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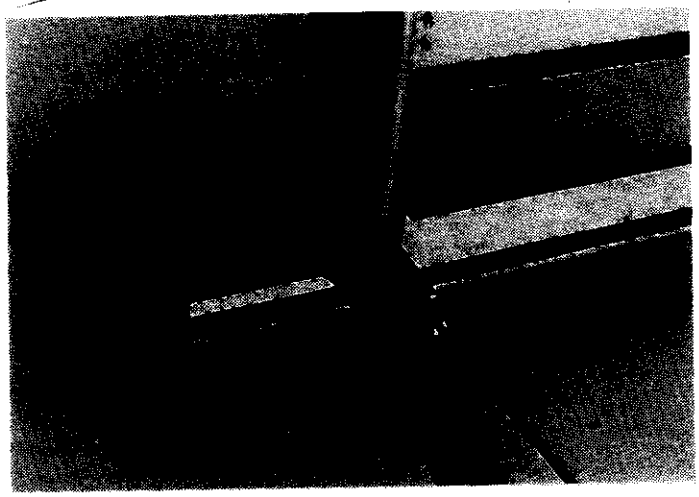
A STUDY TO INVESTIGATE THE FEASIBILITY OF THE ESTABLISHMENT OF A CONSTRUCTION INFORMATION CENTER IN THE STATE OF FLORIDA

SPONSORED BY A GRANT FROM THE BUILDING CONSTRUCTION INDUSTRY ADVISORY COMMITTEE



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School of Building Construction
University of Florida
1988

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A STUDY TO INVESTIGATE THE FEASIBILITY OF THE ESTABLISHMENT OF A CONSTRUCTION INFORMATION CENTER IN THE STATE OF FLORIDA

EXECUTIVE SUMMARY:

The purpose of this study is to investigate existing research and information centers in order to determine whether or not it is feasible to establish a Construction Information Center in the state of Florida.

The research was based on a questionnaire which was mailed out to existing research/information centers. On the basis of the responses, eight centers were selected for a closer examination and the following were visited: The Construction Industry Institute in Austin, Texas, the Owner-Builder Center in Miami, Florida, the Florida Solar Energy Center in Cape Canaveral, Florida, USA-CERL in Champaign, Illinois, Construction Research Center in Atlanta, Georgia, Architecture and Engineering Performance Information Center in College Park, Maryland, and the Southern Technologies Applications Center in Alachua, Florida. Detailed information was obtained from these centers about their objectives, operation and sources of funding.

All the existing centers contacted are essentially construction research centers. Dissemination of construction information is only a part of the several duties of these centers. Information that is presently being disseminated is of such a specialized nature that the small, medium and large-scale residential and

commercial contractors are not adequately served. Widespread dissemination of information relevant to this sector of the industry is needed and can be met by the establishment of a Construction Information Center.

The Construction Information Center may be started on a small scale basis or on a large scale basis. For the initial three-year period, the costs involved in the operation of a small scale center would be approximately $ 153,000 per year, and for a large scale center would be approximately $ 275,000 per year. It is recommended that the center be located near a major university with a strong program in Building Construction, a wide array of research, teaching and computing facilities and capable of offering the support services required.

The primary benefit of such a center would be that information on new materials, equipment, methods of construction and scientific and/or technological information pertinent to the Construction industry will be assembled, compiled, published and disseminated. In addition, duplication of research effort will be greatly minimized.

Copies of this report may be obtained by contacting:

Executive Director
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University of Florida
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I. INTRODUCTION:

The Construction industry has been for years the major contributor to the national economy, accounting generally for over 10% of the gross national product. However the industry has traditionally lagged behind other industries in research. Although some research is done on materials and equipment by private industry, basic research is at a very low level, particularly in areas where interdisciplinary interaction is involved. There is poor coordination of research and development efforts and little in the way of broad dissemination of research results[1].

Traditionally, information on new technological advances in construction has not been disseminated to all sectors of the construction industry. Research centers generate the information, but are not actively involved in the dissemination process. It would be advantageous to the industry to have an information center which would act as a liaison between the research centers and the construction industry. Information obtained from product manufacturing companies on new materials and methods may also be disseminated by the information center.

The purpose of this study is to obtain information about existing

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[1]Thomas Kavanagh, Frank Muller, James O'Brien. "Construction Management - A professional approach." McGraw-Hill Book Company. U.S.A. 1978. p. 1, 4.

research and information centers in the country. It is intended to determine the nature of work that the existing centers are involved in and their sources of funding. Thereafter it is intended to examine the feasibility of the establishment of a Construction Information Center in the state of Florida as a possible complement to the existing centers and as a potential means of compiling and disseminating construction related information.

II. METHODOLOGY

Research for this study was carried out in the following phases:

A. Survey of existing research/information centers;
B. Initial inquiries to the most apparent related centers;
C. Design and mail-out of questionnaire;
D. Site visits to the most appropriate centers and personal interviews.

A. SURVEY OF EXISTING RESEARCH/INFORMATION CENTERS: Reference was made to the National Research Centers Directory (1987), published by Gale Research Company, and information was obtained about the existing Information and Research Centers within the state of Florida and throughout the country. A list was compiled of all the centers that are generally related to the construction industry.

B. INITIAL ENQUIRIES TO THE MOST APPROPRIATE SOURCES:
The following sources were chosen for the initial survey:

1. Building Construction Information Sources, Detroit, MI
2. Construction Industry Joint Conference, Washington D.C.
3. Structural Stability Research Council, Bethlehem, PA
4. Construction Industry Institute (CII), University of Texas, Austin, TX
5. Structural Mechanics Research Laboratory, University of

Texas, Austin, TX

6. Florida Solar Energy Center (FSEC), University of Central Florida, Cape Canaveral, FL
7. Center for Advancement of Computational Mechanics, Georgia Institute of Technology, Atlanta, GA
8. Building Energy Utilization and Technology Center, Iowa State University, Ames, IA
9. Office of Building Research and Community Assistance, Louisiana State University, Baton Rouge, LA
10. Center for Architectural Research, Rensselaer Polytechnic Institute, Troy, NY
11. Stevens Institute of Technology, Hoboken, NJ
12. Research Division, College of Architecture and Environmental Design, Texas A & M University, College Station, TX
13. Architecture and Planning Research Laboratory, University of Michigan, Ann Arbor, MI
14. National Association of Home Builders Research Foundation Inc. (NAHB), Detroit, MI
15. Institute of Building Sciences, Department of Architecture, Carnegie Mellon University, Pittsburg, PA
16. Center for Energy and Environmental Studies, Carnegie Mellon University , Pittsburg, PA
17. Laboratory of Architecture and Planning, Massachusetts Institute of Technology, Cambridge, MA
18. Center for Construction Research and Education, Massachusetts Institute of Technology, Cambridge, MA

19. Construction Research Center, University of Texas Arlington, TX
20. American Concrete Institute, Detroit, MI
21. Architecture and Engineering Performance Information Center, (AEPIC), University of Maryland, College Park, MD
22. Center for Building Technology, National Bureau of Standards, Washington D.C.
23. Metadata Construction Information Sources, New York, NY
24. Schellenger Research Laboratory, University of Texas, El Paso, TX
25. Structural Mechanics Research Laboratory, University of Texas, Austin, TX
26. Fritz Engineering Laboratory, Lehigh University, Bethlehem, PA
27. Texas State Technical Institute, Streetwater, TX
28. National Technical Information Sources, Washington D.C.
29. Midwest Research Institute, Kansas City, MI
30. Journal of Architectural Research, AIA, Washington D.C.
31. Reader Service Department, "Housing", Clinton, IA
32. U. S. Army Construction Engineering Research Laboratory (CERL), Champaign, IL
33. American Iron and Steel Institute, Washington D.C.
34. Engineering Research Center, Colarado State University, Fort Collins, CO
35. Owner-Builder Center, Miami Dade Community College, Miami, FL

36. National Institute of Building Sciences (NIBS), Washington D.C.
37. Building Research Advisory Board (BRAB), Washington D.C.
38. Construction Research Center, Georgia Institute of Technology, Atlanta, GA
39. Southern Technology Applications Center, Alachua, FL

Letters were sent to each of the above centers requesting information about themselves and other existing construction information and/or research centers in the country. A sample of the letter is provided in Appendix-1 on page 80.

Of the centers contacted, 75% responded to the initial survey and provided extensive information about their activities as well as information about other centers within the country. On the basis of the replies received, thirty centers were selected for the next phase of the study.

3. DESIGN AND MAIL-OUT OF DETAILED SURVEY:

A more specific questionnaire was designed and sent to the thirty centers selected from the preliminary phase. A sample of the questionnaire is provided in Appendix 2 on page 82. Replies were received from sixteen centers. On the basis of the responses, eight of the centers were selected for a closer and final examination.

4. SITE VISITS TO THE MOST APPROPRIATELY RELATED CENTERS AND PERSONAL INTERVIEWS:

The eight centers selected after the detailed survey were contacted once again. Site visits were conducted to seven of these centers. Extensive data were collected about the objectives, the organizational structure, funding sources, and accomplishments.

Conclusions were drawn for this study from the information obtained from the detailed survey and the site visits.

III. SURVEY OF RELATED EXISTING CENTERS

The responses received from the survey questionnaire were analyzed and those centers which were most closely related to a Construction Information Center were selected for further study. Site visits were conducted to those centers.

Centers selected were:

1. Construction Industry Institute (CII), University of Texas, Austin, TX
2. Owner-Builder Center, Miami Dade Community College, Miami, FL
3. Florida Solar Energy Center (FSEC), University of Centeral Florida, Cape Canaveral, FL
4. Construction Engineering Research Laboratory (CERL), Champaign, IL
5. Construction Research Center (CRC), Georgia Institute of Technology, Atlanta, GA
6. Architecture & Engineering Performance Information Center (AEPIC), University of Maryland, College Park, MD
7. Southern Technology Applications Center (STAC), University of Florida Research and Technology Park, Alachua, FL
8. Center for Construction Research and Education (CCRE), Massachusetts Institute of Technology, Cambridge, MA

Information sought from each of the Centers generally related to

the following aspects:

1. Objectives
2. Organizational Structure
3. Funding
4. Activities
5. Accomplishments and
6. Problems faced by the Center

A tabular summary of the results of the survey is provided in Table-1 on Page 14. It is followed by a detailed summary of each of these Centers.

TABLE - 1

BRIEF SUMMARY OF CENTERS CONTACTED

NO	CENTER	NATURE	FUNDING SOURCES
1	CONSTRUCTION INDUSTRY INSTITUTE Austin, TX	Construction research and information center catering to the needs of the processing industry	Membership Contributions
2	OWNER BUILDER CENTER Miami, FL	Center to teach home-owners to be amateur builders	Tuition fees, State funds
3	FLORIDA SOLAR ENERGY CENTER Cape Canaveral FL	Solar energy research and information center	State of Florida, U.S. Dept. of Energy, Private Sponsors
4	USA - CERL Champaign, IL	Military construction research and information center	Federal Government , U.S. Army Corps of Engineers
5	CONSTRUCTION RESEARCH CENTER Atlanta, GA	Construction research center	Georgia Tech Research Corp
6	ARCHITECTURE AND ENGINEER--ING PERFORM-ANCE INFO. CENTER College Park, MD	Research and information center dealing with safety aspects of building	NSF, Private donors, U of Maryland
7	SOUTHERN TECHNOLOGY APPLICATIONS CENTER Alachua, FL	General information center	State of Florida, NASA
8	CENTER FOR CONSTRUCTION RESEARCH & EDUCATION Cambridge, MA	Construction research and education center	U. S. Army Corps of Engineers

1. CONSTRUCTION INDUSTRY INSTITUTE (CII)

UNIVERSITY OF TEXAS

AUSTIN, TEXAS

A. INTRODUCTION:

The Construction Industry Institute is an innovative concept for research in construction. Established in 1983, CII brings together owners, contractors and academia in an effort to develop information to improve the U. S. construction industry. CII is housed in a 7000 sq.ft. space about a mile from the University of Texas campus in Austin, Texas.

B. OBJECTIVES:

The mission of the Construction Industry Institute is to improve the cost-effectiveness of the construction industry, and thereby strengthen the competitive position of U.S. business in the international marketplace. CII is organized to take advantage of the strengths and effectiveness of all aspects of both the construction industry and academia. Representatives from the construction industry, owners and contractors offer their experience and guidance in solving real world problems. Input is actively solicited from labor, service industries and technical associations.

