

NCC State Reports Fall 2016 - What's New

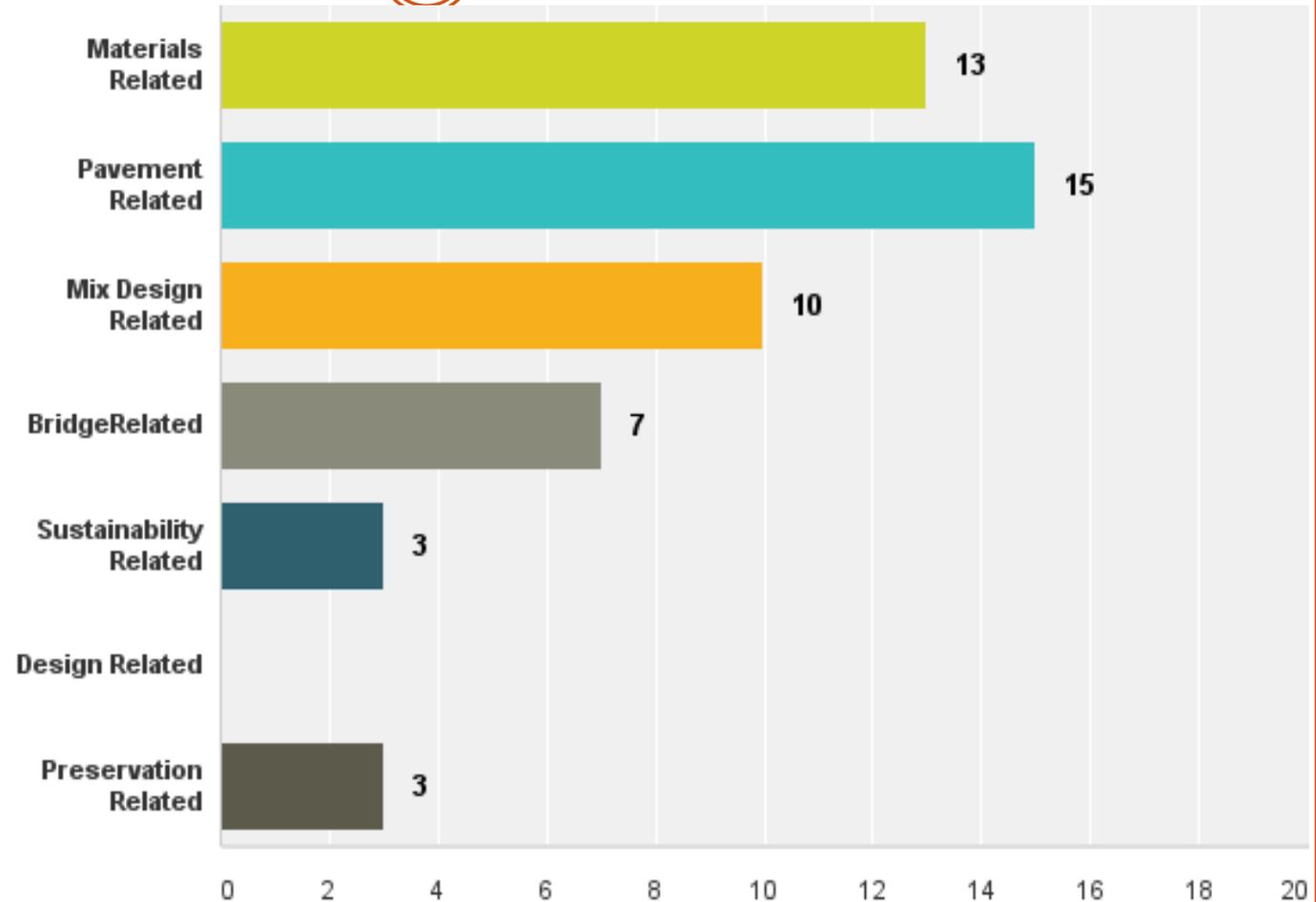


- **Total Responses: 30**
- **Date Created: Wednesday, July 13, 2016**

Q2: What spec are you currently implementing or have recently implemented that may be of interest to other NCC members? Select the topic your answer is most related too (may choose more than 1)

