NCC State Reports Fall 2017 - Concrete Pavement Rehabilitation (CPR)

September 19, 2017

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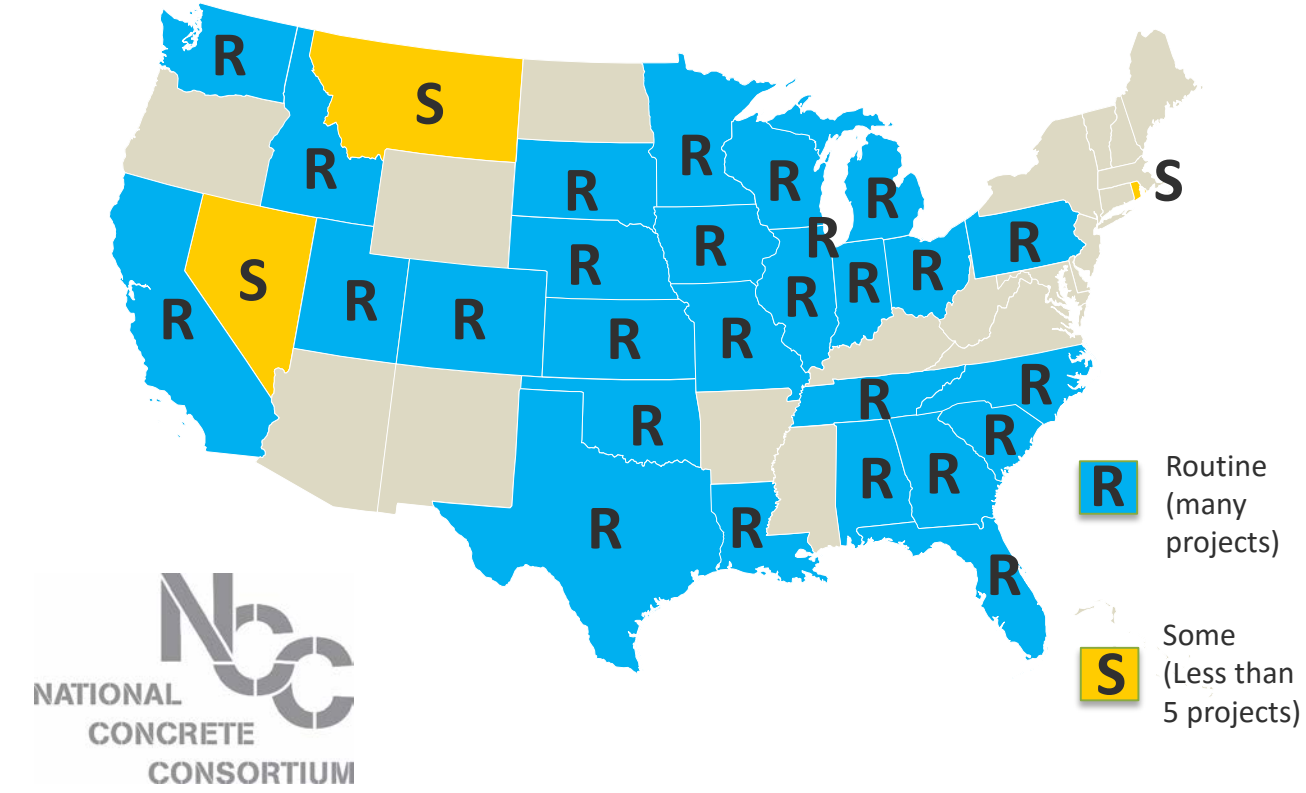
Q2: Full Depth Repairs: What is your Agency's experience doing full depth repairs?



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Q2: Full Depth Repairs: What is your Agency's experience doing full depth repairs?

Answered: 30 Skipped: 0

- **Indiana** - In recent years opening to traffic time and strength has become very complicated. We now identify patches as "short" (<= 15' length) or "long" (>15' length). Short patches are opened at 300 psi flexural and long patches are opened at 425 psi flexural.
- **Illinois Tollway** - Mostly for application to expressways and interchange ramps. Mainly they consist of performance related accelerated mix designs for placement in the median and outer lanes on weekends, or of precast concrete pavement slabs for the middle lanes. High early strength calcium aluminate or prepackaged repair materials are used only for short life emergency repairs.

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Q2: Full Depth Repairs: What is your Agency's experience doing full depth repairs?

Answered: 30 Skipped: 0

- **Michigan** - Very frequently used for many decades. Standard patch sizes are 4' with contraction joints. Concrete mixture type is selected based on open to traffic requirements. The MDOT concrete Grade P-NC is commonly used, which is 7 sacks of Portland cement with the minimum volume of non-chloride accelerator to achieve 300 psi flexural strength required for open to traffic. In the past, our standard patching mixture used calcium chloride along with a 9-sack concrete mixture to achieve early-open strengths. However, those patches tended to only last about 5-7 years. When we eliminate calcium chloride with reduced cement content, we can expect the patch to last up to 15 years. See Standard Plan R-44 and spec book section 603 links at the end

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Q2: Full Depth Repairs: What is your Agency's experience doing full depth repairs?

Answered: 30 Skipped: 0

- **Illinois** - Illinois performs full-depth repairs on both jointed plain concrete (JPC) and continuously reinforced concrete (CRC) pavements.
- **Rhode Island** - Rhode Island has very few concrete roads. The few we have are basically rigid road base.
- **Nebraska** - Full depth PCC repairs are performed as needed on every concrete pavement prior to resurfacing and every composite prior to resurfacing.
- **South Carolina** - good success, been doing them for years on CRC and JPCP
- **Kansas** - (SS 833) (Standard Drawing 721 and 721B)
- **California** - Included as part of a rehabilitation project to address isolated locations that include inside lanes, ramps, shoulders, and truck lanes.

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Q2: Full Depth Repairs: What is your Agency's experience doing full depth repairs?

Answered: 30 Skipped: 0

- **Tennessee** - We have a contract let annually for each of our 4 regions that has specific places designated for concrete pavement repairs.

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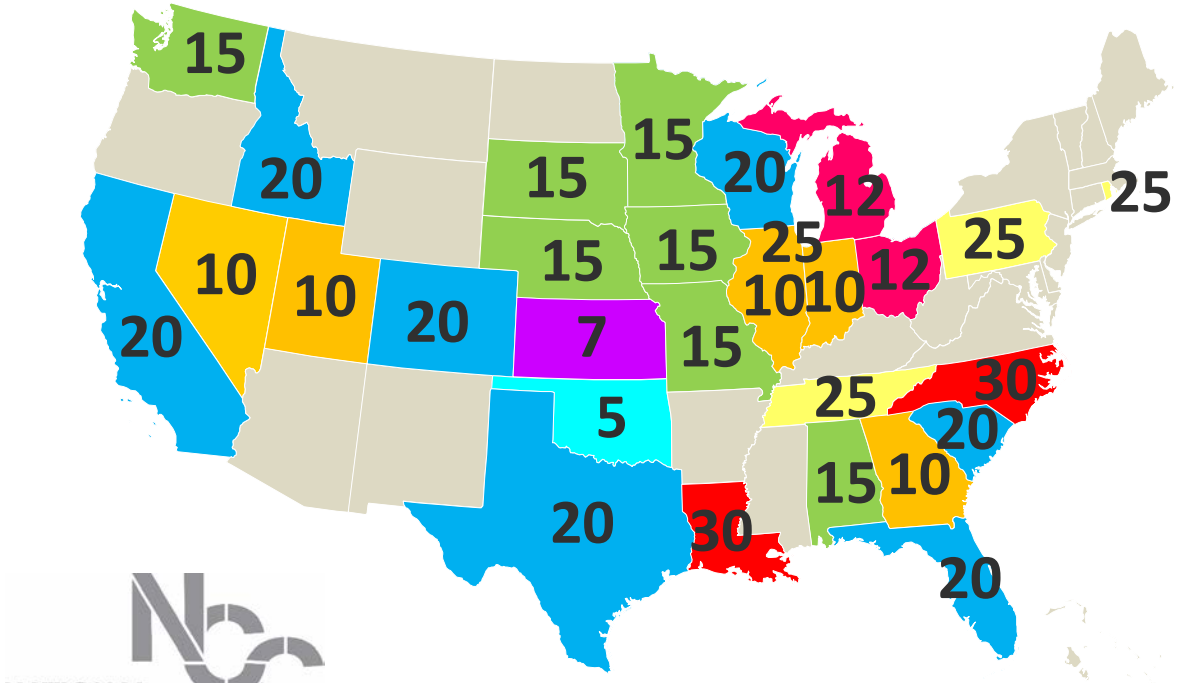
Q3: Full Depth Repairs: What is your Agency's expected life of full depth repair?



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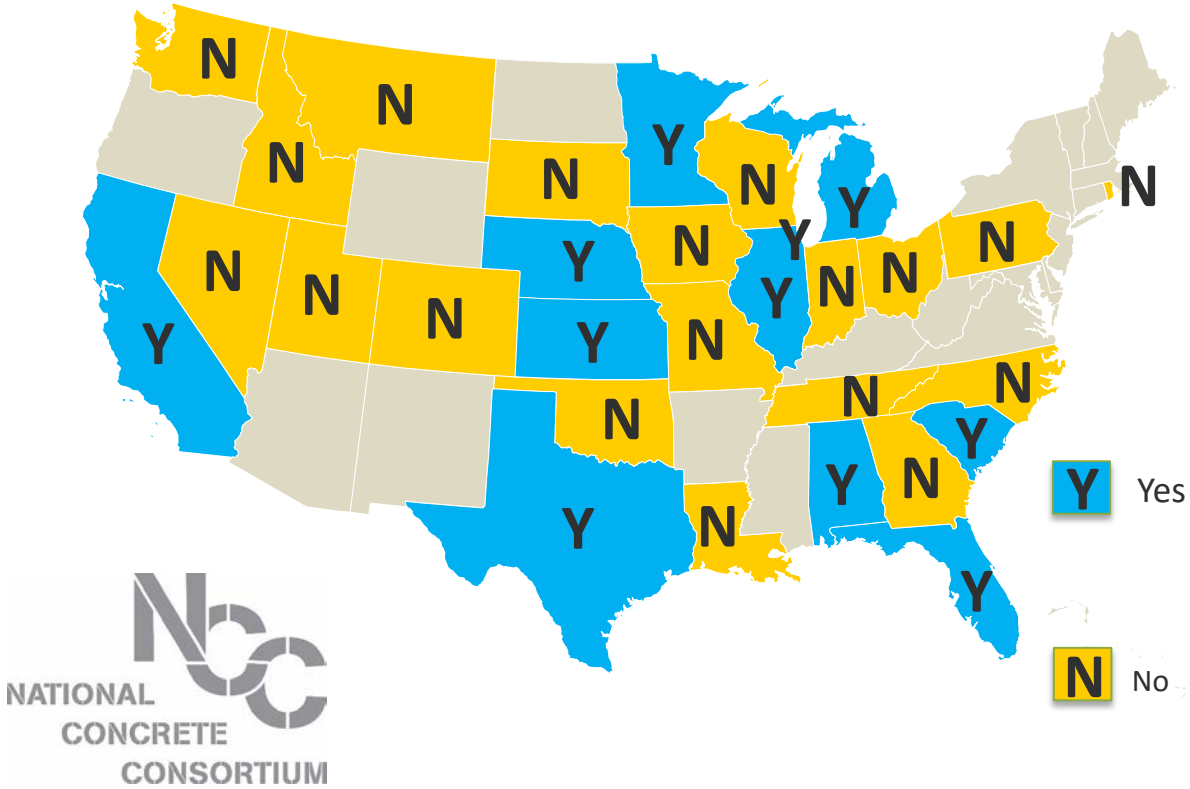
Q4: Full Depth Repairs: Does you Agency have any field verification tests to verify the dowel bars/tie bars are properly grouted/epoxied in-place?



