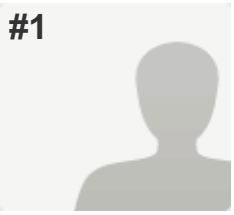


**#1**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Friday, March 17, 2017 6:33:13 AM
**Last Modified:** Friday, March 17, 2017 7:04:34 AM
**Time Spent:** 00:31:21
**IP Address:** 156.75.248.27

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Michael Bergin |
| Agency | DOT |
| State / Province | Florida |
| Email | michael.bergin@dot.state.fl.us |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | 0-10 |
| Additional Comments? | Florida typically does not do overlays, when we do in most cases we use a standard deck mix and hydroblast to remove enough concrete to get below the top mat of steel. |

| | |
|---|---|
| **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).** | Other (Please Specify) |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes,<br><br>Please include a link to each of the standard details.<br>http://www.fdot.gov/roadway/DS/17/IDx/20910.pdf (Concrete Pavement to an approach slab)<br>http://www.fdot.gov/roadway/DS/17/IDx/20900.pdf (Black stuff to an approach slab) |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>See response to Question #4 |

| | |
|---|---|
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 30' |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | between the approach and the deck |
| What is the constructed width of the expansion joint? | 1" |
| What type of materials are installed in the expansion joint? | Poured rubber or rapid cure silicon |
| Include a link to the approved products list (if applicable) | https://fdotwp1.dot.state.fl.us/ApprovedProductList/Specifications?specificationRange=900 |
| Include the specifications for expansion joint material | Section 932 |

| | |
|---|---|
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>Precast deck panels with closure pours cast with high strength, fiber reinforced concrete |

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Curing Days/Hours (ACI Nomograph), Maturity |
| What criteria do you use? | The deck cannot be loaded until it has received 7 days of moist curing and cylinders cured at the same location and curing attain 4,000 psi. The Maturity Method can be used to verify the strength providing that contractor has maturity curves for the temperature ranges during the curing and the unit weight of the concrete is within plus or minus 2 lbs of the approved designed mix. |

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

| | |
|---|---|
| Concrete Pavements | Maturity, Curing Days/Hours (ACI Nomograph), Compressive Strength |
| What criteria do you use? | Similar to bridge deck requirements except that the contractor is required to have 3 days of curing prior to any loading of the concrete, in addition a minimum strength of 3,000 psi is required and can be determined by compressive strength of cylinders or by Maturity method with the same criteria for validating the Maturity curves. (temperature range and unit weight) |

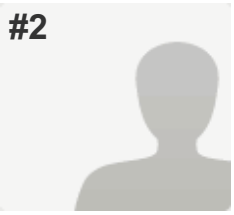
**Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?**

| | |
|---|---|
| Concrete Pavement Repairs | Maturity |
| What criteria do you use? | Slab replacement concrete is defined in Section 353, (attached) http://www.fdot.gov/programmanagement/Implemented/SpecBooks/July2017/Files/353-717.pdf |

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

| | |
|---|---|
| Specifications | See 353 above (#11) |
| Procedures | http://infonet.dot.state.fl.us/materials/administration/resources/library/publications/fstm/Methods/fm3-c1074.pdf |

**Q13: Any additional comments?** *Respondent skipped this question*



**#2**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Friday, March 17, 2017 7:28:03 AM
**Last Modified:** Friday, March 17, 2017 8:22:41 AM
**Time Spent:** 00:54:37
**IP Address:** 63.66.64.245

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Neal Fannin |
| Agency | PADOT |
| State / Province | PA |
| Email | nfannin@pa.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | 51-60 |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | 41-50 |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | |

| | |
|---|---|
| **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).** | Latex Modified Concrete, Ultra Thin Epoxy Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No,<br><br>Please include a link to each of the standard details. http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20218m.pdf BD 628 in the above publication. |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>Bituminous pavement relief joint (expansion joint) used with concrete pavements. |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | Not jointed |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | Either at the abutment or at end of approach slab. (designer choice) |
| What is the constructed width of the expansion joint? | Dependent on bridge expansion requirements |
| What type of materials are installed in the expansion joint? | Compression seal, strip seals, tooth dams. determined by brodge expansion properties. |
| Include a link to the approved products list (if applicable) | http://www.dot.state.pa.us/public/pdf/BOCM_MTD_LAB/PUBLICATIONS/PUB_35/Current_Edition/Bulletin15.pdf (Sections 1020, 1026) |
| Include the specifications for expansion joint material | http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2016/408_2016_2/408_2016_2.pdf (Sections 1008, 1020, 1021, 1026) |

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

Yes,

If yes, what types of applications
PS box beam and bulb T beam bridges. Some precast decks.

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | 2.c Live Loads. Do not allow diamond grinding and diamond saw grooving equipment or power-operated concrete buggies to cross a deck until 10 days after the deck concrete in a span has been placed and the deck concrete has attained a minimum compressive strength of 3,400 pounds per square inch. Do not place the conveyor-belt systems on a deck until 72 hours after the concrete is placed and their weight is uniformly distributed and operation of the system does not damage the deck. Do not allow truck mixers, truck agitators, other heavy equipment, construction traffic, or the traveling public on a structure until authorized by the Representative. This authorization will be given as follows: • A truck mixer not exceeding 5 miles per hour and a slip form paver for barrier will be allowed on the deck for construction of other concrete appurtenances when the concrete in the deck has attained a minimum compressive strength of 3,250 pounds per square inch and after minimum 7 day water cure. Do not allow more than one truck on the deck at a time in a span or continuous unit for each truck placement occurrence. • Bridge deck may be opened to traffic after a period of 21 days after placing the last deck concrete and the deck concrete has attained a minimum compressive strength of 3,600 pounds per square inch and cure period is complete. • Do not open to traffic until texturing of the bridge deck has been applied. • After a period of 7 days after placing the last barrier concrete and the barrier concrete has attained a minimum compressive strength of 3,000 pounds per square inch. Do not construct barrier on new decks until 7 days after placing the deck concrete and the deck concrete has attained a minimum compressive strength of 3,250 pounds per square inch. Do not allow trucks or heavy equipment to travel within 12 feet of barrier until 7 days after placing the barrier concrete and the barrier concrete has attained a minimum compressive strength of 3,000 pounds per square inch. Control speed of trucks, equipment, and the traveling public until barriers have attained a minimum compressive strength of 3,500 pounds per square inch. |

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

| | |
|---|---|
| Concrete Pavements | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | Protection of Pavement. Protect pavement, as specified in Section 901, and exclude traffic, including construction equipment. When required to complete adjacent pavement, the spreading, finishing, and subgrade machines may operate on the pavement surface after 96 hours if 3,000 pounds per square inch is achieved. |

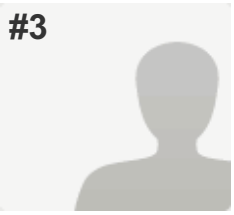
**Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?**

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | (q) Opening to Traffic. For normal strength patches, do not open the repaired area to traffic until the concrete has obtained a minimum compressive strength of 3,000 pounds per square inch, when tested according to PTM No. 604. For accelerated strength patches, obtain samples of plastic concrete, for compressive strength testing for opening to traffic, from each 100 cubic yards or fraction thereof of the day's placement, and, unless otherwise required, from the last mixer load of the day, according to the approved QC Plan. Sample locations will be selected according to PTM No. 1. Test concrete for compressive strength according to PTM No. 604, at the time of opening to traffic but no later than 7 hours after the test specimens were molded. Concrete lots that have not attained a minimum compressive strength of 1,200 pounds per square inch at the time of opening to traffic will be considered defective work. |

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

| | |
|---|---|
| Specifications | http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2016/408_2016_2/408_2016_2.pdf |
| Procedures | http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%2019.pdf |

**Q13: Any additional comments?** *Respondent skipped this question*




**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Friday, March 17, 2017 9:41:39 AM
**Last Modified:** Friday, March 17, 2017 9:58:21 AM
**Time Spent:** 00:16:41
**IP Address:** 63.225.17.34

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Eric Prieve |
| Agency | Colorado DOT |
| State / Province | Colorado |
| Email | eric.prieve@state.co.us |

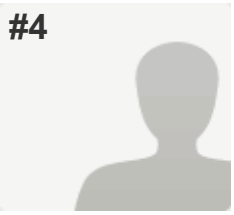
**Q2: What percentage of each type of bridge deck overlays do you routinely construct?**

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 0-10 |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | 0-10 |
| **Other (Please Specify)** | 91-100 |

| | |
|---|---|
| Additional Comments? | Colorado constructs HMA overlays over an asphaltic waterproofing membrane, or a polyester concrete overlay. We use to use silca fume overlays, but they cracked or delaminated. Flexible overlays such as the HMA and polyester concrete have been very successful in keeping moisture and salts from the deck. |

| | |
|---|---|
| **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).** | Other (Please Specify) |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No,<br><br>Please include a link to each of the standard details. No standard details. Each bridge has its own set of plans |

| | |
|---|---|
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>Concrete has a sleeper slab with a 4 inch expansion joint to isolate pavement expansion from locking the bridges expansion joints |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | n/a |
| **Q7: Expansion Joint Materials** | |
| Where is the expansion joint located? | 20 ft from the bridge |
| What is the constructed width of the expansion joint? | 4 |
| What type of materials are installed in the expansion joint? | pre-formed |
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>All of our bridges are constructed of pre-cast elements |
| **Q9: What are your requirements for allowing any type of loading on bridge decks?** | |
| Bridge Decks | Maturity |
| What criteria do you use? | Typically 80% design strength |
| **Q10: What are your requirements for allowing any type of loading on concrete pavements?** | |
| Concrete Pavements | Compressive Strength, Maturity |
| What criteria do you use? | 3000 psi |
| **Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?** | |
| Concrete Pavement Repairs | Compressive Strength, Maturity |
| What criteria do you use? | 3000 psi |
| **Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.** | |
| Specifications | https://www.codot.gov/business/designsupport/2011-construction-specifications/2011-Specs/standard-special-provisions/sections-200-500-revisions/601mmfc/view |
| Procedures | https://www.codot.gov/business/designsupport/materials-and-geotechnical/manuals/2016-fmm/cps/CP-60s/%2813%29%20CP%2069-16/view |
| **Q13: Any additional comments?** | |
| Pilot maturity spec for acceptance:<br><br>https://www.codot.gov/business/designsupport/2011-construction-specifications/2011-Specs/pilot-project-special-provisions/601mm/view | |



**#4**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Friday, March 24, 2017 3:23:41 PM
**Last Modified:** Friday, March 24, 2017 3:51:32 PM
**Time Spent:** 00:27:50
**IP Address:** 204.62.25.101

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Kenny Seward |
| Agency | Okla DOT |
| State / Province | Oklahoma |
| Email | kseward@odot.org |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 51-60 |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | 11-20 |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | 21-30 |
| **Other (Please Specify)** | |

| | |
|---|---|
| **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).** | Latex Modified Concrete,<br>Low Slump (High Cement) Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No,<br>Please include a link to each of the standard details. http://www.odot.org/bridge/2009-sb/brd_std_2009-lrfd-sb-216.pdf http://www.odot.org/bridge/2009-sb/brd_std_2009-lrfd-sb-416.pdf |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | Yes |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | N/A |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | Usually at piers |
| What is the constructed width of the expansion joint? | 2" at 60 degrees |
| What type of materials are installed in the expansion joint? | neoprene |
| Include a link to the approved products list (if applicable) | N/A |

**Q8: Do you have any experience with precast bridge construction?** No

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | Decks and Approach Slabs: Light truck traffic < 5 tons [4.5 metric tons] and/or concrete placement for barrier or traffic rail when underlying forms and falsework still in place 80% or * 7 Days Decks and Approach Slabs: Legal Loads when underlying forms and falsework still in place 100% or *14 Days Decks and Approach Slabs: Open to traffic 100% and *14 Days Decks and Approach Slabs: Entire approach slab on A+B Projects or bridge deck repair areas with underlying forms still in place and having areas less than 100 sq yds [84 sq M] 100% and * 7 Days Deck and Approach Slabs: Permit loads and Stationary loads > 10 tons [9.0 metric ton] **Load specific **Load Specific Deck and Approach Slabs: Heavy Stationary loads 5 - 10 tons [4.5 - 9.0 metric ton] when underlying forms and falsework still in place 100% or *14 Days |

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

| | |
|---|---|
| Concrete Pavements | Compressive Strength, Calendar Days/Hours, Maturity |
| What criteria do you use? | 14 days or 100% strength Construction traffic at 3 days |

