

Fall 2020 National Concrete Consortium Webinar Questions and Responses

Alkali-Silica Reactivity Questions	Response	Speaker
Have you done repeatability tests? It seems that a benefit to the small sample sizes and small amount of aggregate would be increased sampling	Yes we have done lots of repeatability tests. We were sensitive to the small aggregate sample size. We ran tests on the same MADOT aggregates a year apart and the results were the same. We have tested many aggregates more than once and would be pleased to provide the test results if you would like to see them.	Arnold
For the information of the attendees - In 2021, over 1 million tons of harvested fly ash will be made available to concrete manufacturers. This supply is in addition to the supply from operating power plants. Thomas Adams- American Coal Ash Association	(Comment.)	Tennis
Is lithium available anymore with lithium in high demand for batteries in electric cars?	There are admixture producers still listing lithium based admixtures on their websites. With the high demand from other industries, there may be economic issues with these products, but I would not know for sure. Typically the most practical solution is using the right amount of slag cement, fly ash or other pozzolans.	Tennis
How often do the silanes have to be applied to effectively mitigate ASR?		Folliard
Is epoxy injection of cracking due to ASR effective?		Folliard
Any indication that structures should be retreated with Silane?		Folliard
How would T-Fast test results fit in with the R 80 recommendations?		Folliard
Is the timing of the treatments (e.g. silanes) important? For instance, if you apply Silanes shortly after construction would they be more effective than applying once the distress shows?		Folliard
Can you send the source of the data that shows correlation with block farms		Folliard
Does Silane have to be reapplied regularly?		Folliard
Additional data and pictures available for silane sealing applications on pavements?		Folliard
Are there environmental restrictions on the use of silanes in Europe? Have you seen restrictions on use of silanes in North America?		Folliard

All else being the same, will the absorption capacity of the aggregate reduce the ultimate effectiveness of in-service ASR mitigation techniques. Some of the ASR gel formation may be more prevalent within the pores of highly absorptive aggregates, which may be beyond the reach of the lithium.		Folliard
Any opinions on using Lithium Nitrate Admixtures in new concrete mix design for ASR Mitigation due to declining production of Fly ash ?		Folliard
Light-Weight Cellular Concrete Questions		
In using large volumes, are there any issues with shrinkage?	In the geotechnical fill environment, LCC shrinkage is not generally observed in the field due to its location in the ground and the lack of drying that occurs. If the likelihood of shrinkage is a concern, covering the fill to reduce evaporation or adding curing water will minimize the moisture loss. The long-term moisture condition for both density and shrinkage should be designed to stay consistent, either wet or dry. Shrinkage can be assumed to be between 0.5 and 1.0 percent for most mix designs. The actual field mix should be tested prior to installation if excessive shrinkage is a concern.	Halsted
Do you know when the guide will be available?		Halsted
Has the Federal Aviation Administration been approached about the use of LCC?	LCC blocks or panels are used as a kinetic energy dissipating system. Essentially a runaway truck ramp for airplanes, this system is a bed of engineered LCC built at the end of a runway to reduce the severity of the consequences of a plane leaving the end of the paved runway, and has been adopted by the Federal Aviation Administration for use in airports around the country.	Halsted
What is the price range of LCC?	LCC is typically cost competitive with other fill materials currently being used, but actual costs can vary by geographical location and project requirements. The big cost savings are realized because it takes less time, personnel, and equipment to install - all of which positively impact a project's budget.	Halsted
Heat generation can be an issue with lift thickness since LWCF insulates with all the air.	(Comment.)	Halsted

