

#1

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Wednesday, March 10, 2021 1:29:56 PM
Last Modified: Wednesday, March 10, 2021 2:24:07 PM
Time Spent: 00:54:10
IP Address: 108.59.55.248

Page 1

Q1

Your contact information:

Name	Michael Nelson
State	IN
Email Address	mnelson@indot.in.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)**Polyester Concrete****Q3**

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

Standard (Used on 5 or more projects)**Q4**

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)**Q5**

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

Standard (Used on 5 or more projects),

Other (please specify):

INDOT's specification for partial depth joint repairs allows for the use of rapid setting patch materials. Some jobs have been constructed exclusively with FasTrac 246 by Western Materials

Q6

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

Yes,

If yes, please explain:

INDOT routinely uses volumetric mixers for LMC and LMC-VE bridge deck overlays. We intended to pilot a project using CSA (Rapid Set) cement for PCCP patching via volumetric mixers. However, we have not successfully bid a contract due to logistic concerns and the fact that there is only one primary subcontractor in the state that utilizes volumetric mixers.

Q7

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

Curing

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Slump,

Compressive Strength,

Flexural Strength,

If yes or other, please explain::

When these products are used for bridge repairs there is no field testing required. For partial depth joint repairs on PCCP they are tested for slump and strength.

Q9

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

Freeze-Thaw,

Shrinkage,

Strength,

If yes or other, please explain::

Products on the qualified materials list of Rapid Setting Patching Materials must undergo a field evaluation with a minimum of one year exposure prior to being placed onto the list. F-T, Shrinkage and strength must all meet minimum requirements per the data provided by the manufacturer prior to the evaluation. However, the field performance is only based on observation.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

No

Q11

Do you allow calcium chloride in any patching repair materials?

Yes,

If yes, please provide additional information.:
INDOT's standard spec allows calcium chloride to be used in full-depth PCCP patches up to 15 LFT in length.

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Yes, Same as #9

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

For PCCP patches less than or equal to 15 LFT, 300 psi flexural. For PCCP patches greater than 15 LFT, 425 psi flexural. Bridge deck patching, 550 psi flexural

Q14

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

Unknown

Q15

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

Yes,

Please provide any additional useful information.:
SPR-2141 (2001) Purdue University - Development and Evaluation of Cement-based Patching Materials for Repair of Corrosion-Damaged Reinforced Concrete Slabs
SPR-3019 (2012) Purdue University - Field Trial of Rapid Setting Patch Materials

Q16

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

<https://www.in.gov/dot/div/contracts/standards/book/sep19/sep.htm>

See sections 901.07 and 901.08

Q17

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

<https://www.in.gov/indot/div/mt/appmat/pubs/apl30.pdf>

#2

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Wednesday, March 10, 2021 4:02:44 PM
Last Modified: Wednesday, March 10, 2021 5:22:09 PM
Time Spent: 01:19:25
IP Address: 165.234.252.245

Page 1

Q1

Your contact information:

Name	TJ Murphy
State	ND
Email Address	tjmurphy@nd.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Geopolymer Cement (such as activated fly ash, material from Aquafin)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Other (please specify):

• Sika® SikaQuick® 1000* or 2500* • BASF MasterEmaco® T 1060* or T 1061* • Ceratec Pavemend 15.0™ • SpecChem RepCon® 928* • Can be extended with aggregate

Q3

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

Standard (Used on 5 or more projects),

Other (please specify):

Patching operations are handled in house by DOT forces as needed with the approved products listed above.

Q4

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

Respondent skipped this question

Q5**None**

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

Q6**No**

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

Q7**None of the above,**

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

If yes, please explain::

Must follow manufacturers recommendations.

Q8**None of the above**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Q9**None of the above**

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

Q10**No**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11**No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

By certificate of compliance.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Product specific, protected as long as possible from traffic then opened.

Q14

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

Not tracked or known, normally major repair projects are completed to repair them within 5-7 years on structures.

Q15**No**

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

Q16

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

http://mydot.nd.gov/manuals/maintenance/70mtc_opr_manual.pdf

Q17

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

- Ceratec Pavemend VR™
 - SpecChem RepCon® V/O
 - Sika® SikaQuick® VOH
 - BASF MasterEmaco® N425
-

#3

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Wednesday, March 10, 2021 1:35:21 PM
Last Modified: Wednesday, March 10, 2021 5:27:06 PM
Time Spent: 03:51:45
IP Address: 164.165.251.4

Page 1

Q1

Your contact information:

Name	Craig Wielenga
State	ID
Email Address	craig.wielenga@itd.idaho.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)**Q5**

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

Some (Less than 5 projects)**Q6**

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

No

Q7**None of the above**

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

Q8**None of the above**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Q9**None of the above**

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

Q10**No**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11**No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

They are approved on the Qualified Products List (QPL). They have to then be submitted to and approved by the District Materials Engineer.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

2,500 psi

Q14

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

Not Sure.

Q15

No

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

Q16

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

<https://apps.itd.idaho.gov/Apps/manuals/SpecBook/SpecBook18.pdf>

Q17

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

<https://apps.itd.idaho.gov/Apps/Materials/QPL.aspx>

#4

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Wednesday, March 10, 2021 7:06:20 PM
Last Modified: Wednesday, March 10, 2021 7:37:00 PM
Time Spent: 00:30:40
IP Address: 75.142.247.69

Page 1

Q1

Your contact information:

Name	Joe Barreres
State	NV
Email Address	jbarreres@dot.nv.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Polyester Concrete

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Polyester Concrete,

Ultra High Performance Concrete (UHPC),

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5 **Standard (Used on 5 or more projects)**

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

Q6 **No**

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

Q7 **None of the above**

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

Q8 **Slump,
Compressive Strength**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Q9 **Freeze-Thaw,
Shrinkage,
Strength**

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

Q10 **Yes,
If yes, please explain::
A recent example is grinding down patches for spalls on new PCCP to meet pavement smoothness and IRI specifications**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11 **No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

A list of already qualified products is available to contractors for use or another product meeting the standard specifications and special provisions can be submitted

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

The same strength as the existing structure, typically 4,500 psi

Q14

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

Polymer concrete patches tend to typically last 10-15 years

Q15**No**

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

Q16

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

<https://www.dot.nv.gov/home/showpublisheddocument?id=6916>
Section 502.03.15

Q17

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

<https://www.dot.nv.gov/home/showpublisheddocument?id=18262>

#5

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Wednesday, March 10, 2021 1:07:17 PM
Last Modified: Thursday, March 11, 2021 12:59:25 PM
Time Spent: 23:52:08
IP Address: 129.71.250.254

Page 1

Q1

Your contact information:

Name	Michael Perrow
State	WV
Email Address	Michael.D.Perrow@WV.GOV

Q2

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

Other (please specify):

Cementitious & Polymer-Modified Concrete Materials
Polymer Concrete Materials for Concrete Repairs: A Polymer Product is a composite material formed by polymerization of a monomer and an aggregate mixture, in which the polymerized monomer acts as the sole binder for the aggregate. Polymer concrete uses a polymer binder in place of Portland cement.

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Respondent skipped this question**Q5**

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

Our current special provision does not disallow the use of a volumetric mixer. An experienced technical representative of the Manufacturer of the Rapid Set Cementitious or Polymer Concrete Material shall be present during all phases of substrate preparation and material installation. All placements shall be under the direction of the Manufacturer's representative.

Q7

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

Surface Preparation,

Use of reinforcement,

If yes, please explain::

The contractor shall remove all loose, soft, honeycombed, and disintegrated concrete, plus an additional three (3) inches of sound concrete around the perimeter of the repair areas by means of sawcutting or other approved method that will not damage the sound concrete adjacent to the repair area. The surface of the existing concrete to remain is free of all loose or foreign matter, dirt, grime, oil, grease, or any other materials that would diminish the bonding surface. Sandblasting, grinding, jack hammering, or the use of wire brushes may be needed to acquire the necessary bonding surface. The existing exposed reinforcing steel bars shall be cleaned by sandblasting to a SSPC-SP-6 finish. After sandblasting, a rust inhibitor approved by the Manufacturer of the Rapid Set Cementitious or Polymer Concrete Material for compatibility shall be applied to all exposed reinforcing steel bars. Any exposed reinforcing bar that is, per the Engineer's judgment, severed, missing, or damaged shall be replaced with a bar of the same diameter and coupled to the sound reinforcing that will remain with a Division approved mechanical splice. Reinforcing bar material shall be intermediate grade billet steel in accordance with AASHTO M31, Grade 60. This work shall be included under the pay item(s) included herein. The bonding surface shall be dry and free of moisture and a representative of the Manufacturer shall be on site to approve of all bonding surfaces immediately prior to and during application of the Rapid Set Cementitious or Polymer Concrete Material. The Contractor shall protect from damage all materials, which are to remain in place. Materials damaged due to the Contractor's operations, as determined by the Engineer, shall be repaired or replaced at no additional cost to the Department and to the satisfaction of the Engineer

Q8**None of the above**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Q9**Freeze-Thaw,**

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

Shrinkage,**Strength,****Other,**

If yes or other, please explain::

Performance Requirements for Cementitious & Polymer-Modified Concrete Materials 3-hour compressive strength ASTM C39 1-day compressive strength ASTM C39 7-day compressive strength ASTM C39 Bond Strength by Slant Shear, 1 Day ASTM C 882 Bond Strength by Slant Shear, 7 Day ASTM C 882 Rapid Freezing & Thawing Durability Factor (DF) ASTM C 666 (Procedure A) Length Change ASTM C 157 Performance Requirements for Polymer Concrete Materials Bond Strength Using Slant Shear @ 1 Day ASTM C 882 Bond Strength Using Slant Shear @ 7 Days ASTM C 882 1-hour compressive strength ASTM C 579 24-hour compressive strength ASTM C 579 28-day compressive strength ASTM C 579 Chloride Ion Penetration AASHTO T 277 Bond Strength by Direct Tension @ 28 days ASTM C 1583 Linear Shrinkage ASTM C 531 Coefficient of Thermal Expansion ASTM C 53 Rapid Freezing & Thawing Durability Factor (DF) ASTM C 666 (Procedure A)

Q10**No**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11**No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Material to be used in concrete repair applications shall be tested through AASHTO's National Transportation Evaluation Program (NTPEP) and meet the requirements in Table 715.4.1 of our standard specifications. In addition, they must remain current with NTPEP's policy regarding periodic re-testing as required by the program. Product submittals shall include: a completed Form HL-468 (available on the WVDOH Materials Division Web Page), a copy of the technical data sheet, the current Material Safety Data Sheet (MSDS), and the results of NTPEP testing.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

2,000 psi (13.8 Mpa) prior to the time at which the pavement will be opened to traffic

Q14

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

Aquafin Pavement DOT Line, This product seems to work well when no flexure is involved. We have had it in place for 5 years in a back wall repair and it still seems to be performing well. It works well for patching also but is a little hard to finish. We have patches in place that are 2.5 years old and still ok.

