3460000 Portland Cement Concrete
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Comments: (3-6-12) Attached are changes to 346-12 from SCO Internal Review. When placing concrete, the contractor may place part of the load before the QC results are known. This change is needed to clarify that the penalty is only applied if the contractor places the rest of the load after the QC results indicate that the plastic properties do not pass. This language should clarify the intent.

Response: Change Made, Spec's office.

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Lipham, Randall
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Comments: (3-19-12) 346-6.2 Concrete Design Mix: *"For slump target values in excess of 6 inches or self consolidating concrete, utilize a grate over the conveyance equipment to capture any lumps or balls that may be present in the mix."* As proposed, this will require all conveyance equipment to have a grate to prevent the introduction of lumps and balls. We feel that should be at the discretion of the Engineer and only on an as needed basis. If lumps and balls in the concrete mix are consistently not present; a grate over transport devices should not be required.

Response: No change made. This language incorporates the requirements of Materials Bulletin 07-10. Materials Bulletin 05-11 defines requirements for precast/prestressed facilities. This comment will be provided to the Structural Materials Field Operations Section for incorporation into Materials Manual Section 8.1.

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Williams, Jennifer
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Comments: (3-20-12) Within 346-2.3 --- delete 'with exceptions listed below.' There are no exceptions. Flyash or slag is required for all mixes.

Response: Agree. This has been interpreted as an exception, but it is not. Changes have been made to clarify the different proportions.

Within 346-3.1 --- Why the exception? Usually, we require air entraining for all design mixes.

Response: The air entrainment requirement is required to disperse the bubbles. This change is to coordinate all classes as having the same air requirement, except for Drilled Shaft which has always been 0.0 to 6.0. Drilled shaft concrete has a very high slump which can result in an air content of less than one percent.

Within 346-3.2 --- The proposed revision would require an unnecessary number of slumploss tests. Our last drilled shaft job had a temperature variation from 46^0 to 98^0. How many slumploss tests would this require? Also, the revision could require unnecessary EAR's.

Where will the slumploss procedure be located?

Response: The temp range has been removed reducing the slump loss test. The slump loss procedure has been moved to Materials Manual Section 9.2 Volume II.

Within 346-6.2 --- Use of a grate in precast/prestress concrete is impractical and unnecessary. I believe the intent of the grate is for drilled shaft concrete.

Response: Precast/prestressed requirements will be detailed in changes to Materials Manual Section 8.1.

I also suggest that slotted grates on many pump trucks are sufficient. The opening would be larger than 2.5 inches in one direction.

Response: Agree. Changed to allow for openings greater than 2 ½" inches as long as one opening does not exceed 2 ½ inches.

Within 346-7.2 --- We do not agree with the decrease in mixing revolutions to 130. Also, we suggest increasing the total allowable drum revolutions to 350.

Response: No change made. The producer indicates the number of mixing revolutions on the concrete delivery ticket. When water is added, it requires an additional 30 mixing revolutions. No water may be added after 160 mixing revolutions have been reached. Based on this, at the jobsite, no water may be added if the mixing revolutions have reached 130.

Within 346-7.2.2 --- The 15 minutes would be impossible on some pours.

Response: No change made. If more time is needed, a Change Order needs to be processed to allow for additional time with coordination with the District Materials Office

Within 346-7 --- This section can be condensed. We suggest wording such as 'Obtain acceptance samples from the point of final placement unless authorized by the Engineer. If not sampled at the point of final placement, perform a comparative sampling correlation approved by the engineer.'

Response: No change made.

Also, the 'discharged within 20 minutes' contradicts the above 346-7.2.2.

Response: The 20 minutes referred to as transferring from the truck mixer to the bucket is part of the total transit time. If it takes longer than 20 minutes (which is part of the total 105 minutes) the samples must be taken from the bucket. If not, the samples must be taken from the bucket. The 15 minute allowance is after the transit time. Any placement operations that take longer than 15 minutes must be addressed by the PA, regardless of what equipment is used for placement. No change made as this is not a conflict.

