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Guide to Quality Management Auditing in the Concrete Industry

Reported by ACI Committee 121



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Guide to Quality Management Auditing in the Concrete Industry

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Guide to Quality Management Auditing in the Concrete Industry

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This guide provides the background and methods for conducting an audit of an organization's quality management system. Such an audit can assess the organization's commitment to quality management and conformance to standards, codes, and contract requirements. Audits can also identify portions of the quality management system that need correction or improvement.

Keywords: audit; nonconformance; opportunity for improvement; process audit; quality management system; quality manual.

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CHAPTER 1—INTRODUCTION AND SCOPE

1.1—Introduction

An effective means of determining an organization's commitment to quality management is an audit, whether the organization is involved in design, construction, inspection, testing, or other operations. Before procurement, an initial audit can evaluate operations of a supplier or subcontractor. During the course of a project, an audit can verify an organization's quality management, efficiency, and conformance to contract, codes, procedures, and standards. By looking closely into a supplier's operations and asking key questions, a customer can be assured that what is presented or proposed in the bid, proposal, promotional literature, or quality plan is consistent with the supplier's capabilities and methods in their normal course of business.

Furthermore, an organization can assess the effectiveness of its own quality management system and, thereby, its internal performance, efficiency, and conformance by conducting an internal audit. The results of such an audit can be the basis for determination of capabilities, self-declaration of conformance to a standard, and discovery of opportunities for improvement.

This guide incorporates some of the principles contained in **ISO 19011:2011**, which can be used as reference should the auditor determine that ISO 19011 is applicable.

The level of expectations can vary depending on the needs of the client and what the client determines as adequate. A high order of performance can be determined by using the criteria established in **ISO 9001:2008**, in which case it is recommended that **ACI 121R** be used as a guide to determine the level of performance as it applies to the concrete industry.

The questions presented herein are intended to cover a broad range of issues, and some organizations may not be able to respond to them affirmatively. That does not necessarily indicate the organization is not a good choice for the task, as the questions themselves are not necessarily the

criteria for acceptance or rejection. In the absence of well-defined criteria, as would be required by contract, code, or self-proclaimed conformance, there is no right or wrong answer, only the facts, which are to be interpreted by the party requesting the audit. The quality management system capabilities encountered can range from the simple and basic to the robust. The level of quality management necessary to perform the task is determined by the party requesting the audit.

1.2—Scope

This guide is intended for use in the concrete construction industry. Recommendations and practices presented are intended to be nonmandatory and only meant as guidance. This document is not intended to offer guidance in initiating a quality management system or to serve as a standard for third-party registration audits.

This guide addresses several disciplines within the concrete construction industry with questions specific to those disciplines. It begins with the principles and objectives of audits, followed by audit protocol, methods, techniques, and competency of auditors. **Chapter 7** covers common processes of quality management typical to all industries with an emphasis on their application within the concrete construction industry. **Chapters 8** and **9** cover the processes for design and construction. Processes are presented with background information, their impacts on operations, common pitfalls, and sample questions to prompt audit investigations and discussions. For someone not familiar with quality management considerations for a certain discipline within the industry, this guide provides background and a starting point with some of the appropriate questions to ask.

The application of this guide is suited for assembling a list of good practices to use in an audit procedure that is commensurate with the size and complexity of the organization's assigned or proposed task. Its application is also relevant to audits of large organizations with more complex systems and the resources to support them.

CHAPTER 2—DEFINITIONS

ACI provides a comprehensive list of definitions through an online resource, "ACI Concrete Terminology," <https://www.concrete.org/store/productdetail.aspx?ItemID=CT16>.

as-built drawings—generally considered a revised set of drawings provided upon completion of a project, which reflect changes made in the drawings during the construction process; responsibility for providing the drawings, the level of detail required, the liability for the accuracy and completeness of the information provided, and the legal definition differ by the governing bodies of the geographic area and the agreement with the entity purchasing the service. Also known as "record drawings".

audit—systematic, independent, and documented process for obtaining evidence and evaluating it objectively to determine the extent to which criteria are fulfilled.

auditee—organization (or person representing the process) that is being audited.

auditor—person with the competence to conduct an audit; also indicates the lead auditor when an audit team is led by one person.

audit criteria—set of policies, documented information, or requirements used as reference against which audit evidence is compared.

audit plan—description of the activities and arrangements for an audit.

audit program—set of one or more audits planned for a specific time frame and directed toward a specific purpose.

audit scope—extent and boundaries of an audit.

back-checker—architect or engineer within the architect-engineer organization that ensures that all corrections have been addressed; can be one and the same with the checker.