Q15**No**

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

Q16

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

[https://transportation.wv.gov/highways/contractadmin/specifications/Documents/2021_Supplemental_20201208%20\(redline\).pdf](https://transportation.wv.gov/highways/contractadmin/specifications/Documents/2021_Supplemental_20201208%20(redline).pdf)

Section 715.4

Section 600

Section 501 &506

https://transportation.wv.gov/highways/contractadmin/specifications/2017StandSpec/Documents/2017_Standard.pdf

Section 715.4

Section 600

Section 501 &506

Q17

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

<https://transportation.wv.gov/highways/mcst/Documents/2020%20APL/PCC/10-20-2020%20Approved%20List%20of%20Concrete%20Repair%20Materials.pdf>

#6

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Thursday, March 11, 2021 2:58:53 PM
Last Modified: Thursday, March 11, 2021 3:11:04 PM
Time Spent: 00:12:10
IP Address: 165.206.200.230

Page 1

Q1

Your contact information:

Name	Todd Hanson
State	IA
Email Address	todd.hanson@iowadot.us

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,

Polyester Concrete,

Ultra High Performance Concrete (UHPC),

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Some (Less than 5 projects),
 Other (please specify):
 District Bridge Maintenance has done most work using rapid set patch materials. UHPC & Polyester used on deck overlays on a couple of projects only.

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects),

Other (please specify):

Mainly M-Mix w CaCl₂ used on most patching projects. Some use of rapid set patch materials. Trying to get increased use on high traffic areas where time is critical.

Q6

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

Yes,

If yes, please explain:

Mobile mixers allow mix to be placed all at once instead of small batches at a time.

<https://iowadot.gov/erl/current/IM/content/534.htm>

Q7

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

Curing,**Surface Preparation,**

If yes, please explain::

Based on manufacturers recommendations

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

None of the above**Q9**

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

If yes or other, please explain::

NTPEP Test report

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

No,

If yes, please explain::

No data available

Q11

Do you allow calcium chloride in any patching repair materials?

Yes,

If yes, please provide additional information.:

Used with M-Mix (high Portland content mix) for pavement patching.

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

NTPEP Test Report

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Pavements

M-Mix w CaCl

2 Lane - 5 hours

4 Lane - 10 hours

M-Mix w/o CaCl -24 hours

When rapid set patch materials used time may be reduced to 2-3 hours depending on traffic volumes.

Structure - varies

Q14

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

No data available

Q15**No**

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

Q16

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

Pavement - Full depth

<https://iowadot.gov/erl/current/GS/content/2529.htm>

Pavement - Partial depth

<https://iowadot.gov/erl/current/GS/content/2530.htm>

Structural Repair

<https://iowadot.gov/erl/current/GS/content/2426.htm>

Q17

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

<https://maple.iowadot.gov/Search.aspx>

Material Names search for

CONCRETE REPAIR, RAPID SET PATCH MATERIALS

CONCRETE REPAIR, FAST SET STRUCTURAL REPAIR MORTAR

#7

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, March 12, 2021 1:51:52 PM
Last Modified: Friday, March 12, 2021 2:17:17 PM
Time Spent: 00:25:25
IP Address: 164.119.5.219

Page 1

Q1

Your contact information:

Name	Wally Heyen
State	NE
Email Address	wally.heyen@nebraska.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
 ,
Polyester Concrete

Q3

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

Some (Less than 5 projects),
 Other (please specify):
 For construction projects the DOT uses the Standard IP/IT concrete mixes. Typically, for construction we don't use fast setting mixes. Maintenance uses a variety of fast set mixes. Typically, whatever the vendor talks them into.

Q4

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

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6**No**

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

Q7**None of the above**

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

Q8**Air Content,**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

If yes or other, please explain:
Maturity is used for pavement repairs.

Q9**Strength,**

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

If yes or other, please explain:
ASTM C 109

Q10**No**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11**Yes**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

For pavement repairs the DOT has a standard mix.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

3000 psi for pavement - 4000 psi for bridge decks.

Q14

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

20 years would be the max

Q15

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

Yes,

Please provide any additional useful information.:

The university completed a research project on the DOT mix design. Materials & Research is currently looking at the proposed mixes and will have a trial project in 2021.

Q16

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

Standard Specifications for Highway Construction - Section 1002

<https://dotstore.nebraska.gov/storefront/Store/tabid/78/CatID/8/Publications.aspx>

Q17

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

<https://dot.nebraska.gov/business-center/materials/approved-products/>

#8

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, March 12, 2021 4:04:52 PM
Last Modified: Friday, March 12, 2021 4:31:02 PM
Time Spent: 00:26:09
IP Address: 164.154.156.105

Page 1

Q1

Your contact information:

Name	Darin Hodges
State	SD
Email Address	darin.hodges@state.sd.us

Q2

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

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

,

Other (please specify):

We regularly specify a packaged dry rapid hardening mortar/concrete meeting ASTM C 928, Type R3 that does not contain chloride ions and is not Magnesium or Phosphate based.

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

,

Other (please specify):

We occasionally allow or specify a packaged dry rapid hardening mortar/concrete meeting ASTM C 928, Type R3 that does not contain chloride ions and is not Magnesium or Phosphate based.

Q5 **Standard (Used on 5 or more projects)**

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

Q6

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

Yes,

If yes, please explain:

We do not have any specification on the mixer or method used to mix these materials. Other than following manufacturers recommendations.

Q7

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

Curing,**Repair Size****Q8**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

None of the above**Q9**

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

None of the above**Q10**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

All spall repairs have to be completed before diamond grinding the surface on rehab projects. No issues noted using standard diamond grinding.

Q11

Do you allow calcium chloride in any patching repair materials?

No**Q12**

How does your Agency handle the approval of fast setting patching materials if used in your state?

Submit product data sheets and certification statements.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

3,000 psi for pavement partial depth patches.

Q14

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

Unknow for sure. There may be some still in place 15 to 20 years later. We changed to using mostly MNDOT 3U58M materials for spall repairs since we had a high initial failure rate using ASTM C928 Type 3 materials.

Q15**No**

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

Q16

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

Section 390 for PCCP spall repair

<https://dot.sd.gov/doing-business/contractors/standard-specifications/2015-standard-specifications>

Q17

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

N.A.

#9

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, March 12, 2021 3:52:32 PM
Last Modified: Friday, March 12, 2021 4:35:53 PM
Time Spent: 00:43:20
IP Address: 198.238.213.155

Page 1

Q1

Your contact information:

Name	Mark Russell
State	WA
Email Address	russelm@wsdot.wa.gov

Q2

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

Other (please specify):

Bridge deck repair material shall be either an ultra-low viscosity, two-part liquid, polyurethane-hybrid polymer concrete, or a pre-packaged cement based repair mortar, conforming to the following requirements: 1. Minimum compressive strength of 2,500 psi, in accordance with ASTM C 109. 2. Total soluble chloride ion content by mass of product shall conform to the limits specified in Section 6-02.3(2) for reinforced concrete. 3. Permeability of less than 2,000 coulombs at 28-days or more in accordance with AASHTO T 277. If pre-packaged deck repair material does not include coarse aggregate, the Contractor shall extend the mix with coarse aggregate as recommended by the manufacturer.

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Polyester Concrete,

Ultra High Performance Concrete (UHPC),

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)

,

Geopolymer Cement (such as activated fly ash, material from Aquafin)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

,

Other (please specify):

Currently WSDOT allows any type of cementitious material that meets our performance requirements. We are in the process a shifting to polymer concrete for all of our concrete pavement patching material.

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

Volumetric mixers are allowed for concrete pavement patching. Usually bagged mixes are used for partial depth repairs and volumetric mixers are used for full depth replacement of entire concrete panels.

Q7

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

Respondent skipped this question

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Other,

If yes or other, please explain::

Compressive strength and air content is tested on full depth repairs. No testing is performed on partial depth repairs.

Q9

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

Freeze-Thaw,**Shrinkage,****Strength,**

If yes or other, please explain::

For prepackaged material, the manufacturer is required to provide test reports showing the material meets specification requirements before the material is placed on the QPL.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

No performance issues have been identified.

Q11

Do you allow calcium chloride in any patching repair materials?

Yes,

If yes, please provide additional information.:

Bridge patching material has to meet the same chloride requirements of structural concrete. Prepackaged pavement patching material is limited to 1 lb per cubic yard of mortar.

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

If the material meets the performance requirements, it is placed on the QPL.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

2,500 psi for both bridge and pavement.

Q14

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

Unknown

Q15**No**

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

Q16

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

<https://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS.pdf>

See section 9-20.1 for concrete pavement patching material and 9-20.5 for bridge deck patching material.

Q17

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

https://wsdot.wa.gov/biz/mats/QPL/QPL_Search.cfm

For pavement patching material select section 9-20.2 in the Standard Spec. field.

For bridge deck patching material select section 9-20.5 in the Standard Spec. field.

#10

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, March 12, 2021 4:44:17 PM
Last Modified: Friday, March 12, 2021 4:55:15 PM
Time Spent: 00:10:57
IP Address: 165.189.255.43

Page 1

Q1

Your contact information:

Name	James Parry
State	WI
Email Address	james.parry@dot.wi.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,

Geopolymer Cement (such as activated fly ash, material from Aquafin)
,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
,

Polyester Concrete,

Ultra High Performance Concrete (UHPC)

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)

,

Geopolymer Cement (such as activated fly ash, material from Aquafin)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6

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

No

Q7

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

None of the above

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Compressive Strength

Q9

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

**Freeze-Thaw,
Shrinkage,
Strength**

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

No

Q11

Do you allow calcium chloride in any patching repair materials?

