

ARCHITECTURAL EDUCATION FOR MANAGEMENT

By

RONALD JAY REID

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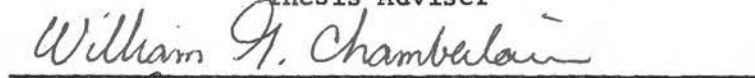
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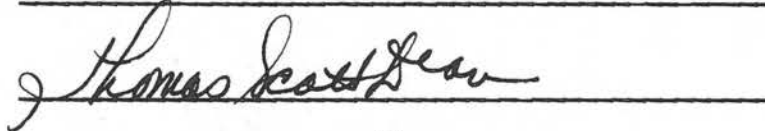
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Thesis Approved:



Thesis Adviser







Dean of the Graduate College

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CHAPTER I

THE PROBLEM

Introduction

Architectural education has undergone many philosophical and procedural changes through the centuries. Its gone through the formal apprenticeships or pupilages, been heavily influenced by the French atelier system, and adopted many of the attitudes of the Bauhaus and the German polytechniques. During the early years of architectural education, when the needs of the profession were slow in changing, education was also able to change slowly. Since World War II, in this scientific age of rapid technological advances, education has strained and struggled to keep up with the needs of civilization and the requirements of the profession.

The decade of the sixties found educators and students involved in making changes in architectural educational philosophies and concepts and in teaching and learning procedures. The beginning of the seventies found architectural education branching into many different areas. The impetus for this change in philosophy and direction came primarily from the area of professional practice. It became increasingly obvious that the rigidity of architectural education was not meeting the changing and broadening aspects of the practice of architecture.

Architectural education must reflect the needs of the profession. But this is a two way street. To quote Robert W. McLaughlin, . . .

"the profession makes demands on education; education nudges and stimulates the profession."¹ This give and take has brought about what at first seems to be an irreconcilable position for the field of architectural education. The expanding services of the profession and the increasing complexity of projects requires that education be broader and more encompassing than ever before. But at the same time in order to stimulate and nudge the profession, education must aim for greater depth and more precise understanding in specific areas.²

Architectural education cannot hope to "get by" with providing either broad scope study or in depth research. Both must be provided in complete and equal measure. And this must be provided in each of the branches of study into which architectural education has divided or will divide. One of the new branches of architectural education in which this depth and breadth can be best seen is in the area of architectural business and management.

Purpose of the Study

It has been generally conceded that architecture is in need of better management and is in need of architects with a better understanding of business skills and attitudes. However, at the same time not every architect need be trained as a specialist in architectural office management.

The conclusions of this study will demonstrate the need for a broad basic education in business and management principles. A broad introduction into this area for all architectural students regardless of which of the existing or future options of graduate study he or she wishes to follow. This study will also show the necessities of having

architects who are specialists in the field of business and management, and thereby demonstrate a need to allow architectural students to specialize in this field if they are inclined to do so. These needs will be shown by analyzing the requisite skills of today's architect from the four basic areas of office practice listed below.

1. The inability of the small firm to provide the comprehensive and management services that is required by business oriented clients and complex projects.
2. The inability of architectural offices to develop and maintain their own profit oriented management procedures and policies.
3. The developing of comprehensive design teams needed to deal with the complex projects of today, and the management necessary to coordinate their efforts.
4. The growing area of construction management, and the requisite skills needed to promulgate good design through "Fast Tracking".

But beyond establishing the needs for architectural education for management, the primary purpose of this study is to develop an educational curriculum to meet these needs.

A remedy will be proposed to alleviate some of the management problems associated with architectural practice. This is an academic remedy so that the architects' practical experience in the area of business need not be as long nor as difficult as it sometimes is, until he has the "know how" to be an effective manager. To be an effective manager of people, time and money.

This academic proposal will consist of three parts.

1. New courses during the four year Bachelor of Science degree required for all major options.
2. Management option with a Master of Architecture degree.
3. A six year Masters in Architectural Business Administration.

Need for the Study

For many years educators and practitioners of architecture have held discussions as to whether architecture is "essentially a business, an applied science or an art."³ But finally everyone has rather accepted the fact that architecture is a combination of all of these. The idea that architecture is also a business has been a difficult concept to accept. But it is becoming accepted. Because of this, educators are investigating programs and courses that might give the architectural student the background in the principles of business and management which he or she needs or might want.

What the student needs is a broad general background of business principles taught during the four undergraduate years. What the student might want, are programs he or she would select for graduate study.

The faculty in the School of Architecture at Oklahoma State University is currently investigating the possible avenues, programs and problems pertaining to a business and management education for architects. With professional educators involved in this process, it's essential that there is student input.

Students have assumed the advocate role in education in the past few years. From students come the new ideas as to what they and the future will need in the way of philosophy and skills. As William Caudill wrote:

Educators are taking their charges, or more accurately their charges are taking them, in many directions at once, ranging from an extremely social-conscience emphasis to highly computerized design methods. . . . Students are demanding and getting more choices of options. The cafeteria curriculum is becoming real.⁴

In our current "cafeteria curriculum" there are courses and directions in the areas of architectural design, structures and environmental control. But if we accept architecture as being a combination of all of these options plus many more, including business and management, then new courses, new programs and new educational concepts must be analyzed and developed. Courses and options must be developed to give the architectural student a basic background in business and management and the option for specializing in architectural management.

FOOTNOTES

¹Robert W. McLaughlin, FAIA, "Education for the New Role," Comprehensive Architectural Services, ed. William Dudley Hunt, Jr., AIA (New York, 1965), p. 37.

²William Wayne Caudill, Architecture by Team (New York, 1971), p. 89.

³Robert W. McLaughlin, FAIA, "Education for the New Role," Comprehensive Architectural Services, ed. William Dudley Hunt, Jr., AIA (New York, 1965), p. 42.

⁴William Wayne Caudill, Architecture by Team (New York, 1971), p. 157.

CHAPTER II

REVIEW OF LITERATURE

Introduction

There are many areas of architectural office practice which have problems that need study and for which solutions need to be provided. The four problem areas listed in Chapter I can be remedied to a large extent by a single solution.

The architectural profession as a whole, appears to have adopted the philosophy of randomly extinguishing small fires wherever and whenever they spring up. This is to say, they only concern themselves with isolating and solving small, disassociated business and financial problems whenever they arise during the normal course of work. Many times the solution to a small problem is "shelved" after its implementation and virtually forgotten about until a similar problem again arises. The profession, wholly and severally, should adopt a fire-fighters policy of precluding the small flare-ups by containing and eliminating the primary or "root" conflagration. The primary cause in this instance being poor management or the total lack of it.