<p>It is intended to act as earth fill. Are geotechnical properties available?</p>	<p>While LCC is usually comprised of only portland cement, water, and air (preformed foam), there can be a vast number of possible mix designs to achieve the desired engineering properties. The introduction of supplementary cementitious materials like fly ash or slag, along with chemical admixtures and aggregate (fine, coarse, or lightweight) into the LCC to change the fresh and hardened properties adds to the complexity of characterizing its physical properties. Fresh properties include density, viscosity, lateral fluid pressure, and set time, while hardened properties include strength, cohesion and friction angle, modulus of elasticity, air content, drying shrinkage, and permeability/sorption.</p>	<p>Halsted</p>
<p>Any issues with high LOI ashes or ashes with activated carbon breaking down the preformed foam?</p>	<p>High carbon content fly ashes may tend to break down the preformed foam, and therefore should be avoided in LCC mixes.</p>	<p>Halsted</p>
<p>How do form pressures compare with cellular concrete as compared to typical concrete? Is additional bracing needed?</p>	<p>LCC is placed into its final location as a fluid material that then hardens and sets over the following 8 to 12 hours. During this set period, the formwork or retaining wall must support the entire hydrostatic force of the lightweight, fluid LCC. While the LCC is light, its horizontal pressure is not reduced as it is in backfill soil, since it is fully liquid. This force may be reduced by limiting the lift height of the LCC placements. It is very important to understand that a day after its placement, the LCC has completely solidified and is no longer providing any fluid pressure against the formwork or wall. In applications where LCC is placed behind precast walls, temporary bracing is required.</p>	<p>Halsted</p>
<p>What is the permeability of the final cured product? Seems like water would run through it depending on void structure.</p>	<p>The understanding of the permeability of LCC has improved in recent years. Previous studies and general understanding have been that it exhibits extremely low permeability. Recently, studies have shown that completely saturated LCC exhibits high permeability characteristics; however, when not saturated, is resistant to water passage. The confusion stems from the initial wetting. A completely dry sample, when submerged in water, will rapidly moisten the cement paste within the sample. It then takes on water extremely slowly to ultimately fill the voids.</p>	<p>Halsted</p>

Can cellular concrete be used to raise structures along the coast?	Sea level rise and elevation raise fills are similar to foundation backfills but may be entirely above grade. Elevated LCC seawalls and bulkheads are a type of coastal armoring that can protect shorelines from strong wave action. These types of fills can protect existing development from rising water due to storm surge and baseline sea level rise. This geotechnical application involves formwork and buoyancy considerations.	Halsted
Might want to investigate increasing the lift. Might be able to lower cost.	LCC is typically placed in 4-foot (1.2 meters) deep lifts; however, thicker and thinner lifts are also common. LCC placed in single lifts exceeding 4 feet (1.2 meters) can be challenging for this product. At the present time, 4 feet (1.2 meters) is the industry standard maximum depth; however, installers have successfully placed LCC in single lifts to 10 feet (3.0 meters) under controlled conditions.	Halsted
Are SCMs used in LCC?	While LCC is usually comprised of only portland cement, water, and air (preformed foam), there can be a vast number of possible mix designs to achieve the desired engineering properties. While they can be incorporated, the introduction of supplementary cementitious materials like fly ash or slag, along with chemical admixtures and aggregate (fine, coarse, or lightweight) into the LCC to change the fresh and hardened properties adds to the complexity of characterizing its physical properties.	Halsted
Could LCC be used as a soil replacement in structural fill and bridge approaches?	The use of LCC as an embankment fill, such as at a bridge approach, has been proven successful in many situations. Typical projects include large freight rail grade separation structures constructed using large volumes of LCC paired with precast concrete panel systems. On these types of projects, LCC was used as the "lightweight soil" replacement in the structural and geotechnical designs.	Halsted
What about runaway truck ramps?	LCC blocks or panels are used as a kinetic energy dissipating system for airplane runways, so it seems completely possible that it could be used on a runaway truck ramp. Such an installation would be a bed of engineered LCC built to reduce the severity of the consequences of a truck leaving the end of the paved roadway.	Halsted

