

**4000700 – PLACING, CURING AND PROTECTING CONCRETE  
RESPONSE TO COMMENTS FROM INDUSTRY REVIEW**

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Bruce Trott  
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**Comments**

Our response is that we are okay with the 15 mph limit based on historical weather data around the state. However, as far as the evaporation rate, we recommend to remove footings and slabs from the requirements and leave it at the current rate of 0.2. The Department could mandate fogging on all bridge decks as a precaution, however we do not feel that the 0.1 restriction is achievable on very many projects.

**Response**

Footings and slabs will be removed. The 0.1 limit accurately reflects the bleed rate of FDOT concretes which have low W/C ratios and; therefore, do not bleed as much as routine building concrete which the 0.2 limit was based on. It is true that many projects will require measures to ensure that the evaporation is controlled but these measures are not expensive. For example, the estimated cost of evaporation retarder (material only without application labor) is \$120.00 per 15,000 square feet of deck or the equivalent of coating a 50 foot wide by 300 foot long bridge deck.

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John Previte

**Comments**

Subject section is improved by encompassing weather in general instead of limiting it to temperature, but I think the prescribed measurement interval ("periodically") is too vague and the corrective measures are not stronger than the previous version.

**Response**

Periodically is used to allow flexibility by the Contractor and corrective measures are stronger because the evaporation limit that requires measures is 0.1 which is reduced from 0.2.

If I am the CEI, I need the interval of moisture loss measurement to be a function of the area of exposed surface and/or evaporation rate and I need an enforceable, more specific mitigation procedure.

**Response**

This office prefers to give the Contractor discretion about how often to monitor since weather conditions can vary from very constant which would need infrequent monitoring to very variable which would need very frequent monitoring.

When evaporation is higher than 0.1 lb/ft<sup>2</sup>/hr, the correction (only examples are given) and the effectiveness thereof can not be challenged given the suggested text.

**Response**

That is the intention; however, if the Contractor repeatedly violates the specification the CPPR can be used to encourage improved practice.

If the problem stated in the origination form is to be facilitated I think we at least need a limit evaporation when the operation must be halted or enclosed. (It is more specific about when the operation can not be planned or started)

**Response**

Once the concrete placement begins, it is not the intention of the spec. to force the Contractor to stop since the ultimate responsibility for concrete cracks that might occur as a result are his; however, if the Contractor repeatedly violates the specification the CPPR can be used to encourage improved practice. Also, if cracks do occur, the new 400-21 specification makes it very clear who will be responsible for the cost of correction and exactly what correction will be required which may include removal of the cracked component.

The revision better **addresses** the problem but I am not convinced the section has been sufficiently **strengthened** for the CEI.

**Response**

The primary purpose of this specification is to increase the quality of the final product. Making it easier for CEI staff to administer the specification is not a goal of this revision.

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Jeff Moore  
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**Comments**

400-7.1.3 Remove the reference to slabs or footings. On a widening project or very small footers, this would be impractical

**Response**

Agree; will be revised.

400-16.1 Change proposed to "Until curing has begun, retain concrete surface moisture at all times by maintaining a surface moisture evaporation rate equal to or less than .2 lb/sf/hr" .1 lb/sf/hr is unreasonable unless it is mandated that fogging or retarder must be used at all times.

Response

Disagree; see comments addressed to Bruce Trott

400-16.1 Change "Peroidally, at the site" to a definate time period of every 100 cy or every 2 hours. Peroidally is too subjective and open to interpretation.

Response

Disagree; this office prefers to give the Contractor discretion about how often to monitor since weather conditions can vary from very constant which would need infrequent monitoring to very variable which would need very frequent monitoring.

400-16.1 Change "If the evaporation is. or is likely to become" to "If the evaporation is .2 lb/sf". Is likely to is too subjective.

Response

Based on the day's forecast, the evaporation conditions before the start of a placement may be favorable but later in the day they could look like there might be a problem; hence, the term "or likely to be". If there is uncertainty then plan on rescheduling or using a measure that will control evaporation such as evaporation retarder.

400-16.1 Add a wind screen should be an acceptable measure to prevent moisture loss

Response

The specification gives examples which do not include wind screens but these can be effective and can be used; however, they would probably be far more expensive than using evaporation retarder. For example, the estimated cost of evaporation retarder (material only without application labor) is \$120.00 per 15,000 square feet of deck or the equivalent of coating a 50 foot wide by 300 foot long bridge deck

400-17.13 Leave in the days requirements. On smaller project it will be a hardship for the schedule to wait the 10 days as proposed.

Response

Disagree; however, Specification 400-17.14 allows the Contractor to break beams to establish the concrete strength for earlier loading and the Department is working on a change that would allow cylinder breaks instead of the more expensive beam breaks

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Donald Barnhouse  
D5/FDOT

Comments

400-7.1.1...should it read 45 degrees and falling.

Response

400-7.1.1 is not included in this spec. review.

Spraying the metal forms with fresh cool water?

Response

400-7.1.1 is not included in this spec. review.

Maintaining a moisture evaporation rate of less than 0.1 lb/ft2/hr ?  
Measuring the wind velocity with weather forecasting to not exceed 15mph?  
I truly understand all this but it is very scientific for a contractor?.