By providing better office management, not only would the primary cause of problems be contained, but management provides a viable conduit of continuity through which new and old solutions and techniques can live and travel. "Living" in the sense that they are always in use or available to use, rather than shelved and out of mind. "Traveling" in

the sense that these solutions and techniques are continually operated on and affected by, the current trends and needs of the architectural profession. In this way they can be mutated into the form most applicable to these trends and needs.

This lack of management has manifested itself in both small architectural offices and in large firms. The basic problems confronting all offices are primarily the same. However, the effects of these problems usually vary in "intensity and result" depending on office size.

This chapter will attempt to shed light on the four basic problem areas suffering from this lack of business management. They will be covered in the following order.

1. Comprehensive services
2. Profit oriented management
3. Architecture by team
4. Construction management

Comprehensive Services

Many small architectural firms, and even some of the larger ones, are finding it difficult to exist due to their inability to provide comprehensive services. But what comprises these "comprehensive services"?

Very few clients, if any, walk into the architects office with all the money they need, their financing completed, their land purchased and simply ask the architect to solve his building problem. More often than not, the client possesses only the building problem and requires help and direction in these pre-design requirements. These pre-design

problems are just a part of the total comprehensive package which require business and management knowledge.

Comprehensive services deal with the architects ability to develop the total environment. At this point we must accept the fact that most architects want to help bring about a better total environment. This is a difficult role. But the architect is the only individual who, in any useful degree, possesses all of the elements of such a role-- education, will, orientation, desire and knowledge.¹ The architect is not completely prepared for such a role, however. His greatest deficiency lies in the area of business and management education.

If the architect is to be proficient in this role he must become involved in the clients' problems before they are architectural problems. He must become involved in areas such as economic feasibility studies, real estate and financing. Ethically, this is possible. Comprehensive services such as these are possible for architects under the principle of agency. This principle makes it possible for one person, the client in this case, to vest authority in another, the architect, to represent him in business transactions with a third party, e.g. a real estate broker or banker.² But how many architects would know how to handle these affairs or understand the duties and responsibilities of an agent? He must receive formal education in these areas. And before a client would allow the architect to act as his agent in these matters, the architect would be required to demonstrate his competency and instill an attitude of confidence in his client.

On this and the following pages is reproduced an outline of comprehensive architectural services taken from Comprehensive Architectural Services published by the American Institute of Architects. Those

performance roles for which architects have not and are not being formally educated, have been capitalized and underlined. The services that have been underlined and capitalized are more properly business functions, rather than professional. Many of them would be negotiated for the owner by the architect as the owner's agent. In such cases, the owner's interests must be closely guarded. For the architect to properly assist and serve his client in such areas, special training will be required leading to a broad background in real estate, finance, business, and taxation, in order to supplement the architect's skills as an investigator, researcher, organizer, and coordinator.³

I.

Project Analysis Services

- A Feasibility Studies
 - 1 Need for Facility
 - 2 Method of Accomplishment
 - 3 ECONOMIC REQUIREMENTS
 - 4 Location Requirements
 - 5 Personnel Requirements
 - 6 LEGAL CONSIDERATIONS
- B Financial Analysis
 - 1 OPERATIONAL FINANCING
 - 2 CAPITALIZATION OF PROJECT
 - 3 LAND VALUES AND AVAILABILITY
 - 4 TAXES AND INSURANCE RATES
 - 5 INTERIM FINANCING
 - 6 LONG-RANGE FINANCING
- C Location and Site Analysis
 - 1 Survey of Locations and Sites
 - 2 Land Uses and Function
 - 3 Relationships to Surroundings
 - 4 Relationships to Labor Force
 - 5 Relationships to Raw Materials
 - 6 AVAILABILITY OF MARKETS
 - 7 Population Trends
 - 8 Relationships to Transportation
 - 9 Climatological Considerations
 - 10 LEGAL CONSIDERATIONS

I.	Project Analysis Services, Continued	<ul style="list-style-type: none"> D Operational Programming 1 Functional Requirements 2 Space Requirements 3 Equipment and Furnishings 4 Personnel Requirements 5 <u>FINANCING REQUIREMENTS</u> 6 <u>Organizational Requirements</u> 7 Maintenance Requirements E Building Programming 1 Basic Philosophy 2 Site and Climatic Requirements 3 Space Requirements and Relationships 4 Occupancy Requirements 5 <u>BUDGETING</u> 6 <u>FINANCING</u> 7 <u>DESIGN AND CONSTRUCTION SCHEDULING</u>
II.	Promotional Services	<ul style="list-style-type: none"> A <u>REAL ESTATE AND LAND ASSEMBLY</u> B <u>FINANCING OF PROJECTS</u> C Promotional Design and Planning D Public Relations E Communications
III.	Design and Planning Services	<ul style="list-style-type: none"> A Operational Design and Planning 1 Operational Procedures 2 Systems and Processes 3 Functional Requirements 4 Layout and Relationships 5 Equipment and Furnishings B Building Design and Planning 1 Schematic Design 2 Preliminary Estimates 3 Design Development 4 Outline Specifications 5 Cost Estimating 6 Working Drawings 7 Specifications
IV.	Construction Services	<ul style="list-style-type: none"> A Bids and Construction Contracts B <u>SUPERVISION AND ADMINISTRATION</u> C <u>JOB COST ACCOUNTING</u> D <u>CONSTRUCTION MANAGEMENT</u> E Post-Construction Services

V.

Supporting Services

- A Supporting Design Services
 - 1 Engineering
 - 2 Urban and Retional Planning
 - 3 Landscape Architecture
 - 4 Site Planning
 - 5 Fine Arts and Crafts
 - 6 Interior and Furnishings
 - 7 Sanitary and Utility Planning
 - 8 Roads and Traffic Design
 - 9 Others--Acoustics, Lighting, etc.

B Special Consulting Services

- 1 Specific Building Types
- 2 ECONOMICS
- 3 MARKET ANALYSIS
- 4 MERCHANDISING ANALYSIS
- 5 LAW

VI.

Related Services

- A Architectural Education
- B Industry Consultation
- C Research and Testing
- D Product Design
- E Architectural Graphics
- F Prefabrication

However, it is not intended to advocate that the architect be trained as a specialist in each of these underlined areas, unless he or she wishes to do so. But even if the architect chooses to use specialized consultants, the architect needs a basic education and understanding in these areas in order to discuss them intelligently and to properly coordinate the activities of the consultant.

