

NCC State Reports Spring 2017 - Bridge Deck Overlays/Approaches/Mix Designs, etc. Survey

Monday, April 17, 2017, Updated 5/9/2017



Disclaimer

All data presented herein is based upon the information provided in the survey and the interpretations of the information by the presenter.

28

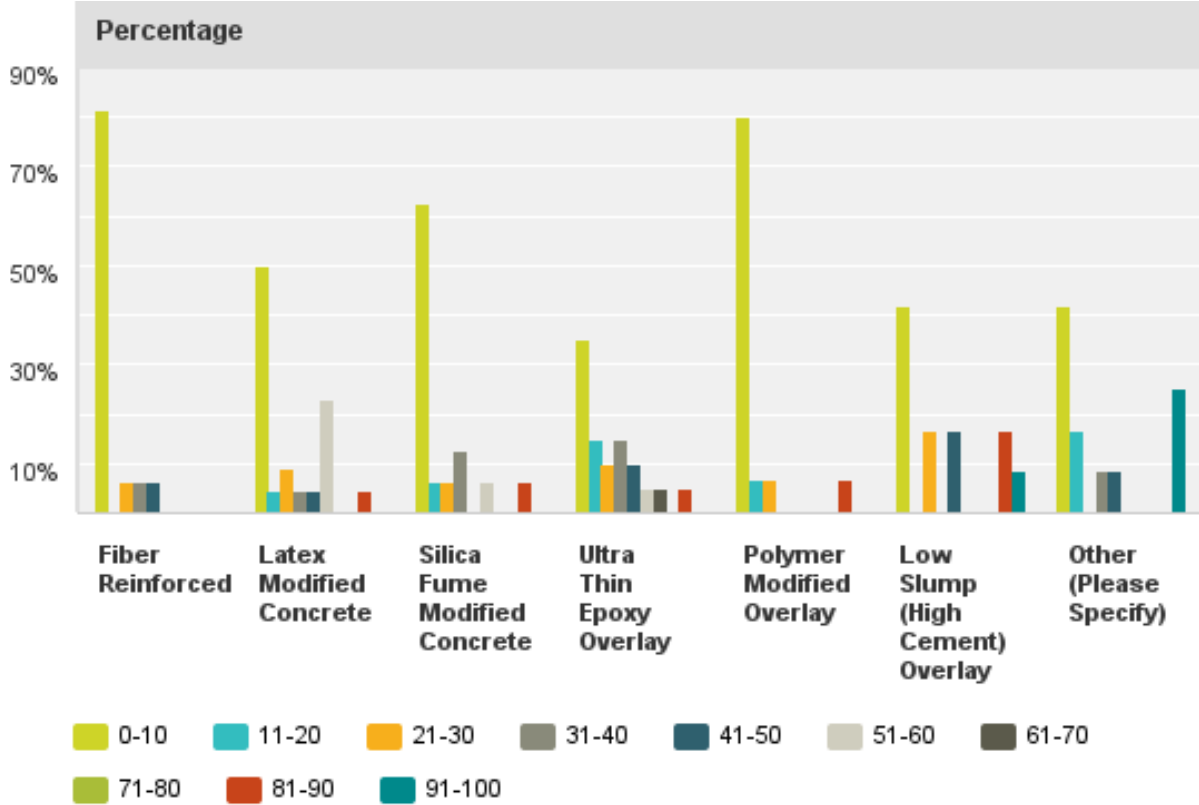
Total Responses

Date Created: Wednesday, February 22, 2017

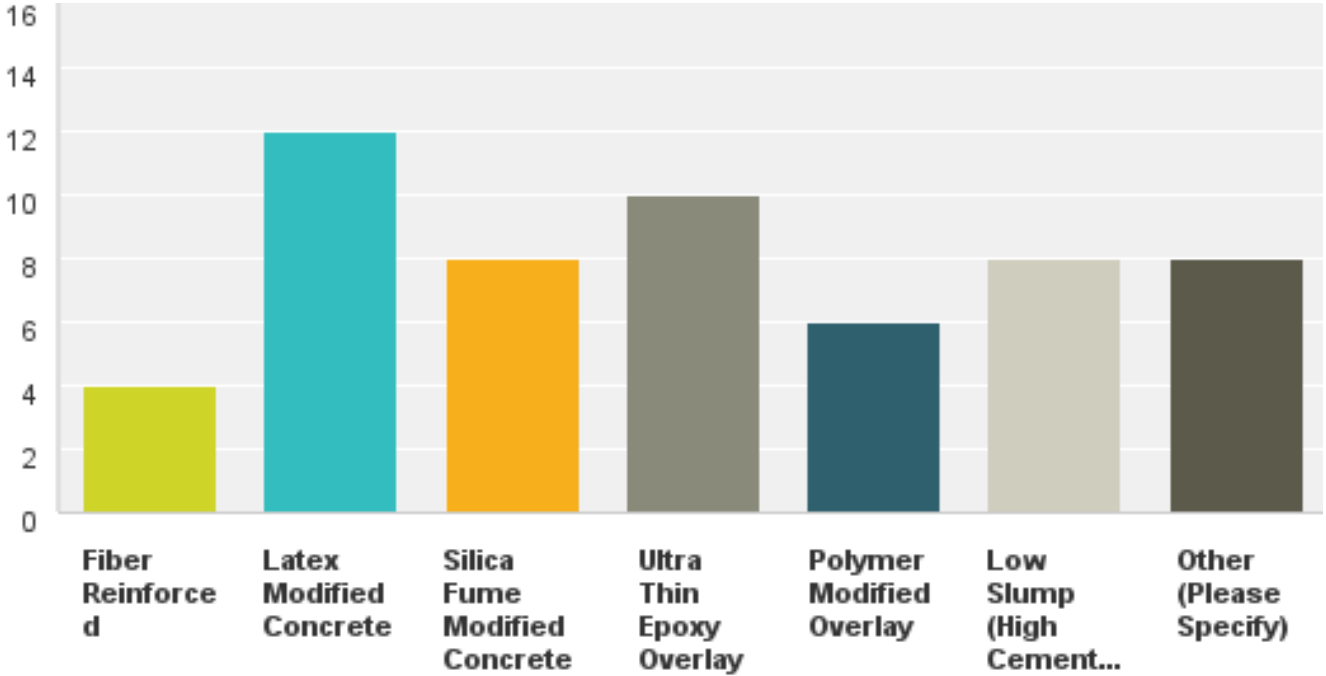
Complete Responses: 28

Refer to the NC2 website for each DOT's response

