3460301 PORTLAND CEMENT CONCRETE
COMMENTS/RESPONSES FROM INDUSTRY REVIEW
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Bill Sears
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Comment: (10/8/09)
The penalty in specification 346-12 of twice the invoice price seems arbitrary and precipitous.

Response: The price level was chosen to be high enough to discourage Contractors from flagrantly violating the specification since the target zone has been eliminated in this revision so Contractors will have more opportunities to add water which increases the likelihood of exceeding the tolerance range on the wet side.

From the State Specifications Office: The following is the background from the construction office. No changes made.

> I wanted to give you this heads-up since the subject revision was partly authored by this office and has what will probably be a controversial provision that we discussed before submitting it to Specs. We proposed the part of the revisions that eliminates the target zone for slump testing which now results in only the tolerance zone and unlike before allows Contractors to add water as long as the truck arrives with a slump anywhere within the tolerance zone. However, this gives Contractors much more ability to legitimately increase the water content (which increases workability and that is good) of the concrete but also increases the likelihood that they will exceed the tolerance on the high side as a result. Anticipating this, the spec revision also includes a penalty – not previously imposed - for placing concrete that fails plastic properties tests. Contractors will never be penalized if they simply comply with the specification and they are in total control of placing concrete so they have to deliberately violate the spec to be penalized. We did allow failed concrete to be placed with Engineer authorization since on rare occasion placing the concrete is better for the overall condition of the structure than not placing it. The penalty is twice the invoice price of the concrete and the justification for that level of penalty is below. This office and the Concrete Materials Technical Advisory Group (Concrete TAG) are of the opinion that Contractors violate this spec too often – I have personally observed this more than once during my occasional project reviews so it must happen on a regular basis – and with the prospect of this being more likely in the future we wanted to sent a very clear message that these violations will not be tolerated anymore without a significant consequence.
>
> **JUSTIFICATION**
>
> If the contractor pays the Producer the invoice price of $100 per cubic yard (typically $1000.00 per 10 yard truck) for concrete then if he sends rejected concrete back to the Producer, $1000.00 will be the cost for wasted concrete or possibly less than invoice since the Producer will probably bear the expense and the actual Producer cost will be somewhat lower then invoice .

If the Contractor tries to avoid that expense and places the concrete in violation of the specification then he saves $1000.00 but risks a low cylinder break (very rare) or a CPPR grade reduction neither of which is likely to be of major consequence and thus will not be an effective deterrent for discouraging future specification violations.

If the Contractor is penalized only the invoice price ($1000.00) for placing rejected concrete then this is not any more loss than he would bear for returning the concrete to the Producer and; therefore, he is likely to place the concrete anyway since there is no strong financial incentive to do otherwise. Therefore, by imposing a penalty of twice the invoice price, the Contractor has a strong incentive to comply with the specification since by not doing so the Contractor/Producer loses $1000.00 more then he would by simply returning the concrete to the Producer as required by spec.

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Rod Nelson
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Comments: (10/8/09)
Maybe this is not the place to say this but central office structures design office needs to address whether the section 346-10 Investigation of low strength concrete for structural adequacy percentage of 10% reduction should be lowered. D2 feels this percentage needs to be lowered in order to require the construction personnel to contact the EOR for their input on the structural adequacies of low concrete strengths more often.

Response: 346-10 does not require the construction personnel to contact the EOR. Lowering the percentage will not require construction personnel to contact the EOR. SMO will forward comment to Structures Design and the State Construction Office.

From the specifications office: No changes made.

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Steven Sheffield
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Comments: (10-9-09)
Some clarification needs to be done to this paragraph, Subarticle 346-6.4, second paragraph.

Reject concrete with slump or air content ~~exceeding~~ *that does not fall within* the ~~above~~ *specified* tolerances *and immediately notify the concrete production facility that an adjustment of the concrete mixture is required so that it will fall within specified tolerances*. ***If adjustments are not implemented by the next load of concrete, reject the concrete and terminate further production until adjustments are implemented.*** *Test the plastic properties of*

*the first adjusted load and every load that arrives at the project site prior to first adjusted load. If adjustments are not implemented~~the Contractor does not implement adjustments~~, **the Engineer may reject the concrete and terminate further production until the Contractor makes correctionsare implemented.** ~~The Engineer may authorize placement of concrete that would otherwise have been rejected because the permanent structure will be adversely affected~~.*

Yellow highlighted areas show contradicting procedure. Which is it; reject or may reject?

Response: This is not a contradiction. The first highlighted portion is in active voice and is the Contractor's responsibility. The second portion is directed at the Department if the Contractor does not fulfill his responsibility. Additional language has been added to clarify.