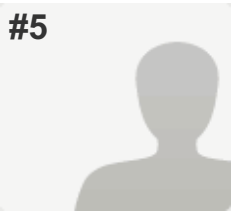
**Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?**

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength |
| What criteria do you use? | 100% strength |

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

| | |
|---|---|
| Specifications | N/A |

**Q13: Any additional comments?** *Respondent skipped this question*



**#5**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, March 27, 2017 1:22:32 PM
**Last Modified:** Monday, March 27, 2017 1:51:31 PM
**Time Spent:** 00:28:59
**IP Address:** 165.206.209.230

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Todd Hanson/Kevin Merryman |
| Agency | Iowa DOT |
| State / Province | Iowa |
| Email | Todd.hanson@iowadot.us<br>Kevin.merryman@iowadot.us |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 0-10 |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | 41-50 |
| **Other (Please Specify)** | 41-50 |
| Additional Comments? | Other - HPC overlay |

| | |
|---|---|
| **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).** | Other (Please Specify),<br><br>Low Slump (High Cement) Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No,<br><br>Please include a link to each of the standard details.<br>http://www.iowadot.gov/erl/current/RS/content_eng/br203.pdf |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>http://www.iowadot.gov/erl/current/RS/content_eng/br211.pdf<br>http://www.iowadot.gov/erl/current/RS/content_eng/br212.pdf |

| | |
|---|---|
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 20 foot length max typically 12 or 14 feet wide on mainline |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | Fixed abutment 60 feet from bridge Movable abutment at bridge and 60 feet from bridge |
| What is the constructed width of the expansion joint? | 3 1/2" at 60 feet from bridge variable at bridge depending upon bridge length |
| What type of materials are installed in the expansion joint? | flexible foam or tire buffings |
| Include a link to the approved products list (if applicable) | https://maple.iowadot.gov/Default.aspx |
| Include the specifications for expansion joint material | http://www.iowadot.gov/erl/current/GS/content/4136.htm |

| | |
|---|---|
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br>If yes, what types of applications ABC |

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

| | |
|---|---|
| Bridge Decks | Calendar Days/Hours, Maturity |
| What criteria do you use? | N. Subjecting Concrete to Exterior Loads. Concrete may not be subjected to loads other than the load caused by the weight of the concrete itself except as follows: 1. Loads Producing Simple Compressive Stress Only. Concrete may be subjected to simple compressive stress as soon as it sets sufficiently to prevent the surface being marred or the edges being chipped from the effect of such loads. 2. Loads Producing Flexural Stresses. a. Unless otherwise indicated in the contract documents, concrete may be subjected to loads due to placing backfill material or to legal traffic when the concrete has reached the minimum age stipulated in Table 2403.03-2 and developed a flexural strength of at least 575 psi. Table 2403.03-2: Minimum Age for Concrete Portland cement (Type I and Type II with or without Class C fly ash ) 7 calendar days With Class F fly ash substitution 8 calendar days Class M mix (with or without Class C or Class F fly ash) 3 calendar days If strength is not determined (regardless of type of cement or class of fly ash) 14 calendar days b. Determine flexural strength by testing (according to Materials I.M. 316) specimens of concrete used in the part of the structure in question, cured under conditions similar to those of the concrete in the structure. c. Footings for piers supported by piling may be subjected to loads of subsequent pier stem concrete placement no less than 18 hours after footing placement is complete, with no minimum strength requirements. d. Unless otherwise specified in the contract documents, the Contractor may request, the time for subjecting to loads to be determined through the use of the Maturity Method as described in Materials I.M. 383. |

When the Maturity Method is used, the time for loading will be based on strength requirements only, as specified above. Furnish labor, equipment, and materials necessary for the development of the maturity-strength relationship as described in Materials I.M. 383. e. Determining sufficient strength has been achieved for loading a part of a structure remains the Engineer’s responsibility when the Maturity Method is used. The Contractor's maturity testing may be used as the basis for this determination. Provide sufficient documentation of maturity testing before loading a part of a structure or opening to traffic. f. Apply the following when the Maturity Method is used: 1) Should circumstances arise beyond the Contractor's or Engineer's control and strength cannot be determined by the Maturity Method, the minimum age, minimum flexural strength, and fly ash restrictions apply. Cure flexural strength specimens under conditions similar to those of the concrete in the structure. 2) Any changes of a material source or proportion in the concrete mixture require a new maturity curve.

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

| | |
|---|---|
| Concrete Pavements | Flexural Strength, Calendar Days/Hours, Maturity |
| What criteria do you use? | Maturity is used the vast majority of the time to determine time of opening. U. Time for Opening Pavement for Use. 1. The time for opening pavement for use will be based on the restrictions listed in Table 2301.03-2, with flexural strength determined from beam specimens made during the progress of the work. Table 2301.03- 3: Minimum Flexural Strength Strength Class of Concrete Minimum Age psi A 14 calendar days(a) 500 B 14 calendar days 400 C 7 calendar days(b) 500 M 48 hours(c) 500 (a) 10 calendar days for concrete 8 inches thick or more. (b) 5 calendar days for concrete 9 inches thick or more. (c) Pavement may be opened for use prior to 48 hours when minimum flexural strength requirements are met. 2. At the Contractor's option (unless specified otherwise in the contract documents), the time for opening pavement may be determined through the use of the maturity method as described in Materials I.M. 383. 3. Apply the following when the maturity method is used: a. The time for opening pavement will be based on strength requirements only, as specified in Table 2301.03-2. Furnish all labor, equipment, and materials necessary for the development of the maturity-strength relationship as described in Materials I.M. 383. b. The Engineer will determine if sufficient strength has been achieved for opening a section of pavement. The Contractor's maturity testing may be used as the basis for this determination. Provide sufficient documentation of maturity testing before opening a section to traffic. c. Should circumstances arise which are beyond the Contractor's or Engineer's control and strength cannot be determined by the maturity method, apply minimum age, minimum flexural strength, and fly ash restrictions. d. Develop a new maturity curve for any change of a material source or proportion in the concrete mixture. 4. In cases where early opening of pavement is desirable, the Engineer may require the use of Class M concrete mixtures. Such sections of pavement may be opened to traffic in accordance with Table 2301.03-2. 5. At the Contractor's option, when Type I/II cements are used, Class C fly ash may be substituted for up to 10%, by weight, of the cement in Class M concrete mixtures. Type IP and Type IS cements may be used in Class M concrete mixtures without fly ash substitution. |

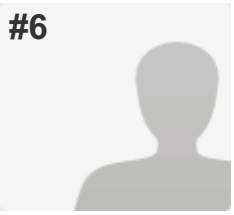
**Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?**

| | |
|---|---|
| Concrete Pavement Repairs | Calendar Days/Hours |
| What criteria do you use? | Cure PCC patches placed on multi-lane sections for a minimum of 10 hours before opening to traffic. Cure PCC patches placed on two-lane sections a minimum of 5 hours before opening to traffic. When allowed by the contract documents or Engineer, cure PCC patches without calcium chloride on multi-lane sections a minimum of 24 hours. These restrictions may be modified in the plans or by the Engineer for specific sections. |

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

| | |
|---|---|
| Procedures | http://www.iowadot.gov/erl/current/IM/content/383.htm |
| Spreadsheets | http://www.iowadot.gov/Construction_Materials/pcc.html |

**Q13: Any additional comments?** *Respondent skipped this question*




**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Thursday, March 30, 2017 11:35:02 AM
**Last Modified:** Thursday, March 30, 2017 12:02:14 PM
**Time Spent:** 00:27:12
**IP Address:** 165.201.162.178

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | David Meggers |
| Agency | Kansas Dept of Trans |
| State / Province | Kansas |
| Email | dave.meggers@ks.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 81-90 |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | 0-10 |
| **Other (Please Specify)** | 11-20 |

| | |
|---|---|
| Additional Comments? | We have gone to full depth decks with a polymer overlay. Most have been multi-layer thin overlays but several have been 3/4 inc thick polyester overlays. We still on occasion use silica fume for a maintenance overlay on and existing structure. |
| **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).** | Silica Fume Modified Concrete,<br>Ultra Thin Epoxy Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br>If no, what is done differently?<br>Asphalt is 13' and no sleeper slab. Concrete is 33 ' with sleeper slab. |

| | |
|---|---|
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 13' |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | At end of first slab and relief slot at the 33' |
| What is the constructed width of the expansion joint? | Max of 3 inches |
| What type of materials are installed in the expansion joint? | Poly joint. |
| Include a link to the approved products list (if applicable) | http://www.ksdot.org/Assets/wwwksdotorg/bureaus/burMatrRes/PQL/pql-15-01.pdf |
| Include the specifications for expansion joint material | http://www.ksdot.org/Assets/wwwksdotorg/bureaus/burConsMain/specprov/2015/1504.pdf |

| | |
|---|---|
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>We only have, experimental |

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

| | |
|---|---|
| Bridge Decks | Calendar Days/Hours |
| What criteria do you use? | http://www.ksdot.org/Assets/wwwksdotorg/bureaus/burConsMain/specprov/2015/PDF/15-07011.pdf |

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

| | |
|---|---|
| Concrete Pavements | Flexural Strength |
| What criteria do you use? | http://www.ksdot.org/Assets/wwwksdotorg/bureaus/burConsMain/specprov/2015/501.pdf (a) Construction Traffic Only. ¬ The flexural strength of the pavement shall meet or exceed 450 psi. Determine the flexural strength of the pavement by testing flexural strength specimens utilizing the third point loading method, or by use of a calibrated maturity meter. ¬ If flexural strength does not meet or exceed 450 psi, observe a 10 day curing period before allowing motorized traffic on the pavement. Provide a strength gain curve of concrete cured at 45°F to justify a curing period of less than 10 days. ¬ Provide protection to keep foreign material out of the unsealed joints by an approved method. (b) All Traffic. In addition to subsection 501.4i.(3)(a), seal the joints according to subsection 501.4g.(9). |

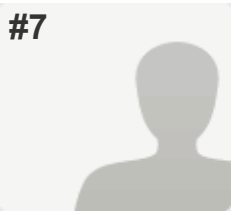
**Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?**

| | |
|---|---|
| Concrete Pavement Repairs | Flexural Strength |
| What criteria do you use? | http://www.ksdot.org/Assets/wwwksdotorg/bureaus/burConsMain/specprov/2015/833.pdf j. Opening to Traffic. Perform testing to determine when the patch can be opened to traffic. ¬ When a minimum flexural strength of 380 psi or minimum compressive strength of 1800 psi is obtained from properly cured specimens. ¬ If the temperature falls below 60°F during the cure period, use the Schmidt rebound hammer to determine when the patch can be opened to traffic. The patch may be opened to traffic when the results of the rebound hammer test equal or exceed results obtained on materials previously tested and known to meet the strength requirements or 60% of the rebound on adjoining pavement. ¬ When maturity is used to determine when the patch is opened to traffic, make cylinders from the same mix to be used. Cure and break the cylinders under a time and temperature plan to develop a concrete maturity curve. Use the concrete maturity curve to determine when the patch has gained the strength to be opened to traffic. ¬ If Grade 2 calcium chloride is used, see subsection 401.3i.(1). ¬ When approved by the Engineer, other methods may be used to determine when the patch has gained the strength to be opened to traffic. |

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

| | |
|---|---|
| Specifications | http://www.ksdot.org/Assets/wwwksdotorg/bureaus/burConsMain/Connections/ConstManual/2016/KT-44.pdf |

**Q13: Any additional comments?** *Respondent skipped this question*




**COMPLETE**

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**Started:** Monday, April 03, 2017 11:40:06 AM
**Last Modified:** Monday, April 03, 2017 12:55:07 PM
**Time Spent:** 01:15:01
**IP Address:** 164.165.251.4

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Matt Farrar |
| Agency | Idaho Transportaition Department |
| State / Province | ID |
| Email | matt.farrar@itd.idaho.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 51-60 |
| **Ultra Thin Epoxy Overlay** | 21-30 |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | 0-10 |
| Additional Comments? | Other is Polyester Concrete |

| | |
|---|---|
| **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).** | Fiber Reinforced, Silica Fume Modified Concrete, Ultra Thin Epoxy Overlay, Polymer Modified Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | Yes,<br>If no, what is done differently?<br>Slightly different Sleeper Beam for asphalt or concrete |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | *Respondent skipped this question* |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | At the sleeper beam for integral abutments |
| What is the constructed width of the expansion joint? | Depends on the expected movement |
| What type of materials are installed in the expansion joint? | typically neoprene compression seals, sometimes Jeene Jt |

| | |
|---|---|
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>Precast Deck Bulb Tees Precast Abutments Precast Piers and Pier Caps Precast Box Culverts and 3 sided culverts precast full depth deck panels |

