

A Quality Plan to Establish Your Company's Credibility

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The NRMCA P2P Initiative to evolve specifications for concrete from prescription to a preferred performance-based alternative is now in its fourth year of implementation. One of the barriers identified by the P2P Steering Committee was a potential lack of trust by engineers of that ready mixed concrete producers could deliver on performance-based requirements. The key item to overcome the lack of trust was to develop a means to establish the credentials and knowledge-based qualifications of a concrete producer. Toward that end, the P2P Steering Committee recognized that documenting process control and other quality systems toward assuring the quality and performance of the product would go a long way toward building trust.

The decision was made to develop a standard format for a Quality Manual that a concrete producer could use to develop its own. Preliminary discussions additionally considered developing a quality certification program that would serve as adequate documentation for project submittals.

The project was contracted with William C. Twitty, Jr., P.E., consulting engineer, Greenville, S.C. and funded by RMC Research & Education Foundation. Mr. Twitty was eminently qualified to take on this project, having worked in the ready mixed concrete industry, served on the ACI Committee 121 on Quality Assurance and provided consulting services on quality systems for the ready mixed and precast concrete industries. He worked very closely with a task group of the P2P Steering Committee in developing the documents.

The document was developed along the general headings of ISO 9000 standards on Quality Management Systems making it pertinent to the ready mixed concrete industry. The primary document is the Preparation Guidelines for Quality Manual for Ready Mixed Concrete Companies. The purpose of these guidelines is to assist ready mixed concrete producers in the preparation of a Quality Manual (QM). The Quality Manual developed by a company documents the quality processes that the company has in place to insure quality of the company's

products and services. The guidelines allow for the structured development of a Quality Manual that should be clear to all responsible personnel of a ready mixed concrete producer. The Quality Manual is flexible in design and can be customized to follow the quality processes of a specific concrete producer. To cover the overall Quality Management System (QMS) in a ready mixed concrete company, the recommended quality plan is covered in fifteen sections. General guidance along with examples is provided relative to what should be covered in each section and subsection.

The sections of the Quality Plan include the following:

1. **Introduction** – covers a general overview of the company and the products and services it provides. The company's Quality Policy is clearly stated in this section indicating the support of executive management in achieving its quality goals.
2. **Quality Management System (QMS)** – provides an overview of the company's Quality Management System developed in the Quality Manual. It outlines the

responsibility and authority for maintaining the Quality Manual, activities that support it and the necessary documentation that ensures that it followed.

3. **Management Responsibility** – This section validates management support for its QMS and states its measurable quality objectives. It discusses the management planning to develop and revise the Quality Manual, and describes systems and monitoring for product realization. The section describes the personnel responsible for control and communication of the Quality Manual and implementation of the company's QMS. It also addresses management review to track improvements of its QMS and states the work environment it will provide for optimum performance of its employees.
4. **Customer Focus** – describes the company's activities toward ensuring customer satisfaction – states general goals, procedures for collecting customer input and complaint management, and activities for interacting with customers to demonstrate the value provided by the company.
5. **Human Resources** – states the company's philosophy with recruiting and retaining qualified personnel, defines minimum qualifications for all roles, training and career enhancement of its employees and the procedures it uses to establish quality awareness company-wide.
6. **Facilities, Plant(s) and Equipment** – describes the production infrastructure of the company, including plants and laboratory facilities. The section establishes the standard procedures for monitoring accuracy of measuring devices and equipment maintenance, including stating required frequencies.
7. **Materials Management** – indicates the materials used by the company for producing its products, defines the process for selection of materials, expectations of its suppliers, processes used for conformance monitoring of received product and procedures for handling and storing material at the production facilities. It also addresses the procedures and responsibilities of managing customer's materials used for the projects.
8. **Concrete Mixture Development or Selection** – describes procedures used

for selection of materials and establishing mixture proportions for various classes of concrete and products furnished. It describes the Company's process of evaluating project specification requirements and pricing its product prior to bidding. It describes the process of validating mixture performance for project requirements, submittals, responsibility for control on established mixtures and collection of data documenting product performance delivered to projects.

9. **Purchasing** – defines purchasing process, procedures for purchasing agreements and purchase orders, record maintenance of purchased products, inventory control and verification of product obtained to the purchase agreements.
10. **Order Processing and Dispatching Procedures** – establishes procedures for receiving and recording orders, scheduling and dispatching, batching instructions to personnel involved and records maintained and retention period for orders.
11. **Concrete Production** – discusses the production planning process, details of ready mixed concrete production and details of steps followed on a daily basis. Establishes the production environment provided for optimized efficiency and control of plant operations. It addresses deviations from normal procedures when producing specialty products.
12. **Concrete Testing** – describes the types of tests and frequencies performance for process control and product monitoring for ready mixed concrete in the fresh and hardened state. Also addresses the company testing conducted to validate results of third party inspection testing.
13. **Concrete Delivery and Site Control** – describes the procedures to be followed for the delivery of product and procedures at the jobsite, including truck tracking, jobsite observations and information recorded, and identification and traceability relative to location in a project a product is placed.
14. **Concrete Troubleshooting** – describes the procedures used by the company for following up and resolution process of customer complaints, investigating a deficiency, analysis of the problem

and the report generated following the resolution.

15. **Measurement, Analysis and Improvement** – this section of the Quality Manual establishes the process of monitoring, measuring and analyzing product performance measures. It discusses steps taken to improve product performance as a result of this monitoring. It also establishes procedures to be taken when non-conforming product is identified.

As illustrated, the guideline document goes into significant detail of a Company's QMS. The guidelines are further supported by appendices with additional information on laboratory resources, guideline for conformance monitoring (testing) of ingredient materials and products, required competencies of company personnel, project checklists, sample forms and internal audit procedures.

Supporting the Guideline document is an accompanying example Quality Manual of a fictitious ready mixed concrete company – Global Ready Mix, Inc., where details in each section of an actual Quality Manual are illustrated by example. It is recognized that the Quality Manual for each producer will vary significantly in terms of the sections covered and the details, based on the size and capability of the organization, the type(s) of market served, and the geographic locations of their plants.

The proposed Quality Manual is comprehensive and includes sections that are not of interest to the purchaser of concrete. As the original intent of this project was to establish the credibility of a concrete producer to an external customer, the P2P Steering Committee extracted those portions of the Quality Manual that would be pertinent to an external audit. The proposed External Audit Checklist serves as possible documentation to satisfy the external customer that the Company has a good QMS. In the future, the Committee might decide to evolve this into a producer certification program if the need for this external audit process by a third party is considered significant toward the adaptation of performance-based specifications. ■

The Quality Management System for Ready Mixed Concrete Companies, in three parts is available from NRMCA or at www.nrmca.org/p2p.