Within 346-8 --- This section is too long. It can be condensed to clarify the intent of not pouring concrete out of tolerance and rejecting concrete after a failing test.

Response: No change made. The language is designed to address all the possible scenarios for placing concrete. Concrete is often placed before it is known to be out of tolerance. We don't want to stop the placement operations (which is often multiple trucks at the same time) until it is known that the concrete is out of tolerance.

Within 346-9.1 --- 6th paragraph, "Compare the averages of the QC results and Verification results."The word "average" is unnecessary and could be confusing. The compressive strength result is an average. I suggest "Compare the QC result to the Verification compressive strength result."

Response: Change made.

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Comments: (3-26-12) **346-3.2** *"If the elapsed time during placement exceeds the slump loss test data, perform an engineering analysis to determine if the shaft is structurally sound."*

In the event the elapsed time is exceeded, and the pour is continuing, I suggest performing a slump test every 15 or 30 minutes. If a slump test fails and the concrete placement continues, then perform an engineering analysis, if the slump test passes, then no engineering analysis is necessary. My intent is reduce time consuming and costly paperwork.

Response: The current language requires that each truck be tested for slump. This is sufficient. No change made.

346-3.2 Suggest adding the Engineer's option to core the drilled shaft foundation in addition to excavating.

"At the direction of the Engineer, excavate and/or core the drilled shaft for inspection."

Response: Coring is unnecessary with CSL requirement. No change made.

346-3.3 Fourth paragraph: Suggest adding, "The temperature readings will continue until the maximum core temperature is reached and a decreasing temperature is confirmed." This would be in addition to the temperature differential.

Response: No change made. The maximum core temperature is already monitored as part of determining the differential.

346-8 Fourth paragraph: *"Immediately cease concrete discharge of the subsequent truck if the QC truck has failing tests and perform a slump test of that truck. Immediately cease discharge*

and reject the remainder of the subsequent truck if its slump test fails and reject the remaining concrete of loads that fail plastic properties tests as soon as the test results are known. Perform slump tests on all trucks that arrive at the site prior to the first corrected truck."

Suggest performing all plastic property tests on subsequent trucks or at least the failing test in addition to the slump. If the air content was high on the first truck, testing the slump on the subsequent truck would be inconclusive.

Response: This language change is based on input from Construction that multiple truck placements are common. No change.

346-8 Fourth paragraph: Allowing multiple trucks to discharge at the same time may make it very difficult to identify the limits of failing plastic properties or compressive strength concrete that may need to be removed/repaired. This could also be very confusing for the inspectors during construction. Recommend additional Quality Control testing technicians to speed up placement rather than discharging multiple trucks prior to the test results of the QC test.

Response: This language change is based on input from Construction that multiple truck placements are common. No change.

346-12 A plastic property pay penalty should not be applied to precast products because it will not be applied consistently.

The pay penalty works for cast-in-place concrete because the results of the plastic property tests are recorded in LIMS. This allows all involved in the project to view the test results and appropriately address failures.

Precast concrete test results are not recorded in LIMS. This data is only maintained by the producer. It will be up to the producers to report the failure their client, the Contractor, and apply the pay penalty to themselves. It will also be up to the producers to estimate the quantity of concrete placed to determine the amount of the pay penalty. FDOT will be unable to verify this information during a quarterly inspection.

There is no FDOT Engineer at a precast plant to give permission to place failing plastic property concrete like there is on a construction site.

If the product is accepted based on certification from the producer and not on concrete strength, is a pay penalty in Specification 346 appropriate?

Response: This pay reduction should be applied when there are plastic properties failures regardless of the application. Future changes to precast QC program requirements will address the Department's ability to verify the data and if the failing material was placed. No change made at this time.

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Katie Bettman

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Comments: (3-28-12) : Change the second sentence of the first paragraph of 346-3.1 to, "Strength and slump are specified in Table 2." In 346-3.2, the Contractor is directed to perform an engineering analysis if the concrete temperature or the elapsed time during placement exceeds the average slump loss test data. The requirements of the engineering analysis need to be defined. State who performs testing and what needs to be submitted.