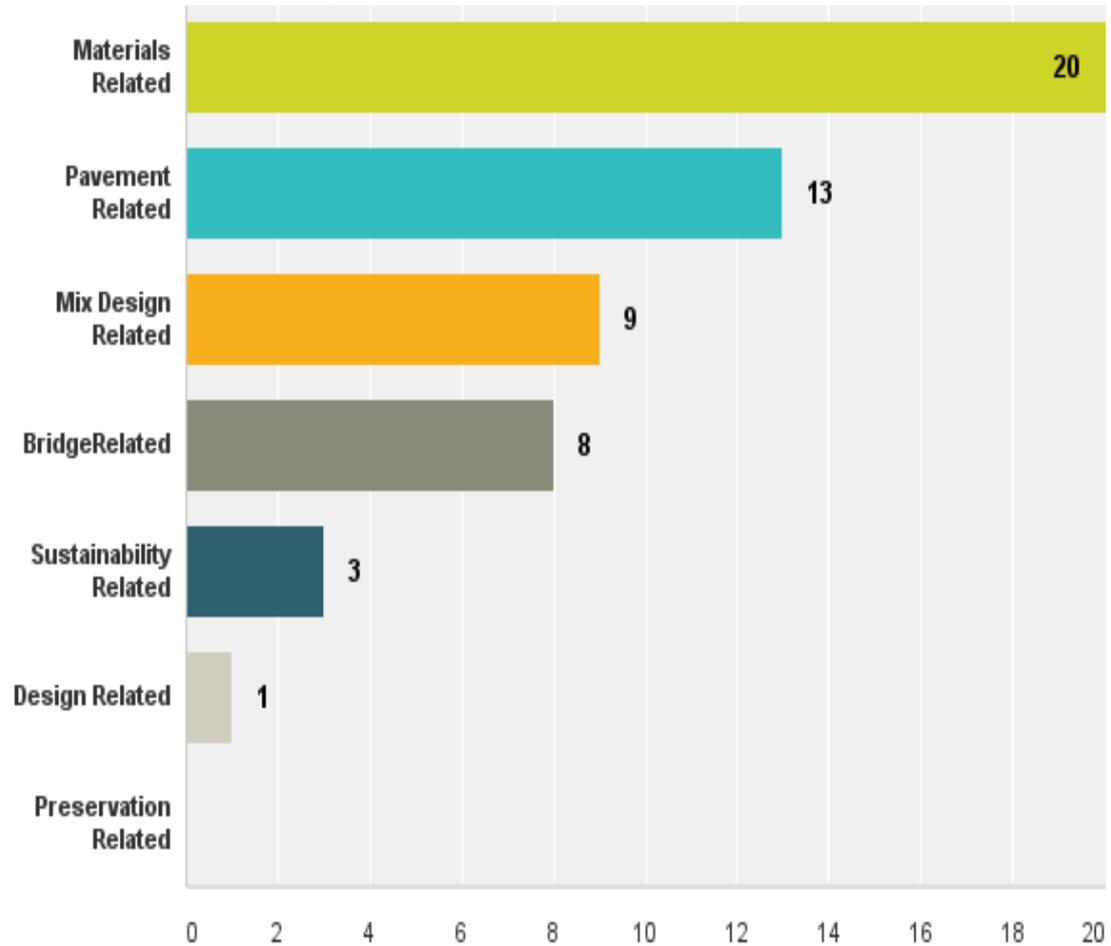


- Answered: 27
- Skipped: 4



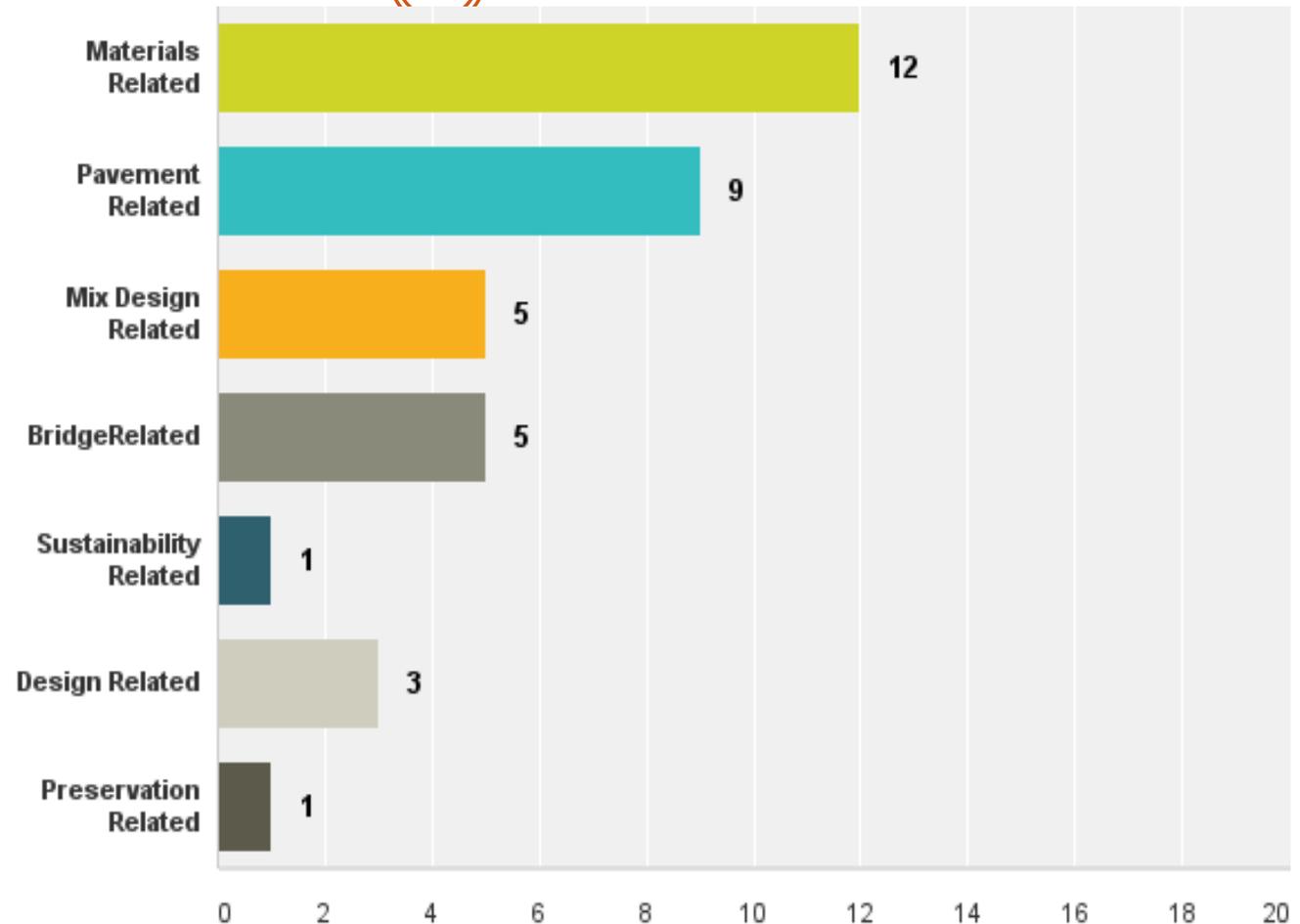
Q3: What are you currently researching that may be of interest to other NCC members? Select the topic your answer is most related too (may choose more than 1)

- Answered: 28
Skipped: 3



Q4: What is one unique construction issue that you have encountered in the last year that may be of interest to other NCC members? Select the topic your answer is most related too (may choose more than 1)

- **Answered: 22**
Skipped: 9



Utah DOT



Implementation:

- Modifying PCC, PCCP standard specifications and are currently using a special provision for Bridge Decks

Current Research:

- Research being conducted on Shrinkage Ring Test for possible Mix Design shrinkage requirement.

Unique Construction Issue:

- Bridge Deck Cracking is an on-going challenge.

Bucket List:

- Developing durability testing that will lead to development of performance specification

Pennsylvania DOT



Implementation:

- High performance concrete paving specification
- High performance bridge deck concrete
- Anti-wash specification

Current Research:

- The implications of implementing PP65 ASR requirements

Unique Construction Issue:

Bucket List:

- The need to restrict polish susceptible coarse aggregates in concrete pavements.

Florida DOT



Implementation:

- We've developed a performance based concrete pavement specification

Current Research:

- We are evaluating the use of alternate pozzolanic materials for use in concrete and concrete pavement. These include ground glass, sugar can baggash, rice hull ash, beneficiated fly ash. In addition we are evaluating the use of lightweight fine aggregate for internal curing and shrinkage reducing admixtures to help control cracking in our bridge decks

Unique Construction Issue:

- The use of UHPC, the cost benefit ratio when used for repair and other construction applications. Its believed this materials has its applications but based on the price of the material and the time it takes to batch, it still seems hard to justify its use.

Bucket List:

- Rapid methods of pavement repair without the associated cracking that occurs with HES concrete used for slab replacement.