Response

Disagree

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Andy Clark  
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Comments

I believe it is important that our Industry be made aware of problems encountered during construction, the cause/factor(s) thereof and what may have been done by which those incidences could have been avoided. However, unless the occurrence is going beyond "rare", I don't believe we need to "re-invent the wheel". I assume this revision is being prompted by a somewhat recent problem with a bridge deck (ramp?) in the Jacksonville area. Does the Department have any statistics on this issue?

Leave it alone unless it becomes a more evident problem.

Response

In the last 5 years at least 20 bridge decks have had significant curing related cracking which makes this concern more than just an occasional isolated problem. This new spec helps Contractors avoid costly rework that might occur because of poor curing practices.

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Richard Ayers

[RAyers@superiorfla.com](mailto:RAyers@superiorfla.com)

Comments

I have the same questions. What is the big problem? Is there going to be a meteorologist somewhere on the job and hopefully he will have a moisture evaporation rate calculator.

Response

The evaporation rate calculator is a free web based site that only requires the input of 4 weather parameters in order to output evaporation rate and is very easy to use. In the last 5 years at least 20 bridge decks have had significant curing related cracking which makes this concern more than just an occasional isolated problem. This new spec helps Contractors avoid costly rework that might occur because of poor curing practices.

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[Keith Waugh](mailto:kwaugh@lewarecc.com)  
[kwaugh@lewarecc.com](mailto:kwaugh@lewarecc.com)

Comments

I'm wondering where there has been a big problem that now warrants the monitoring, reporting, and additional work that will come from these revisions. Will this change add value? It will definitely add cost. Now, not only will the technician be testing concrete, he'll be an amateur meteorologist. Ultimately, I see it adding another technician on each pour, not to mention the reporting (and monitoring of reporting by the Department). Change for the sake of change is not good.

Response

See Dave Sadler's comments below.

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[Dan Turner](#)

Comments

400-7.1.3 Wind Velocity Restrictions. This spec. simply prohibits any placement of concrete on decks, footings & slabs when the wind is predicted to reach 15 mph at the placement site. If this spec. had been in place in the early 90's, we could not have built the Acosta Bridge, the Blount Island Bridge, or the Buckman Bridge, to cite just a few. I was there during the construction of those structures, and the wind speeds were always high and rarely not present. I would suggest

adding some provision for the Contractor to present a method of keeping the concrete from drying out to preclude the fiasco found in the Blanding Blvd. approach bridge last year. Such a proposal should require Departmental approval and have to be in writing. If the Contractor is forced to wait until “the gentle breezes blow”, the cost of placing concrete for most bridges is going to be unnecessarily high.

**Response**

A review of historical weather data shows that average sustained wind speeds of 15 mph or more versus gusts of 15mph or more are rare in Florida. If the Contractor is prohibited from placing concrete because of excessive wind and if the deck placement is on the critical path then he will be eligible for a weather day.

400-17.3 Time of Placing Superstructure. The requirement to wait for a strength gain for any arbitrary time period, again adds unnecessary costs to the project because “time is money”. A method which has been used by the Dept. in the near past (to determine when concrete may be used) is the development of a “strength gain curve”. Of course the curve development had to be mix specific, use specific, project specific, in writing and pre-approved by the Department.

**Response**

Strength gain curves may be used if approved by the District Materials Office; however, Specification 400-17.14 allows the Contractor to break beams to establish the concrete strength for earlier loading and the Department is working on a change that would allow cylinder breaks instead of the more expensive beam breaks.

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Robert V. Robertson, Jr.

**Comments**

Excerpt from 400-16.1 .....Until curing has begun, retain concrete surface moisture at all times by maintaining a surface moisture evaporation rate less than 0.1 lb/ft<sup>2</sup>/hr, particularly for top surfaces of bridge decks, slabs and footings.

If we intend for this requirement to be valid for all pours equally, why add the phrase "particularly for top surfaces.....". This adds ambiguity into the requirement as if this is only critical to top surfaces and may be deleted or forgotten on other surfaces. Delete this portion of the paragraph.

**Response**

Agree.

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David Sadler

Comments

There have been enough instances of cracking in decks to warrant this spec change. While the bridge deck in I-295 that required removal is the most notable, there have been others that have had cracking, albeit less severe. This is not change for changes sake, will not require meteorologists but will add value to the quality of the concrete.

It is interesting that the requirement for weather monitoring has been a contract requirement since prior to 2004. The revision is submitted to clarify the requirement. As for additional costs, there are commercially available, handheld devices that will perform the required temperature, humidity, and wind velocity checks for less than \$200/unit.

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FTBA Structures Committee

Comments

At the FTBA meeting held 10/18/06 in Tampa the following was suggested by various FTBA members: set the requirement for checking the wind velocity forecast at 24 hours prior to concrete placement instead of not specifying a time as the specification reads now.

Response

Disagree, because the Department intends to give Contractors as much flexibility as possible in decision making . For example, if a Contractor needs 36 hours advance notice for deck placement then a 24 limit in the spec may cause unnecessary inconvenience or expense to the Contractor. Or if the Contractor only needs 12 hours notice then the 24 hour limit could cause a needless delay if by waiting 12 hours the forecast could change to favorable.

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