



INDUSTRY IMPLEMENTATION OF THE BUSINESS ROUNDTABLE'S CONSTRUCTION INDUSTRY COST EFFECTIVENESS PROJECT

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EXECUTIVE SUMMARY

This study represents the third and final phase of a comprehensive research study undertaken by the Construction Industry Institute (CII) to measure the impact of the Business Roundtable's Construction Industry Cost Effectiveness (CICE) Project. The study, directed by CII's CICE Impact Evaluation Task Force, attempts to determine the extent to which the industry has implemented CICE supported ideas and the perceived benefits that have resulted.

Implementation Programs

A sample of 38 documented CICE implementation programs were evaluated for this study. Implementation programs were received from 15 owners, 18 contractors, and 5 associations. The industry's largest owners and contractors provided the majority of programs, with a few programs coming from small companies.

Wide variations existed in the documentation of implementation programs. Some programs detailed the company's existing policies and future plans to implement recommendations from each of the 23 CICE reports, whereas other programs provided a cursory review of possible company action. Programs were evaluated on the basis of action being or to be taken in implementing the 223 CICE recommendations.

Safety recommendations were the most frequently used, with 55% of all possible safety recommendations being used in the programs. Other significant areas included: labor motivation, supervisory training, contracts, construction technology, overtime, and union subjourneymen. Owner programs emphasized contractual arrangements by using 30% more contract recommendations than contractor programs. Programs by contractors emphasized areas of supervisory training, construction technology and union subjourneymen by using 20 to 30% more recommendations in these areas than owner programs.

Of the ten most applied recommendations, safety accounted for the top six recommendations in contractor programs and four recommendations in owner programs. Other high priority recommendations were in the areas of: productivity measurement and motivation, supervisory training, and modern management systems.

Project Benefits

Fifteen construction projects were evaluated to determine possible cost savings of programs that embodied CICE ideas and recommendations. Projects came from various industry sectors with seven industrial, six commercial and two power projects evaluated. The various projects ranged in cost from several million to almost one billion dollars.

Programs implemented on these projects were limited to a relatively few specific CICE recommendation areas. Thirteen out of the 15 projects used programs dealing with productivity improvement, constructability, or

safety. Industrial process plants primarily used programs emphasizing labor productivity improvement, whereas commercial projects utilized programs dealing with constructability.

Cost savings realized by implementing CICE recommendations on most of the projects was over 10% of total project cost. Benefit-to-cost ratios for the programs were usually greater than 10 to 1. In many cases, not only was there a cost savings of several million dollars, but also an avoidance of several additional months from the project's schedule.

Conclusions

Based on the findings of this study, the conclusions are:

- (1) Companies are in the beginning stages of developing successful implementation programs.
- (2) Large owners and contractors are leading the way in program development. Successful programs are supported by top management who commit needed resources to ensure program implementation.
- (3) Current implementation programs are usually narrowly focused on a few recommendation areas, such as: safety, productivity improvement or constructability.
- (4) Programs yielded cost savings of approximately 10% of total project cost with benefit-to-cost ratios of greater than 10 to 1.
- (5) Companies with successful programs need to communicate implementation methodologies and benefits to the industry through publications and conferences.

I. BACKGROUND

The Construction Industry is large and complex, consisting of numerous participants. As the industry attempts to progress into the rapidly changing, technological future, it is slowed by its inordinate fragmentation and constant state of confrontation. Due to dwindling cost efficiency, the industry has been forced to examine itself to determine and reinforce its management strengths and alleviate its weaknesses.

The Business Roundtable organized and funded 23 separate studies which analyzed the causes of and some feasible steps to reverse the industry's declining cost effectiveness. Over 250 construction experts spent over three years working on the Roundtable's Construction Industry Cost Effectiveness (CICE) Project. The study teams developed 223 recommendations for action by owners, contractors, trade associations, labor, government, academia and others to give customers more construction for their money. To date, no study has been undertaken to determine the degree to which these recommendations are being used and what are the benefits to their users.