Louisiana DOT



Implementation:

- Surface Resistivity

Current Research:

- Early opening strength for pavement Roller Compacted Concrete

Unique Construction Issue:

- Batching control of materials

Bucket List:

- Screening for potentially ACR-susceptible aggregate
- Determining fatigue life of Roller Compacted Concrete in the lab

Illinois Tollway



Implementation:

- Probably the most of interest would be our success implementing performance related specifications (PRS) for concrete pavement construction (large volume). Implementation for JPCP occurred in 2015 and 2016 and will continue in 2018. Implementation of PRS for CRC pavements will begin possibly in 2018, in 2020 for sure. Specifications and standards for CRC pavements are in the process of being updated pending the results of numerous CRC test sections currently being built and under research study.

Current Research:

- The re-engineering of CRC pavements in order to reduce costs without impacting performance and make CRC pavements score better with life cycle cost analysis programs. Currently under a joint study with the U of I (Roesler), Texas A & M (Zollinger), and Oregon State (Weiss).
- Finding the best way to more accurately predict the service life of a bridge deck using high performance concrete mixes. Tourney Consulting Labs and CTL Group are working together on this study. Tourney is finding the best way to evaluate existing decks of multiple ages to establish an accurate salt application rate to use with various software programs. CTL Group is working on further developing crack resistant HPC mixes to be more impermeable to chlorides or to resist corrosion for extended service life predictions.
- CTL Group has been performing a lab evaluation of rapid setting calcium aluminate cement mixes produced with volumetric mixers to improve the durability and crack resistance of such mixes when used for pavement or bridge deck repair.
- The University of Illinois (Fannestock & Lafave) is soon to begin a study on modular approach slabs for integral abutment bridges to better estimate when modular slabs will be needed to prevent stress cracking from developing off the abutments of integral abutment bridges. Recommendations for design modifications will be expected.

Unique Construction Issue:

- The willingness of contractors to implement PRS specs for concrete pavement construction was shocking.

Bucket List:

- Barrier wall designs and standards, MASH TL4 temporary barriers and buried moment slabs for TL5 barriers

Comment:

- FHWA's/AASHTO's recent changes to controlling criteria for the design of concrete pavements needs to be summarized in order to get design manuals updated for large cost savings.

Kansas DOT



Implementation:

- QC/QA Permeability & Air Voids
- Internal curing PCCP
- Use of Surface Resistivity for QC/QA Overcome the effect of drying of the cores.

Current Research:

- Durability of High Early Strength Concrete
- Concrete Pumpability
- Internal Curing on bridge decks.

Unique Construction Issue:

Bucket List:

- Guidelines fo use of SCMs to prevent ASR. PQL for mix designs without ASTM C-1567 Testing

Wisconsin DOT



Implementation:

- Working on specifications for optimized aggregate gradation and mix design for concrete pavements

Current Research:

- Super Air Meter testing and Surface resistivity.

Unique Construction Issue:

- Zoo pavement markings, salt covering up white pavement markings so using orange

Bucket List:

- Determining the reasons for air content differences between before and after paver and In-Situ core samples.

Georgia DOT



Implementation:

Current Research:

- Bag house dust in cement

Unique Construction Issue:

Bucket List:

North Dakota DOT



Implementation:

Current Research:

- Looking at the value of surface resistivity as a possible requirement for mix design

Unique Construction Issue:

- Joint layout as to minimum width between longitudinal joints and the width of tied pavements.

Bucket List:

California DOT



Implementation:

- Precast Concrete Pavement (PCP)
- Roller Compacted Concrete (RCC)

Current Research:

- Composite Pavement with Two-lift Paving
- Recycled Concrete Aggregate (RCA)
- Glass Fiber Reinforced Polymer (GFRP) Dowels

Unique Construction Issue:

- Rapid Strength Concrete (RSC)/High Early Strength Concrete (HESC)
Performance Continuously Reinforced Concrete Pavement (CRCP)
- End Treatments

Bucket List:

- Pavement ME design Calibration and Implementation

Michigan DOT



Implementation:

- Recently implemented high performance concrete mixtures for all bridge applications.

Current Research:

Unique Construction Issue:

Bucket List:

Rhode Island DOT



Implementation:

- Moving more into QC specifications.
- The use of pavement smoothness has become the norm
- We have done some projects with Intelligent Compaction

Current Research:

- The use of GPR and Infrared Thermography.

Unique Construction Issue:

Bucket List:

- For concrete, longer durability.

Washington DOT



Implementation:

- WSDOT is currently developing an IRI based smoothness specification for concrete pavement. The specification will replace the use of the profilograph

Current Research:

- WSDOT is the lead state for the SPS 2 Pavement Preservation Experiment pooled fund. The phase 1 report is currently under review

Unique Construction Issue:

- Issue of concrete pavement thickness deficiencies keeps coming up. WSDOT requires HMA base on most of its new concrete pavement. The base often does not get paved to the required grade. This results in the concrete paving contractor using additional concrete to make up the difference if the HMA grade is low. If the HMA grade is high the concrete contractor is penalized for deficient thickness. We are being asked by the concrete paving industry to develop a specification that will insure they will not be penalized for work that they are not in control of. WSDOT's position has been that we base our acceptance of thickness on the final product and it is up to the contractor to provide the QC for the grades.

