

CONSTRUCTION
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**INDUSTRY AWARENESS OF
THE BUSINESS ROUNDTABLE'S
CONSTRUCTION INDUSTRY COST EFFECTIVENESS PROJECT**

by

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and
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**A Report to
The Construction Industry Institute
The University of Texas at Austin**

**Under the Guidance of
Task Force 83-1
CICE Impact Evaluation**

**from
Purdue University
Lafayette, Indiana
and
Oregon State University
Corvallis, Oregon**

**SD-3
July 1985**

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Printed in the United States of America.

TABLE OF CONTENTS

	<u>Page</u>
Executive Summary	1
I. BACKGROUND FOR PROJECT	3
CICE Impact Evaluation Committee	3
CICE Exposure Study	4
II. AWARENESS PROJECT OBJECTIVES	4
III. PROJECT RESEARCH METHODOLOGY	6
Data Acquisition Plan	6
Data Collection Process	9
Indiana Construction Industry Sub-sample	9
IV. SUMMARY OF COMPLETED QUESTIONNAIRES	10
V. CURRENT IMPLEMENTATION OF CICE RECOMMENDATIONS	28
VI. CONCLUSIONS AND RECOMMENDATIONS.....	33
APPENDIX A - Awareness Project Questionnaire (Industry)	35
APPENDIX B - Awareness Project Questionnaire (Educators)	40

EXECUTIVE SUMMARY

This study is the second phase of a three phase research project to evaluate the impact of the Business Roundtable's Construction Industry Cost Effectiveness (CICE) Project on the United States Construction Industry.

The basic data for the study were collected by a telephone survey in combination with a written questionnaire. 391 survey respondents were randomly selected from published lists of the largest firms in the Nation. A sub-sample of 196 smaller Indiana construction firms was surveyed to compare to the survey of the large firms. Where statistical comparisons were possible, the results were very similar.

The basic level of awareness of construction industry participants of the CICE Project is still low. Slightly over one third of the main survey respondents, 36%, were aware of the project. General contractors, construction managers and public owners were reasonably aware, while designers, private owners and specialty contractors had a lower awareness. Educators, who comprised 10% of the sample, reported a 95% awareness of the project.

Approximately half, 56%, of the respondents who were aware of the CICE Project are utilizing the information to implement new programs to improve cost effectiveness in their firms. Of these firms, 53% felt significant results had been achieved, 39% felt it was still too early to tell, and 8% had reported no improvement. Three groups, general contractors, private owners, and educators, indicated more significant implementation efforts.

There is considerable interest in the CICE Project and its concepts amongst organizations aware of it. Of the main survey respondents to the project questionnaire, 68% indicated that they would be willing to participate in future project activities, while 89% of those who have tried to implement new programs volunteered to assist with an implementation study. Of the respondents who were not aware of the project, 76% requested that they be sent a set of the CICE Project reports.

These results, two years after completion and first distribution of the CICE Project reports, indicate that a significant segment of this large and diversified industry has been reached. However, the survey also indicates that the CICE reports have not been well studied even though their value as resource documents was rated high. Though the CICE reports have been very instrumental in influencing changes in the industry, the reports alone are not sufficient to accomplish the goal of promoting better cost effectiveness in the construction industry. More personal interaction and audio-visual presentations are also needed.

Recommendations

The Business Roundtable, the Construction Industry Institute, professional societies and other organizations representing the participants in the United States Construction Industry should continue their efforts to promote the concepts of the CICE Project. Construction education programs in the United States should make their students fully aware of the concepts of cost effectiveness in construction as an integral part of their educational process.

I. BACKGROUND FOR PROJECT

Several major companies in the United States joined together in 1969 to form the Construction Users Anti-Inflation Roundtable, a group of owners seeking constructive ways to get "more for their money" from their construction projects. In 1972 the organization merged with others into the Business Roundtable, but continued their quest for better construction via the Roundtable's Construction Committee.

