

# NCC Spring 2021 State Reports on Fast Setting Patching Materials

Thursday, April 08, 2021

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## 35

Total Responses

Date Created: Friday, February 19, 2021

Complete Responses: 35

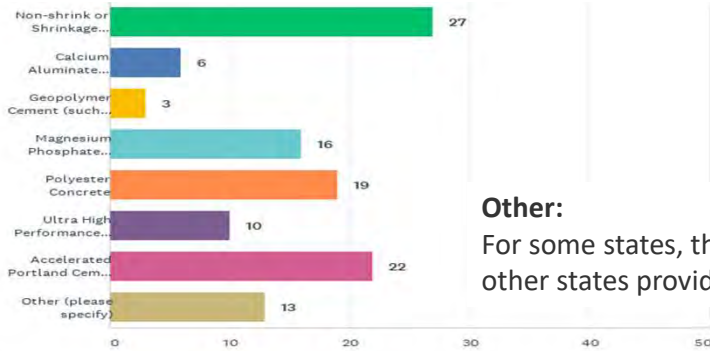
*Thank you for providing responses to the NCC survey. The information will be useful for Tyler Ley in putting together the Work Order for the 2020 Synthesis Proposal "Fast Setting Patching Materials."*

*Disclaimer: The data presented here is subject to interpretation of the Agency responses. Please let us know if we have errors.*

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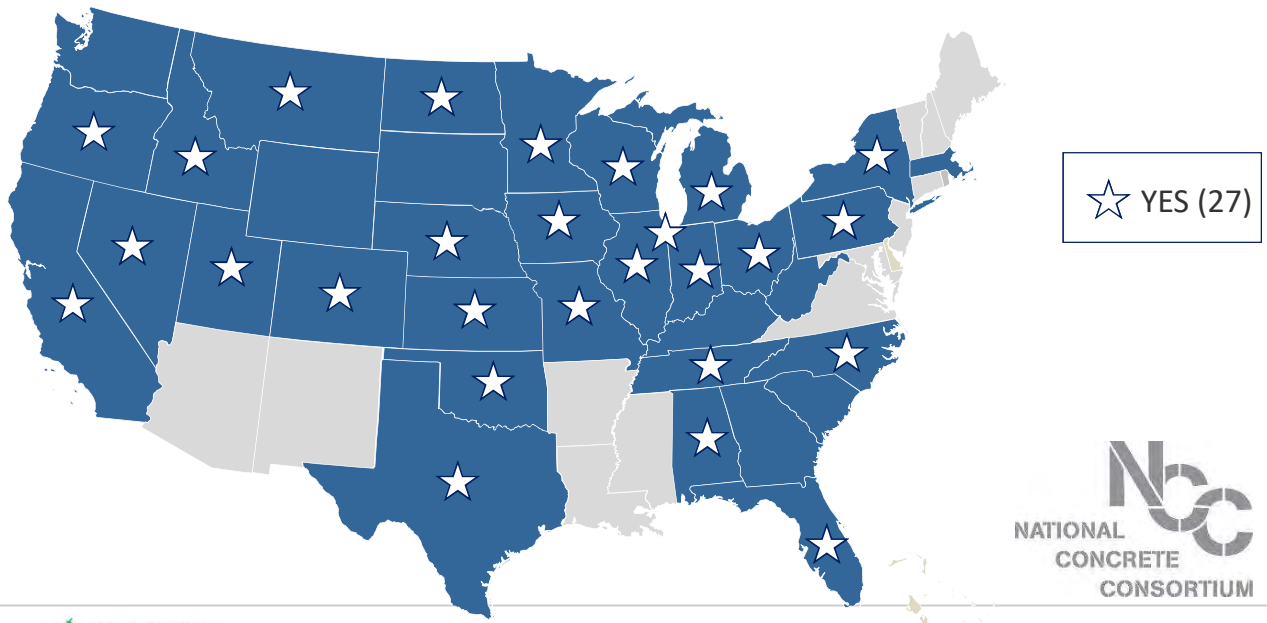
### Q2: For bridge structures - Does your Agency allow/specify any of the following types of fast setting patching materials? (Check all that apply)

State	AL	CA	CO	FL	GA	IA	ID	IL	IN	KS	KY	MA	MI	MN	MO	MT	NC	ND	NE	NV	NY	OH	OK	OR	PA	SC	SD	TN	TX	UT	VA	WI	WV	WY
Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)	x	x	x	x		x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	x		x		
Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)			x					x	x												x		x											
Geopolymer Cement (such as activated fly ash, material from Aquafin)																			x						x								x	
Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)		x	x	x			x		x					x			x	x	x	x	x	x	x	x	x								x	
Polyester Concrete	x	x	x		x	x				x	x			x			x		x	x	x	x		x	x			x	x			x		x
Ultra High Performance Concrete (UHPC)		x		x	x	x			x												x		x		x							x		x
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)	x	x	x	x	x	x		x	x				x	x	x		x				x	x	x	x	x		x	x	x					x
Other (please specify)		x								x	x	x	x				x	x			x					x	x					x		x

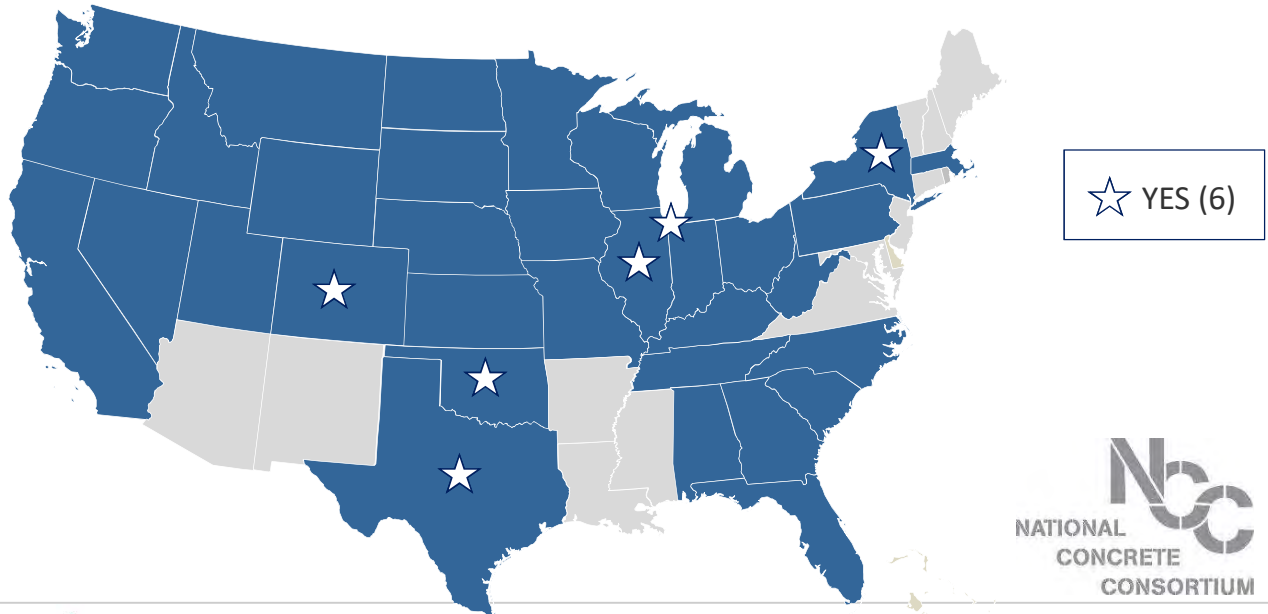


**Other:**  
For some states, that means none of the above and other states provided additional information.

### Q2: For bridge structures – Does your Agency allow/specify Non-shrink or shrinkage compensating cements (such as Rapid Set, CSA, or Type k cement)

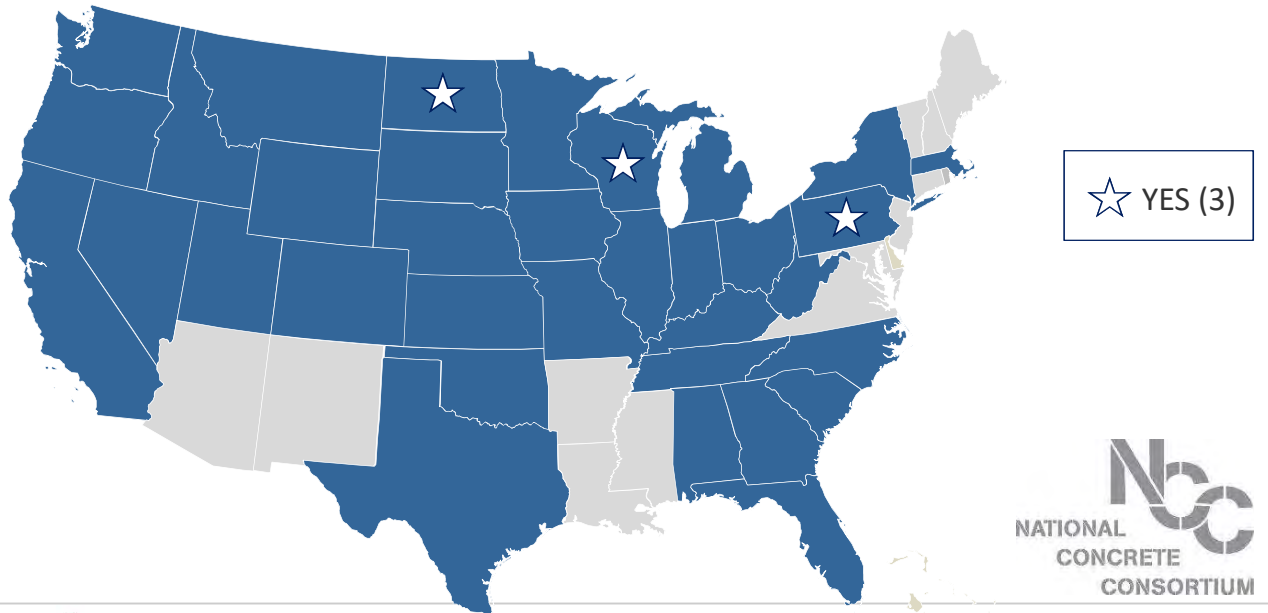


**Q2: For bridge structures - Does your Agency allow/specify Calcium Aluminate Cement (such as Kemeos Aluminate Product or CAC cement)**



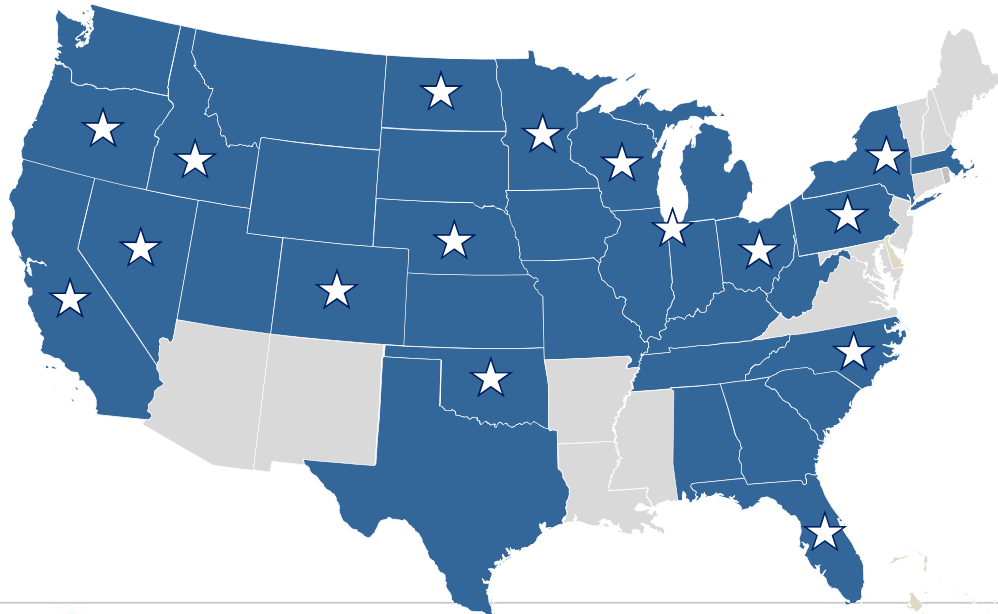
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**Q2: For bridge structures - Does your Agency allow/specify Geopolymer Cement (such as activated fly ash, material from Aquafin)**



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**Q2: For bridge structures - Does your Agency allow/specify Magnesium Phosphate Cement (Such as Phoscrete or MasterEmaco T 545 HT)?**