This becomes especially important when viewing comprehensive services from the standpoint of the small firm. The smaller firms can provide more diversified services by staffing themselves with mostly generalists, and a few specialists, but primarily supplementing their abilities with those of outside consultants or collaborators.⁴ This can often be accomplished through the use of joint ventures.

Joint Ventures

A joint venture is the temporary contractual association of independent firms to execute a particular project and/or to perform a range of services.⁵ This type of temporary "partnership" provides a great deal of flexibility in allowing a small firm to expand its scope of services that may be required only on a single specific project, without hiring specialists on a permanent basis.

Through joint ventures small firms may attempt larger fields of practice in an investigatory manner without making irrevocable financial and manpower commitments.

Joint ventures have many attributes. But when the scale of any service is changed, new problems or areas of concern arise. The largest of the problems are in the areas of law and management.

The early and precise definition of individual responsibilities is probably the most important aspect in providing for the success of a joint venture.⁶ This implies a joint venture agreement put together and signed preferably before a contract with the client is signed. This agreement would contain some of the following.

- Rights of the Parties
- Interests of the Conventures
- Fixed Percentage Division
- Actual Work Load Percentage
- Financing of Services
- Indemnification
- Disputes and Arbitration
- Default of Coventurer
- Insurance
- Methods of Reimbursement
- Property Contributions⁷

Granted, an architect should not enter a joint venture agreement containing the above items without the advice of a lawyer, but the lawyer is not an architect and he cannot be expected to understand the

scope of the project or the needs of the joint venture incurred by it. The architect must be able to transmit his needs and feelings to the lawyer in a knowledgeable manner. And he must be able to understand the agreement he has signed. Also it is not enough to expect the architect to spend half of this professional career learning contract law. He must receive some formal training in college.

Another problem arising in joint ventures is that of an increased need for project organization. Once an agreement is reached a framework of operating procedures must be established. This is a management operation for which architects are poorly prepared. The following are some of the management operations necessary.

Duties of Project Manager

- Continuous Supervision of Entire Project
 - Resolve Irritating Issues
 - Regulate Manpower Allocations
 - Relieve Unsuitable Personnel
 - Control Financial Aspects
 - Appoint Accountant
 - Supervise Wage Disbursements
 - Facilitate Communications
 - Control Dissemination of Technical Information
 - Control Project Budget
 - General Administration

Will this project manager be a business consultant or an architect? It would be hoped that he's an architect first and a manager second. What must the architect know of management? Probably the best way to answer this question is to provide a definition of management. William Wayne Caudill stated that:

Management is the act or art of managing, implying direction and control. Management concerns the judicious use of means to accomplish an end involving the smallest or largest task. A manager is a process-oriented specialist. He has a natural tendency toward functionalism. The manager group includes project managers, programmers, accountants, human behavior consultants, and building type consultants such as school specialists, community college

specialists, university building specialists, office building specialists, civic center specialists, and housing specialists.⁹

Someone must be held responsible for bringing people and things together at the right time in the right place and with the right amount of money. That's the manager's job--to manage the task. Managing implies direction and control of people and things. The task manager makes judicious use of means to accomplish the end. The manager is process-oriented specialist, whereas the designer is product-oriented.¹⁰

One of the major reasons behind developing comprehensive services and entering into joint ventures is finding additional methods which will enable architects to maintain their economic independence. Another field or type of service which is well suited to becoming a basic part of comprehensive services is that of multiple contracts.

Multiple Contracts

The concept of multiple contracts is an easy one to explain, but a difficult one to implement. Under the multiple contract system the architectural office assumes the role and the fee of the general contractor. On the following page (Figure 1) is reproduced the operations chart taken from Architectonics: Accenting Multiple Contracts by Henry Charles Burge. The main item to note is that the architect is negotiating contracts directly with the sub-contractors.

"Multiple contracts approximately double the amount of work (for the architect to do) for each job and spreads the additional work load over a period three or four times as long. This added time spread enables the architect to maintain greater stability of staff and better deployment of personnel. The multiple contract system can double the volume of work for the same amount of sales effort."¹¹