The Construction Committee initiated a large-scale project in the late 1970's, the Construction Industry Cost Effectiveness Project (CICE), a four-year study to investigate ways to remove inefficiencies from the construction process. The study was made by more than 250 construction professionals representing more than 125 companies as well as universities and industry organizations working on project study teams. They produced twenty three separate reports which contain 223 recommendations on specific problem areas, plus two summary reports. These CICE reports have been distributed to hundreds of individuals, companies, and organizations, and have received much publicity from professional and trade organizations.

CICE Impact Evaluation Committee

Considerable interest has been expressed by members of the Business Roundtable as to the existing impact of the CICE Project on the United States Construction Industry. In response to this interest a CICE Impact Evaluation Committee has been established by the Construction Industry Institute, a newly organized construction research institute headquartered at the University of Texas at Austin. One of the purposes of the Committee is to determine the current awareness of the CICE Project and the distributed reports, and possible cost improvement programs which have been implemented in industry due to CICE recommendations.

The first effort of the Committee is a three phase research study to estimate the initial impact of the CICE Project. Phase 1 was designed to evaluate the extent of construction industry exposure to the findings and recommendations of the CICE reports.

Phase 2 was designed to evaluate the level of awareness of construction industry participants of the CICE Project and its reports. Phase 3 was designed to evaluate the extent of any efforts made in the industry to implement the CICE recommendations. The Exposure Study has been completed and a report submitted, the Awareness Study is summarized in this report, and the Implementation Study has been started.

Results of the Exposure Study

The CICE Project Exposure Study was conducted by Dr. Mark A. Smith, Assistant Professor of Civil Engineering at the University of Maryland. It was determined that over 900,000 reports had been distributed by May, 1984. The study tabulated approximately 6,000 requests for CICE reports which resulted in approximately 400,000 being distributed. A breakdown was made of the percentage of the total reports, and the number of specific reports, sent to various categories of industry participants. An evaluation was made of the extent of exposure to the CICE reports according to the size of the company and the level of management requesting information. Finally, evaluations were made of the exposure of the CICE Project and its reports via professional and trade organization publications, and the audio-visual materials developed by the Roundtable for group presentations.

Based on the findings of the researchers, the conclusions of the study are: (1) Large Owners and Contractors are exposed to the CICE information, (2) Small Owners and Contractors, Government Agencies, and A/E firms need additional exposure, and (3) Additional means should be sought to extend the degree of exposure to Academia, Labor, and Technical/Professional Organizations.

II. AWARENESS PROJECT OBJECTIVES

The CICE Awareness Study has been conducted by Dr. Donn E. Hancher, Associate Professor of Construction Engineering and Management at Purdue University, in cooperation with Professor Harold D. Pritchett, Professor of Civil Engineering at Oregon State University. The research goals and research plan for this project were initially developed in cooperation with members of

the CICE Impact Evaluation Committee. The final basic objectives of the study are stated below:

1. Identify a sample population of owners, contractors, designers, and educators actively involved in the construction process in the United States and select a representative sample from this population to contact during the research effort.
2. Develop a research data acquisition plan to use when contacting the selected industry participants to ascertain their awareness of the CICE Project.
3. Collect and evaluate the research data needed to evaluate the current level of awareness of construction industry participants of the CICE Project and the published reports.
4. Identify potential persons to contact for the CICE Implementation Study to be conducted.
5. Prepare a final research report on the findings of the CICE Awareness Study.

III. PROJECT RESEARCH METHODOLOGY

The main goal of this research study was to determine the general level of awareness of the participants in the United States Construction Industry of the Business Roundtable's Construction -Industry Cost Effectiveness Project and its published reports. The main concern of the researchers was how to obtain a representative sampling of the thousands of industry participants. The purpose of this section of the report is to describe how the sample set was determined and what methods were used to evaluate the selected participants' knowledge of the CICE Project.

Data Acquisition Plan

Preliminary discussions of the CICE Awareness Study at meetings of the CICE Impact Evaluation Committee centered on the type of information sought from the selected participants and the types of participants who should be contacted. The information desired was the level of knowledge of the CICE Project and its reports throughout the various levels of management of different construction-related organizations, an evaluation of the awareness of and the value of the reports, and information about any efforts to implement the CICE recommendations. Also, it was desired to identify persons who have implemented any of the recommendations who would be willing to participate in the Committee's proposed third study, the Implementation Study.