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Curing Days/Hours (ACI Nomograph) |
| What criteria do you use? | 10 day wet cure design strength before loading |

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

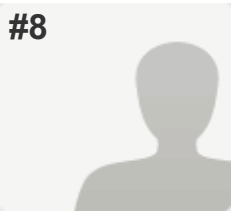
| | |
|---|---|
| What criteria do you use? | Not Sure |

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

| | |
|---|---|
| What criteria do you use? | Not sure |

| | |
|---|---|
| **Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.** | *Respondent skipped this question* |

| | |
|---|---|
| **Q13: Any additional comments?** | *Respondent skipped this question* |

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**Started:** Monday, April 03, 2017 12:48:57 PM
**Last Modified:** Monday, April 03, 2017 1:47:14 PM
**Time Spent:** 00:58:17
**IP Address:** 199.90.35.12

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Tim Sherrill |
| Agency | NCDOT |
| State / Province | NC |
| Email | tmsherrill@ncdot.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | 41-50 |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | 31-40 |
| **Polymer Modified Overlay** | 11-20 |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | |
| Additional Comments? | In the past year, we have begun use of Polyester Polymer Concrete overlays. |

| | |
|---|---|
| **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).** | Latex Modified Concrete, Ultra Thin Epoxy Overlay, Polymer Modified Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No,<br>Please include a link to each of the standard details. https://connect.ncdot.gov/resources/Structures/Pages/Structure-Standards.aspx |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br>If no, what is done differently? https://connect.ncdot.gov/resources/Structures/Pages/Structure-Standards.aspx |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 15' longitudinal length |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| What is the constructed width of the expansion joint? | Minimum 1 inch formed joint opening normal to the centerline of joint when the superstructure is fully expanded. |
| What type of materials are installed in the expansion joint? | Foam; neoprene gland; modular gland |
| Include a link to the approved products list (if applicable) | https://apps.ncdot.gov/vendor/ApprovedProducts/ |

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

Yes,

If yes, what types of applications
Limited experience. Primarily on smaller roads with limited detour options or for some bridge components on larger projects in an effort to expedite construction.

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Curing Days/Hours (ACI Nomograph) |
| What criteria do you use? | Do not place vehicles or construction equipment on a bridge deck until the deck concrete develops the minimum specified 28 day compressive strength and attains an age of at least 14 curing days. |

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

| | |
|---|---|
| Concrete Pavements | Maturity |
| What criteria do you use? | Traffic or other heavy equipment will not be allowed on the concrete pavement or shoulder until the estimated compressive strength of the concrete using the maturity method has exceeded 3,500 psi, unless otherwise permitted. Estimate the compressive strength of concrete pavement in accordance with ASTM C1074 unless otherwise specified. |

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

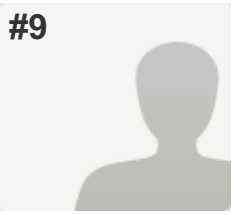
| | |
|---|---|
| What criteria do you use? | Unknown |

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

| | |
|---|---|
| Specifications | https://connect.ncdot.gov/resources/Specifications/2012StandSpecsMan/PDF/2012%20Standard%20Specifications%20Manual%20with%20ASTM.pdf |

**Q13: Any additional comments?**

*Respondent skipped this question*



**#9**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 03, 2017 1:09:46 PM
**Last Modified:** Monday, April 03, 2017 1:53:35 PM
**Time Spent:** 00:43:49
**IP Address:** 164.110.221.225

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Mark Russell |
| Agency | WSDOT |
| State / Province | Washington |
| Email | russelm@wsdot.wa.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | 91-100 |

Additional Comments?

Other includes Concrete Class D (19% of overlays) and Modified Concrete Overlays (79% of overlays). Modified Class D is a Performance Engineered Mix that is also used for new decks. Modified Concrete Overlays includes latex modified, silica fume modified of fly ash modified concrete. The contractor chooses which type of concrete to use on the project. Records of which type was chosen or not kept.

**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).**

Latex Modified Concrete,

Silica Fume Modified Concrete,

Ultra Thin Epoxy Overlay,

Polymer Modified Overlay,

Low Slump (High Cement) Overlay,

Other (Please Specify)

| | |
|---|---|
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No,<br><br>Please include a link to each of the standard details.<br>http://www.wsdot.wa.gov/publications/fulltext/Bridge/Web_BSD/10.6_A1_1.pdf<br>http://www.wsdot.wa.gov/publications/fulltext/Bridge/Web_BSD/10.6_A1_2.pdf<br>http://www.wsdot.wa.gov/publications/fulltext/Bridge/Web_BSD/10.6_A1_3.pdf |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>Typically new approach panels will be doweled to new concrete pavement similar to a contraction joint in the pavement. A butt joint will be used when asphalt pavement abuts an approach panel. When new concrete pavement abuts an existing approach panel the end of the pavement is thickened and dowel bars are not used. |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 40 feet |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | Between the bridge and approach panel |
| What is the constructed width of the expansion joint? | 1-5/8 inch opening |
| What type of materials are installed in the expansion joint? | Elastomeric Compression Seal |
| Include a link to the approved products list (if applicable) | DS Brown CV-2502 or Watson Bowman WA-250 |
| Include the specifications for expansion joint material | The products above are called out on the plan sheets. |

| | |
|---|---|
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>Concrete girders are typically precast. Other elements may be designed as precast when necessary for rapid construction. |

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | No traffic is allowed on bridges until the concrete has reached its 28-day strength but not earlier than 10 days after concrete placement. |

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

| | |
|---|---|
| Concrete Pavements | Compressive Strength, Maturity |
| What criteria do you use? | Concrete pavement may be opened to traffic when the maturity value corresponding to 2,500 psi compressing strength is reached based on a maturity curve developed for the project. WSDOT's maturity specification is located at: http://www.wsdot.wa.gov/publications/fulltext/projectdev/gspspdf/5-05.3(17).OPT1.GR5.PDF |

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength, Maturity |
| What criteria do you use? | Same as concrete pavement. |

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

| | |
|---|---|
| Specifications | See above |

| | |
|---|---|
| **Q13: Any additional comments?** | *Respondent skipped this question* |

**#10**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 03, 2017 2:48:51 PM
**Last Modified:** Monday, April 03, 2017 3:38:10 PM
**Time Spent:** 00:49:19
**IP Address:** 130.47.240.44

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Chad Hayes |
| Agency | Wis.DOT |
| State / Province | WI |
| Email | chad.hayes@dot.wi.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 11-20 |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | 81-90 |
| **Other (Please Specify)** | |

| | |
|---|---|
| **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).** | Low Slump (High Cement) Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | Yes |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 15' |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | On a sleeper slab at the end of the structural approach slab. |
| What is the constructed width of the expansion joint? | 1.5" |
| What type of materials are installed in the expansion joint? | Felt |
| Include a link to the approved products list (if applicable) | n/a |
| Include the specifications for expansion joint material | Furnish expansion joint filler conforming to AASHTO M153 or AASHTO M213 |

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

Yes,

If yes, what types of applications
Very limited. Mainly substructure elements.

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

| | |
|---|---|
| Bridge Decks | Calendar Days/Hours |
| What criteria do you use? | MIN 3 DAYS |

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

| | |
|---|---|
| Concrete Pavements | Compressive Strength, Maturity |
| What criteria do you use? | 3000 PSI COMPRESSIVE AND SEE 415.3.15 http://wisconsindot.gov/rdwy/stndspec/ss-04-15.pdf#ss415 |

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength, Maturity |
| What criteria do you use? | 3000 PSI COMPRESSIVE AND SEE 415.3.15 http://wisconsindot.gov/rdwy/stndspec/ss-04-15.pdf#ss415 |

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

| | |
|---|---|
| Specifications | http://wisconsindot.gov/rdwy/stndspec/ss-04-15.pdf#ss415 |
| Procedures | http://wisconsindot.gov/rdwy/cmm/cm-08-70.pdf#cm8-70.4.8 |

**Q13: Any additional comments?**

SEE 8-70.4.8 for procedure of Concrete Maturity Testing

**#11**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Tuesday, April 04, 2017 3:17:13 PM
**Last Modified:** Tuesday, April 04, 2017 3:30:15 PM
**Time Spent:** 00:13:01
**IP Address:** 164.154.55.136

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Hadly Eisenbeisz |
| Agency | DOT |
| State / Province | SD |
| Email | hadly.eisenbeisz@state.sd.us |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 41-50 |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | 41-50 |
| **Other (Please Specify)** | |

| | |
|---|---|
| **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).** | Low Slump (High Cement) Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>Concrete sleeper slab has a pavement section with a growth joint on both sides. One for the bridge and one for pavement expansion. Asphalt sleeper slabs do not have a growth joint on the pavement side. |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | *Respondent skipped this question* |

| | |
|---|---|
| **Q7: Expansion Joint Materials** | |
| Where is the expansion joint located? | end of approach slab |
| What is the constructed width of the expansion joint? | 3" |
| What type of materials are installed in the expansion joint? | pre-compressed membrane sealant |
| **Q8: Do you have any experience with precast bridge construction?** | No |
| **Q9: What are your requirements for allowing any type of loading on bridge decks?** | |
| Bridge Decks | Compressive Strength |
| What criteria do you use? | Construction loads less than 4000 lbs requires 2400 psi and anything else is full strength 4500 psi |
| **Q10: What are your requirements for allowing any type of loading on concrete pavements?** | *Respondent skipped this question* |
| **Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?** | *Respondent skipped this question* |
| **Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.** | *Respondent skipped this question* |
| **Q13: Any additional comments?** | *Respondent skipped this question* |

**#12**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Tuesday, April 04, 2017 8:00:33 AM
**Last Modified:** Wednesday, April 05, 2017 9:49:43 AM
**Time Spent:** Over a day
**IP Address:** 156.63.133.8

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Dan Miller |
| Agency | Ohio Department of Transportation |
| State / Province | Ohio |
| Email | daniel.miller@dot.ohio.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 31-40 |
| **Latex Modified Concrete** | 21-30 |
| **Silica Fume Modified Concrete** | 31-40 |
| **Ultra Thin Epoxy Overlay** | |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | |

| | |
|---|---|
| Additional Comments? | Our Supplemental Specifications (847 Scarification or 848 Hydro-demo) allows the contractor to select the method of overlay, unless it is specified in the contract. Two of our larger latex overlay projects were new construction, U.S. Grant Bridge in Portsmouth, Ohio (cable-stayed precast sections with LMC wearing surface, and the Jeremiah Morrow Bridge (segmental cast in place) with LMC wearing surface. |
| **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).** | Fiber Reinforced, Latex Modified Concrete, Silica Fume Modified Concrete |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes |

| | |
|---|---|
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>We have three types of approach slabs that may be used according to the standard drawings. Type A: Polymer modified asphalt joint system is used when there is asphalt roadway leading to concrete approach slab. Type B: Buried concrete approach slab with asphalt leading to the bridge. Contains 2" deep 1" wide hot applied joint sealer with a Type A or Type E waterproofing. Type C: Armor less joint seal with bond breaker between concrete approach slab and sleeper slab. When joined with concrete pavement there is a Type B pressure relief joint included 50' from the approach slab. The standard drawings explain better than I can with words. AS-2-15-http://www.dot.state.oh.us/Divisions/Engineering/Structures/standard/Bridges/Standard%20Drawings/AS-2-15.pdf AS-1-15-http://www.dot.state.oh.us/Divisions/Engineering/Structures/standard/Bridges/Standard%20Drawings/AS-1-15.pdf |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | we do not joint them. |
| **Q7: Expansion Joint Materials** | |
| Where is the expansion joint located? | For integrals joint is moved to roadway end. For Non-integrals we do not account for movement. |
| What is the constructed width of the expansion joint? | 3 3/8" to 1 13/16" depending on temperature. |
| What type of materials are installed in the expansion joint? | Preformed expansion joint filler/PVC Sponge, Preformed elastomeric compression joint seals, Elastomeric strip seals. |
| Include a link to the approved products list (if applicable) | http://www.dot.state.oh.us/Divisions/ConstructionMgt/Materials/Pages/QPL.aspx#joint |
| Include the specifications for expansion joint material | ASTM D2628 ODOT CMS Item 705.11. |
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>Piers, abutments, and approach slabs. This was completed 10 years ago. |
| **Q9: What are your requirements for allowing any type of loading on bridge decks?** | |
| Bridge Decks | Compressive Strength, Calendar Days/Hours, Maturity |
| What criteria do you use? | 7 day wet cure, followed by membrane cure and 650 psi beam break or cylinder breaks greater than 0.85%f'c . Maturity may be used as well and be verified according to ODOT Supplement 1098 included in this survey. |

