

Lee Randell, P.E.

From: Herring, Dan <dherring@hwlochner.com>
Sent: Tuesday, June 23, 2020 3:54 PM
To: Lee Randell, P.E.; danderson@munster.org; Cortney Beale (cbeale@indot.in.gov)
Cc: John D. Hilsen; Mike Herz (mherz@walshgroup.com); Arena, Marc; Brad Dailey, P.E.; Christopher King; Shelton, Matt
Subject: RE: [EXTERNAL] Re: SUBM-0004 Concrete Mix Designs, B-36229

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Lee – I wanted to informally get back to the team on the mat foundation mix as that work is upon us.

A few notes below on the lower cement content mix for the foundation:

- No objection to 3631XM mix proposed including lower total cementitious content for the mat foundation of the tunnel. I understand a trial batch is on-going, so this is subject to the success of that trial batch.
- I am waiving the water curing. The concern with water curing is thermal shock of the surface of the concrete for these thicker than normal placements (if water curing introduces cold water to the slab and sucks out the surface heat too quickly this causes risk of thermal cracking). So my direction is to avoid the water curing and go with membrane curing.
- Don't strip side forms for 168 hours, this eliminates heat escaping too quickly from the sides of the placement.
- In addition to membrane curing, use a curing blanket with an R value of 1, apply the curing blanket directly following the application of the curing compound (we may need to discuss practical timing here). R-1 Insulation is a concrete insulation blanket that is about 1/4" to 3/8" thick OR 3/4" thick dry plywood OR 1/2" extruded polystyrene board insulation. Do not use thicker blankets. Hold blanket on slab for 168 hours.
- Limit fresh batch temp to ~80 (at the plant).

Happy to discuss in further detail with the team as needed.

Best- Dan

From: Lee Randell, P.E. <lrlandell@dlz.com>
Sent: Monday, June 22, 2020 12:19 PM
To: Herring, Dan <dherring@hwlochner.com>; danderson@munster.org; Thomas Brasseur (thomas.brasseur@cn.ca) <thomas.brasseur@cn.ca>; Brett Westcott (bwestcott@knightea.com) <bwestcott@knightea.com>; Cortney Beale (cbeale@indot.in.gov) <cbeale@indot.in.gov>
Cc: John D. Hilsen <jhilsen@reltd.com>; Mike Herz (mherz@walshgroup.com) <mherz@walshgroup.com>; Arena, Marc <marena@walshgroup.com>; Brad Dailey, P.E. <bdailey@dlz.com>; Christopher King <cking@reltd.com>; Shelton, Matt <mshelton@hwlochner.com>
Subject: FW: [EXTERNAL] Re: SUBM-0004 Concrete Mix Designs, B-36229

In accordance with the SEOR's previous comments, attached are revised concrete mix designs for the underpass structure. Trial batches for each mix design are being conducted today. Mix 3631M is for use in the walls, and mix 3631XM is for use in the slabs.

Lee Randell, P.E. | Civil Engineer

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From: Atkins, Thomas <thomasatkins@ozinga.com>
Sent: Monday, June 22, 2020 10:35 AM
To: Herz, Michael <mherz@walshgroup.com>
Cc: Lee Randell, P.E. <lrlandell@dlz.com>; Babcock, Zach <zachbabcock@ozinga.com>; Lackey, Brian <brianlackey@ozinga.com>; Hoeffler, John <johnhoeffler@ozinga.com>; Hart, Eric <erichart@ozinga.com>
Subject: RE: [EXTERNAL] Re: SUBM-0004 Concrete Mix Designs, B-36229

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Mike,
Please find attached the revised mix design submittal we discussed. Please let us know if you need anything further.
Thank you,

Thomas Atkins

OZINGA

From: Herz, Michael <mherz@walshgroup.com>
Sent: Monday, June 22, 2020 10:41 AM
To: Atkins, Thomas <thomasatkins@ozinga.com>
Cc: Lee Randell, P.E. <lrlandell@dlz.com>
Subject: RE: [EXTERNAL] Re: SUBM-0004 Concrete Mix Designs, B-36229

Okay. Thank you Thomas.

Mike

From: Atkins, Thomas <thomasatkins@ozinga.com>
Sent: Monday, June 22, 2020 9:22 AM
To: Herz, Michael <mherz@walshgroup.com>
Subject: RE: [EXTERNAL] Re: SUBM-0004 Concrete Mix Designs, B-36229

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Mike,
I can make those changes, however, the mixes will have different identification numbers.

3616M would change to 3631M

3616XMR would change to 3631XM

I will make these changes to the new mix numbers and resubmit.
Thanks,

Thomas Atkins

OZINGA

From: Herz, Michael <mherz@walshgroup.com>
Sent: Monday, June 22, 2020 10:02 AM
To: Atkins, Thomas <thomasatkins@ozinga.com>; Babcock, Zach <zachbabcock@ozinga.com>; Lee Randell, P.E. <lrandell@dlz.com>
Cc: Hartwig, Mark <mhartwig@walshgroup.com>
Subject: RE: [EXTERNAL] Re: SUBM-0004 Concrete Mix Designs, B-36229
Importance: High

Thomas,

I spoke to Lee this morning and we both feel that based on the EOR's comments below we are able to reduce the cement content of the 3616 mix designs.