C. MEMBERSHIP:

Sustaining membership in CII is open to organizations based in

the U.S. that have a significant involvement in the construction industry as a user, constructor, or designer. An annual membership fee of $25,000.00 is required in addition to a commitment to support CII activities through participation in the board of advisors and its committees, councils, and task forces. Examples of the member companies of CII are listed below.

i) AT & T Resource Management
ii) Aluminum Company of America
iii) Amoco Corporation
iv) Anheuser-Busch Companies
v) Atlantic Richfield Company
vi) Chevron Corporation
vii) Consolidated Edison Company of New York, Inc.
viii) Dow Chemical U. S. A.
ix) E. I. duPont de Nemours & Company
x) Exxon Research & Engineering Company
xi) FMC Corporation
xii) General Electric Company
xiii) General Motors Corporation
xiv) Houston Lighting & Power Company

An important part of membership in CII is the support that it receives from the academic institutions that are involved in the research projects. Examples of academic institutions that have been involved in CII research projects are listed below:

i) University of Texas, Austin, Texas

ii) Auburn University, Auburn, Alabama

iii) University of California, Berkeley, California

iv) University of Illinois, Urbana-Champaign, Illinois

v) University of Cincinnati, Cincinnati, Ohio

vi) Texas A & M University, College Station, Texas

vii) Pennsylvania State University, University Park, Pennsylvania

D. ORGANIZATIONAL STRUCTURE

The Organizational structure of the Construction Industry Institute is illustrated in Figure 1 on page 18. The Director of CII is a tenured faculty member of the University of Texas at Austin. A board of advisors assists in ensuring that CII maintains a program that is relevant to the needs of the industry. A technical and administrative staff assist in the daily activities of the CII.

The CII Board of Advisors consists of one representative from each sustaining CII member company. It is the source of personnel for all offices and standing committees, and for the chairmanships of all task forces. The Board votes on all elective offices, and has established seven administrative committees that advise and recommend actions to the membership in specific areas.

Examples of Task Forces are: Construction Industry Cost Effectiveness Report (CICE) Impact Evaluation, Productivity

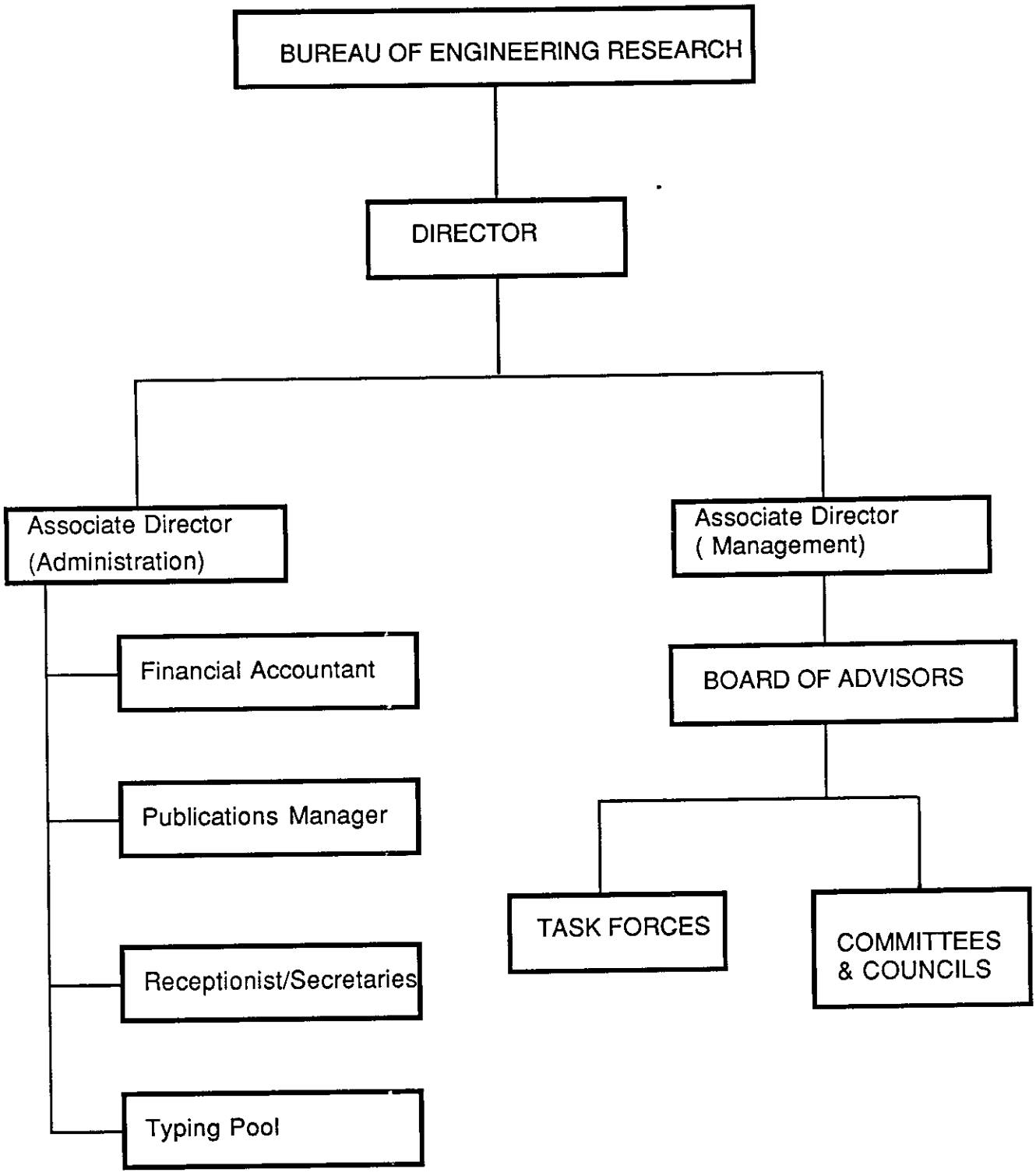

FIGURE - 1

ORGANIZATIONAL CHART - CONSTRUCTION INDUSTRY INSTITUTE

Measurements, Model Plant, Constructibility, Industry Data and Statistics, Contracts, Cost / Schedule Controls, Materials Management, Design, Technology, Quality Management, Employee Effectiveness, Project Organization, Safety and Education and Training. These task groups are considered ad hoc in nature and may be phased out when required. Others are created on an "as-needed" basis.

The full-time staff at CII include:

	#	STAFF DESIGNATION	DUTIES
i)	1	Director	overall coordination
ii)	2	Associate Directors	administration and management
iii)	1	Publications Manager	publications
iv)	1	Financial Accountant	financial accounting
v)	1	Full-time Typing pool clerk	typing
vi)	1	Receptionist / Secretary	Secretarial duties
vii)	1	Secretary to the Director	Secretarial duties

E. FUNDING:

The Construction Industry Institute functions on an annual budget of $2.1 million, out of which, $1 million to $1.25 million is spent on research and the rest is spent on overhead, staff support, printing and publication expenses. The money is

generated largely from membership dues, sale of publications and soft funding[2] from the University of Texas.

F. ACTIVITIES

The activities conducted by CII include:

i) six meetings per year of the executive committee;

ii) task force meetings as and when convened by the chairman

iii) one annual conference which is generally held in the first week of August each year (the last conference held in August 1987 was attended by 400 participants);

iv) two Board of Directors' Meetings per year - generally in the months of April and November each year (normal attendance 75 - 100 participants) and

v) task force chairperson meetings - two per year.

G. ACCOMPLISHMENTS:

In the first full year of operation (1984), a total of 16 research contracts were awarded, 35 at the end of 1985, and 49 at the end of 1986[3].

The following are examples of research projects undertaken by CII:

i) CICE IMPACT EVALUATION:

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[2]Funding provided by educational institutions for research e.g. computer time, office space, stationery

[3]Annual Report 1986. Construction Industry Institute, Austin, TX. p 3 & 4.

This project evaluates the level of awareness of the CICE project reports and recommendations in addition to working on the development of a construction industry cost-effectiveness index.

ii) PRODUCTIVITY MEASUREMENTS:

The purpose of this project is to develop a comprehensive and consistent method for measuring labor productivity at the job site.

iii) MODEL PLANT:

The Model Plant Project is staffed with a subcommittee of the Productivity Measurements Task Force, and is developing a baseline model for evaluation of ongoing construction labor productivity efforts.

iv) CONSTRUCTIBILITY:

A primer of constructibility was published in 1986, whose purpose was to convince senior decision makers that constructibility can be important and profitable to their companies.

v) INDUSTRY DATA AND STATISTICS:

The Industry Data and Statistics Report was released with industry information, data, and statistics.

H. PROBLEMS FACED BY CII:

Like any research organization, CII has faced some problems. The following are some of those problems:

i) CII has become so greatly involved in research activities catering to the processing industry that it has not been able to contribute much to the commercial and residential

industries.

ii) It has had the problem of establishing a good balance between the funding allocated for research and that allocated for implementation.

iii) There is a lack of co-ordination between the various task forces.

As CII continues to mature as a research institute, it predicts that stronger organizational ties between some task forces may occur. For example, there may be advantages to collaborative efforts between task forces sharing interests in areas such as manpower resources, technology, or project controls. While no plans exist at present, this and other possibilities are viewed as a way to continue to support development of the research effort.

I. CONCLUSION:

The Construction Industry Institute is an innovative concept and perhaps the only institute of its kind in this country. However, since it is being sponsored largely by the petrochemical companies, it caters to the needs of the processing industry only. Therefore commercial and residential contractors are generally not served by results of such research.

2. OWNER-BUILDER CENTER

MIAMI DADE COMMUNITY COLLEGE

MIAMI, FLORIDA

A. INTRODUCTION:

The Owner Builder Center is part of the Environmental Center - a non-profit, self supporting department of the Miami Dade Community College. The organization was founded in January 1983. It provides instruction to owners, builders, remodelers, contractors and tradespeople to prepare them for executing various homebuilding projects. In addition it provides consultancy services on various issues related to homebuilding.

B. OBJECTIVES:

The objective of the Owner Builder Center is to assist people in accomplishing their own building and remodeling projects in a professional manner, through a series of owner builder/remodeler courses and a variety of consultation services. The curriculum followed by the Owner Builder Center is designed to meet the South Florida building code and emphasizes passive design and economical construction for a warm, humid climate.

C. ORGANIZATIONAL STRUCTURE:

The Owner-Builder Center is headed by a Director. A Coordinator organizes the day-to-day activities of the Center. The Co-ordinator is assisted in his duties by an Assistant Co-ordinator.

A schedule of courses is set up each semester and various professionals are appointed as instructors to teach the courses. The organizational structure of the Owner-Builder Center is shown in Figure 2 on Page 25.

D. FUNDING:

The Owner-Builder Center was initially funded by the Miami-Dade Community College. Presently, it is a self supporting organization and operates with the help of money generated from tuition fees and grants provided by the State.

E. ACTIVITIES:

Activities of the Center involve conducting courses in subjects related to homebuilding. Examples of titles of courses taught are:

i) Anatomy of a house;

ii) Before you build;

iii) Home Alarm System;

iv) House Design;

v) Housebuilding

vi) Air Conditioning Decisions;

vii) Bathroom Remodeling;

viii) Electrical Workshops and

ix) Interior Workshops.

The courses may be one to twelve sessions long. The length of each class session is generally three hours and the classes

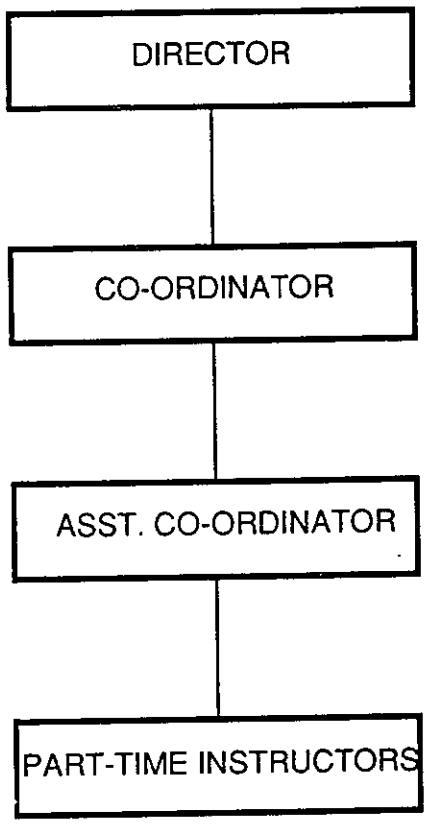

FIGURE - 2

ORGANIZATIONAL STRUCTURE - OWNER-BUILDER CENTER

generally meet twice in a week.