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

| | |
|---|---|
| Concrete Pavements | Flexural Strength |
| What criteria do you use? | ODOT CMS Item 451.17 below explains our opening to traffic procedures. 451.17 Opening to Traffic. When 7 days have elapsed, the Contractor may use the completed pavement for traffic, including construction traffic. If a modulus of rupture of 600 psi (4.2 MPa) has been attained, the Contractor may open the pavement to traffic when 5 days have elapsed. If necessary to open a portion of the pavement in less than 5 days, with the proviso that the pavement will be cured for a minimum of 3 days, use a high early strength concrete composed of additional 701.04 or 701.05 cement, or non-chloride accelerating admixture to obtain a modulus of rupture of 600 psi (4.2 MPa) in 3 days or less. |

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

| | |
|---|---|
| Concrete Pavement Repairs | Flexural Strength |
| What criteria do you use? | Typically a beam break using MS or FS concrete and obtaining a break of 400 psi in either 4 or 24 hours, depending on the project requirements. We would like to get more time, but M.O.T. requirements limit the amount of closure time. |

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

| | |
|---|---|
| Specifications | http://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/1098_01162015_for_2016.PDF |

**Q13: Any additional comments?** *Respondent skipped this question*

**#13**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 03, 2017 1:34:51 PM
**Last Modified:** Wednesday, April 05, 2017 10:30:45 AM
**Time Spent:** Over a day
**IP Address:** 170.141.177.178

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**Q1: State Representative**

| | |
|---|---|
| Name | Jason Mellons |
| Agency | Tennessee DOT |
| State / Province | Tennessee |
| Email | Michael.J.Mellons@tn.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | |

| | |
|---|---|
| **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).** | Latex Modified Concrete, Polymer Modified Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes,<br><br>Please include a link to each of the standard details. http://www.tn.gov/assets/entities/tdot/attachments/STD15_032614.pdf |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | Yes |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 24 feet |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | End of pavement at the bridge ends |
| What is the constructed width of the expansion joint? | Varies; 2" @ 60' 4" @ 120 |
| What type of materials are installed in the expansion joint? | Standard list on Departments QPL (link listed below) |
| Include a link to the approved products list (if applicable) | http://www.tn.gov/tdot/topic/tdot-materialstests-research-product-evaluation-qualified-products |
| Include the specifications for expansion joint material | Listed on Standard Drawing (link listed above) |

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

Yes,

If yes, what types of applications
Accelerated Bridge Construction and the use of bridge deck panels. Precast arched structure placement.

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Calendar Days/Hours |

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

| | |
|---|---|
| Concrete Pavements | Compressive Strength, Calendar Days/Hours |

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength |

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

*Respondent skipped this question*

**Q13: Any additional comments?**

*Respondent skipped this question*

**#14**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Tuesday, April 04, 2017 9:43:31 AM
**Last Modified:** Wednesday, April 05, 2017 2:40:15 PM
**Time Spent:** Over a day
**IP Address:** 204.24.69.109

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**Q1: State Representative**

| | |
|---|---|
| Name | John Staton |
| Agency | MDOT |
| State / Province | Michigan |
| Email | statonj@michigan.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 21-30 |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 21-30 |
| **Ultra Thin Epoxy Overlay** | 61-70 |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | |
| Additional Comments? | - For Silica Fume Modified Concrete, use 100 percent virgin polypropylene collated fibers, 3/4", at 2 lb/cyd that meet the requirements of ASTM C1116, Type III. - For rehabilitation projects we would do either a Deep Concrete Overlay or Shallow Concrete Overlay, typically dependent upon the deck underside condition. Silica Fume Modified Concrete is used in both the Deep and Shallow Overlays. Latex Modified can be used in a Shallow Overlay, although due to the high cost of the material, latex is rarely used. - Epoxy Overlays are considered a preventive maintenance treatment. We typically include these in CPM jobs where the deck is in relatively good condition. |

| | |
|---|---|
| **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).** | Ultra Thin Epoxy Overlay,<br>Silica Fume Modified Concrete |

| | |
|---|---|
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No,<br><br>Please include a link to each of the standard details. http://mdotcf.state.mi.us/public/design/files/englishbridgeguides/62003.pdf http://mdotcf.state.mi.us/public/design/files/englishbridgeguides/62003A.pdf http://mdotcf.state.mi.us/public/design/files/englishbridgeguides/62003B.pdf http://mdotcf.state.mi.us/public/design/files/englishbridgeguides/62003C.pdf http://mdotcf.state.mi.us/public/design/files/englishbridgeguides/62004.pdf http://mdotcf.state.mi.us/public/design/files/englishbridgeguides/62004B.pdf http://mdotcf.state.mi.us/public/design/files/englishbridgeguides/62004C.pdf http://mdotcf.state.mi.us/public/design/files/englishstandardplans/files/R045I.pdf |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently? http://mdotcf.state.mi.us/public/design/files/englishstandardplans/files/R045I.pdf http://mdotcf.state.mi.us/public/design/files/englishbridgeguides/62004C.pdf Concrete panels have an inverted T-shaped sleeper slab. Asphalt has an L-shape for the approach slab and the other side is paved to the joint. |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | We do not do this |
| **Q7: Expansion Joint Materials** | |
| Where is the expansion joint located? | End of bridge at reference line |
| What is the constructed width of the expansion joint? | Varies based on the length of the span |
| What type of materials are installed in the expansion joint? | Elastometric Seals and Modular |
| Include a link to the approved products list (if applicable) | http://mdotcf.state.mi.us/public/design/files/englishstandardplans/spdetfiles/EJ3AB.pdf |
| Include the specifications for expansion joint material | (706.03.K) http://mdotcf.state.mi.us/public/specbook/files/2012/706%20Str%20Conc%20Construction.pdf |

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

Yes,

If yes, what types of applications
- Precast/prestressed box, I-beam and bulb tee beams are widely used in our state regardless of the need to speed up construction. They are an economical and low maintenance alternative to steel. - Decked/precast/prestressed box, I-beam and bulb tee beams have been utilized in several projects over the last 5-7 years. They are used to accelerate construction and typically are post tensioned transversely with conventional concrete closure pours. In 2016, we employed our first use of UHPC for closure pour material. - We've utilized precast box, arch, and box/arch superstructures (like ConSpan) on numerous projects with span lengths up to 48'. - We've utilized precast substructure elements to varying degrees of success. This often gets value engineered out of projects due to increased complexity and contractor finding room in the schedule for forming and cure time. - We've used precast deck panels once back in 2009. We had numerous issues with fitup and several panels had to be re-fabricated. This project had an HMA overlay that has already required replacement.

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Curing Days/Hours (ACI Nomograph) |
| What criteria do you use? | - http://mdotcf.state.mi.us/public/specbook/files/2012/701%20PCC%20for%20Structures.pdf Table 701-1B - Minimum 7-day flexural strength is 625 psi. Minimum 7-day compressive strength is 3,200 psi, - http://mdotcf.state.mi.us/public/specbook/files/2012/706%20Str%20Conc%20Construction.pdf 706.03.N.1.b - Wet cure until concrete attains at least the minimum specified 7-day flexural or compressive strength, and for at least 7 days following placement. Do not remove the wet cure system based on 7-day compressive strengths attained in less than 7 days. |

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

| | |
|---|---|
| Concrete Pavements | Flexural Strength |
| What criteria do you use? | - http://mdotcf.state.mi.us/public/specbook/files/2012/601%20PCC%20Pavement%20Mixtures.pdf Table 601-2 - Minimum flexural 3-day strength for P-NC is 550 psi. Minimum compressive 3-day strength for P-NC is 2,600 psi. Use flexural for opening to traffic and compressive strength for acceptance. |

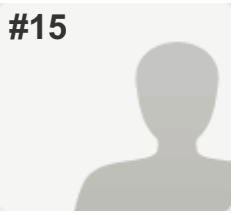
**Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?**

| | |
|---|---|
| Concrete Pavement Repairs | Flexural Strength |
| What criteria do you use? | - http://mdotcf.state.mi.us/public/specbook/files/2012/603%20Conc%20Pavt%20Restoration.pdf Table 603-1 - For Grade P-NC, in order for the pavement to be open before 72 hrs, the minimum compressive strength is 300 psi. For grades P1 and P1M, in order to open up the road after three days, the minimum flexural strength is 550 psi. |

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

| | |
|---|---|
| Specifications | (603.03.B.10) http://mdotcf.state.mi.us/public/specbook/files/2012/603%20Conc%20Pavt%20Restoration.pdf |
| Procedures | Special Provision |

**Q13: Any additional comments?** *Respondent skipped this question*




**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Friday, April 07, 2017 11:12:37 AM
**Last Modified:** Friday, April 07, 2017 11:40:55 AM
**Time Spent:** 00:28:17
**IP Address:** 164.119.50.99

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**Q1: State Representative**

| | |
|---|---|
| Name | Lieska Halsey |
| Agency | Nebraska Department of Roads |
| State / Province | Nebraska |
| Email | lieska.halsey@nebraska.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 0-10 |
| **Polymer Modified Overlay** | 21-30 |
| **Low Slump (High Cement) Overlay** | 0-10 |
| **Other (Please Specify)** | 11-20 |

| | |
|---|---|
| Additional Comments? | NDOR has eliminated the silica fume overlays and Materials & Research has designed their own concrete mix for concrete overlays. For percentage above, all 0-10 is a zero. |
| **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).** | Other (Please Specify) |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes,<br><br>Please include a link to each of the standard details. We don't have experience with precast approach slab, we have have experience with precast decks. |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | Yes |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 12 feet |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | At the grade beam |
| What is the constructed width of the expansion joint? | Depends on the span length |
| What type of materials are installed in the expansion joint? | google NE Bridge Office Policies and Procedures - |
| Include a link to the approved products list (if applicable) | http://www.roads.nebraska.gov/business-center/materials/approved-products/ |
| Include the specifications for expansion joint material | google NE Bridge Office Policies and Procedures |

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

Yes,

If yes, what types of applications
Precast deck, precast girders, precast concrete rails and precast ABC.

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

| | |
|---|---|
| Bridge Decks | Compressive Strength |
| What criteria do you use? | After the deck has been cured and met the design strength of 4000 psi. |

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

| | |
|---|---|
| Concrete Pavements | Maturity, Compressive Strength |
| What criteria do you use? | Maturity may be used on a project to allow the contractor quicker access to the pavement; otherwise, we require a compressive strength of 3000 psi. |

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

| | |
|---|---|
| Concrete Pavement Repairs | Maturity |
| What criteria do you use? | The last concrete pavement repair must have a compressive strength of 3000 psi. |

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

| | |
|---|---|
| Specifications | http://roads.nebraska.gov/media/7023/ndrc1074.pdf |
| Procedures | http://www.roads.nebraska.gov/media/6399/method-development-maturity-curve.pdf |
| Spreadsheets | Will give as requested not available at Nebraska's website. |

**Q13: Any additional comments?** *Respondent skipped this question*

**#16**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Sunday, April 09, 2017 9:44:51 AM
**Last Modified:** Monday, April 10, 2017 9:55:52 AM
**Time Spent:** Over a day
**IP Address:** 108.171.131.160

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**Q1: State Representative**

| | |
|---|---|
| Name | Paul Rowekamp |
| Agency | Minnesota DOT Bridge Office |
| State / Province | Minnesota |
| Email | paul.rowekamp@state.mn.us |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | 0-10 |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | 81-90 |
| **Other (Please Specify)** | |

| | |
|---|---|
| Additional Comments? | We construct low slump concrete wearing courses on about 30-50% of all new bridges. The remaining 50-70% are constructed with a monolithic deck using an HPC mix including polypropylene fibers. On rare occasions we use a polymer modified overlay, which is an excellent product, but is very expensive. |
| **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).** | Polymer Modified Overlay,<br>Low Slump (High Cement) Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes,<br>Please include a link to each of the standard details. Figure 5-297.227 (2 OF 2) at https://standardplans.dot.state.mn.us/StdPlan.aspx |

| | |
|---|---|
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | Yes,<br><br>If no, what is done differently?<br>See Figure 5-297.227 (2 OF 2) at https://standardplans.dot.state.mn.us/StdPlan.aspx<br>See additional info sent via email. |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 20 x 12, See Figure 5-297.228 (2 OF 2) at address above. |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | At far end of approach panel, away from the bridge. |
| What is the constructed width of the expansion joint? | 4" |
| What type of materials are installed in the expansion joint? | See spec provided in question no. 13. We will soon change list ot include several preformed closed cell rubber joint materials. |
| Include a link to the approved products list (if applicable) | List is in spec. sent via email. |
| Include the specifications for expansion joint material | See via email. |

| | |
|---|---|
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>Precast substructure components including: Precast abutment stems Wing walls Pier caps Inverted tee superstructure element Full depth precast concrete deck panels Precast box culverts Three sided bridge structures Precast arch structures |