Yes,

If yes, please provide additional information.:

Only for locations where maximum lane closure period is less than 8 hours

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

NTPEP

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

2000 psi compressive strength

Q14

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

Not known

Q15

No

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

Q16

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

Don't know how to do links

Q17

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

Don't know how to do links

#11

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Monday, March 15, 2021 11:31:15 AM
Last Modified: Monday, March 15, 2021 11:44:35 AM
Time Spent: 00:13:20
IP Address: 170.142.177.150

Page 1

Q1

Your contact information:

Name	Derek Gaw
State	TN
Email Address	derek.gaw@tn.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Some (Less than 5 projects)

Q6

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

Yes,

If yes, please explain:

Standard Specifications 604.04.C

[https://www.tn.gov/content/dam/tn/tdot/construction/2021-](https://www.tn.gov/content/dam/tn/tdot/construction/2021-standard-specifications/January_1_2021_Standard_Specifications.pdf)

standard-

specifications/January_1_2021_Standard_Specifications.pdf

Q7

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

None of the above**Q8**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

None of the above**Q9**

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

Shrinkage,**Strength,**

If yes or other, please explain::

Approved in accordance with NTPEP's program

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

No**Q11**

Do you allow calcium chloride in any patching repair materials?

No**Q12**

How does your Agency handle the approval of fast setting patching materials if used in your state?

Use NTPEP program

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

3000 psi for bridge structures and new concrete pavements. 2500 psi for pavement repairs.

Q14

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

N/A

Q15**No**

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

Q16

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

https://www.tn.gov/content/dam/tn/tdot/hq-materials-tests/qpl/List_13.pdf

Q17

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

<https://www.tn.gov/tdot/materials-and-tests/research---product-evaluation-and-qualified-products-list.html>

#12

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, March 19, 2021 9:44:07 AM
Last Modified: Friday, March 19, 2021 10:13:31 AM
Time Spent: 00:29:24
IP Address: 199.90.35.10

Page 1

Q1

Your contact information:

Name	Brian Hunter
State	NC
Email Address	bhunter@ncdot.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Polyester Concrete,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

,

Other (please specify):

Have allowed Elastomeric Concrete in some cases.

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Other (please specify):

Use of Non-shrink with latex. Elastomeric concrete has also been allowed.

Q5 **Standard (Used on 5 or more projects)**

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

Q6 **Yes**

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

Q7 **Curing**

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

Q8 **Compressive Strength**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Q9 **Strength**

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

Q10 **No**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11 **No**

Do you allow calcium chloride in any patching repair materials?

Q12
How does your Agency handle the approval of fast setting patching materials if used in your state?

Just review manufacturer's Product Data sheet and verify strength in the lab.

Q13

What strength does your Agency require patches to acheive before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

3000 psi

Q14

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

Not sure

Q15**No**

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

Q16

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

N/A

Q17

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

<https://apps.ncdot.gov/vendor/approvedproducts/Default.aspx>

#13

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, March 19, 2021 11:53:42 AM
Last Modified: Friday, March 19, 2021 5:21:55 PM
Time Spent: 05:28:12
IP Address: 98.32.213.231

Page 1

Q1

Your contact information:

Name	Cindy Williams
State	IL
Email Address	cmwilliams@getipass.com

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)
 ,
Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
 ,
Ultra High Performance Concrete (UHPC),
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

<p>Q5</p> <p>What is your Agency's experience with fast setting patching materials for concrete pavement repairs?</p>	<p>Standard (Used on 5 or more projects)</p>
<p>Q6</p> <p>Does your Agency allow volumetric mixers for batching fast setting patching materials?</p>	<p>Yes</p>
<p>Q7</p> <p>Does your Agency modify any of the following requirements when using fast setting patching materials? (Check all that apply)</p>	<p>Curing,</p> <p>Use of reinforcement,</p> <p>If yes, please explain::</p> <p>The curing methods are according to the manufacturer's recommendations. We add welded wire reinforcement to our latex modified calcium aluminate cement mix for jointed plain concrete pavement patching.</p>
<p>Q8</p> <p>Does your Agency require field testing on the fast setting patching materials? (Check all that apply)</p>	<p>Air Content,</p> <p>Slump,</p> <p>Compressive Strength,</p> <p>If yes or other, please explain::</p> <p>Air content and slump testing is dependent on the specific material used.</p>
<p>Q9</p> <p>Does your Agency require performance testing prior to approving fast setting patching materials? (Check all that apply)</p>	<p>Freeze-Thaw,</p> <p>Shrinkage,</p> <p>Strength,</p> <p>If yes or other, please explain::</p> <p>Some performance testing is required for all of our approved fast setting patching materials. The exact scope of testing depends on the type of material and application. We are mainly concerned with compressive strength and durability (shrinkage, freeze/thaw, chloride ingress)</p>
<p>Q10</p> <p>Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?</p>	<p>Yes,</p> <p>If yes, please explain::</p> <p>We've diamond grinded a few small areas and didn't have issues.</p>

Q11**No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Patching mixes that are supplied in a ready-mix truck or volumetric mixer are approved based on lab and field trial batch test results.

Commercial bagged type products are on our approved fast set list. The approval process requires NTPEP evaluation and a field test section on the Tollway. More info can be found on our approved fast set concrete list.

<https://www.illinoistollway.com/documents/20184/239415/ApprovedFastSetConcreteList.pdf/814081c7-4b31-45f7-a28a-6b2ea6cf60ae?version=1.1&t=1539713412473&download=true>

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

2,500 psi and 4,000 psi compressive strength for pavement and structures, respectively.

Q14

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

About 5 years, but we might have some that have been out there for longer.

Q15

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

Yes,

Please provide any additional useful information.:

We are wrapping up a brief report on a fast set concrete partial depth bridge deck patching test section we installed in July 2017. The test section was the basis for our approved product list.

Q16

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

The Tollway's special provisions are not posted online, but can be made available upon request.

Q17

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

<https://www.illinoistollway.com/documents/20184/239415/ApprovedFastSetConcreteList.pdf/814081c7-4b31-45f7-a28a-6b2ea6cf60ae?version=1.1&t=1539713412473&download=true>

#14

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Tuesday, March 23, 2021 11:43:01 AM
Last Modified: Tuesday, March 23, 2021 12:00:34 PM
Time Spent: 00:17:33
IP Address: 149.136.17.249

Page 1

Q1

Your contact information:

Name	Reimond Garcia
State	CA
Email Address	reimond.garcia@dot.ca.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Polyester Concrete,

Ultra High Performance Concrete (UHPC),

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

,

Other (please specify):

Modified high-alumina-based concrete is allowed for structure construction located in Sections 51 and 60 of the Standard Specifications. UHPC is allowed, but not in the Standard Specifications.

Q3

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

Standard (Used on 5 or more projects),

Other (please specify):

Section 90-3 of the Standard Specifications deals with rapid strength concrete. Polyester concrete is also discussed in detail in Section 41-1.02C. Section 41 is for pavement repair. Section 60 discusses bridge repair materials.

Q4

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

Polyester Concrete,

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Magnesium Phosphate Cement (such as Phocrete or MasterEmaco® T 545 HT)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

,

Other (please specify):

Section 41-1.02B of the Standard Specifications discusses fast-setting concrete for pavement. UHPC is currently not used for pavement.

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

Section 90-3.02B discusses volumetric proportioning. Volumetric mixers are also allowed in Sections 51 (Concrete Structures) and 60 (Existing Structures). Volumetric mixers are allowed for fast setting RSCs and polyester concrete for both pavement and bridge repairs. Provisions for mixer calibration and verification are specified in Section 90-3 of the Standard Specifications.

Q7

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

Curing,**Surface Preparation,**

If yes, please explain::

Section 41-1.03D: Place magnesium phosphate concrete on a dry surface. Place portland cement and modified high-alumina concrete on surfaces treated with a bonding agent recommended by the concrete manufacturer. If no bonding agent is recommended by the manufacturer, place concrete on damp surfaces that are not saturated. Section 60-3.04B(1)(d): Place polyester concrete overlay on: 1. Portland cement concrete no sooner than 28 days after concrete placement. 2. Portland cement based RSC no sooner than 14 days after concrete placement and your test results for prequalification of RSC show that the concrete attained at least 3,500 psi compressive strength. 3. RSC using hydraulic cement other than portland cement no sooner than 3 days after concrete placement and your test results for prequalification of RSC show that the concrete attained at least 3,500 psi compressive strength. 4. Magnesium phosphate based rapid setting concrete patch material no sooner than 3 days after final set. 5. Modified high alumina based rapid setting concrete patch material no sooner than 30 minutes after final set. Section 60-3.02C(6): Cure modified-high-alumina-based concrete and portland-cement based concrete using the curing compound method. Do not cure magnesium phosphate concrete.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Compressive Strength,**Other,**

If yes or other, please explain::

Section 60-3.04B(1)(d) of standard specifications: With polyester concrete overlays, friction testing (California Test 342) is required on trial sections before start of construction. Any material used as rapid strength applications must be verified for a variety of characteristics, including set time, strength development, bond strength, shrinkage, physical and chemical properties of the ingredients, etc. For example, Section 51-1.02C provides the requirements for rapid strength materials as bonding materials. Section 60-3.04B(2) discusses the material requirements for polyester concrete. Section 90-3.02 also discusses some criteria for cement used in rapid strength concrete, including % contraction in air, % expansion in water, etc. Tests for material properties are usually not field testing requirements – e.g., shrinkage, bonding material tests, etc. RSC for paving applications require flexural strength test for QC/QA.

Q9

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

Shrinkage,**Strength,****Other,**

If yes or other, please explain::

Bond strength, water absorption, abrasion resistance, chemical composition and physical properties, depending on the application field verification and trial runs are also needed. For example, Section 51-1.02C provides the requirements for rapid strength materials as bonding materials. Section 60-3.04B(2) discusses the material requirements for polyester concrete. Section 90-3.02 also discusses some criteria for cement used in rapid strength concrete, including % contraction in air, % expansion in water, etc.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

Given the friction requirements, it is mentioned in Section 60-4.02C of Standard Specification to grind or groove surfaces having a coefficient of friction less than 0.35. It is understood this means that grinding/grooving can be considered as a viable option as necessary. Not sure if grinding specifications need to be modified. No specific requirements could be found in Section 42 of Standard Specifications.

Q11

Do you allow calcium chloride in any patching repair materials?

No,

If yes, please provide additional information.:

Soluble chloride content is limited to 0.05% for rapid strength materials as bonding materials. Calcium chloride is not allowed in patching repair materials.

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Detailed requirements for each category of materials is elaborated in the Standard Specifications.

The materials will be tested in our labs to ensure desired quality. Also, depending on the application, trial sections will be constructed and tested.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Section 51-5.01D(2)(b):

For approach slabs; trial slab concrete must develop the following minimum compressive strengths:

1. 1,200 psi at the age of break
2. 2,500 psi at 3 days
3. 4,000 psi at 28 days

400 psi MOR for paving applications.

Q14

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

No data, but usually expect 5-10 years of service life.

Q15

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

No,

Please provide any additional useful information.:
Not aware of such research.