From the State Specifications Office: The phrase "If the Contractor does not reject the failing concrete or implement adjustments, the Engineer may reject …" has been added to clarify.

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Steven Sheffield
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Comments: (10-9-09)
Here is another comment.

346-7.7 Adding Water to Concrete at the Placement Site: Perform an initial slump before the addition of water at the jobsite. If the slump, ~~is~~ *as* delivered, ~~within~~ *is outside* the ~~target~~ *tolerance* range, ~~no water will be added to~~*reject* the load. If the slump is ~~outside the target range but is~~ within the tolerance range, that load may be adjusted *by adding water provided the addition of water does not exceed the water to cementitious materials ratio as defined by the mix design*. After adjusting the slump, perform a *slump* test to confirm ~~that the slump of~~ the concrete is within the *slump tolerance* ~~target~~ range as defined in Table ~~6~~*2*. ***Perform*~~**Confirm with another**~~ ***a slump* test *on*~~**that**~~ **the next load** ***to ensure the concrete*~~**is**~~ **within the** ~~**target**~~ ***slump tolerance* range.** Maintain the slump within the ~~target~~ *tolerance* range on successive loads. ~~Repeated incidents of concrete being placed outside the target range may result in revocation of that portion of the QCP.~~ Do not place concrete represented by slump test results outside of the tolerance range.

Highlighted area with the strike outs removed.

***Perform a slump* test *on* the next load *to ensure the concrete* within the *slump tolerance* range.**

May need 'is' inserted after concrete to read …to ensure the concrete is within…

Response: Agree. Change made.

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Comments: (10-9-09) **comments in Yellow highlight**

346-3.2.1 Slump Loss Test Requirements: Provide slump loss tests before drilled shaft concrete operations begin, demonstrating that the drilled shaft concrete maintains a slump of at least 5 inches throughout the concrete elapsed time. Inform the Engineer at least 48hours before performing such tests. Perform slump loss testing of the drilled shaft mix using personnel meeting the requirements of Section 105. *The Engineer may require a new slump loss test in the event that temperature, environmental conditions, or change in structural conditions change.*
Perform the following procedures for slump loss tests:
(1) Begin all elapsed times when water is initially introduced into the mixer.
(2) The slump loss test is performed at a temperature consistent
with the highest ambient and concrete temperatures expected during actual concrete placement. *This test may be used for lower temperature placements without any admixture adjustments.*
(3) Ensure that the mix is at least 3 cubic yards and is mixed in a
truck mixer.
(4) After initial mixing, determine the slump, ambient and concrete temperatures, and air content. Ensure that the concrete properties are within the required specification *limits*~~target range~~ *as specified in 346-3.1, Table 2*.

346-7.7 Adding Water to Concrete at the Placement Site: Perform an initial slump before the addition of water at the jobsite. If the slump, ~~is~~ *as* delivered, ~~within~~ *is outside* the ~~target~~ *tolerance* range, ~~no water will be added to~~*reject* the load. If the slump is ~~outside the target range but is~~ within the tolerance range, that load may be adjusted *by adding water provided the addition of water does not exceed the water to cementitious materials ratio as defined by the mix design*.
After adjusting the slump, perform a *slump* test to confirm ~~that the slump of~~ the concrete is within the *slump tolerance* ~~target~~ range as defined in *346-6.4*~~Table 62~~. *Perform* ~~Confirm with another~~ *a*
slump test *on*~~that~~ the next load *to ensure the concrete is*~~is~~ within the ~~target~~ *slump tolerance* range.
Maintain the slump within the target *tolerance* range on successive loads. Repeated incidents of concrete being placed outside the target range may result in revocation of that portion of the QCP. Do not place concrete represented by slump test results outside of the tolerance range.

Response: Agree. Change made. 346-7.7 no longer references definition of slump range since it is defined in this section.

From the State Specifications Office: Change made to 346-3.2.1. No changes made to 346-7.7 except the word “is” is replaced.

Comment received 12/15/09

The revision to 346-12 below is to make the language consistent with section 346-9.4 that uses the term “pay reduction” to describe the penalty that the Contractor is assessed for loosing QC

cylinders. Also, a little tweaking to make it clear that the pay reduction applies only to the single truck load of concrete that was placed in violation of the spec.

346-12 Pay Reduction for Plastic Properties
If concrete is placed even when the result of plastic properties testing requires its rejection, there will be a pay reduction of twice the invoice price per cubic yard for all the cubic yards of concrete in the truck load represented by the plastic properties tests. If the Engineer authorizes placement of the concrete , there will be no pay reduction.

