MICHIGAN CONCRETE ASSOCIATION

How to Get the Concrete that you Want

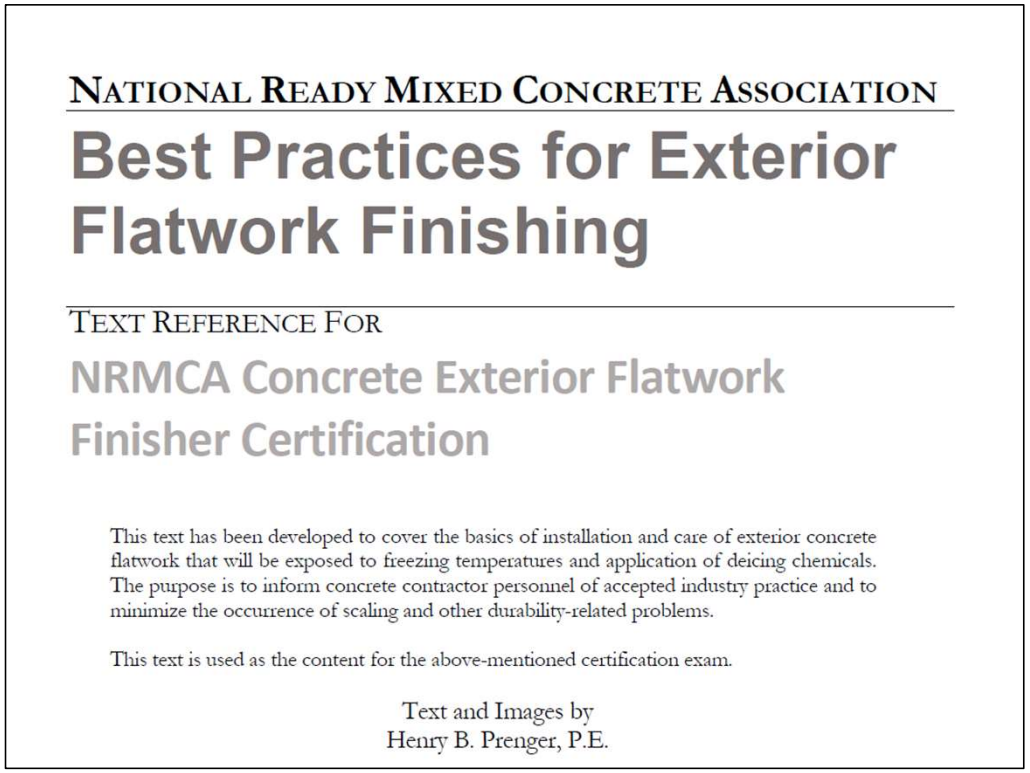
Responsive and Responsible Contractors

Steve Waalkes, PE

Friday, April 25, 2025

How to Award Work to a Quality Contractor

- Special Provisions & Clauses
- Prequalification
- Statement of Qualifications
- List of Previous Projects
- Training (MCA 101, 201, others)
- Certifications
  - NRMCA Exterior Flatwork Finisher



NATIONAL READY MIXED CONCRETE ASSOCIATION

Best Practices for Exterior Flatwork Finishing

TEXT REFERENCE FOR

NRMCA Concrete Exterior Flatwork Finisher Certification

This text has been developed to cover the basics of installation and care of exterior concrete flatwork that will be exposed to freezing temperatures and application of deicing chemicals. The purpose is to inform concrete contractor personnel of accepted industry practice and to minimize the occurrence of scaling and other durability-related problems.

This text is used as the content for the above-mentioned certification exam.

Text and Images by
Henry B. Prenger, P.E.