The following are the changes I would like to see incorporated:

Mix Design 3616M –

- Reduce the Cement content to 658 lbs (SS 702.01)
- Do not exceed 30% cement substitution by weight (SS 702.05)
- Water/Cement ratio goal to be 0.40 (CIB page 159)
- Allowable Consistency/Slump to be 6in (CIB page 88)
- Allowable admixtures to be as listed on CIB page 88.

Mix Design 3616XMR –

- Reduce the Cement content to 658 lbs (SS 702.01)
- Do not exceed 30% cement substitution by weight (SS 702.05)
- Water/Cement ratio goal to be 0.40 (CIB page 159)
- Allowable Consistency/Slump to be 6in (CIB page 88)
- Allowable admixtures to be as listed on CIB page 88.
- Leave INDOT #11 aggregate as substitute for INDOT #8. (CIB page 159)

At the end of the day we need to achieve 5,000 psi in 28 days. The additional time needed to reach 550 flexural strength of the 3616XMR mix will be outweighed by the workability of this mix around the reinforcing design. Let me know your thoughts and if these changes can be used at the 1:00pm scheduled trial batch.

Lee, if you have any additional comments, please provide.

Thanks.

Mike

From: Atkins, Thomas <thomasatkins@ozinga.com>
Sent: Monday, June 22, 2020 6:38 AM
To: Herz, Michael <mherz@walshgroup.com>; Babcock, Zach <zachbabcock@ozinga.com>
Cc: Hartwig, Mark <mhartwig@walshgroup.com>
Subject: RE: [EXTERNAL] Re: SUBM-0004 Concrete Mix Designs, B-36229

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Michael,
I was told we needed the 728 pounds of cementitious materials to meet the railroad specification. We can cut it back to 658 pounds if that's what they want to do. The slag percentage can also be increased to lower the heat of hydration. I have a QC technician scheduled to be at the Gary plant this afternoon to help test the concrete and make cylinders. Please let me know if the EOR wants to make a change.
Thank you,

Thomas Atkins

OZINGA

From: Herz, Michael <mherz@walshgroup.com>
Sent: Saturday, June 20, 2020 1:04 PM
To: Atkins, Thomas <thomasatkins@ozinga.com>; Babcock, Zach <zachbabcock@ozinga.com>
Cc: Hartwig, Mark <mhartwig@walshgroup.com>
Subject: FW: [EXTERNAL] Re: SUBM-0004 Concrete Mix Designs, B-36229

Thomas,

Below is a response from the EOR concerning the XMR mix design. It seems he is willing to lower the required 728 lbs of cement to reduce the 6000psi mix to the 5000psi required. What are your thoughts on his comments?

Mike

From: Herring, Dan <dherring@hwlochner.com>
Sent: Friday, June 19, 2020 5:31 PM
To: Lee Randell, P.E. <lrlandell@dlz.com>
Cc: Arena, Marc <marena@walshgroup.com>; Herz, Michael <mherz@walshgroup.com>; John D. Hilsen <jhilsen@reltd.com>; Christopher King <cking@reltd.com>; Dustin Anderson <danderson@munster.org>; Shelton, Matt <mshelton@hwlochner.com>; Cortney Beale (cbeale@indot.in.gov) <cbeale@indot.in.gov>; Brad Dailey, P.E. <bdailey@dlz.com>
Subject: [EXTERNAL] Re: SUBM-0004 Concrete Mix Designs, B-36229

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Thanks Lee.

A few immediate notes below.

This mix is a 6000 mix (3616XMR) so a bit more strength than needed. Has this mix been used elsewhere? Putting an unproven unique mix into production without trial batching - too much risk for all parties so I am glad to see the trial batching but still not much time to complete this - that is a concern.

A few comments for the good of the project on this mix (3616XMR) below:

I am not opposed to an increase in slump as this will be a pump mix placed relatively quickly - I could flex the spec to 6"+\ - 2" for purposes of workability if Walsh prefers. Also the mix is over strength, more strength equals more heat. Summer is here and heat will likely be an issue. I am not opposed to bringing cement content down so long as we get the 5000psi needed by CNRR and the STR design requirements at the end of the day. Please talk these items over with Walsh and Ozinga.

Still looking for heat control program for whatever mix is used and trial batching results prior to my approval.

Best - Dan

On Jun 19, 2020, at 4:23 PM, Lee Randell, P.E. <lrandell@dlz.com> wrote:

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Attached are mix designs from Ozinga. 3616XMR was received this afternoon. 3616M was previously provided. Material components in each mix design are preapproved in accordance with INDOT's approved materials lists. Although trial batch demonstrations are not required under INDOT SS 702.05, trial batches are scheduled for 6/22/20. The current schedule for the bottom slab pour is the night of 6/25/20.