Q4: Full Depth Repairs: Does you Agency have any field verification tests to verify the dowel bars/tie bars are properly grouted/epoxied in-place?

Answered: 30 Skipped: 0

- **Florida** - Provide an independent testing agency to perform field testing of post installed anchors or dowels under the direction of a Professional Engineer registered in the State of Florida. Submit test reports for each LOT signed and sealed by the Professional Engineer. Perform restrained static tension tests to prevent damage to the surrounding concrete. A restrained test is defined as a test conducted in accordance with ASTM E-488 except that the test equipment support clearance requirements of ASTM E-488 do not apply. The opening in the reaction base shall be approximately equal to the drilled hole diameter for the anchor to preclude concrete or masonry failure, but allow bond failure for the adhesive-bonded anchors and dowels. Displacement measurement for field testing is not required.

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Q4: Full Depth Repairs: Does you Agency have any field verification tests to verify the dowel bars/tie bars are properly grouted/epoxied in-place?

Answered: 30 Skipped: 0

- **Illinois Tollway** - MIT scanning is commonly performed. With full depth repairs performed at the Tollway, gang drills are commonly used for dowels and visually observed to be parallel and aligned before cast-in-place placements
- **Illinois** - Illinois does not have a standardized test for checking dowel bar placement; however, Resident Engineers are supposed to physically pull on the bars to ensure chemical adhesive was used in installation.
- **Nebraska** - We have tested pull-out strengths of tie bars placed in new, plastic concrete to evaluate tie bar placement methods. We intend to perform the same testing in repair situations but have not done so yet.
- **South Carolina** – Visual inspection

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Q4: Full Depth Repairs: Does you Agency have any field verification tests to verify the dowel bars/tie bars are properly grouted/epoxied in-place?

Answered: 30 Skipped: 0

- **Kansas** - Other than inspection, we do not have any additional verification tests.
- **Texas** - We can perform a pull-out test to ensure the epoxy grouted bars are able to hold a load of at least 75% of the bar yield strength.
- **Alabama** - After epoxy has cured as recommended by the producer, 7200 lbs. (32 kN) pull out force shall be applied to the steel tie bar. Should the steel tie bar pull out before the required force is attained the test will be considered a failure.
- **California** - Included as part of a rehabilitation project to address isolated locations that include inside lanes, ramps, shoulders, and truck lanes.

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Q4: Full Depth Repairs: Does you Agency have any field verification tests to verify the dowel bars/tie bars are properly grouted/epoxied in-place?

Answered: 30 Skipped: 0

- **Minnesota** - MnDOT requires the Contractor to preform a Dowel Bar Anchoring Test Section. The test section requires dowel bar installation followed by cores cut through the previously installed dowel bars. MnDOT also randomly cores installed dowel bars to verify continued adequate adhesive (grout or epoxy) coverage.

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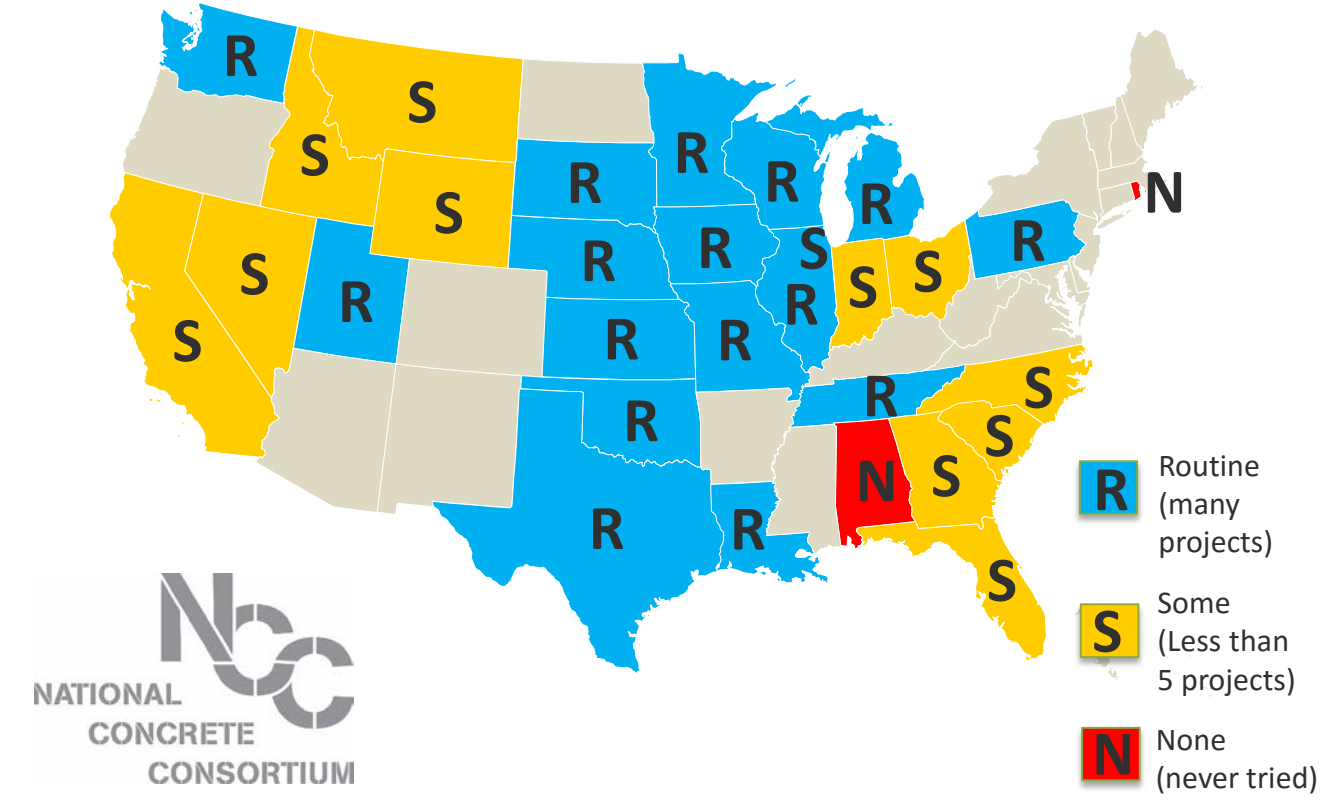
Q5: Partial Depth Repairs: What is your Agency's experience doing partial depth repairs?



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Q5: Partial Depth Repairs: What is your Agency's experience doing partial depth repairs?

Answered: 30 Skipped: 0

- **Florida** - in the far past, we did not have good experiences in doing partial depth repairs with standard concrete mix patches, and making them last. However, recently we have tried fiber reinforced polymer patching material and have had good results. Will be adding this to our design manual, as CPR's are handled by our Resurfacing Program (not maintenance).
- **Georgia** - Spall repair.
- **Wisconsin** - Used less than full-depth repairs
- **Illinois Tollway** - Only for surficial repairs on pavements using epoxy or used on bridge approaches and bridge decks.

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Q5: Partial Depth Repairs: What is your Agency's experience doing partial depth repairs?

Answered: 30 Skipped: 0

- **Indiana** - INDOT has a partial depth patching spec that involves removing the top half of complete slabs, but it is not common and typically full depth removal is done. INDOT recently let four contracts for partial depth joint repairs with a new provision that is similar to the MnDOT process. The contracts are currently under construction.
- **Illinois** - Seldom do traditional partial depth repairs at joints in JPC pavements. Partial depth repairs on CRC pavements limits depth to above longitudinal reinforcement. This repair treatment is typically used prior to a hot-mix asphalt overlay.
- **Nebraska** - We no longer perform partial depth repairs on mainline pavement that will be left exposed. We continue to perform partial depth repairs on exposed shoulders and mainline/shoulders that will receive an HMA overlay.

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Q5: Partial Depth Repairs: What is your Agency's experience doing partial depth repairs?

Answered: 30 Skipped: 0

- **Michigan** - Partial depth repairs have been done on joints and for spall repairs. We have had poor results with partial depth longitudinal and transverse joint repairs. We have tried with several materials such as latex, standard redi-mix concrete, and epoxy materials. Failures usually occur as a result of inconsistent mixtures as well as poor quality control of preparation of the substrate. We have had good experiences with intermediate spall repair. We have used prepackaged fast-set, standard redi-mix concrete, epoxy materials, and some non-cementitious materials for this type of repair
- **Rhode Island** - Most partial repairs are conducted with asphalt hot mix

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Q5: Partial Depth Repairs: What is your Agency's experience doing partial depth repairs?

Answered: 30 Skipped: 0

- **South Carolina** - we have not had good success with partial depth repairs. We utilize them occasionally, dependent on project circumstances but prefer to go to full depth repairs.
- **Kansas** - (SS 833) (std dwg 719A and 719B)

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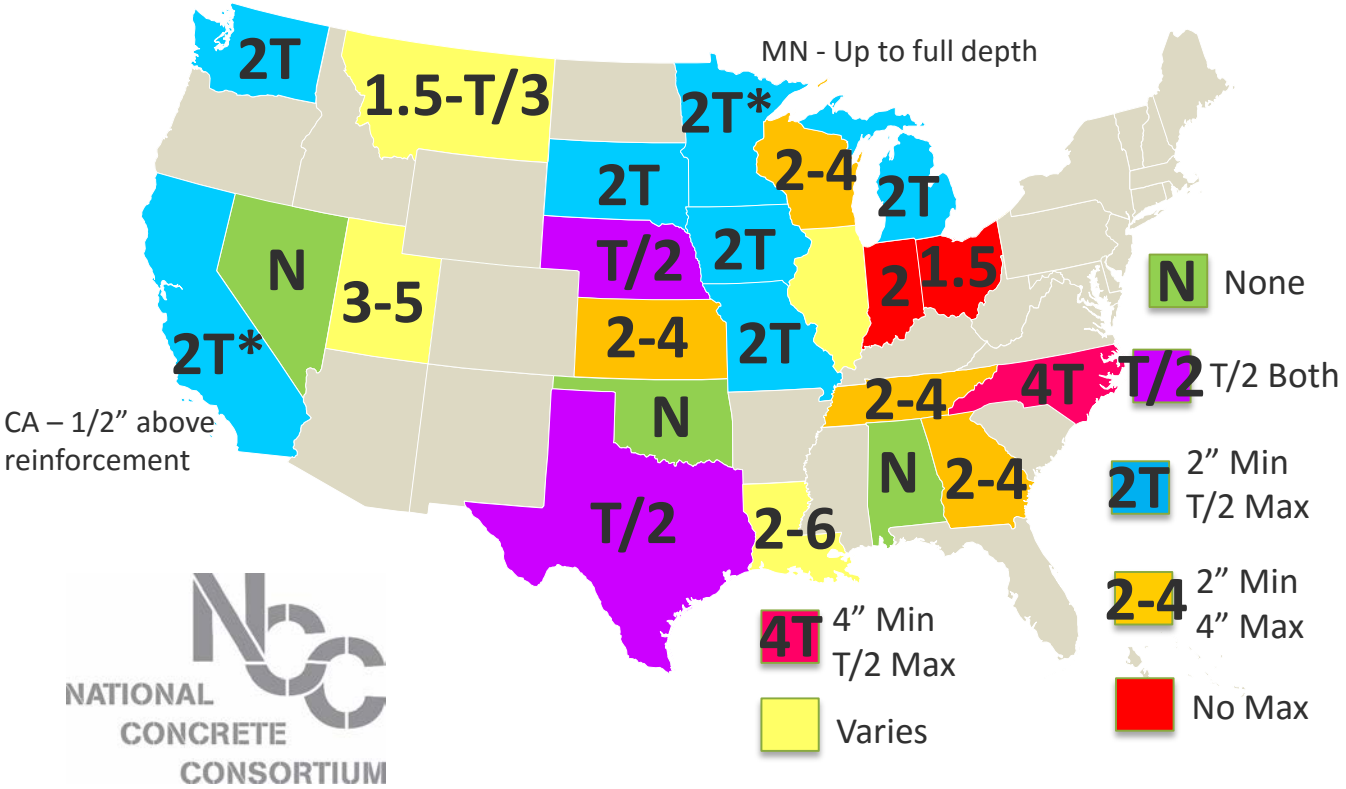
Q6: Partial Depth Repairs: What is your Agency's minimum and/or maximum depth of a partial depth repair?