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | Needs to obtain 100% of specified strength with minimum curing period of 7 days. See spec below.. G.1 Minimum Curing Period The Department defines the "curing period" as the time of maintaining satisfactory moisture and temperature in concrete during the period immediately following placement through the specified duration, so that hydration of the cement may continue until development of the desired properties to a sufficient degree to meet the required service life. In no case, will the concrete surface show evidence of drying which includes surface color changes during the curing period. Maintain a minimum concrete surface temperature of 40° F or greater during the curing period. If the concrete surface temperature drops below 40° F during the curing period, notify the Engineer and make adjustments to the curing to raise the surface temperature above 40° F as prescribed in the curing plan. If the concrete surface temperature drops below 40° F during the curing period, add one additional day to the minimum curing period for each day the temperature drops below 40° F. Provide additional protection as required in accordance with 2401.3.G.5, |

"Protection Against Cold Weather." The Engineer may allow some modification of the requirement for continuous curing without interruption for the purpose of setting wall or column forms on footings, but only when the Contractor protects the concrete from freezing or excessive drying during the interruption period. Resume curing at the earliest opportunity, and cure until completion of the curing period. If using heated enclosures during the curing period, vent heaters and other equipment operated within the enclosure to prevent the buildup of carbon dioxide. When the plans show a permissible construction joint, the Contractor may begin subsequent concrete placement before completion of the curing period, unless otherwise shown on the plans. Determine the minimum curing period for a given element in accordance with Table 2401-1 and the following: (1) High early concrete is not allowed to accelerate strength to aid in earlier form removal; (2) The Contractor may remove forms for curbs, sidewalks, median barrier, and barriers when the concrete can retain its shape and if weather conditions allow the start of the specified concrete finish per 2401.3.F.2.d, "Curb, Sidewalk, and Median Finish," immediately after removing the forms. All other forms are required to remain in place for at least 24 h after casting the concrete or longer if stripping the forms will damage the concrete or prevent disengaging the form ties, unless otherwise noted in Table 2401-1; (3) If forms are removed prior to the completion of the curing period, resume 100% curing coverage within 30 minutes for each formed face. The Engineer may consider revisions to the 30 minute requirement for continuous curing based on field conditions, measured evaporation rates, and the submitted curing plan in accordance with 2401.3.G.3, "Curing Plan;" and (4) Cracking the forms loose the next day is acceptable so long as the concrete surface remains moist for duration of curing period. DESIGNER NOTE: Potential higher % for slabs, CIP boxes, cantilever pier caps (modify highlighted in yellow below in Table 2401-1, if necessary) Table 2401-1 Curing Requirements for Concrete Bridge Elements For all formed and unformed concrete (Do not use for Mass Concrete) Bridge Element Minimum Curing Period Minimum Period For Form Cure Minimum Strength Required to Pull Forms, psi Minimum Strength to Apply Loads, % of Required † Method Allowed to determine in-place concrete strength Bridge superstructures, unless otherwise specified 96 hrs 24 hrs 2000 ‡ 65 Maturity or Control Cylinders Slab Span Superstructure 7 days 8 days See special provisions See special provisions Maturity or Control Cylinders Diaphragms and end webs

not a part of box girders and cast before the bridge slab 72 hrs 24 hrs 2000 ǂ 45 Maturity or Control Cylinders Pier Caps 72 hrs 72 hrs 2000 ǂ 65 Maturity or Control Cylinders Retaining Walls 72 hrs 12 hrs * Self-supporting 100 Maturity or Control Cylinders Barriers and Parapets 72 hrs - Self-supporting 45 ‖ Maturity or Control Cylinders Sections not included in superstructures, unless otherwise specified 72 hrs 24 hrs 2000 ǂ 45 Maturity or Control Cylinders Bridge Decks 7 days - - 100 - Bridge Deck Underside 7 days 8 days 2000 100 - * When weather conditions require cold weather protection in accordance with 2401.3.G.5, "Protection Against Cold Weather," increase form curing to a minimum of 24 hours. ‖ Achieve 4000 psi. prior to use as a traffic barrier. † Applied loads include but are not limited to equipment, beams, backfilling, or successive concrete placements. ǂThe Engineer will require verification of the minimum strength when air temperatures drop below 40° F during the curing period or when the mix design includes greater than 15% cement substitution. The minimum strength requirement does not apply to bulkheads and edge of deck forms. G.6.e Protection from premature loading Do not allow vehicles or equipment on the bridge slab until after completion of the curing period and minimum strength requirements of Table 2401-1. Reinforcement bar bundles or pallets may be placed on the bridge slab after 96 hours provided the loading is not greater than 1,000 lbs per 100 square ft area. After the curing period and prior to achieving deck design strength, operate equipment at speeds less than 10 mph to minimize shock waves. Restrict mixer revolution to agitation speed while on the bridge slab. Do not allow equipment with gross weight greater than 15 tons on the bridge slab for box girder and slab span bridges prior to achieving deck design strength.

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

| | |
|---|---|
| Concrete Pavements | Flexural Strength, Compressive Strength, Calendar Days/Hours, Maturity |

What criteria do you use?

O Opening Pavement to Traffic Do not open a new pavement slab to general public traffic or operate paving or other heavy equipment on it for 7 days, or until the concrete has reached a minimum flexural strength meeting the requirements of Table 2301-18, or minimum compressive strength of 3,000 psi; whichever occurs first. If the pavement joints are widened, seal the joints before operating paving or other heavy equipment and general public traffic on the pavement. Cast the field control specimens in accordance with 2461.3.G.5, “Test Methods and Specimens.” Cure the field control specimens in the same manner and under the same conditions as the pavement represented. The Engineer will test the field control specimens in accordance with 2461.3.G.5, “Test Methods and Specimens.” Table 2301 18 Minimum Strength Requirements for Opening Pavements to Construction and to General Public Traffic Slab Thickness, in Flexural Strength, psi ≤7.0 500 7.5 480 8.0 460 8.5 440 9.0 390 ≥ 9.5 350 Perform operations on new pavement as approved by the Engineer and in accordance with the following: (1) When moving on and off the pavement, construct a ramp to prevent damage to the pavement slab. (2) Protect the concrete pavement surface and joints from damage due to heavy loads or equipment in accordance with 1513, “Restrictions on Movement and Storage of Heavy Loads and Equipment.” Sweep the pavement surface free of debris prior to placing the protective material or tracked paving equipment onto the slab. (3) Operate equipment on a slab without causing damage. If damage results, suspend operations and take corrective action as approved by the Engineer. Do not operate the equipment wheels or tracks within 4 in of the slab edge. (4) When hauling aggregate and other materials across newly constructed joints, keep the pavement surface free of debris by sweeping or other method as approved by the Engineer to prevent spalling of the pavement joints. O.1 Early Opening of Pavement to Traffic For early use of the pavement as required by the Engineer, construct a section of pavement of high-early strength concrete in accordance with 2301.2.L, “Concrete Mix Design Requirements,” at important road crossings, intersections, driveway entrances, or other locations as shown on the plans or directed by the Engineer. Take precautions to satisfactorily finish, cure, and protect high-early strength concrete pavements.

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength, Calendar Days/Hours, Maturity |
| What criteria do you use? | For partial depth repairs Refer to Table 2302-2, “MnDOT Mix 3U18 Opening Times”, to determine the allowable mix adjustments to Grade 3U18 concrete. When anticipated time to opening for construction equipment or general traffic is less than 7 calendar days, and the ambient temperatures are anticipated to remain at or above 60 ≯F [15 ≯C] during the curing time, provide approved admixture as outlined in Table 2302-2. The mix design will include the admixtures solution as part of the total recommended mixing water. TABLE 2302-2 MnDOT Mix 3U18 Opening Times Anticipated Minimum Time to Opening * Concrete Mix Grade Admixture Dosage & Type Based on manufacturer’s recommended dosage rate Mix Design Responsibility Testing and Strength Required for Opening ≥ 7 calendar days 3U18 ‖ None Required 2302 None * 72 hours to 7 calendar days 3U18 ‖ Type A ‡ 2302 None * 36 hours to < 72 hours 3U18 ‖ Type A ‡ 2302 Control Cylinders as per 2302.3.B.4(c) # π 12 hours to < 36 hours 3U18 ‖ † As Needed § 2302 Control Cylinders as per 2302.3.B.4(c) # π * If at any time the ambient temperature falls below 60 ≯F [15 ≯C] during the curing time, use control specimens to determine opening times in accordance with 2302.3.B.4. ‖ The maximum slump for 3U18 mixes measured after 5 minutes is 1 inch [25 mm]. † Accelerating admixtures are not allowed when the ambient air temperature exceeds 80°F [27°C] without the approval of the Concrete Engineer. ‡ Use manufacturer’s recommended dosage rate to achieve 3000 psi [20.6 MPa] minimum compressive strength or 500 psi [3.4 MPa] flexural strength at the time of opening. # The Contractor may request to the Engineer a reduction in the number of control specimens required based on control specimen strengths and site conditions. § Use a Type A, C or E admixture in accordance with 2302.3.A and the manufacturer’s recommended dosage rate to achieve 3000 psi [20.6 MPa] minimum compressive strength or 500 psi [3.4 MPa] flexural strength at the time of opening. π Do not allow construction vehicles or general traffic on Type B repairs unless a minimum of 12 hours have elapsed and control cylinders achieve a minimum compressive strength of 3000 psi [20.6 MPa] or 500 psi [3.4 MPa] flexural strength. For full depth repairs: Refer to Table 2302-3, “Mix 3R52 and 3RHE52 Opening Requirements,” to determine the criteria for opening 3R52 and 3RHE52 concrete to traffic. Do not accelerate concrete strength gain to facilitate early strength of pavement repairs solely for construction traffic unless approved |

| | |
|---|---|
| | by the Engineer. Because of the increased rate of hardening of concrete that incorporates accelerating type admixtures, take extra precautions as necessary to ensure satisfactory finishing, curing, and protection of the concrete repairs. The Contractor assumes full responsibility for the performance of the concrete. The Engineer will determine final acceptance of the Type C repair concrete based on satisfactory field placement and performance, in accordance with 2302.3.G. “Repair Warranty.” TABLE 2302-3 Mix 3R52 and 3RHE52 Opening Requirements Anticipated Minimum Time to Opening * Concrete Mix Grade Admixture Dosage & Type Based on manufacturer’s recommended dosage rate Mix Design Responsibility Testing and Strength Required for Opening ≥ 7 calendar days 3R52 2461* ‖ Contractor None < 7 calendar days to ≥ 12 hours 3R52 3RHE52 2461* ‖ Contractor Control Cylinders as per 2302.3.B.4(c) † ‡ * Accelerating admixtures are not allowed when the ambient air temperature exceeds 80°F [27°C] without the approval of the Concrete Engineer. ‖ Use manufacturer’s recommended dosage rate to achieve 3000 psi [20.6 MPa] minimum compressive strength or 500 psi [3.4 MPa] flexural strength at the time of opening. † The Contractor may request to the Engineer a reduction in the number of control specimens required based on the results of the control specimen strengths and site conditions. ‡ Do not allow construction vehicles or general traffic on Type C repairs unless a minimum of 12 hours has elapsed and control cylinders achieve a minimum compressive strength of 3000 psi [20.6 MPa] or 500 psi [3.4 MPa] flexural strength. For dowel bar retrofit repairs: The Engineer will not permit traffic by the public or Contractor on the newly placed concrete patching material until adequate strength is achieved, according to the manufacturer's recommendations or 3000 psi [20.6 MPa] whichever is greater. |

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

| | |
|---|---|
| Specifications | http://www.dot.state.mn.us/materials/concretematurity.html |
| Procedures | http://www.dot.state.mn.us/materials/concretedocs/DRAFT_Maturity_Meter_Procedure-MnDOT_Concrete_Manual.docx |
| Spreadsheets | http://www.dot.state.mn.us/materials/concretematurity.html |

| | |
|---|---|
| **Q13: Any additional comments?** | *Respondent skipped this question* |

**#17**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 10, 2017 10:08:05 AM
**Last Modified:** Monday, April 10, 2017 10:35:59 AM
**Time Spent:** 00:27:53
**IP Address:** 168.178.122.12

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Bryan Lee |
| Agency | UDOT |
| State / Province | Utah |
| Email | bryanlee@utah.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 0-10 |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | 0-10 |
| **Other (Please Specify)** | 91-100 |

| | |
|---|---|
| Additional Comments? | Overlays for UDOT structures are Thin Bonded Polymer - 95% Polyester Concrete - 5% |
| **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).** | Other (Please Specify) |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>Abutting Concrete (approach slabs/pavement) - Flat sleeper slab Abutting Asphalt - sleeper slab with stem |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | Cast in place approach slab - not jointed, precast -25 ft length |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | At support and ends of approach slabs |
| What is the constructed width of the expansion joint? | Based on movement rating and temperature at setting. |
| What type of materials are installed in the expansion joint? | Pourable joint seal - backer rod and silicone sealant, Compression seal - elastomeric seal |
| Include a link to the approved products list (if applicable) | N/A |

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

Yes,

If yes, what types of applications
Decks/parapets, approach slabs, abutments, wingwalls, girders, footings, bent columns and caps, box culverts, three-sided culvert structures.

