Concrete Structures – General

Revision and Approval

Revision	Date	Nature of Changes	Approved By
0	01-05-2023	Original Issue	Richard Foley

Click here to request previous versions Contact SC Technical Team F for questions

Background

This process establishes Structure Construction (SC) responsibilities and procedures for review and authorization of submittals, quality assurance, and department acceptance of concrete structures. Special topics include but are not limited to:

- Submittals for methacrylate crack treatment public safety plans, concrete forms, deck placement work plans, contractor-proposed precast member shop drawings, permanent steel deck forms, bonding materials, rapid strength concrete, grout, mortar, chemical adhesives, colored concrete, and hinge tiedowns.
- Quality control for rapid strength concrete and test panels.
- Department acceptance procedures for testing concrete surfaces coefficient of friction, surface smoothness, and crack intensity.

For materials acceptance, use this Bridge Construction Memo (BCM) in conjunction with:

- BCM 90-1, *Concrete – General*

For concrete placement, use this BCM in conjunction with:

- BCM 51-1.03C-D, *Concrete Structures – General – Construction – Preparation and Placing Concrete*

For additional department acceptance criteria for finishing roadway surfaces, refer to

- BCM 51-1.03F(5-6), *Concrete Structures – General – Construction – Finishing Concrete – Finishing Roadway and Pedestrian Overcrossing Surfaces*

Prior to reviewing this BCM, it is essential to review the *Contract Specifications (CS)*, Section 51-1.01, *Concrete Structures – General,* that this BCM is based on as identified in the title block above. Information in the *CS* typically will not be repeated in the text of this BCM.

Process Inputs

1. Action and informational submittals related to concrete structures
2. Material samples
3. Form CEM-3101, *Notice of Materials to be Used*

Procedure

1. All work associated with this process is charged as Project Direct – Construction.
2. Inspection of field work for this process is:
   a. Benchmark for form work
   b. Intermittent for rebar placement
   c. Continuous for concrete pour.
3. Before construction begins, the Structure Representative or delegate must:
   a. Review and understand the requirements in the contract documents and perform the tasks as applied for each section of the *CS*, Section 51-1.01C, *Concrete Structures – General – Submittals*, listed below for:
      i. General:
         1. Review all submittals per contract documents. Authorize or reject action submittals in writing.
         2. Review the *Reinforced Concrete Construction Manual,* especially Chapter 7, *Bridge Deck Construction,* for guidance on testing roadway surfaces.
         3. If multiple submittals are turned in simultaneously, work with the Contractor on a prioritization list.
         4. Refer to and review BCM 51-1.03H, Attachment 1, *Bridge Deck Crack Prevention.*
         5. Determine if precast shop drawings and/or concrete form design is required. Review and authorize, or reject in writing.

ii. Permanent steel deck forms:

1. Review and authorize or reject permanent steel deck form submittal. Notify the Contractor in writing.
2. Refer to the *Concrete Technology Manual*, Chapter 5, *Concrete Construction,* page 5-13*, Metal Decking*, for guidance.

iii. Bonding materials:

1. Discuss with the Contractor the requirements listed by the manufacturer (necessary equipment, substrate preparations, weather).
2. Refer to the Materials Engineering and Testing Services (METS) Authorized Materials List. For previously authorized bonding material, obtain a certificate of compliance (COC) for each material shipment.
3. Contact METS for materials not on the Authorized Materials List.

iv. Rapid strength concrete (RSC):

1. Review and authorize or reject submittals. Notify the Contractor in writing.
    a. During review of the RSC mix design submittal, note the prequalification results that yield the age of break and opening age in hours.
2. Review RSC work placement plan and contingency plan. Discuss both with the Contractor at the preconstruction meeting mentioned below.
    a. If the Contract does not require a preconstruction meeting, it is highly advisable to hold a pre-pour meeting with the Contractor prior to concrete placement operations. See BCM 90-1, *Concrete – General*, for details.
3. Based on the application for RSC and if required per contract, ensure the following requirements are met:
    a. Contractor has a quality control (QC) manager to complete the responsibilities found in the *CS*.
    b. Conduct a preconstruction meeting in accordance with the *CS.*
    c. Construction of a mock-up:
        i. Witness mock-up casting and authorize or reject it based on the contract requirements.
        ii. Determine the opening age of RSC.

v. Drill and bond dowel - chemical adhesive:

1. Review chemical adhesive informational submittal and verify a COC is included.

2. Collect material samples and submit to METS for testing, per contract requirements.
3. Assure weather conditions during application are within the acceptable parameters provided by the manufacturer.

vi. Colored concrete:

1. Review and authorize or reject colored concrete submittal in writing.
2. Coordinate with the Contractor and the District Landscape Architect to discuss contract color (location of referee sample).

vii. Hinge tiedowns:

1. Review and authorize or reject shop drawing submittal in accordance with the contract documents.

b. Provide METS with a copy of Form CEM 3101, *Notice of Materials to be Used,* for items requiring METS testing/inspection services.

c. Witness preparation and construction of test panel(s):

i. Confirm construction and finishing methods for constructing test panels meet the requirements of the contract documents and authorized submittals.

ii. Inform the District Landscape Architect that test panels have been completed and obtain their concurrence.

1. For a building project, coordination with the Structures & Engineering Services Project Architect may be required.

iii. Authorize the test panels after the Contractor meets the requirements of the contract documents.

4. During construction, the Structure Representative or delegate must:

a. Ensure that the Contractor's crews have the latest authorized submittals and verify field compliance with the same.

b. Verify conditions are consistent with the contract documents and authorized submittals.

i. If field conditions merit a change to the authorized submittals, then discuss with the Contractor and request a remedy which may involve a resubmittal.

ii. Perform material sampling and testing per the *CS*.

c. Document all inspection, construction, and quality assurance activities, pertinent to this BCM, in the daily reports per BCM C-7, *Daily and Weekly Reports.*

5. Following construction, the Structure Representative or delegate must:

a. Confirm the opening age strength requirement has been met before authorizing opening of the newly placed section to traffic.

b. Implement contingency plan if necessary.

c. Determine acceptability of work in accordance with the *CS* by performing the following tests:

   i. Surface smoothness per California Test 547, *Method of Test for Surface Smoothness Using the Bridge Profilograph.* See Attachment 1, *Letter to Contractor Following Surface Smoothness Testing,* for additional guidance.

   ii. Coefficient of friction per California Test 342, *Method of Test for Surface Skid Resistance with the California Portable Skid Test.* See Attachment 2, *Friction Testing of Bridge Decks,* for additional guidance.

   iii. Crack intensity - review the *Reinforced Concrete Construction Manual,* Chapter 7, *Bridge Deck Construction*, which has guidance on this topic.

   iv. Plan tests in advance to ensure equipment and personnel availability.

6. File all project documentation (materials acceptance documentation, correspondence, daily reports, etc.) in the appropriate category in the project records as specified in the *Construction Manual*, Section 5-102, *Organization of Project Documents*.

Process Outputs

1. Authorized submittals
2. Authorized test panel(s)
3. Materials incorporated into the work conforming with contract requirements
4. Concrete placement records

Attachments

1. Attachment 1, *Letter to Contractor Following Surface Smoothness Testing*
2. Attachment 2, *Friction Testing of Bridge Decks*