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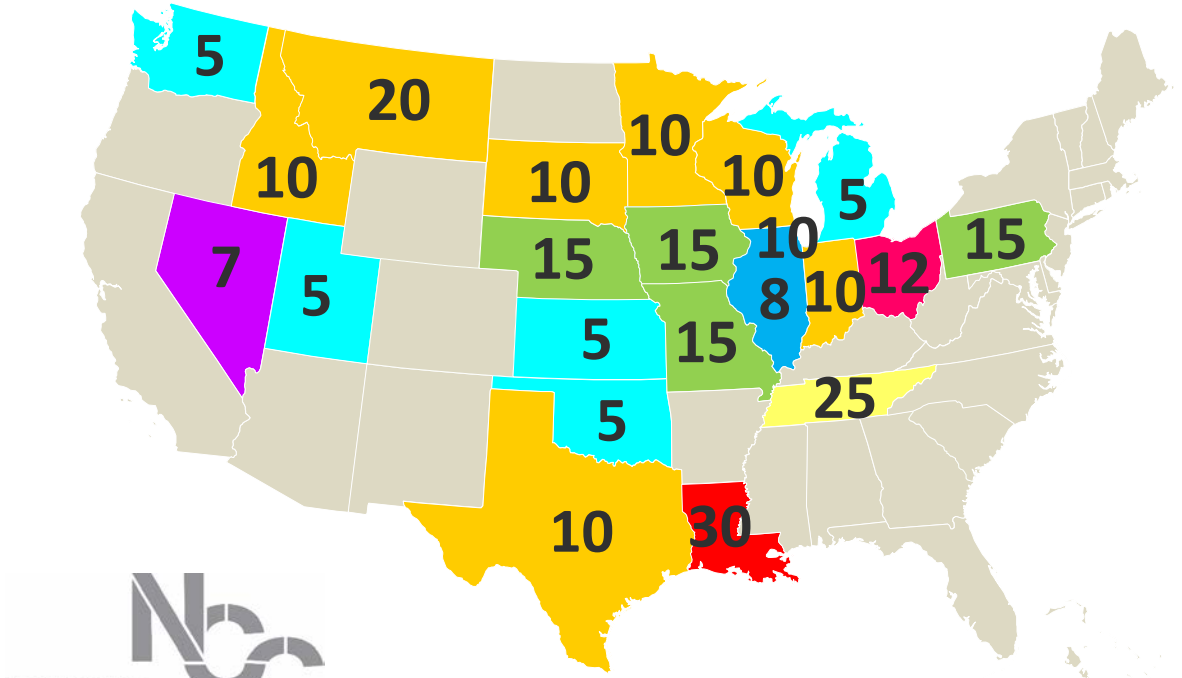
Q7: Partial Depth Repairs: What is your Agency's expected life of partial depth repair?



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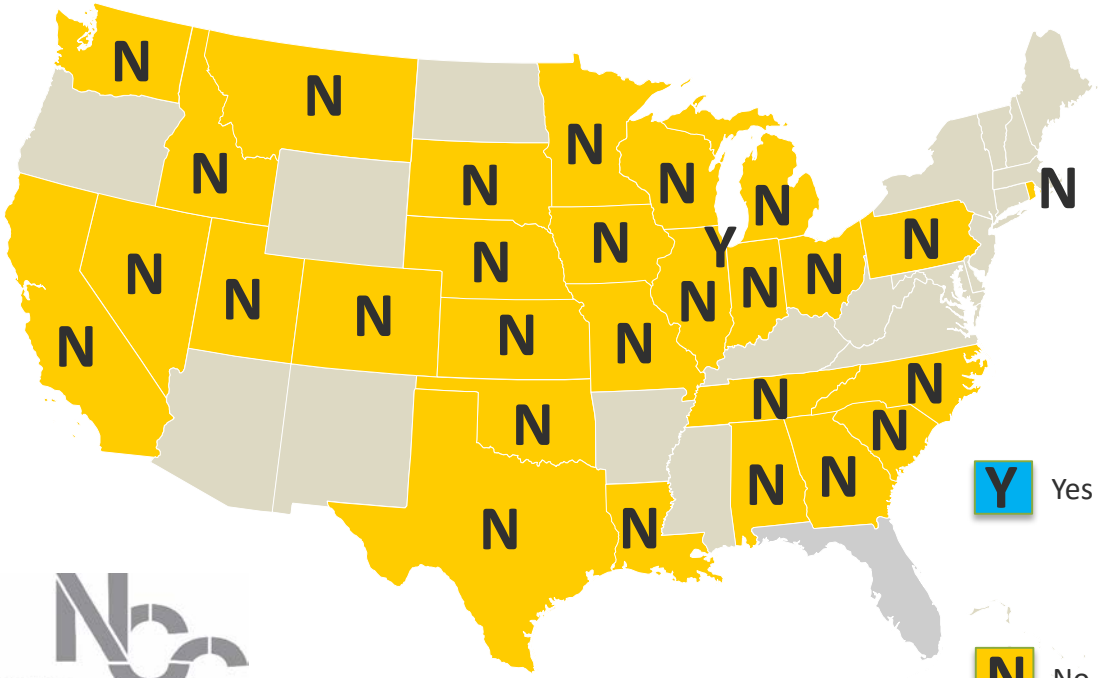
Q8: Partial Depth Repairs: Does you Agency have any field verification tests to verify the dowel bars/tie bars are properly grouted/epoxied in-place?



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Q8: Partial Depth Repairs: Does you Agency have any field verification tests to verify the dowel bars/tie bars are properly grouted/epoxied in-place?

Answered: 29 Skipped: 1

Illinois Tollway - GPR scans performed to locate reinforcement for structures. Not applicable for pavements since partial depth repairs of pavements are only surficial.

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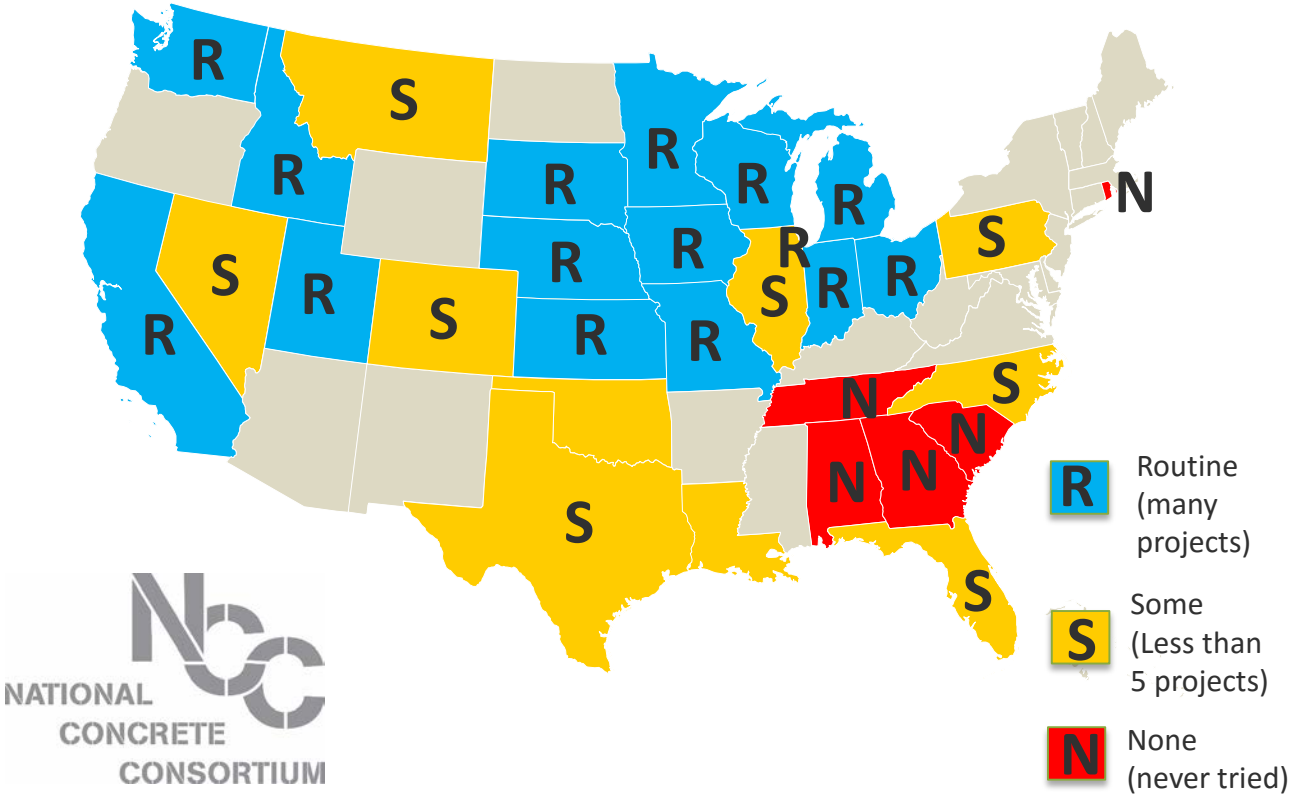
Q9: Dowel Bar Retrofits: Does your Agency have any experience doing dowel bar retrofit repairs?



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Q9: Dowel Bar Retrofits: Does your Agency have any experience doing dowel bar retrofit repairs?