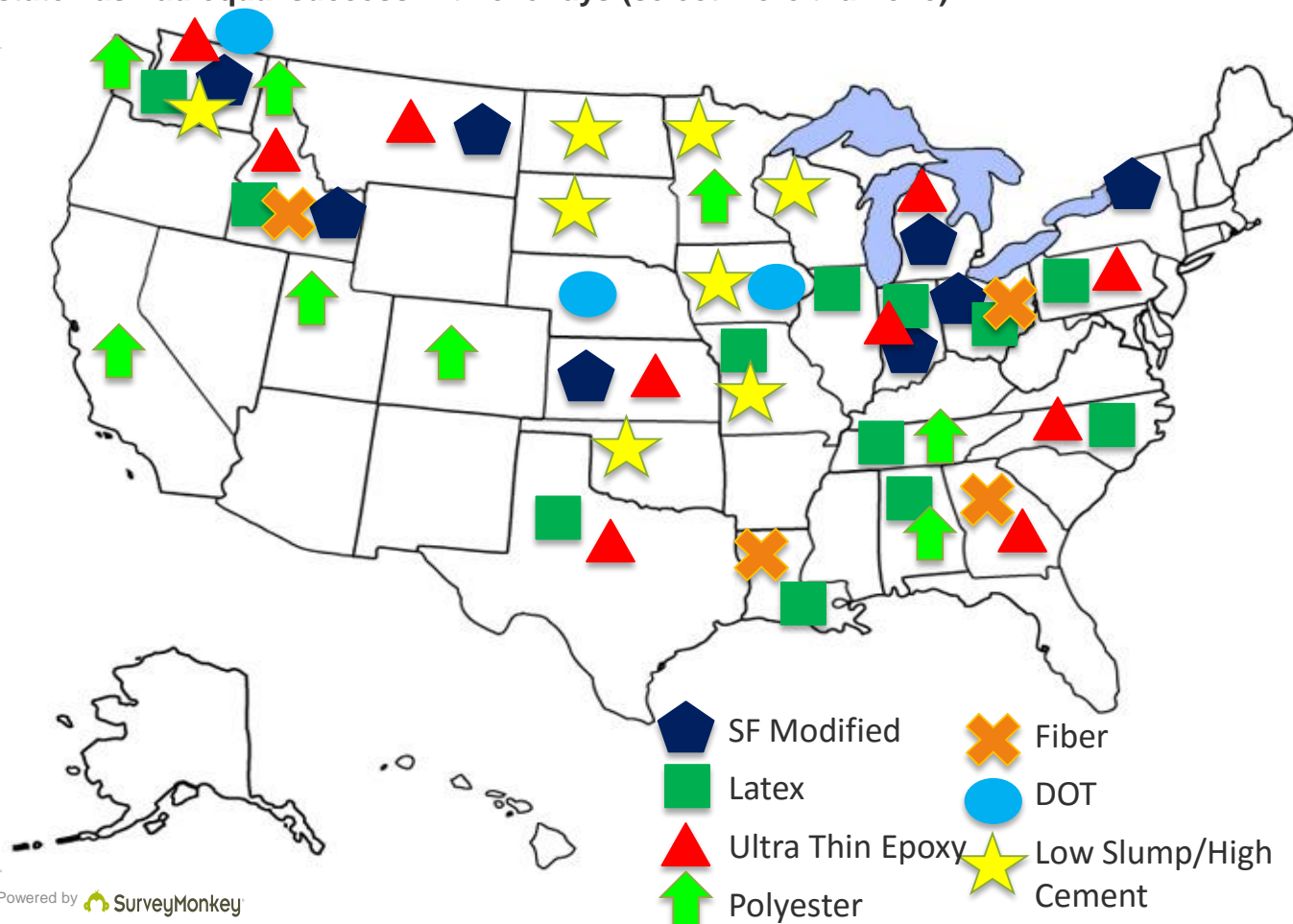
Q2: What percentage of each type of bridge deck overlays do you routinely construct?



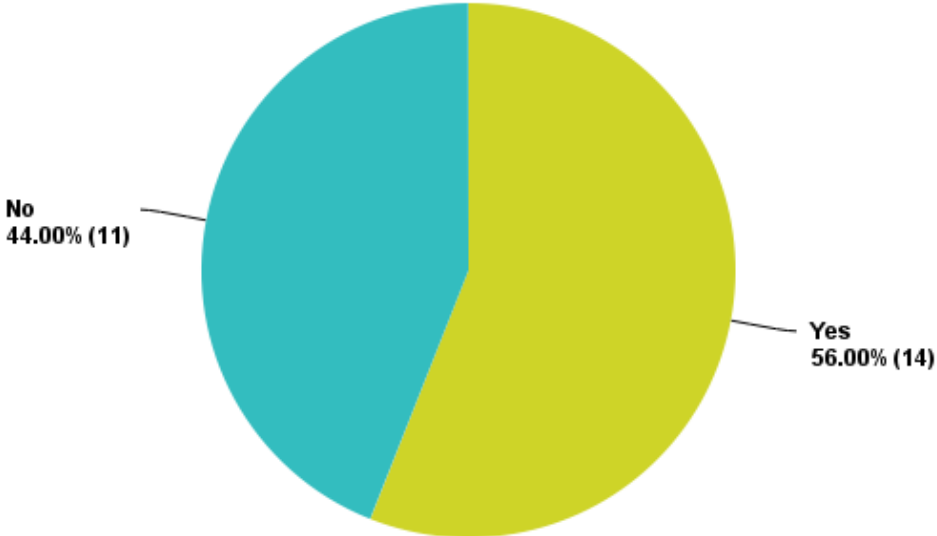
Q3: Select the overlay type your state has had the best success constructing. If your state has had equal success with overlays (select more than one).



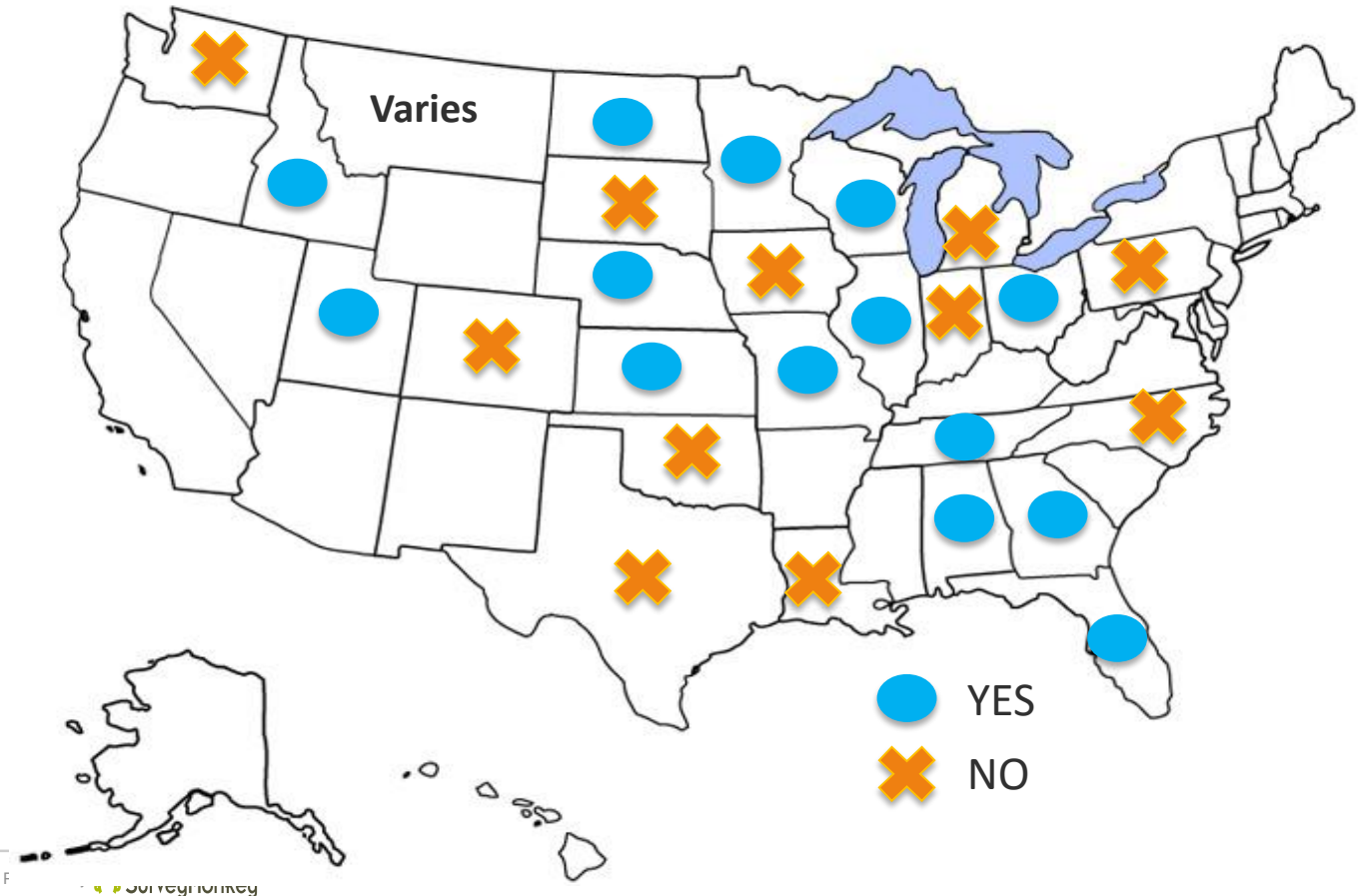
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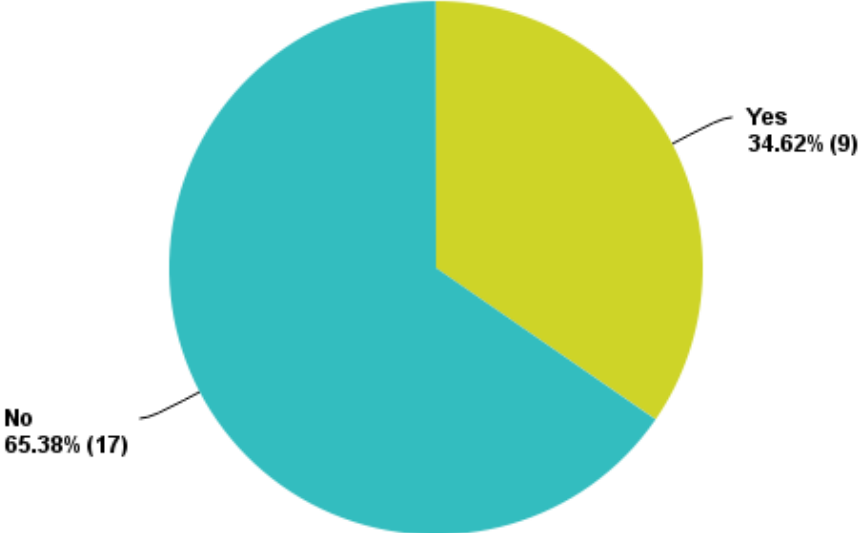
Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?