F. ACCOMPLISHMENTS:

The Owner Builder Center has trained about 5000 students in the past five years. A study conducted by the Center revealed that after completing an Owner Builder course, 86% of the students felt they had been helped, 73% felt their confidence in their abilities had significantly increased, 95% would recommend the course to a friend, and 91% would take another course from the Center[4].

G. PROBLEMS FACED BY THE CENTER:

When the Center was first conceived, there was bureaucratic resistance from the Miami Dade Community College. The Center has come a long way since then. The response from members of the surrounding communities has been very good. Presently, the only major problem that the Center faces is difficulty in finding the appropriate instructors and co-ordinators.

H. CONCLUSION:

The Owner Builder Center is an imaginative concept and is the only institute of its kind in the state of Florida. The aim of the center is to train homeowners to be amateur builders. It therefore does not serve as an information center designed to

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[4]Brochure, Owner Builder Center, Miami Dade Community College, Miami, FL

serve professional contractors and builders in the commercial or heavy (roads, utilities, earth moving, etc.) construction industries.

3. FLORIDA SOLAR ENERGY CENTER (FSEC)

UNIVERSITY OF CENTRAL FLORIDA

CAPE CANAVERAL, FLORIDA

A. INTRODUCTION:

The Florida Solar Energy Center, the focal point of the State's solar energy activities, is located on a 14-acre site adjacent to North Port Canaveral and just south of Kennedy Space Center. It was created by the state Legislature in 1974 to conduct research on alternative energy technologies, to ensure the quality of solar energy equipment in Florida, and to educate Floridians about their energy option. FSEC functions as an institute of the University of Central Florida at Orlando.

B. OBJECTIVES:

The objectives of the Florida Solar Energy Center, broadly stated are to:

i) encourage the use of solar energy and conservation techniques;

ii) conduct research and development on those techniques;

iii) test and certify solar energy equipment;

iv) engage in demonstration projects;

v) provide educational programs for general and technical audiences;

vi) disseminate information on solar energy based on current research and

vii) seek external funding for a variety of research programs.

C. ORGANIZATIONAL STRUCTURE:

Florida Solar Energy Center has a total staffing of 110 - 115 employees. Out of these, 75 - 80 employees work full-time and the remaining are students from the University of Central Florida, working part-time. FSEC is organized into four divisions: Photovoltaics and Advanced Technologies, Research and Development, Testing and Operations, and Business Affairs.
The organizational chart of Florida Solar Energy Center is shown in Figure 3, Page 30.

D. FUNDING:

The overall annual budget of the Florida Solar Energy Center is $5 - 5.5 million. Out of this, the State provides $3 M and private sponsors (e.g. material manufacturers, solar collection and system vendors) provide the balance. Approximately $1 million to $1.25 million account for overhead expenses and the balance goes into research.

E. ACTIVITIES:

The following are examples of some of the activities of FSEC:

i) it conducts contracted and state-supported research focussing on technologies such as: photovoltaics, energy use in buildings, solar water heating, power electronics, innovative air-conditioning systems, production and use of

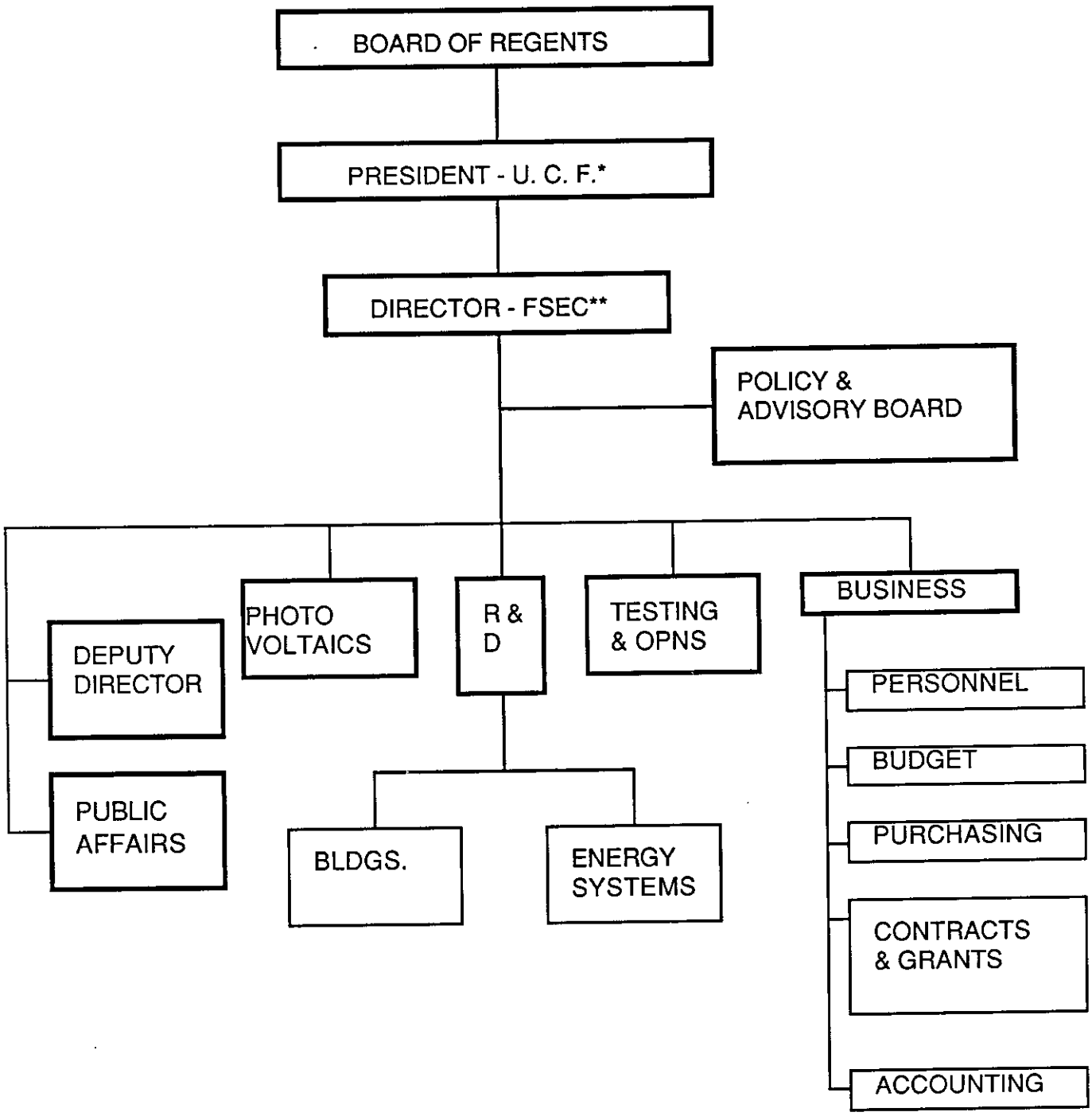

FIGURE - 3

ORGANIZATIONAL STRUCTURE - FLORIDA SOLAR ENERGY CENTER

* university of central florida ** florida solar energy center

hydrogen and ocean thermal energy conversion;

ii) it satisfies more than 15000 individual requests for energy information each year through its Public Information Office;

iii) it conducts statewide educational outreach programs for teachers and energy professionals;

iv) its Building Design Assistance Center is a research center where architects and engineers can evaluate the effects of energy conservation techniques on commercial design;

v) its technical library which boasts of one of the nation's most extensive holdings on solar and alternative energy subjects, responds to the information needs of both the research community and the general public.

F. ACCOMPLISHMENTS:

Projects undertaken by the Center include solar energy collector testing, providing extensive meteorological data, radiant barrier material emissivity testing, instrumentation support, photovoltaic module exposure testing, pyranometer calibration, fenestration research, solar cooling research, and building design assistance.

G. PROBLEMS FACED BY FSEC:

The problems faced by FSEC mainly revolve around finding the right people to work for them. It is the experience of FSEC that there is an abundance of non-technical personnel, but not

sufficient technical personnel in the job market.

H. CONCLUSION:

The Florida Solar Energy Center is a model center for solar energy research and information. However the research it conducts and the information it generates are very specialized in nature and limited to solar energy. It is therefore not a center designed to handle the dissemination of general construction related information.

4. CONSTRUCTION ENGINEERING RESEARCH LABORATORY (USA-CERL)

U.S. ARMY CORPS OF ENGINEERS

CHAMPAIGN, ILLINOIS

A. INTRODUCTION:

The U.S. Army Construction Engineering Research Laboratory (USA-CERL) is the research arm of the U.S. Army Corps of Engineers, a major Army command that provides engineering and construction support to the Army. USA-CERL supports the military construction effort by developing innovative engineering techniques and state-of-the-art technologies. USA-CERL's research is directed towards increasing the Army's ability to more efficiently construct, operate, and maintain its Army installations at a reduced life-cycle cost. It works closely with its Army customers to ensure that its research produces responsive products delivered in a timely manner. The laboratory was established in Champaign-Urbana, Illinois in 1969, to work with the College of Engineering at the University of Illinois (UIUC). The affiliation with academia allows USA-CERL to bring in specialized expertise and ensures a steady flow of new ideas and approaches to help deal with the Army's research needs.

B. OBJECTIVES:

The objectives of USA-CERL are:

i) to provide high quality products and technical assistance responsive to U.S. army's needs;

ii) to pursue mission accomplishment with a bias toward leap-ahead technologies;

iii) to ensure a balance between R & D and technical assistance;

iv) to seek out and support improved technology transfer mechanisms and

v) to be a full-spectrum, mission oriented research and development laboratory with an international reputation for excellence.

C. ORGANIZATIONAL STRUCTURE:

USA-CERL is organized into the following four divisions:

i) Engineering and Materials Division which conducts research on innovative engineering practices and materials used in the construction, maintenance, and repair of Army facilities;

ii) Energy Systems Division which assists the Army in its efforts to reduce energy consumption and its costs. Energy conservation techniques and management procedures are developed for application at military installations;

iii) Facility Systems Division which conducts research on management engineering for the planning, design, construction, operation and maintenance of civil works facilities, and methods for enhancing the habitability of military installations;

iv) Environmental Division which develops environmental quality technology to control air and water pollution, manage

hazardous materials and wastes at Army installations, and maintain realistic training ranges in support of the Army training, readiness, and mobilization missions.

The current staff consists of 230 permanent personnel, including five Army officers. The permanent staff is supplemented by over 300 people from the University of Illinois at Urbana Champaign (UIUC)[5]. The organizational chart of USA-CERL is provided in Figure 4 on Page 36.

D. FUNDING:

The annual cost of running USA-CERL is $50 million, all of which is provided by the U. S. army and by other government grants. Out of this, approximately $8 million is spent on overhead expenses and the rest is spent on research.