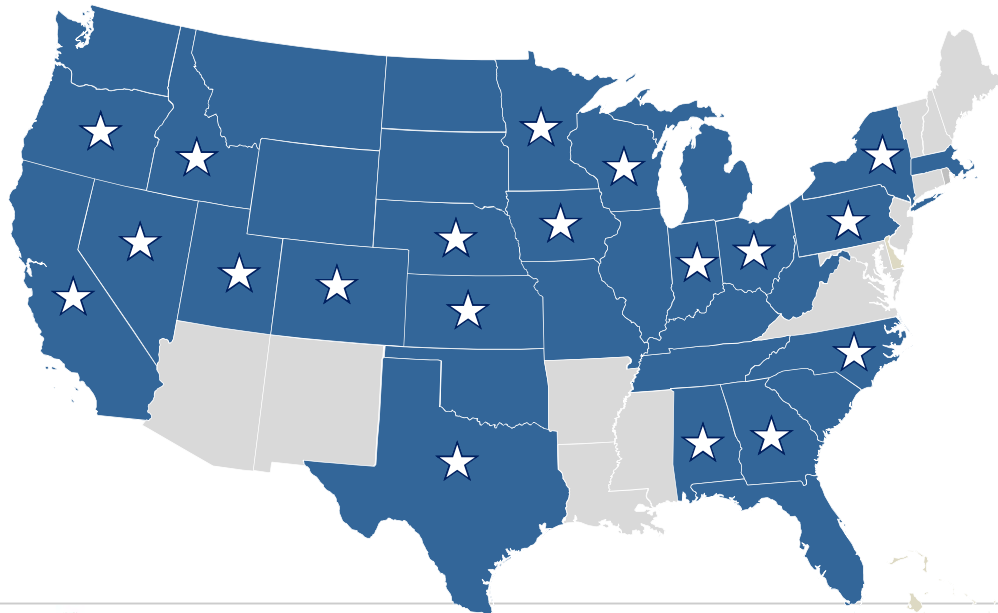


☆ YES (16)



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**Q2: For bridge structures - Does your Agency allow/specify Polyester Concrete?**

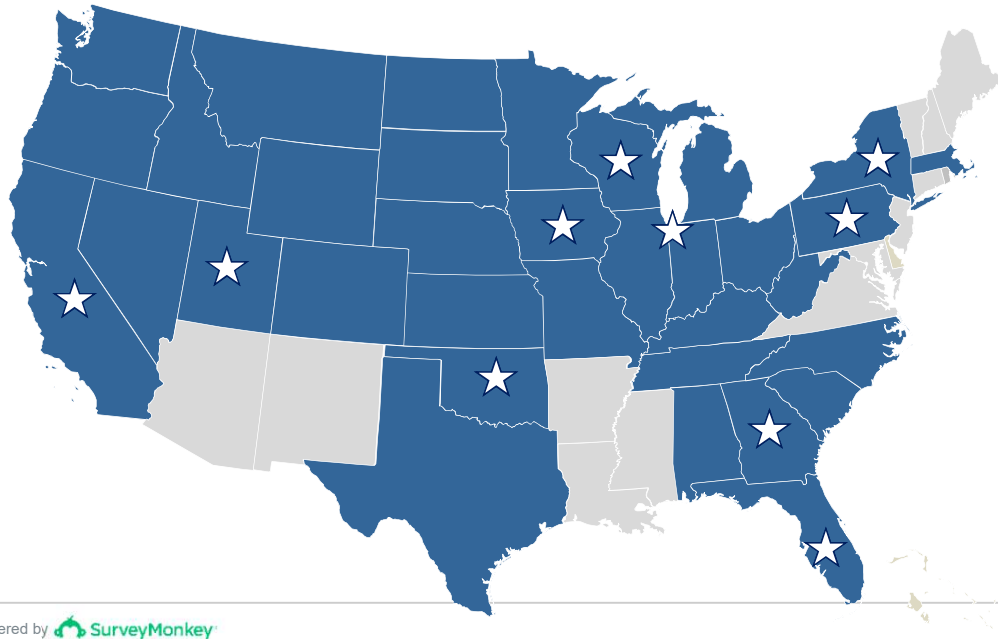


☆ YES (19)



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**Q2: For bridge structures - Does your Agency allow/specify Ultra High-Performance Concrete (UHPC)?**

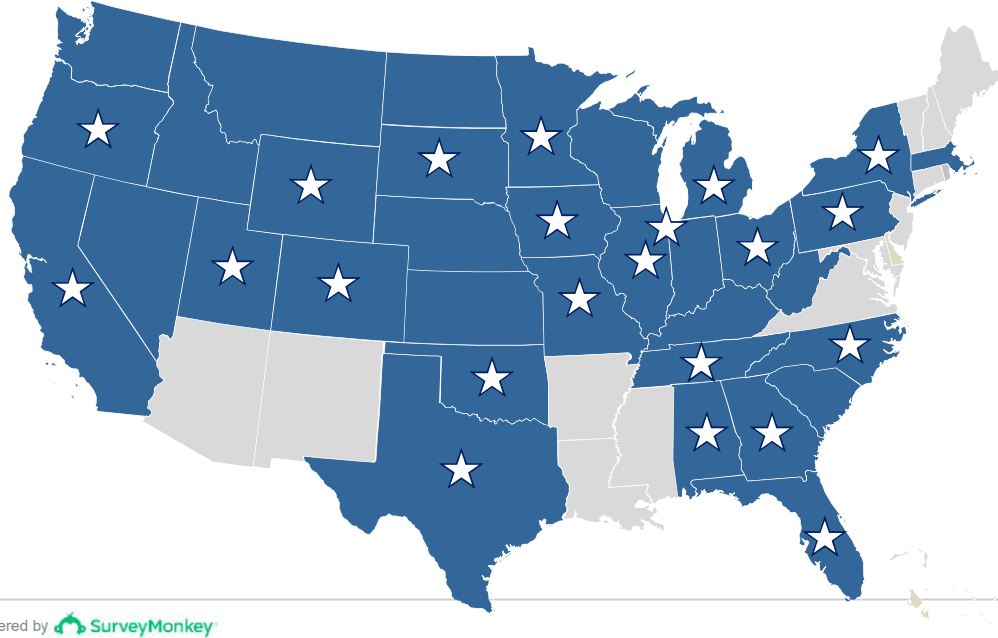


☆ YES (10)



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**Q2: For bridge structures - Does your Agency allow/specify Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)**



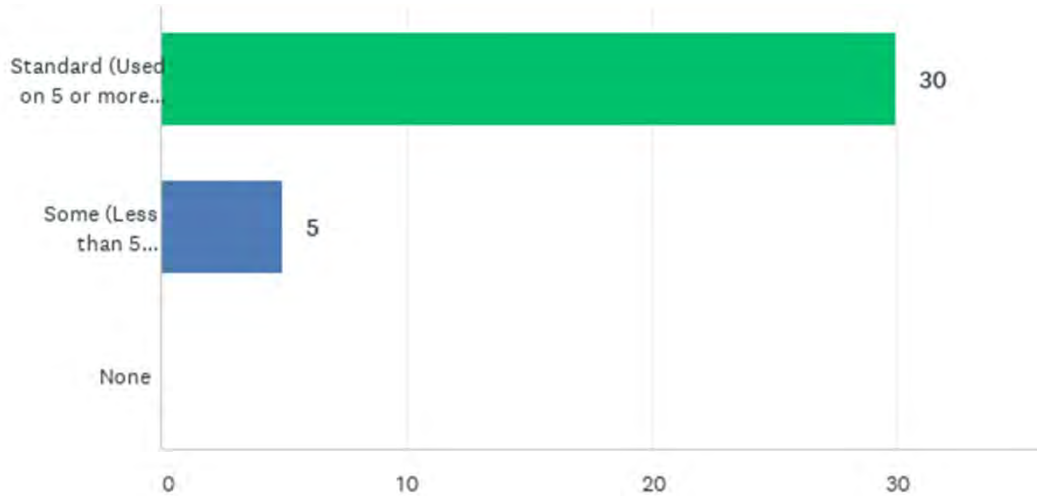
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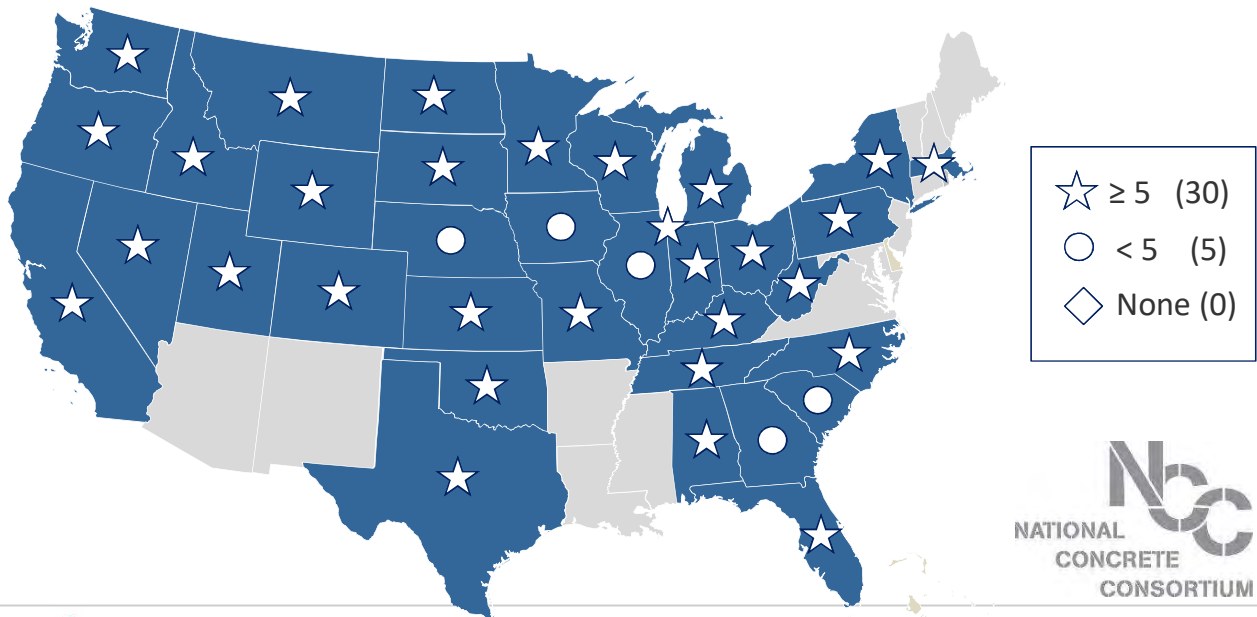
### Q3: What is your Agency's experience with fast setting patching materials for bridge repairs?

Answered: 35 Skipped: 0



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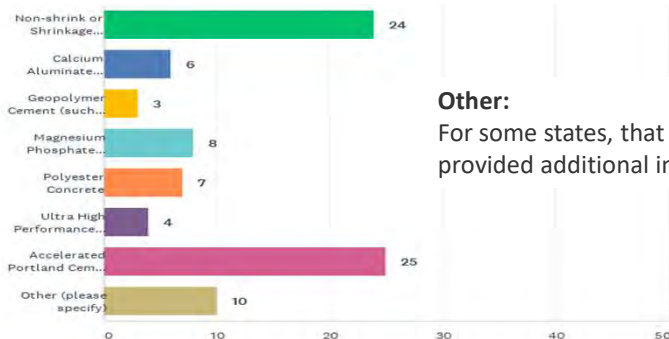
### Q3: What is your Agency's experience with fast setting patching materials for bridge repairs (number of projects)?



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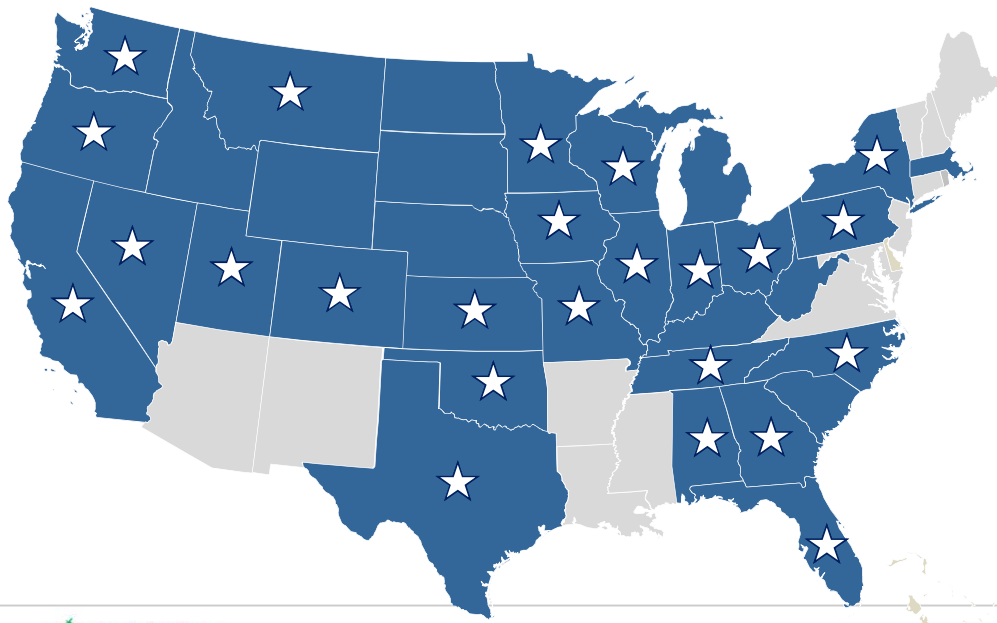
### Q4: For concrete pavements - Does your Agency allow/specify any of the following types of fast setting patching materials? (Check all that apply)

State	AL	CA	CO	FL	GA	IA	ID	IL	IN	KS	KY	MA	MI	MN	MO	MT	NC	ND	NE	NV	NY	OH	OK	OR	PA	SC	SD	TN	TX	UT	VA	WI	WV	WY	
Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)	x	x	x	x	x	x		x	x	x				x	x	x	x			x	x	x	x	x	x			x	x	x	x	x			
Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)								x	x												x										x	x			
Geopolymer Cement (such as activated fly ash, material from Aquafin)																									x							x	x		
Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)		x	x			x														x	x				x							x	x		
Polyester Concrete		x																		x	x				x						x	x	x		
Ultra High Performance Concrete (UHPC)		x																		x	x				x								x		
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)	x	x	x	x	x	x	x	x	x	x				x	x					x	x	x	x	x	x		x	x	x	x	x	x	x		
Other (please specify)	x										x	x	x	x											x	x							x		