Answered: 30 Skipped: 0

- **Florida** - done in the far past, with not good results. Not in our standards at this time.
- **Colorado** - Not much experience as most of our highways were built with dowels. DBR is mostly for joints missing bars when checked by the MIT
- **Indiana** - INDOT does do dowel bar retrofit, but it is typically case-by-case and not large scale.
- **Ohio** - They have become less prevalent with shorter joint spacing and old project being covered with asphalt.
- **Illinois Tollway** - Once commonly used for mid slab cracking on slabs of 20 ft. length between joints. Now used for remedial action when MIT scanning of new pavements finds misalignment of bars. Retrofits are one of the alternatives for remedial action.

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Q9: Dowel Bar Retrofits: Does your Agency have any experience doing dowel bar retrofit repairs?

Answered: 30 Skipped: 0

- **Michigan** - It is a tool in our toolbox, but it isn't used very often. Contractors typically would rather do a full depth repair than the retrofit.
- **Illinois** - Illinois uses dowels in all JPC pavements on state maintained routes, so seldom a need for dowel bar retrofit. May have been used by local agencies on pavements that were built without load transfer dowel bars.
- **Nebraska** - NE performed many DBRs years ago. We have only performed a few in the last 10 years as we have few candidates left. We have been doweling pavements since approximately 2000. There are few un-doweled, exposed concrete pavements remaining w/out deterioration from Alkali Silica Reaction.

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Q9: Dowel Bar Retrofits: Does your Agency have any experience doing dowel bar retrofit repairs?

Answered: 30 Skipped: 0

- **South Carolina** - We have recently looked into this on 2 projects but have not performed any DBR work.
- **Kansas** - (SS 504) (std dwg RD723)
- **Louisiana** - Probably less than 10 have ever been done in the state. Last one was several years ago.
- **California** - DBR is a CAPM preservation strategy that can significantly prolong pavement service life from 10 to 15 years by improving load transfer efficiency (LTE) across joints and cracks.
- **Minnesota** - MnDOT has found DBR's to provide excellent load transfer efficiency years after installation through Falling Weight Deflection (FWD) testing

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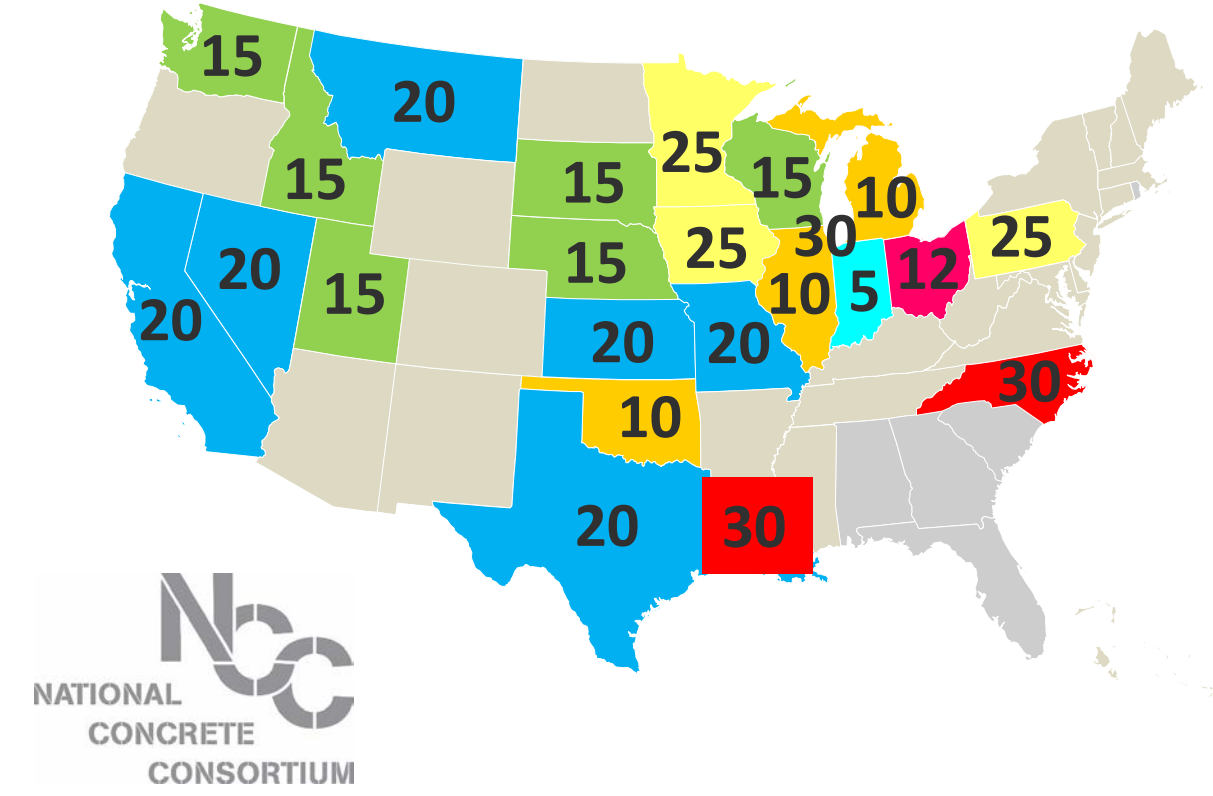
Q10: Dowel Bar Retrofits: What is your Agency's expected life of dowel bar retrofit repair?



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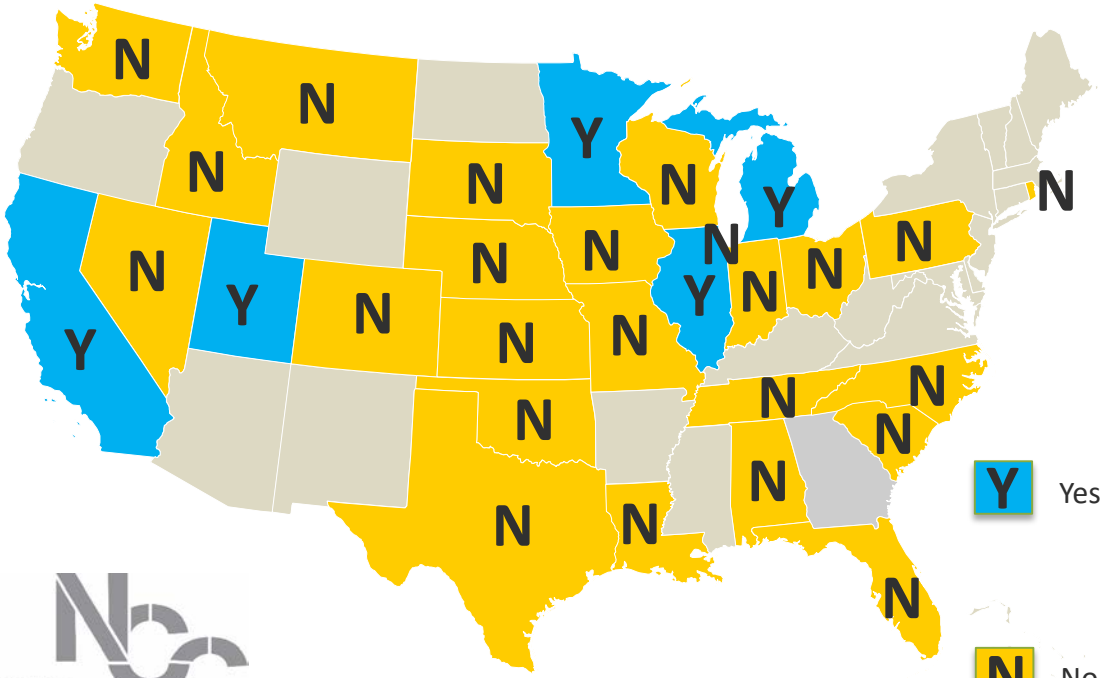
Q11: Dowel Bar Retrofits: Does your Agency have any field verification tests to verify the dowel bars are properly grouted in-place?



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Q11: Dowel Bar Retrofits: Does your Agency have any field verification tests to verify the dowel bars are properly grouted in-place?

Answered: 29 Skipped: 1

- **Utah** - In the past, we have routinely core-drilled a small number to verify placement and encasement. We have incorporated test strips into our projects to reduce the number of cores for the project pavement. We are also experimenting with non-destructive dowel bar detection.
- **Illinois** - Inspect installation prior to and after grouting. After installation, could check load transfer efficiency with Falling Weight Deflectometer.
- **California** - Engineer selects core locations for dowel bars placement verification.

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Q11: Dowel Bar Retrofits: Does your Agency have any field verification tests to verify the dowel bars are properly grouted in-place?

Answered: 29 Skipped: 1

- **Minnesota** - Test Section Provide a test section consisting of complete dowel bar retrofit at a site directed by the Engineer at least three (3) days prior to startup of major operations as follows: h) Install 24 retrofit dowels in the test section. i) The Engineer will identify and mark three (3) locations for coring. j) Take three (3) – 6 in [150 mm] diameter full depth cores at least 4 hours after completion of the test section. At the Engineer's discretion, the Contractor will take additional cores to confirm consistent dowel placement and proper consolidation for each 600 bars placed. The Engineer will randomly mark two retrofit locations for assurance coring.

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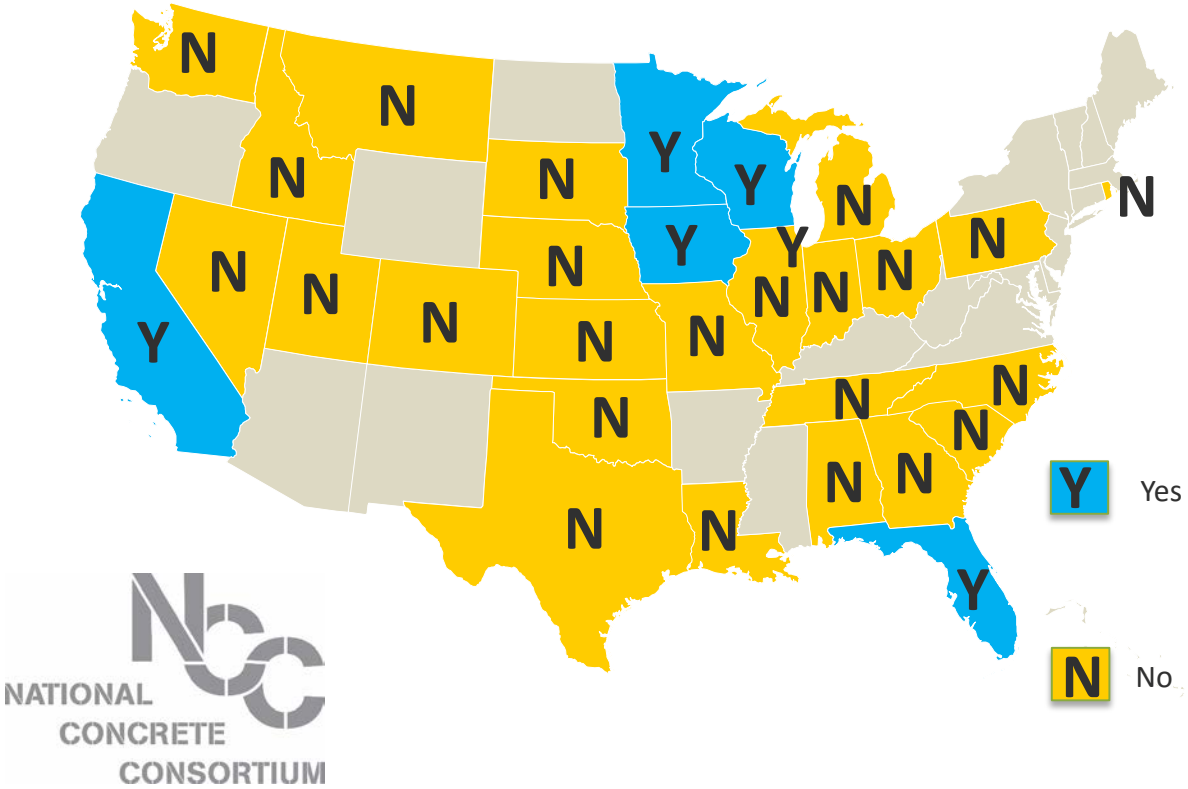
Q12: Does your Agency have any warranties associated with concrete pavement rehabilitation?