E. RESEARCH PHILOSOPHY:

During its 17-year history, USA-CERL has taken an innovative approach to research characterized by the effective use of available technology and engineering personnel and resources from nearby UIUC. The USA-CERL research philosophy is based on the identification of specific Army needs and an assessment of available technology to meet that need. If usable existing

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[5]Fact Sheet PA 4. Research Success at the U.S. Army Construction Engineering Research Laboratory. (1987) USA-CERL Champaign, IL

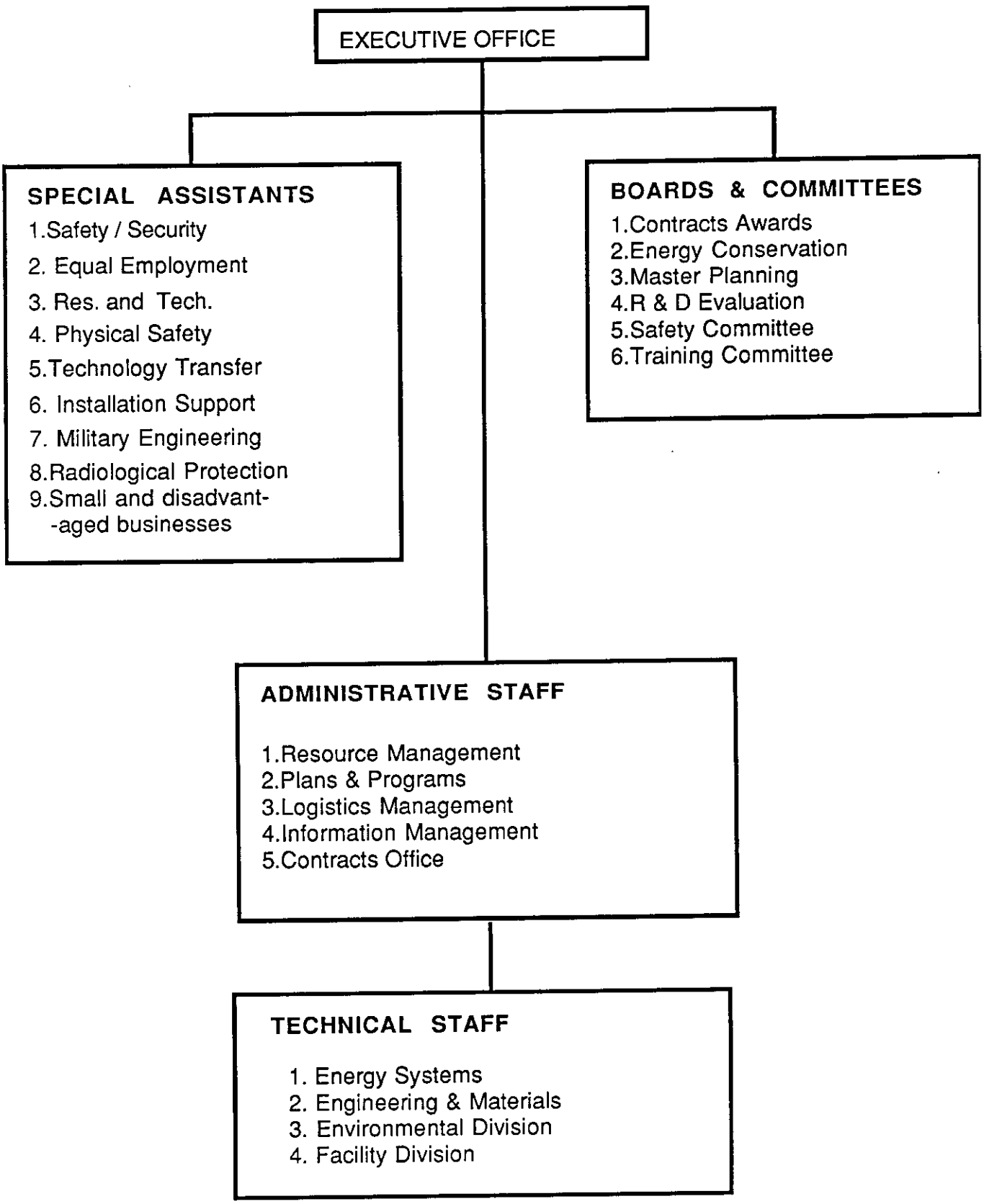

FIGURE - 4: ORGANIZATIONAL STRUCTURE - USA-CERL

technology is available, it is incorporated for Army use or modified to better meet the specific need. Where no technology is available, USA-CERL will develop new technology to meet the Army's needs. To assist in this effort, USA-CERL uses both its own personnel and resources, and those of the College of Engineering at UIUC. University personnel hired by USA-CERL on a temporary basis to perform research include advanced graduate students, and faculty members. The practice of hiring university personnel enables USA-CERL to bring in specialized expertise in a given field and ensures a steady flow of new ideas and approaches to dealing with Army research problems. USA-CERL works closely with several universities in addition to UIUC. Task Order Contracts have been awarded to 16 universities and private research institutions such as Massachusetts Institute of Technology, Illinois Institute of Technology and Gas Research Institute[6].

F. ACTIVITIES:

Research has been conducted by USA-CERL on many topics, some of which are:

i) Technology Transfer to the Private Sector

ii) Housing Decision Support Systems

iii) Real-time weld quality control systems

iv) Voice operated inspection systems

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[6]Fact Sheet PA 4. Research Success at the U.S. Army Construction Engineering Research Laboratory. (1987) USA-CERL, Champaign, IL

v) Building Loads Analysis and Systems Thermodynamics

vi) Remote site waste treatment management techniques

vii) Development of Heating, Ventilation and Air-conditioning control panels and

viii) Development of Combat Engineer Military Computer Applications

G. ACCOMPLISHMENTS:

The Army Research and Development Awards are the high awards to Army researchers. Since 1972, USA-CERL researchers have received 27 R & D awards covering 15 projects. USA-CERL has also been awarded patents on 11 of its products and has another nine patents pending. The National Standard Corporation of Michigan received exclusive licensing rights to manufacture USA-CERL's Weld Quality monitor on a commercial basis. USA-CERL has been very responsive to the needs of the Army. The USA-CERL research philosophy has resulted in money-saving products that get to the field with minimum delay. The typical USA-CERL product becomes an Army standard within 3.8 years after the initial identification of an existing need. In contrast, it takes a research concept 17 years to become an industry standard in the private sector. An independent audit of 22 USA-CERL products indicated that every dollar spent on USA-CERL research produces an average of 34 dollars in benefits to the Army. The return-on-investment ratio for individual USA-CERL products ranges from

178:1 to 4:1[7].

H. PROBLEMS FACED BY THE CENTER:

In starting the Center, the main problem that the center faced was characterizing, storage, updating and verification of data. The problem presently faced in running the center is the lack of sufficient funds.

I. CONCLUSION:

As their research wing, USA-CERL has become an indispensable part of the U.S. Army. The research that it conducts and the information it generates are geared primarily to be of benefit to the Army. All of USA-CERL's research findings are available to the general public for a fee. It may be concluded that a Construction Information Center would be an excellent complement in disseminating information from USA-CERL that may be beneficial to the private construction industry.

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[7]Fact Sheet PA 4. Research Success at the U.S. Army Construction Engineering Research Laboratory. (1987) USA-CERL, Champaign, IL

5. CONSTRUCTION RESEARCH CENTER (CRC)

GEORGIA INSTITUTE OF TECHNOLOGY

ATLANTA, GEORGIA

A. INTRODUCTION:

The decision to develop a Construction Research Center in June 1986 at Atlanta's Georgia Institute of Technology was made in response to the critical need facing our entire nation to increase the efficiency and quality of all services comprising our total construction industry. The issue of cost effectiveness in construction has never before impacted the ability of this country's major corporations to compete in world markets as it does today. This makes the need for innovation from within our industry and comprehensive research in academic institutions very important. The Construction Research Center was therefore designed to facilitate research and development in construction technology "for all American industries, for all American communities and for all American people".

B. OBJECTIVES:

The main objective of the Construction Research Center is to provide the U.S. Construction Industry with a focal point for construction technology research and information exchange. It aims to conduct an active R & D program responsive to the needs of the U.S. construction community and plans to disseminate research results to U.S. industry through a vigorous technology

transfer program.

C. ORGANIZATIONAL STRUCTURE:

The Center presently has a director, a part-time secretary and a Graduate Research Assistant. Within the next few years, the Center plans to expand into an organization with 100 employees and housed in its own facility. A preliminary organizational chart of the initiation phase of this Center is provided in Figure 5 on Page 42.

D. FUNDING:

CRC presently operates on an annual budget of $100,000 all of which is provided by the Georgia Tech Research Corporation. This funding is assured until the end of 1988, after which CRC is expected to be fully funded by sponsored research and funds raised by the alumni to meet an estimated annual budget of $5 million. CRC anticipates $3 million to be used for research and the rest for overhead expenses.

E. RESEARCH PHILOSOPHY:

In addition to addressing topics which are of interest to the entire construction industry, CRC proposes to conduct specific research projects that respond directly to the interests and needs of corporate sponsors. In all areas, research is to be conducted in partnership with private industry and government. The faculty, administration and alumni of the College of

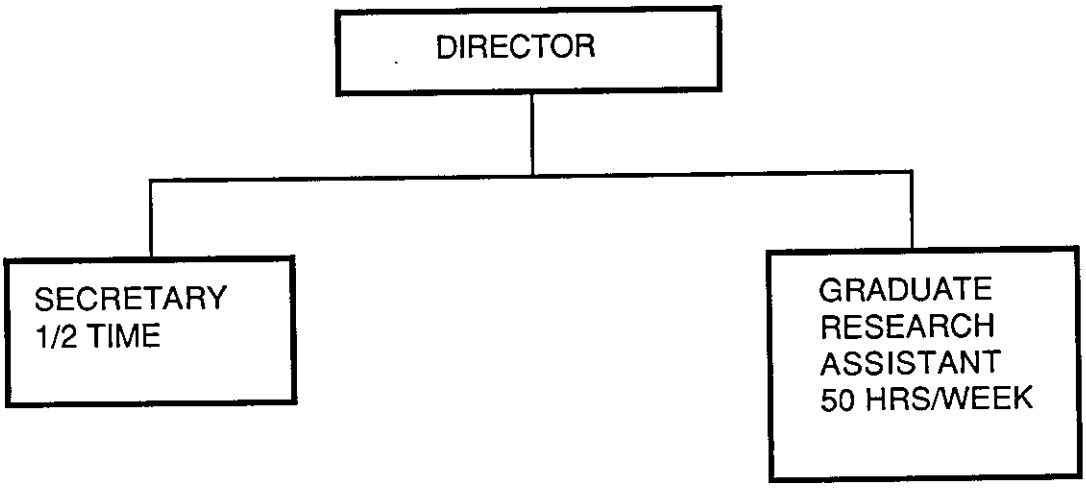

FIGURE - 5

ORGANIZATIONAL STRUCTURE - CONSTRUCTION RESEARCH CENTER

Architecture propose to provide the required leadership for success. A Board of advisors will provide input from all segments of the construction industry. Administered by a Director experienced in construction research, the Center's activities are expected to include interaction with designers, contractors, manufacturers, real estate developers, and industrial users of design and construction services. This collaboration of industrial and educational professionals not only will assure the selection of research projects most beneficial to all involved, but it is expected to greatly enhance communication of salient information as it becomes available.

F. ACTIVITIES:

The proposed activities of the Construction Research Center are to address the problems of the building construction industry in virtually all areas including Materials Composition and Performance, Design and Development of New Materials in Construction, Energy Management and Systems Development, System Performance Evaluation, Facility Diagnosis, Intelligent Buildings and Policy and Code Research.

G. ACCOMPLISHMENTS:

During the past two years, CRC has mainly been involved in organizing itself, developing its short and long term plans and clarifying its own objectives. CRC has released brochures to inform the public and the industry about its existence and to

solicit donations.

H. PROBLEMS FACED BY CRC:

In starting the Construction Research Center, the pioneers were faced with the inevitable problem of funding. In running the center, CRC is presently faced with the problem of lack of space.

I. CONCLUSION:

Construction Research Center at Georgia Tech is mainly a research organization. The establishment of a Construction Information Center in Florida which can co-operate with this research center in the dissemination of information generated would be of mutual benefit to the contractors and the construction industry in both Georgia and Florida. The Director of CRC has expressed interest and willingness to collaborate with an information center if one were to be established in the State of Florida.

6. ARCHITECTURE AND ENGINEERING PERFORMANCE INFORMATION CENTER (AEPIC)

UNIVERSITY OF MARYLAND

COLLEGE PARK, MARYLAND

A. INTRODUCTION:

The Architecture and Engineering Performance Information Center, a joint endeavor of the School of Architecture and the College of Engineering at the University of Maryland, was established in July 1982. It was given its initial support by a National Science Foundation grant of $150,000. That grant, with considerable additional support from the University of Maryland, the College of Engineering, Victor O. Schinnerer & Company, Sperry/Univac Corporation, several professional societies, and others with enthusiasm for AEPIC, made the center actually possible. AEPIC is housed in approximately 2,000 sq.ft. space on the campus of the University of Maryland.

B. OBJECTIVES:

The concept of the Architecture and Engineering Performance Information Center was developed to assist in the struggle to learn from construction failures. AEPIC believes that a systematic collection, collation, analysis, and dissemination of information about the performance (failure) of buildings, civil structures, and other constructed facilities will assist us in learning from our failures. The building industry can thus

improve its professional practice and prevent the repetition of poor practices that contribute to failure. The center has developed the systems, programs, software and storage networks for the systematic collection, collation, analysis, and dissemination of information about the performance of buildings, civil structures, and other constructed facilities.

C. ORGANIZATIONAL STRUCTURE:

The University of Maryland serves as the international center and the national repository for AEPIC. An advisory board of ten distinguished persons provides advice on AEPIC policies, programs, and technical operations. The members of the advisory board are selected for their expertise in architecture, engineering, engineering testing, geotechnical analysis, insurance law, contracting, research and education. In addition, an advisory council and nine advisory committees have been formed to provide liaison between AEPIC and membership organizations, technical and trade associations, councils and institutes, major agency media, research organizations, educational institutions and legal and technical user networks. Several hundred professional firms, agencies, organizations, institutions and individuals are correspondents to AEPIC. They have no council or committee affiliations but information is shared on a mutual interest basis. Several selected individuals are appointed as correspondent reporters who assist AEPIC from particular regions of the country by sharing news of interest, assisting in

distribution of AEPIC material and clarifying AEPIC objectives. The staff at AEPIC consists of a director, an executive director, a general secretary, at least one full-time data processing expert, a librarian and graduate students. The organizational charts of AEPIC are shown in Figure 6 on page 48 and in Figure 7 on page 49.