Q16

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

The standard specifications can be found using the following link:

<https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications>

Please review sections 41, 51, 60, and 90 for requirements of rapid strength and normal concrete.

Q17

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

<https://dot.ca.gov/programs/engineering-services/authorized-materials-lists>

#15

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Thursday, March 25, 2021 8:53:19 AM
Last Modified: Thursday, March 25, 2021 9:14:22 AM
Time Spent: 00:21:03
IP Address: 63.225.17.34

Page 1

Q1

Your contact information:

Name	Eric Prieve
State	CO
Email Address	eric.prieve@state.co.us

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,

Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)
,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
,

Polyester Concrete,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

We allow these mixers to mix on-site & on demand vs having small batches from a RM plant or sloppy hand batching. Self Contained Mobile Mixer. Proportioning and mixing equipment shall be of the self-contained, mobile, continuous mixing type in accordance with ASTM C685 and subject to the following: (1) The mixer shall be self-propelled and capable of carrying sufficient unmixed dry, bulk cementitious materials, fine aggregate, coarse aggregate, admixtures, and water to produce on the site at least 6 cubic yards of concrete. The mixer shall have one bin for each size aggregate. (2) The mixer shall be capable of positive measurement of cementitious materials being introduced into the mix. A recording meter visible at all times and equipped with a ticket printout shall indicate the quantity of total concrete mix. (3) The mixer shall provide positive control of the flow of water into the mixing chamber. Water flow shall be indicated by flow meter and be readily adjustable to provide for minor variations in the aggregate moisture. (4) The mixer shall be capable of calibration to automatically proportion and blend all components of indicated composition on a continuous or intermittent basis as required by the finishing operation, and shall discharge mixed material through a conventional chute directly in front of the finishing machine. (5) The Contractor shall perform calibration tests according to the equipment manufacturer's recommendations at the beginning of each project, and when there is a change in the mix design proportions or source of materials. The Engineer may require a calibration test or yield check when a change in the characteristics of the mixture is observed. The tolerances in proportioning the various ingredients shall be according to ASTM C685.

Q7**None of the above**

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

Q8

Air Content,
Compressive Strength,

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

If yes or other, please explain::

Compressive strength through maturity. Air content is required for durability

Q9

Freeze-Thaw,
Shrinkage,
Strength,
Other,

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

If yes or other, please explain::

compressive strength of at least 4,500 psi at 24 hours tested according to ASTM C39 or ASTM C109. minimum bond strength of 1,000 psi at 24 hours, as tested by ASTM C882. shall have a relative durability factor greater than 90 as tested by ASTM C666 method A. shall have a maximum shrinkage of 0.13 percent at four days as tested by ASTM C157.

Q10**No**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11**No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Paper review of NTPEP or other independent lab test data from CCRL/AMRL accredited labs

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

2500 psi for pavement
Depends on bridge structure

Q14

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

There is no tracking system to determine age of patches.

Q15**No**

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

Q16

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

ASTM C1600 for CSA cements
ASTM C928 for general packaged patching materials
Bridge deck patching:
<https://www.codot.gov/business/designsupport/cdot-construction-specifications/2019-construction-specifications/rev-ssp/rev-sec600/rev-601-cdej>

Q17

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

<https://apps.codot.gov/apl/AplSearch.cfm?SelectBy=Cat&cid=Concrete&scid=Repair/Patching>

#16

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Thursday, March 25, 2021 11:45:03 AM
Last Modified: Thursday, March 25, 2021 12:51:51 PM
Time Spent: 01:06:47
IP Address: 156.63.69.78

Page 1

Q1

Your contact information:

Name	Daniel Miller
State	OH
Email Address	daniel.miller@dot.ohio.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
 ,
Polyester Concrete,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

Currently being approached by a contractor as we have added spec language on volumetric trucks for use on DOT projects, aside from bridge deck overlays with latex modified concrete. We may be using these trucks for patching this summer.

Q7

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

None of the above

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Air Content,

Slump,

Flexural Strength,

If yes or other, please explain::

We use C293 center point method for beam testing and we have our own beam breakers that read out the psi value for the break.

Q9

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

Freeze-Thaw,

Strength,

If yes or other, please explain::

for our Rapid Repair Concrete Mix, we currently require the aggregate to meet our freeze-thaw durability requirements.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

Followed our Proposal Note 420. Structures is Proposal Note 555.

Q11

Do you allow calcium chloride in any patching repair materials?

Yes,

If yes, please provide additional information.:

We allow liquid or flake. The materials are listed on the QPL. They are not to be used where reinforcing steel is present.

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Qualified Products List for bag materials. Ready mix concrete has flexural strength and aggregate requirements.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

400 psi flexural in 4 hours.

Q14

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

unsure. Most patches are in for about 5 to 10 years to aid as a band aid prior to selling a larger project.

Q15**No**

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

Q16

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

<https://www.dot.state.oh.us/Divisions/ConstructionMgt/OnlineDocs/Pages/2019-Online-Spec-Book.aspx>

Q17

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

<https://www.dot.state.oh.us/Divisions/ConstructionMgt/Materials/Pages/QPL.aspx>

<https://www.dot.state.oh.us/Divisions/ConstructionMgt/Materials/Approved-List/Pages/default.aspx>

https://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/PN420_01172020_for_2019.pdf

https://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/PN555_01152021_for_2019.pdf

#17

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Thursday, March 25, 2021 1:47:09 PM
Last Modified: Thursday, March 25, 2021 2:36:59 PM
Time Spent: 00:49:49
IP Address: 161.7.39.7

Page 1

Q1

Your contact information:

Name	Wesley Dess
State	MT
Email Address	wdess@mt.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

Q5

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

Standard (Used on 5 or more projects)

Q6

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

No,
 If yes, please explain:
 Can be allowed under certain circumstances based on the project requirements.

Q7

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

None of the above,

If yes, please explain::

Typically manufactures recommendations.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

None of the above**Q9**

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

None of the above**Q10**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

No**Q11**

Do you allow calcium chloride in any patching repair materials?

No**Q12**

How does your Agency handle the approval of fast setting patching materials if used in your state?

Based on certification and third party testing

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

3000 PSI

Q14

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

NA

Q15

No

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

Q16

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

MDT specifications are fairly vague currently.

Q17

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

NA

#18

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, March 26, 2021 12:38:23 PM
Last Modified: Friday, March 26, 2021 1:50:39 PM
Time Spent: 01:12:16
IP Address: 165.201.162.178

Page 1

Q1

Your contact information:

Name	Dan Wadley
State	KS
Email Address	Dan.Wadley@ks.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Polyester Concrete,

Other (please specify):

Products prequalified through NTPEP under R1, R2, and R3 classifications. Information regarding soluble chloride content per ASTM C928 mandatory statement must be included if it exceeds 1 #/CY. Metallic iron content per ASTM C928 mandatory statement must be included if exceeding 1% by mass. Have done epoxy patch (proprietary).

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

,

Other (please specify):

HESC mixes should target 2880 psi at 24 hours.

Q5 **Standard (Used on 5 or more projects)**

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

Q6 **Yes**

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

Q7 **Curing,**

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

If yes, please explain::
Shorter cure time.

Q8 **Air Content,**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Compressive Strength,
Other,
If yes or other, please explain::
Freeze Thaw C666, Procedure B 90% min. at 300 cycles by NTPEP.

Q9 **Freeze-Thaw,**

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

Shrinkage,
Strength,
If yes or other, please explain::
Through NTPEP.

Q10 **No**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11 **Yes,**

Do you allow calcium chloride in any patching repair materials?

If yes, please provide additional information.:
Up to 2%.

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

NTPEP for cement but Aggregates approved by KDOT.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Flexural = 380 psi or F'c = 1800 psi.

Q14

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

If they stay 5 years we're lucky.

Q15

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

Yes,

Please provide any additional useful information.:
Current K-Tran study with Kansas State University & Research.

Q16

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

<https://www.ksdot.org/bureaus/burConsMain/specprov/2015specprov.asp>

Q17

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

<https://www.ksdot.org/bureaus/burMatrRes/PQL/default.asp>

#19

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, March 26, 2021 3:13:21 PM
Last Modified: Friday, March 26, 2021 3:25:19 PM
Time Spent: 00:11:58
IP Address: 204.64.21.250

Page 1

Q1

Your contact information:

Name	Andy Naranjo
State	TX
Email Address	andy.naranjo@txdot.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)
 ,
Polyester Concrete,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Polyester Concrete,
Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5 **Standard (Used on 5 or more projects)**

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

Q6 **Yes**

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

Q7 **None of the above**

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

Q8 **Compressive Strength,**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

If yes or other, please explain::

Compressive strength for opening to traffic.

Q9 **Freeze-Thaw,**

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

Shrinkage,

Strength,

Other,

If yes or other, please explain::

Slant shear testing. MOE and CTE for informational purposes

Q10 **Yes,**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

If yes, please explain::

No performance issues that we are aware of after grinding.
No modifications to grinding specs.

Q11 **No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

DOT prequalifies all materials and maintains a pre-qualified products list.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

1800 psi compressive strength for concrete pavement. 4000 psi for bridge decks.

Q14

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

Some patch are over at least over 10 year old and still performing satisfactorily.

Q15

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

Yes,

Please provide any additional useful information.:

<https://library.ctr.utexas.edu/ctr-publications/0-6723-1.pdf>

Q16

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

https://ftp.txdot.gov/pub/txdot-info/cst/DMS/4000_series/pdfs/4655.pdf

Q17

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

<https://ftp.txdot.gov/pub/txdot-info/cmd/mpl/concrepair.pdf>

#20

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Monday, March 29, 2021 9:48:21 AM
Last Modified: Monday, March 29, 2021 10:25:55 AM
Time Spent: 00:37:34
IP Address: 69.40.91.74

Page 1

Q1

Your contact information:

Name	Jason Waters
State	GA
Email Address	jwaters@dot.ga.gov

Q2

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

Polyester Concrete,
Ultra High Performance Concrete (UHPC),
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Some (Less than 5 projects)

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes

Q7 Respondent skipped this question

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

Q8 Air Content,
Slump,
Compressive Strength

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Q9 None of the above

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

Q10 No

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11 Yes

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

The concrete plant has prove the mix and with breaks and other test data.

Q13

What strength does your Agency require patches to acheive before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

2500 psi for standard 24 hour mix. 3000 psi for 4 hour mix with Rapid Setting Cement

Q14

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

Not sure. Very limited use.