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Calendar Days/Hours, Curing Days/Hours (ACI Nomograph) |
| What criteria do you use? | Traffic loads - 14 days and cured. 100% of specified 28 day strength Parapets - 7 days after deck placement and 100% strength. Closure pours - 7 days and cured, 100% of 28 day strength High Early - 3 days and 100% strength. |

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

| | |
|---|---|
| Concrete Pavements | Compressive Strength |
| What criteria do you use? | 100% design strength verified by cylinders or Maturity Method AASHTO T 325 |

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength |
| What criteria do you use? | 100% design strength verified by cylinders. |

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

*Respondent skipped this question*

**Q13: Any additional comments?**

*Respondent skipped this question*

**#18**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 10, 2017 12:25:43 PM
**Last Modified:** Monday, April 10, 2017 1:08:20 PM
**Time Spent:** 00:42:37
**IP Address:** 199.168.151.87

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Don Streeter |
| Agency | NYSDOT |
| State / Province | New York |
| Email | donald.streeter@dot.ny.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | 0-10 |
| **Silica Fume Modified Concrete** | 81-90 |
| **Ultra Thin Epoxy Overlay** | 0-10 |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | 0-10 |

| | |
|---|---|
| Additional Comments? | Predominate overlay material is a silica fume modified concrete used approximately 85 to 90 % of the time with service life of 20 to 25 years. These are progressed as rehabilitations - we don't place overlay on new construction typically NY has "bare deck" policy so very little overlays are done to any new construction. Latex is making a resurgence after 25 years of no use - probably 3% or less of the overlay situations, again with approx. 20 years of expected service. Thin polymers are used maybe 3 to 5% of the time as remedial treatment with life of 7 to 10 years. Lastly use of HMA with membrane in a few rural situations, 3 to 5% with life of anywhere from 7 to 15 years. |

| | |
|---|---|
| **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).** | Silica Fume Modified Concrete |

| | |
|---|---|
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | *Respondent skipped this question* |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | *Respondent skipped this question* |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | *Respondent skipped this question* |
| **Q7: Expansion Joint Materials** | *Respondent skipped this question* |
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>historic process is use of adjacent box beams and bulb-T beams with structural cast-in-place deck. Now seeing more precast deck panels with use of UHPC for closure between the panels. Some newer designs use NEXT-Beam structures without cast-in-place deck needed or just a non-structural overlay. Numerous other "1 time" trial applications exist. |

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Curing Days/Hours (ACI Nomograph), Maturity |
| What criteria do you use? | Acceptance decision is predominately use of curing days before opening. We're seeing more and more applications needing to be opened ASAP so use of maturity and/or cylinder compressive strengths are being specified in these applications. |

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

| | |
|---|---|
| Concrete Pavements | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | compressive strength of 2500 psi for High-Early Strength mixtures, 10-15 days duration for conventional pavement mixtures depending on the time of year (environmental conditions) at the time of construction. |

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | Same as above. |

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

| | |
|---|---|
| Specifications | see section 502 at https://www.dot.ny.gov/main/business-center/engineering/specifications/english-spec-repository/2017_1_specs_usc_tc.pdf |

**Q13: Any additional comments?**

I had requested input from our Structures office and I'm told they responded directly to the survey answering questions 2 thru 9... They forwarded a "copy" to me and it was blank. I'll answer what I can and if you received 2 responses assume theirs to be more accurate. Let me know if you need anything else. Thanks - Don

**#19**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 10, 2017 12:18:12 PM
**Last Modified:** Monday, April 10, 2017 1:15:31 PM
**Time Spent:** 00:57:19
**IP Address:** 143.100.53.12

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**Q1: State Representative**

| | |
|---|---|
| Name | Jason Waters |
| Agency | Georgia DOT |
| State / Province | Georgia |
| Email | jwaters@dot.ga.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 41-50 |
| **Latex Modified Concrete** | 21-30 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 21-30 |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | 0-10 |
| **Other (Please Specify)** | 0-10 |

**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).**

Fiber Reinforced, Ultra Thin Epoxy Overlay

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

Yes,

Please include a link to each of the standard details.
http://mydhttp://mydocs.dot.ga.gov/info/gdotpubs/ConstructionStandardsAndDetails/9017p.pdf
http://mydocs.dot.ga.gov/info/gdotpubs/ConstructionStandardsAndDetails/9017r.pdf

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

No,

If no, what is done differently?
We use a recessed approach slab when adjoining to asphalt pavement.

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

30'

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | Between the approach slab and the bridge deck |
| What is the constructed width of the expansion joint? | 3/4" |
| What type of materials are installed in the expansion joint? | Preformed Foam joint filler, silicone |

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

Yes,

If yes, what types of applications
We have an Accelerated Bridge Construction(ABC) project that is under construction now. We also use precast bridges with precast caps, deck panels and barrier wall on off-system routes.

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | AF. Expose New Concrete to Loads Prohibit dead or live loads during or after construction except as described in this section. If using high early strength concrete, the Engineer may reduce time limitations if the concrete develops adequate strength. 1. Dead Loads on the Substructure After pouring footings, do not begin work on columns or piers for at least 12 hours. After pouring columns, do not begin cap construction for at least 24 hours. Do not place beams on caps or place falsework and forming for concrete T-Beam construction before the cap concrete reaches a minimum strength of 2,500 psi (17 MPa). 2. Dead Loads on the Superstructure If necessary, stockpile construction materials on decks within a complete unit (a simple span or continuous or cantilever unit) if the following conditions exist: The deck concrete of the complete unit reaches its 28-day cylinder strength. The deck concrete is at least 10 days old. The curbs are at least 5 days old. The Engineer must approve the location, height, and spread of the loads. On composite-design bridges (those that have prestressed concrete beams or steel beams with shear connectors), do not pour curbs, parapets, or sidewalks until the deck concrete reaches a minimum strength of 1,500 psi (10 MPa) or is at least 3 days old. |

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

| | |
|---|---|
| Concrete Pavements | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | N. Open Pavement to Traffic Wait to open the pavement slab to traffic, except for joint sawing vehicles, until the concrete is 14 days old unless representative compressive tests show that the slab has a compressive strength of 2,500 psi (15 MPa). Cure compressive test specimens used for traffic opening as near as possible to the roadway. |

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | H. Opening to Traffic Schedule slab replacements so that the concrete will have a curing time of at least four hours. Complete the work and open the lanes to traffic before sunset the day it is placed, unless authorized otherwise. The Engineer may require a longer curing period, mix design adjustments, or other corrective action to ensure sufficient concrete strength development before opening to traffic. |

| | |
|---|---|
| **Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.** | *Respondent skipped this question* |
| **Q13: Any additional comments?** | *Respondent skipped this question* |

**#20**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 10, 2017 1:26:01 PM
**Last Modified:** Monday, April 10, 2017 1:32:13 PM
**Time Spent:** 00:06:11
**IP Address:** 205.174.143.2

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Drew Waldrop |
| Agency | ALDOT |
| State / Province | AL |
| Email | waldropa@dot.state.al.us |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | 11-20 |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | |
| **Polymer Modified Overlay** | 81-90 |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | |

| | |
|---|---|
| Additional Comments? | Bridge deck overlays represent a tiny fraction of our construction work & budget. |
| **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).** | Latex Modified Concrete, Polymer Modified Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes,<br><br>Please include a link to each of the standard details. http://alletting.dot.state.al.us/Docs/Standard_Drawings/2017%20English/STDUS17_0100.pdf |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>Concrete pavement: crown of bridge end slab matches that of pavement @ pavement end, that of bridge and bridge end, transitions over the length of the slab.<br>Asphalt pavement: crown of bridge end slab matches that of bridge, pavement transitions to match over no more than 100 feet. |

| | |
|---|---|
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | No transverse joints; base dimension of 12'x20' (may be longer depending on skew) |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | At pavement end of bridge end slab |
| What is the constructed width of the expansion joint? | Varies by bridge design |
| What type of materials are installed in the expansion joint? | Materials meeting AASHTO M 153 or M 213 |
| Include a link to the approved products list (if applicable) | N/A |
| Include the specifications for expansion joint material | Section 832 http://conweb.dot.state.al.us/Specification%20Section/Specifications%20Library/2012_ALDOT_Spec_Book.pdf |

| | |
|---|---|
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>Currently constructing a bridge in Auburn using precast columns. Original design was to include precast caps as well, but design issue forced us to abandon that. Also developing a project using double-tee prestress girders & UHPC. |

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

| | |
|---|---|
| Bridge Decks | Compressive Strength |
| What criteria do you use? | No traffic or other superimposed loads may be put on the bridge deck until 4,000 psi is reached. |

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

| | |
|---|---|
| Concrete Pavements | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | Open to light construction traffic at 3,000 psi, not before 72 hours. Open to all traffic at 4,000 psi, not before 7 days. |

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | No traffic for at least 6 hours, 3,000 psi required |

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

| | |
|---|---|
| Procedures | http://www.dot.state.al.us/mtweb/Testing/testing_manual/pdf/Pro/ALDOT425.pdf |
| Spreadsheets | http://www.dot.state.al.us/mtweb/Testing/testing_manual/frm/BMT/BMT188.xlsm |

| | |
|---|---|
| **Q13: Any additional comments?** | *Respondent skipped this question* |

**#21**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 10, 2017 1:26:26 PM
**Last Modified:** Monday, April 10, 2017 1:34:27 PM
**Time Spent:** 00:08:00
**IP Address:** 165.234.252.170

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Clayton Schumaker |
| Agency | NDDOT |
| State / Province | North Dakota |
| Email | cschumaker@nd.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | 91-100 |
| **Other (Please Specify)** | |

| | |
|---|---|
| **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).** | Low Slump (High Cement) Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | Yes |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 20' |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | In the roadway section |
| What is the constructed width of the expansion joint? | 1" |
| What type of materials are installed in the expansion joint? | silicone |
| Include a link to the approved products list (if applicable) | No approved products list |
| Include the specifications for expansion joint material | https://www.dot.nd.gov/divisions/environmental/docs/supspecs/2014StandardSpecifications.pdf |

| | |
|---|---|
| **Q8: Do you have any experience with precast bridge construction?** | No |

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

| | |
|---|---|
| Bridge Decks | Compressive Strength |
| What criteria do you use? | f'c = 4000 psi |

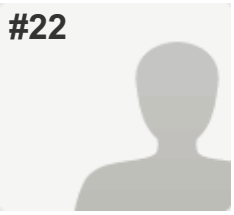
**Q10: What are your requirements for allowing any type of loading on concrete pavements?**

| | |
|---|---|
| Concrete Pavements | Flexural Strength, Compressive Strength |
| What criteria do you use? | Either 3000 psi compressive or 550 psi flexural. |

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength |
| What criteria do you use? | 3000 psi compressive. |

| | |
|---|---|
| **Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.** | *Respondent skipped this question* |
| **Q13: Any additional comments?** | *Respondent skipped this question* |



**#22**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 10, 2017 2:12:02 PM
**Last Modified:** Monday, April 10, 2017 2:30:55 PM
**Time Spent:** 00:18:52
**IP Address:** 163.191.13.70