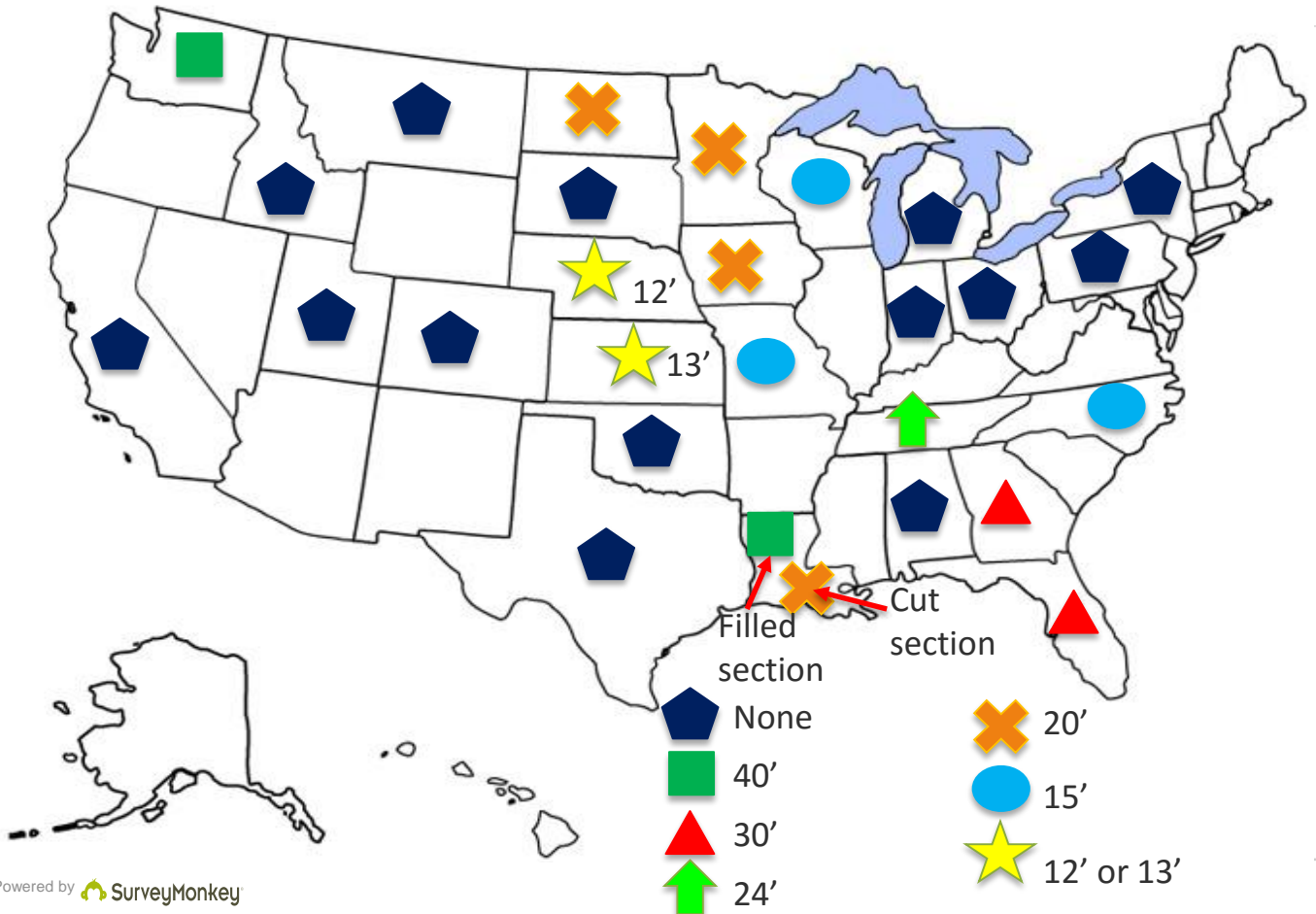
Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?



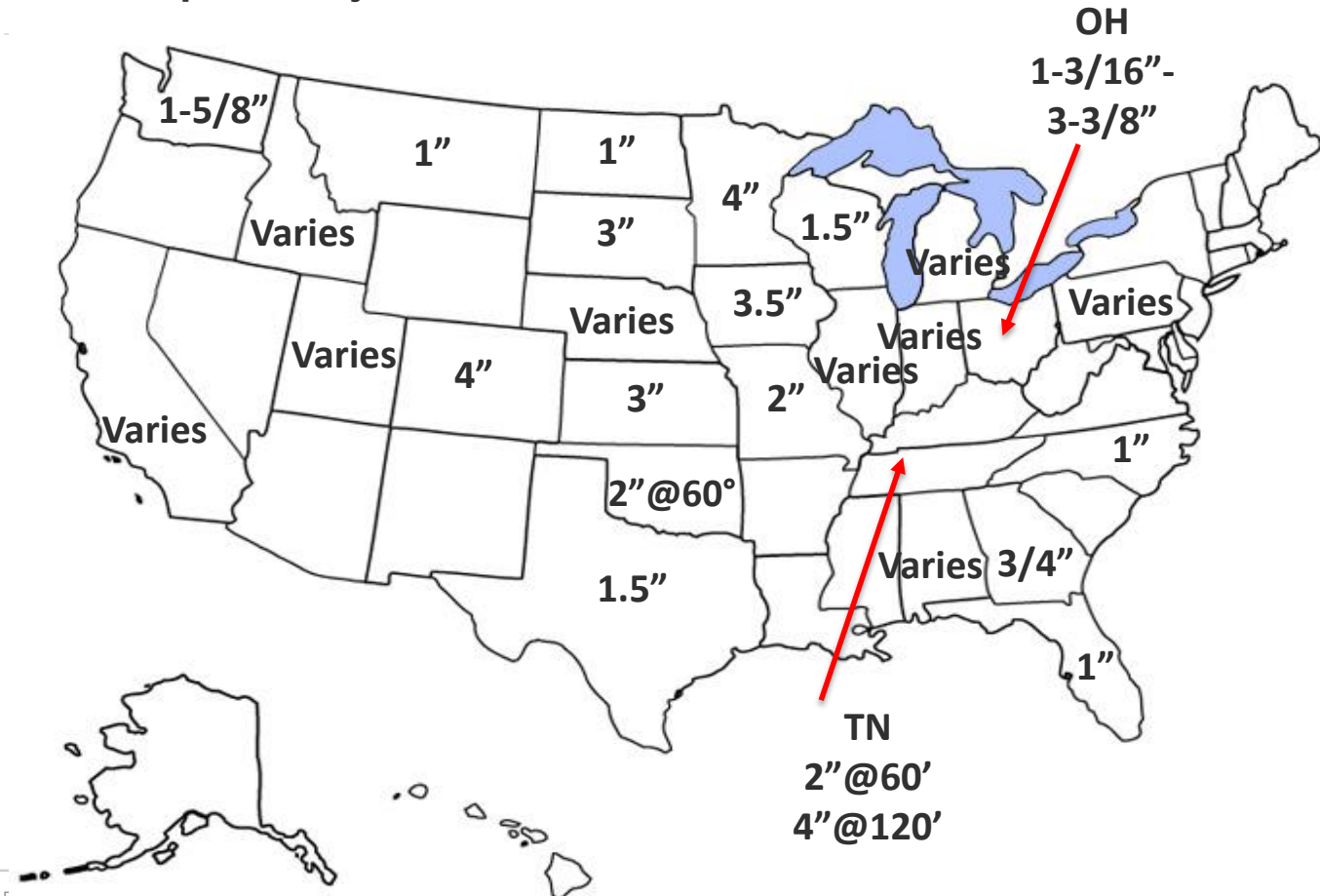
Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?