It was decided that a standard questionnaire would be the best tool to use to collect the desired research information. However, with the often low success rate of mailed questionnaires, it was further decided that the participants should also be contacted by telephone first to seek their help with the study. The researchers met with an appointed subcommittee to finalize the questionnaire and the data collection process. Two separate questionnaires were developed for the study, one for industry contacts (see Appendix A), and one for construction educators (see Appendix B).

The questionnaires were designed so that the first three questions could be asked over the telephone. If the participant

was aware of the CICE Project, then permission was to be asked to send them a questionnaire to complete and return. If not aware of the project, then they would be asked if they would like to receive a set of the CICE Project reports. It was believed that this system would improve the number of responses to the requests for information. The final concern of the subcommittee was the selection of the industry participants to be included in the research sample set; this will be outlined in detail in the next paragraph.

The goal of the researchers was to obtain a total sample of 400 to 500 participants to contact for the study. The primary concern was to select a random sample of participants from the thousands of potential candidates. It was finally decided that the research sample set would be chosen from well-known lists of the top organizations involved in construction in the United States. Although this would bias the sample set toward larger organizations, it was believed that these participants would represent those involved in the major percentage of the dollar volume of construction work in the Nation. A sub-sample of participants was obtained in Indiana, which are predominately smaller organizations, as a comparison to check if significant differences in results would occur.

The various groupings of construction industry participants originally selected for the study are identified in Table 1 and Figure 1. The source of individual names is shown in Column 2 of Table 1, listed as Data Source. Column 3 shows the original target estimate of the number of each industry group to try to contact as the "base research sample set", while Column 4 shows the gross number of possible participants that were identified for selecting the base sample set. The selected participants were chosen by the use of a table of random numbers. Since the lists were to be divided between the researchers at Purdue (those east of the Mississippi River) and at Oregon State (those west of the Mississippi River), approximately fifty percent more names were generated to allow for an adequate distribution in both areas. Also, the extras would be needed if some of the samples could not be contacted. The final number of contacts made in the study was 391, and these made up the "main sample set" used for analysis.

	INDUSTRY GROUP	DATA SOURCE	TARGET # CONTACTS	GROSS # SELECTED
1	OWNERS/DEVELOPERS	BLDG. DES. & CONSTR.	100	150
2	OWNERS	FORTUNE 500	100	150
3	GENERAL CONTRACTORS	ENR TOP 400	100	148
4	CONSTRUCTION MANAGERS	ENR TOP 50	10	20
5	SPECIALTY CONTRACTORS	ENR TOP 400	40	60
6	DESIGNERS	ENR TOP 500	50	75
7	EDUCATORS	PROFESSIONAL MEETINGS	50	75
TOTAL			450	678

TABLE #1 SUMMARY OF SELECTED RESEARCH SAMPLE SET

	INDUSTRY GROUP	TARGET # OF CONTACTS					
		25	50	75	100	125	150
1	OWNERS/DEVELOPERS						
2	OWNERS						
3	GENERAL CONTRACTORS						
4	CONSTRUCTION MANAGERS						
5	SPECIALTY CONTRACTORS						
6	DESIGNERS						
7	EDUCATORS						

FIGURE # 1 SUMMARY OF TARGET RESEARCH SAMPLE SET

Data Collection Process

The data collection process used in the study followed that outlined by the CICE Impact Evaluation Committee. The researchers would first place a telephone call to a selected organization and ask to speak to an appropriate manager. This was not a difficult task for contractors and designers, but was often a laborious process for owners, especially for manufacturing firms. Once the contact was made, the person was informed of the purpose of the survey and asked if they were aware of the Business Roundtable (Question 1) and if they were aware of the CICE Project (Question 2). If not aware of the project, they were asked if they would like a complimentary set of the reports and were then thanked for their help. If they were aware of the project, they were asked if they would complete the questionnaire if it was mailed to them with a stamped return envelope.