D. FUNDING

The National Science Foundation, private donors, research grants and soft funding from the University of Maryland help to fund the Architecture and Engineering Performance Information Center. AEPIC functions on an overall annual budget of $650,000 to $700,000. Out of this, approximately $150,000 account for overhead expenses and the rest is used for research.

E. RESEARCH METHODOLOGY:

AEPIC's database covers performance information about buildings and civil structures, and includes all aspects of problems arising from the building envelope, structural, mechanical, and electrical systems, moisture barriers, economic and environmental concerns, thermal, acoustical, visual, and behavioral dysfunctions. The center's performance data relate to materials, elements, systems, processes and procedures. Data are stored in computerized data files of libraries, and include case files, citation files, a dossier library, a visual material library and a reference library.

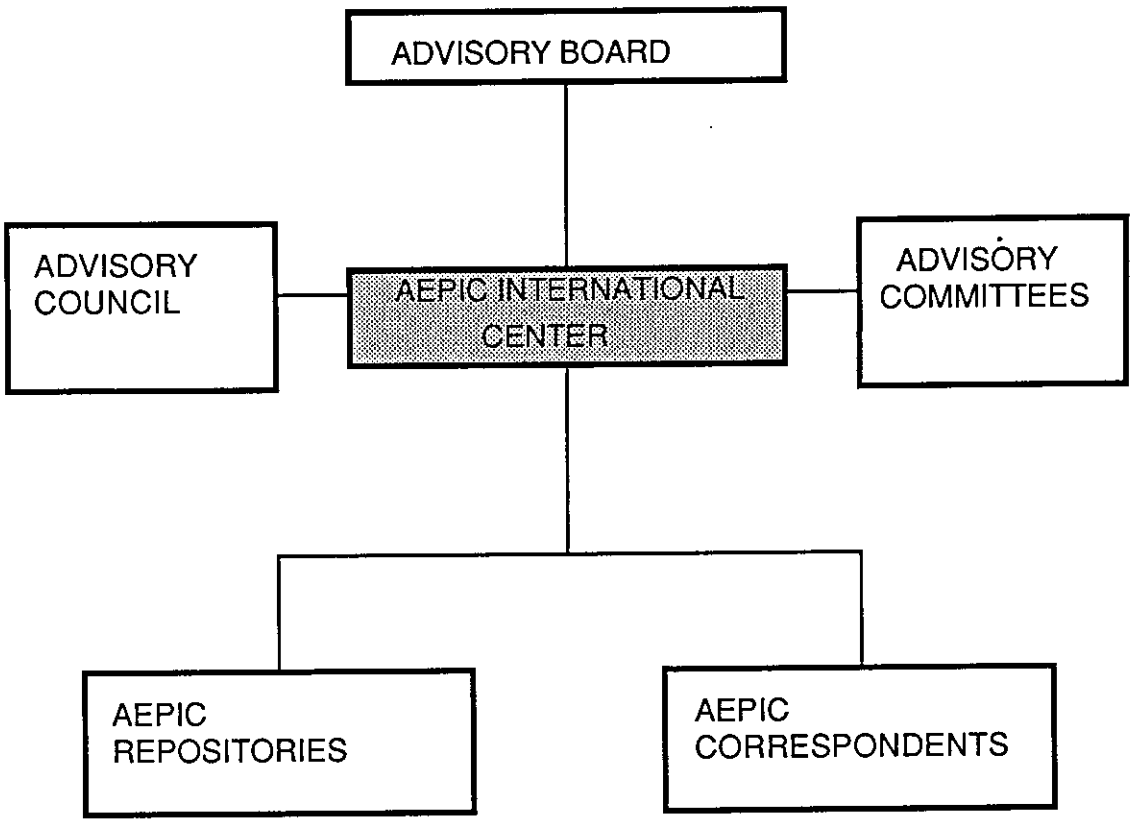

FIGURE - 6

OVERALL ORGANIZATIONAL STRUCTURE - ARCHITECTURE AND ENGINEERING PERFORMANCE INFORMATION CENTER (AEPIC)

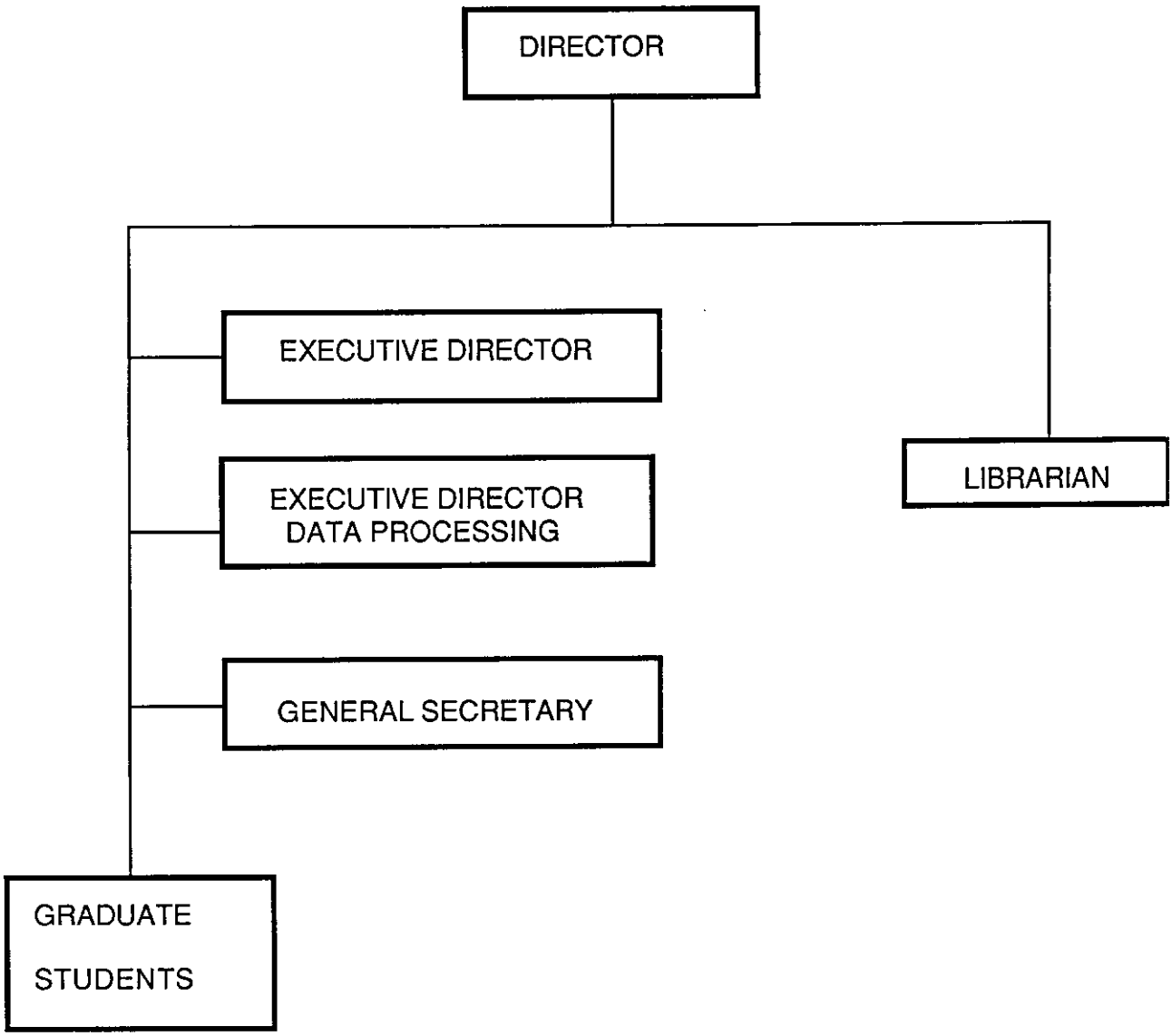

FIGURE - 7

DETAILED ORGANIZATIONAL STRUCTURE - ARCHITECTURE AND ENGINEERING PERFORMANCE INFORMATION CENTER (AEPIC INTERNATIONAL CENTER)

Businesses, agencies and institutions may contract with AEPIC to monitor and analyze performance data for a particular building or group of buildings. The data are collected and stored under the appropriate code to facilitate analysis. Personal identification is deleted from these files to provide anonymity and permit the basic information to become a part of the general database and be of assistance to all the users of AEPIC.

Architects, engineers, contractors, developers, manufacturers, lawyers, building owners and users, federal and state agencies, insurance underwriters, university and private research organizations, and others interested in the objectives of AEPIC may use this computer-based collection of performance information for:

i) planning of new projects;
ii) reviewing existing structures for rehabilitation or restoration;
iii) teaching (case studies);
iv) modifying codes and regulations;
v) planning research;
vi) preparing professional texts;
vii) dispute resolution;
viii) developing new products for the industry;
xi) implementing effective quality control measures;
xii) improving professional and industry practice and
xiii) creating an in-house resource base with lessons learned from

project performance.

F. CURRENT PROJECTS:

Examples of studies in progress include:

i) trends in bridge performance;

ii) trends in roofing performance;

iii) trends in HVAC performance;

iv) a historical survey of the brick veneer and steel stud back-up performance problems;

v) trends in glass and glazing performance and

vi) trends in surveying errors.

G. PROBLEMS FACED BY AEPIC:

The problems faced by AEPIC generally involve:

i) availability of funding for operations;

ii) divergent expectations of the design professionals and the construction industry professionals and

iii) enormous cost of accessing data.

H. CONCLUSION:

The Architecture and Engineering Performance Information Center is an innovative concept for carrying out research and providing information about building performance. However the institute deals only with building performance and other building safety related aspects. It does not address information of general interest to the construction industry.

7. SOUTHERN TECHNOLOGY APPLICATIONS CENTER

UNIVERSITY OF FLORIDA RESEARCH AND TECHNOLOGY PARK

ALACHUA, FLORIDA

A. INTRODUCTION:

The Southern Technology Applications Center (STAC) is a sophisticated network of information resources and technology transfer expertise devoted to finding the answers entrepreneurs, high-tech professionals and business managers need to survive in today's competitive climate. Created by NASA and the State University System of Florida in 1975, STAC is located in the Progress Center at the University of Florida Research and Technology Park in Alachua, about 15 minutes from the University of Florida campus. STAC has grown into a full-service technology transfer service which accesses more than 1200 databases worldwide. By using these databases and the expertise of STAC's professional staff, decision makers receive the most timely information on virtually any subject area - from state-of-the-art developments in technology to new initiatives in business management.

B. OBJECTIVES:

The main objective of STAC is to put the makings of sound decision at the fingertips of managers, professionals, researchers and entrepreneurs in a wide variety of industries. STAC offers its clients the most current, accurate and

comprehensive data available, and the finished product is understandable and ready to implement.

C. RESEARCH METHODOLOGY:

STAC is constantly expanding its access to telecommunications networks and database services, and employs a staff of experienced professionals who are capable of using and interpreting these sophisticated tools. STAC's technical and information research team finds answers through on-line access to worldwide databases. In addition the staff members have extensive experience and educational backgrounds in both technical and management disciplines including engineering, chemistry, physics, information sciences, marketing and business administration. During the last few years, STAC's role in technology transfer and information development has expanded well beyond its goals and its original market area in Florida. STAC operates from many locations at state universities and colleges in Alabama, Florida, Georgia, Mississippi, South Carolina, Tennessee and Texas.