Response: Additional language added to clarify EAR requirements and who can perform.

For precast and prestressed concrete facilities, Materials Bulletin 05-11 allowed for the rejection of concrete with lumps or balls or the use of a grate as an alternative. If they were not having issues with lumps and balls, they were not required to use a grate. 346-6.2 now states, "For slump target values in excess of 6 inches or self consolidating concrete, utilize a grate…" It doesn't incorporate the allowance for precast and prestressed concrete facilities.

Response: Change made.

In the second sentence of 346-7.2, remove the word mixing. The sentence should read, "Do not add water after the total number of drum revolutions exceeds 130." At the production facility, a truck initially is mixed 70 to 100 revolutions at mixing speed. When water is added, the truck is mixed an additional 30 revolutions at mixing speed. The cutoff of when water is allowed to be added should be in terms of total revolutions since that is what the truck keeps track of. I thought this is why the specification was changed from 160 to 130.

Response: Change made.

346-7.2.2 describes a placement time in addition to the transit time stated in 346-7.2.1. I think this specification could be read differently by different people. Clarify the meaning of final placement position. I think some will read this as a 15 minute extension of the transit time requirement, not as a separate and additional requirement. Also, the time extensions that have been allowed through a no cost change order have all previously been given with respect to the transit time. I think the statement about a time extension approved in advance by the Engineer should be in 346-7.2.1.

Response: The purpose of 346-7.2.2 is to ensure that the concrete gets out of the truck and into the forms within 15 minutes. Anything longer than that will require the Engineer's approval. In addition to this new subarticle, language will be added to the CPAM to describe the approval process (in advance, by change order, with DMO recommendations, etc.). No change made.

Change the third sentence in 346-7.7 Sample Location to, "Include provisions in the QCP to sample the plastic concrete for all testing at the point of final placement except where noted below." The way it currently is written, testing from final placement only has to be done when the concrete plastic properties could be affected. The "when" could be changed to a "since" or the entire explanation could be removed.

Response: Changes made to describe QCP and sampling requirements.

The fourth and fifth sentences of the third paragraph of 346-8 specify that two technicians are needed if a placement site has multiple concrete trucks. Most placement sites have multiple concrete trucks to complete a concrete pour, but they are not being discharged at the same time. Most pours also have just one technician. I think the intent of this specification is that a project with multiple placement sites pouring at one time needs to have one technician per placement site placing concrete.

Response: Changes made to clarify the requirements.

346-8 discusses initial and acceptance plastic concrete sampling and testing. The first sentence of the fourth paragraph of 346-8 needs to be left in the specification for initial delivery tests. It should state, "Do not proceed with the placement operation until the initial QC tests confirm that the delivered concrete complies with the plastic properties specified."

Response: No change made. The first sentence is struck at the request of Construction so that placement is not halted until it is known that there is a QC failure.

The added language in the fourth paragraph of 346-8 needs to be clarified. The word acceptance should be added to QC testing to differentiate this testing from the initial testing. It states that a subsequent truck may also discharge, but doesn't state that the truck being tested may discharge once the sample has been taken. When the plastic properties fail and a subsequent truck is being discharged, the specification requires a slump test of the subsequent truck. Slump is not the only plastic property that could have failed. I think all plastic properties would need to be tested. If the plastic properties of the subsequent truck pass, the specification doesn't address if the LOT would still be terminated and what takes place. This new language brings up a lot of new questions. This paragraph needs to be coordinated with the seventh and eighth paragraphs of 346-8 as well as 346-12.

Response: The word acceptance has been added.

The second paragraph of 346-9.1 does not agree with the requirements in the Materials Manual for precast plants. For incidental precast, the inspector is only required to perform a monthly inspection and has the option of observing quality control sampling and testing or performing the verification tests. The Materials Manual does not limit the option to perform inspections in lieu of tests to Class I and II concrete or plastic properties.

