ACI 121R-08

Guide for Concrete Construction Quality Systems in Conformance with ISO 9001

Reported by ACI Committee 121

American Concrete Institute®

First Printing
July 2008

American Concrete Institute®
Advancing concrete knowledge

Guide for Concrete Construction Quality Systems in Conformance with ISO 9001

The technical committees responsible for ACI committee reports and standards strive to avoid ambiguities, omissions, and errors in these documents. In spite of these efforts, the users of ACI documents occasionally find information or requirements that may be subject to more than one interpretation or may be incomplete or incorrect. Users who have suggestions for the improvement of ACI documents are requested to contact ACI. Proper use of this document includes periodically checking for errata at **www.concrete.org/committees/errata.asp** for the most up-to-date revisions.

ACI committee documents are intended for the use of individuals who are competent to evaluate the significance and limitations of its content and recommendations and who will accept responsibility for the application of the material it contains. Individuals who use this publication in any way assume all risk and accept total responsibility for the application and use of this information.

All information in this publication is provided "as is" without warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose or non-infringement.

ACI and its members disclaim liability for damages of any kind, including any special, indirect, incidental, or consequential damages, including without limitation, lost revenues or lost profits, which may result from the use of this publication.

It is the responsibility of the user of this document to establish health and safety practices appropriate to the specific circumstances involved with its use. ACI does not make any representations with regard to health and safety issues and the use of this document. The user must determine the applicability of all regulatory limitations before applying the document and must comply with all applicable laws and regulations, including but not limited to, United States Occupational Safety and Health Administration (OSHA) health and safety standards.

Order information: ACI documents are available in print, by download, on CD-ROM, through electronic subscription, or reprint and may be obtained by contacting ACI.

Most ACI standards and committee reports are gathered together in the annually revised *ACI Manual of Concrete Practice* (MCP).

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331
U.S.A.
Phone: 248-848-3700
Fax: 248-848-3701

www.concrete.org

Guide for Concrete Construction Quality Systems in Conformance with ISO 9001

Reported by ACI Committee 121

Paul Hedli
Chair

Jon B. Ardahl
Vice Chair

Thomas G. Tyler*
Secretary

Godwin Q. Amekuedi	Thomas M. Greene	Anand S. Mehta	Roger D. Tate
Casimir Bognacki	Michael C. Jaycox	Oon-Soo Ooi	James R. Turnham*
Martin Brugger	H. P. Errol Lim	Ryan K. Riehle*	Woodward L. Vogt
Martin J. Fradua	Stephen Marchese	Johan C. F. Schor*	Paul Zoltanetzky, Jr.
Alejandro Graf			

*Subcommittee members who prepared this report.
Additional recognition to C. Raymond Hays, who led the subcommittee that developed this document, Lawrence G. Mrazek, who actively participated, and Anthony R. Ameruso, posthumously, for his work on the committee.

ACI Committee 121 developed this manual to provide ISO 9001:2000-based quality management system requirements and guidance to the concrete construction industry. Discussion is offered for each clause of the ISO 9001:2000, providing advice and construction-specific information that can be used as a reference to either produce a new quality management system compliant with ISO 9001:2000, or to upgrade an ISO 9001:1994 or other quality management system to meet the ISO 9001:2000 requirements.

Appendix A, "Model Quality Management System Manual for Designers, Construction Managers, and Constructors," is based on the "NYC MTA Bridges and Tunnels, Engineering and Construction Department," and is recommended for use as a template for any company beginning to write a quality manual.

Keywords: quality assurance; quality control; procedures.

CONTENTS

ACI 121R-08 supersedes ACI 121R-04 and was adopted and published July 2008.

FOREWORD

This manual has been developed to address quality management for design and construction, with particular emphasis on concrete construction. It is based on the requirements of the ISO 9001:2000, "Quality Management Systems—Requirements," which is referred to herein as ISO 9001:2000 or the "Standard."

As an internal advantage, basing the quality management system on the Standard brings the concept of process management to the forefront of an organization. Rather than using the production control methods as an end in themselves, the organization uses them as tools and measures of process effectiveness, aids to continual improvement, elements of employee involvement, and indicators of customer satisfaction.

As an external advantage, the ISO 9001:2000 has international recognition. Compliance with the Standard has become a necessity for conducting business internationally and, more recently, in the United States. Because it places the responsibility for quality management on the vendor, those in compliance are seen as well-managed organizations with methods of quality management that can be assessed against a recognized standard. International and U.S. government agencies and private companies are requiring International Organization for Standardization (ISO) compliance or sometimes registration to conform to contract requirements or to become a preferred vendor.

Review of this publication and assessment of an organization's quality management system may indicate that many of the requirements of the Standard are already in place. Therefore, the objective should not be to reinvent the organization's quality management system in the image of the Standard, but rather to conduct a gap analysis to determine where compliance is already in place and in what areas it is weak or lacking.

ISO history

In the 1920s, statistical theory began to take shape and the first control chart was developed by Walter Shewart at Bell Labs for use in production. It was the first use of a formalized quality control technique. Out of this grew an approach to manufacturing that expanded after World War II. Inspectors had been a specialized function in production facilities since World War I, but the emphasis was on avoidance of the defects without a statistical basis.

In the 1950s, W. Edward Deming and Joseph Juran were invited to Japan by General McArthur to bring new life to a damaged industry by teaching a total management approach to production. By the beginning of the 1960s, the phrase "made in Japan" took on a new meaning, and the West began to follow suit.

Throughout the 1950s, manufacturing developed in the West without a formal quality management standard. In 1959, the United States developed MIL-Q-9858, "Quality Program Requirements," for military procurement (U.S. Department of Defense 1959). Following this, NASA developed "Quality System Provisions for Space System Contractors" (NPC 200-2) in 1962, and NATO adopted the Allied Quality Assurance Publications for procurement of equipment in 1968 (NATO 1968).

Throughout the 1960s, various systems of quality assurance were required of the manufacturers in the United Kingdom and Canada. In 1971, to standardize the systems, the British Standards Institute (BSI) published the first UK standard for quality assurance. This was followed in 1974 by BS 5179 (British Standards Institute 1974). These publications placed the responsibility of quality management in the hands of the third-party inspection.

In 1979, after meetings and agreements with key industry bodies, the British Standards Institute published BS 5750. Key industry bodies agreed to drop their own standards and use BS 5750 as a common contractual document. Process improvement was not addressed; only production control was addressed. The requirements were enforced by audit. The BS 5750 carried the core 20 elements that would form the backbone of ISO 9000:1987, and were continued into the ISO 9000:1994 series.

ISO was originally created in 1947 to facilitate world trade. Its emphasis up to the late 1970s had been on technical standards, engineering practices, and manufacturing. The development of quality management and increasing international trade led to the need for an international standard, which was pursued by ISO Committee TC176.