D. DATABASES AT STAC:

STAC has access to many databases dealing with advertising, agriculture, archeology, architecture, construction, specifications, textiles, travel, urban planning and video/radio/television amongst other subjects. Some of the construction information related databases are:

i) HUD USER ONLINE: This is a Construction, Urban and Regional Planning database containing over 4000 citations, with abstracts to documents on housing and urban development. It covers building technology, housing policy and planning. It includes affordable housing, housing for the elderly and disabled, rent control, tenant management laws, housing rehabilitation, neighborhood revitalization programs, energy conservation, economic development and demographic trends. Sources include reports, technical manuals, conference proceedings, monographs and case studies from HUD and other U. S. federal and state agencies, commercial publishers and professional associations. The database covers information from all over the U. S. It spans information from 1967 to date and is updated quarterly.

ii) COMPENDEX PLUS: The COMPENDEX PLUS database provides coverage of the world's significant engineering and technological literature. It is produced by the Engineering Information Inc., New York, NY. Each record in the COMPENDEX PLUS file is a reference to a journal article, technical report, engineering society publication, book, conference proceeding or individual conference paper and includes a concise abstract describing the document. Author-prepared abstracts are used when available. The COMPENDEX PLUS database utilizes both controlled vocabulary and classification codes to facilitate subject searching. Approximately 25% of the documents are published in a language other than English. Civil and Structural Engineering and Environmental Technology are some of the vast variety of topics

included in this database.

iii) BRIX: This database contains about 115,000 citations with abstracts to the worldwide literature on construction. It covers building research, construction problems and solutions in developing countries, electrical and mechanical engineering, energy conservation, environmental design, pollution, geotechniques, earthquakes, structural engineering, design, properties and performance. This database is completely in English and its coverage is international.

iv) IBASEDEX: This is a Construction, Energy and Engineering database which contains approximately 53,000 citations with abstracts to the worldwide literature on mechanical and electrical services in buildings, including heating, ventilation, air-conditioning, lighting and power, plumbing and sanitation, communications, transportation and security. Sources include journals, reports, conference papers, books, standards and unpublished materials. It provides international coverage and is published in English.

v) PASCAL: BATIMENT, TRAVAUX PUBLICS: This is a Construction, Engineering and Urban and Regional Planning database covering 145,000 citations with abstracts to the worldwide literature on building and public works. It covers architectural acoustics, building maintenance, demolition and restoration and civil engineering topics related to bridges, dams, highways, nuclear plants, offshore structures, sewerage, transport facilities, tunnels, water supplies and waterways. Sources include books,

periodicals, theses, reports and conference proceedings. This database is in French and covers information mainly from Europe.

vi) PICA (Property Service Agency Information on Construction and Architecture): This is an Architecture and Construction database containing approximately 53,000 citations, with some abstracts to the worldwide literature on construction and architecture. It covers airfields and associated buildings, building conservation, contracts, legislation and regulations, computer-aided architectural design, energy conservation and use, failure of structures, fireproof construction, health and safety, heating, ventilation, etc. Its coverage is international, with emphasis on English speaking countries. It is published in English with titles in the original languages.

vii) ARCHITECTURE DATABASE: This is the online catalogue of the British Architectural Library, Royal Institute of British Architects. It covers all aspects of architecture, interpreting it in the widest sense to include both technical and aesthetic materials of all periods and countries. It includes information on applied arts, architectural education, architectural history, architectural practice and management, building design, building types, housing, topography, structural elements, urban history, and vernacular architecture.

viii) ENGINEERING MATERIALS ABSTRACTS (EMA): This is a comprehensive coverage of the world's published literature concerning the science of polymers, ceramics and composite materials intended for use in the design, construction and

operation of structures, equipment and systems. Subjects covered include material properties, processes, products and forms of engineered materials.

E. ACTIVITIES:

The following are some of the major activities of STAC:

i) STAC has the expertise in all phases of database development, problem definition, system creation, manipulation and maintenance.

ii) STAC has access to an extensive network of specialists located in universities, NASA laboratories, Federal laboratory consortia, R & D Parks, and Entrepreneurship forums. Therefore if the required expertise is not available on its staff, STAC has the capability of locating the appropriate expert elsewhere.

iii) STAC can help businesses which want to bring new products and services into the marketplace. A STAC database search can provide the business with the state-of-the-art technical knowledge that is necessary to write a successful proposal. In addition, a STAC search can help identify experts who can be used as consultants or technical advisors to strengthen the proposal.

iv) STAC is a direct line of communication to NASA for business opportunities in space. STAC can establish contact with the appropriate NASA research experts, and ground-based facilities in order to develop new space-based products. This connection helps solve earth-based problems in product development such as the effects of convection, gravity and sedimentation.

v) STAC's technology transfer activities link governmental agencies, universities, federal research laboratories and the private sector. It identifies federal technology available for licensing, matches client companies for joint ventures, assists in commercializing technology generated in the private sector, prepares reports to assist in go/no-go decisions on commercialization, determines patentability and marketability of selected products and processes, and couples university experts with the private sector.

vi) STAC services do not stop with a list of bibliographic references and abstracts. Full-text documents can be located and delivered including newspaper, journal and periodical reprints. U.S. and foreign patents, conference proceedings, theses, dissertations, microfilm and microfiche, books, editorials, financial reports, newsletters and governmental reports.

F. CONCLUSION:

The Southern Technology Applications Center is a high technology center providing information on an extensive array of topics including construction. Obtaining information from STAC is however quite expensive as a single search will cost a patron at least $250.00.

8) CENTER FOR CONSTRUCTION RESEARCH AND EDUCATION (CCRE)

Massachusetts Institute of Technology

Cambridge, MA

The Center for Construction Research and Education was set up in 1962 within the Civil Engineering department at M.I.T. The objective of CCRE is to foster closer interaction with the Construction industry and provide a focal point in M.I.T. for engineering, design and industry.

The Center consists of a Director, a Deputy Director and an Administrative Officer. In addition faculty members are actively involved in research within CCRE. Research is conducted in four areas: Constructed Facilities, Transportation, Water Resources, and Environmental Aspects.

CCRE is sponsored by the U.S. Army Corps of Engineers. In 1987, the volume of research conducted by CCRE amounted to $3 million out of which overhead expenses accounted for $200,000. Recent research work conducted by CCRE include topics like bridge deck inspection, tents, tepees and space frames, and cafeteria planning. CCRE fosters industry interaction by roundtable meetings, conferences and seminars. In addition to undergraduate and graduate level studies, various short construction related educational programs are conducted by the Center. The Center releases a newsletter dealing with Construction related issues.

International Cooperation is fostered at CCRE by conducting visits to construction schools in developing countries like India and Egypt.

The Center for Construction Research and Education is essentially a Construction research center. A Construction Information Center primarily involved in information dissemination would be a valuable complement to the CCRE.

IV. SUMMARY OF FINDINGS

Following is a summary of the important findings of the study:

1. Of the centers contacted, 3% classify themselves as "engineering research centers and 26% classify themselves as "construction research centers". 6% are "construction information centers" and 10% are "engineering information centers". "Trade associations", "business associations" and "professional societies" comprise 10% of the centers contacted. "Educational institutions" comprise the remaining 45%. (Refer Figure 8, Page 63)

2. Over 60% of the centers contacted were established after 1960, 30% were established between 1940 and 1960, and 10% between 1900 and 1910.

3. Of the centers contacted, 10% are funded by the Federal government, 10% by State governments, 23% by contributions and dues from membership, 6% by the Army Corps of Engineers, 10% by private sources, and the remaining 41% are funded by research grants (Refer Figure 9, Page 64).

4. All the centers contacted expressed enthusiasm and appreciation of a Construction Information Center. The construction related ones expressed the willingness to

participate in the activities of the center by making available results of research conducted at those centers for further dissemination.

5. All the existing centers found in this study are essentially construction research centers. Dissemination of construction information is one of the duties of some of the centers. The information disseminated generally deals with specific issues such as solar energy, building performance and chemical processing industries. A Construction Information Center that would be fully devoted to general construction information dissemination would be an essential complement to the existing research centers.

SUMMARY OF RESEARCH FINDINGS
1. NATURE OF CENTERS

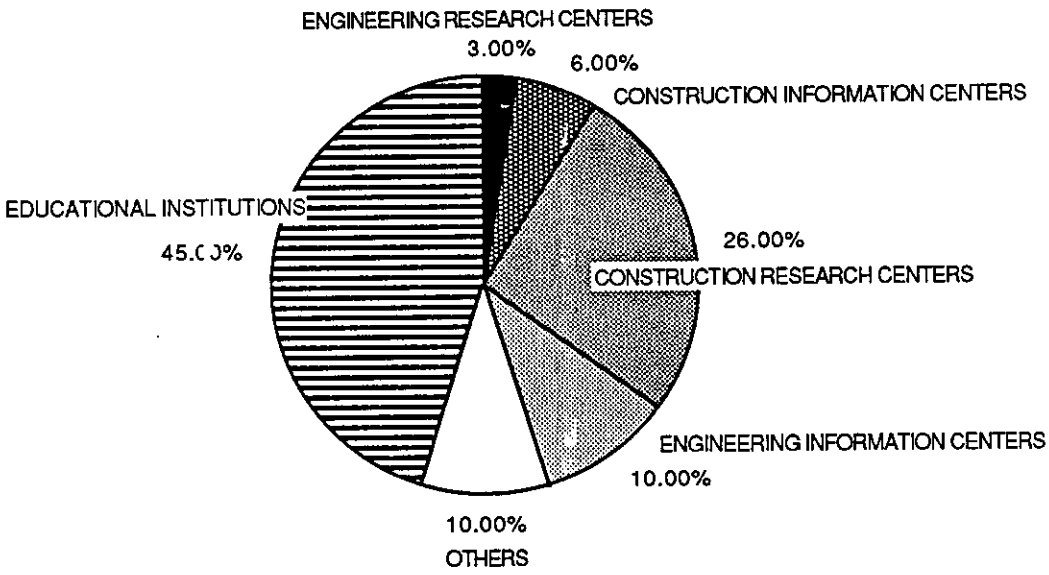

FIGURE - 8

SUMMARY OF RESEARCH FINDINGS
2. FUNDING INFORMATION

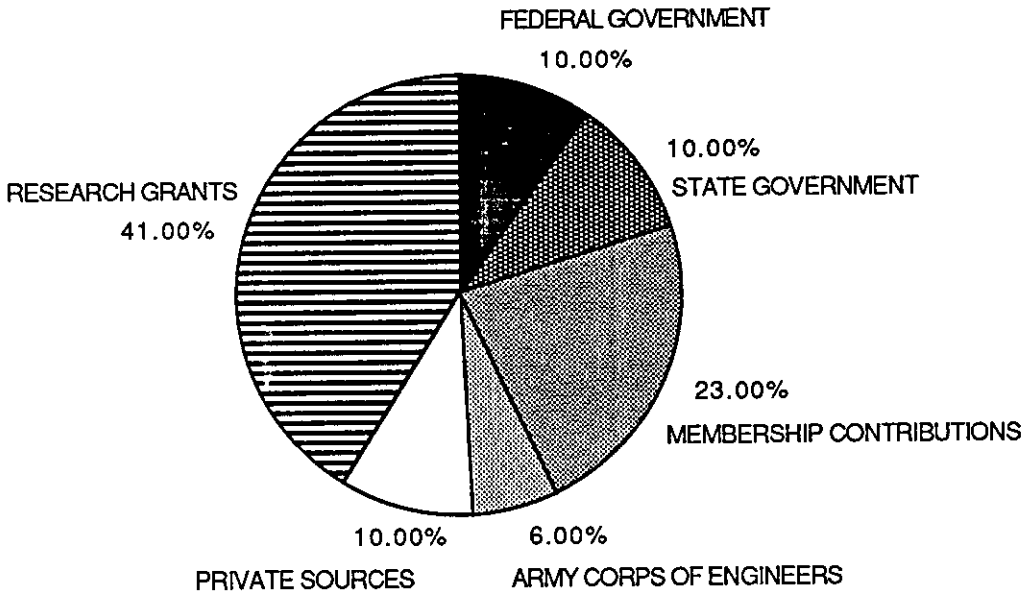

FIGURE - 9

V. RECOMMENDATIONS

Based on the findings of this study, the following are recommendations for consideration in the establishment of a state Construction Information Center.

1. NATURE OF CENTER:

The nature of a Construction Information Center catering to the needs of the commercial and residential construction contractors varies from that of Architects, Engineers, Manufacturers, Suppliers and the "Do-it-yourselfers". Therefore, a decision should be made at the very outset about who the proposed Construction Information Center is intended to serve.

2. SOURCES OF FUNDING:

Funding may be obtained from the federal government, the state government and from private sponsors. Soft funding may be obtained from one of the State Universities if the Center is located near one. With the NASA - Southern Technologies Applications Center already established in the Progress Center at University of Florida's Research and Development Park in Alachua FL, the University of Florida may be a possible and practical location for the proposed center.

3. SPACE:

The Construction Information Center may be set up on the premises

of the Progress Center, University of Florida Research and Technology Park, Alachua, FL (where the NASA-STAC - Southern Technology Applications Center is located). The space in the Progress Center is extendible as per requirement.