CADD manager—person responsible for the overall management of the computer-aided design and drafting (CADD) portion of the project.

CADD manual—manual, usually written by the CADD manager, that coordinates and standardizes the CADD operation and style.

checker—architect or engineer within the architect-engineer organization who performs quality control by detailed examination of the calculations, specifications, and drawings.

compliance—adherence to laws or regulatory requirements.

conformance—adherence to standards, procedures, specifications, or work methods and instructions.

corrective action—efforts made to eliminate and prevent recurrence of the cause of a detected nonconformity or other undesirable situation.

deficiency—physical work item or condition identified by project personnel that is not in conformance with the construction documents and that has a predetermined remedial action by means of existing specification, previously closed nonconformance report, or by an accepted repair procedure (also known as a “minor nonconformance”).

disposition—process of identifying a proposed correction for a nonconformity to bring the item into conformance with project requirements.

external audits—generally second- and third-party audits.

findings—results of the evaluation of the collected audit evidence against audit criteria.

first-party audits—conducted by, or on behalf of, the organization itself for management review and for process improvement and for conformance, and may form the basis for an organization’s self-declaration of conformity.

hold point—point in a process where it cannot proceed further without a specified inspection, test, or acceptance.

inspection and testing plan—list of the elements of the project and the required testing and inspection for each one.

internal audits—generally known as first-party audits.

lead auditor—auditor in charge of the audit team.

nonconformance—product, material, or process that does not meet established standards or criteria.

opportunity for improvement—documented notification to the auditee that may be issued by the auditor when, by adopting an improvement to the process, the

system is thought to have an increased ability of fulfilling a requirement.

placing drawings—drawings used by reinforcing steel installers to place reinforcing steel (refer to *CRSI Manual of Standard Practice* [CRSI 2009]).

preventive action—elimination of the cause of a potential nonconformity or other undesirable potential situation.

preventive action request—notification to the auditee issued by the auditor when a process is seen to be in danger of delivering a nonconforming product.

procedure—document that explains the process for achieving a task and typically addresses who, when, where, what, and why associated with the process and may contain one or several work methods.

quality management procedure—procedure that details the methodology for a particular process related to the quality management system (also known as “quality management procedures”).

quality management system—management system to direct and control an organization with regard to quality (also referred to as “quality system”).

quality manager—person responsible for the oversight of the quality management system to include coordination, quality control activities, reviews, auditing of the processes, and recognition of opportunities for improvement.

quality manual—document or set of documents specifying the quality management system of an organization.

quality plan—document specifying which procedures and associated resources should be applied by whom and when to a specific project, product, process, or contract.

quality policy—overall intentions and direction of an organization related to quality as formally expressed by top management.

resolution—proposed or approved correction for a nonconformance or deficiency to bring the item into conformance with project requirements.

root cause—initiating cause of either a condition or a casual chain of events that leads to an undesirable outcome.

second-party audits—conducted by parties having an interest in the organization, such as customers.

sign-off—to concur with the contents of a document by signature or initial and date.

supplier—entity that provides a service or a product to the organization; this can be internal or external to the organization, or in a contractual situation sometimes called a contractor or subcontractor (also referred to as “vendor”).

surveillance audits—spot or random checks to ensure that systems presented in previous audits or plans are in use and functioning adequately.

third-party audits—conducted by external, independent auditing organizations.

traceability—ability to follow the history, origin, application, destination, or location of a product or components through documentation.

validation—process of assuring that the design meets the customer’s needs.

verification—assurance that all the requirements are met.