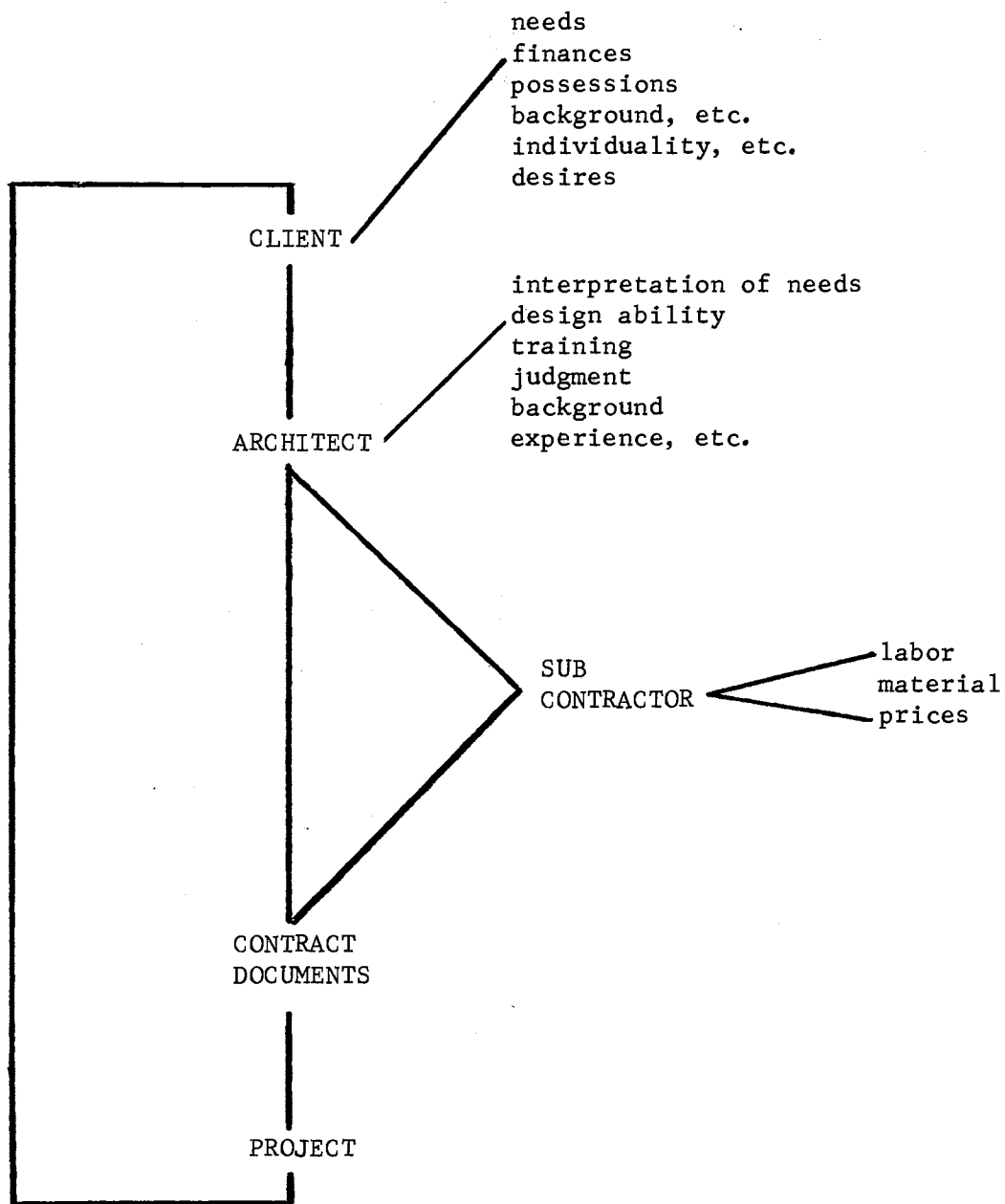


Figure 1. Multiple Contracts Operations Chart

When the architect becomes more involved and exercises more control of the building project he is able to improve his services to the client on a qualitative basis by seeking out the best sub-contractors, services and construction methods; the architect increases his control over the aesthetic portions of the finishing of the project; and the architect becomes more cognizant of, and exercises more control over the economics of construction.

In spite of these advantages its obvious that the architect must exhibit and use many new skills which do not come into play under usual single contract operations. The architect must be able to:

- Make detailed construction estimates
- Award multiple contracts
- Check insurance coverage and verification
- Issue change orders
- Cost accounting control
- Take competitive bids
- Supervise construction

Henry Burge stated in Architectonics: Accenting Multiple Contracts:

"The multiple separate contract system can benefit the quality of creative architectural design by developing a broader and more refined picture of materials, processes, law, and architectural business."¹²

But how can an architect administer satisfactorily a concept permeated with law and business when he is not educated in these areas? Must we force him to wait for such an opportunity until he's 50 years old and has gained this knowledge through trial and error? This would seem a terrible waste of time and talent.

Profit Oriented Management

The next problem area facing the architectural profession that should be discussed is what is needed to develop and maintain a profit making office. More than ever before, architectural firms are finding it difficult to remain financially solvent. In 1966 a study done by Case and Company for the American Institute of Architects shows that one firm out of 12 suffered a loss and the average architect lost money on one job out of four.¹³

Architectural projects are growing in size and complexity. A trend which will continue! But the study mentioned above shows that ". . .the more difficult the design and complexity of the building, the lower the rate of profit realized."¹⁴ This is a sobering thought, especially from the standpoint of the small firm. The small firm already has difficulty in obtaining the large, complex projects. If projects become more complex the small firm will find it hard to obtain them and make a profit on them.

Figure 2 contains data compiled by Case and Company which shows that in 1966 the smallest firms already had the highest indirect expenses and the lowest pre-tax income.

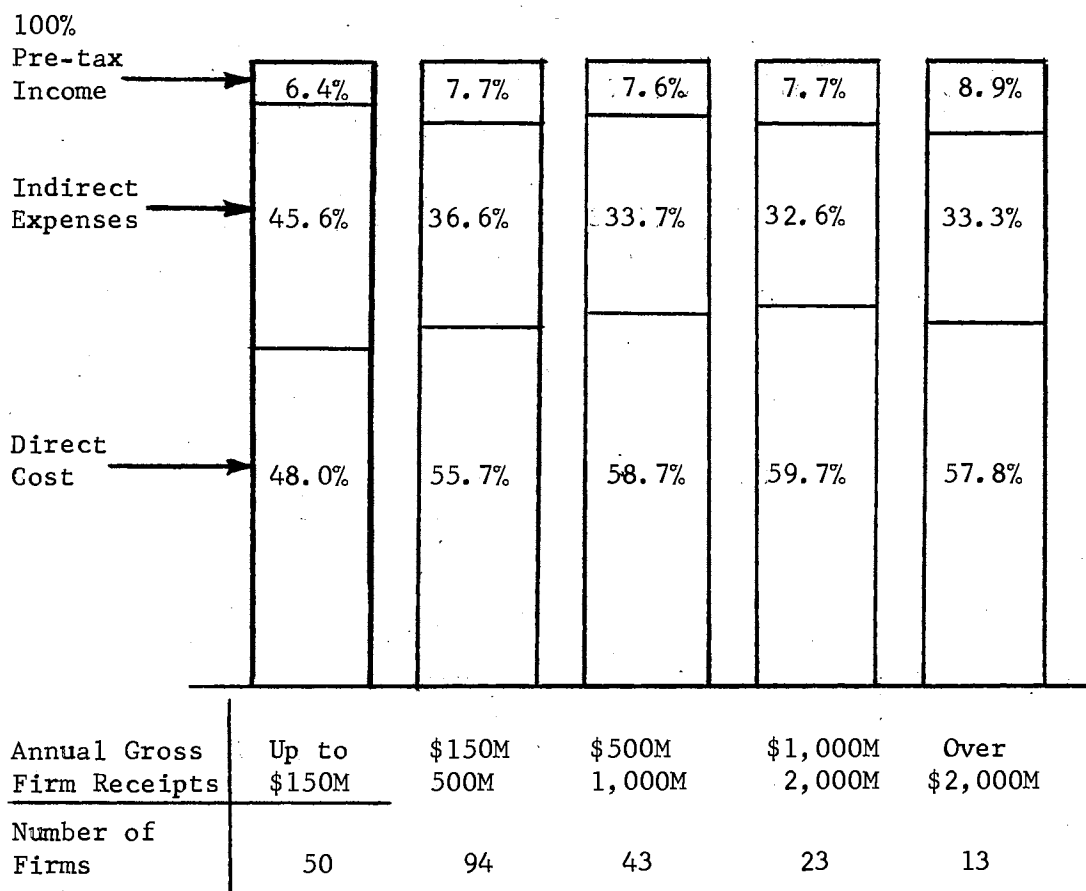
However, small firms should not be singled out as the only firms that have been affected by this world's economic squeeze. One of the primary problems facing the profession as a whole is what method of compensation to use. Even though 80% of all contracts use a "percent of construction cost method," and this method produces the highest pre-tax income, it produces the third lowest actual dollar profit.