Any issues with high LOI ashes or ashes with activated carbon breaking down the preformed foam?	I'm not aware that we've seen such a combination. For the most part, fly ashes with high LOI or activated carbon tend not to be marketed for IDOT use. (What I've heard is that there may be a negative effect for the same reason there are incompatibilities between such fly ashes and conventional concrete AEs.)	Krstulovich
Is it possible that the 5 psi precision is the accuracy of the measurement device and not precision in the test.	While it might be possible, I don't believe we would have based it on that, particularly since the accuracy is dependent on the load range being verified and accounting for that across multiple labs' machines would be difficult to anticipate. My original guess was that we based the 5 psi on a relative proportion of the typical strengths anticipated. However, that doesn't appear to be what we did; so now I'm guessing that we took it from one of the consultant-developed special provisions we had on file.	Krstulovich
PEM Tests State Experiences Questions		
What sample conditioning method was utilized for your surface resistivity tests? (lime water, moist cure room or salt water type solution or other?)	We left the cylinders in the molds for 24 hours at that point we stripped and placed them in a moist cure room.	Bahmer
Dan, how many attended your central training class?	We have about 12 per year, for 2 years now.	Wadley
Did you say that you were going to do 50 linear traverse tests on cylinders with SAM number?	I'm not sure the exact number of samples we have from each motion (more from EB than WB), but it will be in that neighborhood if not more.	Wadley
Would it be unusual to reject 5% of the concrete based on volumetric air? Is the SAM number to low?	I don't know what % we reject on any given project based on low air. Good SAM #'s would be in the 0.05 and 0.30 range, and that usually corresponds to an air content somewhere north of 4% and south of 8%, but it would obviously depend on the mix.	Wadley
Did you do Hardened air with the SAM? Was hardened air used as your proposed criteria to SAM acceptance numbers in the future? But would it have excluded some of them?	Yes we make 2 cylinders to run C-457 on when we run a SAM. Both results will be evaluated to create our proposed Spec. moving forward. Our Field Sheets and Tyler's check sheet helps us to exclude bad SAM runs.	Wadley
I didn't quite follow the conclusion for SS and SF compared to SAM#. If the SAM wasn't used to qualify the mixes...which mixes had "good quality" hardened air? All of them? Seems like SAM excluded some that have good hardened air?	I look at SS as another way of thinking about what the information is telling us. The SAM will be used in the future to qualify a mix, as well as for QC/QA as it relates to SF. Give me a chance to get all our data in and processed and I'll do my best to speak about everything a bit more clearly next time.	Wadley
Can we get a copy of the shadow SAM spec?	We don't have one yet. Working on it. Yes when we get it done.	Wadley

<p>How does the texture of the aggregate e.g. crushed vs rounded and manufactured sand vs. natural sand affect the optimized design?</p>	<p>It does not affect the optimized design gradation at all. It is truly a gradation specification requirement. But, there is a provision in the optimized mixtures specification that indicates the contractor is responsible for workability. Contractor has to put concrete through the paver that looks good and finishes to acceptable standards. If crushed vs. round or manufactured vs natural sand affect the ability to place and finish that is where it will come out in the spec.</p>	<p>McMullen</p>
<p>What is specified MOR and compressive strength??</p>	<p>Our strength spec is a percent within limits approach. Compressive target strength is 4500 psi. Flexural strength target is 650 psi.</p>	<p>McMullen</p>
<p>Is the Wisconsin research project report available?</p>	<p>Yes, https://wisconsindot.gov/documents2/research/0092-17-07-interim-report.pdf</p>	<p>McMullen</p>
<p>Are a lot of WI contractors utilizing the optimized aggregate mix design spreadsheet and how long have they been using it?</p>	<p>Yes, I see the big five paving contractors using optimized gradation on most of their paving. They are required to submit their mix design to the Department with this spreadsheet.</p>	<p>McMullen</p>
<p>How does the specification work when applying the tarantula curve on projects. Is it based on average of lots per sieve or does it look at individual tests going outside of band limits?</p>	<p>The specification breaks into lots of 1500 CY of concrete. One optimized aggregate test per lot and a four point running average of the tests.</p>	<p>McMullen</p>
<p>I attended the class and screwed the test up many times. It was a great class and experience. The techs helped me a lot. Lots of steps to follow in specific order.</p>	<p>(Comment.)</p>	<p>McMullen</p>
<p>Why the limit of 520 lbs. of Cementitious? Why not just based on meeting the strength, durability, etc.?</p>	<p>That is the direction I hope to ultimately move. But, WisDOT wanted the 520 lb. threshold as a interim step. WisDOT was firm on this . They did not want an early problem/failure to occur.</p>	<p>McMullen</p>
<p>Has anyone done any testing with the Surf™ which is a Surface Electrical Resistivity Testing device?</p>	<p>I believe this is the device that Behnke Materials is using on the Performance Engineered Mixtures research study. Otherwise use is limited to those experimenting because it is not required to be used by spec.</p>	<p>McMullen</p>
<p>Would you consider adding training classes in each district?</p>	<p>We do annual concrete pavement inspection classes in each WisDOT region in February - April time frame. The mix design and development is part of the day. WisDOT is supposed to be sending the next season's concrete project engineers to t the class.</p>	<p>McMullen</p>

