

Guide for Concrete Plant Inspection and Testing of Ready-Mixed Concrete

Reported by ACI Committee 311

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This guide is intended for use in establishing basic duties and reports required of inspection personnel. It can be used for all types and sizes of projects but should be supplemented with additional inspection requirements when the complexity of the project so dictates. Refer to ACI 311.4R for guidance on additional requirements and to SP-2 for more detailed information on concrete production practices and inspection and testing of concrete.

This guide recommends minimum requirements for inspection at the concrete plant when such inspections are required by specifications or the owner. It also recommends minimum requirements for field and laboratory testing of concrete. It is intended for use by specifiers, architects, engineers, owners, contractors, or other groups needing to monitor the ready-mixed concrete producers' activities at the concrete plant and concreting activities at the project site through the use of an independent inspection agency or in-house inspection organization.

This guide also recommends minimum testing laboratory qualifications, minimum inspector qualifications, duties, and reports.

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CONTENTS

Chapter 1—Plant inspection of ready-mixed concrete, p. 311.5-1

- 1.1—Introduction and scope
- 1.2—Inspector qualifications
- 1.3—Inspector duties
- 1.4—Reports

Chapter 2—Testing of ready-mixed concrete, p. 311.5-3

- 2.1—Introduction and scope
- 2.2—Qualifications
- 2.3—Testing laboratory
- 2.4—Duties
- 2.5—Testing high-strength concrete
- 2.6—Reports

Chapter 3—References, p. 311.5-5

- 3.1—Referenced standards and reports
- 3.2—Other references
- 3.3—Laboratory evaluation and accreditation agencies

CHAPTER 1—PLANT INSPECTION OF READY-MIXED CONCRETE

1.1—Introduction and scope

This chapter recommends minimum requirements for inspection of the concrete plant when required by specifications or the owner. It is intended for use by specifiers, architects, engineers, owners, contractors, or other groups interested in monitoring the ready-mixed-concrete producers' activities at

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the plant through the use of an independent inspection agency or in-house inspection organization. This chapter recommends:

1. Minimum qualifications of an inspector;
2. The minimum duties of an inspector; and
3. The type of reports that should be made.

The scope and responsibility involved in plant inspection should be established in the contract documents, which should also define the relationships between the owner, concrete contractor, concrete supplier, and the inspector.

1.2—Inspector qualifications

The plant inspector should be qualified by education, training, and experience to perform the minimum duties set forth in this guide. The inspector should have a technical understanding of the materials used to produce concrete along with the principles involved in concrete batching and should know the basic operating sequence of the concrete plant. The inspector should provide evidence of his or her training and experience. ACI inspector or technician certifications, Reinforced Concrete Special Inspector Certification (co-sponsored by ACI and various building code organizations) or appropriate state agency certifications are acceptable evidence that the person has completed minimum training and examination requirements for specific areas of inspection and testing covered in this document. The inspector should also have and become familiar with the published standards referenced in this guide and with project specification requirements.

The authority of the plant inspectors and to whom they report should be established before the start of the project.

1.3—Inspector duties

1.3.1 To determine required inspections, the inspector should review and fully understand the project specifications, plans, and other project documents. The inspector should observe that the facilities, scales, and truck mixers meet the specified project requirements. The provisions of the following documents should normally be incorporated in the project specification:

- ACI 301;
- ASTM C 94/C 94M;
- Plant qualification in accordance with the National Ready Mixed Concrete Association (NRMCA) checklist for certification of ready-mixed concrete production facilities; and
- Local, state, or federal agency specifications.

1.3.2 Inspectors should conduct activities in accordance with all safety policies, health standards, and safe work practices in effect at the job site.

1.3.3 The inspector should verify proper storage of all materials on a daily basis. All storage areas should be clean and free of contamination. Cementitious materials should be stored in weatherproof silos or similar structures. Aggregate storage areas should provide for separation and free draining of stockpiled materials. Storage areas should be equipped with water spray systems for maintaining aggregates in a saturated condition. Means for protecting and preventing freezing of aggregates during winter production should also be provided. Admixture storage areas should be suitably insulated or heated to prevent freezing.

1.3.4 All tests and inspections should be conducted at the frequencies required by the project specifications in a

manner that does not interfere unnecessarily with the manufacture and delivery of the concrete. During the first batch being shipped to the project under the inspector's jurisdiction, the inspector should be present at the batching console to verify that the specified type and amount of materials, conforming to the approved design mixture proportions, are batched and delivered to the mixer.

If the operation is automated and recorded, the inspector should make observations as often as possible, preferably on a continuous basis, but at least once per hour.

If the batching operation is manual, the inspector should be present at the batching console during all batching. The inspector should verify that quantities of materials for each batch fall within the tolerances set forth by the project specifications.

1.3.5 The inspector should verify that coarse- and fine-aggregate gradation tests are being performed in accordance with ASTM C 136 and that the results meet the project requirements. If deviation occurs, batch plant personnel and the client should be notified immediately, or previously authorized action should be taken.

1.3.6 The inspector should verify that aggregate moisture contents are properly determined in accordance with ASTM C 566, and that the batch quantities of materials are adjusted to compensate for free moisture in the aggregates. If aggregate moisture contents are being measured by rapid methods, daily correlation tests following ASTM C 566 should be conducted.

1.3.7 The inspector should determine that the trucks are in good operating condition and not loaded beyond their rated capacities for mixing and agitation. Trucks should also be inspected (safety regulations regarding confined spaces should be followed, if applicable) for blade wear, build-up of concrete on the blades, and for proper mixing speed as described in Section 3 of the NRMCA Quality Control Manual. Truck mixers should be equipped with counters or similar means to enable verification of the number of revolutions applied to the drum.

1.3.8 The inspector should verify that the scales and other measurement systems have been properly calibrated within the time period specified by the project specifications or referenced documents.

1.3.9 The capability of the production facility to produce concrete within the temperature limits of the project specification should also be evaluated and verified. In cold weather this generally requires a water and aggregate heating capacity of 15 boiler horsepower per 100 yd³ (76 m³) production. In hot weather, this generally requires a system for spraying and cooling aggregates and a system for efficiently weighing and delivering crushed ice to the mixer in the range of 40 to 100 lb per yd³ (18 to 45 kg per m³).

1.3.10 For each batch of concrete the inspector should verify that the concrete plant is furnishing to the purchaser a delivery ticket conforming to ASTM C 94/C 94M. A place should be provided on the ticket to reflect the following information:

- Name of the concrete plant;
- Serial number of the ticket;
- Date;
- Truck number;
- Name of the purchaser;
- Project designation (name and location);
- Class or designation of concrete.