From the State Specifications Office: 346-12 has been revised as follows:
346-12 Pay Reduction for Plastic Properties
If concrete is placed even when the result of plastic properties testing requires its rejection, the payment for concrete represented by the plastic property tests will be reduced by twice the invoice price per cubic yard. If the Engineer authorizes placement of the concrete, there will be no pay reduction.

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Duane Brautigam

Comments: (10-9-09)
(1) 346-3.1(e) - The last sentence is not in active voice
(2) 346-3.2.1 - The last sentence in the first paragraph is awkward, i.e, ending in "... or change in structural conditions change." Suggest "... in the event of changes in temperature, environmental conditions or structural conditions". Having said that, what do we mean by a change in "structural conditions"?
(3) 346-6.4 - Could use some active voice formatting
(4) 346-9.4 - In the first sentence, is it the intent that the Contractor accepts or rejects, as formatted in active voice, or should this be formatted to say the Engineer will accept or reject?

Response:
1. Reworded to include active voice. From the State Specifications Office: Minor formatting changes made.
2. Environmental conditions are defined by Structures Design Guidelines. Language for structural conditions reworded for clarity.
3. Language reworded for active voice.
4. See response to Steve Sheffield's comment. Language reworded for clarification.

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Comments:
Just a couple of comments on the following portion.

346-12 Pay Adjustments for Plastic Properties
If concrete is placed even when the result of plastic properties testing requires its

rejection, a fee of twice the invoice price per cubic yard of the placed concrete will be assessed for all the concrete in the load that is placed. If the Engineer authorizes placement of the concrete in accordance with 346-6.4, no fee will be assessed.

1. Should this be re-worded to indicate a pay adjustment instead of a fee?
2. It seems a little confusing if the Engineer "rejects" the load due to failing the test and then allows it to be placed anyway wouldn't he be "authorizing placement" and therefore there would be no fee?

Response: Agree that pay adjustment instead of fee is better. Under rare circumstances, delaying the concrete placement by sending a truck back might be detrimental to the structural integrity of the finished product and; therefore, the Engineer may authorize placement of concrete that fails plastic properties tests for this reason.

From the State Specifications Office: "Adjustment" has been changed to "reduction."

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Dan Hurtado
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Comments: (10-19-09)
SECTION 346-12 SHOULD BE REMOVED.

Response: Disagree – a disincentive that discourages flagrant violations of the specification is beneficial is this case since the revised spec increases the likelihood that out of tolerance concrete on the wet side will happen. If Contractors simply comply with the spec, no pay adjustment will happen. The Contractor cannot accidently place concrete that fails plastic properties tests.

From the State Specifications Office: See response to comment from Bill Sears above. No changes made.

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David Wang
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Comments: (10-20-09)
1. **346-3.1 General:** (e) When precast three-sided culverts, box culverts, endwalls, inlets, manholes or junction boxes require a Class III concrete, the minimum cementitious materials will be 470 lb/yd^3. The air content range will not apply and the maximum ~~allowable~~ slump shall be 6 inches.

Delete the word "allowable".

Response: Agree. Change made.

2. **346-3.2.1 Slump Loss Test Requirements:** Provide slump loss tests before drilled shaft concrete operations begin, demonstrating that the drilled shaft concrete maintains a slump of at least 5 inches throughout the concrete elapsed time. Inform the Engineer at least 48 hours before performing such tests. Perform slump loss testing of the drilled shaft mix using personnel meeting the requirements of Section 105. The Engineer may require a new slump loss test in the event that temperature, environmental conditions, or ~~change in~~ structural conditions change.

Delete the words “change in”.

Response:
From the Specifications office: Words have been deleted. See response to Steve Sheffield's comment above.

3. **346-6.1 General**: Ensure the QCP includes any anticipated requirements for adjusting the concrete at the placement site. Include the testing procedures that will be implemented to control the quality of the concrete and ensure that concrete placed is within the ~~target~~ *tolerance* range.

Delete extra space before “tolerance”.

Response:
From the Specifications office: Extra space has been deleted.