It becomes even more confusing when you look at the "multiplier method" which produces the largest actual dollar profit and has the

COMPARATIVE FINANCIAL ANALYSIS BY SIZE OF FIRM
223 FIRMS

Annual Income Statement Data

Direct costs, indirect expenses and firm pre-tax income as percentages of gross receipts



Source: Case and Company, Inc., The Economics of Architectural Practice (Library of Congress, 68-19047, 1968), p. 9.

Figure 2. Comparative Financial Analysis by Size of Firm

fourth lowest average profit percentage. This low profit percentage stems from the fact that this type of project has the highest percentage of overhead. Therefore, it follows that the old standard multiplier of $2\frac{1}{2}$ times payroll is obsolete. Case and Company, in their study, showed that the multiplier should be closer to 3.25.¹⁵

The problem of indirect costs or overhead is of primary concern to the whole profession. Figure 3 shows the rise in indirect expenses through the years. Figure 4 from Case and Company probably gives a more relevant view of this rise in indirect costs. Since 80% of all projects are billed on a percentage of building cost, from Figure 4 it is obvious that since 1960 architects are paying more and more in indirect expenses and the cost on which their fees are based has not risen commensurately.

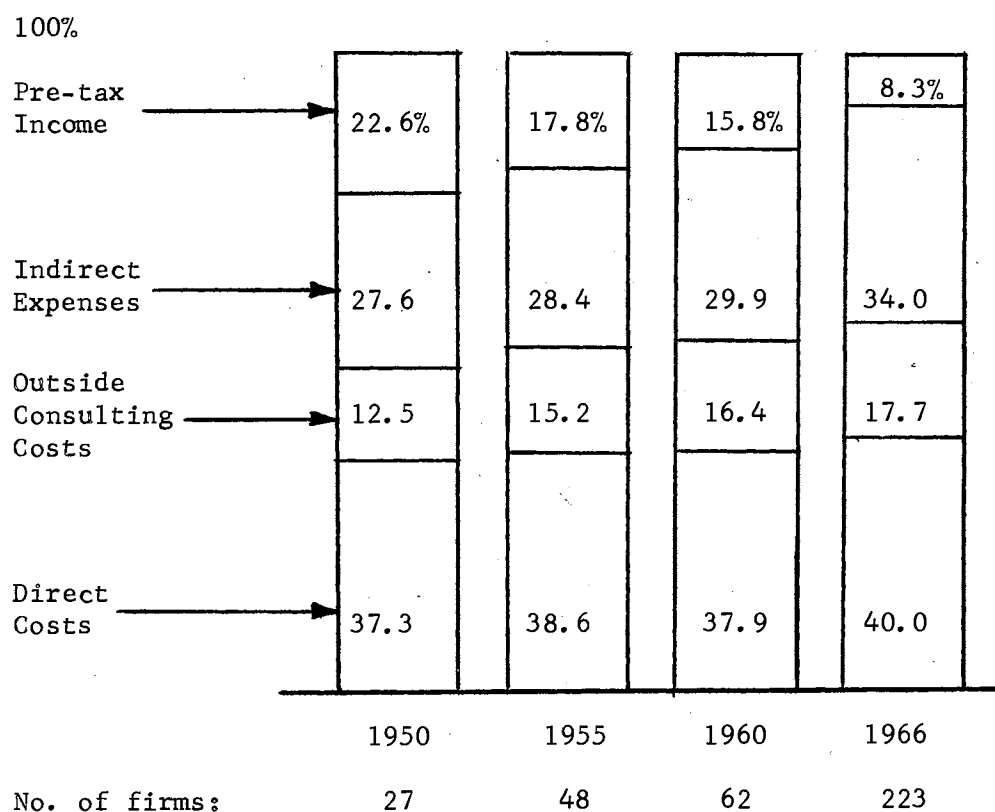
It is obvious that overhead must be reduced. The question is; How? The answer is; better management! For instance, money can be saved easily by proper policy in the following areas.¹⁶

- Rent
- Correspondence and postage
- Discounted office supplies
- Job-printing costs
- Old tracing and print storage
- Theft of supplies
- Salary bookkeeping costs
- Coffee breaks
- Misplaced holidays

Soaring overhead and unsuitable compensation methods, although excellent examples, are only two of many parts of the profit picture which are in need of better management. The area of management most alien to architects is "profit planning". The fundamental concept of "profit planning" is the development of a model or framework into

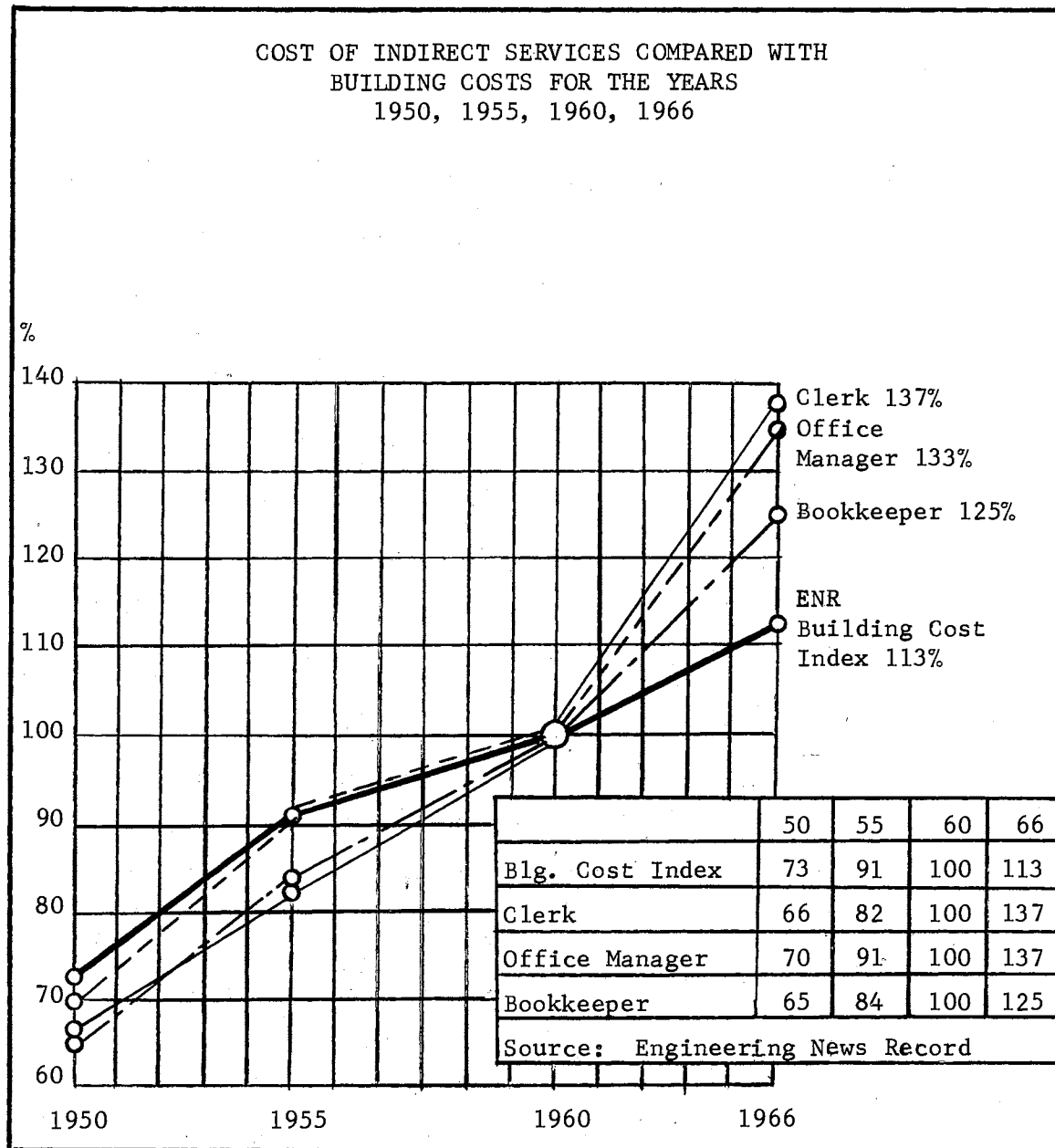
COST AND INCOME TRENDS IN ARCHITECTURAL PRACTICE FOR THE YEARS
1950, 1955, 1960, 1966