CICE Impact Evaluation Committee

The Construction Industry Institute (CII) formed the CICE Impact Evaluation Task Force in early 1984. The committee consists of representatives from owners, contractors, and academia. The



task force's mission is two-fold. First, to evaluate the impact of the Roundtable's CICE Project with regard to increasing the efficiency of the construction industry. Secondly, the task force will attempt to develop a methodology for measuring the changes over time in the industry's overall cost effectiveness.

The CICE Impact Evaluation Task Force initiated a three-phase study program, consisting of the following studies: Exposure, Awareness, and Implementation. The Exposure study evaluated the extent of knowledge of companies and individuals that the Business Roundtable had completed a series of studies dealing with the industry's cost effectiveness. The Awareness study made a determination as to the levels of knowledge that the industry had of the CICE report findings. The final phase of this three study program concentrated on evaluating the attempts to implement the 223 CICE recommendations and what perceived benefits have been achieved. This report represents the findings and conclusion of that study.

Exposure Study

The Exposure study, which evaluated the extent of exposure to the Roundtable's CICE project, was completed in December 1984. Almost one million copies of the 23 specific reports and two summary reports were distributed to construction participants as of May 1984. Results from the study indicated that large owners and contractors were the primary recipients of the reports, thus they had a high level of exposure.

Small companies, design firms and government agencies had much lower levels of exposure. Upper management levels seemed to be more knowledgeable of the reports than did lower levels in all companies. The study concluded that the Business Roundtable should continue the policy of the distributing CICE reports, and that additional efforts should be made to contact those participants with low levels of exposure.

Awareness Study

In August 1985, the study that attempted a determination of the different levels of awareness of CICE report findings was completed. The overall conclusion from that study was that individuals believed that the specific reports had a high value, but they were not being studied and utilized to their full extent.

From an unbiased sample of almost 400 responses, 36% of respondents were aware of the Roundtable's CICE project. Implementation efforts regarding CICE recommendations were being undertaken by 20% of the total industry sample. As with the Exposure study, the level of awareness was very high for contractors, but design firms and private owners had a lower level of awareness.

Study Purpose and Objectives

This report concentrates on the final phase of the three study program. Results from the two previous studies indicate that industry leaders are exposed and aware of CICE reports findings and recommendations. This report deals with the efforts undertaken to implement the 223 CICE recommendations and to determine the perceived benefits that have been realized.

The purpose of the Implementation study is to:

Determine the extent of the industry's response to the Business Roundtable's Construction Industry Cost Effectiveness Project and to evaluate any measureable results from the industry's various implementation programs.

To meet the purpose of the study, five objective steps were undertaken. They include:

1. Identify participants with implementation programs in effect.
2. Develop a system to collect data on implementation programs.
3. Classify programs by content, type of project and industry participant.
4. Develop a questionnaire to obtain measureable or perceived results from implemented programs.
5. Evaluate results to determine impact of CICE recommendations.

Report Organization

This report is divided into four parts. The first part includes a description of the methodology used for the study. Data sources are identified and methods used to collect data are described.

Contents of implementation programs collected for the study will be discussed in the report's second part. The programs will be classified by the 223 CICE recommendations utilized in the programs. Comparisons will be made between owner and contractor programs.

The third part will focus on the cost saving benefits of implementation programs. Several projects, varying from petrochemical to commercial, will be used to illustrate savings being realized by implementing CICE recommendations.

The final part of the report discusses conclusions drawn from an analyses of implementation programs. Recommendations are given to further the realization of implementation benefits by construction users.

II. STUDY METHODOLOGY

The intent of this study was to collect available CICE implementation programs and to evaluate commonality between programs. The study team solicited information from companies known to or anticipated to have instituted implementation efforts. Thus, the data collection procedure was not random or unbiased, but rather a predetermined list of companies was solicited for information.

Data Sources

Collection of implementation information was accomplished by use of a solicitation letter. Letters of requests were organized to inform individuals about efforts to measure exposure and awareness of CICE reports, and to request that documented implementation programs be forwarded. Companies were informed that information received would be evaluated in strict confidentiality and individual company identities would not be revealed.