Response: The second paragraph is not intended to apply to Incidental Precast. It was added as part of the remove restrictions for precast other than incidental. Change made.

The first sentence of the last paragraph of 346-9.1 should not be changed. It's a little wordy, but it clearly states what is to be done. This was previously changed because it was confusing of whether the QC and Verification results were to be averaged together. The "are" in the second to last sentence of the last paragraph of 346-9.1 should be changed to "is." It would read, "When the difference between QC and Verification is less than or equal to the Comparison Criteria, the QC data is verified."

Response: Change made.

Concrete pavement for Specification 350 is paid per square yard. Concrete pavement for Specification 353 is paid per cubic yard. I think LOT Size for Class I (Pavement) should be in cubic yards since this is how the concrete delivered is measured. I think this will make it easier to keep track of LOTs, it's how we measure LOTs for all the other Classes except Class III (Seal), and it will make the Maximum LOT Size a fixed quantity rather than dependent on the thickness. I would recommend changing the 2,000 yd2 in Table 8 to 500 yd3.

Response: The lot size was revised to match Section 350 pay item requirements. Concrete pavement is measured and paid in square yards. Thickness is not used to determine lot size in a square yard measurement. No change made.

346-9.2.1 states for reduced frequency that the samples have to be, "produced at the same concrete production facility, the same prime contractor and subcontractor, on a given Contract." This doesn't work for precast and prestressed production facilities. Even without the added language, this requirement doesn't work for the precast and prestressed production facilities, which can pour multiple projects at the same time. If I were to leave this language in the specification, I would add the word "for" prior to "the same prime…" Also, the added requirement was only put on the Class IV or higher and not the lower than a Class IV.

Response: This comment will be passed on to the State Materials Office Precast/Prestressed Field Operations Section. Changes to Section 8.1 addressing lot size will also include information regarding how to apply reduced lots

In the second paragraph of 346-9.5, the Engineer determines whether the QC or verification strength test results can be relied upon. If the Engineer determines that neither is in error, the concrete is based on the QC data. In the third paragraph, it describes deeming the QC or the verification strength test results to be the most accurate in order to determine a pay reduction. The third paragraph and second paragraph should use the same language to describe how the QC test results will be evaluated and when the pay reduction will be assessed. If the QC data is not determined to be the most accurate but is not determined to be in error, no pay reduction will be assessed.

Response: Change made.

In the second paragraph of 346-9.5, the Engineer has four days to inform the QC and the Verification labs to transport their "hold" cylinders. The labs then have three days to transport their "hold" cylinders to the resolution lab. With these time frames, it is sometimes difficult to "ensure that the QC and verification "hold" cylinders are tested within seven days of the acceptance strength tests."

Response: No change made at this time. Additional investigation will be done to review Resolution processing times.

I'm not sure why that requirement is placed on the Engineer.

Response: The Engineer or his designee is responsible for determining if Resolution is needed. Based on this, we require the Engineer to notify QC and V to ensure hold cylinders are broken within the 7 day time from.

Also, there is no specification if this does not occur or if there is a lost, missing, damaged, or destroyed "hold" cylinder.

Response: If the QC "hold" cylinder is lost, missing or destroyed, a pay reduction should be applied for that cylinder as well.

Delete "from the specified minimum strength" in the first sentence in 346-10.1.

Response: Change made.

The second paragraph of 346-10.1 gives the Contractor two options for investigating low strength concrete for structural adequacy. The first option is to furnish a structural analysis performed by the Specialty Engineer. This option would also most likely require cores, but is not specifically stated. The second option requires the Contractor to furnish drilled core samples as specified in 346-10.3. 346-10.3 requires the Contractor to furnish the cores and 346-10.4 states that the Department will test the cores. The second paragraph of 346-10.1 goes on to state that the Contractor will obtain, test, and report the data to the Engineer within 14 days of the 28 day compressive strength. This conflicts with 346-10.3 in which the Contractor furnished undamaged cores and with 346-10.4 where the Department tests the cores. Also, the investigation is supposed to be at no additional cost to the Department. That is difficult to do if the Department is testing the cores. In order to determine payment reductions, 346-11.2 also states that the Contractor will submit the core samples and the Engineer will test the cores. This conflict needs to be clarified.

