



TOTAL QUALITY MANAGEMENT: THE COMPETITIVE EDGE

Bureau of Engineering Research
The University of Texas at Austin

Publication 10-4
April 1990

The purpose of this publication is to make available to industry the results of research conducted by the Construction Industry Institute (CII). The publication does not necessarily represent the views of CII member companies, but is offered as a contribution to the industry.

CII was founded in 1983 to improve the cost effectiveness of the nation's largest industry. The members, who represent a broad cross-section of owners and contractors, believe that many of the problems that limit cost effectiveness are common ones, and that real improvements can be best accomplished in a cooperative environment with the benefits being shared by the construction industry at large.

The Construction Industry Institute
The University of Texas at Austin
3208 Red River
Suite 300
Austin, Texas 78705-2650
(512) 471-4319
FAX (512) 499-8101

Total Quality Management: The Competitive Edge

**Prepared by
The Construction Industry Institute
Quality Management Task Force**

**Publication 10-4
April 1990**

© 1990 Construction Industry Institute™.

The University of Texas at Austin.

CII members may reproduce and distribute this work internally in any medium at no cost to internal recipients. CII members are permitted to revise and adapt this work for the internal use provided an informational copy is furnished to CII.

Available to non-members by purchase; however, no copies may be made or distributed and no modifications made without prior written permission from CII. Contact CII at <http://construction-institute.org/catalog.htm> to purchase copies. Volume discounts may be available.

All CII members, current students, and faculty at a college or university are eligible to purchase CII products at member prices. Faculty and students at a college or university may reproduce and distribute this work without modification for educational use.

Printed in the United States of America.

TABLE OF CONTENTS

<i>Chapter</i>	<i>Page</i>
Summary	V
1. Introduction	1
Research Objectives, Scope and Methodology	1
2. TQM—Total Quality Management	2
Customers	2
Performance Improvement	3
Elements of TQM	5
3. Interview Process	7
4. Findings	8
Organizational Structure and Operation	8
Instituting TQM	9
Training	13
Tools, Methods and Techniques	14
Contract Party Relations	14
Contracting Methods	15
Effectiveness of Quality Management Effort	15
5. Conclusions and Recommendations	17
References	19
Acknowledgement	20

SUMMARY

Companies must institute total quality management (TQM) or become noncompetitive in the national and international construction and engineering markets within the next five to ten years. This startling conclusion is based on interviews with 142 individuals from 19 owner and contractor firms involved in constructing heavy industrial, manufacturing and commercial facilities.

Total quality management is a company-wide effort that involves everyone in the organization in the effort to improve performance. It permeates every aspect of a company and makes quality a primary strategic objective. TQM is achieved through an integrated effort among personnel at all levels to increase customer satisfaction by continuously improving performance.

Recommendations

- Institute an integrated approach of total quality management and quality assurance/quality control (QA/QC).
- Develop a corporate TQM program by thoroughly investigating the different approaches offered by various consultants/theorists and selecting the aspects of each one that apply to the specific needs of a particular company.
- Education and training
 - Educate management first, as managers must fully understand and support the TQM process and actively participate in its implementation.
 - Address both the technical and humanistic aspects of TQM in the training effort.
 - Tailor training to the job functions of the employees.
- Use pilot projects early during implementation to obtain management and employee acceptance of TQM.
- Develop closer, more productive relationships among owners, contractors, subcontractors and vendors to create a team attitude toward improving quality.

INTRODUCTION

The CII Quality Management Task Force has conducted research to identify quality management approaches and techniques that the U.S. construction industry is using to improve quality performance. The task force research shows that U.S. owners, engineers and contractors are adapting and successfully implementing concepts of total quality management that the U.S. manufacturing industry and Japanese contractors have been using for many years.

Research Objectives, Scope and Methodology

The research objectives were to:

1. Identify quality management techniques and organizations that were effective in the construction industry
2. Identify the reasons these techniques and organizations were effective and the ways in which they were developed and implemented
3. Recommend generic guidelines for implementing improved quality management in the construction industry.

The task force interviewed individuals from 19 owner and contractor firms who are involved primarily in heavy industrial, manufacturing or commercial construction and who are recognized as industry leaders in quality. The task force analyzed development of various quality management organizations and techniques to determine those attributes that have been perceived as most effective. Where available, data were used to verify this effectiveness. Further information is provided in the CII source document (Reference 1) and other references listed in another section of this publication.

TQM—TOTAL QUALITY MANAGEMENT

Total quality management is an effective, comprehensive management technique that has proven successful both in the United States and overseas in manufacturing, service and construction. Japanese construction companies began instituting TQM during the 1970s, embracing TQM concepts (even though the construction process is a creative, one-time process) and in spite of arguments that TQM could only apply to mass production. An indication of their success is that since the mid-1970s, three Japanese contractors have won Japan's coveted Deming Prize, which recognizes quality improvement in industry (Reference 2).

Customers

Customers can be either internal or external. *External customers* are not part of the company producing the product or service, but are impacted by the product or service. For engineering, the products are plans and specifications and the customers are the construction organization and the owner. For construction, the product is the completed facility and the customer is the final user of the facility.

Internal customers are those from within the engineering and construction organizations. These internal customers receive products and information from other groups or individuals within their organization. Satisfying the needs of these internal customers is an essential part of the process of supplying the ultimate external customer with a quality product.

Every party in a process has three roles: supplier, processor and customer. J. M. Juran defines this as the "triple role" concept (Reference 3). This concept can be applied to construction and is illustrated in Figure 1. The owner, designer and constructor each have the three roles to perform.