Specifications

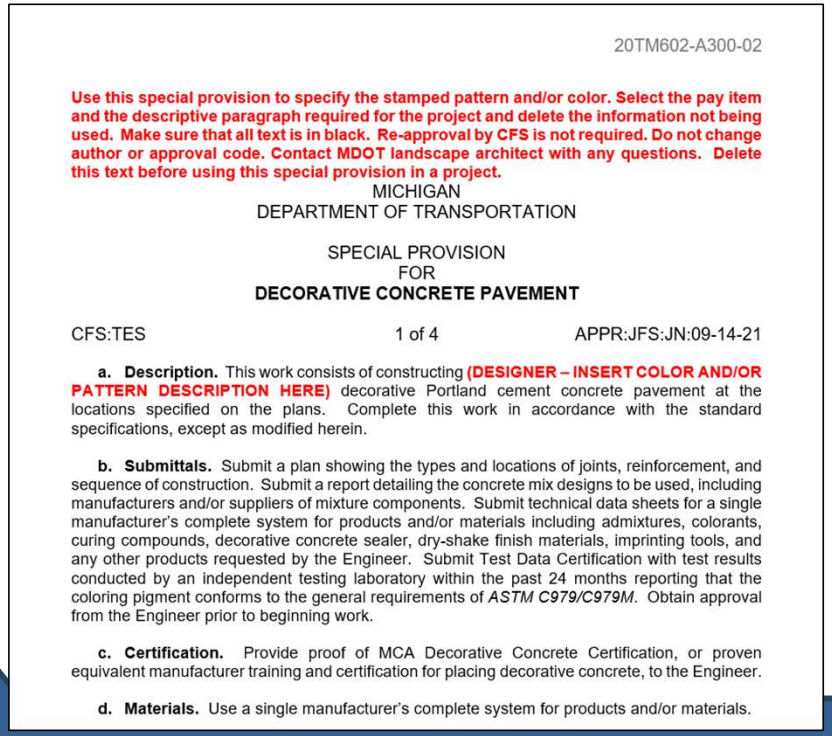
- MDOT mixtures typically very durable
  - Prequalified aggregate sources
  - Minimum cementitious contents
  - Use of SCM's encouraged or required in high performance mixtures
  - One-time water addition allowed before placement begins
- MDOT construction specs require curing compound application
  - 200 sq ft per gallon or 25 syds per gallon
- Non-MDOT (commercial, industrial, residential) can follow ASTM
  - In many cases will still use MDOT quality materials

Examples of Modifications to Specifications

- For **Placement** add language stipulating that all concrete road pavement up to 31 feet wide, from 6 inches thick or greater installed in public right of way shall be placed with a self-propelled slipform paver or machine running on steel full height forms. Other paving means shall be approved by the **Engineer**.
- Minimum cementitious content of **517 lbs/cyd**
- For **Late Season Placement** - Concrete placed after September 30, a penetrating silane or siloxane sealant shall be applied to the concrete within 30 to 40 days after placement, in accordance with manufacturers recommendation for application.

Examples of Certifications Already Required

- MCA / ACI Level 1 Concrete Field Testing Technician
  - Testing Technicians (sampling, temp, slump, air, cylinders); also Inspectors for Construction Engineering Prequalification
- MCA Level 2 Advanced Concrete Technician
  - Mix design & adjustments, JMF & QC Plan submittals
- MCA Decorative Concrete Finisher
- Other specialty ACI certifications
  - Self Consolidating Concrete Testing
  - Concrete Strength Testing



20TM602-A300-02

Use this special provision to specify the stamped pattern and/or color. Select the pay item and the descriptive paragraph required for the project and delete the information not being used. Make sure that all text is in black. Re-approval by CFS is not required. Do not change author or approval code. Contact MDOT landscape architect with any questions. Delete this text before using this special provision in a project.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
DECORATIVE CONCRETE PAVEMENT

CFS:TES 1 of 4 APPR:JFS:JN:09-14-21

a. Description. This work consists of constructing **(DESIGNER – INSERT COLOR AND/OR PATTERN DESCRIPTION HERE)** decorative Portland cement concrete pavement at the locations specified on the plans. Complete this work in accordance with the standard specifications, except as modified herein.

b. Submittals. Submit a plan showing the types and locations of joints, reinforcement, and sequence of construction. Submit a report detailing the concrete mix designs to be used, including manufacturers and/or suppliers of mixture components. Submit technical data sheets for a single manufacturer's complete system for products and/or materials including admixtures, colorants, curing compounds, decorative concrete sealer, dry-shake finish materials, imprinting tools, and any other products requested by the Engineer. Submit Test Data Certification with test results conducted by an independent testing laboratory within the past 24 months reporting that the coloring pigment conforms to the general requirements of *ASTM C979/C979M*. Obtain approval from the Engineer prior to beginning work.

c. Certification. Provide proof of MCA Decorative Concrete Certification, or proven equivalent manufacturer training and certification for placing decorative concrete, to the Engineer.

d. Materials. Use a single manufacturer's complete system for products and/or materials.

Durable Concrete Requires Inspection!

- Concrete inspection is how we ensure the **quality, safety, and longevity** of concrete pavements.
- Not trying to play "Gotcha!" with contractors or suppliers, but instead **partnering** to ensure quality.
- Through inspection, we **identify and address defects** during construction to minimize repairs after the project is complete.
- Critical in Michigan due to **freeze-thaw cycles and high-traffic conditions**.
- It's **required** in almost all specifications!