4. ORGANIZATIONAL STRUCTURE AND BUDGET:

Following are details about two types of organizational structures (Plan I and Plan II) that may be considered:

PLAN I - A SMALL SCALE CENTER

The center may be located in-house or near a School of Building Construction (with experienced faculty and graduate facilities to conduct research) of some state university. The space available for use may be as little as 300 S.F. The center may consist of a Director assisted by an Administration Assistant and two graduate assistants. The only disadvantage is that there will always be turnover upon the graduation of the two students. The Director of the center would report to the Director of the School of Building Construction. The Director of the School would report to the Dean of the College who would in turn report to the Vice-President of Academic Affairs and consequently to the President of the University. Figure 10 on page 67 shows the organization structure of the proposed center as per Plan I.

As per Plan I, the annual cost of running the center would be approximately $152,375. Table 2 on page 68 indicates the breakdown of costs for this plan.

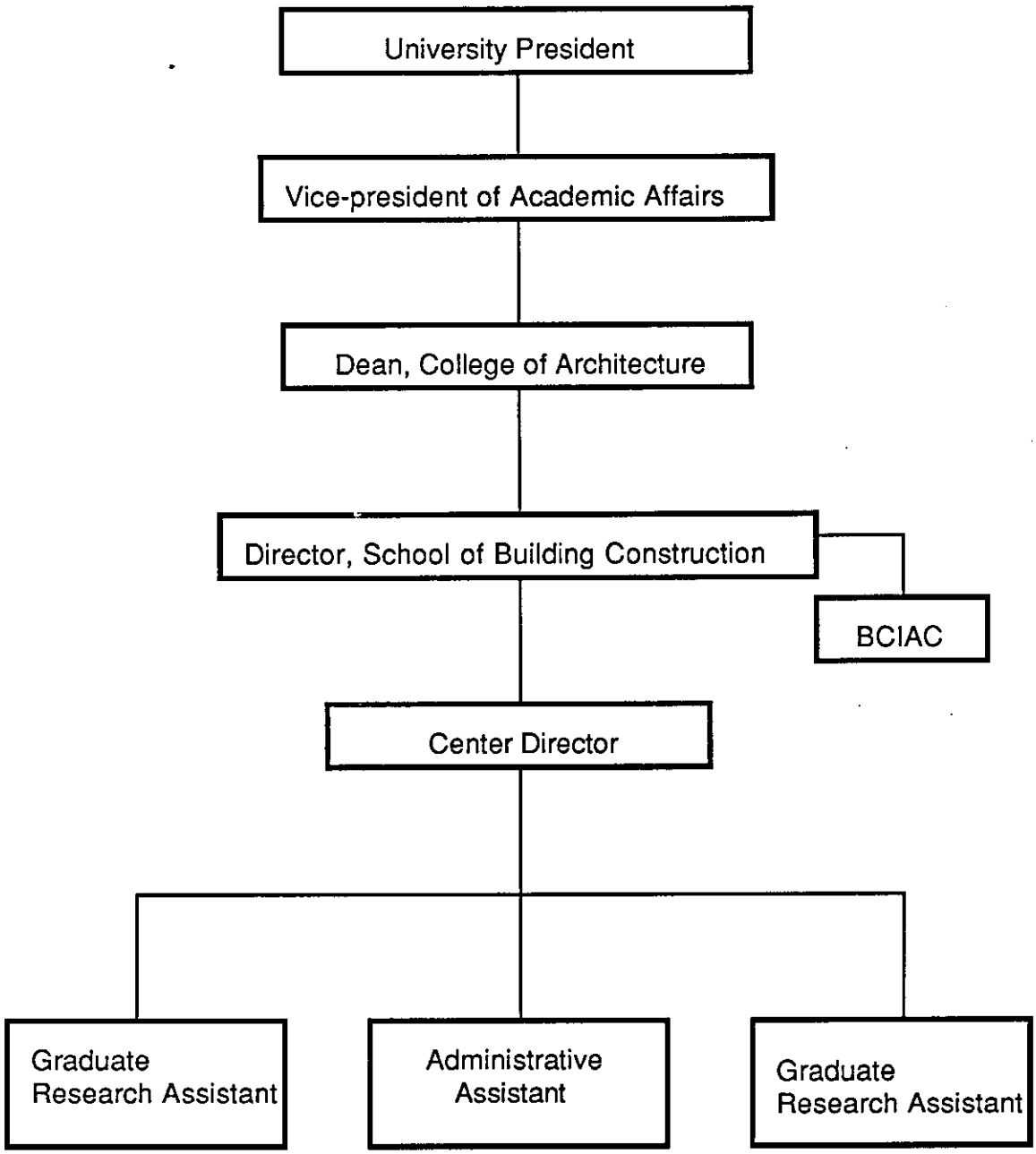

FIGURE 10

CONSTRUCTION INFORMATION CENTER
PROPOSED ORGANIZATIONAL STRUCTURE
PLAN I

TABLE - 2

ESTIMATED PROPOSED BUDGET(PLAN I)

An estimate of costs for the initiation of the proposed center as per Plan I and running it on an annual basis is shown below.

I.	ANNUAL BUDGET:		
1.	SALARIES:		
a.	Center Director	$ 55,000	
	Fringes(27.5%)	$ 15,125	
	TOTAL		$ 70,125
2.	OTHER PERSONNEL SERVICES (OPS):		
a.	Administrative Assistant	$ 18,000	
	Fringes(27.5%)	$ 4,950	
b.	Graduate Assistants (2 each @ 0.33 FTE)	$ 8,000	
	TOTAL		$ 30,950
3.	OTHER CAPITAL OUTLAY (OCO)[8]:		
a.	CENTER INITIATION BUDGET:		
	Lease(300 s.f. @ $11 per s.f.)	$ 3,300	
	Equipment	$ 15,000	
	Computer Hardware & Software	$ 10,000	
	Special Software[9]	$ 10,000	
	Others	$ 2,000	
	TOTAL		$ 40,300
4.	EXPENSES:		
a.	Travel (Including but not limited to surface and air transportation, lodging, meals, etc.) 6 trips @ $ 500 each.	$ 5,000	
b.	Administrative costs (Including but not limited to supplies, telephone, postage, etc.)_$ 500 per month	$ 6,000	
	TOTAL		$ 11,000
	TOTAL ESTIMATED ANNUAL BUDGET:		$ 152,375

[8]Capital assets worth over $ 200.00

[9]Software necessary for bibliographic retrieval services. Estimated cost includes communication software, start-up equipment and training costs for one person to use the software.

PLAN II - A LARGE SCALE CENTER

The center may be located on its own premises of approximately 500 S.F. area. Initially, only a minimum number of personnel need to be appointed. It is recommended that the Director of the Center report to the Director of some School of Building Construction (with experienced faculty and graduate facilities to conduct research) who will report to the Dean of the College. The Dean would in turn report to the Vice-President of Administrative Affairs and consequently to the President of the University. Initially the Director could be assisted by a general assistant, a Dissemination assistant and an administrative assistant. Figure 11 on page 70 indicates the organizational structure of this center.

The estimated annual cost of running the center would be approximately $275,175. Table 3 on page 71 indicates the breakdown of costs for Plan II.

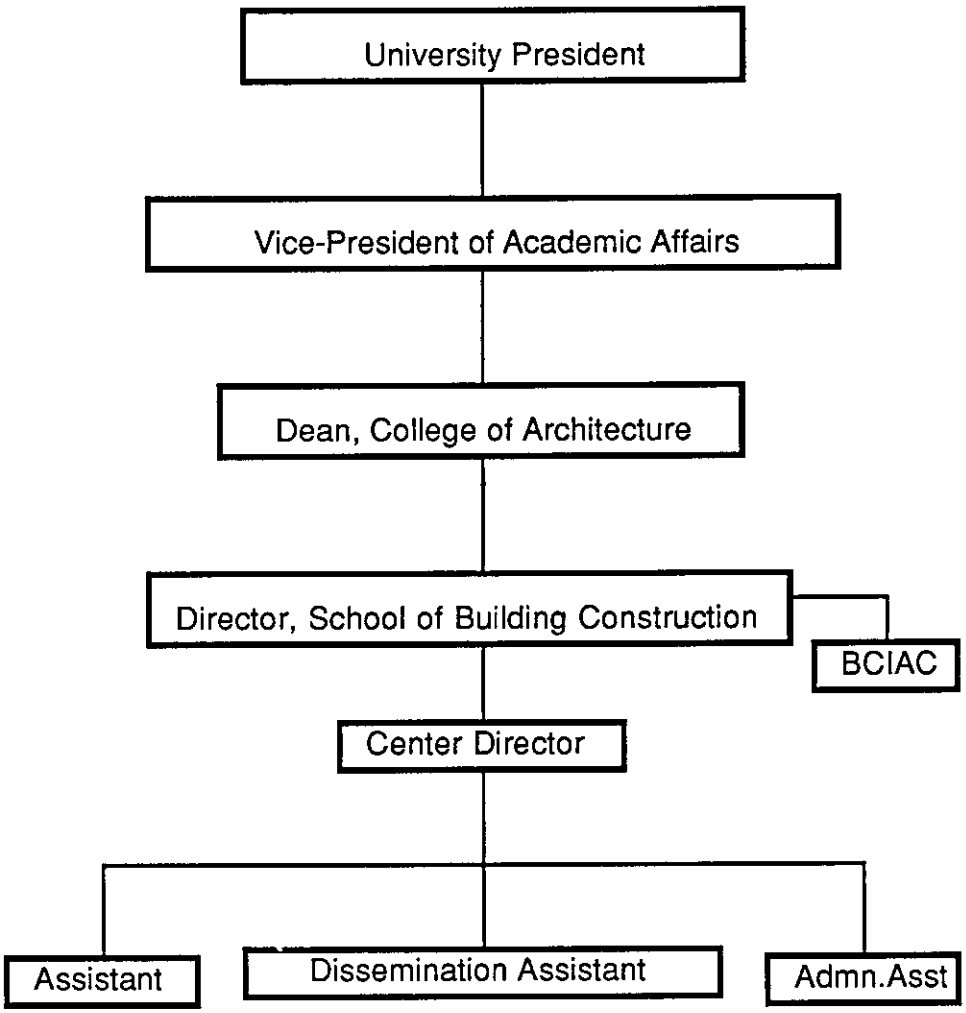

FIGURE - 11

CONSTRUCTION INFORMATION CENTER
PROPOSED INITIAL ORGANIZATIONAL STRUCTURE
PLAN II

TABLE - 3

ESTIMATED INITIAL BUDGET(PLAN II)

An estimate of costs for initiation of the proposed center as per Plan II and running it on an annual basis is shown below:

I	ANNUAL BUDGET:		
1.	SALARIES:		
a.	Director	$ 55,000	
b.	General Assistant	$ 40,000	
c.	Dissemination Assistant	$ 40,000	
d.	Fringes (27.5%)	$ 37,125	
	TOTAL		$172,125
2.	OTHER PERSONNEL SERVICES (OPS):		
a.	Administration Assistant	$ 18,000	
	Fringes (27.5%)	$ 4,950	
b.	Graduate Assistants (2 each at @ 0.33 FTE)	$ 8,000	
	TOTAL		$ 30,950
3.	OTHER CAPITAL OUTLAY (OCO):		
a.	CENTER INITIATION BUDGET:		
	Lease(500 s.f. @ $11 per s.f.)	$ 5,500	
	Equipment	$ 20,000	
	Computer Hardware & Software	$ 10,000	
	Special Software	$ 10,000	
	Others	$ 5,000	
	TOTAL		$ 50,500
4.	EXPENSES:		
a.	Travel (included but not limited to surface and air transportation, lodging, meals, etc.) 12 trips @ $1000 each.	$ 12,000	
b.	Administrative costs (including but not limited to supplies, telephone, postage, etc.) @ $800 per month	$ 9,600	
	TOTAL		$ 21,600
	TOTAL ESTIMATED ANNUAL BUDGET:		$275,175

PLAN II (EXTENDED):

As the center established as per Plan II grows, the space may be expanded into an approximately 800 S.F. area, more people may be hired and the departments may be organized into distinct entities. It is recommended that the Director have two Assistant Directors, one to handle Materials, Construction Methods and Construction Equipment, and the other to handle Construction Management and Special Projects. The Administration department which will handle all the day-to-day operations and the financial aspects may be further sub-divided into a department of Business Affairs and a department of Dissemination. The Business Affairs department may handle affairs related to personnel, budget, purchasing, contracts and grants and accounting. The department of Dissemination may handle affairs related to public information. Figure 12 on page 73 indicates the proposed extended organizational structure.