Direct architectural costs, outside consulting costs, indirect expenses and pre-tax income as percentages of gross receipts



Source: Case and Company, Inc., The Economics of Architectural Practice (Library of Congress, 68-19047, 1968), p. 49.

Figure 3. Cost and Income Trends in Architectural Practice



Source: Case and Company, Inc., The Economics of Architectural Practice (Library of Congress, 68-19047, 1968), p. 54.

Figure 4. Cost of Indirect Services Compared with Building Costs

which a number of dollar estimates can be inserted in such a way that their total influence on potential future profits is clearly revealed.¹⁷

Profit planning is accomplished by executing the following pattern of logical steps.¹⁸

1. Select a minimum acceptable personal compensation amount for each principal for the coming year.
2. Agree on the best plan for the division of principals' time between direct client services and for business administration.
3. Estimate the number of direct technical employees which the principals expect to keep occupied during the year and the full cost of their pay and employee benefits.
4. Forecast the probable expenditure for outside consulting services--engineering and special services. If the firm provides its own engineering or other specialized services, estimate the probable cost of the staff so engaged.
5. Estimate the probable amount of other unreimbursed direct costs which will be incurred for such items as specifications, renderings, models.
6. Review each element of indirect expense (overhead) for the past year, evaluate the needs of the coming year, and establish a budget amount for each item.
7. Choose a reasonable overall profit target for the firm.
8. Based on the preceding data, calculate the total annual volume of business (gross income) required to meet the goals established by the principals.

When these steps have been taken, it is then possible to develop a pro-forma income statement which is the profit plan for the coming year. This is not a difficult process, so one might ask why architects don't do it? There are no doubt several reasons, not the least of which is attitude.

The term "profit" has historically been one which architects have preferred to avoid. One successful architect stated:

When I left college I didn't know beans about business. I thought "profit" was something you squeezed out of helpless workers--something no honest man would think about. "Efficiency" meant speeded up assembly line. "Management" meant dividing time between filling in ledgers and being a prison guard.¹⁹

Civilization has long felt that the best way to alter attitudes is through education. It is submitted that these attitudes in architects are due to a lack of knowledge in the principles and skills of management. This lack of education and unserving attitudes has resulted in the following statistics compiled by Case and Company.

Of firms interviewed:

- 17% make no effort to schedule workloads.
- 20% maintain no job cost sheets.
- 23% make no effort to control costs.
- 36% get financial reports only once or twice a year.

And everyone who does utilize these concepts admits freely that they are not doing these things as well as they know they should.²⁰

The primary motivation for using the proper profit planning and management techniques must come from within each architect. But basic education can facilitate this motivation by decreasing fear of, and increasing respect for, good management.

Architecture by Team

It's been touched on previously that architectural projects are growing in size and complexity. This growth has resulted in the fact that today's architecture is no longer the work of one man. The work of the "great architect" or Prima Donna has given way to the work of the "Team". As Bill Caudill said, "From now on the great architect will be on the great interdisciplinary teams."²¹

The word "interdisciplinary" in the above quote carries the greatest import when defining the "team concept" approach to architecture. This team is not simply a collection of architects and draftsmen or of architects and engineers. This team goes much further to include sociologists, psychologists, urban planners, financiers, landscape architects, lawyers, etc. It goes on to include any and all specialists that may be required on any particular project.

The advantages and attributes of the team approach are relatively obvious. Bill Caudill probably stated it best in his book when he said,

An interdisciplinary approach, involving people concerned with a wide range of specialties, results in more efficacious planning and smoother progress.²²

The problems that may arise in the team approach are more subtle, but must be understood in order to avoid devastating hardships. Anytime you put a group of people together in a situation where they must solve a problem or reach a common goal, there may be conflicts such as:

Personality conflicts
Leadership difficulties
Usurpation of authority
Disparity of opinions as to goals
Lack of communication
In-fighting

These conflicts can reduce the team concept to one of "design by committee." This is a disastrous result. How can this be prevented?

First of all there is a need for good leadership. This leadership is not to be provided by one man. This would go against the team concept and provide too much authority to one man. Caudill Rowlett Scott developed what they call the "Troika". This is a three man leadership group. The leadership group is composed of three different functions: design, management, and technology. As a project progresses through its various stages the primary leadership may change within the

leadership group as the conditions require. This provides for dynamic and optimizing leadership, provided the members of the "Troika" are all pulling in the same direction.

The "Troika" can minimize team conflicts by carefully selecting the team members to fit the task. If an interaction group is to be stable and effective, there is probably no more important requirement than that its members have favorable attitudes toward one another. This does not mean that members must like each other. In groups that are primarily task-oriented, respect of its members for one another as working associates is usually a more significant form of favorable attitude.²³

This respect for associates must begin in the leadership group. The leadership group must carefully control or eliminate, if possible, the status differentiation between members of the team. Marked status differentiation within a group tends to inhibit contributions on the part of the lower-status members.²⁴ It must be obvious that the ideas and contributions of all team members are important and considered.