Q6: If the approach panels are jointed, what is the maximum panel size?



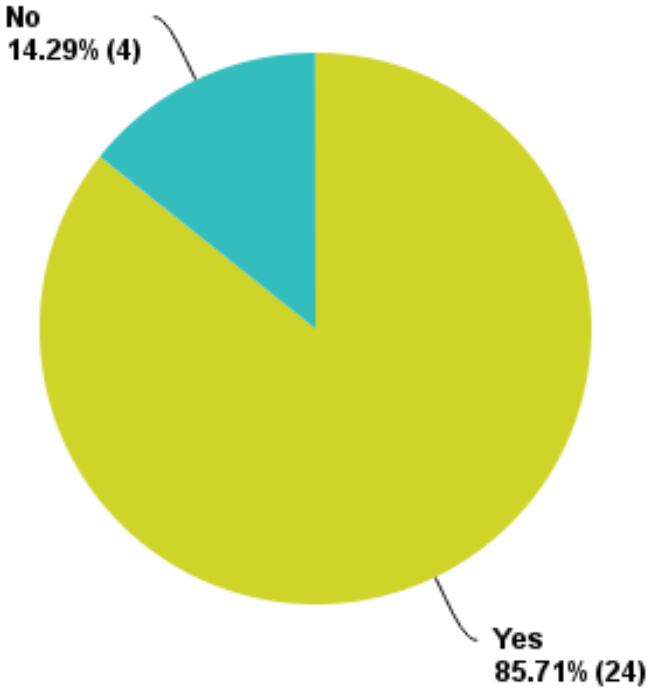
Q7: Expansion Joint Materials: What is the constructed width of the expansion joint?



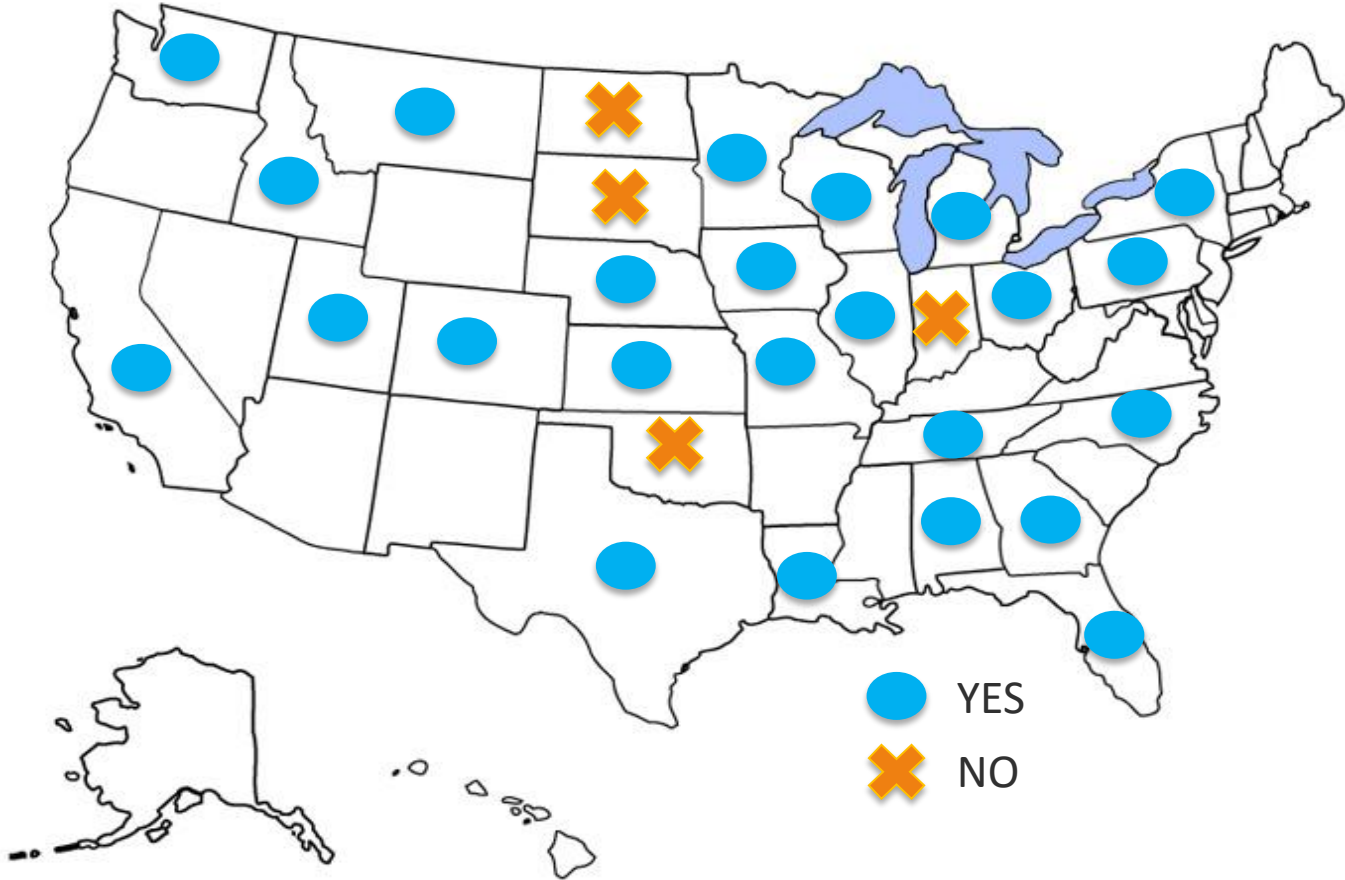
Q7: Expansion Joint Materials: What type of materials are installed in the expansion joint?

Poured Rubber	Silicone	Preformed Compression Seal (Neoprene)	Strip Seal	Tooth Dam	Preformed Joint Filler	Flexible Foam	Tire Buffings	Polyjoint	Jeene Jt	Elastomeric and Modular	Fabric Reinforced Elastomeric	Sponge Rubber Expansion	1 part self leveling poly-urethane
FL	FL	PA	PA	PA	WI	IA	IA	KS	ID	MI	IL	MO	MT
	UT	CO	OH		OH	NC				IL			
	ND	OK	IL		AL								
	TX	ID			MO								
		NC											
		WS											
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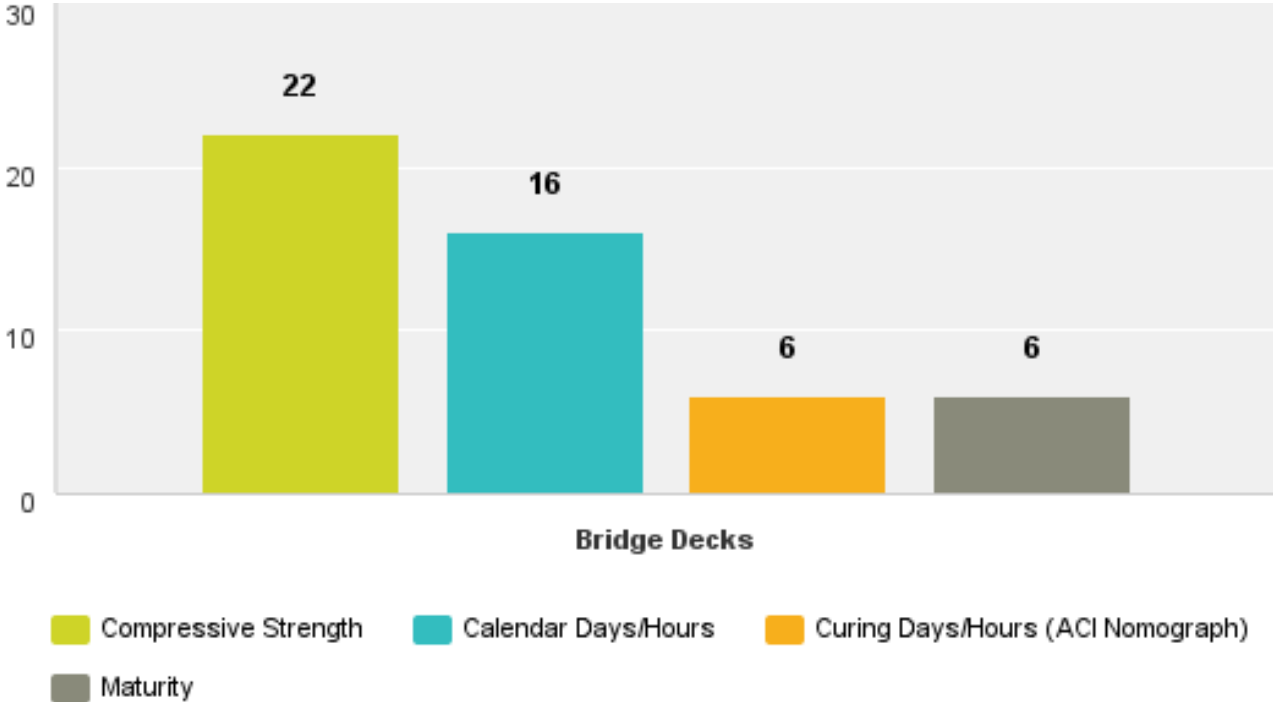
Q8: Do you have any experience with precast bridge construction?