Bucket List:

- Recycled aggregate in concrete pavement.

North Carolina DOT



Implementation:

- Concrete pavement for local roads and streets

Current Research:

- Durable and sustainable concrete pavements. Decreased permeability with lime and fly ash combination. Looking at current mix design in NC and ways to improve the pavement.

Unique Construction Issue:

- Diamond grinding slurry disposal pilot program to dump slurry in medians and slopes

Bucket List:

- Long life concrete pavements

South Dakota DOT



Implementation:

- We recently updated our specifications for partial depth repair. We now are using the MNDOT 3U18 materials and the chipping back of the sawed edges.

Current Research:

- We have research started looking at the following: Portland Limestone Cements for SD sulfate levels. Fibers in Concrete Structural Components.

Unique Construction Issue:

- A PCC Paving mix that consistently produced an "odd and somewhat unique" pattern of random cracking.

Bucket List:

Texas DOT



Implementation:

- Nothing new at the point

Current Research:

- Durability of Type IL cement with greater than 15% limestone content. Direct determination of cement compositions (will begin this year)
- Evaluation of Alternate SCM
- Use of RAP and RAS in concrete mixtures
- Evaluation of chemical admixtures to improve durability
- Deflection based testing of base layers
- Concrete overlay type selection and design
- Measuring diamond grinding configurations and texture life

Unique Construction Issue:

- Use of dowel bar inserter and MIT Scan to measure dowel bar alignment
- Use of rapid setting cement in a latex modified bridge deck overlay

Bucket List:

Illinois DOT



Implementation:

- Most recently, we have implemented an internal curing special provision for new bridge decks.
- In the very near future, we will likely be implementing new guidelines for conditioning and testing cores for concrete items that did not make strength. Essentially, the new guidelines would have the core dried in front of a fan for 24 hours immediately prior to testing; the research this is based on suggests that wet conditioning (as specified in AASHTO T 24), although preferable with respect to within-lab or between-lab variations, produces significantly conservative results with respect to the 'actual' in-place strength.

Current Research:

- Shrinkage mitigation materials for bridge deck concrete (i.e., shrinkage reducing admixtures, shrinkage compensating expansive cementitious materials, internal curing with lightweight fine aggregates, and micro-textured epoxy-coated reinforcement).
- Concrete's very early-age response to fatigue loading and damage in an effort to possibly allow earlier opening to traffic (i.e., less than 3 days).

Unique Construction Issue:

- We recently had a cement significantly fail the standard quality autoclave test specified by AASHTO M 85. At the time of failure, the cement had already been incorporated into upwards of 40,000 cubic yards of concrete throughout a few of our Districts and the Illinois Tollway. Jobs were delayed as we scrambled to determine the potential risk of such a failure. What did not help matters was finding that there does not appear to be very much literature concerning the issue. Ultimately, we were able to make a call based on what little we could find, plus some insight from professionals and additional testing using a standard test more common in Europe and India. As rare an occurrence as this situation appears to be, our experience might be helpful for others down the road.

Bucket List:

- Alternative cementitious/supplementary cementitious materials

Tennessee DOT



Implementation:

- Recently (within the last year) implemented a new Self Consolidating Concrete (SCC) specification.
- Implemented a new water specification for testing water sources that are from non-municipal sources.
- Looking at converting from the 2" x 2" grout cubes to having the acceptance testing be conducted using 4" x 8" cylinders.

Current Research:

- Currently conducting Alkali-Silica Reactivity (ASR) for aggregates sources.
- Implementation of recycled concrete aggregate (RCA) into our base structure of the roadway.
- The amount of chlorides in our concrete mixtures as well as which method (water soluble, acid soluble, or Soxhlet) should be specified

Unique Construction Issue:

- Successfully completed an Accelerated Bridge Construction (ABC) project last year replacing eight (8) interstate bridges in thirteen (13) weekends. The bridge decks consisted of precast deck panels that were tied together by a 6,000 psi in 8-hour mix design. This allowed opening the roadway to traffic without delay to the motoring public.
- Moving to implement non-destructive testing for precast concrete products such as catch basins, manholes, junction boxes, etc.