**Other:**  
For some states, that means none of the above and other states provided additional information.

### Q4: For concrete pavements – Does your Agency allow/specify Non-shrink or shrinkage compensating cements (such as Rapid Set, CSA, or Type k cement)

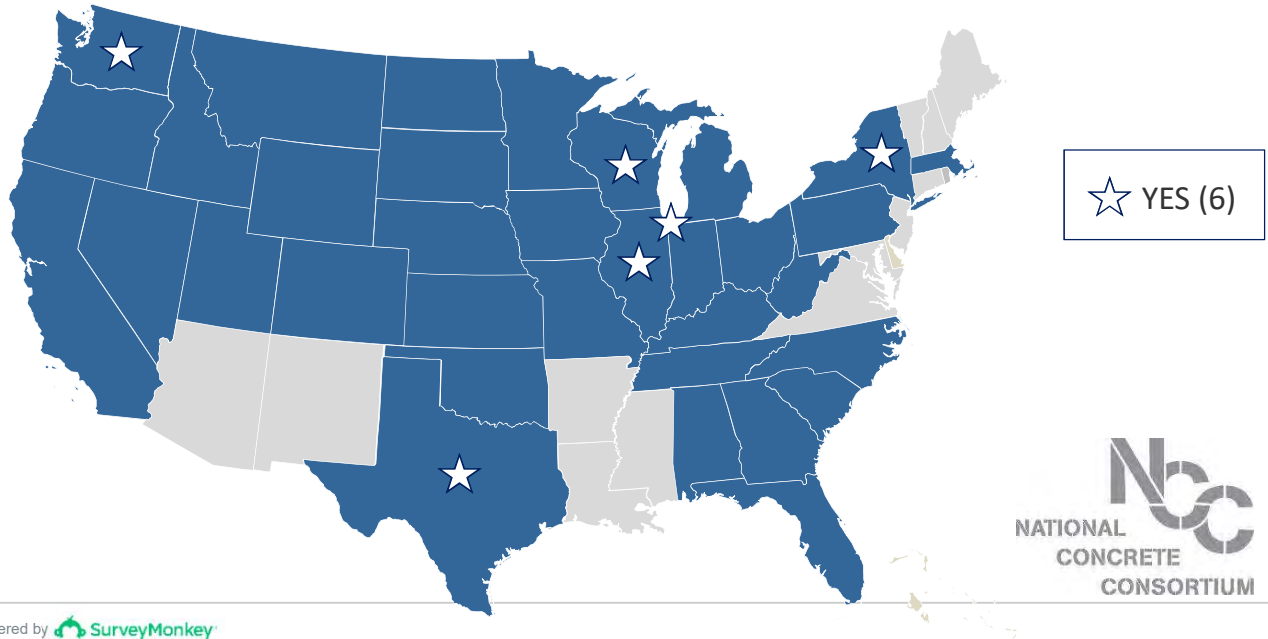


☆ YES (24)

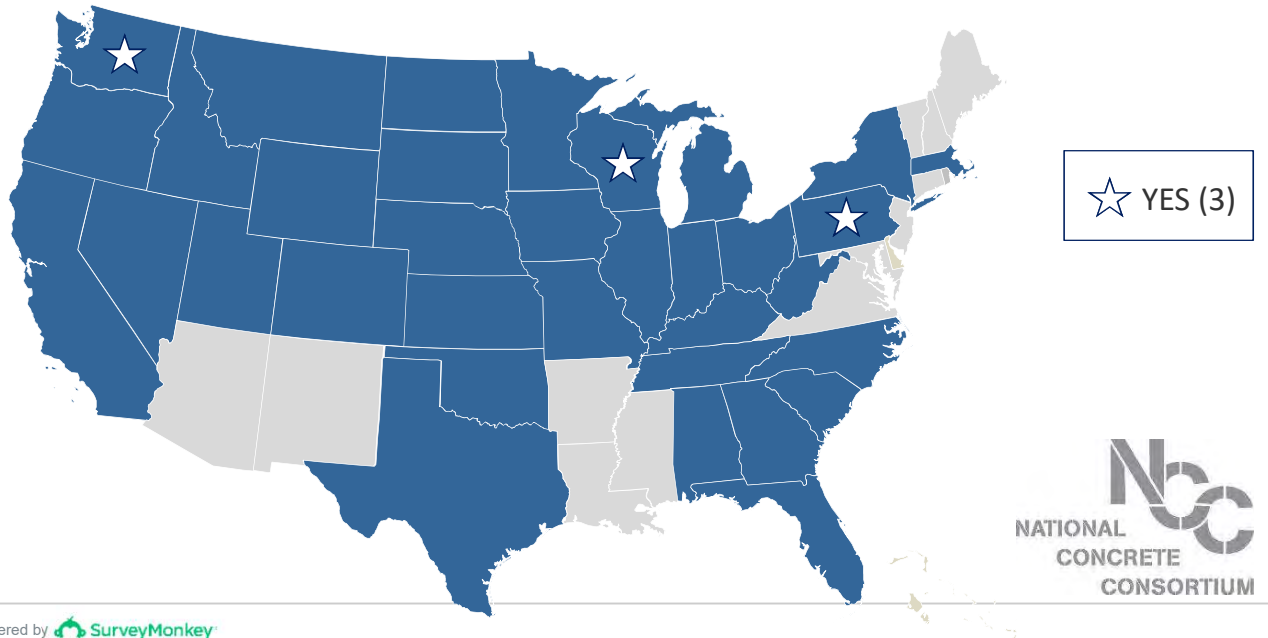


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**Q4: For concrete pavements - Does your Agency allow/specify Calcium Aluminate Cement (such as Kemeos Aluminate Product or CAC cement)**

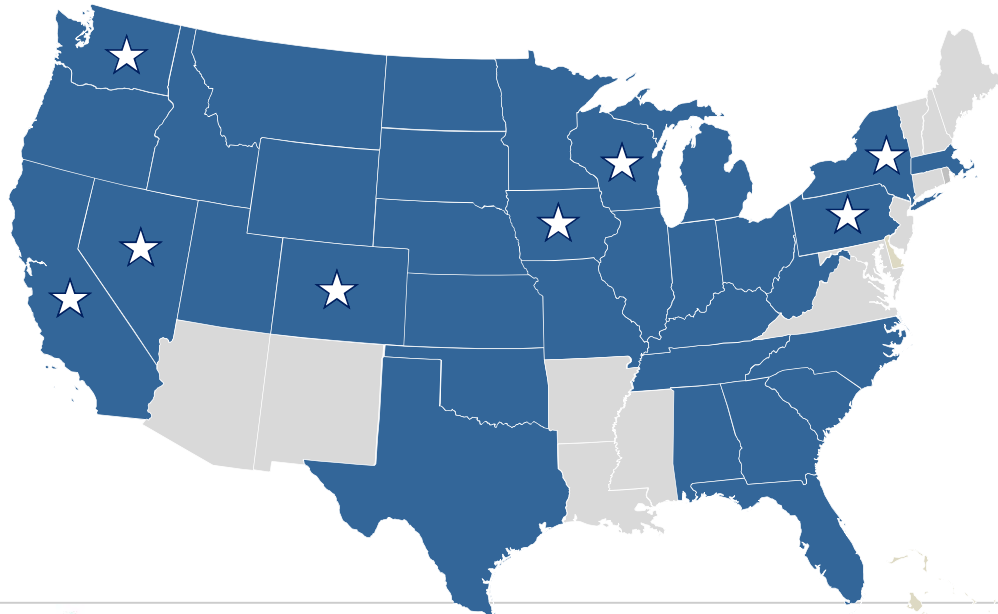


**Q4: For concrete pavements - Does your Agency allow/specify Geopolymer Cement (such as activated fly ash, material from Aquafin)**





**Q4: For concrete pavements - Does your Agency allow/specify Magnesium Phosphate Cement (Such as Phoscrete or MasterEmaco T 545 HT)?**

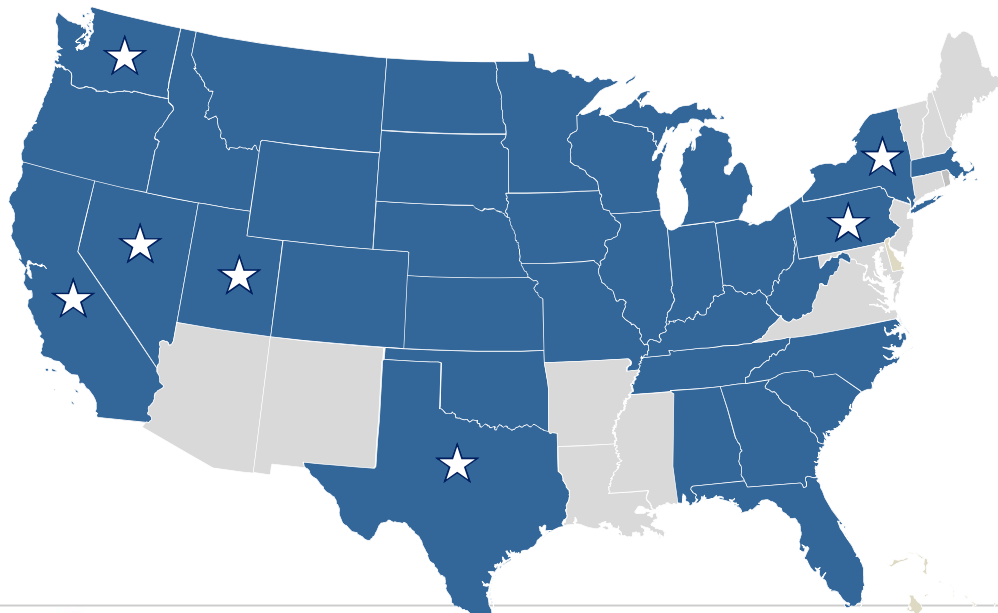


☆ YES (8)



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**Q4: For concrete pavements - Does your Agency allow/specify Polyester Concrete?**

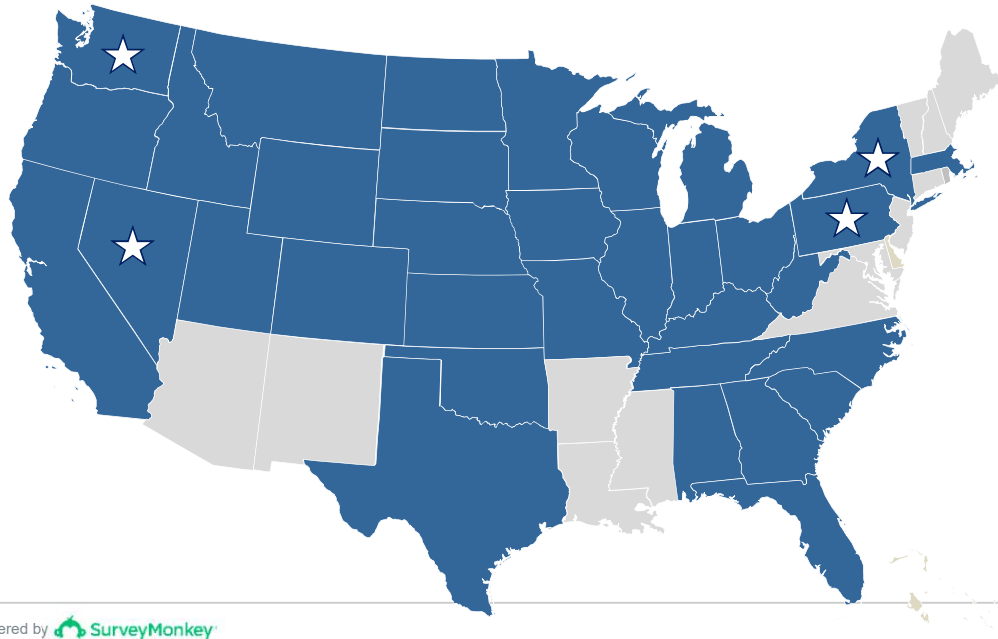


☆ YES (7)



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**Q4: For concrete pavements - Does your Agency allow/specify Ultra High-Performance Concrete (UHPC)?**

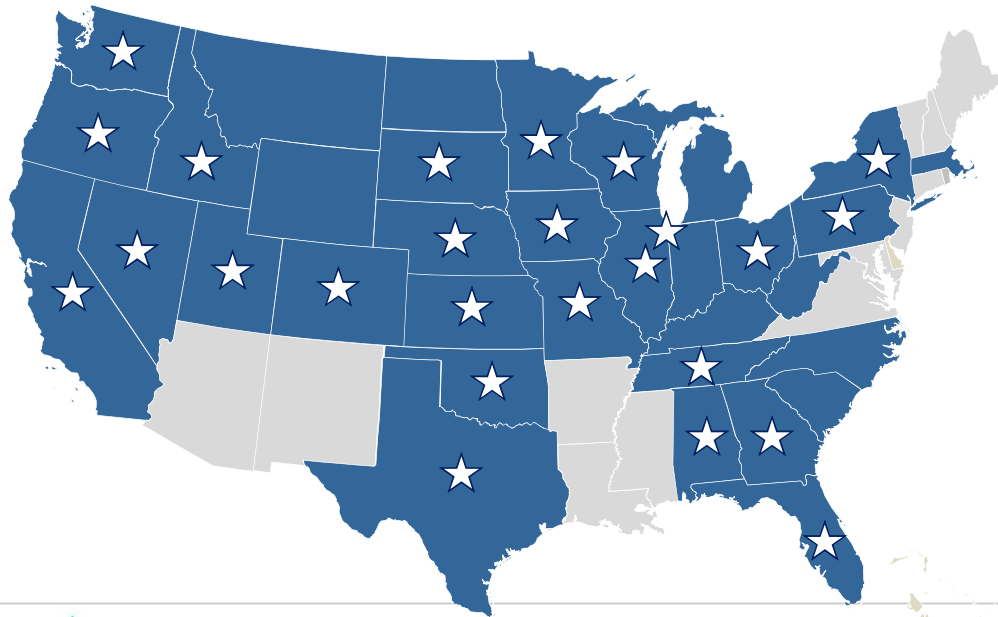


☆ YES (4)