Since the study was not designed to be based on a random sample, attempts were made to develop a comprehensive list of industry participants known or expected to have functioning implementation programs. Sources of data included the companies or members of the following:

<u>Data Source</u>	<u># of Companies</u>
1. Construction Industry Institute	50
2. Awareness Study List (companies indicating implementation plans)	75
3. Business Roundtable Conference Attendees (December 1984 - San Diego)	125
4. Engineering News Record - Top 400 Contractors (1984)	400
5. Local Construction User Groups	50

Approximately 600 solicitation letters were sent to specific individuals within each identified company. The letters requested either documented implementation plans or negative responses if the companies did not have written documentation. Ten percent of the companies responded to the solicitation letter. A total of 38 documented implementation plans were forwarded for evaluation. A plan was classified as being a documented CICE implementation program if the plan listed steps that the company was taking or anticipated to take to incorporate CICE recommendations into standard operating procedures.

CICE Reports

The Business Roundtable produced 23 specific reports and two summary reports for the Construction Industry Cost Effectiveness Project. Table 2.1 lists titles of all reports published for the CICE Project. The reports were divided into five major study areas:

1. Study Area A - Project Management
2. Study Area B - Construction Technology
3. Study Area C - Labor Effectiveness
4. Study Area D - Labor Supply and Training
5. Study Area E - Regulations and Codes

Over one and one half million copies of the reports have now been distributed throughout the industry. The reports detail the possible causes for the lack of cost effectiveness on major construction operations. In addition, the reports recommend strategies and methods to resolve poor cost performance.

TABLE 2.1.

CONSTRUCTION INDUSTRY COST EFFECTIVENESS PROJECT

PROJECT MANAGEMENT - STUDY AREA A

1. A-1 Measuring Productivity in Construction
2. A-2 Construction Labor Motivation
3. A-3 Improving Construction Safety Performance
4. A-4 First and Second Level Supervisory Training
5. A-5 Management Education and Academic Relations
6. A-6 Modern Management Systems
7. A-7 Contractual Arrangements

CONSTRUCTION TECHNOLOGY - STUDY AREA B

8. B-1 Integrating Construction Resources and Technology into Engineering
9. B-2 Technological Progress in the Construction Industry
10. B-3 Construction Technology Needs and Priorities

LABOR EFFECTIVENESS - STUDY AREA C

11. C-1 Exclusive Jurisdiction in Construction
12. C-2 Scheduled Overtime Effect on Construction Projects
13. C-3 Contractor Supervision in Unionized Construction
14. C-4 Constraints Imposed by Collective Bargaining Agreements
15. C-5 Local Labor Practices
16. C-6 Absenteeism and Turnover
17. C-7 The Impact of Local Union Politics

LABOR SUPPLY AND TRAINING - STUDY AREA D

18. D-1 Subjourneymen in Union Construction
19. D-2 Government Limitations on Training Innovations
20. D-3 Construction Training Through Vocational Education
21. D-4 Training Problems in Open Shop Construction
22. D-5 Labor Supply Information

REGULATIONS AND CODES - STUDY AREA E

23. E-1 Administration and Enforcement of Building Codes and Regulations
24. Summary Report - More Construction for the Money
25. Executive Summary - Message to Owners

CICE Recommendations

The 23 specific reports detail 223 recommendations aimed at improving construction effectiveness. Table 2.2 presents a breakdown of the number of recommendations applicable to major project participants. These participants include: owners, contractors, union, government, general, and others. The list of all 223 recommendations, taken directly from individual CICE reports, is available from the Business Roundtable.

Almost 80% of the recommendations apply to owners and contractors. Owners have the largest number of directed recommendations due to their primary impact on construction projects.

Program Evaluation Methodology

Implementation programs submitted for review are as varied in both form and content as the companies which created them. Some programs follow the format of the CICE reports, Report A-1 through E-1, listing applicable recommendations and steps that the company is taking to achieve implementation. However, most programs are far more general in nature. These programs discuss in broad terms the essence of the various CICE reports, and in a similarly general nature, what the company is doing to incorporate the main thrust of the report into its routine procedures.