<p>Is the PEM Concept Initiative only used for slip paving concrete? How is the non slip paving concrete mix optimized where higher slump (4") hand placed concrete is required? Does the 520 min cementitious increase significantly or is the w/c ratio increased?</p>	<p>PEM spec can be used for any paving. There are some small quantity exceptions if the contractor/supplier want s to use them. WisDOT is starting to put some of the PEM requirements into the bridge concrete specs. It is the contractor's option to add additional water if he has room in the W/C requirements of the spec or increase the use of water reducer to get slump requirements for hand pours. I also see some contractors adding cement and water to get the hand pours as well.</p>	<p>McMullen</p>
<p>Has WI considered the new mini beam for flexural strength testing?</p>	<p>Yes, no action to date by WisDOT. They are waiting on FHWA and AASHTO to take the lead. I have some contractor members experimenting with the smaller beams and mix designs with 3/4-inch max aggregate. Stand by it may be a fore front issue soon.</p>	<p>McMullen</p>
<p>The MIRA is available for loan through the FHWA Mobile Concrete Technology Center.</p>	<p>(Comment.)</p>	<p>McMullen</p>
<p>Is the incentive for aggregate optimization based on contractor test results?</p>	<p>Yes, WisDOT is a QC state and they do a quality verification test at a one test per five contractor test frequency.</p>	<p>McMullen</p>
<p>Dowel/Tie Bars Questions</p>		
<p>Do you know how tie bar requirements came to be in Illinois?</p>	<p>I am not aware of when tie bars came to be required in longitudinal construction and contraction joints. It seems to go back at least into the 1970s.</p>	<p>Roesler</p>
<p>Was the MIT Scan also used to scan joints where the shipping wires were not cut? If so, did you use that information in this analysis.</p>	<p>There was not MIT scan used in the field evaluation. We use the multi-array ultrasonic tomography device (MIRA) to do all the locating and they are not affected by whether shipping baskets are cut or not. This only becomes an issue for eddy current devices.</p>	<p>Roesler</p>
<p>Were cracks somewhat uniformly spaced? Any correlation with underlying structures?</p>	<p>In some sections the cracking levels were very high like 1 out of 3 slabs so the number of cracks were much larger than underlying structures and something more systematic in the design/material was going on. In some observed cracks, we did see transverse and longitudinal cracks that seemed to be correlated to the drainage inlets/settlement but this was less frequent.</p>	<p>Roesler</p>

<p>Why require a MIT T2-T3 vs a metal detector for the plastic phase of verification?</p>	<p>A metal detector could be an acceptable alternative. MnDOT opted to go down this path at the same time we were exploring using the MIT-Scan T2 for thickness measurements also. Requiring the Contractor to purchase the device allowed us to use the device for dual purpose efforts. Besides the cost, the MIT-Scan T2 device was easy to use and understand.</p>	<p>Masten</p>
<p>Have you used the MIT-SCAN2-BT to check dowel alignment or only the T2? With baskets the MIT scan can still show if the basket is centered under the joint.</p>	<p>While the MIT-SCAN2 device has much more capabilities in determining acceptable dowel bar basket alignment, the negative is the equipment is used on the hardened concrete. The benefit of the MIT-Scan T2 device is the ability to get enough information in the plastic concrete where this is still a chance to make a change to the operations while paving that day.</p>	<p>Masten</p>
<p>In your experience what is the impact of the type of subbase the baskets are being anchored to on dowel alignment? Do aggregate bases have higher rates of basket movement/misalignment?</p>	<p>We do not see as much misalignment on aggregate bases as we have seen on concrete overlays. We have experienced misaligned baskets on aggregate bases when the Contractor anchors into the top rung of the dowel basket instead of the bottom rung. Inspection will always be important regardless of all the tools available. MnDOT sees the most misalignment on concrete overlays that are anchored into new asphalt and milled asphalt.</p>	<p>Masten</p>
<p>How many transverse cracks did you usually observe in each project? Is it systematic?</p>	<p>Our FHWA report is scheduled for an October 2020 release and has this information on a state by state basis. I will email you a copy when it is released. Bottom line, transverse cracking at most sites is very low and generally speaking related to the thickness of the PCC (and other factors such as PCC strength, widened lane, as I mentioned in my presentation). I am not sure I understand what you mean by systematic, but feel free to reach out to me if you need to discuss. Most sections have very little cracking even when dowels are misaligned (as indicated by a high joint score or a low effective dowel diameter).</p>	<p>Rao</p>