Q12: Does your Agency have any warranties associated with concrete pavement rehabilitation?

Answered: 29 Skipped: 1

- **Georgia** - Currently looking at implementing warranties.
- **Wisconsin** - Partial Depth – DBR
- **Iowa** - 30 days for partial depth repairs
- **Illinois Tollway** - It is a one year warranty upon completion of the work that is too long to paste into this box.
- **South Carolina** - It varies on projects but our standard specifications state 45 days on full depth patches.

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Q12: Does your Agency have any warranties associated with concrete pavement rehabilitation?

Answered: 29 Skipped: 1

- **California** - Guarantee that work remains free from substantial defects for 1 year after Contract acceptance except for work parts for which you were relieved of maintenance and protection. Guarantee each of these relieved work parts for 1 year after the relief date. The guarantee excludes damage or displacement caused by an event outside your control, including: 1. Normal wear and tear 2. Improper operation 3. Insufficient maintenance 4. Abuse 5. Unauthorized change 6. Act of God During the guarantee period, repair or replace each work part having a substantial defect.

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Q12: Does your Agency have any warranties associated with concrete pavement rehabilitation?

Answered: 29 Skipped: 1

- **Minnesota** - Remove and replace areas of failure that appear within thirty (30) calendar days at no cost to the Department. The 30 calendar day warranty will commence after all Type B, Type C, Dowel Bar Retrofits repair and Concrete Grinding (when required) are completed in a single traffic lane. The continuity of a single traffic lane is not broken by either staging or project exceptions unless otherwise authorized by the Engineer. Any subsequent warranty repairs are subject to the 30 calendar day specification at no cost to the Department. Failures include (but are not limited to) the loss of bonding to the in place concrete or crack apparent in the repair other than the desired crack in the newly constructed joint or re-established crack.

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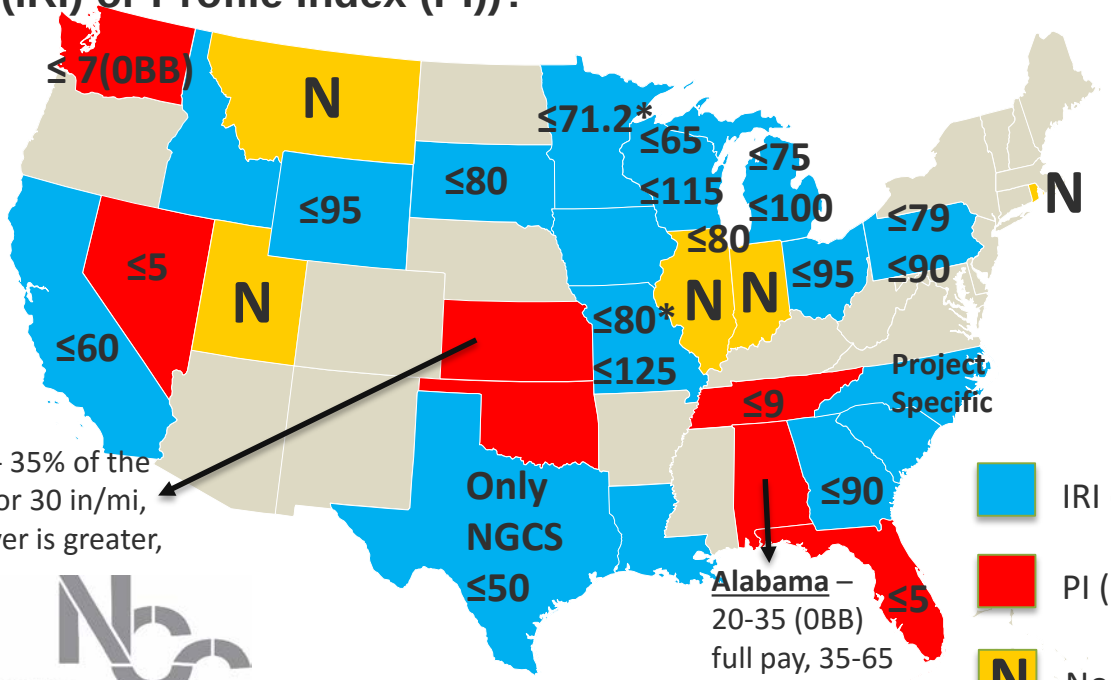
Q13: Diamond Grinding: What is your Agency's specification limit for pavement rehabilitation diamond grinding for acceptance (Either International Roughness Index (IRI) or Profile Index (PI))?



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Two numbers indicated different speed limits

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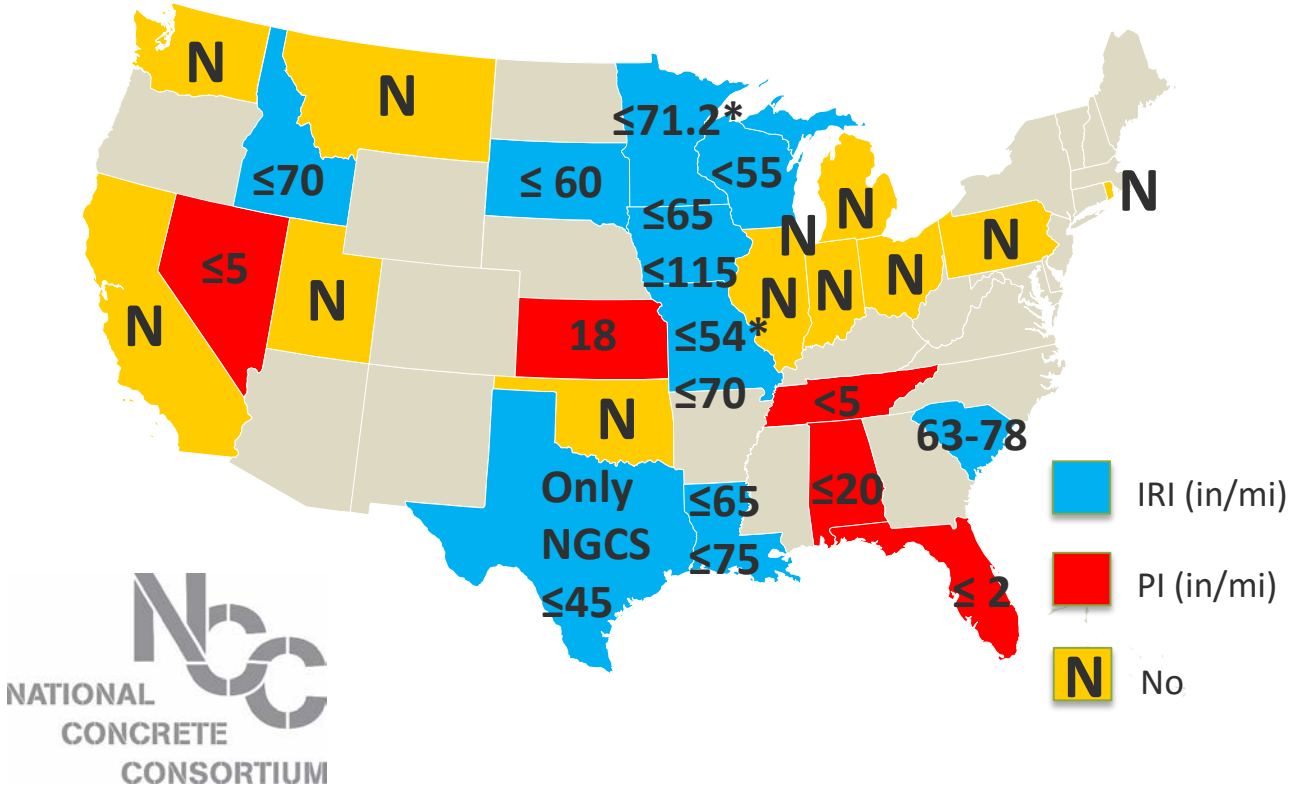
Q14: Diamond Grinding: If your Agency offers a smoothness incentive for diamond grinding, what is your limit to earn an incentive (Either IRI or PI)?



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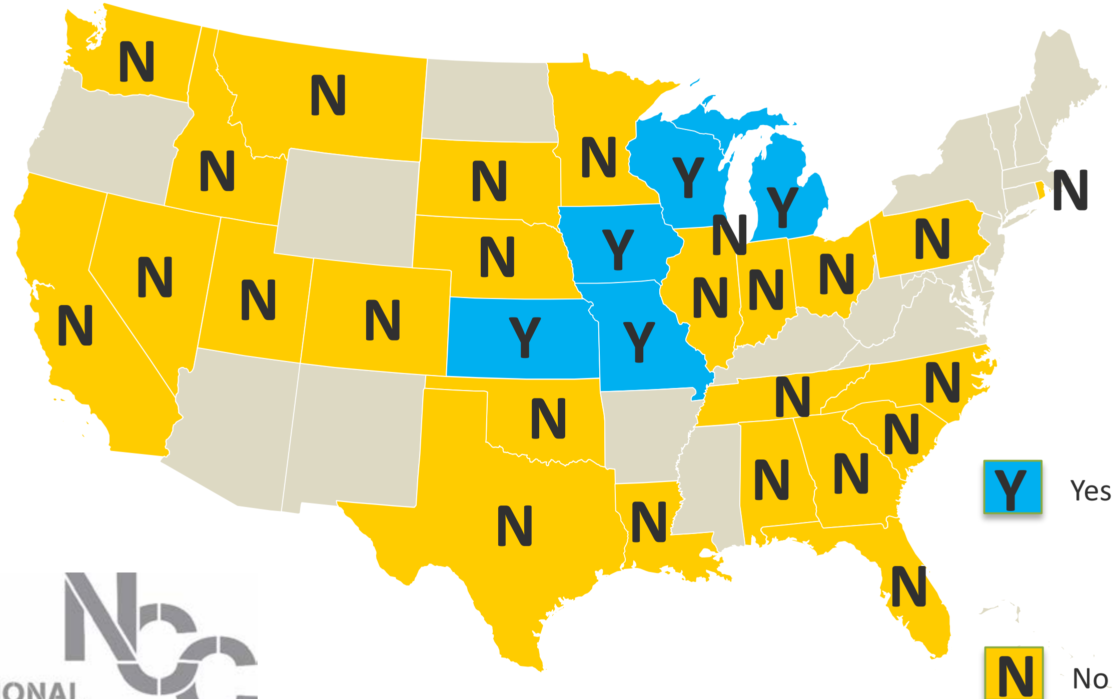
Q15: Diamond Grinding: If your Agency has a Percent (%) Improvement Spec, what is the expected % improvement to comply with specifications?