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | James Krstulovich |
| Agency | Illinois DOT |
| State / Province | Illinois |
| Email | James.Krstulovich@illinois.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 81-90 |
| **Silica Fume Modified Concrete** | 11-20 |
| **Ultra Thin Epoxy Overlay** | |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | 0-10 |

| | |
|---|---|
| Additional Comments? | Silica fume overlays have fallen out of favor with most Districts as they have gained experience with latex-modified overlays. We are just getting started adding synthetic fibers to our bridge deck overlay mixes, but one District has so far had good enough constructability experience with them that all of its deck overlays for the foreseeable future will include them. Other PCC type deck overlays we allow specify fly ash or slag cement: http://www.idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Bridges/Bridge-Special-Provisions/GBSP72.pdf Our southern two Districts use hot-mix asphalt overlays on bridge decks. |

| | |
|---|---|
| **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).** | Latex Modified Concrete |

| | |
|---|---|
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes,<br><br>Please include a link to each of the standard details. There are 18 variations of precast Bridge Approach Slabs and another 18 variations of cast-in-place Bridge Approach Slabs; their file names begin with "BA" and can be found at: http://www.idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Bridges/CADD/Superstructure/Bridge%20Approach%20Slabs-Precast.pdf |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | Yes |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | max. 6-ft wide and min. 3-ft wide |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | For integral structures, it is at the end of the Bridge Approach Slab between it and the Pavement Connector. |
| What is the constructed width of the expansion joint? | Variable; it is a function of the installation temperature and joint manufacturer. |
| What type of materials are installed in the expansion joint? | Preformed elastomeric seals, neoprene expansion joint materials, fabric reinforced elastomeric |
| Include the specifications for expansion joint material | Start with Section 520 (and then see associated articles, e.g., 1028, 1052, 1053.02, 1053.03, etc.) of our Standard Specifications: 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 |

| | |
|---|---|
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>I am aware of only one precast deck panel bridge project completed so far; a short report on it can be found here: http://www.extension.iastate.edu/registration/events/UHPCPapers/UHPC_ID77.pdf |

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | Superimposed loads, either live or dead, shall not be applied until the concrete has the required flexural* strength (675 psi @ 14 days) and the curing period is completed (7 days). * A compressive strength established through field testing to be equivalent may be used if approved by the Engineer. |

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

| | |
|---|---|
| Concrete Pavements | Flexural Strength, Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | When the curing period (3 days) has been completed, the Engineer will determine when the pavement shall be opened to traffic. The earliest will be when a flexural strength of 650 psi or a compressive strength of 3500 psi is attained. (Without tests, the pavement will not be opened sooner than 14 days, or 28 days when fly ash and/or slag is used.) |

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

| | |
|---|---|
| Concrete Pavement Repairs | Flexural Strength, Compressive Strength, Maturity |
| What criteria do you use? | Class PP-1: open once 600 psi flexural or 3200 psi compressive attained Classes PP-2 thru PP-5: open once 250 psi flexural or 1600 psi compressive attained; and verify 600 psi flex./3200 psi comp. is attained in the time specified for the class of concrete (24, 16, 8, and 4 hrs, respectively) Regarding maturity, according to our opening to traffic specs for patches: With the approval of the Engineer, concrete strength may be determined according to Illinois Modified AASHTO T 325. |

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

| | |
|---|---|
| Procedures | For IL Mod. AASHTO T 325 & IL Mod. ASTM C 1074, see our Manual of Test Procedures for Materials: http://www.idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Materials/testproceduresmanual2017.pdf |

**Q13: Any additional comments?** *Respondent skipped this question*

**#23**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 10, 2017 4:10:48 PM
**Last Modified:** Monday, April 10, 2017 4:45:18 PM
**Time Spent:** 00:34:30
**IP Address:** 168.166.124.100

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Brett Trautman |
| Agency | Missouri DOT |
| State / Province | Missouri |
| Email | Brett.Trautman@modot.mo.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 51-60 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 0-10 |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | 21-30 |

**Other (Please Specify)**

| | |
|---|---|
| Additional Comments? | The Missouri DOT has developed a Job Special Provision for using CSA cement in a bridge deck overlay. Have constructed over twenty bridge decks. Have not placed one in a couple of years. |

| | |
|---|---|
| **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).** | Latex Modified Concrete,<br>Low Slump (High Cement) Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Yes,<br>Please include a link to each of the standard details. Section 504.00J - Concrete Approach Pavement (3 sheets): http://www.modot.org/business/standards_and_specs/documents/Std_Plans_10_01_2016.pdf |

| | |
|---|---|
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | Yes,<br><br>If no, what is done differently?<br>Note: On Missouri's minor routes approach concrete pavement not utilized when an asphalt pavement is involved. |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | 15 feet |
| **Q7: Expansion Joint Materials** | |
| Where is the expansion joint located? | Between the approach pavement and the mainline pavement centered over the concrete sill (i.e. sleeper slab). |
| What is the constructed width of the expansion joint? | 2 inches |
| What type of materials are installed in the expansion joint? | Preformed Fiber Expansion Joint Filler or Preformed Sponge Rubber Expansion Joint Filler |
| Include a link to the approved products list (if applicable) | Section 1057: http://www.modot.org/business/materials/pdf/PAL/Preformed%20Fiber%20Expansion%20Joint%20Material.pdf |
| Include the specifications for expansion joint material | Section 1057: http://www.modot.org/business/standards_and_specs/2016%20Missouri%20Standard%20Specific%20-%20MHTC%20(Jul%202016).pdf |
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>Precast panels supported by pre-stress/precast girder (NU & I). |
| **Q9: What are your requirements for allowing any type of loading on bridge decks?** | |
| Bridge Decks | Compressive Strength, Calendar Days/Hours, Maturity |
| What criteria do you use? | - Light material and equipment under 1,000 pounds: At least 24 hours after placement and doesn't damage texturing or interfere with wet curing - Vehicles, material, and equipment under 4,000 pounds: At least 3,200 psi - Placement of barrier walls: Minimum design strength and at least 7 days - Open to all traffic: Minimum design strength and at least 10 days - Sections 703.3.6.1.5 & 703.3.6.1.6 of the Standard Specifications |
| **Q10: What are your requirements for allowing any type of loading on concrete pavements?** | |
| Concrete Pavements | Compressive Strength, Maturity |
| What criteria do you use? | - Low volume, light construction traffic: At least 2,500 psi - Open to all types of traffic: At least 3,000 psi and all joints sawed - Section 502.9 of the Standard Specifications |

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

| | |
|---|---|
| Concrete Pavement Repairs | Compressive Strength, Calendar Days/Hours, Maturity |
| What criteria do you use? | Partial Depth Repairs - At least 2 hours after placement or the time recommended by the manufacturer - At least 1,600 psi - Section 613.20.3.5 of the Standard Specifications Full Depth repairs - At least 2,000 psi - Section 613.10.2.4.3 of the Standard Specifications |

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

| | |
|---|---|
| Specifications | Section 507: http://www.modot.org/business/standards_and_specs/2016%20Missouri%20Standard%20Specific%20-%20MHTC%20(Jul%202016).pdf |

**Q13: Any additional comments?** *Respondent skipped this question*

**#24**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Tuesday, April 11, 2017 7:05:16 AM
**Last Modified:** Tuesday, April 11, 2017 8:08:30 AM
**Time Spent:** 01:03:14
**IP Address:** 108.59.48.4

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Michael Nelson |
| Agency | INDOT |
| State / Province | IN |
| Email | mnelson@indot.in.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | 51-60 |
| **Silica Fume Modified Concrete** | 0-10 |
| **Ultra Thin Epoxy Overlay** | 31-40 |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | |
| Additional Comments? | INDOT expects the percentage of silica fume overlays to increase in the coming years. |

| | |
|---|---|
| **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).** | Ultra Thin Epoxy Overlay,<br>Silica Fume Modified Concrete,<br>Latex Modified Concrete |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | Currently not jointed |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | Currently between bridge and approach, this is changing |
| What type of materials are installed in the expansion joint? | varies |

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

No,

If yes, what types of applications
INDOT is just beginning the process of designing a UHPC deck.

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

| | |
|---|---|
| Bridge Decks | Calendar Days/Hours |
| What criteria do you use? | INDOT still uses flexural strength to determine when loads can be applied. However, bridge decks also require a minimum of 7 days wet cure. |

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

| | |
|---|---|
| Concrete Pavements | Flexural Strength |
| What criteria do you use? | INDOT requires 550 psi for opening to traffic for new pavement. |

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

| | |
|---|---|
| Concrete Pavement Repairs | Flexural Strength |
| What criteria do you use? | INDOT requires 300 psi flexural for opening to traffic for patches less than/equal to 15 feet in length and 425 psi for patches greater than 15 feet in length. |

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

| | |
|---|---|
| Specifications | 501.23 & 506.11 |
| Procedures | http://www.in.gov/indot/div/mt/itm/pubs/402_testing.pdf |
| Spreadsheets | link not available |

**Q13: Any additional comments?**

Link to standard specs:
http://www.in.gov/dot/div/contracts/standards/book/sep15/sep.htm

**#25**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Tuesday, April 11, 2017 1:45:47 PM
**Last Modified:** Tuesday, April 11, 2017 1:53:56 PM
**Time Spent:** 00:08:08
**IP Address:** 161.7.59.18

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Paul Bushnell/David Johnson |
| Agency | Montana Department of Transportation |
| State / Province | Montana |
| Email | pbushnell@mt.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | |
| **Silica Fume Modified Concrete** | 31-40 |
| **Ultra Thin Epoxy Overlay** | 51-60 |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | |
| Additional Comments? | both overlay methods have been successful. |

| | |
|---|---|
| **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).** | Silica Fume Modified Concrete, Ultra Thin Epoxy Overlay |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | Please include a link to each of the standard details. We use very few integral abutments (< 5%). Approach slabs are specific to the project and may be floating or pinned to the abutment depending on expansion requirements. |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | If no, what is done differently? we use very few integral abutments (< 5%). Approach slabs are specific to the project and may be floating or pinned to the abutment depending on expansion requirements. |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | We have not used jointed panels |

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | Between backwall and approach panel |
| What is the constructed width of the expansion joint? | generally, 1-inch |
| What type of materials are installed in the expansion joint? | one-component, self-leveling, polyurethane-base material |

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

Yes,

If yes, what types of applications
Limited precast deck panels but extensive use of precast concrete voided slabs and deck girders

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

| | |
|---|---|
| Bridge Decks | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | 552.03.20 Opening to Traffic Open concrete deck bridges to traffic only with the Project Manager's approval. Do not open concrete bridge decks to traffic when the air temperature during the cure period is 50 °F (10 °C) or higher, until one of the following is met: 1. Twenty-one days after placing concrete unless standard strength test results indicate more time is required; or 2. Test results on field-cured test cylinders indicate that at least 90% of the required minimum strength has been attained. Two cylinders constitute a test, with the test strength being the average of the strengths of the 2 individual cylinders. The Project Manager will determine the opening date when the ambient temperature during the cure period has been lower than 50 °F (10 °C). |

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

| | |
|---|---|
| Concrete Pavements | Flexural Strength, Compressive Strength, Maturity |
| What criteria do you use? | Do not permit traffic or Contractor equipment, excluding joint sawing and sealing equipment, on the concrete until one of the following test results indicate the concrete has developed sufficient strength. A. Flex Beam Method. Prepare the concrete flex beams in accordance with MT 101 and test for modulus of rupture using AASHTO T 97. One test set consists of 3 beams. Take the concrete for the test beams from different concrete batches for each 2,500 square yards (2,100 m2) of concrete pavement and make at least 2 sets per day. Test the beam sets for modulus of rupture. Cure the test beams under the same environmental conditions as the pavement they represent. The pavement, represented by the beams, may be opened to traffic when the average modulus of rupture of the set exceeds 350 psi (2,415 kPa) and no individual beam's modulus of rupture is less than 300 psi (2,070 kPa). The Contractor may select the time for testing the beams. Test |

| | |
|---|---|
| | the flex beams on or near the project, using Contractor furnished equipment and with a Department Inspector witnessing the tests. Include all costs to make, cure and test the flex beams in the contract unit price for PCCP. B. Maturity Meter Method. Prepare concrete flex beams or compressive test cylinders to validate the maturity meter performance curves. Furnish the Project Manager the maturity-strength relationship and maturity curves along with supporting data for verification. Maturity-strength relationship must indicate compressive strengths of 2500 psi or greater. Develop the maturity meter index curves before construction has commenced. Determine the time for testing flex beams. Furnish suitable testing equipment. The pavement may be opened to traffic and construction equipment, with Project Manager's approval, when the maturity meter readings reflect target values have been met. Furnish all equipment, including maturity meter, thermocouples, wire, and a qualified technician to monitor the maturity meter system. C. Concrete Test Cylinder Method. Prepare concrete test cylinders according to MT 101 and MT 105, and test for compressive strength according to AASHTO T 22. Make a minimum of one set of three compressive test cylinders, sampled from random locations, for each 2,500 square yards (square meters) of concrete pavement but not less than two sets per day. Test compressive test cylinders in sets of three for compressive strength. Cure test cylinders under the same conditions as the pavement they represent. The pavement may be opened to traffic and construction equipment, with Project Manager's approval, when the average compressive strength of a set of test cylinders is 2500 psi (17,237 kPa) or greater with no single test less than 2,000 psi (13,790 kPa). Determine the time for testing cylinders. Furnish suitable equipment and test compressive cylinders on or near the project. |