<p>What are your thoughts on reduced number of dowels and moving outer dowel away from pavement edge?</p>	<p>Although not directly related to my presentation, I don't think there is any harm with reducing dowels. The mid lane dowels are somewhat redundant. To reduce corner deflections and corner cracking, I personally believe the two outside dowels on both sides of the slab are the most important. For load transfer the two wheel path dowels also play a significant role. So, I think as long as there are 4 + 4 dowels at each joint, that is sufficient. I would not move the dowel more than 6 inches from the pavement edge (for 12 foot slab widths) and more than 1 ft. from the pavement edge (for 13 foot or higher slab widths). I personally haven't conducted research regarding this item, but reducing corner deflections are important in JPCP.</p>	<p>Rao</p>
<p>is it grease or oil? Isn't there concerns with grease being too thick and creating a void at the bottom of the dowel?</p>	<p>I apologize, I somewhat used those two terms interchangeably. I acknowledge that there is some concern regarding grease (and too much grease) - the point I was trying to make was that locking the joint has more to do with the friction/bond between the bar and the concrete rather than dowel alignment. A light coating of oil sufficient to reduce that friction/bond is likely enough to do the trick.</p>	<p>Rao</p>
<p>Colorado DOT is dropping joint score from our spec. Just using visual inspection of MIT Scan image to make sure bars are present and in "reasonable" alignment.</p>	<p>(Comment.)</p>	<p>Rao</p>
<p>Textile is used on most dowel bar baskets as an alternative to greasing. Have you looked into the effectiveness of the material.</p>	<p>No. That was not the focus of our study.</p>	<p>Rao</p>

<p>For Shree: Did study attempt to correlate cracking with number of consecutive high joint-score joints? Seems that single "poor" joints rarely cause slab cracking, but consecutive ones do.</p>	<p>I understand that the ACPA Guide Spec focuses on consecutive high score joints, and we did look at sections with consecutive high score joints in previous work. I have not seen evidence of midpanel cracking associated with consecutive high score joints (not to say that cannot happen). I believe that in most cases even joint scores as high as 30-40 do not lock up the individual joint, because I think the flaw is in the joint score methodology itself. For example, if joint A has 2 bars with extremely tilts or skews (say 3+ inches) in two critical locations of a joint with all remaining bars with no discernable misalignment, the joint score for that joint would be 21. If joint B has 8 bars with 1+ inch misalignment each, the joint score for that joint would be 41. If I were a betting man, I would say joint A has a higher probability of being locked than joint B. I do acknowledge that there are several cases, which I categorized in my presentation as POOR joints, that can lead to cracking, but most of that cracking, in my opinion, will occur near the joint (likely early age) and not midpanel transverse crack. Another example may be a situation where two joints can have the same high joint score, but if one joint gets that high joint score with tilts and skews in different directions, there is a higher probability of joint lockup, than a joint getting the high joint score with tilts and skews in the same direction.</p>	<p>Rao</p>
<p>Have you investigated a good way to assess the diameter of in-place dowel bars?</p>	<p>No. That was not the focus of our study. My guess is that if design information is not available (or lost), coring (all it takes is one core) may be the only sure fire way of assessing the diameter if in-place dowel bars.</p>	<p>Rao</p>
<p>For Shree: are there compounding effects on dowel bar alignment for higher strength concrete materials? That is, are stronger pavements more likely to have problems with dowel bar misalignment</p>	<p>Good question. This is not an issue when dowels are placed with baskets. When baskets are used, dowel misalignment has little to do with the mix and more to do with the quality of the basket (e.g. welds, stiffness), transport and storage of the baskets, proper construction (pinning the baskets adequately, not stepping on them, etc.). When dowel bar inserters are used, mix properties (slump? consistency? uniformity? coarse aggregates?) and slipform paver vibrators can play a role in the alignment of the dowels.</p>	<p>Rao</p>