Bucket List:

- Lightweight Aggregates - Absorption Internal Curing

Nebraska DOT



Implementation:

- Quality Assurance of Blended/Interground cements.
- Quality Control of lightweight pieces in aggregate.
- Recycled concrete passing the No. 200 sieve for soil stabilization with lime

Current Research:

- The evaluation of the installation of tie bars (mechanical vs hand placement).

Unique Construction Issue:

- Finding the acceptable percentage of lightweight pieces in aggregate and a appropriate test method for local aggregates from dry pits.
- Evaluation of tie bar placement (mechanical vs hand placement).

Bucket List:

- Evaluation of the SAM and future incorporation into the specifications.
- Evaluation of the miniature concrete prism test for interground/blended cements acceptance.
- Using chemistry for blended/interground cements for acceptance in place of physical testing for ASR.

Idaho DOT



Implementation:

- Idaho is currently reviewing our mix design spec with the intent it will be modified this fall

Current Research:

- Current research involves calibrating ME design for concrete in Idaho.
- Just starting a research project for concrete in a high salt environment.

Unique Construction Issue:

- Still investigating this one. A long section of concrete barrier in a mountain area is deteriorating rapidly after the first year of service.

Bucket List:

- Follow up on ASR research on I84 near Mountain Home, ID.

Oklahoma DOT



Implementation:

- About to introduce optimized gradation using the tarantula curve.

Current Research:

- Currently researching resistivity.

Unique Construction Issue:

- We are having a problem with bridge joints closing to the point we are shearing the anchor bolts off.

Bucket List:

- Nothing comes to mind.

Missouri DOT



Implementation:

- Materials and Preservation Related

Current Research:

- Materials and Bridge Related

Unique Construction Issue:

- Materials Related

Bucket List:

- Roller Compacted Concrete
- Internal Curing
- PCCP Mixtures Utilizing Large Coarse Aggregate (Plus 1 inch)

Alabama DOT



Implementation:

- Upcoming firsts for Alabama: precast prestressed concrete pavement, and segmental bridge construction.

Current Research:

- "Friction & Texture Retention of Concrete Pavements after Diamond Grinding & Grooving" - Eric Giannini (UA) & Nathan Klenke (UA alumnus, currently employed w/ LBYD of Birmingham, AL). Study to address post-diamond grinding friction loss on concrete pavements made from Alabama limestones.
- "Effect of Core Geometry & Size on Concrete Compressive Strength" -- Adam Carroll, Aaron Grubbs, Dr. Anton Schindler & Dr. Robert Barnes (all of Auburn Univ). This study hopes to establish a quantitative relationship between cylinder strength, core size, core age, and direction of coring relative to placement.

Unique Construction Issue:

- Successfully implemented our first "slide-in" bridge deck, as part of accelerated bridge construction project implementation.

Bucket List:

- The projects in #3 are initial phases. Following these to completion, and ultimate spec implementation is our top priority w/ concrete right now.

Indiana DOT



Implementation:

- INDOT is following through on research by Dr. Jason Weiss that indicates that increased SCMs will improve pavement durability. Historically, fly ash and ggbfs have been optional in pavement. The new specification mandates the use of at least one SCM and allows the use of up to two SCMs. The provision allows fly ash, ggbfs and silica fume with an allowable amount up to 40% of cementitious.

Current Research:

- INDOT research project SPR-4003 includes a task by Dr. Jason Weiss to follow up on previous research that involved resistivity measurement in concrete. Specifically, this research is intended to implement the use of "formation factor" as a rapid durability measure on concrete.

Unique Construction Issue:

Bucket List:

- Find a cost effective replacement for fly ash that would have similar effects

Iowa DOT



Implementation:

- Bridge - UHPC connections for ABC bridges
- Preservation - Partial depth PCC patching

Current Research:

Unique Construction Issue:

Bucket List:

Colorado DOT



Implementation:

- Implementing maturity meters for acceptance to replace cast cylinders. Pilot specification being developed for 2017 construction season. Looking at replacing beam testing with split tensile testing for accepting concrete pavement strength. Also looking at maturity meter flexural strength to replace beam testing.

Current Research:

Unique Construction Issue:

- Fly ash shortages and substituting other sources when aggregates are known to be ASR susceptible.

Bucket List:

- Factors that affect lab developed maturity curves vs field testing. IE, how much affect does allowable mix variance affect the strength vs maturity curve.

New York DOT



Implementation:

- Materials - reduction in w/c ratio from max of 0.44 to 0.40.
- Pavement - switch from PI to IRI for ride quality.