4. **346-7.7 Adding Water to Concrete at the Placement Site:** Perform an initial slump *test* before the addition of water at the jobsite. If the slump *value,* ~~is~~ *as* delivered*,* ~~within~~ *is outside* the ~~target~~ *tolerance* range, ~~no water will be added to~~*reject* the load. If the slump *value* is ~~outside the target range but is~~ within the tolerance range, that load may be adjusted *by adding water provided the addition of water does not exceed the water to cementitious materials ratio as defined by the mix design*. After adjusting the slump, perform a *slump* test to confirm ~~that the slump of~~ the concrete is within the *slump* ~~*tolerance*~~*tolerance* ~~target~~ range as defined in Table ~~6~~*2*. *Perform* ~~Confirm with another~~ *a slump* test *on* ~~that~~ the next load *to ensure the concrete* ~~is~~ within the ~~target~~ *slump tolerance* ~~*tolerance*~~ range. Maintain the slump within the ~~target~~ *tolerance* ~~*tolerance*~~ range on successive loads. ~~Repeated incidents of concrete being placed outside the target range may result in revocation of that portion of the QCP.~~ Do not place concrete represented by slump test results outside of the tolerance range.
Add space between *“slump tolerance”.* and “perform a”.

Response:
From the Specifications office: Spaces have been inserted.

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Comments: (10-20-09)
1. Subarticle 346-3.1, Table 2, Third Column Delete “Value”. It is redundant. There is no reason for not adding the same word in the 2nd and 4th columns.

Response: Value was added to make it clear that the spec no longer has a target range and the word value distinguishes the word target as a value instead of a range.

From the State Specifications Office: No changes made.

2. Subarticle 346-3.1 (a), First Sentence Start a new sentence after, “the maximum allowable slump…” and modify it to read, “The maximum allowable slump shall be 6 inches, except as noted in (b).”

Response: Agree. Change made.

3. Subarticle 346-3.1 (b) Expand note (b) to read, “The Engineer may allow higher target slump when Types F, G, I, or II admixtures are used in concrete. The maximum target slump of 7 inches will be allowed when these admixtures are used in concrete, with the exception of flowing concrete, which the target slump shall be 9.0 inches.”

Response: Agree. Change made.

4. Subarticle 346-3.1 (e) Expand the note to read, “…slump shall be 6 inches, except as noted in (b).”

Response: Same as #2.

5. Section 346-3.2.1 The terminologies “environmental conditions” and “structural conditions” need to be defined.

Response: See response to Duane Brautigam's comment #2.

6. Section 346-3.2.1 (2) At lower temperature placements, there will be a need for admixture adjustment. It should be clarified that the same mix design be used with admixture adjustment to obtain the required slump.

Response: The CMTAG has agreed to this as stated. No change made.

7. Section 346-4.2.2 Certification The word “certification” in this title does not match the description of the proposed specification.

Response:
From the Specifications Office: Added “monthly certification form” to the end of the sentence.
“If any chloride test data exceeds the limits in Table 4, identify the exception on the Construction Compliance with Specifications and Plans ***~~monthly certification~~ form****.”*

SMO Response*: It is not just a monthly certification form. Removed the words monthly certification. The Form title is "Construction Compliance with Specifications and Plans" (700-020-02).*

8. 346-6.3 The delivery ticket includes all the information about plastic properties. How can the contractor verify that the delivered concrete complies with the requirements of Table 4 without

testing hard concrete, unless the certification is based on chloride content of concrete materials ingredients?

Response: The chloride results shown on the delivery ticket represents the design mix. No change made.

9. 346-6.4, Second Paragraph, Last Sentence In the sentence, "…if adjustments are not implemented, the engineer may reject the concrete … until corrections are implemented.", the word "may" should be changed to "shall" or "will".

Response: By specifying that the Engineer must reject the concrete, we do not allow construction personnel to determine to not reject for contract administration reasons.

From the State Specifications Office: No changes made.

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Comments: (10-26-09) (Comments by Diego Pagan of Leesburg Operations)
There are typos in 346-3.2.1(6): "…equal to the midrange…" And SUBARTICLE 346-7.7: "…to ensure the concrete is…"

Response:
From the Specifications Office – These typos have been corrected. (10-26-09)

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Ron Holcomb
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Comments: (11-2-09)
346-3.2.1- Slump loss test requirements The proposed revision states that; The Engineer may require a new slump loss test in the event that temperature, environmental conditions, or change in structural conditions change. Then, in note 2; (2) The slump loss test is performed at a temperature consistent with the highest ambient and concrete temperatures expected during actual concrete placement. This test may be used for lower temperature placements without any admixture adjustments.

COMMENT: This would seem to be open to interpretation, as the engineer can require a new test for a change in temperature or environmental conditions. In effect, if the ambient temperature decreases, no admixture adjustments need to be made, based on Note 2; yet since it was a temperature or environmental change, a new test could be required. Requiring multiple slump loss tests for varying ambient conditions results in additional expense, possible delays to

the project, and the environmental impact of disposing of the concrete used for the slump loss test.