<p>Did you look into dowel alignment using MIT scan? This would've likely been limited if the shipping tie wires were left uncut but side shift would still be visible and would hint towards possible inadequate load transfer between slabs?</p>	<p>Yes, we used MIT scan to evaluate dowel alignment. I think I answered this question during the open session. It is actually a misunderstanding that MIT scan cannot be used with shipping tie wires are uncut. That is only true for new construction but not true for older pavements. We evaluated older pavements (many 20+ years old). Over time, the shipping tie wires break off or thin down significantly due to corrosion. This disconnects the magnetic loop effect caused by the transport tie wires that interferes with the measurements and effectively it is like the transport tie wires are cut.</p>	<p>Rao</p>
<p>What is the threshold to determine whether repairing pavement based on dowel misalignment is worth the risk?</p>	<p>I believe this determination should be made on a case by case basis depending on other factors such as number of affected joints, concrete strength, etc. as I mentioned in the presentation. If the dowel alignment is in the POOR category (where baskets are dragged or significantly tilted), the pavement should be repaired. However, if the joint scores are high and your greatest concern is joint locking, then I would recommend measuring joint opening/closing. We did this for a project in Florida which had several joints with joint scores as high as 40. We measured joint opening over a 48 hour period for joints in 5 categories (0 JS, 20 JS with many bars misaligned, 20 JS with few bars misaligned, 40 JS with many bars misaligned, 40 JS with few bars misaligned). If the high JS joints open and close (to the same extent as the low JS joints), then I suggest leaving them as they are and assess the contractor a penalty for potential higher faulting/roughness at that happen in the future.</p>	<p>Rao</p>
<p>We use joint score regularly and a joint score above 30 is very high and typically corresponds to a joint with severe misalignment -- your data shows about 20% of joints fell into this category, which is again very high. In your experience is this an accurate representation of where dowel misalignment is at across the country?</p>	<p>The data represented an overall picture when all projects are considered and not an individual project. The high joint scores are not typical in most projects, so I did not mean to imply that on any given project 20% of joints will have high joint scores. But there have been some projects constructed with poor alignment and high joint scores throughout the entire project and those projects are mostly responsible for the high overall percentages. From my experience, generally speaking on most projects that have good construction and QA practices with an early evaluation of dowel alignment to make sure the construction process is working well, less than 5% and in many cases less than 2% of joints have high joint scores.</p>	<p>Rao</p>

NTPEP (National Transportation Product Evaluation Program) Questions		
Any plans to evaluate steel mills that produce MMFX, stainless or other type of high strength bars?	Yes, these products are currently being reviewed by the NTPEP Product Implementation Task Force.	Malusky
Can NTPEP also take on certifying profilers so all 50 states do not have to do it. This would be treating profilers as products for smoothness testing.	No, NTPEP does not provide any certifications.	Malusky
For the cement evaluation testing, didn't see a reference to ASTM C1157. Is there a consideration of adding ASTM C1157?	Yes, we will look at including C1157 once we get any initial issues with DataMine and/or the testing program resolved.	Waldrop
What blended cements do you allow and for what applications? Specifically Type IS	The program allows all types covered by AASHTO M 240 / ASTM C595 and does not dictate applications for the cement being tested.	Waldrop
In the case of a new import, how long would the approval process conceivably take once the sample is received? Are the data available real time or only as a final report?	Testing labs must complete all samples within 2 months from date of receipt. Data should be available real-time to producers as soon as it's uploaded in DataMine.	Waldrop
What would a cement supplier need to do if a DOT requires testing that is not currently listed in the NTPEP program. For example, T380	DOTs still set all requirements for acceptance on their QPL. The PBC work plan is only intended to provide DOTs with test data and information that the vast majority of DOTs require. If a state in your market requires anything beyond the scope of the NTPEP work plan, producers would still be required to meet those requirements on their own.	Waldrop
If NTPEP is not a pass/fail criteria then what?	NTPEP (and specifically the PBC Program) simply evaluates the products for a set list of criteria, and reports the results to those interested (specifically, state DOTs). It is still left to the approving agency (DOTs) to make the ultimate acceptance/rejection decision based on that data.	Waldrop
What is the status of the Portland Cement testing?	We currently have a revision to the Work Plan out for ballot, and should be ready to receive samples as soon as states start requiring participation in the program.	Waldrop
States need a third party test to accept the manufacturer testing. (TDOT)	(Comment.)	Waldrop
Will the contract labs doing the testing be required to have ACI cement technician certification?	Not currently.	Waldrop
Do you consider a 2 month turn around as reasonable for project level testing?	This program does not replace project level sampling & testing; it only focuses on testing cement as it leaves the mill.	Waldrop