Current Research:

- Currently progressing performance based specifications for all PCC applications that would rely on strength, air content, freeze/thaw durability, shrinkage, and permeability / resistivity without any control of cement content, water content, w/c ratio, or slump.

Unique Construction Issue:

Bucket List:

- Performance and cost effectiveness of various dowel bar materials and coatings.

Montana DOT



Implementation:

- Surface resistivity requirements for concrete used for deck placement and repair. There are mix design requirements and acceptance requirements with associated pay factor with possibility for incentive/disincentive during production. For several years Rapid Chloride Ion Penetration testing was used to determine acceptability. The change was made to use SR as it dramatically saved manpower and resources and seemed to yield repeatable results.

Current Research:

- Shrinkage Reducing Admixtures and associated bridge deck cracking. Three pairs of bridge decks were placed in 2014. One deck within each pair was placed with our current class deck mix which incorporates a max. cement content of 564 lb/yd, inclusion of silica fume and either fly ash or GGBFS and a w/c ratio of 0.42. The other deck within each pair contained macrofiber and Shrinkage Reducing admixture. Ongoing comparison of the two structures will be performed until at least 2017 at which time a report will be generated.

Unique Construction Issue:

- Bridge Deck cracking and early failure. We have noted in the last year that many bridge decks in a particular corridor and time period (2006-2012) have shown an unacceptable level of transverse and in many instances longitudinal cracking. Several decks had portions of concrete literally fall out which required full depth repair that extended well beyond the distressed areas of the decks. This has spurred additional data gathering regarding the conditions of the bridge decks throughout our State.

Bucket List:

- Shrinkage Testing. We plan to perform Length Change of Hardened Hydraulic –Cement Mortar and Concrete (ASTM C157) testing on our existing approved Deck mix designs. We hope this will help establish a baseline on our materials and potential shrinkage of concrete in our state.

Minnesota DOT



Implementation:

- Recently implemented 100% Contractor/Producer mix designs for all concrete ready-mix and bridges (standard not HPC). We have been 100% contractor designed for concrete pavements for almost 20 years.

Current Research:

- The University of Minnesota Duluth (UMD) is currently conducting a research study titled, "Performance Comparison of Structural Fibers and Development of a Specification for using Structural Fibers in Thin Concrete Overlays" for MnDOT to determine appropriate fiber selection criteria and optimum dosages. The performance of fiber reinforced concrete (FRC) in terms of toughness and load transfer efficiency with different fiber types and dosage rates will be studied.
- Looking at what volumetric properties the existing HMA pavement should have for a successful thin whitetopping project

Unique Construction Issue:

- Over the last few years we have investigated the methods used to anchor dowel bars into full depth repairs. We knew the dip and stick method will not hold up and actually became more prescriptive with our installation process than before. Now require pre-packaged grout capsules soaked in water and then pushed into the hole before the dowel bar. We do also allow use of epoxy. Require demonstration of installation and coring to validate that the materials completely filled the voids around the dowel bars.
- Longitudinal cracking in thin whitetopping where the PCC thickness is greater than the plan thickness

Bucket List:

- I would like to see a quick and easy field test that would measure how well the dowel bar basket assembly was anchored into the substrate.

Ohio DOT



Implementation:

- Smoothness specifications for pavements.

Current Research:

- Premature failures of Ohio unbonded concrete overlays.
- Currently looking at adding aggregate fines as a mineral filler for concrete mix designs. We were holding back on adding this to wait for the ASTM Standard to be adopted and granted a number which it recently received as of this survey being completed. The document is under final review. Any advice or word of caution is appreciated.
- Internal curing research has wrapped up and is being implemented on a project as a plan note to continue the research and evaluation of the use of lightweight fine aggregate for IC.
- Carbon Fiber Composite Cable (CFCC) as prestressing strand is currently being researched to produce long life prestressed members. The current project is using 17x48 box beams with CFCC strand and stainless steel reinforcement. The facility in Decatur, IN has completed similar work for Michigan and we have heard both good and bad with the material.

