MN Concrete Flatwork Specifications for Local Agencies

- **Approved** for use on Local Government Agency Projects and State Aid funded projects
- **Not approved** for use on local federal-aid projects or projects within the Trunk Highway right-of-way. These projects must continue to follow the guidelines of the MnDOT Standard Specifications for Construction
Mn Concrete Flatwork Specifications for Local Agencies

• Developed for less agency inspection and greater contractor responsibility
• Intent is for more durable concrete by requiring qualified personnel, using better curing practices and mix designs based on strength with limits
• Requires Contractor Certification and more responsibility on contractor for daily and pre-bid quality tests.
• Use existing MnDOT forms for field testing and weekly reports
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- Quality Control Plan has 13 items required including the following:
  - Traffic Control Plan
  - Concrete Placement Plan
  - Curing Plan
  - Rain Protection Plan
  - Hot Weather Plan
  - Cold Weather Plan
5 Main Parts

- General
- Products
- Execution
- Concrete Strength by Maturity
- Pre-Pour Meeting
Part 1 General, Section 1.5

Measurement and Payment

- Concrete Pavement
- Curb and Gutter
- Driveway Pavement Entrances
- Sidewalk and Concrete Median
- Concrete Field Testing for Contracting Authority
- Concrete Pavement Smoothness
- Maturity Testing for Compressive Strength
- Enhanced Coarse Aggregate Quality
Part 2 - Products

• 2.1 – Materials
  – Cement, SCM’s.
  – Aggregates, Admixtures
  – Curing Compound and Curing Covering Materials

Use MnDOT Approved or ASTM Approved Products per specification requirements
Part 2 – Production, Section 2.2
Concrete Mixes

- Concrete Mix Designs
  - New spec is performance based
  - 4000 psi concrete at 28 days
  - Traffic allowed at 3000 psi
  - Water/cementitious ratio is set at maximums
    - Paving/Machine – 0.42 W/C
    - Hand Work – 0.45 W/C
Concrete Mix Design Parameters

• 400 lbs Minimum Cement Content
• 530 lbs Minimum Cementitious Content
• 658 lbs Maximum Cementitious Content
• Maximum fly ash replacement is 30%
• Maximum slag replacement is 35%
• Maximum W/C = 0.42 for Machine Placed
• Maximum W/C = 0.45 for Hand Placed
Concrete Mix Design

• Slump Specification – 5” Maximum
  • Slump only run on hand placed concrete
• Air Specification - 6.5% +/- 1.5%
• Slump, Air and temperature when strength specimens are made
• Early-strength mixes shall be designed to reach opening compressive strength of 3000 psi at a predetermined time
• Admixtures must be on the MnDOT approved products list
Certificate of Compliance

- Must be provided with each truck load of concrete
- Use MnDOT System
- All Reports done by Contractor Personnel
- All Reports turned over to Contracting Authority
Part 3 Execution

Mn Concrete Flatwork Specifications for Local Government Agencies
Section 3.1 Personnel

• Will require 2 people to hold a current ACI Concrete Flatwork Technician certification or Concrete Flatwork Finisher certification
• Will require at least one of the people to be onsite for all concrete pours
• Personnel performing field testing of plastic concrete shall carry at a minimum either a current MnDOT or ACI Concrete Field 1 testing certification
• Personnel performing gradations and moistures shall carry a current MnDOT Concrete Plant 1 or an ACI Aggregate Testing Technical Level 1 certification
• Personnel performing plant testing shall carry a current MnDOT Concrete Plant 1 certification
Ready Mix Plant is Either MnDOT Certified or NRMCA Certified
Section 3.4 - Concrete Placement Equipment

- Slipform Construction
- Fixed Form Construction
- Curing Equipment
Section 3.5 Pavement Construction
Subsection O – Construction of Joints

• If no jointing plan is shown the contractor will provide a jointing plan to engineer for approval prior to placing concrete
• No tooling of joints for mainline pavements
Section 3.8 - Curing of all Concrete

- An airless spraying machine is required for curing of all concrete
  - Required to have a re-circulating bypass system that provides for contiguous agitation of the reservoir material
- Place at a rate of 150 sq.ft./ gallon
- Use MnDOT approved 3754 AMS white pigment curing compound
- Cure placed within 30 minutes
- Failure to comply can result in a monetary deduction of $50 per cubic yard of concrete in question.
Section 3.12
Table 5 - Minimal Testing Rates for Curb, Gutter & Sidewalks

- Contractor tests Air and Slump on first load each day per mix and then every 200 cubic yards -(slump not required for slipform placement)
- Agency decides if it wants to tests at their discretion
- Cylinders made by contractor and Agency will test the cylinders.
- Results to be recorded on the COC ticket and shall be noted whether QC or QA test
Section 3.11
Table 6 - Minimal Testing Rates for Concrete Pavement

- Contractor tests air and slump on first load each day per mix and then every 200 cubic yards - (slump not required for slipform placement)
- Agency tests air and slump every 400 cubic yards or once per day whichever is lower sampling rate
- Cylinders made by both contractor and agency
- Testing of cylinders will be done by the Agency
- Results to be recorded on the COC ticket and shall be noted whether QC or QA test
Surface Smoothness

- All concrete is covered by a straightedge specification of ¼ “ in 10 feet.
- If Concrete Paving is designed with a Ride Specification it will be done as ALR and shown as a separate bid item.
- Areas of Localized Roughness uses the IRI and will require a MnDOT certified Surface Profilior and a certified operator.
Concrete Thickness Verification

- Coring not Required
- Contractor Quality Control Probing
- Coring/Probing Spreadsheet available on web
- Results to over to Contracting Authority on a weekly basis
- Penalties assessed according to Table 9 in Flatwork Specifications.
Part - 4 Maturity Testing

• Will be bid as a separate item

• Can be used with any concrete mix.

• Must be Re-calibrated with a change in a Cementitious product.

• Can provide the greatest benefit with Early Strength Mixes.
Follow Wash Out Guidance February of 2009

Wash Out Pit

Pump on Ready Mix Truck
Part 5
Pre-Pour Meeting for 500 cubic yard pours

- Project Personal
- Grading and Base
- Concrete Pour Schedule
- Concrete Mixes
- Concrete Testing
- Concrete Placement
- Curing Plan

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Summary

• Flatwork Specifications are available at the State Aid Website along with the Technical Memorandum

• They can be used as a separate specification from the MnDOT specifications for the applicable items

• Include in the Special Provisions of the project proposal. Should clarify to bidders that the MN Concrete Flatwork Spec is the governing specification for those items its being used on