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Q15: Diamond Grinding: If your Agency has a Percent (%) Improvement Spec, what is the expected % improvement to comply with specifications?

Answered: 30 Skipped: 0

- **Wisconsin** – 65%
- **Iowa** - For extremely rough conditions: the greater of 35% of the pre-grind profile or the aforementioned requirement shall be the required smoothness or less and no bumps exceeding 0.5 inches in 25 feet.
- **Kansas** - 35% of the control or 30 in/mi, whichever is greater, (SS 838)
- **Missouri** - 35% improvement or 80.0 in./mile whichever is greater

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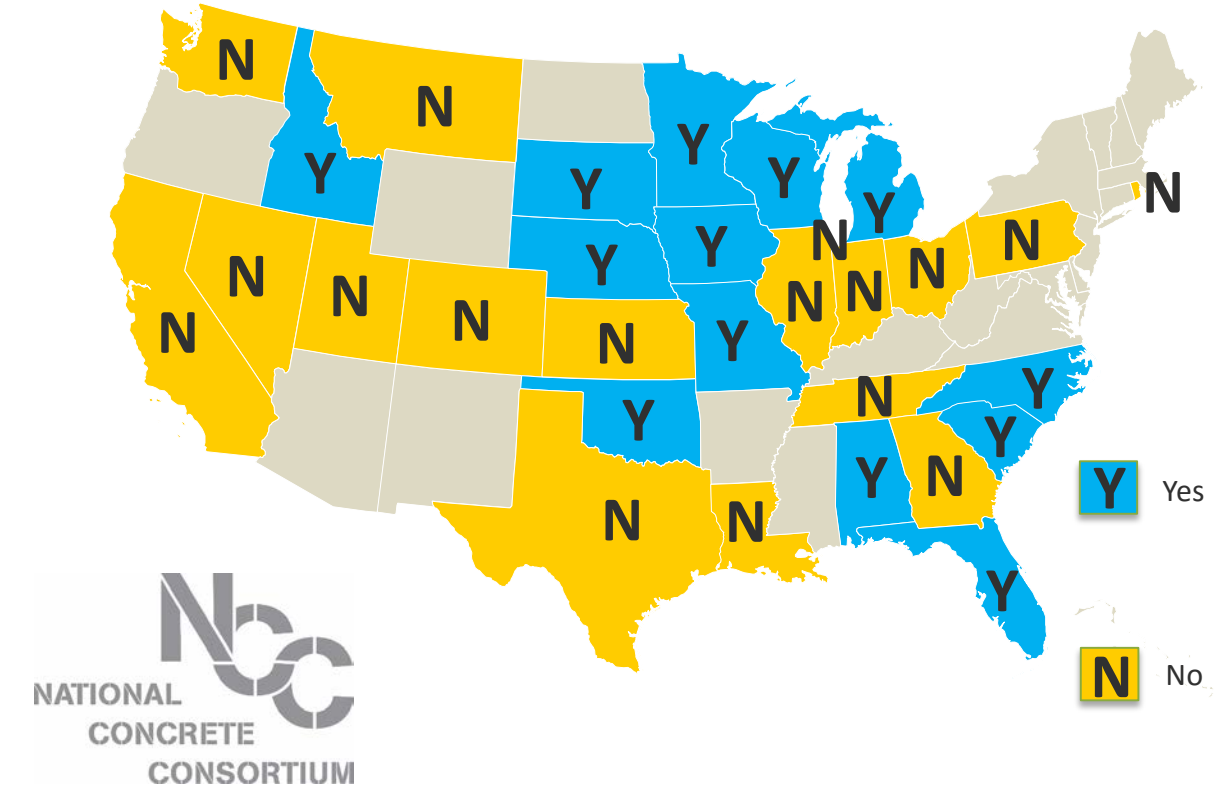
Q16: Slurry Management Practices: Does your Agency allow immediate discharge onto the ground after diamond grinding?



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Q16: Slurry Management Practices: Does your Agency allow immediate discharge onto the ground after diamond grinding?

Answered: 29 Skipped: 1

- **Pennsylvania** - PA is in the middle of changing our specifications for handling slurry after some recent environmental agency conflicts.
- **Florida** – Yes...but we're beginning the discussions on whether this is acceptable per Florida standards, or not.
- Wisconsin - Not on all projects.
- **Iowa** - Continuously remove all slurry or residue resulting from the grinding operations. Do not deposit on the slab or shoulder. Leave pavement and paved shoulders in a clean condition. Ensure residue from grinding operations does not flow across lanes occupied by public traffic or into gutters or other drainage facilities. This residue may be spread on the foreslope or removed according to Article 1104.08.

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Q16: Slurry Management Practices: Does your Agency allow immediate discharge onto the ground after diamond grinding?

Answered: 29 Skipped: 1

- **Michigan** - Yes, but the slurry must have a pH below 12.5 percent and it cannot be in urban areas
- **Nebraska** - Slurry is collected in urban areas. It may be discharged onto the ground in rural areas if several conditions are met. Conditions are based partially on a NDOR/UNL research project on slurry impacts to vegetation.
- **South Carolina** - We generally accept IGGA bmp's. However, we are in discussions with the Department of Health and Environmental Control to establish accepted methods in SC.
- **Kansas** - Must use vacuum equipment or other continuous method to remove grinding slurry and residue. (SS 838)

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Q16: Slurry Management Practices: Does your Agency allow immediate discharge onto the ground after diamond grinding?

Answered: 29 Skipped: 1

- **North Carolina** - Currently allowed to discharge on side of the road as a trial to monitor the impact. Previous projects required collection of the slurry and disposal off-site.
- **Idaho** - Not covered by specification
- Louisiana - Promptly remove slurry or residue that results from the grinding operation. Prevent slurry flow across lanes occupied by public traffic, or into gutters or other drainage facilities.
- **Alabama** - Spec language: "The Contractor shall provide positive means for the removal of the grinding residue before such residue is blown by traffic action or wind. Residue shall not be permitted to flow across lanes designated for traffic use or into gutters or other drainage structures."

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Q16: Slurry Management Practices: Does your Agency allow immediate discharge onto the ground after diamond grinding?

Answered: 29 Skipped: 1

- **California** - The Contractor to include water pollution control measures to address the handling of the grinding pavement residue within the Storm Water Pollution Prevention Plan or Water Pollution Control Program.
- **Missouri** - Can not be placed on right-a-way within 100 ft. of a waterway such as a lake, stream or river. Also can not be within 15 ft. of a water filled ditch.
- **Minnesota** - Yes, on some rural grinding projects

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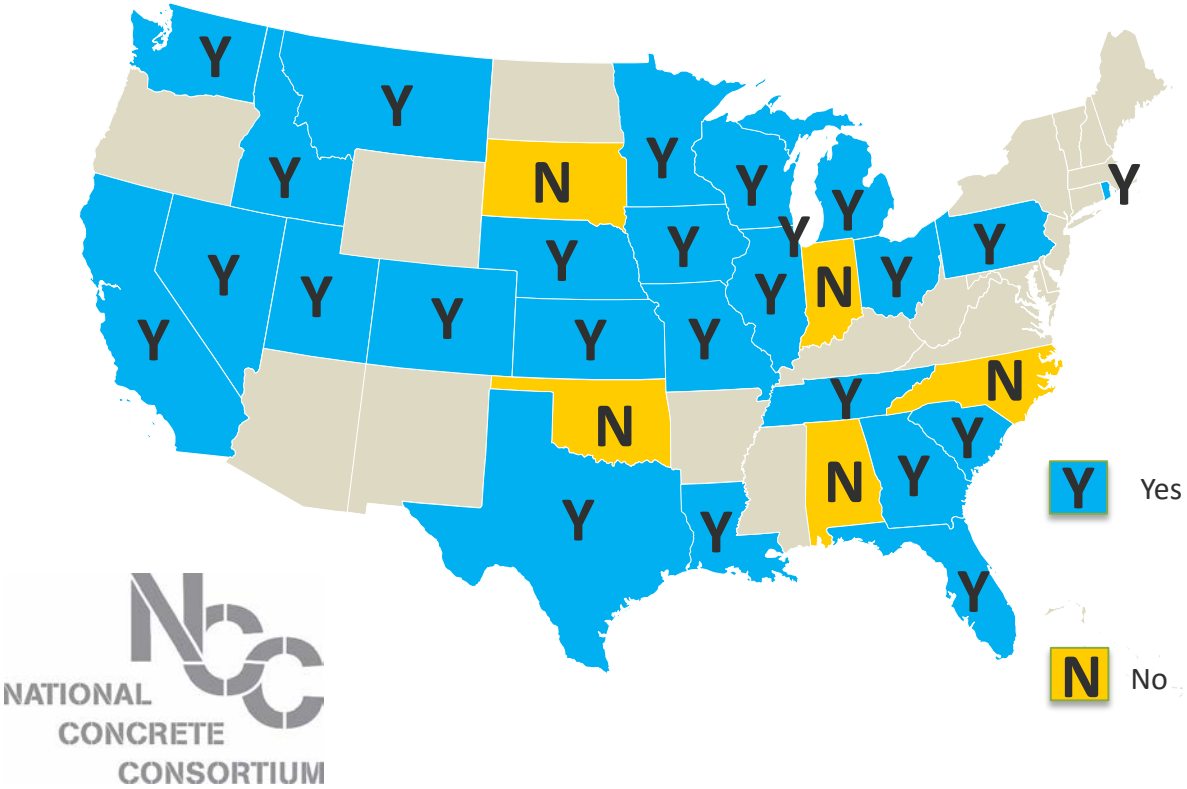
Q17: Slurry Management Practices: Does your Agency require collection of slurry after diamond grinding and dispose off-site?



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Q17: Slurry Management Practices: Does your Agency require collection of slurry after diamond grinding and dispose off-site?

Answered: 29 Skipped: 1

- **Pennsylvania** - PA is in the middle of changing our specifications for handling slurry after some recent environmental agency conflicts.
- **Iowa** - Continuously remove all slurry or residue resulting from the grinding operations. Do not deposit on the slab or shoulder. Leave pavement and paved shoulders in a clean condition. Ensure residue from grinding operations does not flow across lanes occupied by public traffic or into gutters or other drainage facilities. This residue may be spread on the foreslope or removed according to Article 1104.08.

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Q17: Slurry Management Practices: Does your Agency require collection of slurry after diamond grinding and dispose off-site?

Answered: 29 Skipped: 1

- **Ohio** - Our specification is not very prescriptive it just generally directs them to follow the law.
- **Illinois Tollway** - Proposed methods of disposal must be submitted to the Tollway for approval
- **Michigan** - Yes, but there is a land permit from the Department of Environmental Quality that waives the collection requirement and allows discharge onto the land if the pH is below 12.5 percent and the job is in a rural area. Urban areas still require collection.
- **Rhode Island** - RIDOT diamond ground one bridge which required collection of slurry and disposal off-site

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Q17: Slurry Management Practices: Does your Agency require collection of slurry after diamond grinding and dispose off-site?

