TECHNICAL BULLETIN # 9

Points for Consideration in Creating a Comprehensive Quality Control Plan for Concrete Producers

Organization & Structure of QC Plan

Consider what personnel, actions or processes are most critical for maintaining quality of concrete for your organization - it is these elements which should be written into a QC Plan. A QC plan should be printed on a company letterhead (if available) or another professional format of your choosing. A simple place to start is by defining the table of contents for your document, and what headings or sections you want to include.

Determine the scope and purpose of your QC Plan. It is common to include general information about the company, its local reporting structure, a statement of its commitment to Quality Assurance and Quality Control. You can attach other documents from your company to the QC Plan if relevant.

The QC Plan may also detail the minimum requirements for hiring of qualified personnel for critical positions that influence quality. It is also suggested to define the personnel within the company who are expected to be aware of and follow the QC Plan, such as concrete batchers, delivery truck drivers, QC personnel, or others.

One person or group should be assigned to maintaining the QC Plan document and noted as such within. This entity will ensure the document's upkeep, including: making it accessible to personnel who are expected to follow the plan, defining the process for making approved changes and updating the document annually or as required, and which personnel should receive updated copies of the QC plan when alterations are made.

Operations Specific Requirements – Plant & Process Controls

Implementing minimum requirements for your concrete plant equipment and material handling processes is critical to maintain product quality and consistency. Inscribing it into the QC Plan will formalize the requirements.

Consider including sections to detail the following items or processes:

- Minimum requirements for batching equipment and batching software.
- Requirements for raw material handling and storage to prevent cross-contamination.
- Schedule for raw material property and durability testing:
    - Common aggregate testing examples include aggregate sieve analysis and moisture content, CSA A23.1 Table 12 and Petrographic testing, and Alkali Aggregate Reactivity testing.
    - At a minimum, these tests are done according to requirements within CSA. Project specifications such as for Alberta Transportation bridge project may require more frequent testing.
    - Cementing materials and combinations thereof may require sulphate resistance testing, where exposure to sulphates in natural soils is an issue for concrete supplied from your facility.
    - This testing schedule should be written by someone with knowledge of the local, provincial, and national testing frequency requirements to ensure continuous compliance.
- Protocol for reporting and resolving plant batching errors.
- Continuous compliance with CSA A23.1 requirements for minimum information to appear on delivery tickets.
- Minimum requirements for mixer drum condition on concrete delivery vehicles, in compliance with CSA A23.1, within batch uniformity and mixer driver concrete quality education or experience.
- Schedule for calibration intervals of all plant equipment, in compliance with CSA.

Quality Control Specific Requirements – Mix Design Controls, Materials & Certifications

A focus on implementing quality control procedures will greatly improve concrete consistency and customer satisfaction in the long term. Suggested topics to consider and include are:

- Mandate QC reference and retain copies of the latest concrete construction codes and standards (such as CSA, ABC, and any relevant provincial or local municipal codes)
- Minimum requirements for QC working space (lab or shop) and equipment
- Minimum requirements for number and experience of QC Personnel
- Expectations for Plant vs Field QC testing focus and frequency
- Mix design performance, monitoring, maintenance, optimization and modification procedures
- Procedures for troubleshooting non-conforming concrete on site
- Procedures for investigating hardened concrete deficiencies in the field after placement
- Processes for monitoring concrete mix performance and customer feedback

Improving the QC Plan

The QC Plan should be a living document supported by upper management, and by all identified support personnel. Concrete producers should develop the plan with specific consideration for their own facilities and experiences. No two QC Plans will be the same. Its common for the plan to grow and include more items as producer experience grows.

It is suggested to review and update the QC Plan at least annually to reflect current challenges your team has encountered with the goal of preventing future issues related to quality. It's also recommended to include participation in the Concrete Alberta ARMCA Plant Certification Program within the Plan to further signal demonstrate commitment to continuous compliance with national quality standards and requirements.

More information on Quality System development and management can be found in the following resources.

NRMCA's Quality Management System for Ready Mixed Concrete Companies
https://www.nrmca.org/wp-content/uploads/2020/06/QMS_3Parts.pdf

NRMCA's Guideline Manual for Quality Assurance Quality Control
https://my.nrmca.org/ItemDetail?iProductCode=2P190&Category=ENG&WebsiteKey=ccc47b8b-8f64-4219-ad5b-0c98afb23ccc