Response: Language has been changed to reflect that the testing is performed by the contractor. Originally the Department was responsible for core testing as there were not many labs qualified under ASTM C-42. Currently there are more labs available to perform the core testing.

The second paragraph of 346-10.1 states that the Contractor will obtain, test, and report the data to the Engineer within 14 days of the 28 day compressive strength. 346-11.6 gives instructions how to make core strength adjustments for cores tested later than 42 days after the concrete was cast, but the specification doesn't actually allow the cores to be tested outside of the 42 days. The allowance to test cores outside of the specified timeframe and any other action needed to be taken needs to be stated in the specification.

Response: Language has been revised to clarify that the formulas are to be used for data outside of the 42 day limit. The Specification does not restrict the cores from being taken after the 42 days and we need a way to determine the equivalent test strength at 28 days.

346-12 needs to be written in terms of when results are known and what is placed. It also needs

to be coordinated with 346-8. With the allowance of a subsequent truck or load to be placed, this creates more scenarios to be explained in terms of the pay reduction and what quantity to assess the pay reduction on. I think the following statement will not be interpreted the same by everybody: "If concrete fails a plastic properties test and is thereby a rejected load but is placed, payment for the concrete will be reduced."

Response: No change made. 346-12 is general language intended to cover all the types of material placements. 346-8 is intended to allow for multiple placements. No change made.

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Pat McCann

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Comments: (3-29-12) 346-2, General, "*in excess of the Sections listed above*." doesn't read well. Do we even have a tolerance for such materials in concrete? If we do then the wording should be" in excess of that specified in the above Sections."

Response: Change made.

346-3.2; Third paragraph, do we define the "initial concrete temperature" or the "acceptance concrete temperature"?

Response: This language was removed based on other comments.

346-7.6 This section addresses adding water but the term adding water and adjusting the slump are being interchanged. For consistency please eliminate reference to adjusting the slump and stick with adding water.

Response: Change made.

346-7.8; Fourth paragraph, last sentence; If the QC truck is at the site why would we wait until the other loads are discharged to test the QC load?

Response: In the case of pump operations with multiple trucks discharging simultaneously, it is important that the sample represent only the concrete in the QC truck. This would be the only exception to multiple trucks discharging simultaneously. This sentence has been reworded for clarification.

346-9.2.1; First paragraph, the added text *the same prime contractor and subcontractor*, seems to missing words.

Response: Subarticle reworded for clarification.

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Neil Monkman
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Comments: (4-12-12) Per your memo I have reviewed the proposed specification revisions and offer the following: Overall I feel the proposed revision are a significant improvement and my thanks to those that participated in it. The proposed changes offer much clarification and remove unneeded redundancies. There was only 1 item that I wanted to offer further comment on. It appears that the 45 minute and 90 minute discharge time limits are being removed, but I did not see anything that reduced, increased or revised the time criteria. If I missed it please excuse me. My opinion for years has been that no mix should be discharge after the "initial set" time that is usually established during the mix design stage and can range from 1 to 3 hours depending on the mix.

Response: This is not being removed. It is being moved from 346-7.6 to 346-7.2 so that all information related to transit time is in one subarticle.