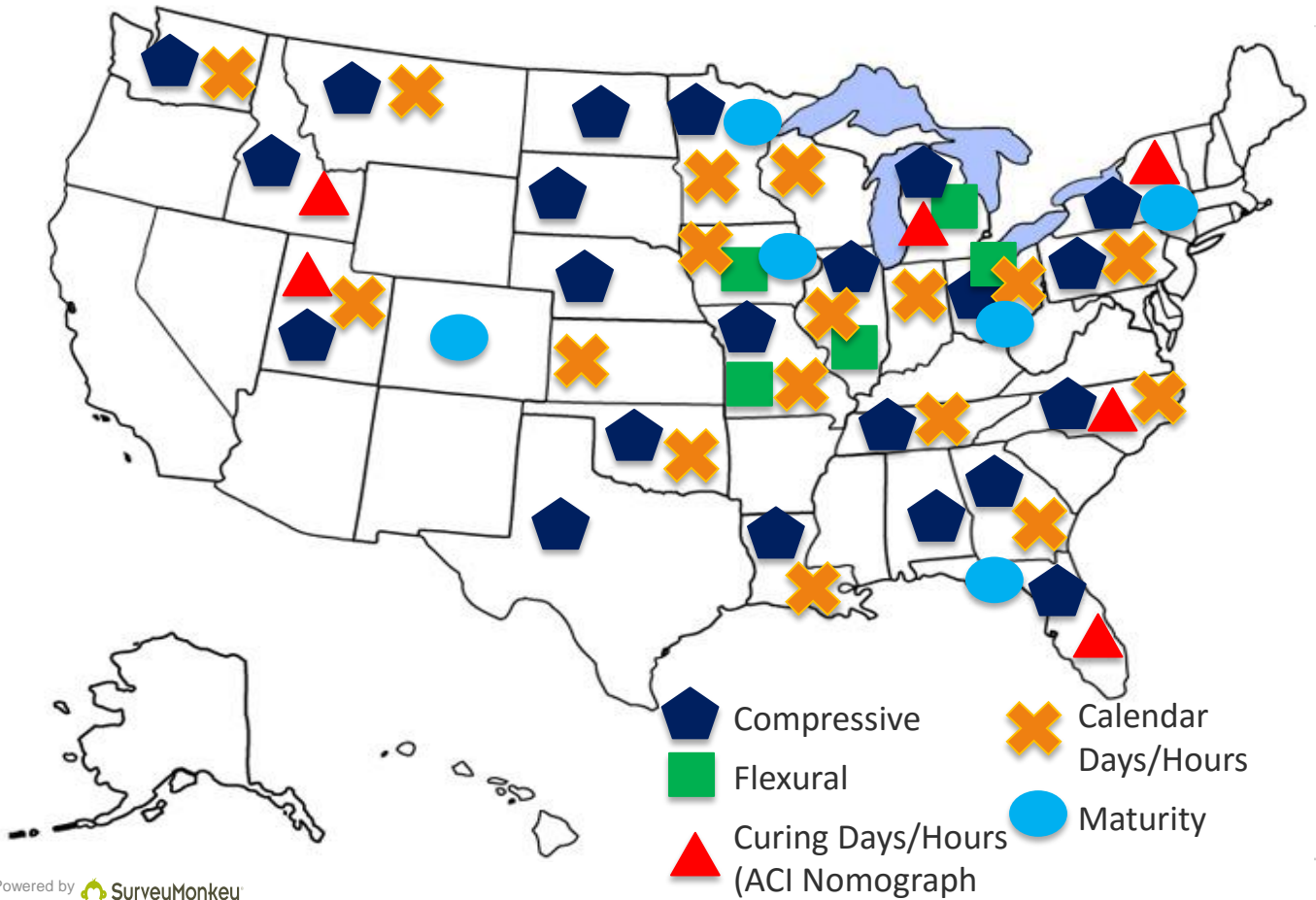
Q8: Do you have any experience with precast bridge construction?



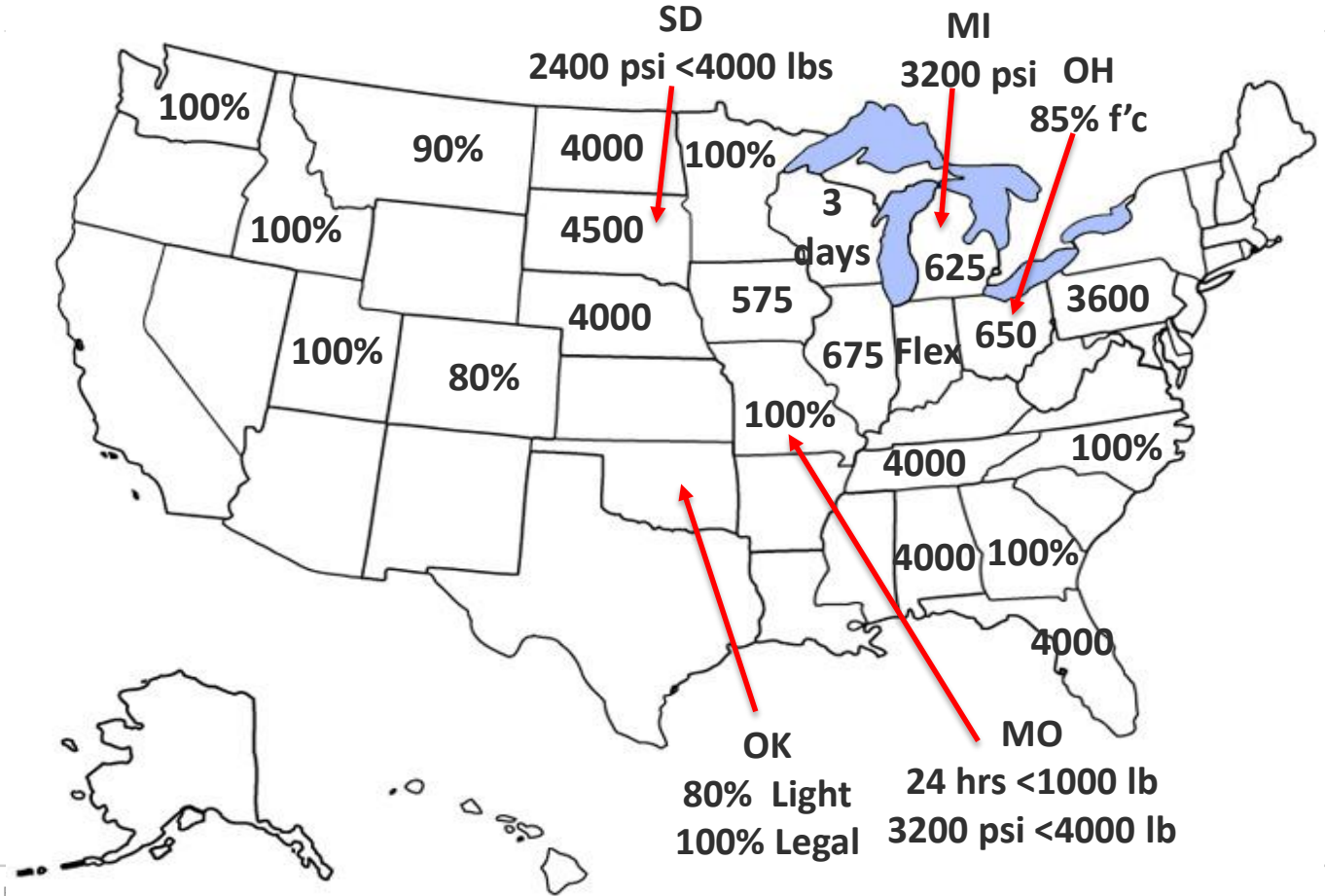
Q9: What are your requirements for allowing any type of loading on bridge decks?