Enough has been said about the structure and function of the team concept to proceed with a more precise look at the management oriented architect and his role in the team.

Every task needs management. The larger the task, the more need there is for a specialist in management. In the architectural team this specialist is found in the role of the project manager, who is a member of the leadership group. Some of the duties of the project manager were listed on page 14, so it's not necessary to repeat them here. But essentially his function is to bring people and things

together at the right time and in the right place with the right amount of money to accomplish a given task or reach a common goal.

However, when we speak of the manager as a specialist we must not lose sight of his role as a generalist. Bill Caudill explains this interaction quite well. "Specialization must grow from a broad, multidisciplinary base."²⁵

It's like stacking tin cans. The higher the degree of specialization, the broader the base of generalization need be.

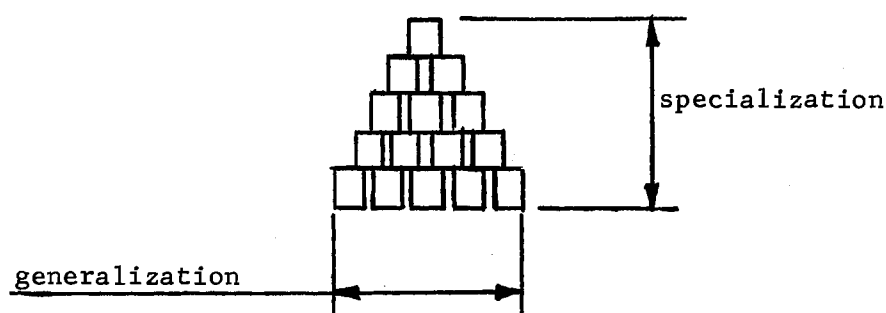


Figure 5. Specialization vs. Generalization

Each person has a different "qualification profile."⁶ That is; each architect, through his broad education as a generalist, is able to find the area of specialization for which he is most suited. These areas of specialization on the architectural team are many and varied. The area of management is only one. But at the present time it is one area which is not touched on in the general part of architectural education. Nor is it offered as a specialization in graduate studies.

The people who fill the roles of management on the "team" are those who learned the skills and principles necessary, on their own, during their professional career. It's believed that they could have been better managers sooner had they had the opportunity to discover

their management aptitude or "qualification profile" during their general education in college, just as they were exposed to structures, design and environmental control. And just as others have specialized in these other options, so they could have specialized in management.

Construction Management

An area in which architects are becoming increasingly interested is that of Construction Management. However, they are facing difficulties in making inroads into this area because of the competition provided by people in the field of construction and civil engineering. What skills does the architect need to meet this competition? This would be best explained by showing what is needed in the professional approach to Construction Management.

The most simplistic definition of Construction Management, which is usually used is that it ". . . is a refining method of contracting the time lapse from project start to completion."²⁷ As stated this is a single definition, incomplete at best. Granted, this time lapse collapsing is the most obvious role. And it is predicted on the basis of profit. It is the condition of inflation which makes "Fast Tracking" so necessary for businesses to obtain a favorable return on their investment.

But there are two other reasons for implementing construction management. First the ever-larger works of man are being commissioned by "hydra-headed" groups of individuals who spend the money of other groups to improve the interests of still other groups. This quagmire of checks and balances and responsibilities seems able to be sorted out only through the use of professional management.

Secondly, these ever-larger works of man are requiring the large interdisciplinary teams which were discussed under the section "Architecture by Team". These teams need the ". . . image of professional management as an instrument of team accomplishment."²⁸

Construction Management actually consists of three basic areas of the management function.²⁹

1. Project Administration
2. Consultation During Design
3. Post Bid Management

Project administration refers to one man. He is the administrator. He is the voice of the client. He must reflect the needs and requirements which the project must embody.

The other two areas under Construction Management refer to the firm or team capable of early and professional application of resources of general construction cost and method knowledge as it affects the design stipulations of the architect.

The duties of the construction manager, who is the head of this Construction Management team, are many and varied, but here are a few.³⁰

1. Manage the general coordination and scheduling of the work.
2. Maintain his own supervisory and inspection staff at the job site as well as conducting factory inspections as required.
3. Update and keep current the CPM or other computerized overall control and be sure that all parties with the need to know are informed.
4. Review and process all applications for progress payments.
5. Set up on-site lines of authority and communication to be sure progress of the work of all contractors is unimpeded and the intent of the architects and engineers is accurately fulfilled.
6. Establish procedures for coordination among the administrator, architects, engineers, separate contractors and the construction management organization.

7. Conduct such conferences among successful bidders as may be necessary to maintain schedule and clarify any matters in dispute.

As can be seen from the duties of the construction manager, "Fast Tracking", or the handling of the CPM, is only a small part of his management responsibilities.

Synthesizing all phases of construction management into a successful and profitable operation will require a balance between the art and the science of management that is rare among graduates in either engineering, architecture, or business, except where special efforts are made to educate and train broadly rather than for one field.³¹

Engineers tend to overemphasize science and technology and architects overemphasize appearance and use, while both neglect the art that involves all of the complex human business relations; those educated in business are lacking the reciprocal factors. It is easier for the engineer or architect to correct their deficiency than for the business graduate to acquire cumulative and quantitative training. The business graduate also lacks the prerequisites in studies and sometimes the aptitude to grasp the engineering or architectural sciences. Those who combine something of all these different educations or who are willing to cooperate with others make the best construction manager.³²

Summary of Needs

The facts and statistics in this chapter were used to point up the deficiencies existing within the management expertise of the architectural profession. These deficiencies must be filled with architects that are specialists and architects who are generalists.

This is to say we need architects that are extensively trained in particular areas of business and management in order to provide the necessary skills to alleviate technical problems. Also we need architects with broad knowledge in business so that their attitudes are conducive to the work of the specialist and the consultant and inspire confidence from the business oriented client.

A brief summary of areas in which the architectural profession needs education and direction follows:

- Feasibility Studies
 - Economic Requirements
 - Legal Considerations
- Financial Analysis
- Market Availability
- Budgeting
- Design and Construction Scheduling
- Real Estate and Land Assembly
- Job Cost Accounting
- Profit Planning
 - Compensation Method
 - Cost of Services
 - Cost Management
 - Efficiency
- Human Relations Management

FOOTNOTES

¹Dudley Hunt, Jr., AIA, Comprehensive Architectural Services (New York, 1965), p. 2.