Q15**No**

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

Q16

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

<http://www.dot.ga.gov/PartnerSmart/Business/Source/specs/2021StandardSpecifications.pdf>

Q17

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

<http://www.dot.ga.gov/PartnerSmart/Materials/Pages/QPL.aspx>

#21

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Monday, March 29, 2021 9:28:23 AM
Last Modified: Monday, March 29, 2021 10:27:01 AM
Time Spent: 00:58:37
IP Address: 167.7.17.3

Page 1

Q1

Your contact information:

Name	Caleb Gunter
State	SC
Email Address	guntercb@scdot.org

Q2

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

Other (please specify):

We do not have a specification allowing any of these types of materials for bridge structures. They can be allowed in case by case instances for patching or rehab applications.

Q3

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

Some (Less than 5 projects),

Other (please specify):

Again, the use of these products can be allowed on a case by case basis.

Q4

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

Other (please specify):

For patching of concrete pavement we do allow any material meeting the requirements of ASTM C 928, Types R2 or R3.

Q5

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

Standard (Used on 5 or more projects)**Q6**

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

Yes,

If yes, please explain:

It has been allowed in conjunction with rapid set cement.

Q7

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

None of the above,

If yes, please explain::

Typically we waive our maximum concrete temperature requirement. We generally only use the rapid set materials for partial depth patches.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Compressive Strength

Q9

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

None of the above,

If yes or other, please explain::

For rapid set concrete pavement patching materials, we have a Qualified Products List which recently changed to require NTPEP testing to ensure the products meet ASTM C928, Types R2 or R3. We don't have a specification for rapid set bridge deck patching materials. We currently have research underway to develop a material specification for these materials.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

I would imagine that has occurred in our state, but I don't have any specific information on such.

Q11

Do you allow calcium chloride in any patching repair materials?

No

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

For rapid set concrete pavement patching materials we have a Qualified Product List requiring NTPEP testing to ensure that the products meet ASTM C928. Rapid set bridge deck patching materials are handled on a case by case basis. It is my understanding that products from the concrete pavement list are often used for bridge decks. When our research is finished, we will likely be developing a better specification for bridge decks.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Our specifications do not allow loading of the concrete until it meets 90% of the design strength. Therefore, generally bridge decks are 4000 psi concrete, so the patch would have to meet 3600 psi. Concrete pavement is 4000 or 5000 psi, so the patch would have to meet 3500 or 4500 psi.

Q14

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

I don't have that information.

Q15

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

Yes,

Please provide any additional useful information.:

We are conducting research that will help us specify long lasting rapid set bridge deck patches.

Q16

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

Basically the QPP is the specification for the rapid set concrete pavement patching materials.

<http://info2.scdot.org/Materials/QualProd/22%20QPP.pdf>

There is no specification for rapid set bridge deck patching materials.

We currently specify standard concrete for bridge deck patching in our Standard Specifications.

Q17

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

<http://info2.scdot.org/Materials/QualProd/22%20QPP.pdf>

#22

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Monday, March 29, 2021 12:34:11 PM
Last Modified: Monday, March 29, 2021 1:30:52 PM
Time Spent: 00:56:41
IP Address: 136.181.197.244

Page 1

Q1

Your contact information:

Name	Ethan Bahmer
State	MI
Email Address	BahmerT1@Michigan.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

,

Other (please specify):

Most of the selected products above are not likely to be used. The department has seen the use of dry and wet mix shotcrete increase over the past years. Dry mix tends to be the go-to material. We also have our standard patch materials (Latex Modified Concrete) and a QPL for Prepackaged Fast Set Mortars.

Q3

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

Standard (Used on 5 or more projects),

Other (please specify):

When shotcrete is included in this category we have typically more than 5 projects a year.

Q4

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

Other (please specify):

The Department has transitioned into using non cementitious repairs almost exclusively. Recently we have been trying out a MMA repair material. We also use a concrete mixture with a low w/c and the use of strength/hardening type S admixture.

Q5

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

Standard (Used on 5 or more projects),

Other (please specify):

The Department has seen the use of fast setting patch materials increase the past few years in new/reconstruction projects.

Q6

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

Yes,

If yes, please explain:

In the past the Department has used volumetric mixers under special circumstances.

Q7

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

Curing,**Full Depth or Partial Depth Repair,****Surface Preparation,**

If yes, please explain::

Curing depends on the material and application. Use of wet burlap, blankets, curing compound, etc. could be required or use may vary from standard requirement. Full depth special attention is required of the base material. Make sure the base material is not disturbed. Both full and partial: Bring all surfaces to SSD for cementitious materials. For non-cementitious follow the manufacturer's instructions. Surface Preparation is going to be different for non-cementitious materials. A primer will most likely be required, follow the manufacturer's requirements. Shotcrete requires SSD surface and either wet burlap or curing compound.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Air Content,**Compressive Strength,****Flexural Strength,****Other,**

If yes or other, please explain::

It is dependent on the application and the material that is being used. For most cementitious materials air content is checked. Compressive strength may be performed. Most of the materials require a flexural break for open to traffic. For non-cementitious requirements vary. Shotcrete requires daily coring and visual inspection of the patch and core.

Q9

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

Freeze-Thaw,

Shrinkage,

Strength,

Other,

If yes or other, please explain::

We have a QPL procedure we use for standard prepackaged Fast Set Materials. QPL requires the following testing: compressive strength, slant shear bond, modulus of elasticity, thermal coefficient of expansion, initial plastic shrinkage, surface scaling and minimum work time. Department provided mixtures have gone through research projects in the past and were subject to various tests. For new materials freeze-thaw, shrinkage and strength would be looked at along with various other requirements.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

No,

If yes, please explain::

Patching with non-cementitious materials has been relatively small compared to the total grinding surface, therefore no problems have emerged at this time. If they become more prevalent it is possible a modification will be required. Standard fast sets and full depths have not required special modifications.

Q11

Do you allow calcium chloride in any patching repair materials?

No

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

For standard fast set materials, the department has a QPL procedure or it is a mixture called out in our specifications.

For new/unique materials we would implement a trial project and look at the performance of the material. If it meets the requirements a Special Provision would be created to govern this material.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Structures: Must meet a minimum flexural strength of 550 psi and must meet the required curing time (curing time is dependent on the material).

Pavements: For rapid patches (scheduled Opening <72 hours) must meet minimum flexural strength of 300 psi
For standard patches (scheduled Opening >=3 days) must meet minimum flexural strength of 550 psi

Q14

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

A Cementitious mix with a low w/c ratio and a strength/hardening admixture (type S):10 years

Standard hydraulic patches: 5 years

Non-cementitious patches: 10 years

Q15

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

Yes,

Please provide any additional useful information.:

We have researched a wide range of fast setting repair mixtures. Some of the more recent materials the Department has worked with are concrete mixtures using a low w/c and a strength/hardening type S admixture, Polyester Concrete, and MMA Polymer Concrete. For more details on what the Department has worked with please feel free to contact me.

Q16

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

<https://mdotjboss.state.mi.us/SpecProv/specBookHome.htm>

Look at Division 603 for pavement repairs.

Look at Division 702 and 703 for structural repairs.

Q17

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

https://www.michigan.gov/documents/mdot/2021_January_MSG_Final-with_Links_708873_7.pdf

look at sections:702.02B for Non-Shrinking Mortar and Grout Type H-1 (Non-Metallic) Pre-Mixed and 703 for Prepackaged Hydraulic Fast Set Mortar

#23

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Monday, March 29, 2021 5:27:27 PM
Last Modified: Monday, March 29, 2021 6:29:05 PM
Time Spent: 01:01:38
IP Address: 205.197.219.184

Page 1

Q1

Your contact information:

Name	Jason Richins
State	UT
Email Address	Jtrichins@utah.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

Polyester Concrete,

Ultra High Performance Concrete (UHPC),

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Polyester Concrete,

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects),

Other (please specify):

We have since moved away from it and are using a more flexible patching material.

Q6**Yes**

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

Q7

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

Curing,**Full Depth or Partial Depth Repair,****Surface Preparation,**

If yes, please explain::

We use Dowel bars and Tie bars but not reinforcement.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Compressive Strength,

If yes or other, please explain::

For the Mix design approvals we test air content & flexural strength.

Q9

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

Freeze-Thaw,**Shrinkage,****Strength****Q10**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

Three questions with only one response. Yes, we have diamond ground fast setting patches. No, it issues after diamond grinding. No modifications to the specifications.

Q11

Do you allow calcium chloride in any patching repair materials?

No**Q12**

How does your Agency handle the approval of fast setting patching materials if used in your state?

APL and the product in called out in the project special provision.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

3500 psi

Q14

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

7 years

Q15**Yes**

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

Q16

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

Specifications <https://drive.google.com/file/d/1TQu03yV5JN5kU7BzFD01GoNb1uUhO3rg/view?usp=sharing>

Traditional repair

Section 02751 Partial Depth Repair for Concrete Pavements.

Section 2753 Full Depth Slab Replacement for Concrete Pavements

Section 03934 Structural Pothole Patching

We do have a special provision that we are taking soon to our standards committee for approval as a standard.

We can make that available.

Q17

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

Materials Authorized Products <https://www.udot.utah.gov/connect/business/materials-qualification-programs/materials-authorized-products/>

#24

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Tuesday, March 30, 2021 6:08:44 AM
Last Modified: Tuesday, March 30, 2021 6:49:32 AM
Time Spent: 00:40:47
IP Address: 161.11.160.128

Page 1

Q1

Your contact information:

Name	Adam Miller
State	NY
Email Address	adam.miller@dot.ny.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,

Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)
,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
,

Polyester Concrete,

Ultra High Performance Concrete (UHPC),

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)
,

Other (please specify):
 We have used Polyester Concrete and UHPC but we generally don't consider them viable fast setting patching material options.

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Polyester Concrete,

Ultra High Performance Concrete (UHPC),

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

,

Other (please specify):

Same as question 2.

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

On large projects we allow the use of the cementitious component of the repair material to be used with State approved aggregates. In such cases, we find the use of a volumetric mixer is beneficial due to the to the rapid set time in most of these products that make it prohibitive when using a ready mix truck.

Q7

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

Repair Size,

Full Depth or Partial Depth Repair,

If yes, please explain::

The repair size when using pre-bagged fast setting patching material is generally limited to areas no larger that 10ft2 or 5ft3 for a single patch. Some of these fast setting products can set in as little as 5 minutes after contact with water so there is very little time to place the material. The depth is limited to 2" depending on if the material is extended with coarse aggregate or not. If extended then it may be used up to full depth. If the cementitious component is used in a mix design then this area/volume can be increased based on the set time of the mix.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

None of the above,

If yes or other, please explain::

This depends largely on the size of the repair area. If we're talking about a 10 square foot area on a bridge deck then no, we would not test that material. If we're using the cementitious component for at larger volumes like closure pours between Precast deck panels then yes, it would be tested.

