response: Yes, the interpretation is right. The intent of the specification is to use the same type of mix ingredient that is called for in the plan for a specific mix.

We disagree with Mr. McGee's proposed change. The terminology of "equivalent ingredient" will be very confusing. If the plan called for the specific class of mix, the substituted higher class mix should have the same material ingredients, including fly ash, slag, cement, silica fume, and admixtures.

Gum, Deborah
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Comments: (4-8-11) The following statement: "...and both classes must contain the same types of mix ingredients" is vague. Is the intent to ensure the component suppliers and applicable mine or terminal numbers are from the same source; or is the intent to ensure mixes are from any approved source? Additionally, I believe the Producer should be held responsible for the actual

28 day compressive strength as required per mix design.

In lieu of the proposed Standard Specification 346 proposed change, I recommend the following:

Substitution of an approved higher class concrete mix in lieu of an approved lower class concrete mix may be allowed when the substituted concrete mixes are included as part of the Quality Control Plan. Required shipping strength will not vary from the approved plan requirement; 28 day compressive strength will meet or exceed the actual concrete mix design strength. Component providers of both concrete mix designs shall be shown in the Department's data base as approved sources.

Response: The same type of mix ingredients means that if the concrete class requires silica fume, the substituted mix should also have silica fume. The substituted mix will not be allowed to use a mix that does not have silica fume. Ms. Gum's proposed changes will add unnecessary steps to a simplified process.

Sean P. Masters Sr., P.E.
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Comments: (4-18-11) Our comment is the portion "Ensure for precast concrete, that the substitution of a higher class concrete in lieu of a lower class concrete is made part of the Producer's Quality Control Plan."

- 1) The specifications are directed to the Contractor, not usually a supplier. This will create some confusion that regular ready-mix concrete producers will be required to add this to their QCP.
- 2) Chapter 8 of the Materials Manual is directed at Precast/Prestressed Concrete Producers and this comment should be in that section.

Response: We agree with Mr. Masters' comment No.1. The proposed changes are related to precast and cast-in-place concrete. Therefore, the 346 specification is a proper place for this requirement.

Action: Change "Producer's Quality Control Plan" to "Precast Concrete Producer's Quality Control Plan". No change is needed in the other parts of the proposed specification.

edwin moyano
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Comment: (4-26-11) *Proposed Spec Change 3460301 for substituting a higher class mix for a lower one. The language may cause confusion - Jerry Shannon.*

In Mr. Shannon's absence, Mr. Dill asked if during the substitution of a higher class mix for a lower one, did all of the ingredients have to be exactly the same? Mr. Bergin replied that control had to be maintained over the varying ingredients so the answer would be yes. Permeability was the highest concern.

Ghulam suggested adding the proposed mix substitutions for specific products to the plant's QC program and have the District approve the change before hand.

The control over the mix design comes from FDOT 346spec. The substitution does not mean that the higher class mix is allowed to violate the requirements of the lower class mix. If permeability, or any other requirements, were an issue that the lower class mix needed to meet then the higher class mix needs to meet or exceed all those requirements of the lower class mix.

Example:

Lower Class Example Mix A - FDOT Class IV - Meets Slightly Aggressive Environment Requirements

<u>Ingredients</u>	<u>Supplier</u>	<u>Weight</u>
Cement	Holcim	525 lbs
Slag	Slag Co	175 lbs
Coarse Agg	Bonita Agg	1500 lbs
Fine Agg	Stewart Mining	1000 lbs
AE admix	Euclid	1.0oz
HRWR	Euclid	73oz
Water	City	32gl
Slump/Spread	1.5"-4.5"	
W/C	0.38	

Higher Class Example Mix B - FDOT Class V Flowing - Meets Extremely Aggressive Environment Requirements

<u>Ingredients</u>	<u>Supplier</u>	<u>Weight</u>
Cement	American	725
Flyash	STI-Proash	145
Coarse Agg	Titan	1200
Fine Agg	Jahna	800
AE admix	BASF	4.0oz
HRWR	BASF	82oz
Water	City	33.5
Slump	7.5"-10.5"	
W/C	0.32	

The above example mixes would not be allowed to be substituted by the higher class mix since the ingredients are not the same. The current FDOT 346-3spec would allow this since it is a approved mix that is higher class and meets all the requirements of the lower class mix. The FDOT 346 allows for different materials within the same requirements such as: Flyash or Slag, Silica Fume or Metakaolin or UltrafineFlyash. Adding these substitutions to the QC plan is not necessary and adds another step to a process that works flexibly. The responsibility is already on the producers and project engineers. Please consider my concern for the 3460301 spec change.

Response: The proposed specification change was suggested by Industry during the last FPCA/FDOT Liason meeting. Upon approval of the proposed specification changes, the precast concrete producers will be allowed to include their proposed substituted mixes as part of their quality control plans, which will be approved by the District Materials Office. The approval will be applicable to all projects. The current specification requires Engineer's approval for each project when higher class mix is used in lieu of lower class.

I disagree with you that these substitutions will add another step to the process. Instead, as described above, it will simplify the process.

If the project contract document requires a specific mix ingredient, there is good reason for having that mix ingredient. It will not be in compliance with the requirement of contract documents if a mix of different mix ingredient will be used.

Please call me or Mike Bergin if you have further question related to the proposed specification change. From Ghulam Mujtaba, P.E., C.P.M.

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Pat McCann

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Comment: (5-6-11) District 4 has the following comments: Is it necessary to require both mixes to have the same "class" of mix ingredients? Do we explain what we mean by "class"?

Response: The changes require the "same type of mix ingredients", not the "same class of mix

ingredients”.

Yes, it is necessary that the substituted mix should have the same type of mix ingredient that is called for in the plans. This means that if the concrete class requires fly ash the substituted mix should have fly ash. A design mix without fly ash will not be acceptable.
