

Certifications for Sustainability in Manufacturing and Application of Ready Mixed Concrete

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Introduction

The National Ready Mixed Concrete Association (NRMCA) is an internationally recognized trade association representing ready mixed concrete producers in the United States. The association was chartered on December 26, 1930. A cornerstone purpose of the initial charter was *“to render services of an educational nature with respect to the use of ready-mixed concrete with a view to promoting and extending such use.”* The association’s 700-plus member companies produce more than 70% of ready mixed concrete used in the US. Working together, the association and its’ members actively promote quality and uniform concrete production in a safe, environmentally friendly manner.

NRMCA actively participates on committees of the American Concrete Institute (ACI), the American Society for Testing Materials (ASTM) and other standard setting organizations. As a member of these organizations, NRMCA works to ensure that concrete’s ingredient materials, mix designs, production and delivery conform to the quality standards necessary in our nation’s infrastructure. NRMCA also participates in technical committees at the American Association of State Highway and Transportation Officials (AASHTO), the Transportation Research Board (TRB), and the Federal Highway Administration (FHWA).

Raising professionalism of the industry through a knowledgeable workforce and production facilities that comply with industry standards is a primary objective in the NRMCA strategic vision. NRMCA has developed educational and certification programs that are designed to accomplish this objective. NRMCA operates a research laboratory that facilitates development of technical data to affect changes to industry standards and enhance the knowledge of its workforce to ensure that quality concrete is provided to building and construction customers. NRMCA furthermore believes that the same rules must apply to everyone producing ready mixed concrete in order to meet a high standard for concrete quality.

Certification of Ready Mixed Concrete Production Facilities

The National Ready Mixed Concrete Association (NRMCA) administers a certification program for ready mixed concrete plants and delivery vehicles that ensures that these facilities used to manufacture concrete are in compliance with industry standards and are capable of furnishing

quality concrete. The inspection is conducted by a licensed professional engineer, approved by NRMCA, who goes through a thorough checklist during the inspection process.

Requirements and policy for the program are established by the NRMCA Research Engineering and Standards (RES) Committee. These are kept updated as standards and needs change. All policies and revisions are approved by the NRMCA Board of Directors.

NRMCA certification of concrete production facilities provides a system for establishing that production equipment and procedures at ready-mixed concrete plants are satisfactory. It reflects, and in many cases exceeds the requirements of standard specifications for ready mixed concrete, such as ASTM C94/C94M and AASHTO M157 (Specifications for Ready Mixed Concrete); The Truck Mixers Manufacturers Bureau, TMMB 100; and the Concrete Plant Standards of the Concrete Plant Manufacturers Bureau, CPMB 100. A certified plant is permitted to display a Certificate of Conformance that assures the purchaser that the facility is physically capable of furnishing good quality concrete.

Certification may be obtained by any producer of ready mixed concrete with the procedures and limitations addressed in the Check List document. Certification is issued only when the facility complies with all the pertinent requirements in the Check List.

A valid Certificate of Conformance should include the signature and seal of the inspecting engineer and be signed by the company's principal executive. Certification of production facilities is valid for two years from the date of inspection. Truck certification cards are provided for each delivery vehicle with an expiration of 14 months from the date of inspection. The intent is an annual inspection of delivery vehicles.

NRMCA certifies approximately 700 plants every year and 2400 concrete plants hold current certification. The certification is required (or recognized) by several State Highway and other public agencies and engineering firms that write specifications for a wide variety of construction projects. It is also recognized in reference specification documents published by the American Institute of Architects and the American Concrete Institute. Quality conscious concrete producers use certification as an audit of their concrete production facilities, even if specifications in that area do not require the certification.

No claim is made that certification of plant facilities will assure delivery of high quality concrete. Proper equipment is only one of several factors involved in concrete control, although a very essential one. The presence of a Certificate of Conformance should, therefore, be accepted precisely for what it is—evidence that certain capabilities exist. The existence of those capabilities will reduce the likelihood of deficiencies in quality when normal inspection is exercised within requirements of usual sales agreements.