The system worked quite well, although it was very time consuming; however, it is believed that the 391 responses obtained would never have been possible without the personal telephone calls. Most of the persons contacted were very cooperative and were quite interested in the project, even if they were not aware of it. Due to the high number of owners who were originally identified for possible contact, and due to time constraints, the total list of owners was not contacted. It is believed that the 123 samples obtained are sufficient and representative of owners. The results of the surveys will be discussed in Section IV of this report.

Indiana Construction Industry Sub-sample

The Purdue researchers decided to survey the Indiana Construction Industry as part of the study as a separate sample group. Since most of the firms in Indiana are much smaller than the large firms selected for the main research sample set, it was believed that this would provide a good measure of the concern that the main sample set was biased toward larger organizations. Also, it was very easy to contact these firms due to their close proximity to Purdue University. The Indiana sub-sample was obtained by mass mailing of the study questionnaires to the members of several construction and design organizations in

Indiana. Over 800 questionnaires were mailed out, with 196 completed and returned. Owners and educators were not included in the Indiana sub-sample; this was done due to a shortage of time and a feeling that the main sample surveys were representative of these groups. The results of the surveys of those responding will also be discussed in Section IV of this report.

IV. SUMMARY OF COMPLETED QUESTIONNAIRES

Three hundred and ninety one (391) questionnaires were completed and submitted for this study by contacted participants from the base research sample set of four hundred and fifty (450) organizations. The 391 respondents, which make up the "main sample set," are classified by type of firm in Table 2 and Figure 2. The number of responses obtained was very close to the target of 450 responses. Only private owners and developers were targeted for contact in the survey; however, some government agencies were selected randomly from the data sources and have been labeled as Public Owners. One hundred and ninety six (196) questionnaires were completed and submitted from a mass mailing to over eight hundred (800) contractors and designers in Indiana. Owners and educators were not contacted. Information on the respondents from the Indiana sub-sample is displayed in Table 3 and Figure 3.

It was deemed desirable to compare the survey results for various areas of the United States; therefore, geographic areas were subdivided into six basic areas. These areas are depicted in Figure 4 and the states in each area are listed in Table 4. A detailed listing of the respondents by both geographic area and type of firm is shown in Table 5 and Figure 5. A satisfactory number of firms was obtained in each of the areas; the number in Area 5 was smaller, but was expected due to the low population density.

Question 1 of the survey asked the participants if they were familiar with the Business Roundtable. The responses to this question from the main sample set are summarized in Table 6 and Figure 6. Forty five percent of the respondents were familiar, with only general contractors, construction managers and educators responding above 50%. The responses from the Indiana sub-sample are summarized in Table 7 and Figure 7. Forty six percent

FIRM TYPE		PURDUE	OREGON STATE	TOTAL SAMPLE	% TOTAL SAMPLE
1	GENERAL CONTRACTORS	69	50	119	30.4
2	DESIGNERS	24	30	54	13.8
3	PRIVATE OWNERS	59	47	106	27.1
4	PUBLIC OWNERS (GOVT.)	8	9	17	4.3
5	SPECIALTY CONTRACTORS	28	14	42	10.7
6	CONSTRUCTION MANAGERS	11	3	14	3.6
7	EDUCATORS	20	19	39	10.0
*** TOTAL ***		219	172	391	100.0

TABLE #2 CICE QUESTIONNAIRE RESPONDENTS LISTED BY TYPE OF FIRM
(MAIN SAMPLE SET FOR STUDY)

