METHODS OF SAMPLING AND TESTING
MT 111-12
SAMPLING, INSPECTION AND REPORTING ON PRESTRESSED STRUCTURAL MEMBERS

1 Scope

1.1 This method is written to the individuals completing inspection and establishes a uniform procedure for the sampling, inspecting, and reporting of pre-stressed structural members.

1.2 Inspection Process Overview

1.2.1 Provide data to the field as it becomes available. Send original test results and reports to MDT Helena Materials Lab (to be placed in the job file), keep one copy in the Inspectors personal file, and send one copy to the Project Manager for the project file.

1.2.2 Send an inspection report with each beam to the project. Provide copies to the EPM, District Materials Lab, the Construction Bureau, and the Materials Bureau. This report must state that all of the materials used in the completed beams have been sampled, tested, and documented within reports that are in the possession of the Plant Inspector. Identify the beams by number and place in the report file as an indication that the beams are complete and acceptable subject to final field inspection.

1.2.3 The following links provide access to the Department's most current forms to be used during Prestress Inspection:

Strand Tensioning & Cylinder Breaks
Form 45 – Rebar or Strand Sample
Form 48 – Shipping & Final Approval
Form 48A – Final Plant Inspection
Ready Mix Pour Record
Fabrication Inspection Report
Miscellaneous Inspection Report

2 Referenced Documents

AASHTO Methods

T 24 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
T 119 Slump of Hydraulic Cement Concrete
T 152 Air Content of Freshly Mixed Concrete by the Pressure Method
T 347 Slump Flow of Self-Consolidating Concrete

MT Materials Manual

MT 101 Making and Curing Compressive and Flexural Strength Test Specimens
MT 108 Sampling and Certification of Portland Cement
MT 117 Making and Curing Concrete Compressive and Flexural Strength Specimens in the Field for Self Consolidating Concrete (SCC)
MT 118 Method of Determining Air Content of Freshly Mixed Self Consolidating Concrete by the Pressure Method
MT 201 Sampling Roadway Materials

3 Materials

3.1 Materials used in the manufacture of pre-stressed beams are covered individually to avoid any misunderstanding on the part of the Plant Inspectors.

3.2 Sample and test aggregates will be sampled and tested quarterly in accordance with MT 201. If new sources or deviations in material properties are apparent, resample aggregates as necessary for quality assurance.

3.3 Cementitious materials and admixtures are listed on the Department's Qualified Products. Verify that the mix design has been approved by the Helena Materials Bureau and appropriate material types and quantities are used.

3.4 Wire strand is tested in the Materials Bureau. Submit samples with a Form 45, a copy of the mill test results of the load elongation curve, and associated documentation to meet Buy America requirements. The pre-stress plant is responsible for notifying the Plant Inspector when shipments of strand are received at the pre-stress plant. Sample strand by obtaining two 5 foot (1.5 m) long sections from a reel in the shipment. Submit these samples together with reel numbers, heat numbers, and all available information such as size, strength, etc., to the Materials Bureau for testing. Strand or any other item or ingredient used in the manufacture of a structural member prior to test results being received by the Plant Inspector are at the plant's risk. Reject members constructed with strand that does not meet Department requirements.

3.5 Sample reinforcing steel as each new shipment arrives at the plant. The pre-stress plant is responsible for notifying the Plant Inspector when shipments of rebar are received at the pre-stress plant. Submit two 3 foot (1.0 m) long samples of each bar size to the Materials Bureau with a Form 45 and associated documentation required to meet Buy America requirements. Verify that all of the pertinent information is shown on the accompanying reports.

3.6 Witness the casting of cylinders representing release breaks by the pre-stress plant personnel. Witness or cast the cylinders for acceptance of twenty-eight day strength testing in accordance with MT 101. Ensure that a set of at least 3 cylinders are fabricated for each pour in addition to release cylinders of a sufficient number to perform the required tests prior to release of the strand per Specification Subsection 553.03.11 Transfer of Pre-stress (minimum of 3 cylinders).

4 Plant Inspection and Acceptance

4.1 Review all documentation to verify conformity with contract requirements. For typical documentation requirements, see Specification Subsections 553.02 and 553.03.

4.2 Verify that the bed layout measurements have been checked by plant personnel and are in agreement with the approved shop drawings.

4.3 Verify strand patterns are in agreement with the approved shop drawings prior to tensioning. Check strands for strength and elongation (temperature correction) as provided on the approved shop drawings. Document and notify pre-stress plant personnel of any materials used in the beam that have not been sampled and tested in accordance with Section 3.1.3.

4.4 Verify that the rebar cage layout has been checked by pre-stress plant personnel and is in accordance with contract requirements. Document and notify pre-stress plant personnel of any materials used in beam that have not been sampled and tested in accordance with Section 3.1.4.

4.5 Verify that a final pre-pour inspection occurs prior to forms being set. Obtain a copy of the plant's pre-pour inspection form which must include details on the placement of inserts, bulkheads, bearing plate locations, and all other applicable details.

4.6 Visually check forms for proper placement. Verify that remaining steel and lift hooks have been included in accordance with approved shop drawings prior to concrete placement.

4.7 Witness concrete tests and cylinder breaks to verify requirements of Section 3.1.5 and Specification Sections 553.03.10 and 553.03.11 are met. After forms are removed, visually inspect before allowing the strand release (cutting of strands). If repairs are necessary, do not allow strand release until repairs are completed and are cured for a minimum of 24 hours.

4.7.1 Record pour placement times and field verification information using the "Ready Mix Pour Record" when pre-stress items are constructed using ready mix concrete.

4.8 Perform Final Inspection to ensure the finished member meets plan dimensions. Document the Final Inspection on Form 48-A.

4.8.1 Mark each pre-stress member that conforms to specification requirements in all respects with a Circle M stamp (see Fig.1) before shipment from the plant. This identifying mark indicates that fabrication procedures, quality of materials and workmanship are satisfactory and the member is complete at the plant.

4.8.2 If deficiencies are identified, notify the Physical Testing Engineer, Bridge Bureau and Project Manager of the concerns and determine the corrective actions that are required. Do not mark these members with a Circle M stamp unless corrective actions have been completed and no additional concerns exist. Absence of a Circle M stamp indicates that the member is not complete or deficiencies have been observed by the Plant Inspector and additional corrective actions may be required. Note any deficiencies on the Pre-stress Beam - Final Plant Inspection Check List (Form 48-A). Noted deficiencies not corrected before shipment will be transmitted to the field with the Pre-stressed Beam Report Lab Form 48.



Figure 1
CIRCLE M STAMP

5 Field Inspection and Acceptance

5.1 When the product arrives at the job site, inspect members for shipping and handling damage or other defects. Notify the Project Manager of any damage or defects observed in the field.

5.2 Final acceptance of the member is made in the field in accordance with the contract. Ensure any deficiencies identified on the Pre-stressed Beam Report (Form 48) are addressed before final acceptance. Project Manager may reject any product that does not serve the necessary function or fails to meet contract requirements.

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