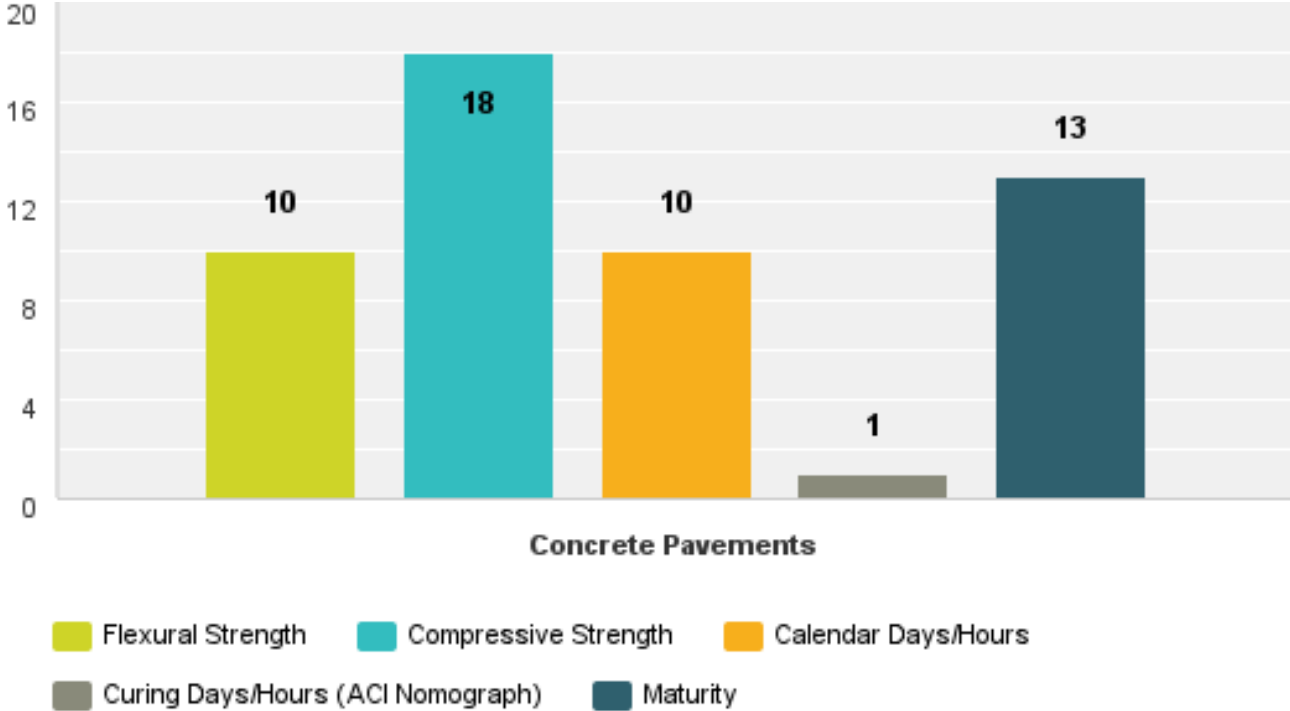
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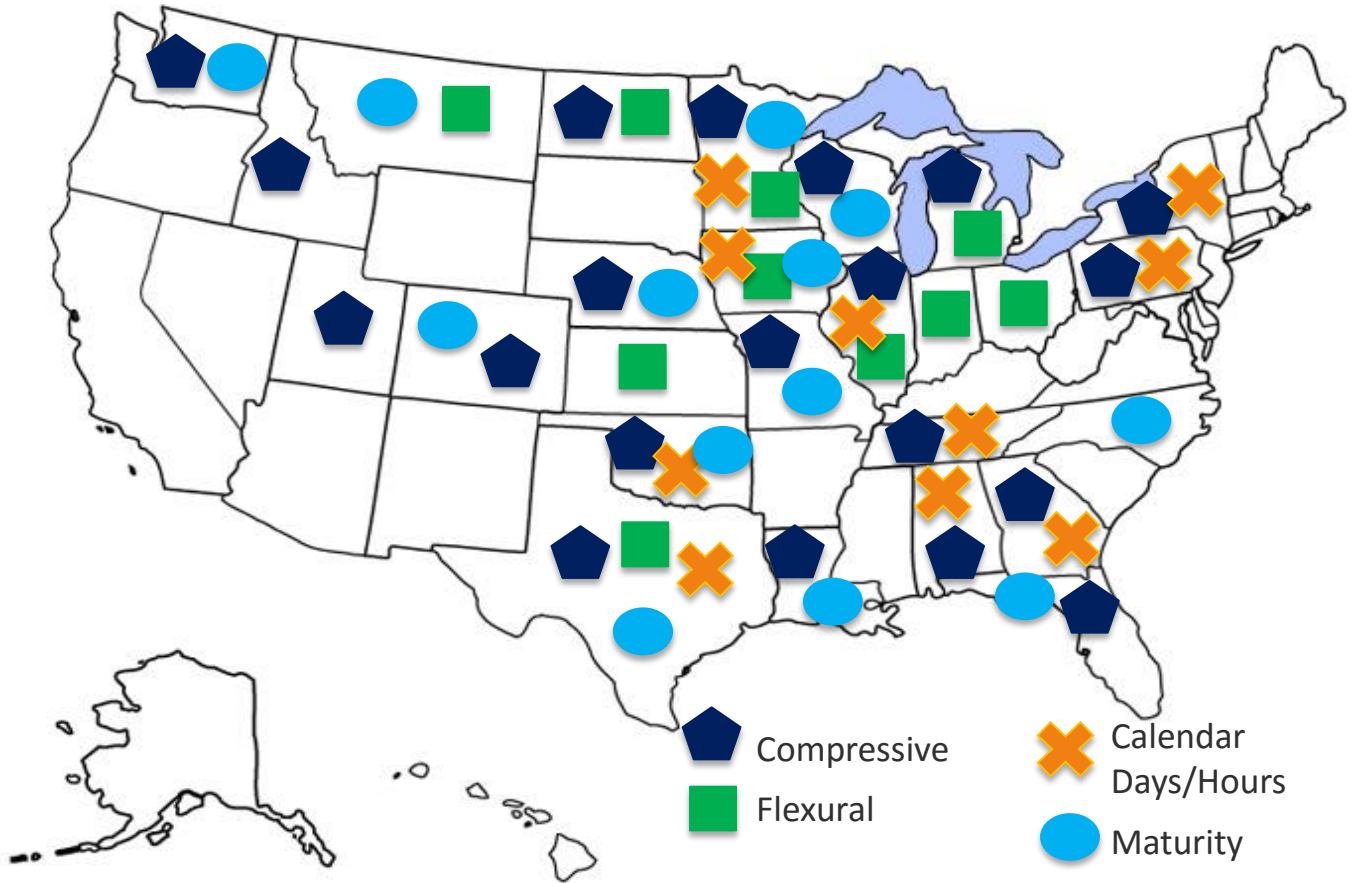
Q9: What are your requirements for allowing any type of loading on bridge decks? *FULL LOADING*



