



General – Freeze-Thaw Areas

Revision and Approval

Revision	Date	Nature of Changes	Approved By
0	04-22-2019	Original issue.	Steve Altman

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Background

This process establishes Structure Construction (S.C.) responsibilities and procedures for verifying that applicable concrete freeze-thaw preservation measures are incorporated in the finished construction project. Design details which have produced adequate structures in mild climates have resulted in expensive maintenance problems on structures which are subject to the freeze-thaw cycle, deicing chemicals, and chain wear.

Caltrans Bridge Memo to Designers (M.T.D.) [8-2](#), *Protection against Deicing Chemicals and Freeze-Thaw Environment*, [Attachment 3](#), *Freeze-Thaw Areas*, identifies severe climate areas that can be exposed to freeze-thaw conditions. The severe climate areas are listed by County, State Route, and post-mile limits. M.T.D. 8-2 is used to verify that a project is in a severe weather area and requires additional design consideration, such as the use of corrosion resistant reinforcing steel, modifications to the concrete mix design, and curing methods. Structures located near severe weather areas may be exposed to deicing chemicals that are carried by vehicle traffic.

Prior to reviewing this Bridge Construction Memo (B.C.M.), it is essential to review the [Contract Specifications](#) 1-1.09, *General – Freeze-Thaw*, applicable to your specific project, that this B.C.M. is based on as identified in the title block above. The information in the contract specifications typically will not be repeated in the text of this B.C.M.

Process Inputs

1. Trigger activity from process sequence for bridges, sign structures, buildings, walls, project development teams, or constructability reviews
2. Location of the project
3. Freeze-thaw requirements listed in the contract documents

Procedure

1. All work associated with this process is charged as [Project-Direct – Construction](#), or [Project-Direct – Preconstruction](#).
2. Inspection of field work for this process is:
 - a. [Benchmark](#) as needed for verification of reinforcing steel freeze-thaw requirements.
 - b. [Continuous](#) for concrete placement activities.
3. Before construction begins:
 - a. Review [Concrete Technology Manual](#) for freeze thaw background information.
 - b. Verify project locations and whether any are in a freeze-thaw area. If the project is not in a freeze-thaw area do not perform the following steps.
 - c. Verify required freeze-thaw elements are included in the contract documents.
 - d. Discuss any discrepancies with project locations and freeze-thaw areas with the Project Designer and prepare a change order if necessary.
 - e. Discuss freeze-thaw requirements, such as epoxy coated reinforcement samples for Materials Engineering and Testing Services (M.E.T.S.), with the Contractor at the pre-construction conference.
 - f. Verify all concrete mix designs for severe weather freeze-thaw areas meet contract requirements per [B.C.M. 90-1.01C](#), *Concrete – Submittals*.
4. During construction:
 - a. For epoxy-coated reinforcement:
 - i. Inspect, handle, and store in accordance with the Special Provisions, [B.C.M. 52-2.01A\(3\)](#), *Reinforcement – Epoxy-Coated Reinforcement and Epoxy-Coated Prefabricated Reinforcement*, and the *Construction Manual*, Section [4-52](#), *Reinforcement*.
 - ii. Verify epoxy-coated reinforcement has been approved by M.E.T.S.

- iii. Provide minimum concrete cover as shown in contract documents.
- b. For concrete:
 - i. Verify delivered concrete meets the authorized concrete mix design submittal requirements (e.g., air entrainment).
 - ii. Perform required freeze-thaw concrete field testing (air entrainment) in accordance with *Construction Manual*, [Table 6-1.17](#), *Materials Acceptance Sampling and Testing Requirements: Concrete*.
 - iii. Verify concrete curing method complies with contract documents (e.g., water method for concrete barriers).
- c. For additional details needed in freeze-thaw environment (e.g., bent sealing under deck expansion joints, polyester concrete overlay, etc.), perform work in accordance with Special Provisions and applicable B.C.Ms.
- d. Collect, review, and file certificates of compliance (e.g., concrete, epoxy-coated rebar).
- e. Document all inspection and construction activities for freeze-thaw requirements in the Daily Reports per [B.C.M. C-4.04](#), *Daily and Weekly Reports*.
- f. File all test results and Daily Reports in the appropriate category in the project records as specified in the Construction Manual [5-102](#), *Organization of Project Documents*.

Process Outputs

1. Materials incorporated into the work meet the contract specifications for freeze-thaw. Certificates of compliance (e.g., concrete, epoxy-coated rebar):
2. Daily Reports: Document all inspection and construction activities for freeze-thaw requirements in the Daily Reports per [B.C.M. C-4.04](#), *Daily and Weekly Reports*

Attachments

None