Response: The language has been clarified by providing a minimum temperature change that will trigger another slump loss test. Also, see response to Duane Brautigam's comment above.

Comments: (11-2-09)
346-6.4 Plastic Properties Tolerances- The statement; "If adjustments are not implemented by the next load of concrete, reject the concrete and terminate further production until adjustments are implemented", implies that the subsequent load, which may already be in transit, would be rejected regardless of the plastic properties, if an adjustment is not noted. In previous versions, there was an allowance for concrete in transit; The Engineer will take into consideration trucks already in route from the concrete production facility after the facility has been notified. This previous wording could be amended to state that the Engineer will take into consideration trucks already in route from the concrete production facility after the facility has been notified, as long as those trucks in route meet the plastic property tolerances, and the water-cement ratio for the class of concrete has not been exceeded.

Response: If a load fails, any trucks in transit must meet the plastic property requirements. These trucks are to be tested and will only be rejected if the plastic property requirements are not met. The language has been clarified.

Comments: (11-2-09)
346-6.4 Plastic Properties Tolerances - As long as the allowable jobsite water and the water-cement ratio for the class of concrete is not exceeded, it would seem that slump adjustments to concrete less than the tolerance could be allowed. Two sets of criteria would be used for the basis of rejection or acceptance, such as concrete with a tested slump over the allowable tolerance will be rejected. Concrete with a slump less than the allowable tolerance can be adjusted to within the tolerance range as long as the allowable jobsite water and the water-cement ratio requirements are not exceeded.

Response: The tolerance range is the range the Department has determined to be acceptable. Material outside the tolerance range is to be rejected. If the concrete is starting out that low, there is something wrong with the quality control of the material and must be addressed. No change made.

Comments: (11-2-09)
346-9.4 and 346-12- The revision of 346-12 seems unfair and unclear- payment based on plastic properties, “fee of twice the invoice price will be assessed” for plastic properties. It would seem that the statement is aimed to prevent placing concrete with excessive slump, when adjusted at the site with allowable water. Since the statement in 346-9.4 states “will accept at full pay only LOTs of concrete represented by plastic properties which meet the requirements”, would the “twice the invoice” affect only one load as stated in 346-12, or the entire LOT it represents? It would seem if the concrete met the hardened properties, that “twice the invoice price” is a stiff penalty for a slightly low air test or a slump ¼” too tight due to waiting to discharge, especially if

a replacement load is not readily available within the allotted time to avoid losing the structure being placed.

Response: 346-12 states that the pay adjustment will be on the placed load only, not the entire LOT. The Engineer has the authority to concur with the placement of the concrete if the possibility of losing the structure is a legitimate concern. See response to Bill Sears for further explanation of this provision.

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No Name

Comments: (11-3-09)
346-3.2.1 In the last sentence of the first paragraph, "or change in structural conditions change". Awkward, suggest or structural conditions change. The active voice and rewording added clarity.

Response:
From the Specifications Office: This has been changed. See response to comment #2 from Duane Brautigam.

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JC Miseroy
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I had some comments on the proposed 3460301 Portland Cement Concrete Specification. Hopefully you can still consider these comments, even though I missed the deadline.

1. 346-6.4 Plastic Property Tolerances. We would like to be able to add water to delivered concrete when the slump is within tolerance, but low for placement purposes. Of course this would only work if the water added was still within the allowed WC ratio.
2. 346-7.7 Adding Water to Concrete at the Placement Site. To conform with our proposal above, we would suggest changing 'is outside' in the second sentence to 'is above'. As discussed above, this would permit the addition of allowable water to produce a more workable concrete.

Thanks for your consideration of these comments. JC Miseroy

Response: The revised spec allows water to be added to the concrete as long as it arrives at the site anywhere within the slump tolerance range after the slump is determined by test. After water is added, as determined by another slump test, as long as the slump does not exceed the upper limit of the tolerance range then it can be placed as long as the W/C ratio is in compliance. See response to Ron Holcomb's second comment above.

From the State Specifications Office: No changes made.

From the State Specifications Office (1-4-10):

SMO made some minor changes to 346-8, 346-9.2, and 346-9.6 to clarify language.

The following sentence was moved from -9.6 to -8,
“On concrete placements consisting of only one load of concrete, perform initial sampling and testing in accordance with this Section. The acceptance sample and plastic properties tests may be taken from the initial portion of the load.”

The following sentence was moved from -8 to -9.2,
“The Department may perform Independent Verification testing to verify compliance with specification requirements.”