Answered: 29 Skipped: 1

- **Nebraska** - Slurry is collected in urban areas. It may be discharged onto the ground in rural areas if several conditions are met. Conditions are based partially on a NDOR/UNL research project on slurry impacts to vegetation.
- **South Carolina** - Dependent on PH in accordance with IGGA bmp's
- **North Carolina** - Currently allowed to discharge on side of the road as a trial to monitor the impact. Previous projects required collection of the slurry and disposal off-site.
- **Missouri** - When within 100 ft. of a waterway such as a lake, stream or river. When within 15 ft. of a water filled ditch.
- **Minnesota** - Yes, on all urban projects

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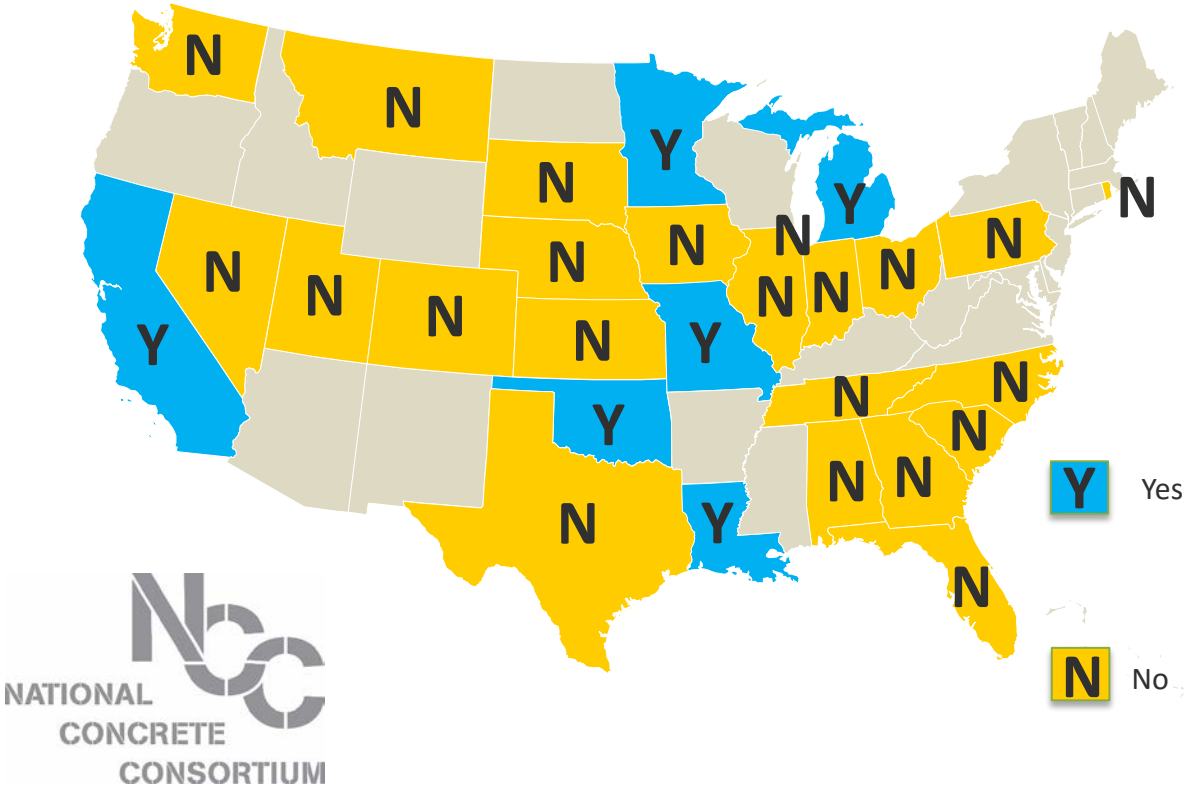
Q18: Slurry Management Practices: Does your Agency have any other Best Management Practices for slurry?



Q18: Slurry Management Practices: Does your Agency have any other Best Management Practices for slurry?

Answered: 28 Skipped: 2

- **Pennsylvania** - PA is in the middle of changing our specifications for handling slurry after some recent environmental agency conflicts.
- **Michigan** - Treat the slurry before release if the pH is above 12.5 percent.
- **Louisiana** - When practical, slurry may be disposed of on the slope near the shoulder edge as the machine progresses down the roadway, unless otherwise directed. Conduct a final sweeping with power equipment before opening the pavement to traffic.
- **Oklahoma** - Bury
- **California** - SWPPP and WPCP guidance http://www.dot.ca.gov/hq/construc/stormwater/reviewguidance.pdf

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Q18: Slurry Management Practices: Does your Agency have any other Best Management Practices for slurry?

Answered: 28 Skipped: 2

- **Missouri** - Place on vegetation area and slurry material is to be spread out so as not to form a mound.
- **Minnesota** - https://www.pca.state.mn.us/water/road-construction-concrete-slurry-guidance

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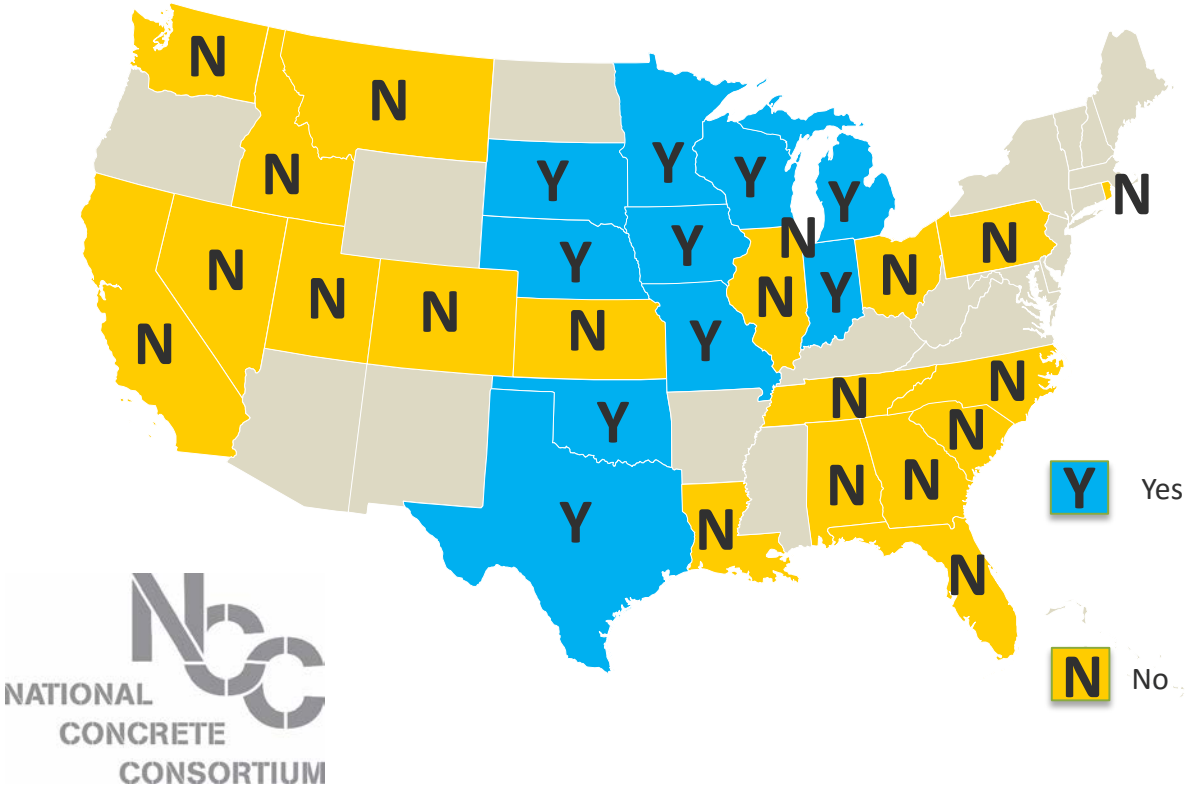
Q19: Is your Agency doing any research related to any CPR activities?



Q19: Is your Agency doing any research related to any CPR activities?

Answered: 30 Skipped: 0

- **Wisconsin** - Rapid Repair - Dr. Cramer
- **Indiana** - SPR-4004 - Development of Subgrade Stabilization & Slab Undersealing Solutions for PCC Pavements Restoration and Repairs. The research is intended to provide a solution to void undersealing with hot asphalt material. It is also looking into options to chemically stabilize relatively small areas of patching (one or two slabs) that are difficult to use traditional chemical stabilization methods.
- **Iowa** - Improved patching practices - WJE

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Q19: Is your Agency doing any research related to any CPR activities?

Answered: 30 Skipped: 0

- **Michigan** - MDOT has participated in several past and current research projects to study issues related to concrete pavement deterioration and preservation. We has participated on a NCHRP project team to study the durability of early-open concrete mixtures. We are also involved with research to study the effectiveness of CPR treatments.
- **South Dakota** - Doing test sections on curled and warped PCCP to determine how to maintain the smoothness after grinding. This is informal work by the SDDOT working with the IGGA.
- **MN, MI, IL, WI, CA, MO** - In cooperation with the National Road Research Alliance and MnROAD, there are activities related to early opening of repairs and development of rapid repair materials that maintenance could use to achieve 5+year fixes. In addition RCC and IC FDR are being tested for early opening

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Q19: Is your Agency doing any research related to any CPR activities?

Answered: 30 Skipped: 0

- **Nebraska** - NDOT and UNL have a current research project to develop a more durable PCC repair mix. Our standard paving mix is used for repair of multilane facilities when a lane can be shut down for 5+ days. On rural, two lane roads that must be open w/in 4-8 hours we use our Pavement Repair (PR) mix that often utilizes chloride accelerators and does not mitigate ASR leading to durability issues.
- **Texas** - Currently working on a Development of Concrete Overlay Type and Design for PCC Pavements
- **Oklahoma** - Concrete Pavement Rehabilitation
- **Missouri** - MoDOT is assisting with a FHWA effort to develop best practices for concrete pavement repairs. ARA won the contract and is giving a presentation at the 2017 Fall NCC meeting.