Q9

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

Freeze-Thaw,

Shrinkage,

Strength,

Other,

If yes or other, please explain::

All bagged rapid setting patch materials are tested by our Central Lab for compressive strength, freeze thaw (NY Method), and shrinkage (ASTM C 1090) prior to being approved by the State. Additional required testing is as follows: T 131 - Set Time 3 point load bond test

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

We has diamond ground UHPC. I'm not aware of any performance issue after UHPC has been diamond ground.

Q11

Do you allow calcium chloride in any patching repair materials?

Yes,

If yes, please provide additional information.:

Calcium Chloride can be used in accelerated Portland cement mixes for pavement repairs when there is no steel reinforcing present.

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Manufacturers are required to send an applications to the Materials Bureau for review and testing. Once a paper review of the literature has been completed, a sample is requested for testing according to SS 701-09, 701-12, or 701-13 depending on the specifics of the product.

Below is a link to the APL submittal instructions.

<https://www.dot.ny.gov/divisions/engineering/technical-services/materials-bureau/approved-list-submission>

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

We require 3000 psi to open a bridge deck and 2500 psi to open a pavement.

Q14

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

Typical fast setting bagged patching material used to repair a bridge deck last between 5 and 10 years on average. It's unknown how long the oldest one is.

The cementitious component of the repair material like Calcium Aluminate Cement used through a volumetric mixer with State approved sand and coarse has been shown to last 25+ years.

Q15

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

Yes,

Please provide any additional useful information.:

We have not specifically performed research on our own but we do use the NTPEP RSCP Test Deck as a resource.

Q16

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

https://www.dot.ny.gov/main/business-center/engineering/specifications/english-spec-repository/2021_5_specs_usc_tc_vol4.pdf

Standard Specifications 701-04, 710-09, and 701-12 are fast and normal setting bagged repair materials.

Standard Specification 701-13 is for Rapid Hardening Hydraulic Cement.

Q17

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

https://www.dot.ny.gov/divisions/engineering/technical-services/technical-services-repository/alme/NYS DOT_Aproved_List.pdf

#25

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Monday, March 22, 2021 12:03:45 PM
Last Modified: Tuesday, March 30, 2021 9:49:03 AM
Time Spent: Over a day
IP Address: 159.19.100.192

Page 1

Q1

Your contact information:

Name	Wesley Glass
State	KY
Email Address	wesley.glass@ky.gov

Q2

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

Other (please specify):

Submittal of products to NTPEP "Rapid Set Concrete Patch Materials" and posting of data. Review in accordance with ASTM C928.

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Other (please specify):

Submittal of products to NTPEP "Rapid Set Concrete Patch Materials" and posting of data. Review in accordance with ASTM C928.

Q5

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

Standard (Used on 5 or more projects)**Q6**

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

No

Q7

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

None of the above,

If yes, please explain::

Follow manufacturer's recommendations.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Compressive Strength,

If yes or other, please explain::

For early opening to traffic.

Q9

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

None of the above**Q10**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

Not certain concerning issues encountered or any modifications.

Q11

Do you allow calcium chloride in any patching repair materials?

No**Q12**

How does your Agency handle the approval of fast setting patching materials if used in your state?

Submittal of products to NTPEP "Rapid Set Concrete Patch Materials" and posting of data. Review in accordance with ASTM C928.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

3000psi or based on project specific notes.

Q14

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

Not sure.

Q15**No**

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

Q16

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

<https://transportation.ky.gov/Materials/Documents/LAM.PDF>

Q17

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

<https://transportation.ky.gov/Materials/Documents/LAM.PDF>

The KY LAM is in need of updating to comply with NTPEP submittal.

#26

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Wednesday, March 31, 2021 8:41:08 AM
Last Modified: Wednesday, March 31, 2021 1:23:55 PM
Time Spent: 04:42:46
IP Address: 207.152.102.207

Page 1

Q1

Your contact information:

Name	James Krstulovich
State	IL
Email Address	James.Krstulovich@illinois.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Some (Less than 5 projects)**Q4**

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5 **Standard (Used on 5 or more projects)**

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

Q6 **Yes,**

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

If yes, please explain:
Volumetric mixers are required for our Class PP-4 and PP-5 mixtures. Class PP-4 requires rapid hardening cement (basically similar to ASTM C1600 cement products), and Class PP-5 requires CAC.

Q7 **None of the above**

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

Q8 **Air Content,**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Slump,

Compressive Strength,

Flexural Strength,

If yes or other, please explain::
Slump and Air every 50 cuyd or minimum once per day.
Compressive or Flexural strength every 250 cuyd or minimum once per day.

Q9

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

Shrinkage,**Strength,**

If yes or other, please explain.:

Rapid hardening cement shall meet the following: (1) Minimum final set of 10 minutes, according to Illinois Modified AASHTO T 131. (2) Minimum compressive strength of 2000 psi at 3.0 hours, 3200 psi at 6.0 hours, and 4000 psi at 24.0 hours according to Illinois Modified AASHTO T 106. (3) Maximum drying shrinkage of 0.07% at 28 days according to Illinois Modified ASTM C 596. (4) Maximum expansion of 0.04% at 14 days according to Illinois Modified ASTM C 1038. Calcium-aluminate cement shall meet the following: (1) Standard physical requirements of Type I cement according to AASHTO M 85, except the time of setting shall not apply. (2) Chemical requirements shall be determined according to AASHTO T 105 and shall be as follows: minimum 37% aluminum oxide, maximum 42% calcium oxide, maximum 1% magnesium oxide, maximum 0.4% sulfur trioxide, maximum 1.75% loss on ignition, and maximum 7% insoluble residue.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

No**Q11**

Do you allow calcium chloride in any patching repair materials?

Yes,

If yes, please provide additional information.:

Only when specified in the contract. In general cases, when a calcium chloride accelerator is specified in the contract, the maximum chloride dosage shall be 1.0 quart of solution per 100 lb of cement. The dosage may be increased to a maximum 2.0 quarts per 100 lb of cement if approved by the Engineer. When a calcium chloride accelerator for Class PP-2 concrete is specified in the contract, the maximum chloride dosage shall be 1.3 quarts of solution per 100 lb of cement. The dosage may be increased to a maximum 2.6 quarts per 100 lb of cement if approved by the Engineer.

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Prepackaged products are approved according to our submittal requirements included on our QPL:

<https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Materials/Materials-&-Physical-Research/Concrete/rapidhardeningconcrete.pdf>

Rapid hardening cements are approved according to our submittal requirements included on our QPL (forthcoming).

Calcium-aluminate cements are approved on a per lot basis.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Pavement patches can be opened at 250 psi flexural or 1600 psi compressive.

Bridge deck patches have to cure for 72 hours and achieve 675 psi flexural or 4000 psi compressive.

Q14

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

We still have some calcium-aluminate cement patches (Class PP-5 concrete) installed in 2008 in service on I-94/Edens Expressway.

Q15

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

Yes,

Please provide any additional useful information.:

We will be starting a research project looking into non-proprietary UHPC/VHPC in August 2021.

Q16

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

Refer to our Standard Specifications: <https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Construction/Standard-Specifications/Standard%20Specifications%20for%20Road%20and%20Bridge%20Construction%202016.pdf>

Section 442: Pavement Patching

Article 1001.01(d): Rapid Hardening Cement (updated, see below)

Article 1001.01(3): Calcium Aluminate Cement (updated, see below)

Section 1020: Portland Cement Concrete (updated, see below)

Updates to Article 1001.01(d) and Section 1020: <https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Design-&-Environment/BDE-Special-Provisions/80431.pdf>

Update to Article 1001.01(3): <https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Manuals-Guides-&-Handbooks/Highways/Construction/Supplemental-Standards-Specifications/2021%20Supplemental%20Specifications%20for%20Website.pdf>

Q17

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

PACKAGED, DRY, RAPID HARDENING CEMENTITIOUS MATERIALS FOR CONCRETE

REPAIRS: <https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Materials/Materials-&-Physical-Research/Concrete/rapidhardeningconcrete.pdf>

RAPID HARDENING CEMENT: forthcoming

#27

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Wednesday, March 31, 2021 4:24:13 PM
Last Modified: Wednesday, March 31, 2021 5:00:05 PM
Time Spent: 00:35:51
IP Address: 168.166.80.221

Page 1

Q1

Your contact information:

Name	Brett Trautman
State	MO
Email Address	Brett.Trautman@modot.mo.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

CSA cements set very rapidly making it risky to use transit mixers. A volumetric mixer allows the concrete to be produced and placed on the job site.

Q7

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

Curing,

If yes, please explain::

When utilizing CSA cement wet curing is performed for only 4 hours prior to opening to traffic. Missouri does not require a curing compound be applied.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Air Content,**Slump,****Compressive Strength****Q9**

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

Freeze-Thaw,**Shrinkage,****Strength,****Other,**

If yes or other, please explain::

Missouri requires permeability testing in accordance with AASHTO T277.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

The diamond grinding specifications were not modified. Have not had any issues to date.

Q11

Do you allow calcium chloride in any patching repair materials?

Yes,

If yes, please provide additional information.:

Allow maximum 2 percent calcium chloride by weight of cement. Calcium chloride shall be in solution form. Only allow calcium chloride in full depth concrete repair patches.

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

For horizontal repairs (i.e. pavements and bridge decks) products are required to be tested by NTPEP. For vertical and overhead repairs, the material is submitted to the MoDOT Central Laboratory for testing. A test section is constructed and monitored for two years. If satisfactory performance achieved, the product will be placed on the prequalified list.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Full Depth Pavement Repairs - 2,000 psi

Partial Depth Pavement Repairs - 1,600 psi

Bridge Structures - 3,200 psi

Q14

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

Full Depth Concrete Pavement - 15 years

Q15

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

No,

Please provide any additional useful information.:

Please be advised that the NRRRA conducted a study involving field performance of different fast setting repair materials.