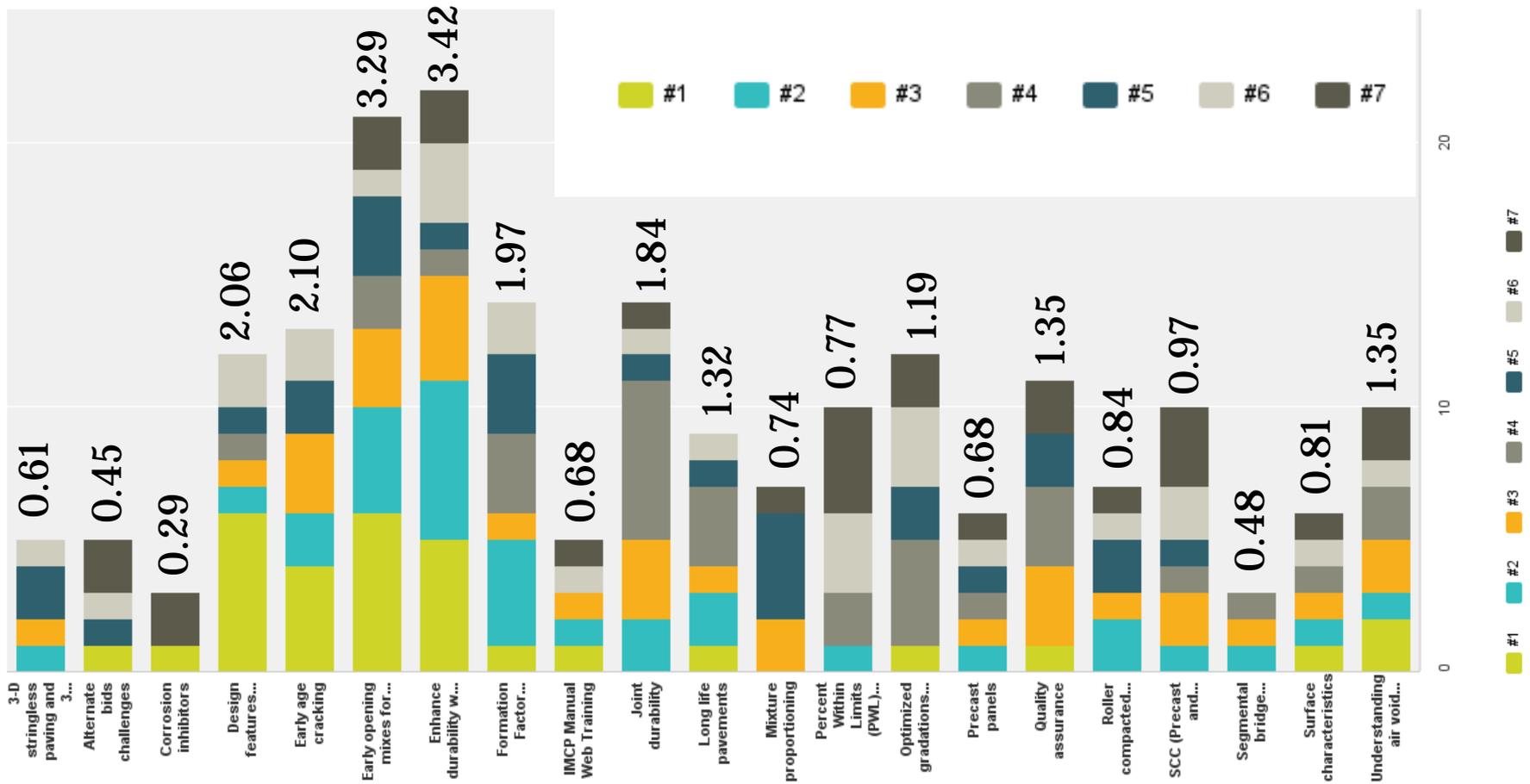
Unique Construction Issue:

- Tie bar misalignment on several projects when blindly inserted.
- Fast set concrete mix designs not setting as intended. With tight timeframes on lane closures contractors and ready mix producers have had a hard time with getting mixes to set up. Our current specification calls for either our fast set mix with 900 lb. of cement or our rapid repair concrete mix (RRCM), which requires the use of a specialty admixture system (BASF 4x4, Sika Rapid -1, etc.). What are other states doing with fast set mixes and/or lane closure times?

Bucket List:

- Uniformity of air entrainment in pavement concrete.

Q6: Please prioritize what you would like the CP TechCenter to focus on next? Select your top 7 choices



Q6: And the Top 6 Are (Drumroll Please)....



- Answered: 31 Skipped: 0

Ranking	Moving Average	Total Votes	Subject
#1	3.42	22	Enhance durability with focus on SCM, air content and admixtures
#2	3.29	21	Early opening mixes for traffic control (strength, load restriction, time requirement)
#3	2.10	13	Early age cracking
#4	2.06	12	Design features (widened lanes, tied shoulders, base support, critical features, shrinkage cracking, cracking vs. joint spacing - is there a correlation?)
#5	1.97	14	Formation Factor (resistivity and w/c ratio)
#6	1.84	14	Joint durability