History

- The NRMCA Check-list for Ready Mixed Concrete Production Facilities was approved at the 1965 Annual meeting of the NRMCA Board of Directors.

- The program was put into operation in 1966, initially for members only, but then extended to non-members of NRMCA to facilitate adoption of the program by specifying agencies.
- The NRMCA's Plant Certification Program has evolved over the years and has seen greater acceptance by concrete producers and specifying agencies.

Program Details

- Ingredient materials for concrete are managed to maintain their characteristics
- The production facility has the capability of producing concrete in cold weather
- The batching systems in operation are defined and measuring devices are verified for accuracy at stated frequencies
- The batching systems are capable of accurately batching concrete without interferences
- The batching process complies with the required tolerances stated in industry standards
- There are systems in place and operational to account for aggregate moisture when batching concrete
- There are systems in place and operational to manage the required slump and consistency of concrete
- Production facilities with a plant mixer (central mixing plant) is of adequate condition to produce uniformly mixed concrete
- The production facility issues a delivery ticket that conforms to the mandatory reporting requirements of ASTM C 94
- Evaluates the recording capabilities for batched materials at the concrete plant and states such on the certificate
- That 90% of the delivery fleet operating from the plant maintain current certification
- The delivery fleet has the ability, via a visual inspection, to produce uniformly mixed concrete and has necessary devices in proper operating condition
- Requires attestation to the completeness of the inspection by a licensed professional engineer
- Requires statement by a company official that the accuracy of measuring devices will be maintained in conformance for the duration of the certification
- Inspectors and their assistants have to go through a qualification process and be approved by NRMCA to conduct inspections for this program. The qualification process requires a thorough reading of the plant inspectors guide followed by answering a series of questions, submission of a statement of qualifications and signing a pledge.

More detailed information on the program, listing of currently certified plants, listing of approved inspecting engineers and required documents for inspection and certification are posted on the NRMCA website at http://www.nrmca.org/Research_Engineering/Plant_Certification/Main.htm

NRMCA Concrete Producer Quality Certification

Background

One of the primary constraints for moving towards performance based specifications that will provide the concrete producer more control on mixture proportioning and eliminating prescriptive requirements in specifications for concrete mixtures is the aspect of *credibility*. It was understood that not all concrete producers could deliver on performance based mixtures and there needed to be a means by which the specifying engineers knew who could and had a means of pre-qualifying those entities.

Through funding from the RMC Research Foundation the guideline for developing a quality management system (Quality Plan) was developed and published. It used the general headings of ISO 9000, the accepted general standard for Quality Management Systems, and made it specific to the ready mixed concrete industry. As part of the document, an external audit checklist was created that a specifying engineer could evaluate the quality practices of a producer. Following that a focus group of design professionals from various prominent design firms was convened. This group indicated that they would not go through the process of performing the external audit and preferred an easier means of recognizing proficient producer companies. They endorsed the development of a certification program. This program is under development and the policies and audit procedures are being finalized. It is anticipated that the program will be up and running later in 2012.

Certification Criteria

The Producer Quality Certification is established for a division or entity and can (will typically) include several plants. The applying entity will be audited to ensure that they conform to the stated aspects in their quality plan with several minimum criteria established in the certification.

The program includes requirements to audit:

- Existence of a quality plan with minimum items and management support
- Resources - Qualification of personnel and laboratory capabilities
- Quality management of ingredient materials
- Production facilities (NRMCA Plant certification or DOT approved plants accepted) and associated quality practices
- Product Quality Management – concrete
- Measurement systems that track quality, customer satisfaction, identify non-conforming product and processes to facilitate continuous improvement.

Auditing Process

A group of independent auditors will be established. The audit will likely not include site visits, but there could be some confirmation of submitted documentation and additional clarification between the auditor and the company. The advantage of using this auditing process would be uniformity in the audit process.