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**Q4: For concrete pavements - Does your Agency allow/specify Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)**



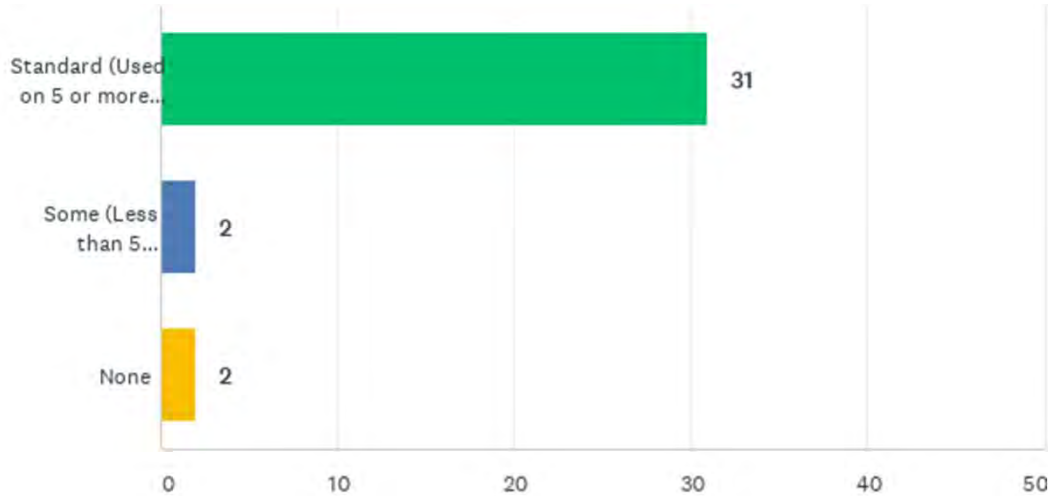
☆ YES (25)



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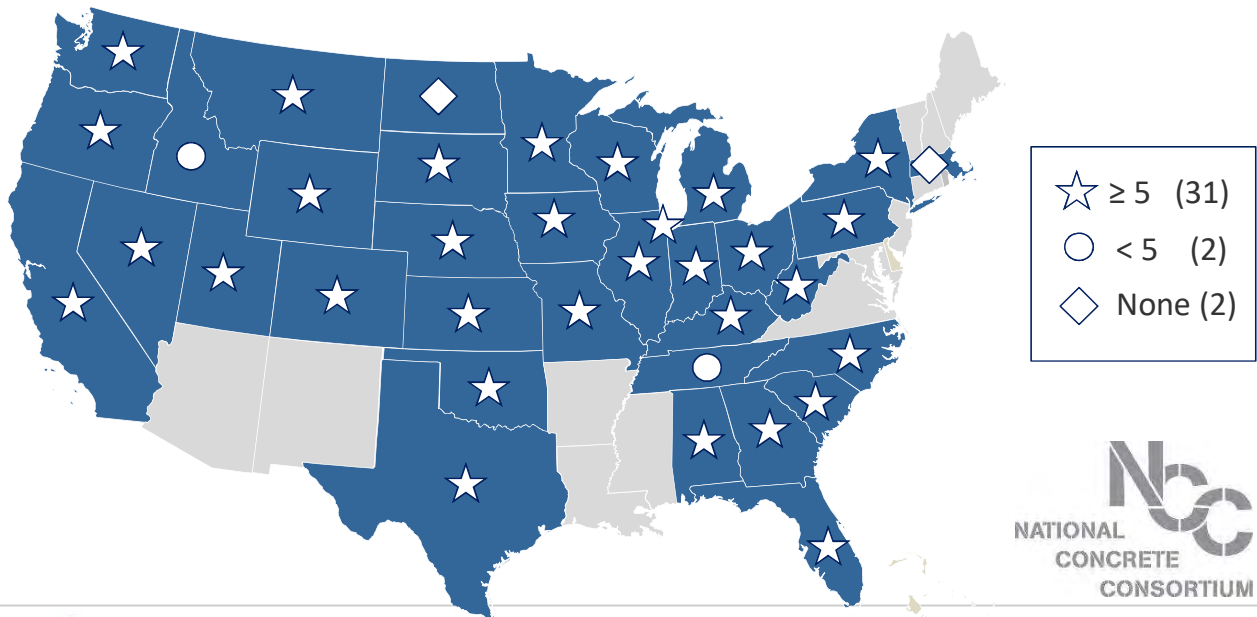
### Q5: What is your Agency's experience with fast setting patching materials for concrete pavement repairs?

Answered: 35 Skipped: 0



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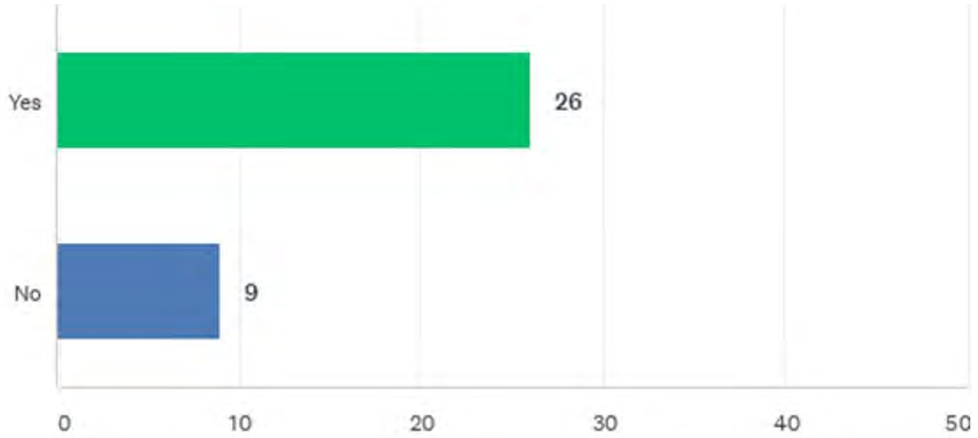
### Q5: What is your Agency's experience with fast setting patching materials for concrete pavement repairs (number of projects)?



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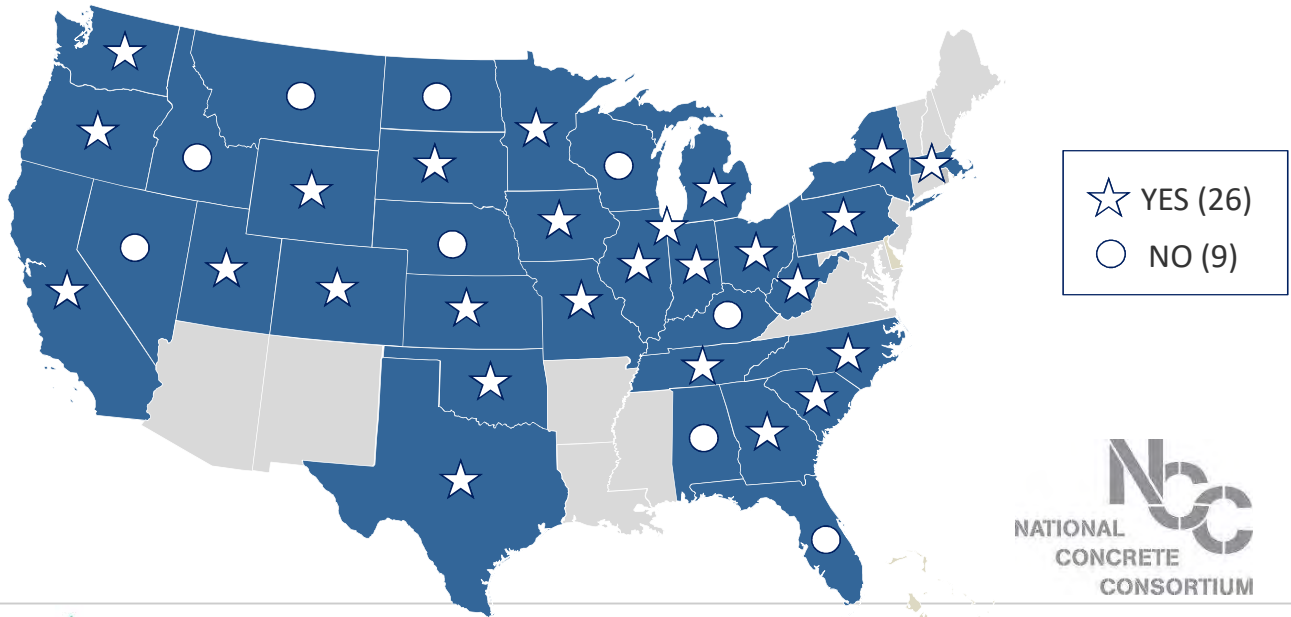
### Q6: Does your Agency allow volumetric mixers for batching fast setting patching materials?

Answered: 35 Skipped: 0



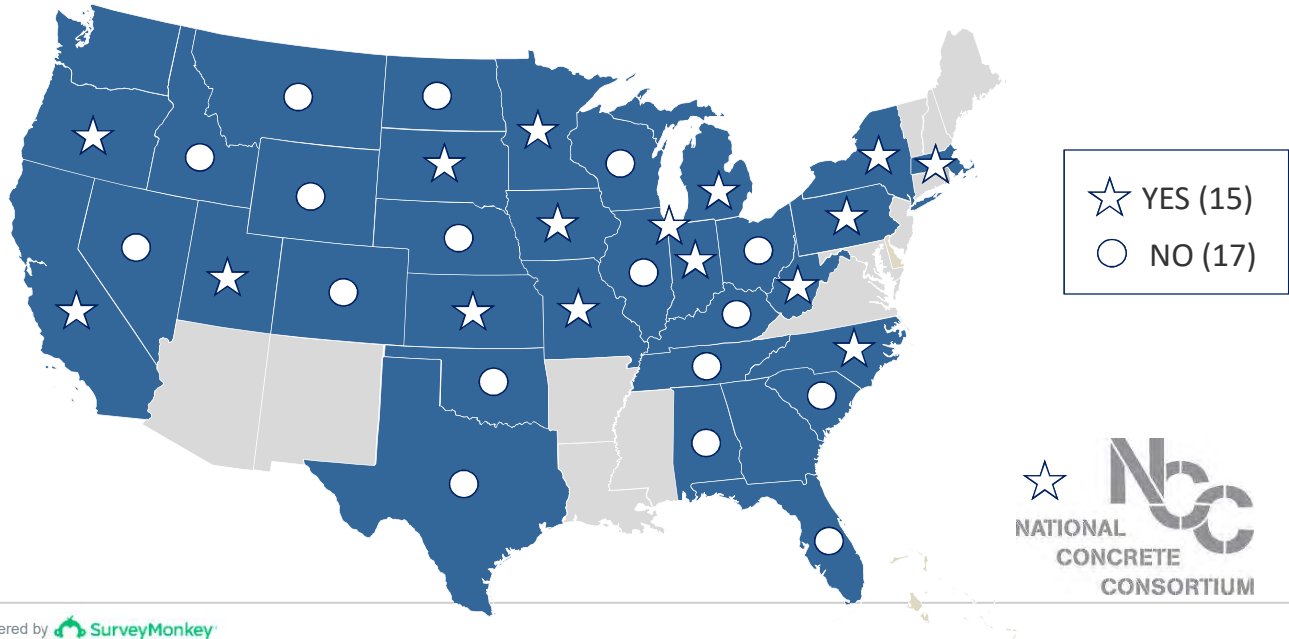
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### Q6: Does your Agency allow volumetric mixers for batching fast setting patching materials?



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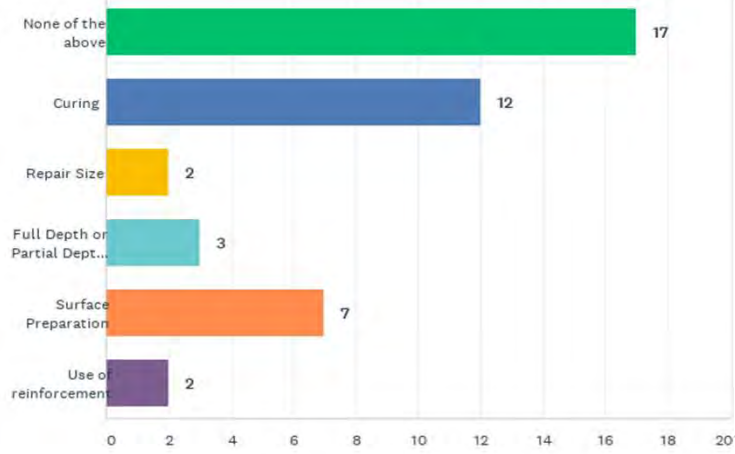
### Q7: Does your Agency modify any repair details when using fast setting patching materials?