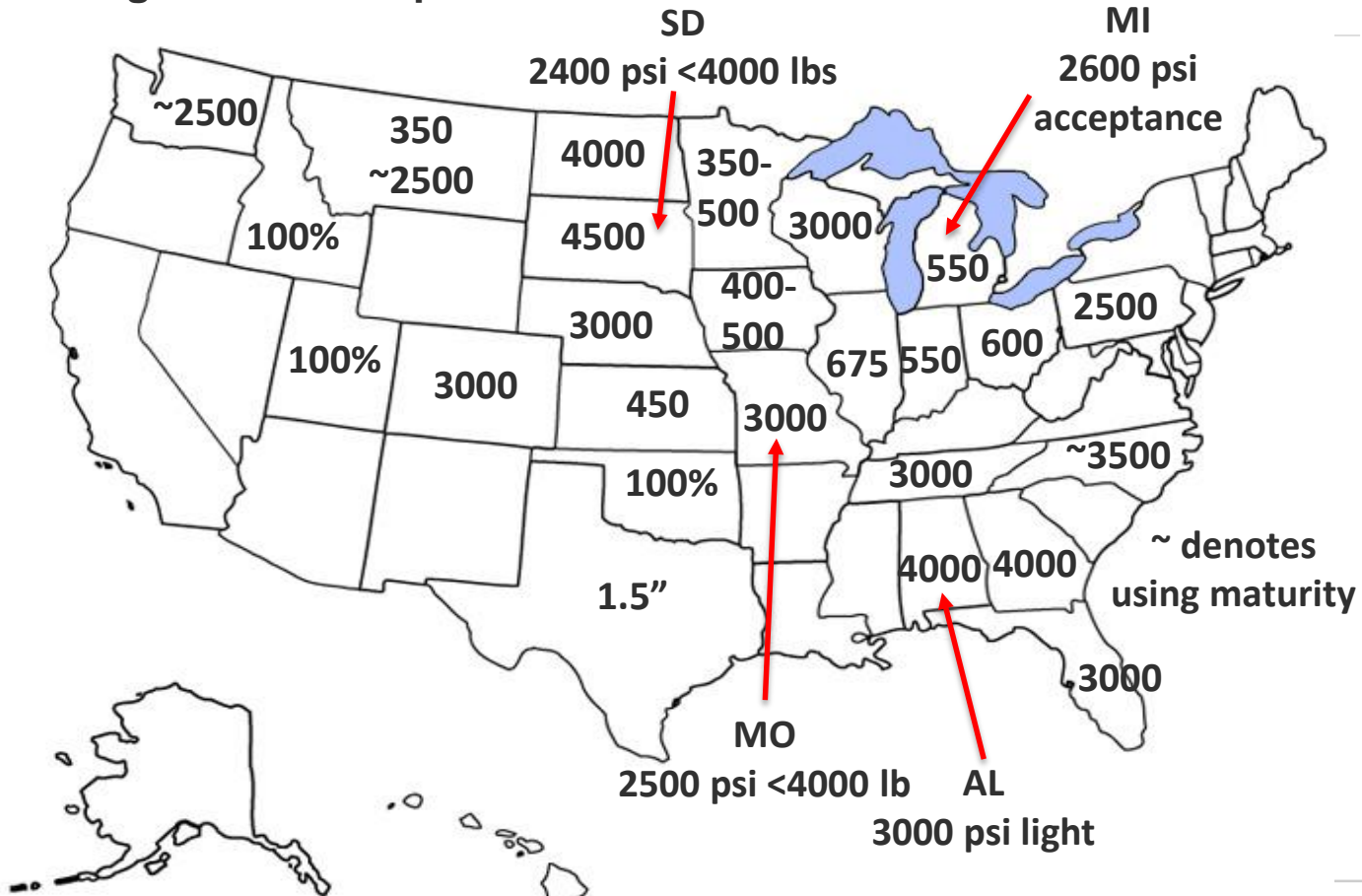
Q10: What are your requirements for allowing any type of loading on concrete pavements?



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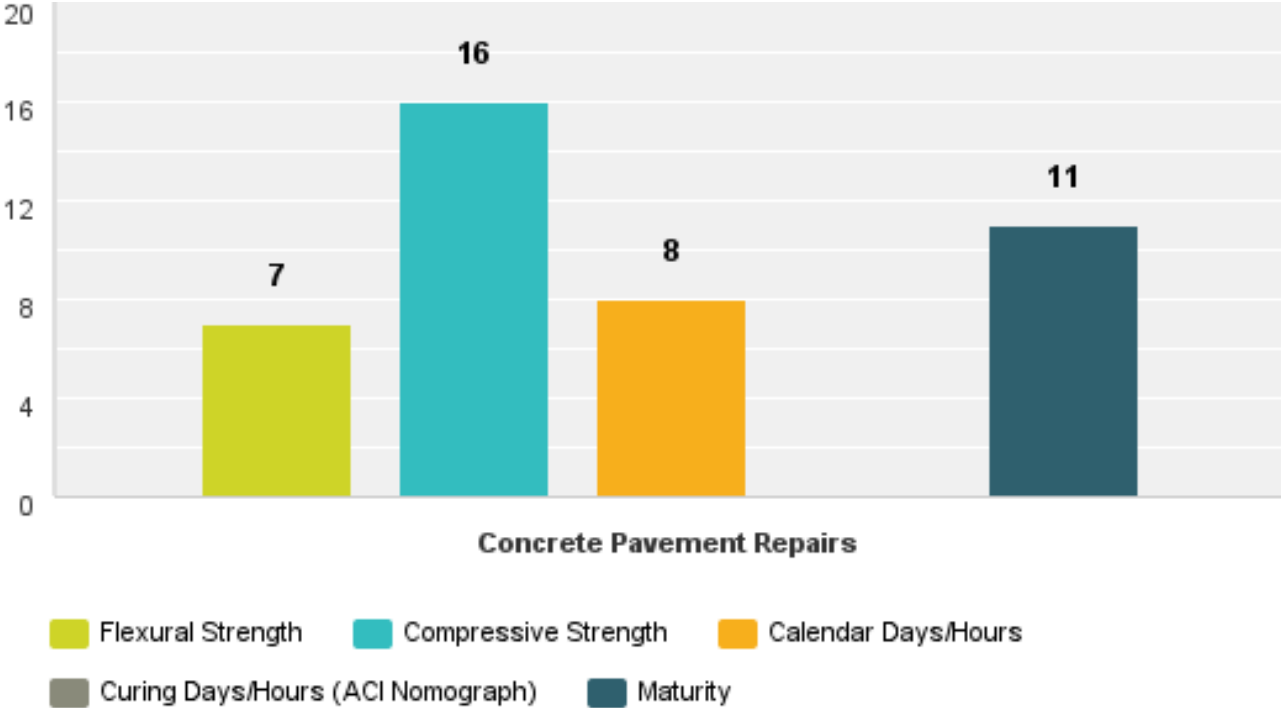