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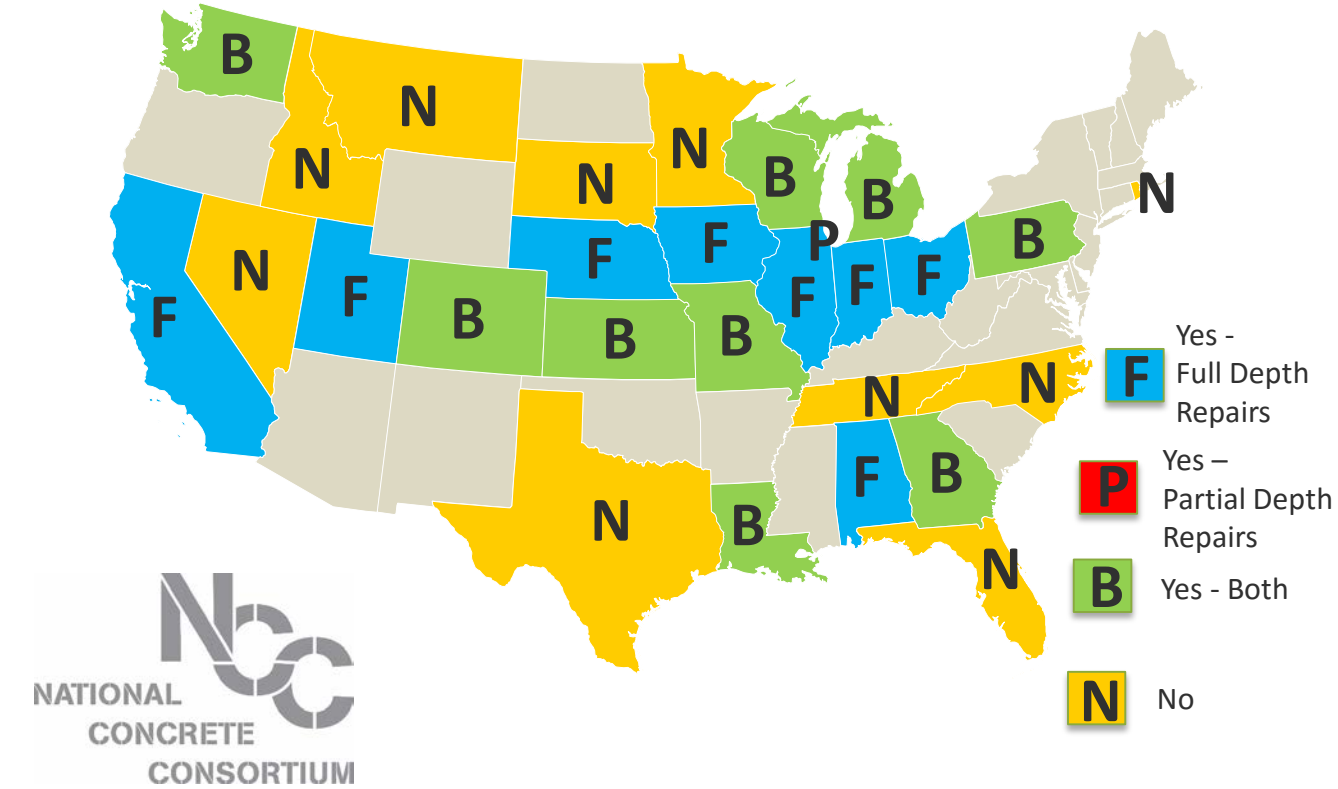
Q20: Do your Agency's maintenance forces perform any CPR work?



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Q20: Do your Agency's maintenance forces perform any CPR work?

Answered: 30 Skipped: 0

- **Florida** - Maintenance forces may apply an asphalt patch, or fiber reinforced polymer patching material here and there just to temporarily bridge over spalls and breaks, but CPR (full depth slab repairs) are performed through FDOT's Resurfacing Program and the work is let as a construction contract.
- **Indiana** - Full Depth Repairs - Emergency repairs only
- **Illinois Tollway** - Only for short life emergency repairs.
- **Utah** - The majority of our CPR work is performed by contractors, even isolated repairs and blow-ups. Much of our UDOT maintenance forces work is temporary, i.e. an asphalt patch until we can arrange for a contractor.
- **Michigan** - Capital Preventive Maintenance work is contracted out while scheduled maintenance and emergency repair are performed in-house.

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Q20: Do your Agency's maintenance forces perform any CPR work?

Answered: 30 Skipped: 0

- **Illinois** – Full Depth Repairs on a limited basis and only used for emergency situations.
- **South Carolina** – Full Depth Repairs very minimally in emergency situations. 99.9% of CPR work is done through contractors.
- **Kansas** - Maintenance is normally limited to spray patching (partial depth) or full depth patching with HMA. There are occasions that concrete is used by maintenance to patch, but this is rare.
- **Louisiana** – Both smaller FDR and PDR and repairs that are needed quickly are done by our maintenance crews.

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Q21: Please attach a link to your Agency's Specifications.

Answered: 30 Skipped: 0

Pennsylvania - Section 516 of http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2016/408_2016_3/408_2016_

Florida - http://www.fdot.gov/programmanagement/Implemented/SpecBooks/July2017/Files/717eBook.pdf

Georgia- http://www.dot.ga.gov/PartnerSmart/Business/Source/specs/ss451.pdf
http://www.dot.ga.gov/PartnerSmart/Business/Source/specs/ss452.pdf

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Q21: Please attach a link to your Agency's Specifications.

Answered: 30 Skipped: 0

Washington - http://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/2016Amended2017-04-03.pdf see Section 5-01

Wisconsin – http://wisconsindot.gov/rdwy/stndspec/ss-04-16.pdf#ss416

Ohio - http://www.dot.state.oh.us/Divisions/ConstructionMgt/OnlineDocs/Pages/2016-Online-Spec-Book.aspx

Utah - http://www.udot.utah.gov/main/uconowner.gf?n=31730316757114651

Michigan - http://mdotcf.state.mi.us/public/specbook/files/2012/603%20Conc%20Pavt%20Restoration.pdf

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Q21: Please attach a link to your Agency's Specifications.

Answered: 30 Skipped: 0

South Dakota - Section 390 "Spall Repair" @ http://www.sddot.com/business/contractors/specs/2015specbook/Default.aspx

Kansas - https://www.ksdot.org/bureaus/burConsMain/specprov/2015specprov.asp

North Carolina - https://connect.ncdot.gov/resources/Specifications/StandSpecLibrary/2018%20Standard%20Specifications%20for%20Roads%20and%20Structures.pdf

Idaho - http://apps.itd.idaho.gov/apps/manuals/SpecBook.pdf

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Q21: Please attach a link to your Agency's Specifications.

Answered: 30 Skipped: 0

Texas - ftp://ftp.dot.state.tx.us/pub/txdot-info/des/spec-book-1114.pdf, see Item 361

Louisiana - http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Standard_Specifications/Standard%20Specifications/2016%20Standard%20Specifications%20for%20Roads%20and%20Bridges%20Manual%20(for%20Use%20on%20Selected%20Projects)/10%20-%202016%20-%20Part%20VI%20-%20Rigid%20Pavement.pdf

Alabama - http://www.dot.state.al.us/conweb/pdf/Specifications/2012%20DRAFT%20Standard%20Specs.pdf (Sections 453 & 455)

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Q21: Please attach a link to your Agency's Specifications.

Answered: 30 Skipped: 0

California - http://www.dot.ca.gov/hq/maint/Pavement/Offices/Pavement_Engineering/CPG/CPG_complete_download.pdf

Missouri - www.modot.org/business/standards_and_specs/2017%20Missouri%20Standards%20Specific%20-%20MHTC%20(Jul%202017).pdf

Tennessee - http://www.tn.gov/tdot/article/transportation-construction-2015-standard-specifications

Minnesota (Spec 2302) - http://www.dot.state.mn.us/pre-letting/prov/index.html

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Q21: Please attach a link to your Agency's Procedures

Answered: 30 Skipped: 0

Pennsylvania - Section C.5.8 of http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%202/PUB%202.pdf

Ohio - http://www.dot.state.oh.us/Divisions/ConstructionMgt/Pages/2017-MOP.aspx

Illinois - http://www.idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Construction/Standard-Specifications/Standard%20Specifications%20for%20Road%20and%20Bridge%20Construction%202016.pdf

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Q21: Please attach a link to your Agency's Procedures

Answered: 30 Skipped: 0

Alabama -
ALDOT-366 (pull-out test):
http://www.dot.state.al.us/mtweb/Testing/testing_manual/pdf/Pro/ALDOT366.pdf

Missouri -
www.modot.org/business/standards_and_specs/2017%20Missouri%20Standards%20Specific%20-%20MHTC%20(Jul%202017).pdf

Michigan -
http://www.michigan.gov/documents/mdot/MDOT_PCC_PWL_Worksheet_384094_7.xls

Minnesota -
http://www.dot.state.mn.us/materials/concretepavementrehabilitation.html

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Q21: Please attach a link to your Agency's Standard Drawings

Answered: 30 Skipped: 0

Pennsylvania - RC-26M of http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%2072M/RC-26M.pdf

Georgia -Standard P1, P2 & P3. http://mydocs.dot.ga.gov/info/gdotpubs/ConstructionStandardsAndDetails/Forms/AllItems.aspx

Washington – http://www.wsdot.wa.gov/publications/fulltext/Standards/english/PDF/a60.10-03_e.pdf http://www.wsdot.wa.gov/publications/fulltext/Standards/english/PDF/a60.20-03_e.pdf

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Q21: Please attach a link to your Agency's Standard Drawings

Answered: 30 Skipped: 0

Wisconsin - See SDD 13C8-10
http://wisconsindot.gov/rdwy/sdd/sd-13-00toc.pdf
Michigan -
http://mdotcf.state.mi.us/public/design/files/englishstandardplans/files/R044f.pdf
Illinois -
http://www.idot.illinois.gov/Assets/uploads/files/Doing-Business/Standards/Highway-Standards/Rev%20219%20Complete%20Set.pdf
The two standards for full-depth patching are:
CRC Pavement - 219-442001-04_classapatches.pdf
JPC Pavement - 219-442101-07_classbpatches.pdf

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Q21: Please attach a link to your Agency's Standard Drawings

Answered: 30 Skipped: 0

Kansas - https://kart.ksdot.org/

Texas - ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/cserve/standard/roadway/repcp14.pdf

Louisiana - http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Standard_Plans/Pages/default.aspx?RootFolder=%2FInside_LaDOTD%2FDivisions%2FEngineering%2FStandard_Plans%2FSpecial%20Details%2FConcrete%20Pavement%20Rehab&FolderCTID=0x012000B45DF4ABE71813419EF4AF62EBF6A9F3&View={818530E6-561D-4F7C-A684-91AEF628795A}

Alabama - http://alletting.dot.state.al.us/Docs/Standard_Drawings/2017%20English/STDUS17_0100.pdf

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Q21: Please attach a link to your Agency's Standard Drawings

Answered: 30 Skipped: 0

Missouri - www.modot.org/business/standards_and_specs/documents/Std_Plans_07_01_2017.pdf

Tennessee - http://www.tn.gov/tdot/article/transportation-roadway-design-standard-drawings-std.-dwg-item-nos-rpj23
Section 501: Rigid Pavements

Minnesota - http://www.dot.state.mn.us/materials/concretedocs/MemoandCPR_Details_04-22-2016.pdf

South Carolina - We are working on development of CPR standard drawings but they are not available at this time.

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Q22: Additional Comments

Answered: 30 Skipped: 0

- **Pennsylvania** - PA does not have "expected dowel life" specification. a full depth repair is expected to last the rest of the pavements serviceable life. A partial depth repair can be either asphalt or concrete depending on the age of the pavement.
- **Indiana** - INDOT does not diamond grind or groove PCCP for smoothness. The only exception is bump/profile correction on new pavement if it does not pass the profiliograph.
- **Illinois Tollway** - Too many specifications and drawings to attach. Geopolymers may be our next step to research along with precast CRC repairs using UHPC for splice zones.
- **Nebraska** - Specifications and Standard Drawings can be supplied in PDF form on request. Specs for #13 & #14 were not immediately available but can also be provided.

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