The estimated annual cost of running the center after the extension plan has been implemented would be approximately $377,225. Table 3 on page 74 indicates the breakdown of costs.

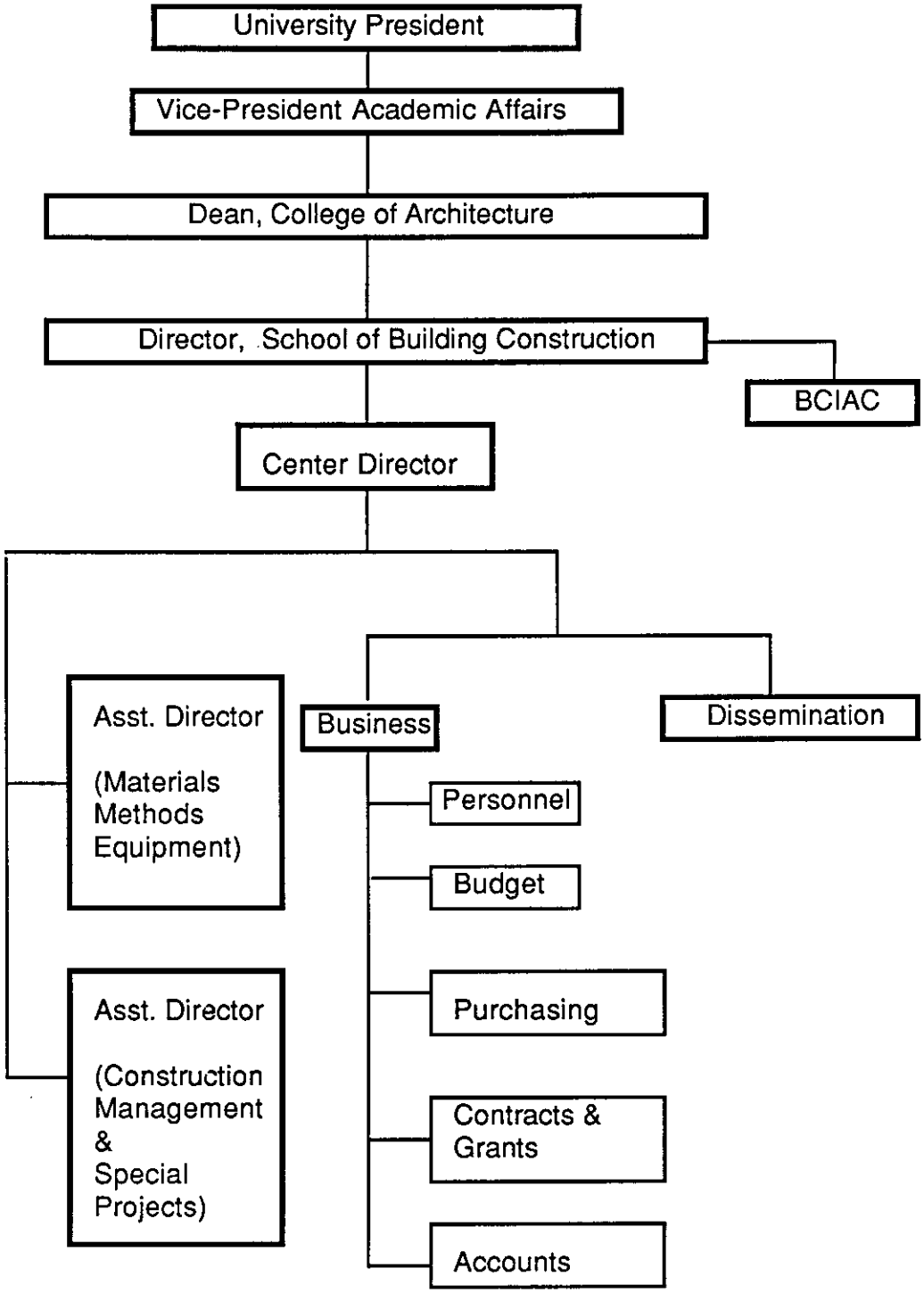

FIGURE - 12

CONSTRUCTION INFORMATION CENTER
PROPOSED EXTENDED ORGANIZATIONAL STRUCTURE
PLAN II

TABLE - 4

ESTIMATED EXTENDED BUDGET(PLAN II)

An estimate of extended annual costs of the proposed center is shown below:

ANNUAL BUDGET:

1.	SALARIES		
a.	Director	$ 55,000	
b.	Assistant Directors (2 each @ $40,000 each)	$ 80,000	
	Fringes (27.5%)	$ 37,125	
	TOTAL		$172,125
2.	OTHER PERSONNEL SERVICES (OPS):		
a.	Administration Personnel 2 nos. @ $18,000 each	$ 36,000	
	Fringes (27.5%)	$ 9,900	
b.	Graduate Assistants (3 each @ 0.33 FTE)	$ 12,000	
	TOTAL		$ 57,900
3.	OTHER CAPITAL OUTLAY (OCO):		
a.	EXTENSION PLAN BUDGET:		
	Lease(800 s.f. @ $11 per s.f.)	$ 8,800	
	Equipment	$ 25,000	
	Computer Hardware & Software	$ 15,000	
b.	Others	$ 10,000	
	TOTAL		$ 58,800
4.	EXPENSES:		
a.	Travel (included but not limited to surface and air transportation, lodging, meals, etc.) 24 trips @ $1000 each.	$ 24,000	
b.	Administrative costs (including but not limited to supplies, telephone, postage, etc.) @ $1200 per month	$ 14,400	
c.	Newsletter costs	$ 50,000	
	TOTAL		$ 88,400
	TOTAL ESTIMATED ANNUAL BUDGET:		$377,225

5. ACTIVITIES:

The following are examples of the major activities recommended for the Center.

a. Assemble, compile, publish and disseminate information on new materials, equipment and methods of construction and new scientific and/or technological information pertinent to the Construction industry.

b. Increase public awareness of the Building Construction Industry Advisory Committee (BCIAC), its functions and merits by assisting in disseminating reports generated from research.

c. Organize and sponsor statewide meetings, forums and conferences to facilitate the exchange of innovative ideas and methods within the Construction industry..

d. Develop a system to provide information to all Universities and construction contractors about building construction programs and continuing education courses.

e. Perform other functions as may be deemed appropriate by the committee.

This study indicated that most of the Centers surveyed were located next to a major University with graduate faculty, students and facilities capable of supporting a Center. The University of Florida compares favorably with most of the institutions visited and is suggested only as a possible location of the proposed center. The next section provides a summary of

facts to support this recommendation.

VI. UNIVERSITY OF FLORIDA - A POSSIBLE LOCATION:

The University of Florida is one of the premier institutions of learning in this country. It is involved in funded research worth about $122 million each year[10] and research projects span every discipline. The University has equipment worth millions of dollars to capture, record and transmit research data.

It has the capacity to network computer information nationally and internationally. It has recently acquired a new satellite uplink transmitting station (C band), with the help of which the University can send information via satellite to all parts within the state of Florida. The University has the most extensive library system for research and teaching in Florida.

The College of Architecture, University of Florida is a multifaceted teaching and research institution, offering education in five disciplines dealing with building design and planning. The School of Building Construction is America's first school of Construction education and has the facilities, faculty and staff to house the recommended Construction Information Center.

The College of Architecture is a member of many statewide and

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[10]Information obtained from Mr. Dillard Marshall, Division of Sponsored Research, University of Florida

nationwide architectural and building construction organizations. Some of them are:

1. The Architectural Research Centers Consortium (ARCC) - a national organization involved in implementation and dissemination of architectural, construction and planning related research.

2. The National Institute of Building Sciences (NIBS) - a consensus building organization of private and federal organizations.

3. ACADIA - an organization involved in the use of Computer-aided design in architecture.

4. Various building construction organizations such as:

(i) Associated Schools of Construction (ASC);

(ii) Associated General Contractors of America (AGC);

(iii) Building Construction Industry Advisory Committee (BCIAC);

(iv) Associated Builders and Contractors (ABC):

(v) Florida Homebuilders Association and the National Association of Homebuilders (NAHB);

(vi) American Association of Cost Engineers (AACE) and

(vii) Energy Extension Service, State of Florida.

By its affiliation with the above associations and professional organizations, the University will be able to reach out to a large number of participants in the construction industry.

In addition, the headquarters of the Southern Technology Applications Center is located in Alachua, just 15 minutes from

the University of Florida campus. Funded partly by the state of Florida and partly by NASA, this center is a repository of all types of general and construction related information. Together with the Building Construction Industry Advisory Committee located in the School of Building Construction, NASA-STAC would be an invaluable asset to the proposed Construction Information Center.

The School of Building Construction is starting a new Ph.D program in Building Construction this year (the first true doctoral program in Building Construction in the country) which will bring a crop of graduate students with extensive industry and field experience. This new program, coupled with the extensive library and research facilities of the University of Florida, and its capability to transmit and disseminate information extensively, make the University of Florida a good and possible location for the proposed Construction Information Center.

APPENDIX - 1

Date

Florida Solar Energy Center
300, State Rd, 401
Cape Canaveral, FL 32920

ATTENTION: Mr. David Block

Sub: Information regarding construction information centers

Sir

The School of Building Construction under a grant from the State of Florida, Department of Education, is investigating the feasibility of the establishment of a Construction Information Center in the state of Florida.

We would therefore be very grateful if you could provide us with any of the following information:

1) Names of any existing general information centers,
2) Names of any existing Construction Information Centers in the country,
3) Methods used to finance the existing centers.

The above information is needed to initiate our research efforts. Therefore your prompt response to this request will be very much appreciated.

Sincerely

Kweku Bentil
Associate Professor

APPENDIX - 2

November 16, 1987

The Director
Construction Research Center
College of Architecture
Georgia Institute of Technology
Atlanta, GA 30332-0155

Sub: Pilot survey regarding Construction Information Centers

Dear Sir/ Madam

The construction industry has traditionally lagged behind other industries in research. What little research has been done had been fragmented and the results have not been widely disseminated.

As an initial move to inform its construction industry about new materials, methods of construction, new scientific and/or technological advances, the state of Florida is contemplating the establishment of a Construction Information Center. The School of Building Construction at the University of Florida is conducting a nationwide pilot survey to learn more about the existing Construction Information Centers.

Specifically we are interested in the nature of the centers, their objectives and the way they are financed in order to determine if additional research is required before we make recommendations to the state of Florida.

You can greatly assist us in this research by taking approximately 15 minutes to fill out the enclosed questionnaire and returning it in the enclosed postage paid envelope no later than December 15, 1987.

Thank You in advance for helping with this research.

Sincerely

Kweku Bentil
Associate Professor

Encl.

QUESTIONNAIRE:

PILOT SURVEY OF CONSTRUCTION RESEARCH AND INFORMATION CENTERS

This survey has been sent to all known construction research and information centers. Please take approximately 15 minutes to answer all the following questions.

1) Which of the following best describes your organization?

___ 1. Research Center ___Construction? ___Engineering?
___ 2. Information Center
___Construction? ___Engineering?
___ 3. Trade Association
___ 4. Technical Society
___ 5. Professional Association
___ 6. Publishing Company
___ 7. Other, please specify_____

2) When was your organization / center established?
___ 1. 18_____
___ 2. 19_____

3) Which of the following best describes the objectives of your center?
___ 1. Construction Research
___ 2. Civil Engineering Research
___ 3. Dissemination of Construction Information - General
___ 4. Dissemination of Construction Information - Specialized
(Please state area of specialization, e.g. concrete_____)
___ 5. Dissemination of Civil Engineering Information - General
___ 6. Dissemination of Civil Engineering Information-Specialized
(Please state area of specialization, e.g. roads_____)
___ 7. Other, please specify_____

4) If a research or information center, how is your organization / center financed?
___ 1. Federal Government grant
___ 2. State Government grant
___ 3. Local Government grant
___ 4. U. S. Army Corps of Engineers
___ 5. U. S. Air Force grant
___ 6. U. S. Navy grant
___ 7. Private Sources
___ 8. Contributions / Dues from membership
___ 9. Association funds
___ 10.Other sources, please specify

5) Are you aware of the existence of any Construction Information Centers?
___ 1. Yes

___ 2. No
If Yes, what is its name? _____
Where is it located? _____
_____
_____

Tel no. _____

6) If the opportunity arose, would you consider an affiliation with the State of Florida's proposed Construction Information Center?

___ 1. Yes
___ 2. No
If yes, what would you consider the approximate annual cost to the State of Florida to be?
1. $ _____
2. Cannot determine at this time, but may be negotiated at the appropriate time
3. No cost

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