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### Q7: Does your Agency modify any of the following requirements when using fast setting patching materials? (Check all that apply)

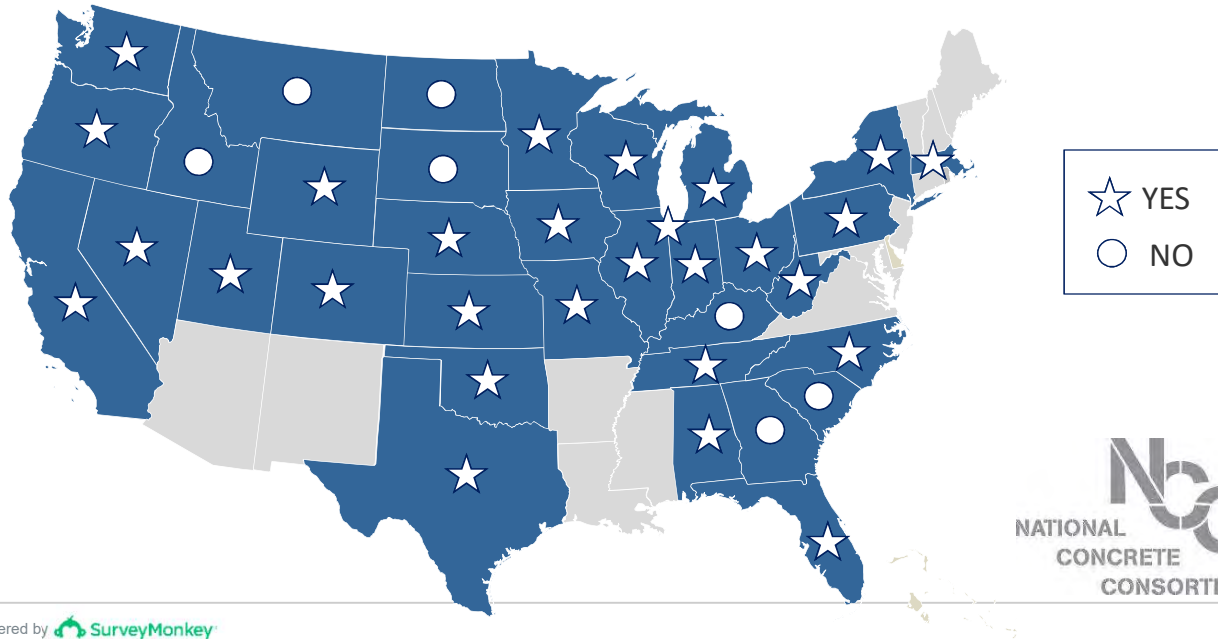
State	AL	CA	CO	FL	GA	IA	ID	IL	To	IN	KS	KY	MA	MI	MN	MO	MT	NC	ND	NE	NV	NY	OH	OK	OR	PA	SC	SD	TN	TX	UT	VA	WI	WV	WY
None of the above	x		x	x			x	x		x	x	x		x	x		x		x	x	x		x	x			x	x	x			x			x
Curing		x					x		x	x	x		x	x		x		x		x	x				x			x							
Repair Size																							x					x							
Full Depth or Partial Depth Repair														x									x							x					
Surface Preparation		x					x						x	x	x															x					
Use of reinforcement									x																										x



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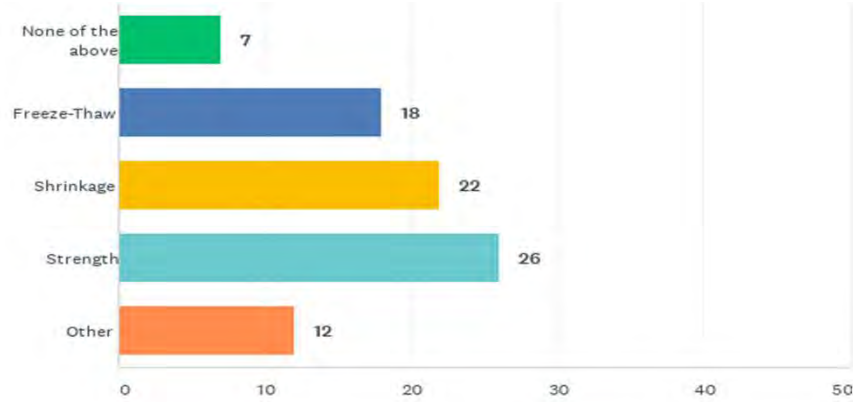
**Q9: Does your Agency require performance testing prior to approving fast setting patching materials? (Check all that apply)**



**Q9: Does your Agency require performance testing prior to approving fast setting patching materials? (Check all that apply)**

Answered: 34 Skipped: 1

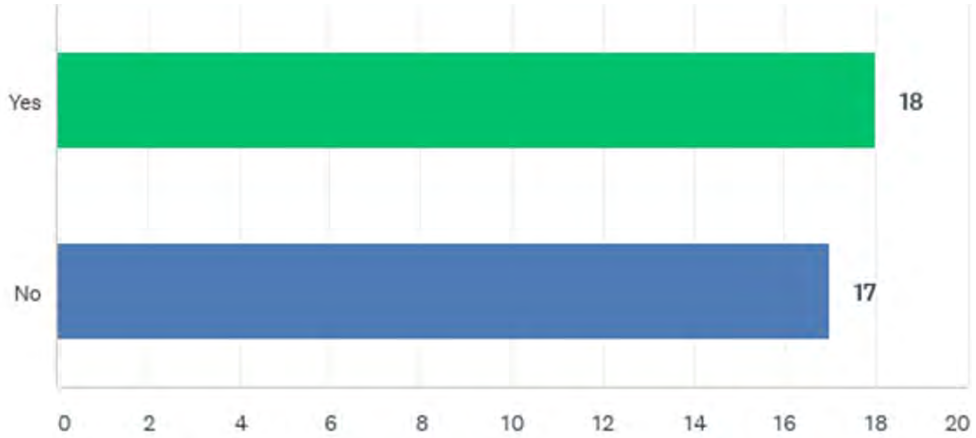
State	AL	CA	CO	FL	GA	IA	ID	IL	Toll	IN	KS	KY	MA	MI	MN	MO	MT	NC	ND	NE	NV	NY	OH	OK	OR	PA	SC	SD	TN	TX	UT	WA	WI	WV	WY
None of the above					x		x					x					x		x								x	x							
Freeze-Thaw			x						x	x	x		x	x	x	x					x	x	x			x				x	x	x	x	x	x
Shrinkage		x	x	x				x	x	x	x		x	x	x	x						x	x		x	x			x	x	x	x	x	x	x
Strength	x	x	x	x				x	x	x	x		x	x	x	x		x		x	x	x	x	x					x	x	x	x	x	x	x
Other	x	x	x	x									x	x		x									x	x				x				x	



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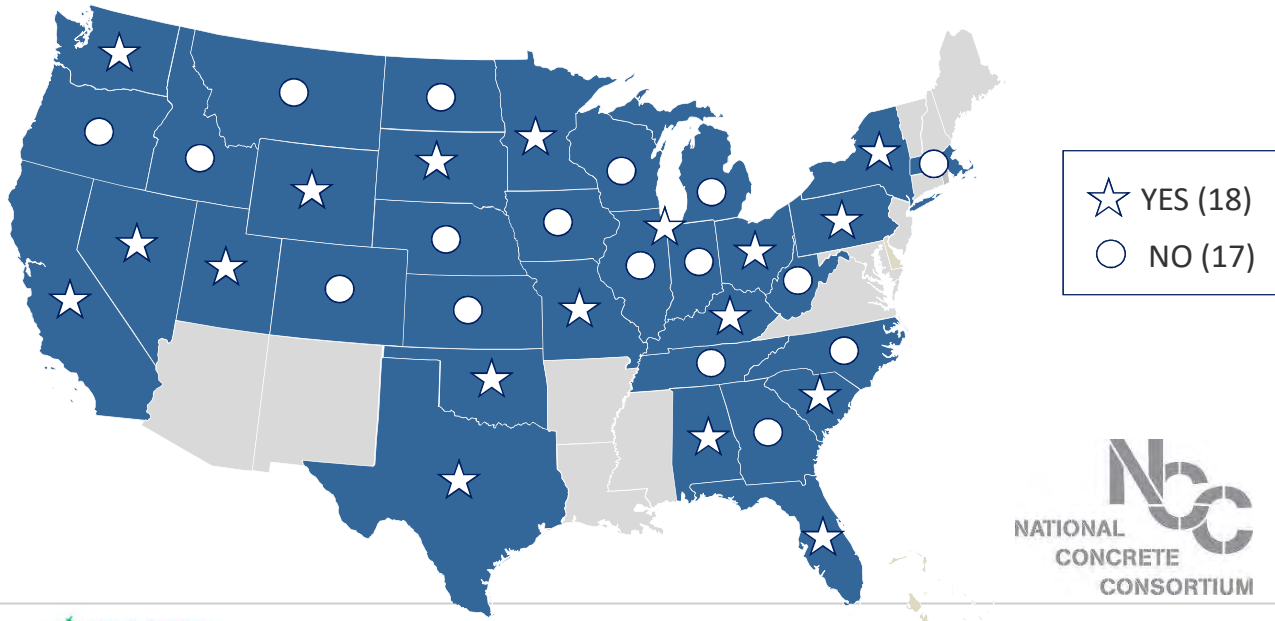
### Q10: Has your Agency diamond ground any of the fast setting patching materials?

Answered: 35 Skipped: 0



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### Q10: Has your Agency diamond ground any of the fast setting patching materials?



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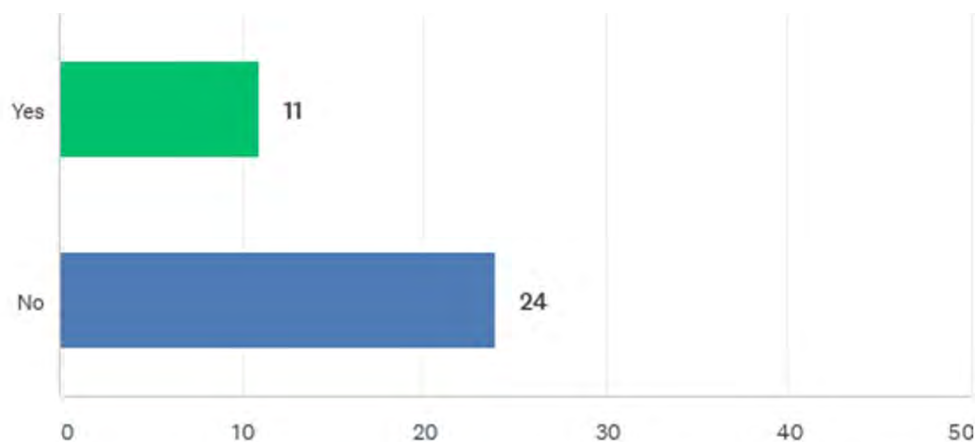


## Q10: Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

AL	I'm sure patched sections of pavement have been ground as part of a rehab project, but in Alabama, any ground pavement would be covered with OGFC or similar. So it would be difficult to assess if we have any performance issues after grinding.
CA	Given the friction requirements, it is mentioned in Section 60-4.02C of Standard Specification to grind or groove surfaces having a coefficient of friction less than 0.35. It is understood this means that grinding/grooving can be considered as a viable option as necessary. Not sure if grinding specifications need to be modified. No specific requirements could be found in Section 42 of Standard Specifications.
FL	High early ready mix concrete typically for slab repairs. Depends on area of repair. No known issues related to diamond grinding.
IL Toll	We've diamond grinded a few small areas and didn't have issues.
KY	Not certain concerning issues encountered or any modifications.
MI	Patching with non-cementitious materials has been relatively small compared to the total grinding surface, therefore no problems have emerged at this time. If they become more prevalent it is possible a modification will be required. Standard fast sets and full depths have not required special modifications.
MN	no problems with grinding. we do chain all the pdr's after the grind to determine if the UHE remains bonded after the grinding. We always seem to find a few repairs that are not bonded. the Contractor would then need to remove and replace those repairs that are not bonded at their expense. FYI my experience with UHE concrete patch mix is, UHE concrete backfill is by far more prone to shrinkage cracks. Cracks that would required removal and replacement when utilizing MnDOT's standard repair mix, PDR's that are not bonded always require removed and replaced at the Contractors expense.
MO	The diamond grinding specifications were not modified. Have not had any issues to date.
NV	A recent example is grinding down patches for spalls on new PCCP to meet pavement smoothness and IRI specifications
NY	We has diamond ground UHPC. I'm not aware of any performance issue after UHPC has been diamond ground.
OH	Followed our Proposal Note 420. Structures is Proposal Note 555.
PA	The contractor had issues with the fast setting patching material cracking shortly after being diamond ground. What was discovered was the contractor never added the #8 aggregate extender to the mix because the repair depth was in excess of 2". Once the contractor started adding the aggregate extender to the patches greater than 2" in depth they cracking issue disappeared.
SC	I would imagine that has occurred in our state, but I don't have any specific information on such.
SD	All spall repairs have to be completed before diamond grinding the surface on rehab projects. No issues noted using standard diamond grinding.
TX	No performance issues that we are aware of after grinding. No modifications to grinding specs.
UT	Three questions with only one response. Yes, we have diamond ground fast setting patches. No, it issues after diamond grinding. No modifications to the specifications.
WA	No performance issues have been identified.