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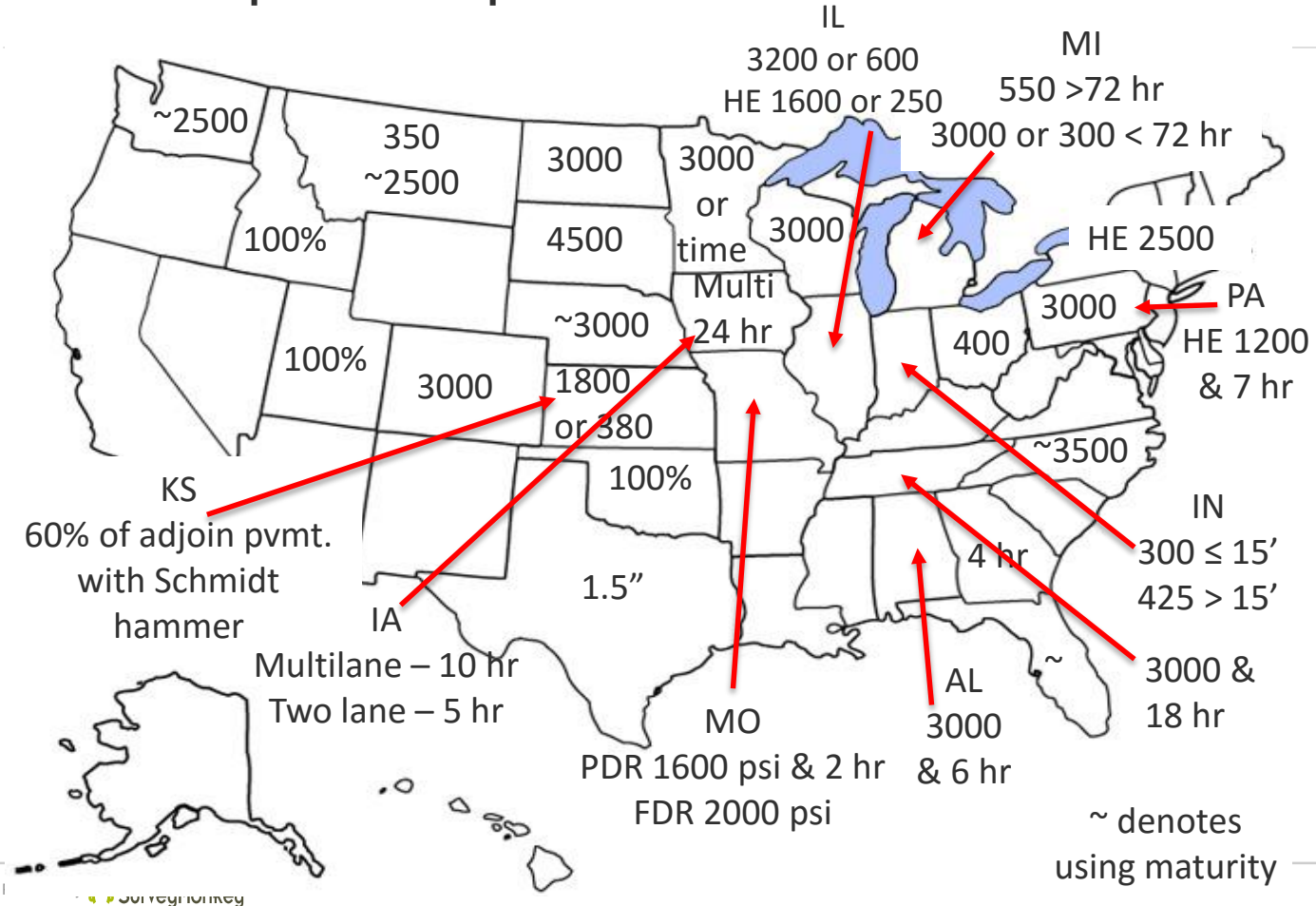


Also require time – FL, PA, IA, OH, MI, AL, IL, TN

Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?



Q11: What are your requirements for allowing any type of loading on concrete pavement repairs? *FULL LOADING*



Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.

- Most states have a maturity specification
- States with spreadsheets
- Alabama - http://www.dot.state.al.us/mtweb/Testing/testing_manual/frm/BMT/BMT188.xlsm
- Indiana – Contact for spreadsheet
- Iowa - http://www.iowadot.gov/Construction_Materials/pcc.html
- Minnesota - <http://www.dot.state.mn.us/materials/concretematurity.html>
- Nebraska - Will give as requested not available at Nebraska's website.

Q13: What is the typical mix design for Fiber Reinforced Overlay?

	MI	SD	OH	MO	CA
Cement (pcy)	618	520	600	705-790	
Fly Ash (pcy)	N/A	130	0	Optional	
Slag (pcy)	N/A		0	Optional	
Silica Fume (pcy)	40		50	Optional	
Other (pcy)	N/A				
Fine Aggregate (% or pcy)	1273	45	1410	101-109pcf	
Coarse Aggregate (% or pcy)	1601	55	1450		
Maximum Coarse Aggregate Size	3/4 inch	3/8"	#8	3/4"	
Target Air Content or range (%)	6.5 +/- 1.5	5-7.5%	8 +/-2		
Fibers (% or pcy)	2 lb/cyd	8 lb /yd3	1 lb/cy	45pcy	1 pcy micro & 3 pcy macro
Slump			6"	3"	
W/C Ratio			0.4	0.4	
Comments		These are contractor mixes and vary widely.		Steel Fibers	3/4 gal/cy SRA and 28 day shrinkage 0.032% or less

Q13: What is the typical mix design for Latex Modified Overlay?

	IL Tollway	MI	OH	PA	WA	NC	MT	MO
Cement (pcy)	658	658	658	658	1 pt/wt	658	660	658
Fine Aggregate (% or pcy)	50-58%	1490	1645	55-65	2.4-2.75	50-55		50-55
Coarse Aggregate (% or pcy)	42-50%	1300	1315	35-45	1.75-2	45-50		45-50
Maximum Coarse Aggregate Size	3/4 in.	3/4 inch	#8			#78M	1/2"	
Target Air Content or range (%)	0-7	4.5 +/- 1.5	7 +/-2	1-7	6	3.5-6.5	3-6.5	0-6.5
% Latex	24.5 gal/cy	206 lb/cyd	204 lb	3.5 gal/lb cement	3.5 gal/lb cement	24.5 gal/cy		24.5 gal/cy
Type of Latex Additive	styrene butadiene	White Latex Styrene Butadiene Modifier	Styrofan 1186 or Trinseo Modifier A/NA			styrene butadiene		
Slump				3-7	7"		5"	9"
w/c ratio				0.35-0.40	0.33	0.4	0.30-0.40	0.4
Comments	maximum of 157 pounds of water in addition to the 24.5 gal/cy of latex							HE Latex - use Type HE Cement Coulomb 1000@28 days

Q13: What is the typical mix design for Silica Fume Modified Overlay?

What is the typical mix design for SILICA FUME MODIFIED overlay?				
	WS	NY	MT	MO
Cement (pcy)	658	657	580	640
Silica Fume (pcy)	52	61		6-8%
Fine Aggregate (% or pcy)	1515	53%		50-55%
Coarse Aggregate (% or pcy)	1515	47%		45-50%
Maximum Coarse Aggregate Size		1" max	1/2"	
Target Air Content or range (%)	6.0 +/- 1.5%	6.5 +/- 1.5%	5.0-8.5	5%
Slump	7"	2-6"	5"	3 - 7-1/2"
w/c ratio	0.33	0.37	0.42	0.37
Comments			Performance Testing Required	HRWR as required

Q13: What is the typical mix design for DOT Specific Overlay?

	CO	MI	IA	IA	OH	RI	MN	MO	WI	WA
Cement (pcy)	700 lbs	658*	825	390	825	500-700	836	818-827	823	611
Fly Ash (pcy)	As needed for ASR mitigation. Typically 20% substitution with Class F	N/A		142	0					275
Slag (pcy)	not available in Colorado	25-40%		177	0					
Fine Aggregate (% or pcy)	50	Follow ACI 211	1393	1415	1300		1415	50	50	38
Coarse Aggregate (% or	50	Follow ACI 211	1409	1436	1315		1364-1540	50	50	62
Maximum Coarse Aggregate Size	3/8"	Follow ACI 211	1/2"	1/2"	#8		#7			#7 or #8
Target Air Content or range (%)	5-8%	5.5 - 8.0	Target 6.5% +2/-1	Target 6.5% +2/-1	8 +/-2	5-9%	6.5% +/- 1.5%	5%	6 +/-1%	6 +/- 1.5%
Slump						2-4"	3/4" +/-1/4"	1 1/2 +/- 1/2"	3"	7"
w/c ratio			3/4"		0.36	0.4	0.32		0.33	0.3
Comments	This is rarely used, since we are replacing concrete overlays with HMA or polyester to "water proof" the deck	Deep Concrete Bridge Deck Overlay	mobile mixer	Mid Range WR required. Mix based on Abs Vol. cement will be lower with lower SpG blended cements		permeability T277 28 day <2000 accelerated T277 28 day <1000 drying shrinkage 0.040	mobile mixer			

Q13: Other Comments?

Colorado has a policy of not having bare concrete decks. We are in the process of overlaying existing key bare decks with 1/2" polyester overlays. We have had a long and successful history of applying an asphalt membrane and 3" HMA overlay on bridge decks. Old (50+ year old) bridges that have been demolished with the HMA overlays show minimal corrosion on black bar even when bridge rails and unprotected concrete show significant deterioration from rebar corrosion. CDOT roads and bridges are heavily deiced with MgCl. The HMA overlay must be maintained. Typically milled & filled every 10 years. If milling hits the asphalt membrane, the contractor must repair the area.

Q13: Other Comments?

Kansas presently is using very few silica fume concrete overlays, maintenance only. We have shifted to Multi-Layer polymer overlays and Slurry polymer overlays on new structures and for maintenance. We have constructed a very few concrete overlays with fibers as we have shifted primarily to polymers.

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