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Jeff Begovich
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Comments: (4-18-12) With respect to 346-9.4 I would recommend paragraph 2 and 3 to include the following language as it relates to lost, missing, damaged or destroyed cylinders. This is a more fair determination as there have been instances were cylinders were secure on site and destroyed by non related construction accident, or even stolen for someones driveway. Additionally, I believe the penalty for a lost, missing, damaged or destroyed cylinder is too high. I would recommend reducing the $750.00 to $500.00, When one of the three QC cylinders from a LOT is determined by the department to be lost, missing, damaged or destroyed as a result of the contractor' or subcontractor's negligence, determination of compressive strength will be made by averaging the remaining two cylinders. If more than one QC cylinder from a LOT is determined by the department to be lost, missing, damaged or destroyed as a result of the contractor's or subcontractor's neglegence, the Contractor will core the structure at no additional expense to the Department to determine the compressive strength. Acceptance of LOT may be based on verification data at the discretion of the Engineer. Obtain the approval of the Engineer to core, and of the core location prior to coring. For each QC cylinder that is lost, missing, damaged or destroyed, payment for that LOT will be reduced by $500.00 per 1,000 psi of the specified design strength [Example: loss of two Class IV (Drill Shaft) QC cylinders that has no verification data will require the element to be cored and a penalty pay reduction will be assessed (4,000 psi / 1,000 psi) x $500.00 x 2 = $ 4,000.00]. This reduction will be in addition to any pay adjustment for low strength.

Response: The formula has not been changed. There is no intent to reduce the penalty. No change made at this time.

Ron Holcomb
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Comment: (4-24-12) Type: 3460000
Text: Do not use materials containing hard lumps, crusts or frozen matter, or that is contaminated with dissimilar material in excess of the Sections listed above. Comment 346-2.1- This seems to be a good clarification ----------

Response: Thank you for the input.

346-2.3 Pozzolans and Slag: Fly ash or slag materials are required in all classes of concrete, with exceptions listed below. Use fly ash or slag materials as a cement replacement, on an equal weight replacement basis, in all classes of concrete with the following limitations: Comment 346-2.3- This should exclude section 353 Pavement replacement mixes. Section 353 references 346 Class I pavement, which is exempt from the above statement, per 4 (d) below. Is further clarification of this required in the spec?

Response: Section 353 has language not requiring pozzolans or slag beginning with the July 2011 workbook. No change is needed in Section 346 as exceptions to 346 for 353 are listed in 353.

Additionally, section 457 Cathodic Protection Pile jackets reference 346 Class IV, but have a statement that fly ash, slag, or silica fume is not allowed. Is further clarification of this required in section 346? ----------

Response: Section 457 is a Special Provision. No changes will be made to Section 346 based on 457 restrictions.

Use admixtures in accordance with the manufacturer's recommended dosage rate. Dosage rates outside of this range may be used with written recommendation from the admixture producer's technical representative. Do not use admixtures or additives containing calcium chloride (either in the raw materials or introduced during the manufacturing process) in reinforced concrete. Comment 346-2.5- Clarifies this issue. ----------

Response: Thank you for your input.

346-3 Classification, Strength, Slump and Air Content. 346-3.1 General: The separate classifications of concrete covered by this Section are designated as Class I, Class II, Class III, Class IV, Class V and Class VI. Strength, slump, and air content of each class are specified in Table 2. The air content range for all classes of concrete is 1.0 to 6.0%, except for Class IV (Drilled Shaft) which is 0.0 to 6.0%. Comment 346-3- In addition to Drill Shaft concrete, Mass Concrete should also be 0% to 6%. For consistency, all concrete classifications should be at 0% to 6%, there is no significance of an air content of 1.0% as compared to an air content of less than 1.0%. ----------

Response: Mass concrete does not have a separate air content requirement since it is not restricted to a certain class. No further changes are being made at this time.

Comments 346-3.2 Drilled Shaft Concrete-

1. Where does the anticipated ambient temperature come from? NOAA? Someone from the site?

Response: This language has been removed

2. The total temperature range of 15 degrees F (plus 5 degrees, minus 10), is too restrictive. The plus 5, minus 10 ambient is even more restrictive when the concrete temperature has to be within the same "plus 5, minus 10" of the concrete temperature of the slump loss test. This could dictate several slump loss tests to complete a single day production of multiple shafts, as it is common to have 20 to 30 degree temperature swings during the day. What happens when a large shaft is started when the temperature is 60 degrees, and the concrete batched using the matching slump loss, and the ambient temperature rises to 85 degrees before the shaft is complete? Is it expected to have 2 or 3 different batched formulas for concrete going into the same hole (which is a stable temperature in any ambient condition just a few feet below the surface)?