## Q11: Do you allow calcium chloride in any patching repair materials?

Answered: 35 Skipped: 0





**Q13: What strength does your Agency require patches to achieve before they are open to traffic? If different for bridges and structures, please indicate.**

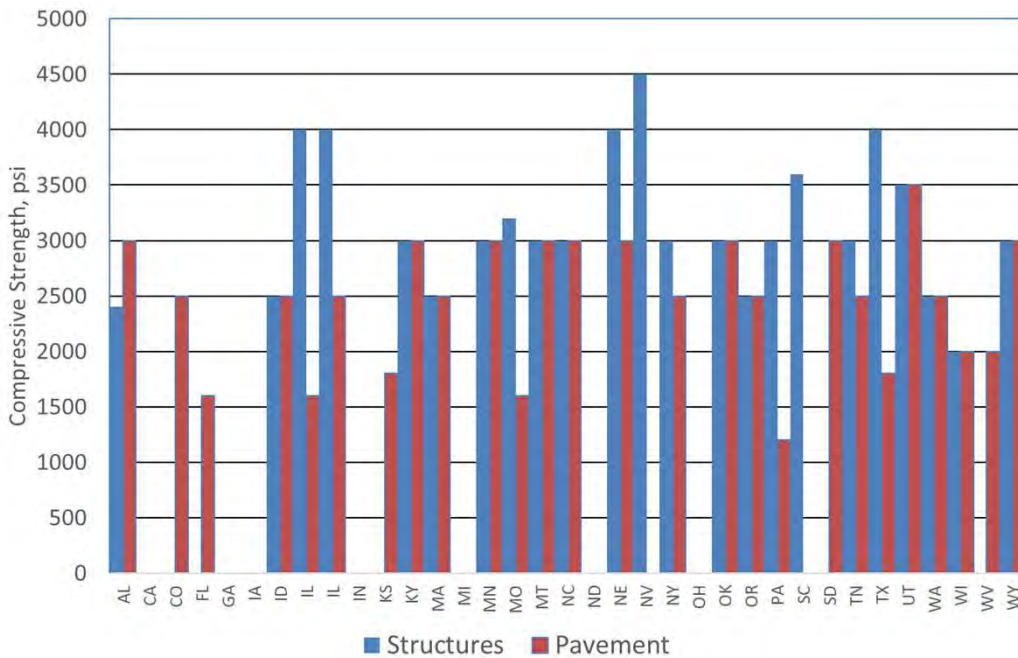
Answers varied:

- Compressive and/or Flexural Strength
- Strength and Time
- Time
- Pavement repair length
- Bridge Design Strength



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**Q13: What strength does your Agency require patches to achieve before they are open to traffic? If different for bridges and structures, please indicate.**



**Disclaimer:**  
This is a subset of the results. Some of the strengths charted have additional conditions.



**Q13: What strength does your Agency require patches to achieve before they are open to traffic? If different for bridges and structures, please indicate.**

<b>AL</b>	Bridges: 2400 psi or 6 hours. Pavement: 3000 psi or 6 hours.
<b>CA</b>	Section 51-5.01D(2)(b): For approach slabs; trial slab concrete must develop the following minimum compressive strengths: 1. 1,200 psi at the age of break 2. 2,500 psi at 3 days 3. 4,000 psi at 28 days 400 psi MOR for paving applications.
<b>CO</b>	2500 psi for pavement Depends on bridge structure
<b>FL</b>	Prepackaged - Manufacturer's recommendations or as specified in the Project Plans. High early ready mix - 1600 psi for pavement, design strength for bridge decks.
<b>GA</b>	2500 psi for standard 24 hour mix. 3000 psi for 4 hour mix with Rapid Setting Cement
<b>IA</b>	Pavements M-Mix w CaCl 2 Lane - 5 hours 4 Lane - 10 hours M-Mix w/o CaCl -24 hours When rapid set patch materials used time may be reduced to 2-3 hours depending on traffic volumes. Structure - varies
<b>ID</b>	2,500 psi
<b>IL</b>	Pavement patches can be opened at 250 psi flexural or 1600 psi compressive. Bridge deck patches have to cure for 72 hours and achieve 675 psi flexural or 4000 psi compressive.
<b>IL Toll</b>	2,500 psi and 4,000 psi compressive strength for pavement and structures, respectively.
<b>IN</b>	For PCCP patches less than or equal to 15 LFT, 300 psi flexural. For PCCP patches greater than 15 LFT, 425 psi flexural. Bridge deck patching, 550 psi flexural

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**Q13: What strength does your Agency require patches to achieve before they are open to traffic? If different for bridges and structures, please indicate.**

<b>KS</b>	Flexural = 380 psi or $F'c = 1800$ psi.
<b>KY</b>	3000psi or based on project specific notes.
<b>MA</b>	AASHTO T 22 Compressive Strength: For the most part, 2500 psi seems to be a common parameter in the special provisions.
<b>MI</b>	Structures: Must meet a minimum flexural strength of 550 psi and must meet the required curing time (curing time is dependent on the material). Pavements: For rapid patches (scheduled Opening <72 hours) must meet minimum flexural strength of 300 psi For standard patches (scheduled Opening $\geq 3$ days) must meet minimum flexural strength of 550 psi
<b>MN</b>	Partial depth repairs on bridges and PCCP require 3000 psi prior to opening to construction equipment or opening to the public. Full depth repairs require 2000 psi prior to opening to either construction equipment or public travel.
<b>MO</b>	Full Depth Pavement Repairs - 2,000 psi Partial Depth Pavement Repairs - 1,600 psi Bridge Structures - 3,200 psi
<b>MT</b>	3000 PSI
<b>NC</b>	3000 psi
<b>ND</b>	Product specific, protected as long as possible from traffic then opened.
<b>NE</b>	3000 psi for pavement - 4000 psi for bridge decks.

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**Q13: What strength does your Agency require patches to achieve before they are open to traffic? If different for bridges and structures, please indicate.**

<b>NV</b>	The same strength as the existing structure, typically 4,500 psi
<b>NY</b>	We require 3000 psi to open a bridge deck and 2500 psi to open a pavement.
<b>OH</b>	400 psi flexural in 4 hours.
<b>OK</b>	3,000 psi
<b>OR</b>	Patches require 2,500 psi prior to returning to traffic.
<b>PA</b>	1200 psi
<b>SC</b>	Our specifications do not allow loading of the concrete until it meets 90% of the design strength. Therefore, generally bridge decks are 4000 psi concrete, so the patch would have to meet 3600 psi. Concrete pavement is 4000 or 5000 psi, so the patch would have to meet 3500 or 4500 psi.
<b>SD</b>	3,000 psi for pavement partial depth patches.
<b>TN</b>	3000 psi for bridge structures and new concrete pavements. 2500 psi for pavement repairs.

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**Q13: What strength does your Agency require patches to achieve before they are open to traffic? If different for bridges and structures, please indicate.**

<b>TX</b>	1800 psi compressive strength for concrete pavement. 4000 psi for bridge decks.
<b>UT</b>	3500 psi
<b>WA</b>	2,500 psi for both bridge and pavement.
<b>WI</b>	2000 psi compressive strength
<b>WV</b>	2,000 psi (13.8 Mpa) prior to the time at which the pavement will be opened to traffic
<b>WY</b>	Typically 3000 psi

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**Q14: If your Agency has installed any fast setting patching materials, what is the longest installed patches still in service and performing acceptably.**

Answers ranged from:

- Unknown or Not sure
- 5 years
- 5 – 10 years
- 7 years
- 10+ years



Some success stories listed (Tyler Ley may contact you for further information)

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**Q14: If your Agency has installed any fast setting patching materials, what is the longest installed patches still in service and performing acceptably.**

<b>AL</b>	For pavements, Fibercrete has been used extensively in the Birmingham Area. For Bridges, XJS expansion joint system repairs have been extensively used. Cases of both of these products have been in service for 10+ years now without issue.
<b>CA</b>	No data, but usually expect 5-10 years of service life.
<b>CO</b>	There is no tracking system to determine age of patches.
<b>FL</b>	No data.
<b>GA</b>	Not sure. Very limited use.
<b>IA</b>	No data available
<b>ID</b>	Not Sure.
<b>IL</b>	We still have some calcium-aluminate cement patches (Class PP-5 concrete) installed in 2008 in service on I-94/Edens Expressway.
<b>IL Toll</b>	About 5 years, but we might have some that have been out there for longer.
<b>IN</b>	Unknown

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**Q14: If your Agency has installed any fast setting patching materials, what is the longest installed patches still in service and performing acceptably.**

<b>KS</b>	If they stay 5 years we're lucky.
<b>KY</b>	Not sure.
<b>MA</b>	Not sure, but the rapid set concrete patch materials are always thought of as "temporary" while the volumetric mixer rapid hardening concrete repairs are thought of as more permanent.
<b>MI</b>	A Cementitious mix with a low w/c ratio and a strength/hardening admixture (type S):10 years Standard hydraulic patches: 5 years Non-cementitious patches: 10 years
<b>MN</b>	2009 the UHE ready mix used in full depth repairs are performing no differently than a standard mix. Regarding partial depth repairs, on this project, the UHE backfill is exceeding every expectation I had. yes some PDR's have failed and been patched with bit. But, I would say the UHE patch mix material used on this project is performing nearly as well, if not as well as MnDOT's standard PDR patch mix. But I have used other types of prebagged UHE mixtures that have not performed nearly as well. My belief is some bagged UHE are susceptible durability issue when the Contractor exceeds the recommend water content. On a project constructed in 2011, the same Contractor used two different UHE mixes extended at 50% by mass and the same source of aggregate. Even though both mixes pass the testing requirement out lined in question 12, the durability performance was not the same. The same mix used on the 2009 project performed very well. The second bagged UHE mix did not perform nearly as well. The second mix had severe freeze thaw damage after 10 years.
<b>MO</b>	Full Depth Concrete Pavement - 15 years

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**Q14: If your Agency has installed any fast setting patching materials, what is the longest installed patches still in service and performing acceptably.**

<b>MT</b>	NA
<b>NC</b>	Not sure
<b>ND</b>	Not tracked or known, normally major repair projects are completed to repair them within 5-7 years on structures.
<b>NE</b>	20 years would be the max
<b>NV</b>	Polymer concrete patches tend to typically last 10-15 years
<b>NY</b>	Typical fast setting bagged patching material used to repair a bridge deck last between 5 and 10 years on average. It's unknown how long the oldest one is. The cementitious component of the repair material like Calcium Aluminate Cement used through a volumetric mixer with State approved sand and coarse has been shown to last 25+ years.
<b>OH</b>	unsure. Most patches are in for about 5 to 10 years to aid as a band aid prior to selling a larger project.
<b>OK</b>	Not sure.
<b>OR</b>	Unknown, >10 years

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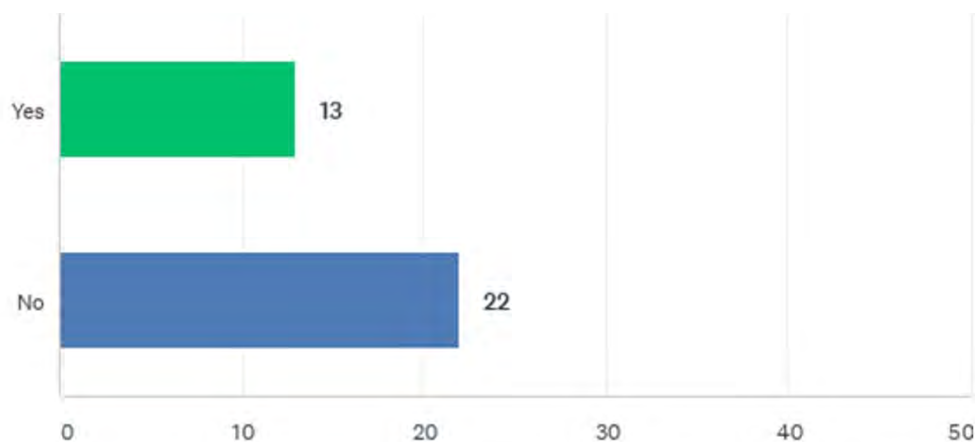
**Q14: If your Agency has installed any fast setting patching materials, what is the longest installed patches still in service and performing acceptably.**

<b>PA</b>	10+ years
<b>SC</b>	I don't have that information.
<b>SD</b>	Unknow for sure. There may be some still in place 15 to 20 years later. We changed to using mostly MNDOT 3U58M materials for spall repairs since we had a high initial failure rate using ASTM C928 Type 3 materials.
<b>TN</b>	N/A
<b>TX</b>	Some patch are over at least over 10 year old and still performing satisfactorily.
<b>UT</b>	7 years
<b>WA</b>	Unknown
<b>WI</b>	Not known
<b>WV</b>	Aquafin Pavement DOT Line, This product seems to work well when no flexure is involved. We have had it in place for 5 years in a back wall repair and it still seems to be performing well. It works well for patching also but is a little hard to finish. We have patches in place that are 2.5 years old and still ok.
<b>WY</b>	Probably a few latex overlay lasting 30+ years but not typical

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**Q15: Does your Agency have any research either in progress or complete on fast setting repair materials?**

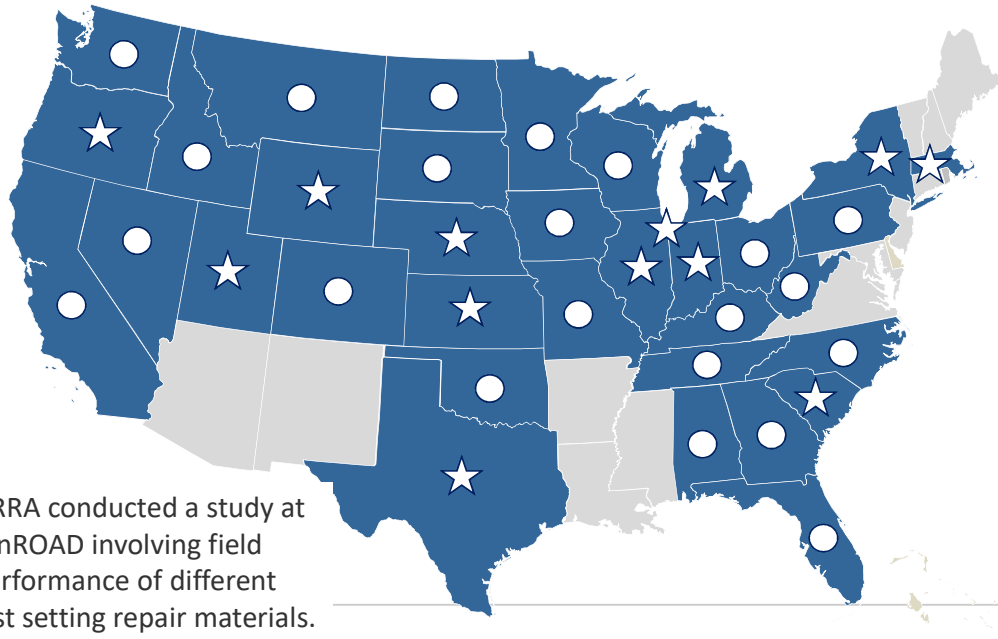
Answered: 35 Skipped: 0



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**Q15: Does your Agency have any research either in progress or complete on fast setting repair materials?**



NRRA conducted a study at MnROAD involving field performance of different fast setting repair materials.