Q16

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

Link to MoDOT's Standard Specifications is shown below:

<https://www.modot.org/sites/default/files/documents/2020%20Missouri%20Standard%20Specific%20-%20MHTC%20%28April%202021%29.pdf>

Section 613 Pavement repairs

Section 704 Concrete Masonry Repairs

Rapid Set Patching Material - Horizontal JSP-02-10

https://spexternal.modot.mo.gov/sites/de/_layouts/15/WopiFrame.aspx?sourcedoc={6483C083-3678-489B-B59B-AF6303A60814}&file=JSP0210.doc&action=default

Rapid Setting Patching Materials - Overhead & Vertical JSP-02-01

https://spexternal.modot.mo.gov/sites/de/_layouts/15/WopiFrame.aspx?sourcedoc={30AF5C32-7AD8-4B69-B282-0B68FED4910A}&file=JSP0201.doc&action=default

Q17

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

Rapid Set Patching Material List - Horizontal

https://www.modot.org/sites/default/files/documents/FS704T1_5.pdf

Rapid Setting Patching Materials List - Overhead & Vertical

https://www.modot.org/sites/default/files/documents/FS704T2_2.pdf

#28

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Wednesday, March 31, 2021 1:05:07 PM
Last Modified: Thursday, April 01, 2021 6:15:14 AM
Time Spent: 17:10:06
IP Address: 71.173.202.183

Page 1

Q1

Your contact information:

Name	Joe Cribben
State	PA
Email Address	jcribben@pa.gov

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,
Geopolymer Cement (such as activated fly ash, material from Aquafin)
,
Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
,
Polyester Concrete,
Ultra High Performance Concrete (UHPC),
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3**Standard (Used on 5 or more projects)**

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

Q4

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

Polyester Concrete,

Ultra High Performance Concrete (UHPC),

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Geopolymer Cement (such as activated fly ash, material from Aquafin)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

For some of the approved bag mixes, we allow volumetric mixers

Q7

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

Respondent skipped this question

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Air Content,

Slump,

Compressive Strength,

If yes or other, please explain::

As with any of our concrete placement operations, QC testing is required

Q9

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

Freeze-Thaw,

Shrinkage,

Other,

If yes or other, please explain::

Chloride permeability is also another testing parameter.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

The contractor had issues with the fast setting patching material cracking shortly after being diamond ground. What was discovered was the contractor never added the #8 aggregate extender to the mix because the repair depth was in excess of 2". Once the contractor started adding the aggregate extender to the patches greater than 2" in depth they cracking issue disappeared.

Q11

Do you allow calcium chloride in any patching repair materials?

No**Q12**

How does your Agency handle the approval of fast setting patching materials if used in your state?

As with any material, the manufacturer must submit samples and data which are reviewed and tested against ASTM and AASHTO standards. We have a Product Evaluation process and once approved the material is listed in the Department's Bulletin 15.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

1200 psi

Q14

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

10+ years

Q15

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

No**Q16**

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

http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2020/408_2020_IE/408_2020_IE.pdf

Sections 516, 525,1046, and 1047 list specifications for approved materials for concrete patching on pavement and bridge decks.

Q17

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

http://www.dot.state.pa.us/public/pdf/bocm_mtd_lab/publications/pub_35/current_edition/bulletin15.pdf

Sections 516, 525,1046, and 1047 list approved materials for concrete patching on pavement and bridge decks.

#29

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Thursday, April 01, 2021 2:39:09 PM
Last Modified: Thursday, April 01, 2021 3:27:41 PM
Time Spent: 00:48:32
IP Address: 47.28.205.157

Page 1

Q1

Your contact information:

Name	Bob Rothwell
State	WY
Email Address	bob.rothwell@wyo.gov

Q2

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

Polyester Concrete,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)
 ,
 Other (please specify):
 We use latex modified concrete on bridge decks

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Respondent skipped this question**Q5**

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

Standard (Used on 5 or more projects),
 Other (please specify):
 Use for such items as spalls, spalled joints, corner breaks

Q6

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

Yes,
 If yes, please explain:
 For latex modified concrete

Q7**None of the above**

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

Q8

Air Content,
Slump,
Compressive Strength,

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

If yes or other, please explain::
For silica fume and latex

Q9

Freeze-Thaw,
Shrinkage,
Strength,

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

If yes or other, please explain::
For QPL require results from independent laboratory

Q10

Yes,
If yes, please explain::
no modification

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11**No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Typically use preapproved list or certification

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Typically 3000 psi

Q14

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

Probably a few latex overlay lasting 30+ years but not typical

Q15

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

Yes,

Please provide any additional useful information.:
Conducted research on silica fume modified concrete overlays

Q16

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

Section 810 Concrete Repair of Standard Specification

<http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Construction/2021%20Standard%20Specifications/Wyoming%202021%20Standard%20Specifications%20for%20Road%20and%20Bridge%20Construction.pdf>

Fast setting patching handled by special provisions, links not available

Q17

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

http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Materials/Qualified%20Products/Qualified%20Products%2008_28_2019.pdf

#30

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, April 02, 2021 10:34:35 AM
Last Modified: Friday, April 02, 2021 10:44:12 AM
Time Spent: 00:09:37
IP Address: 205.174.143.2

Page 1

Q1

Your contact information:

Name	Drew Waldrop
State	AL
Email Address	waldropa@dot.state.al.us

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,
Polyester Concrete,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6**No**

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

Q7**None of the above**

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

Q8**Compressive Strength**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Q9**Strength,**

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

Other,

If yes or other, please explain::

All patching materials must be on List III-2, which requires participation in the NTPEP RSCP program.

Q10**Yes,**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

If yes, please explain::

I'm sure patched sections of pavement have been ground as part of a rehab project, but in Alabama, any ground pavement would be covered with OGFC or similar. So it would be difficult to assess if we have any performance issues after grinding.

Q11**No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

NTPEP RSCP evaluation.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Bridges: 2400 psi or 6 hours.

Pavement: 3000 psi or 6 hours.

Q14

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

For pavements, Fibercrete has been used extensively in the Birmingham Area. For Bridges, XJS expansion joint system repairs have been extensively used. Cases of both of these products have been in service for 10+ years now without issue.

Q15**No**

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

Q16

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

Section 453 <https://www.dot.state.al.us/conweb/pdf/Specifications/2018StandardSpecificationsCompleteBook.pdf>

List III-2 Evaluation & Maintenance Procedure: <https://www.dot.state.al.us/mtweb/Testing/MSDSAR/pdf/Pro/Piii02.pdf>

Q17

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

<https://www.dot.state.al.us/mtweb/Testing/MSDSAR/pdf/QMSD/Liii02.pdf>

#31

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, April 02, 2021 10:52:53 AM
Last Modified: Friday, April 02, 2021 11:04:21 AM
Time Spent: 00:11:28
IP Address: 167.131.0.194

Page 1

Q1

Your contact information:

Name	David Dobson
State	OR
Email Address	david.dobson@odot.state.or.us

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)

,

Polyester Concrete,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)

,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

We utilize volumetric mixers frequently for CSA cement based mix designs. Bagged mixes can be utilized for smaller patches, but the majority of larger patches for both bridge decks and pavement is done with volumetric mixers. We have calibration requirements, but no official certification required.

Q7

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

Curing,

If yes, please explain::

Cure duration is decreased for rapid set materials. Bridge patches typically require a 3 hour wet cure. Depending on traffic control, a curing compound is used in place or in addition to wet cure.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Air Content,**Slump,****Compressive Strength****Q9**

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

Shrinkage,**Strength,****Other,**

If yes or other, please explain::

Set time

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

No**Q11**

Do you allow calcium chloride in any patching repair materials?

No**Q12**

How does your Agency handle the approval of fast setting patching materials if used in your state?

We utilize product review criteria for submittal to the QPL. Patching is done with QPL materials.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Patches require 2,500 psi prior to returning to traffic.

Q14

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

Unknown, >10 years

Q15

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

Yes,

Please provide any additional useful information.:
Oregon State University is performing research on CSA and CAC cements for bridge deck overlays. A supplemental outcome of the research will likely be additional information regarding patching materials. The research is in the early phase of material acquisition. Many of the materials identified for the study are bagged fast setting repair materials.

Q16

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

<https://www.oregon.gov/odot/Business/Pages/Special-Provisions.aspx>

Q17

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

https://www.oregon.gov/odot/Construction/Doc_ProductReview/pcc_repair.pdf

#32

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, April 02, 2021 10:37:32 AM
Last Modified: Friday, April 02, 2021 11:12:29 AM
Time Spent: 00:34:57
IP Address: 146.243.160.4

Page 1

Q1

Your contact information:

Name	Richard Mulcahy
State	MA
Email Address	richard.mulcahy@dot.state.ma.us

Q2

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

Other (please specify):

Rapid Set Concrete Patch Materials and Volumetric Mixer
Rapid Hardening Concrete

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Other (please specify):

MassDOT currently does not produce cement concrete for pavement. However, rapid set concrete materials and volumetric mixer rapid hardening concrete is used to repair bridge decks quite often (Used on 5 or more projects).

Q5

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

None,

Other (please specify):

MassDOT currently does not produce cement concrete for pavement. However, rapid set concrete materials and volumetric mixer rapid hardening concrete is used to repair bridge decks quite often (Used on 5 or more projects).

Q6

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

Yes,

If yes, please explain:

Volumetric mixer rapid hardening concrete is used to repair bridge decks quite often. It is also used for closure pours. The cement of choice for all of our volumetric mixer companies that produce rapid hardening concrete is CTS LOW P FA1 (Fly Ash Blend) - Cypress, CA.

Q7

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

Curing,**Surface Preparation,**

If yes, please explain::

We currently do not have a standard specification, but we have different special provisions for each contract. Curing and Surface Preparation criteria is generally mentioned in contract special provisions. An effort is being undertaken to make a single standard specification.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Air Content,**Slump,****Compressive Strength,****Flexural Strength,****Other,**

If yes or other, please explain::

AASHTO T 121 / T 152 / T 196 Air Content: 3 to 7%
AASHTO T 119 Slump: Suggested 7 to 9 in, however not required
AASHTO T 22 Compressive Strength: 4 hours >2500 psi, 7 days > 5000 psi, 28 days > 7000 psi
AASHTO T 97 Flexural Strength: 4 hours > 400 psi, 7 days > 650 psi, 28 days >800 psi
AASHTO T 318 Water-Cementitious (w/cm) Ratio Estimate: Verify within close conformity to design w/cm target
AASHTO T 358 Chloride Ion Penetration Resistance, Surface Resistivity: 7 days > 21 kΩ-cm Or
AASHTO TP 119 Chloride Ion Penetration Resistance
Uniaxial Resistivity: 7 days > 10 kΩ-cm

Q9

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

Freeze-Thaw,**Shrinkage,****Strength,****Other,**

If yes or other, please explain::

AASHTO T 161 (A) Freezing and Thawing Resistance, Durability Factor: 300 Cycles > 80 AASHTO T 160 Unrestrained Volume Change: 28 Days < 0.04% ASTM C1581 Restrained Shrinkage: 28 Days No Cracking (Cracking is defined as the sudden decrease in compressive strain greater than 30 $\mu\epsilon$) AASHTO T 22 Compressive Strength: 4 hours >2500 psi, 7 days > 5000 psi, 28 days > 7000 psi AASHTO T 97 Flexural Strength: 4 hours > 400 psi, 7 days > 650 psi, 28 days >800 psi ASTM C882 Bond Strength: 24 hours >1200 psi, 7 days > 1900 psi, 28 days > 2200 psi AASTHO T 197 Time of Initial Set and Final Set: Suggested Initial Set Target of 30 min., Suggested Final Set Target of 40 min, however not required. AASHTO T 318 Water-Cementitious (w/cm) Ratio Estimate: Verify within close conformity to design w/cm target AASHTO T 358 Chloride Ion Penetration Resistance, Surface Resistivity: 7 days > 21 k Ω -cm Or AASTHO TP 119 Chloride Ion Penetration Resistance Uniaxial Resistivity: 7 days > 10 k Ω -cm

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

No**Q11**

Do you allow calcium chloride in any patching repair materials?