Response: This language has been removed.

3. IF a ready-mix concrete company decided to continue producing drill shaft concrete under this spec, they would need to plan for lots of waste concrete from the slump loss tests alone.

Response: The temperature range requirement has been removed.

4. Would there be project delays while trying to coordinate additional slump loss tests for every 10 degree change in ambient temperature?

Response: The temperature range requirement has been removed.

5. The entire process of slump loss tests needs to be discussed before this is implemented, as this will become almost impossible to construct drill shafts without incurring a penalty. ----------

Response: No penalties will be applied as long as the elapsed time has not been exceeded.

Comment 346-4.1 Master Proportion Table: The maximum cementitious content is an issue if a mass concrete is required to have silica fume and surface resistivity testing, as to achieve the surface resistivity requirements requires more than 752 pounds of cementitious. This will also be an issue in a mass concrete using #89 coarse aggregate, as 752 pounds will not yield the required strength over-design for mix approval. In #89 mixes, this limitation also dictates a very low water content with silica fume. The limitation dictates an impractical water content with ultra-fine fly ash. ----------

Response: The requirement has been removed.

Comment 346-6.1 Control of Quality- the slump loss process varies by district- this may not work well in districts 4 and 6 , as the slump loss is project specific. There are slight differences in how the slump loss results are documented, by district. Examples- In District 5, a new number (suffix) is assigned to each slump loss test. In Districts 1 and 7, the results are attached to the mix design, but the same mix number used even when there are multiple slump loss tests performed on the same mix number. ----------

Response: Requirement has been removed from this section.

346-6.2 Concrete Design Mix: Provide concrete that has been produced in accordance with a Department approved design mix, in a uniform mass free from balls and lumps. For slump target values in excess of 6 inches or self consolidating concrete, utilize a grate over the conveyance equipment to capture any lumps or balls that may be present in the mix. The grate must cover the entire opening of the conveyance equipment and have square or rectangular openings that are a maximum of 2 1/2 inches in either direction, Remove the lumps or balls from the grate and discard them. COMMENT 346-6.2 Concrete Mix Design- The original statement "in a uniform mass free from balls and lumps" needs to be changed to be consistent with the new statement, which covers the use of the grate and discarding the lumps and balls. ----------

Response: No change made.

346-6.3 Delivery Certification: Ensure that an electronic delivery ticket is furnished with each batch of concrete before unloading at the placement site. The delivery ticket may be proprietary software or in the form of an electronic spreadsheet, but shall be printed. Ensure that the materials and quantities incorporated into the batch of concrete are printed on the delivery ticket. Include the following information on the Delivery Ticket: (1) Arrival time at jobsite, (2) Time that concrete mix has been completely placeddischarged, Comment 346-6.3 (2) Delivery Certification- This is a good change, "completely discharged" is easier to document, whereas "completely placed" is open to interpretation. ----------

Response: Thank you for your input.

346-7.2 Transit Truck Mixing: When water is added at the jobsite, mix the concrete 30 additional drum mixing revolutions. Do not add water after. When the total number of drum mixing revolutions exceeds 160130, do not make additional mix adjustments. Discharge all concrete from truck mixers before total drum revolutions exceed 300. Seek approval from the Engineer prior to using a central mixer and depositing the batch into a truck mixer. Comment 346-7.2 Transit Truck Mixing- this is effectively the same statement, as water can not be added after 130 revolutions AT MIXING SPEED, to stay below the maximum of 160 revolutions at mixing speed. Is the statement "additional drum mixing revolutions" and "total number of mixing revolutions" as clear as stating "additional drum revolutions at mixing speed" and "total number of revolutions at mixing speed"? ----------

Response: No change made at this time, suggestion is being looked at.