**Q15: Does your Agency have any research either in progress or complete on fast setting repair materials?**

<b>IL</b>	We will be starting a research project looking into non-proprietary UHPC/VHPC in August 2021.
<b>IL Toll</b>	We are wrapping up a brief report on a fast set concrete partial depth bridge deck patching test section we installed in July 2017. The test section was the basis for our approved product list.
<b>IN</b>	SPR-2141 (2001) Purdue University - Development and Evaluation of Cement-based Patching Materials for Repair of Corrosion-Damaged Reinforced Concrete Slabs SPR-3019 (2012) Purdue University - Field Trial of Rapid Setting Patch Materials
<b>KS</b>	Current K-Tran study with Kansas State University & Research.
<b>MA</b>	Perhaps not exactly research, but we do have plenty of test data from over the 10 plus years we've utilized these materials.
<b>MI</b>	We have researched a wide range of fast setting repair mixtures. Some of the more recent materials the Department has worked with are concrete mixtures using a low w/c and a strength/hardening type S admixture, Polyester Concrete, and MMA Polymer Concrete. For more details on what the Department has worked with please feel free to contact me.
<b>MO</b>	Please be advised that the NRRA conducted a study involving field performance of different fast setting repair materials.
<b>NE</b>	The university completed a research project on the DOT mix design. Materials & Research is currently looking at the proposed mixes and will have a trial project in 2021.
<b>NY</b>	We have not specifically performed research on our own but we do use the NTPEP RSCP Test Deck as a resource.
<b>OR</b>	Oregon State University is performing research on CSA and CAC cements for bridge deck overlays. A supplemental outcome of the research will likely be additional information regarding patching materials. The research is in the early phase of material acquisition. Many of the materials identified for the study are bagged fast setting repair materials.
<b>SC</b>	We are conducting research that will help us specify long lasting rapid set bridge deck patches.
<b>TX</b>	<a href="https://library.ctr.utexas.edu/ctr-publications/0-6723-1.pdf">https://library.ctr.utexas.edu/ctr-publications/0-6723-1.pdf</a>
<b>UT</b>	
<b>WY</b>	Conducted research on silica fume modified concrete overlays

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### Q16: Please provide a link to the specifications for concrete patching repair materials (include both fast setting and traditional).

<b>AL</b>	Section 453 <a href="https://www.dot.state.al.us/conweb/pdf/Specifications/2018StandardSpecificationsCompleteBook.pdf">https://www.dot.state.al.us/conweb/pdf/Specifications/2018StandardSpecificationsCompleteBook.pdf</a> List III-2 Evaluation & Maintenance Procedure: <a href="https://www.dot.state.al.us/mtweb/Testing/MSDSAR/pdf/Pro/Piii02.pdf">https://www.dot.state.al.us/mtweb/Testing/MSDSAR/pdf/Pro/Piii02.pdf</a>
<b>CA</b>	The standard specifications can be found using the following link: <a href="https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications">https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications</a> Please review sections 41, 51, 60, and 90 for requirements of rapid strength and normal concrete.
<b>CO</b>	ASTM C1600 for CSA cements ASTM C928 for general packaged patching materials Bridge deck patching: <a href="https://www.codot.gov/business/designsupport/cdot-construction-specifications/2019-construction-specifications/rev-ssp/rev-sec600/rev-601-cdejc">https://www.codot.gov/business/designsupport/cdot-construction-specifications/2019-construction-specifications/rev-ssp/rev-sec600/rev-601-cdejc</a>
<b>FL</b>	<a href="https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/specbooks/july2021/7-21ebook.pdf?sfvrsn=9a1c9abf_4">https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/specbooks/july2021/7-21ebook.pdf?sfvrsn=9a1c9abf_4</a> Sections 346, 353, 926, 930
<b>GA</b>	<a href="http://www.dot.ga.gov/PartnerSmart/Business/Source/specs/2021StandardSpecifications.pdf">http://www.dot.ga.gov/PartnerSmart/Business/Source/specs/2021StandardSpecifications.pdf</a>
<b>IA</b>	Pavement - Full depth <a href="https://iowadot.gov/erl/current/GS/content/2529.htm">https://iowadot.gov/erl/current/GS/content/2529.htm</a> Pavement - Partial depth <a href="https://iowadot.gov/erl/current/GS/content/2530.htm">https://iowadot.gov/erl/current/GS/content/2530.htm</a> Structural Repair <a href="https://iowadot.gov/erl/current/GS/content/2426.htm">https://iowadot.gov/erl/current/GS/content/2426.htm</a>
<b>ID</b>	<a href="https://apps.itd.idaho.gov/Apps/manuals/SpecBook/SpecBook18.pdf">https://apps.itd.idaho.gov/Apps/manuals/SpecBook/SpecBook18.pdf</a>

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### Q16: Please provide a link to the specifications for concrete patching repair materials (include both fast setting and traditional).

<b>IL</b>	Refer to our Standard Specifications: <a href="https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&amp;-Handbooks/Highways/Construction/Standard-Specifications/Standard%20Specifications%20for%20Road%20and%20Bridge%20Construction%202016.pdf">https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&amp;-Handbooks/Highways/Construction/Standard-Specifications/Standard%20Specifications%20for%20Road%20and%20Bridge%20Construction%202016.pdf</a> Section 442: Pavement Patching Article 1001.01(d): Rapid Hardening Cement (updated, see below) Article 1001.01(3): Calcium Aluminate Cement (updated, see below) Section 1020: Portland Cement Concrete (updated, see below) Updates to Article 1001.01(d) and Section 1020: <a href="https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Design-&amp;-Environment/BDE-Special-Provisions/80431.pdf">https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Design-&amp;-Environment/BDE-Special-Provisions/80431.pdf</a> Update to Article 1001.01(3): <a href="https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&amp;-Handbooks/Highways/Construction/Supplemental-Standards-Specifications/2021%20Supplemental%20Specifications%20for%20Website.pdf">https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&amp;-Handbooks/Highways/Construction/Supplemental-Standards-Specifications/2021%20Supplemental%20Specifications%20for%20Website.pdf</a>
<b>IL Toll</b>	The Tollway's special provisions are not posted online, but can be made available upon request.
<b>IN</b>	<a href="https://www.in.gov/dot/div/contracts/standards/book/sep19/sep.htm">https://www.in.gov/dot/div/contracts/standards/book/sep19/sep.htm</a> See sections 901.07 and 901.08
<b>KS</b>	<a href="https://www.ksdot.org/bureaus/burConsMain/specprov/2015specprov.asp">https://www.ksdot.org/bureaus/burConsMain/specprov/2015specprov.asp</a>
<b>KY</b>	<a href="https://transportation.ky.gov/Materials/Documents/LAM.PDF">https://transportation.ky.gov/Materials/Documents/LAM.PDF</a>
<b>MA</b>	There is no standard as of yet, however, I am working with industry to develop a standard specification. For those how want to reach out for an information on that, they may reach me at <a href="mailto:richard.mulcahy@dot.state.ma.us">richard.mulcahy@dot.state.ma.us</a> .

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### Q16: Please provide a link to the specifications for concrete patching repair materials (include both fast setting and traditional).

<b>MI</b>	<a href="https://mdotjboss.state.mi.us/SpecProv/specBookHome.htm">https://mdotjboss.state.mi.us/SpecProv/specBookHome.htm</a> Look at Division 603 for pavement repairs. Look at Division 702 and 703 for structural repairs.
<b>MN</b>	<a href="http://www.dot.state.mn.us/products/concrete/pdf/MnDOTApprovedPackagedDryNon-ShrinkRapid-HardeningConcreteProcedures2018.pdf">http://www.dot.state.mn.us/products/concrete/pdf/MnDOTApprovedPackagedDryNon-ShrinkRapid-HardeningConcreteProcedures2018.pdf</a> The testing requirements to place a DBR backfill product on the MnDOT's APL are the same as what MnDOT would require for a UHE product used for backfilling PDR's. In other words, if a UHE product is on MnDOT's APL for dowel bar retrofits, that product also could be used to backfill PDR's. Standard CPR Spec. S-145 (2302) CONCRETE PAVEMENT REHABILITATION (CPR) <a href="http://www.dot.state.mn.us/pre-letting/prov/index.html">http://www.dot.state.mn.us/pre-letting/prov/index.html</a>
<b>MO</b>	Link to MoDOT's Standard Specifications is shown below: <a href="https://www.modot.org/sites/default/files/documents/2020%20Missouri%20Standard%20Specific%20-%20MHTC%20%28April%202021%29.pdf">https://www.modot.org/sites/default/files/documents/2020%20Missouri%20Standard%20Specific%20-%20MHTC%20%28April%202021%29.pdf</a> Section 613 Pavement repairs Section 704 Concrete Masonry Repairs Rapid Set Patching Material - Horizontal JSP-02-10 <a href="https://spexternal.modot.mo.gov/sites/de/_layouts/15/WopiFrame.aspx?sourcedoc={6483C083-3678-489B-B59B-AF6303A60814}&amp;file=JSP0210.doc&amp;action=default">https://spexternal.modot.mo.gov/sites/de/_layouts/15/WopiFrame.aspx?sourcedoc={6483C083-3678-489B-B59B-AF6303A60814}&amp;file=JSP0210.doc&amp;action=default</a> Rapid Setting Patching Materials - Overhead & Vertical JSP-02-01 <a href="https://spexternal.modot.mo.gov/sites/de/_layouts/15/WopiFrame.aspx?sourcedoc={30AF5C32-7AD8-4B69-B282-0B68FED4910A}&amp;file=JSP0201.doc&amp;action=default">https://spexternal.modot.mo.gov/sites/de/_layouts/15/WopiFrame.aspx?sourcedoc={30AF5C32-7AD8-4B69-B282-0B68FED4910A}&amp;file=JSP0201.doc&amp;action=default</a>
<b>MT</b>	MDT specifications are fairly vague currently.

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### Q16: Please provide a link to the specifications for concrete patching repair materials (include both fast setting and traditional).

<b>NC</b>	N/A
<b>ND</b>	<a href="http://mydot.nd.gov/manuals/maintenance/70mtc_opr_manual.pdf">http://mydot.nd.gov/manuals/maintenance/70mtc_opr_manual.pdf</a>
<b>NE</b>	Standard Specifications for Highway Construction - Section 1002 <a href="https://dotstore.nebraska.gov/storefront/Store/tabid/78/CatID/8/Publications.aspx">https://dotstore.nebraska.gov/storefront/Store/tabid/78/CatID/8/Publications.aspx</a>
<b>NV</b>	<a href="https://www.dot.nv.gov/home/showpublisheddocument?id=6916">https://www.dot.nv.gov/home/showpublisheddocument?id=6916</a> Section 502.03.15
<b>NY</b>	<a href="https://www.dot.ny.gov/main/business-center/engineering/specifications/english-spec-repository/2021_5_specs_usc_tc_vol4.pdf">https://www.dot.ny.gov/main/business-center/engineering/specifications/english-spec-repository/2021_5_specs_usc_tc_vol4.pdf</a> Standard Specifications 701-04, 710-09, and 701-12 are fast and normal setting bagged repair materials. Standard Specification 701-13 is for Rapid Hardening Hydraulic Cement.
<b>OH</b>	<a href="https://www.dot.state.oh.us/Divisions/ConstructionMgt/OnlineDocs/Pages/2019-Online-Spec-Book.aspx">https://www.dot.state.oh.us/Divisions/ConstructionMgt/OnlineDocs/Pages/2019-Online-Spec-Book.aspx</a>
<b>OK</b>	None
<b>OR</b>	<a href="https://www.oregon.gov/odot/Business/Pages/Special-Provisions.aspx">https://www.oregon.gov/odot/Business/Pages/Special-Provisions.aspx</a>
<b>PA</b>	<a href="http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2020/408_2020_IE/408_2020_IE.pdf">http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2020/408_2020_IE/408_2020_IE.pdf</a> Sections 516, 525, 1046, and 1047 list specifications for approved materials for concrete patching on pavement and bridge decks.