ADDING WATER

Wet burlap drag

- Specs prohibit adding water to slab by spray, wand, brush or other methods
- Wet burlap drag is allowed
- Decrease moisture if slurry or small bubbles develop on trailing edge of burlap

ADDING WATER (READY MIX)

- Watch the amount of added water!
- Added water not to exceed max w/c (check batch tickets)
- If water added, mix for additional 30 revolutions

Adding 1 gallon / cu. yd:

- Increases workability ~1"
- Lowers strength ~200 psi
- Increases drying shrinkage ~10%
- Increases permeability ~ 50%

FINISHING

Hand float and straight edge

- Remove small imperfections
- Tight surface with few holes
- Extensive finishing can damage integrity of slab
- Do not add free water

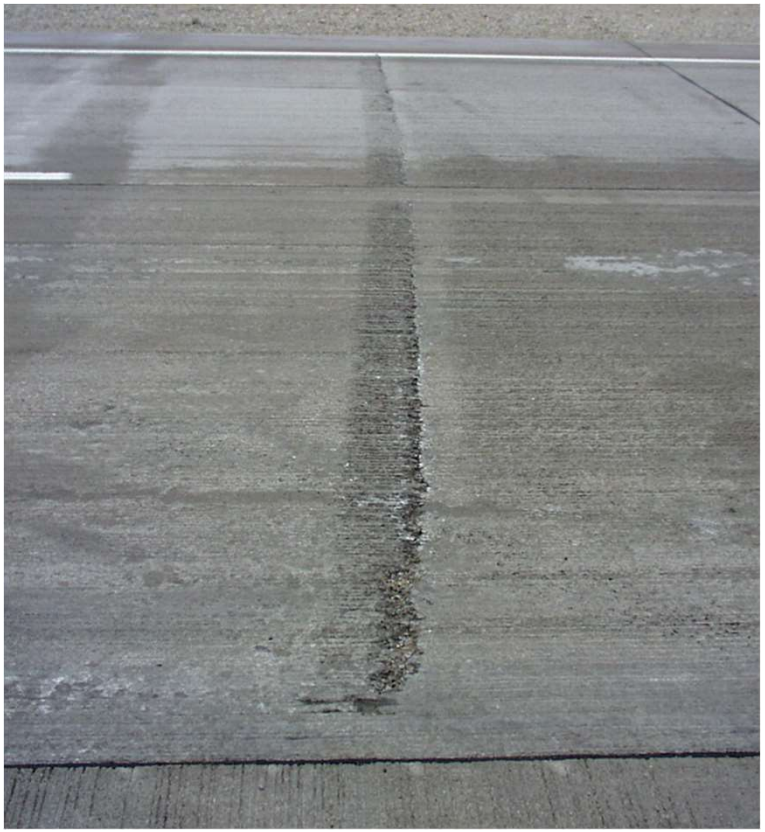
TEXTURING (MICRO)

- Micro texture placed using burlap or artificial turf
- Adequate contact area
- Keep moist (not soaking)
- Keep clean

TEXTURING (MACRO)

- Longitudinal tining produces less noise
- Shallow produces less noise than deep
- Adjust tine angle and length for desired depth (consistency)
- Minimize positive texture by keeping tines straight and clean
- Don't stop the tine rake in down position
- Some hand work areas can be excluded

TEXTURING (MACRO)



MAKE CURING UNIFORM

- Surface should be uniform white on surface and vertical edges
- Windy days require additional effort
- Application rate = 0.067 gal per SY
- Apply within 30 min.
- Should not track after 12 hours

Non-uniform cure

MAKE CURING UNIFORM

COMPLIANCE

- Inspector encounters work that is outside of the specifications, it is considered to be non-complying
- Inspector should notify the Project Manager
- Project Manager will then issue a Non-Compliance Notice

Communicate with the contractor when questionable activities are observed

Proper Construction for Durable Concrete

Construction practices that can affect durability:

- Addition of (and mixing in) water to the ready-mix truck on site
  - Must not exceed maximum w/cm ratio – extra water lowers strength
  - Can sometimes affect air bubble spacing (air void coagulation)
- Under or over vibration of the concrete (if at all)
  - Under can result in honeycombing; over can result in loss of entrained air
- Use of water during finishing makes the surface weaker
- Over finishing can result in loss of entrained air at the surface
- Lack of, or improper curing results in unhydrated cement at the surface, resulting in a weak paste layer

Maintenance Practices to help with Durability

- Sodium chloride (NaCl), commonly termed rock salt, when used as directed, has proven to be the safest deicer for melting ice and not adversely affecting the durability of the concrete
- Once the NaCl has turned the ice to slush, it is recommended that it be shoveled up and disposed
- All forms of de-icing salts and chemicals should be avoided during the flatworks first year of service, and other means of snow and ice removal should be considered
- Other deicers such as magnesium chloride, calcium chloride, potassium acetate, or products which combine these chemicals have been found to be detrimental to the surface durability of concrete

Summary

- Concrete surfaces are durable, long-lasting, cost effective and aesthetically pleasing if:
  - They are designed & specified properly
  - They are constructed properly
  - They are inspected to ensure compliance with the project specifications
  - They are maintained and taken care of properly

MICHIGAN CONCRETE ASSOCIATION

LTU CTM Program

MICHIGAN CONCRETE ASSOCIATION

QUESTIONS?

Steve Waalkes, P.E.
616-633-9629
steve@miconcrete.org