Respectfully,

Lee Randell, P.E. | Civil Engineer

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lrandell@dlz.com | www.dlz.com

<image001.gif>

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From: Herring, Dan <dherring@hwlochner.com>

Sent: Friday, June 19, 2020 3:24 PM

To: Lee Randell, P.E. <lrandell@dlz.com>; Marc Arena <marena@walshgroup.com>;
mherz@walshgroup.com

Cc: John D. Hilsen <jhilsen@reltd.com>; Christopher King <cking@reltd.com>; Dustin Anderson <danderson@munster.org>; Shelton, Matt <mshelton@hwlochner.com>

Subject: Fwd: SUBM-0004 Concrete Mix Designs, B-36229

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Gents - Where are we at on this issue? I understand Lee has been coordinating with Ozinga and Walsh. I am available Monday morning to discuss but out of town this weekend.

Best - Dan

Begin forwarded message:

From: "Herring, Dan" <dherring@hwlochner.com>
Date: June 18, 2020 at 5:57:00 PM CDT
To: "John D. Hilsen" <jhilsen@reltd.com>, "Christopher King <cking@reltd.com>
(cking@reltd.com)" <cking@reltd.com>, "Dustin Anderson (danderson@munster.org)"
<danderson@munster.org>, "Lee Randell, P.E." <lrandell@dlz.com>
Cc: "Shelton, Matt" <mshelton@hwlochner.com>
Subject: RE: SUBM-0004 Concrete Mix Designs, B-36229

Team:

Further thought on this issue... In reviewing the contract specifications it is not possible to get through the required trial batch procedure quick enough for the bottom slab placement next week and this will create an issue for approval and schedule. In addition, I'd like to see Walsh's thermal control program for their placement.

In thinking about the issue, I note that there are other mix designs alternative to the 3616M mix proposed which have already been trail batched and tested on other regional projects produced by Ozinga for 5000psi concrete. Some that we are aware of have good workability, excellent service life characteristics, low heat and are less costly to produce than the 3616M mix proposed here. We are thinking this may be the only path forward to maintain schedule and allow approval to move forward in time for the bottom slab placement planned for next week.

Let's discuss tomorrow.

Best Regards, Dan

Daniel W. Herring, P.E., S.E.
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From: Herring, Dan
Sent: Tuesday, June 16, 2020 1:30 PM
To: John D. Hilsen <jhilsen@reltd.com>; Christopher King <cking@reltd.com>
(cking@reltd.com) <cking@reltd.com>; Dustin Anderson (danderson@munster.org)

<danderson@munster.org>; Lee Randell, P.E. <lrاندell@dlz.com>

Cc: Shelton, Matt <mshelton@hwlochner.com>

Subject: RE: SUBM-0004 Concrete Mix Designs, B-36229

Team:

Lee and I just spoke and he is running down a trial batch on the 3616M slag mix design with Ozinga which is prudent and covered under 702.05. Our primary concern is that Walsh is comfortable with the 1" top size aggregate proposed (versus say a ¾" top size) and that the slump is line with what they need for their means and methods of consolidation – the USP allows for the adjustment in aggregate top size as it specifically deleted the classes which would require #8 coarse aggregate. We require running a trial batch with both 1 inch as proposed as well suggest a ¾ inch top size mix trial batch to see which one Walsh prefers. The ¾ inch top size mix will be easier to consolidate. Lee confirmed that the materials being used are approved materials and these comments are considered satisfied. Based on this the original comments are reduced to the following with some satisfied (shown by strike thru) and some still in play.

- We are receptive to the Slag Mix 3616M – **this will be used.**
- The USP allows wide flexibility in the mix including reduction of the top size aggregate if Walsh prefers a smaller top size (say ¾") for purposes of easing consolidation of the concrete – **Suggested running a ¾" top size trial mix as well to see which Walsh prefers for purposes of consolidation.**
- ~~Provide Cement Certs~~
- ~~Provide Admixture Certs~~
- ~~Provide GGBFS Cert~~
- ~~Provide Gradation Reports for Coarse and Fine Aggregate~~
- Provide Set Time Curves (this is critical for the top slab compatibility with the Contractors proposed shoring system) - **this only applies to the top slab so there is plenty of time to get to this answer.**
- ~~Provide Slump before and after admixture addition~~
- Provide Trail Batch Strength Testing results including Air Content and Slump – **it's important to recognize this will be a pump mix so the mix should be proportioned to make sure it comes out of the pump nozzle at the project required slump and air. I wouldn't be opposed to running the slump up a bit prior to the pump so Walsh can maximize workability at the pump nozzle. Additionally, have Ozinga make some trial batch cylinders sets (in addition to beams) for direct testing of the compressive strength requirement required by the contract (5000psi).**

I will stay tuned for information coming out of the trail batch. Based on the schedule Lee noted to me, there is still time to get the above done and everyone satisfied prior to the bottom slab placement.

Best- Dan

<WALSH B36229A MUNSTER - 3616XMR.pdf>

<SUBM-0004 Ozinga Gary - B36229 Mix Designs.pdf>