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### Q16: Please provide a link to the specifications for concrete patching repair materials (include both fast setting and traditional).

<b>SC</b>	Basically the QPP is the specification for the rapid set concrete pavement patching materials. <a href="http://info2.scdot.org/Materials/QualProd/22%20QPP.pdf">http://info2.scdot.org/Materials/QualProd/22%20QPP.pdf</a> There is no specification for rapid set bridge deck patching materials. We currently specify standard concrete for bridge deck patching in our Standard Specifications.
<b>SD</b>	Section 390 for PCCP spall repair <a href="https://dot.sd.gov/doing-business/contractors/standard-specifications/2015-standard-specifications">https://dot.sd.gov/doing-business/contractors/standard-specifications/2015-standard-specifications</a>
<b>TN</b>	<a href="https://www.tn.gov/content/dam/tn/tdot/hq-materials-tests/qpl/List_13.pdf">https://www.tn.gov/content/dam/tn/tdot/hq-materials-tests/qpl/List_13.pdf</a>
<b>TX</b>	<a href="https://ftp.txdot.gov/pub/txdot-info/cst/DMS/4000_series/pdfs/4655.pdf">https://ftp.txdot.gov/pub/txdot-info/cst/DMS/4000_series/pdfs/4655.pdf</a>
<b>UT</b>	Specifications <a href="https://drive.google.com/file/d/1TQu03yV5JN5kU7BzFD01GoNb1uUhO3rg/view?usp=sharing">https://drive.google.com/file/d/1TQu03yV5JN5kU7BzFD01GoNb1uUhO3rg/view?usp=sharing</a> Traditional repair Section 02751 Partial Depth Repair for Concrete Pavements. Section 2753 Full Depth Slab Replacement for Concrete Pavements Section 03934 Structural Pothole Patching We do have a special provision that we are taking soon to our standards committee for approval as a standard. We can make that available.

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### Q16: Please provide a link to the specifications for concrete patching repair materials (include both fast setting and traditional).

<b>WA</b>	<a href="https://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS.pdf">https://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS.pdf</a> See section 9-20.1 for concrete pavement patching material and 9-20.5 for bridge deck patching material.
<b>WI</b>	Don't know how to do links
<b>WV</b>	<a href="https://transportation.wv.gov/highways/contractadmin/specifications/Documents/2021_Supplemental_2020_1208%20(redline).pdf">https://transportation.wv.gov/highways/contractadmin/specifications/Documents/2021_Supplemental_2020_1208%20(redline).pdf</a> Section 715.4 Section 600 Section 501 &506 <a href="https://transportation.wv.gov/highways/contractadmin/specifications/2017StandSpec/Documents/2017_Standard.pdf">https://transportation.wv.gov/highways/contractadmin/specifications/2017StandSpec/Documents/2017_Standard.pdf</a> Section 715.4 Section 600 Section 501 &506
<b>WY</b>	Section 810 Concrete Repair of Standard Specification <a href="http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Construction/2021%20Standard%20Specifications/Wyoming%202021%20Standard%20Specifications%20for%20Road%20and%20Bridge%20Construction.pdf">http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Construction/2021%20Standard%20Specifications/Wyoming%202021%20Standard%20Specifications%20for%20Road%20and%20Bridge%20Construction.pdf</a> Fast setting patching handled by special provisions, links not available

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### Q17: Please provide a link to the APL/QPL for all of your Agency's concrete patching repair materials.

<b>AL</b>	<a href="https://www.dot.state.al.us/mtweb/Testing/MSDSAR/pdf/QMSD/Liii02.pdf">https://www.dot.state.al.us/mtweb/Testing/MSDSAR/pdf/QMSD/Liii02.pdf</a>
<b>CA</b>	<a href="https://dot.ca.gov/programs/engineering-services/authorized-materials-lists">https://dot.ca.gov/programs/engineering-services/authorized-materials-lists</a>
<b>CO</b>	<a href="https://apps.codot.gov/apl/AplSearch.cfm?SelectBy=Cat&amp;cid=Concrete&amp;scid=Repair/Patching">https://apps.codot.gov/apl/AplSearch.cfm?SelectBy=Cat&amp;cid=Concrete&amp;scid=Repair/Patching</a>
<b>FL</b>	<a href="https://fdotwp1.dot.state.fl.us/ApprovedProductList/Specifications?specificationRange=900&amp;IsDevSpec=False">https://fdotwp1.dot.state.fl.us/ApprovedProductList/Specifications?specificationRange=900&amp;IsDevSpec=False</a> 926 and 930
<b>GA</b>	<a href="http://www.dot.ga.gov/PartnerSmart/Materials/Pages/QPL.aspx">http://www.dot.ga.gov/PartnerSmart/Materials/Pages/QPL.aspx</a>
<b>IA</b>	<a href="https://maple.iowadot.gov/Search.aspx">https://maple.iowadot.gov/Search.aspx</a> Material Names search for CONCRETE REPAIR, RAPID SET PATCH MATERIALS CONCRETE REPAIR, FAST SET STRUCTURAL REPAIR MORTAR
<b>ID</b>	<a href="https://apps.itd.idaho.gov/Apps/Materials/QPL.aspx">https://apps.itd.idaho.gov/Apps/Materials/QPL.aspx</a>
<b>IL</b>	PACKAGED, DRY, RAPID HARDENING CEMENTITIOUS MATERIALS FOR CONCRETE REPAIRS: <a href="https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Materials/Materials-&amp;-Physical-Research/Concrete/rapidhardeningconcrete.pdf">https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Materials/Materials-&amp;-Physical-Research/Concrete/rapidhardeningconcrete.pdf</a> RAPID HARDENING CEMENT: forthcoming
<b>IL Toll</b>	<a href="https://www.illinoistollway.com/documents/20184/239415/ApprovedFastSetConcreteList.pdf/814081c7-4b31-45f7-a28a-6b2ea6cf60ae?version=1.1&amp;t=1539713412473&amp;download=true">https://www.illinoistollway.com/documents/20184/239415/ApprovedFastSetConcreteList.pdf/814081c7-4b31-45f7-a28a-6b2ea6cf60ae?version=1.1&amp;t=1539713412473&amp;download=true</a>
<b>IN</b>	<a href="https://www.in.gov/indot/div/mt/appmat/pubs/apl30.pdf">https://www.in.gov/indot/div/mt/appmat/pubs/apl30.pdf</a>
<b>KS</b>	<a href="https://www.ksdot.org/bureaus/burMatrRes/PQL/default.asp">https://www.ksdot.org/bureaus/burMatrRes/PQL/default.asp</a>

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### Q17: Please provide a link to the APL/QPL for all of your Agency's concrete patching repair materials.

<b>KY</b>	<a href="https://transportation.ky.gov/Materials/Documents/LAM.PDF">https://transportation.ky.gov/Materials/Documents/LAM.PDF</a> The KY LAM is in need of updating to comply with NTPEP submittal.
<b>MA</b>	<a href="https://www.mass.gov/service-details/rapid-set-concrete-patch-materials-horizontal-verticaloverhead">https://www.mass.gov/service-details/rapid-set-concrete-patch-materials-horizontal-verticaloverhead</a> <a href="https://www.mass.gov/service-details/approved-cement-concrete-producer-contact-information">https://www.mass.gov/service-details/approved-cement-concrete-producer-contact-information</a> <a href="https://www.mass.gov/info-details/cement-concrete-producers-approved-mix-designs">https://www.mass.gov/info-details/cement-concrete-producers-approved-mix-designs</a>
<b>MI</b>	<a href="https://www.michigan.gov/documents/mdot/2021_January_MSG_Final-with_Links_708873_7.pdf">https://www.michigan.gov/documents/mdot/2021_January_MSG_Final-with_Links_708873_7.pdf</a> look at sections:702.02B for Non-Shrinking Mortar and Grout Type H-1 (Non-Metallic) Pre-Mixed and 703 for Prepackaged Hydraulic Fast Set Mortar
<b>MN</b>	<a href="http://www.dot.state.mn.us/products/concrete/pdf/MnDOTApprovedPackagedDryNon-ShrinkRapid-HardeningConcreteProcedures2018.pdf">http://www.dot.state.mn.us/products/concrete/pdf/MnDOTApprovedPackagedDryNon-ShrinkRapid-HardeningConcreteProcedures2018.pdf</a> Qualification process for DBR concrete backfill is the same as what would be required if the project required UHE concrete for PDR's
<b>MO</b>	Rapid Set Patching Material List - Horizontal <a href="https://www.modot.org/sites/default/files/documents/FS704T1_5.pdf">https://www.modot.org/sites/default/files/documents/FS704T1_5.pdf</a> Rapid Setting Patching Materials List - Overhead & Vertical <a href="https://www.modot.org/sites/default/files/documents/FS704T2_2.pdf">https://www.modot.org/sites/default/files/documents/FS704T2_2.pdf</a>
<b>MT</b>	NA

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### Q17: Please provide a link to the APL/QPL for all of your Agency's concrete patching repair materials.

<b>NC</b>	<a href="https://apps.ncdot.gov/vendor/approvedproducts/Default.aspx">https://apps.ncdot.gov/vendor/approvedproducts/Default.aspx</a>
<b>ND</b>	• Ceratec Pavemend VR™ • SpecChem RepCon® V/O • Sika® SikaQuick® VOH • BASF MasterEmaco® N425
<b>NE</b>	<a href="https://dot.nebraska.gov/business-center/materials/approved-products/">https://dot.nebraska.gov/business-center/materials/approved-products/</a>
<b>NV</b>	<a href="https://www.dot.nv.gov/home/showpublisheddocument?id=18262">https://www.dot.nv.gov/home/showpublisheddocument?id=18262</a>
<b>NY</b>	<a href="https://www.dot.ny.gov/divisions/engineering/technical-services/technical-services-repository/alme/NYS DOT_Aproved_List.pdf">https://www.dot.ny.gov/divisions/engineering/technical-services/technical-services-repository/alme/NYS DOT_Aproved_List.pdf</a>
<b>OH</b>	<a href="https://www.dot.state.oh.us/Divisions/ConstructionMgt/Materials/Pages/QPL.aspx">https://www.dot.state.oh.us/Divisions/ConstructionMgt/Materials/Pages/QPL.aspx</a> <a href="https://www.dot.state.oh.us/Divisions/ConstructionMgt/Materials/Approved-List/Pages/default.aspx">https://www.dot.state.oh.us/Divisions/ConstructionMgt/Materials/Approved-List/Pages/default.aspx</a> <a href="https://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/PN420_01172020_for_2019.pdf">https://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/PN420_01172020_for_2019.pdf</a> <a href="https://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/PN555_01152021_for_2019.pdf">https://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/PN555_01152021_for_2019.pdf</a>
<b>OK</b>	Not on APL
<b>OR</b>	<a href="https://www.oregon.gov/odot/Construction/Doc_ProductReview/pcc_repair.pdf">https://www.oregon.gov/odot/Construction/Doc_ProductReview/pcc_repair.pdf</a>
<b>PA</b>	<a href="http://www.dot.state.pa.us/public/pdf/bocm_mtd_lab/publications/pub_35/current_edition/bulletin15.pdf">http://www.dot.state.pa.us/public/pdf/bocm_mtd_lab/publications/pub_35/current_edition/bulletin15.pdf</a> Sections 516, 525, 1046, and 1047 list approved materials for concrete patching on pavement and bridge decks.
<b>SC</b>	<a href="http://info2.scdot.org/Materials/QualProd/22%20QPP.pdf">http://info2.scdot.org/Materials/QualProd/22%20QPP.pdf</a>
<b>SD</b>	N.A.

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<b>TN</b>	<a href="https://www.tn.gov/tdot/materials-and-tests/research---product-evaluation-and-qualified-products-list.html">https://www.tn.gov/tdot/materials-and-tests/research---product-evaluation-and-qualified-products-list.html</a>
<b>TX</b>	<a href="https://ftp.txdot.gov/pub/txdot-info/cmd/mpl/concrepair.pdf">https://ftp.txdot.gov/pub/txdot-info/cmd/mpl/concrepair.pdf</a>
<b>UT</b>	Materials Authorized Products <a href="https://www.udot.utah.gov/connect/business/materials-qualification-programs/materials-authorized-products/">https://www.udot.utah.gov/connect/business/materials-qualification-programs/materials-authorized-products/</a>
<b>WA</b>	<a href="https://wsdot.wa.gov/biz/mats/QPL/QPL_Search.cfm">https://wsdot.wa.gov/biz/mats/QPL/QPL_Search.cfm</a> For pavement patching material select section 9-20.2 in the Standard Spec. field. For bridge deck patching material select section 9-20.5 in the Standard Spec. field.
<b>WI</b>	Don't know how to do links
<b>WV</b>	<a href="https://transportation.wv.gov/highways/mcst/Documents/2020%20APL/PCC/10-20-2020%20Approved%20List%20of%20Concrete%20Repair%20Materials.pdf">https://transportation.wv.gov/highways/mcst/Documents/2020%20APL/PCC/10-20-2020%20Approved%20List%20of%20Concrete%20Repair%20Materials.pdf</a>
<b>WY</b>	<a href="http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Materials/Qualified%20Products/Qualified%20Products%2008_28_2019.pdf">http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Materials/Qualified%20Products/Qualified%20Products%2008_28_2019.pdf</a>

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