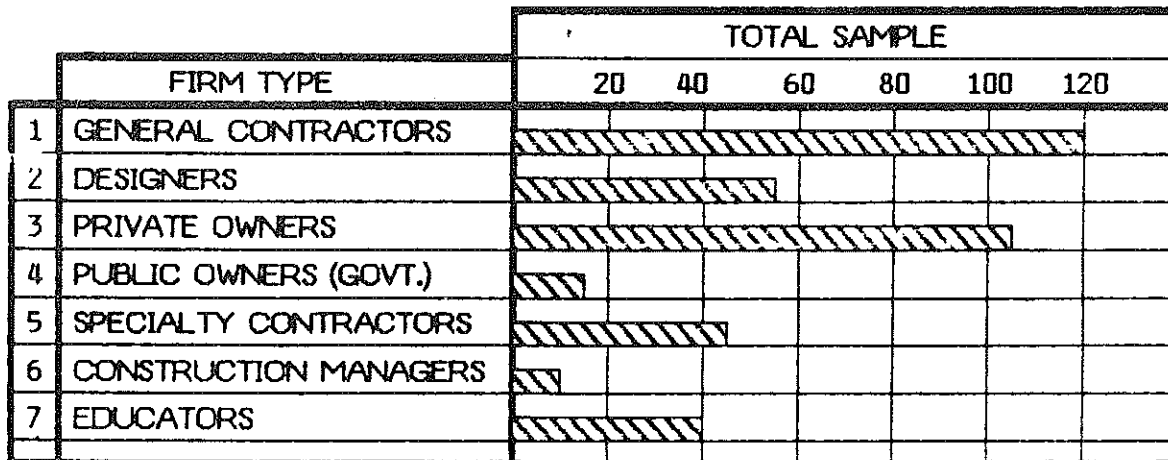


FIGURE #2 CICE QUESTIONNAIRE RESPONDENTS LISTED BY TYPE OF FIRM

	FIRM TYPE	TOTAL SAMPLE	% TOTAL SAMPLE
1	INDIANA AGC	22	11.2
2	INDIANA ABC	93	47.4
3	INDIANA PLUMBERS	17	8.7
4	INDIANA CONSULTANTS	22	11.2
5	INDIANA CONSTRUCTORS	14	7.1
6	INDIANA MECHANICAL	16	8.2
7	INDIANA ELECTRICAL	12	6.2
	*** TOTAL ***	196	100.0

(NOTE: APPROX. 800 QUESTIONNAIRES MAILED OUT)

TABLE #3 CICE QUESTIONNAIRE RESPONDENTS FROM THE INDIANA SUB-SAMPLE

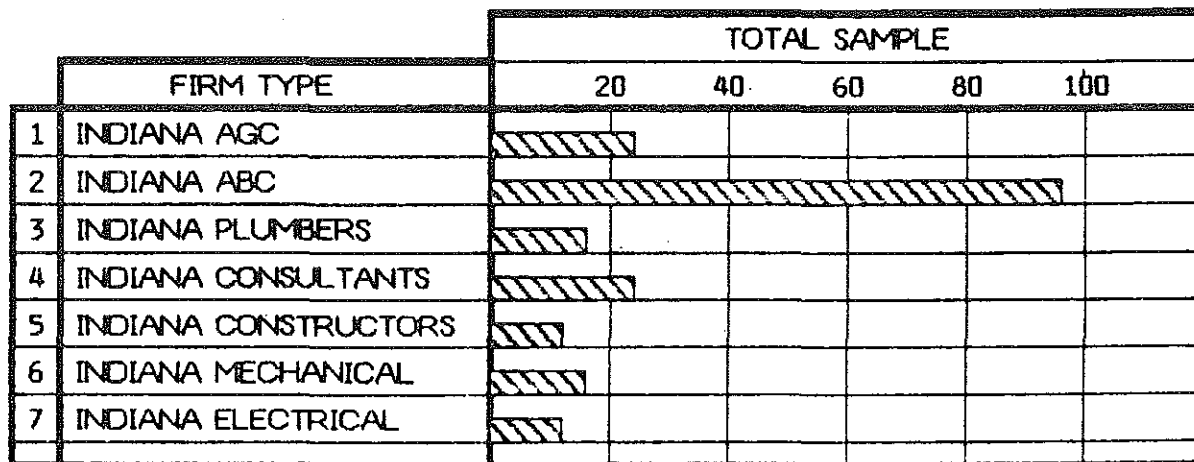


FIGURE #3 CICE QUESTIONNAIRE RESPONDENTS FROM THE INDIANA SUB-SAMPLE