No**Q12**

How does your Agency handle the approval of fast setting patching materials if used in your state?

Use the test results form National Transportation Products Evaluation Program (NTPEP) for Rapid Set Concrete Patch Materials. For Volumetric Rapid Hardening Concrete, perform annual verification and trial batch testing on each volumetric mixer.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

AASHTO T 22 Compressive Strength: For the most part, 2500 psi seems to be a common parameter in the special provisions.

Q14

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

Not sure, but the rapid set concrete patch materials are always thought of as "temporary" while the volumetric mixer rapid hardening concrete repairs are thought of as more permanent.

Q15

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

Yes,

Please provide any additional useful information.:

Perhaps not exactly research, but we do have plenty of test data from over the 10 plus years we've utilized these materials.

Q16

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

There is no standard as of yet, however, I am working with industry to develop a standard specification. For those how want to reach out for an information on that, they may reach me at richard.mulcahy@dot.state.ma.us.

Q17

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

<https://www.mass.gov/service-details/rapid-set-concrete-patch-materials-horizontal-verticaloverhead>

<https://www.mass.gov/service-details/approved-cement-concrete-producer-contact-information>

<https://www.mass.gov/info-details/cement-concrete-producers-approved-mix-designs>

#33

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Friday, April 02, 2021 1:16:09 PM
Last Modified: Friday, April 02, 2021 1:20:32 PM
Time Spent: 00:04:22
IP Address: 204.62.22.65

Page 1

Q1

Your contact information:

Name	Kenny Seward
State	OK
Email Address	kseward@odot.org

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Calcium Aluminate Cement (Such as Kerneos Aluminate product) or CAC cement)
 ,
Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
 ,
Ultra High Performance Concrete (UHPC),
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)

Q4

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5 **Standard (Used on 5 or more projects)**

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

Q6 **Yes**

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

Q7 **None of the above**

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

Q8 **Air Content,
Slump,
Compressive Strength**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Q9 **Strength**

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

Q10 **Yes**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Q11 **No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Project by Project.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

3,000 psi

Q14

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

Not sure.

Q15**No**

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

Q16

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

None

Q17

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

Not on APL

#34

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Thursday, April 01, 2021 8:03:34 AM
Last Modified: Friday, April 02, 2021 3:29:00 PM
Time Spent: Over a day
IP Address: 156.75.252.6

Page 1

Q1

Your contact information:

Name	Bouzid Choubane
State	FL
Email Address	Bouzid.Choubane@dot.state.fl.us

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
 ,
Ultra High Performance Concrete (UHPC),
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
 ,
Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6**No**

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

Q7**None of the above**

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

Q8**Other,**

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

If yes or other, please explain::

Prepackaged or on APL - no field testing. High early strength ready mix - slump, air, and compressive strength.

Q9**Shrinkage,**

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

Strength,**Other,**

If yes or other, please explain::

Bond strength.

Q10**Yes,**

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

If yes, please explain::

High early ready mix concrete typically for slab repairs. Depends on area of repair. No known issues related to diamond grinding.

Q11**No**

Do you allow calcium chloride in any patching repair materials?

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

Prepackaged - Manufacturers submit products with supporting documents for approval. The Department performs tests to verify performance.

High early mix - requires trial batching.

Q13

What strength does your Agency require patches to achieve before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Prepackaged - Manufacturer's recommendations or as specified in the Project Plans.

High early ready mix - 1600 psi for pavement, design strength for bridge decks.

Q14

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

No data.

Q15**No**

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

Q16

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

https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/specbooks/july2021/7-21ebook.pdf?sfvrsn=9a1c9abf_4

Sections 346, 353, 926, 930

Q17

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

<https://fdotwp1.dot.state.fl.us/ApprovedProductList/Specifications?specificationRange=900&IsDevSpec=False>

926 and 930

#35

COMPLETE

Collector: Web Link 3 (Web Link)
Started: Wednesday, March 17, 2021 3:43:54 PM
Last Modified: Wednesday, April 07, 2021 2:56:45 PM
Time Spent: Over a week
IP Address: 151.111.143.1

Page 1

Q1

Your contact information:

Name	Gordon Bruhn
State	MN
Email Address	gordon.bruhn@state.mn.us

Q2

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,

Magnesium Phosphate Cement (such as Phoscrete or MasterEmaco® T 545 HT)
,

Polyester Concrete,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q3

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

Standard (Used on 5 or more projects)**Q4**

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

Non-shrink or Shrinkage Compensating Cements (Such as Rapid Set, CSA or Type K cement)
,

Accelerated Portland Cement Concrete (by using silica fume and/or accelerating admixtures)

Q5

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

Standard (Used on 5 or more projects)

Q6

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

Yes,

If yes, please explain:

The fast setting cement is delivered in 3000# supersacks, Mobile mixer then extends the material with up to 50% by mass. depending on the condition of the mobile mixer, At times the mobile mixer will discharge into a skid steer mud mixer for additional mixing time and subsequent placement into the PDR's.

Q7

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

Surface Preparation,

If yes, please explain::

To prep PDR's holes we follow the manufactures recommendation and use Hudson Sprayer to mist the sub straight just prior to backfilling. Generally, when backfilling with a standard repair mix, a bonding grout of cement, sand, and water is applied to the sub-straight just prior to backfilling the PDR. Along with pretesting requirements, UHE manufacture needs to provide a signed statement stating; MnDOTS means and methods for prepping PDR's are acceptable.

Q8

Does your Agency require field testing on the fast setting patching materials? (Check all that apply)

Compressive Strength,

Flexural Strength,

If yes or other, please explain::

for info only, standard strength 28-day lab cylinders are cast. Three field cured cylinders would also be cast to determine when the repair has adequate strength to open to traffic or construction equipment

Q9

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

Freeze-Thaw,

Shrinkage,

Strength,

If yes or other, please explain::

MnDOT requires ASTM 928 testing to be placed on the APL. We would also require ASTM 928 testing again with the extender rock. once this is completed the product remains on the APL for 5 years.

Q10

Has your Agency diamond ground any of the fast setting patching materials? Any performance issues after diamond grinding? Did you have to modify any of the diamond grinding specifications?

Yes,

If yes, please explain::

no problems with grinding. we do chain all the pdr's after the grind to determine if the UHE remains bonded after the grinding. We always seem to find a few repairs that are not bonded. the Contractor would then need to remove and replace those repairs that are not bonded at their expense. FYI my experience with UHE concrete patch mix is, UHE concrete backfill is by far more prone to shrinkage cracks. Cracks that would required removal and replacement when utilizing MnDOT's standard repair mix, PDR's that are not bonded always require removed and replaced at the Contractors expense.

Q11

Do you allow calcium chloride in any patching repair materials?

No

Q12

How does your Agency handle the approval of fast setting patching materials if used in your state?

To get on the rapid set APL, MnDOT requires the rapid-hardening be ASTM 928 testing. Then once the Contract is awarded, MnDOT would write in the contract documents the product the contractor chooses use (from the rapid hardening APL) needs to be ASTM 938 tested again with the locale aggregate source that will be used to extend the Prepackaged Rapid-Hardening Concrete Material on the repair project. Aggregate extensions are limit to 50% by mass.

MnDOT requires all repair mixes be air entrained, including Ultra High Early bag mixes. Requiring air entrainment has vastly improved the durability of Rapid set mixtures.

MnDOT testing requirements include ASTM 666 Procedure. with a requirement of RDM of 80% requirement at 300 cycles.

ASTM C157 (modified by ASTM 928) no greater than .050% shrinkage at 28 days.

ASTM C457 Hardened air content requires a spacing factor of less than or equal to 0.008 inch

N

Q13

What strength does your Agency require patches to acheive before they are open to traffic? If different for bridge structures vs. pavements, please indicate.

Partial depth repairs on bridges and PCCP require 3000 psi prior to opening to construction equipment or opening to the public.

Full depth repairs require 2000 psi prior to opening to either construction equipment or public travel.

Q14

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

2009 the UHE ready mix used in full depth repairs are performing no differently than a standard mix.

Regarding partial depth repairs, on this project, the UHE backfill is exceeding every expectation I had. yes some PDR's have failed and been patched with bit. But, I would say the UHE patch mix material used on this project is performing nearly as well, if not as well as MnDOT's standard PDR patch mix.

But I have used other types of prebagged UHE mixtures that have not performed nearly as well. My belief is some bagged UHE are susceptible durability issue when the Contractor exceeds the recommend water content.

On a project constructed in 2011, the same Contractor used two different UHE mixes extended at 50% by mass and the same source of aggregate. Even though both mixes pass the testing requirement out lined in question 12, the durability performance was not the same. The same mix used on the 2009 project performed very well. The second bagged UHE mix did not perform nearly as well. The second mix had severe freeze thaw damage after 10 years.

Q15**No**

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

Q16

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

<http://www.dot.state.mn.us/products/concrete/pdf/MnDOTApprovedPackagedDryNon-ShrinkRapid-HardeningConcreteProcedures2018.pdf>

The testing requirements to place a DBR backfill product on the MnDOT's APL are the same as what MnDOT would require for a UHE product the would be used for backfilling PDR's. In other words, If a UHE product is on MnDOT's APL for dowel bar retrofits, that product also could also be used to backfill PDR's.

Standard CPR Spec. S-145 (2302) CONCRETE PAVEMENT REHABILITATION (CPR)
<http://www.dot.state.mn.us/pre-letting/prov/index.html>

Q17

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

<http://www.dot.state.mn.us/products/concrete/pdf/MnDOTApprovedPackagedDryNon-ShrinkRapid-HardeningConcreteProcedures2018.pdf>

Qualification process for DBR concrete backfill is the same as what would be required if the project required UHE concrete for PDR's