Some DOTs don't require redundant testing but accept CCRL PSP test results as the "third-party" verification of testing abilities and production data. NTPEP would add costs to the manufacturers who already spend approximately \$1/ton of cement produced for Quality Control. How would a quarterly program (representing 250,000 tons of production) be better than the current testing frequency of 2500 tons per day at each cement plant?	States are not required to participate in NTPEP; each program is a tool they *may* use to replace or supplement their own testing program as they see fit. If a state accepts CCRL PSP participation in lieu of their own QA testing, I would expect that they would not choose to participate in this NTPEP program. That being said, this program was developed to be comparable to the majority of state DOT QA testing programs, which require verification testing be performed at some prescribed interval, independently of the producer's own QC testing.	Waldrop
Will this be expanded to pozzolans?	The intention is to get the cement program established & operational first. But yes, we would likely look at expanding to pozzolans in the future.	Waldrop
What is the status of the cement reciprocity program that NCC started years ago where if a cement plant was in one state another state could agree to accept that source as a APL?	This is outside the scope of the PBC technical committee and I cannot speak to the status of this.	Waldrop
Air During Pumping Questions		
How can we get your final research report?	Sent. Request from tyler.ley@okstate.edu.	Ley
Is there a volume change after pumping when the bubbles come back?	No there is not. I think the bubbles form in small pores where water is present. This may just move water within the concrete.	Ley
For Tyler: Sometimes air volume goes up at discharge from the pump. Any theories that explain this observation?	When you have an A frame or arch configuration this creates a vacuum in the line. If the O-rings are bad, I think this can draw air into the concrete and cause the air content go up.	Ley
Dr. Ley makes the case that concrete should be sampled pre-pump with regards to more accurate measurement of air content. However, what about other properties, is there any merit to it being better to sample for those post-pump? I'm specifically thinking about w/cm content, esp. with use of lightweight aggregates.	I don't think there are any properties that are better measured after the pump. We found comparable strength both before and after the pump in our lab testing. You can lose slump but that is not caused by a change in the water content.	Ley
Did you say that air content went UP after pumping or down after pumping when using C231? SAM?	Typically, the air goes down after pumping and the SAM goes up.	Ley
Were SCM's involved in the paste pressure testing? If so same results as straight cement?	There was no difference between the response of OPC and those with fly ash. We did not try other SCMs.	Ley

NRRA Project Questions		
Any thoughts about using this facility for RCC pavements?	It is possible that in the future a RCC pavement could be constructed at MNROAD. The decision would depend upon the research proposal, cost, and National Road Research Alliance (NRRRA) support. RCC has already been utilized at MNROAD to constructed a side walk in front of an office building located at the facility. RCC has also been used in a few full depth pavement repairs on the mainline.	Trautman
When traffic is diverted to the main line are highway speeds still apparent?	Yes, MNROAD was constructed so as to maintain the same speed on the mainline sections as posted for Interstate 94.	Trautman
FYI-driven both sections of I-94 between Minneapolis and Fargo. Big thumb up on concept/process.	(Comment.)	Trautman
MnROAD has done mainline I-94 shoulders - contact Tom Burnham at MnDOT	(Comment.)	Trautman