346-7.2.2 Placement Time: All the concrete in a load must be in its final placement position a maximum of 15 minutes after the transit time has expired unless a time extension is approved in advance by the Engineer. Comment 346-7.2.2- Good clarification of discharging and placement time allowances. ---------- Perform slump tests on all trucks that arrive at the site prior to the first corrected truck. When more than one truck is discharging into a pump simultaneously, discharge all trucks completely prior to discharging a truck designated for QC testing into the pump and discharge a sufficient quantity of concrete from the end of the pump hose to obtain a representative sample of concrete from only the QC truck.

Response: Thank you for your input.

Comment 346-8- This change may allow for faster placement at the start of a project. ----------
A rejected load in accordance with 346-6.4 is defined as the entire quantity of concrete contained within a single ready mix truck or other single delivery vehicle regardless of what percentage of the load was placed. If concrete fails a plastic properties test and is thereby a rejected load but is placed, payment for the concrete will be reduced. The pay reduction for cast-in-place concrete will be twice the invoice price per cubic yard of the quantity of concrete in the rejected load. The pay reduction for placing a rejected load of concrete into a precast product will be applied to that percentage of the precast product that is composed of the concrete in the rejected load. The percentage will be converted to a reduction factor which is a numerical value greater than zero but not greater than one. The precast product payment reduction will be twice the Contractor's billed price from the Producer for the precast product multiplied by the reduction factor. If the Engineer authorizes placement of the concrete, even though plastic properties require rejection, there will be no pay reduction based on plastic properties failures; however, any other pay reductions will apply.

Response: Thank you for your input.

Comment 346-12- The "single ready mix truck" is clear, but the added "however, any other pay reduction will apply"--- as long as the other properties are achieved there would be no adjustments, correct? Why would there need to be a pay reduction if the load of concrete did not exceed the water cement ratio, based on plastic properties if the concrete is placed?

Response: That is correct. If there are no other instances where a pay reduction would be applied such as low strength or lost or missing cylinders, no other pay reductions will be applied. Each occurrence that will result in a pay reduction will be reviewed separately.

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Vulcan Materials Company

Comment: (4-25-12)

3.2) The 15° F "window" will require at least 3-4 slump loss tests &/or approved mix designs for the same drilled shaft mix design.

Also, during a single placement, it appears that two different mixes will likely be used for many placements. For example, if the temperature at the start of a placement is 3° F above the average for the mix, then the temperature rises to 6° F above the average during the placement, a switch to a mix with a higher average temperature would be required.

If I am understanding this correctly, this will obviously cause problems in the field.

7.2) The 130 revolutions may very well be too low, even for as short as a 15 minute delivery. What is the justification for this value? This may essentially not allow water adjustments upon initial arrival at the jobsite. Would not mixers be shut down prior to adjustment at the jobsite if the 120 limit is anticipated to be exceeded?

8, para. 7) The previous paragraph speaks to testing trucks before rejecting them. However, this extension to the sentence states rejecting "any other loads that have begun discharging", but does not call to test those load(s).

9.4) The inclusion of the word "missing" raises suspicion when I think most consider it the same as "lost". Please explain why "missing" needs to be included.

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Response: This language has been removed.

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Response: No change made at this time.

8, para. 7) The previous paragraph speaks to testing trucks before rejecting them. However, this extension to the sentence states rejecting "any other loads that have begun discharging", but does not call to test those load(s).

Response: The language was added to allow for trucks to continue to be placed while the QC tests are being performed. If the QC tests fail and the Contractor elects to place concrete, all trucks involved in the placement before tests were known will need to be addressed.

9.4) The inclusion of the word "missing" raises suspicion when I think most consider it the same as "lost". Please explain why "missing" needs to be included.

Response: There have been instances in the past where the cylinders were not physically lost by project personnel. This language is intended to convey that the Contractor is responsible for securing the cylinders in a manner that they will not be stolen, lost or go missing.