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

| | |
|---|---|
| Concrete Pavement Repairs | Flexural Strength, Compressive Strength, Maturity |
| What criteria do you use? | Do not permit traffic or Contractor equipment, excluding joint sawing and sealing equipment, on the concrete until one of the following test results indicate the concrete has developed sufficient strength. A. Flex Beam Method. Prepare the concrete flex beams in accordance with MT 101 and test for modulus of rupture using AASHTO T 97. One test set consists of 3 beams. Take the concrete for the test beams from different concrete batches for each 2,500 square yards (2,100 m2) of concrete pavement and make at least 2 sets per day. Test the |

| | |
|---|---|
| | beam sets for modulus of rupture. Cure the test beams under the same environmental conditions as the pavement they represent. The pavement, represented by the beams, may be opened to traffic when the average modulus of rupture of the set exceeds 350 psi (2,415 kPa) and no individual beam's modulus of rupture is less than 300 psi (2,070 kPa). The Contractor may select the time for testing the beams. Test the flex beams on or near the project, using Contractor furnished equipment and with a Department Inspector witnessing the tests. Include all costs to make, cure and test the flex beams in the contract unit price for PCCP. B. Maturity Meter Method. Prepare concrete flex beams or compressive test cylinders to validate the maturity meter performance curves. Furnish the Project Manager the maturity-strength relationship and maturity curves along with supporting data for verification. Maturity-strength relationship must indicate compressive strengths of 2500 psi or greater. Develop the maturity meter index curves before construction has commenced. Determine the time for testing flex beams. Furnish suitable testing equipment. The pavement may be opened to traffic and construction equipment, with Project Manager's approval, when the maturity meter readings reflect target values have been met. Furnish all equipment, including maturity meter, thermocouples, wire, and a qualified technician to monitor the maturity meter system. C. Concrete Test Cylinder Method. Prepare concrete test cylinders according to MT 101 and MT 105, and test for compressive strength according to AASHTO T 22. Make a minimum of one set of three compressive test cylinders, sampled from random locations, for each 2,500 square yards (square meters) of concrete pavement but not less than two sets per day. Test compressive test cylinders in sets of three for compressive strength. Cure test cylinders under the same conditions as the pavement they represent. The pavement may be opened to traffic and construction equipment, with Project Manager's approval, when the average compressive strength of a set of test cylinders is 2500 psi (17,237 kPa) or greater with no single test less than 2,000 psi (13,790 kPa). Determine the time for testing cylinders. Furnish suitable equipment and test compressive cylinders on or near the project. |
| **Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.** | *Respondent skipped this question* |
| **Q13: Any additional comments?** | *Respondent skipped this question* |

**#26**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Wednesday, April 12, 2017 1:03:47 PM
**Last Modified:** Wednesday, April 12, 2017 1:27:47 PM
**Time Spent:** 00:23:59
**IP Address:** 204.64.21.50

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Kevin Pruski |
| Agency | Texas Department of Transportation |
| State / Province | Texas |
| Email | kevin.pruski@txdot.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | |
| **Latex Modified Concrete** | 31-40 |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | 31-40 |
| **Polymer Modified Overlay** | |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | 31-40 |

| | |
|---|---|
| Additional Comments? | To provide a percentage is very difficult. The common practice when the entire inventory of bridge decks is included, the actual percentage of bridge decks with overlays (other than asphaltic), is less than 1%. Thus, the use of overlays with the TxDOT system is very small. The current practice is to use an equal percentage of multi-layer polymer, latex concrete, and standard concrete overlays. Dense (or low slump high cement) concrete overlays are no longer specified. |
| **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).** | Latex Modified Concrete, Ultra Thin Epoxy Overlay, Other (Please Specify) |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No, Please include a link to each of the standard details. We do not commonly utilize integral abutments. |

| | |
|---|---|
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br>If no, what is done differently?<br>A relief joint is provided for concrete pavement. |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | Continuously reinforced |
| **Q7: Expansion Joint Materials** | |
| Where is the expansion joint located? | At Abutment and end of Approach Slab |
| What is the constructed width of the expansion joint? | 1 1/2" |
| What type of materials are installed in the expansion joint? | Silicone, preformed neoprene |
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br>If yes, what types of applications<br>Not sure what is meant. TxDOT predominantly utilizes precast members in combination with cast in place concrete. The use of full depth precast deck panels and precast concrete panels is very limited. |
| **Q9: What are your requirements for allowing any type of loading on bridge decks?** | |
| Bridge Decks | Compressive Strength |
| What criteria do you use? | Look at Item 422 in the Standard Specifications. ftp://ftp.dot.state.tx.us/pub/txdot-info/des/spec-book-1114.pdf |
| **Q10: What are your requirements for allowing any type of loading on concrete pavements?** | |
| Concrete Pavements | Flexural Strength, Calendar Days/Hours, Maturity |
| What criteria do you use? | Look at Item 360 in the Standard Specifications. ftp://ftp.dot.state.tx.us/pub/txdot-info/des/spec-book-1114.pdf |
| **Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?** | |
| Concrete Pavement Repairs | Flexural Strength, Calendar Days/Hours, Maturity |
| What criteria do you use? | Look at Item 361 in the Standard Specifications.<br>Look at Item 360 in the Standard Specifications. |
| **Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.** | |
| Specifications | Look at Item 360 in the Standard Specifications. |
| Procedures | Article 360.4.11.4.2 |
| **Q13: Any additional comments?** | *Respondent skipped this question* |

**#27**

**COMPLETE**

**Collector:** Web Link 1 (Web Link)
**Started:** Monday, April 24, 2017 2:22:55 PM
**Last Modified:** Monday, April 24, 2017 2:35:30 PM
**Time Spent:** 00:12:34
**IP Address:** 130.39.255.10

PAGE 1

**Q1: State Representative**

| | |
|---|---|
| Name | Amar Raghavendra |
| Agency | Louisiana DOT |
| State / Province | Louisiana |
| Email | amar.raghavendra@la.gov |

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

| | Percentage |
|---|---|
| **Fiber Reinforced** | 0-10 |
| **Latex Modified Concrete** | 51-60 |
| **Silica Fume Modified Concrete** | |
| **Ultra Thin Epoxy Overlay** | 11-20 |
| **Polymer Modified Overlay** | 0-10 |
| **Low Slump (High Cement) Overlay** | |
| **Other (Please Specify)** | |

| | |
|---|---|
| **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).** | Fiber Reinforced, Latex Modified Concrete |
| **Q4: Do you use the same approach panel details for integral abutment (end bent) vs. non-integral abutment (end bent) bridges?** | No,<br><br>Please include a link to each of the standard details. Please go to Louisiana DOT's bridge design website to request approach slab standard details. |
| **Q5: Do you use the same approach panel details when abutting concrete vs. abutting asphalt pavement?** | No,<br><br>If no, what is done differently?<br>Use same cast-in-place approach slab details, but connections are different. Please go to Louisiana DOT's bridge design website to request approach slab standard details. |
| **Q6: If the approach panels are jointed, what is the maximum panel size?** | No precast panels allowed. Use cast-in-place approach slab (40' long for filled section and 20' long for cut section) |

| | |
|---|---|
| **Q7: Expansion Joint Materials** | *Respondent skipped this question* |
| **Q8: Do you have any experience with precast bridge construction?** | Yes,<br><br>If yes, what types of applications<br>Precast piles, precast girders |
| **Q9: What are your requirements for allowing any type of loading on bridge decks?** | |
| Bridge Decks | Compressive Strength, Calendar Days/Hours |
| What criteria do you use? | Design for LADV-11 (Louisiana Design Vehicle Live Load 2011 model, see Louisiana DOT's bridge design and evaluation manual) |
| **Q10: What are your requirements for allowing any type of loading on concrete pavements?** | |
| Concrete Pavements | Compressive Strength, Maturity |
| **Q11: What are your requirements for allowing any type of loading on concrete pavement repairs?** | |
| Concrete Pavement Repairs | Compressive Strength, Maturity |
| **Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.** | *Respondent skipped this question* |
| **Q13: Any additional comments?** | *Respondent skipped this question* |

**#28**

**COMPLETE**

*Answers Entered Manually*

**Collector:** Web Link - Manual Entry 1 (Web Link)
**Started:** Tuesday, May 09, 2017 1:16:21 PM
**Last Modified:** Tuesday, May 09, 2017 1:21:49 PM
**Time Spent:** 00:05:28
**IP Address:** 108.171.131.160

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**Q1: State Representative**

| | |
|---|---|
| Name | Mehdi Parvini |
| Agency | Caltrans |
| State / Province | California |
| Email | mehdi.parvini@dot.ca.gov |

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

*Respondent skipped this question*

**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).**

Other (Please Specify)

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

Please include a link to each of the standard details.
It depends. Freeway applications, structure approach slab is 30ft long about 1ft deep with top and bottom reinforcement.

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

No

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

*Respondent skipped this question*

**Q7: Expansion Joint Materials**

| | |
|---|---|
| Where is the expansion joint located? | It varies |
| What is the constructed width of the expansion joint? | It depends on movement rating |
| What type of materials are installed in the expansion joint? | It varies. Most common are shown in the Standard Plans. |

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

Yes,

If yes, what types of applications
We have built with precast girders, decks, abutment, columns and piles.

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

| | |
|---|---|
| What criteria do you use? | Can be strength and time both. |

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

| | |
|---|---|
| What criteria do you use? | Can be strength and time both. |

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

| | |
|---|---|
| What criteria do you use? | Can be strength and time both. |

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| **Q12: Please attach a link to your specifications/procedures and any spreadsheets for concrete maturity.** | *Respondent skipped this question* |
| **Q13: Any additional comments?** | *Respondent skipped this question* |

1. What type of bridge deck overlays do you routinely construct?
    a. Fiber reinforced- Concrete deck overlays contain polyolefin fibers, 1lb/cy micro and 3lb/cy macro and also require a minimum of 3/4 gal/cy of SRA and must have a 28day shrinkage value 0.032% or less.
    b. Latex Modified Concrete
    c. Silica Fume Modified Concrete
    d. Ultra Thin Epoxy Overlay
    e. Polymer Modified Overlay
    f. Low Slump (High Cement) Overlay aka. "Iowa Low Slump"
    g. Other (please specify)-we routinely place polyester concrete deck overlays.
2. Do you have a preferred type of bridge deck overlay?
    a. Same answers as #1 above- polyester concrete
3. Do you see a decrease in reflective cracking with one type of overlay vs. another? Select overlay you have had best success with
    a. Same answers as #1 above- polyester concrete overlays are performing very well.
4. What is your standard for approach panels? It depends. Freeway applications, structure approach slab is 30ft long about 1ft deep with top and bottom reinforcement.
5. Do you put joints in your approach panels? No What is the maximum panel size?
6. Do you tie the approach panel to the pavement, the bridge, neither, it depends?
    a. Pavement no
    b. Bridge yes
    c. Neither
    d. It Depends
7. What is the constructed width of the expansion joint you use? It depends on the movement rating.
8. Where is the expansion joint located? It varies.
9. Is this different for asphalt and concrete pavements? No.
10. What type of materials do you install in the expansion joint? It varies. Most common are shown in the Standard Plans.
11. What is your experience with precast bridge construction? We have built with precast girders, decks, abutment, columns and piles.
12. What are your requirements for opening a bridge deck to any sort of loading?
    a. Strength
    b. Time
    c. Both It depends but it can be both.
13. What are your requirements for opening a concrete pavement to any sort of loading?
    a. Same answers as #12 Both.
14. What are your requirements for opening a concrete pavement repair to any sort of loading?
    a. Same answers as #12 Time.
15. Do you require/accept maturity for opening or form removal? No.
    a. Structures
    b. Pavements
    c. Concrete Repairs