²Ibid., p. 5.

³Ibid., p. 7.

⁴Ibid., p. 47.

⁵David R. Dibner, AIA, Joint Ventures for Architects and Engineers (New York, 1972), p. 8.

⁶Ibid., p. 62.

⁷Ibid., pp. 91-104.

⁸Ibid., pp. 105-120.

⁹William Wayne Caudill, Architecture by Team (New York, 1971), p. 117.

¹⁰Ibid., p. 126.

¹¹Henry Charles Burge, AIA, Architectonics: Accenting Multiple Contracts (Library of Congress, 61-18704, 1962), p. 54.

¹²Ibid., p. 22.

¹³Case and Company, Inc., The Economics of Architectural Practice (Library of Congress, 68-19074, 1968), p. 3.

¹⁴Ibid., p. 5.

¹⁵Ibid., p. 30.

¹⁶Guideline Publications, Architectural Management (Berkeley, California, 1969), pp. 14-17.

¹⁷Case and Company, Inc., Profit Planning in Architectural Practice (Washington, D.C., June, 1968), p. 5.

¹⁸Ibid., pp. 10-24.

¹⁹Guideline Publications, Architectural Management (Berkeley, California, 1969), p. 19.

²⁰Case and Company, Inc., The Economics of Architectural Practice (Library of Congress, 68-19074, 1968), p. 63.

²¹William Wayne Caudill, Architecture by Team (New York, 1971), p. 31.

²²Ibid., p. 73.

²³Theodore M. Newcomb, Social Psychology (New York, 1965), p. 124.

²⁴Ibid., p. 131.

²⁵William Wayne Caudill, Architecture by Team (New York, 1971), p. 234.

²⁶Ibid., p. 235.

²⁷William B. Foxhall, Professional Construction Management and Project Administration (Library of Congress, 71-165514, 1971), p. 3.

²⁸Ibid., p. 3.

²⁹Ibid., p. 9.

³⁰Ibid., p. 29.

³¹Harry Rubey, Construction and Professional Management (University of Oklahoma, 1966), p. 10.

³²Ibid.

CHAPTER III

EDUCATIONAL PHILOSOPHY AND PROGRAM REQUIREMENTS

Introduction

Historically architectural education has attempted to give the student a broad education in all areas necessary for developing the total physical environment. However, the definition of what constitutes the total physical environment has continued to expand and consequently the needs of this expansion continue to change. Needs are not static but are in a continual state of flux. They change with habits of living; with the changes in human values and living standards; with new technologies and the conditions created by them. They also vary with kinds of people; the environment in which they find themselves; and their activities. Standards, likewise, are a function of new knowledge and new building development, and they change with the changing needs of people.¹

Its a foregone conclusion that education must adapt itself to these changing needs. When architecture was considered primarily an art form, it was taught as an art form, with great emphasis on a student's ability to render an imaginative concept. After the second world war the tremendous advances in science and building technology forced architectural education to expand into the areas of engineering and mathematics to a greater degree. The 1960's brought the age of behavioral and environmental awareness and social consciousness. New

courses and direction were added in order to design not simply for the body of man, but for his mind and his sustenance as well.

The 1970's have brought the environmental crisis, the energy crisis, and the personality identity crisis all together in one lump. And weighing down this lump of crises is the economic crisis. The architectural profession has found itself wanting in the field of business and management in past years. It will no doubt find the economic situation of the present and future to be a hazard to attaining its professional goals.

Educational Philosophy

Higher education must help meet these needs in business and management on two levels.

1. General Education
2. Specific Education

General Education

This type of education must occur during the four undergraduate years leading to the bachelor of science (architectural studies) degree. These first four years must function as a sounding board for each student. During their completion the student should have the opportunity to identify his "Qualification Profile", whether it be structures, design, environmental control, urban planning, landscaping, etc., or management.

This identification of the students abilities is necessary if he or she plans to do graduate study. But even if the student does not wish to do graduate study or does not wish to do graduate study in

management, he or she needs a basic understanding of business and management philosophy.

The student who leaves school after receiving the B.S. degree may not use business principles in architecture as often as the licensed professional, but will no doubt find them just as applicable to his private life.

The students receiving the professional degree, regardless of their graduate study options, will find lower level management study useful, whether they work for someone or for themselves. Any professional who hopes to assume the positions of job captain or project manager will, by necessity, be dealing with the management of time, money and men. If the problems become too large he may hire a consultant, but even this does not preclude him from having to understand his consultants role and to communicate his needs to a management consultant.

Maybe the most important reason for undergraduate education in business and management is for the development of proper attitudes in the profession toward business and management, so that profit is not viewed as sinful; so that efficiency is not viewed as assembly lines; so that management is not viewed as a process of regimentation.

Before management skills can be implemented by the architect or his consultant, the proper attitude and perspective concerning goals to be reached must be present. This attitude must be expressable to the client. The business or corporate clients of today expect their architect, not only to speak the language of business, but to have a proper attitude toward the "necessities" of business.

Good design can be good business. It is up to the architect to prove this. We assume the architect learns in college what constitutes

good design. But how many know what are the ingredients of good business. Without competency in both areas he will find it difficult to reconcile the two.

Specific Education

This type of education concerns graduate study in the field of construction and architectural management. It is a process of specialization through education. We are in the midst of the "age of specialization," whether it be in the repair of fuel pumps or the transplantation of hearts.

Although architectural education has been and will be broad, out of necessity, architecture is also a profession of specialists, such as designers, programmers, spec writers, production managers, etc. This specialization has traditionally occurred only after many years of practice. However, this specialization has been facilitated, and the time it takes shortened, by introducing options such as structures, design and environmental control. I don't see any reason to belabor the idea of specialization at this point since all of this study up to this point is in support of this contention.

The two years of graduate study in the present six year professional program should allow each student to develop his special talents or abilities. It has become accepted that even though a student is not a superb designer, he can still fill a role in the architectural profession. Two of these specialty roles are architectural management and construction management.

Education in these areas should be done through carefully studied and developed options. Even though there is an elective program

available under which this type of education can be taken, there needs to be more direction given to students. This is necessary so that students do not take unnecessary or superfluous courses. Also so that they can be advised as to course content and the attributes or deficiencies of various courses.

The "cafeteria curriculum" which most universities practice today has both its advantages and problems. The advantage is that students may choose from a university of courses to meet their individual needs. The problem arises in the fact that students cannot always distinguish between their "needs" and their "wants". This makes it necessary to have a faculty which can provide excellent counseling and advisory services. This counseling takes a great amount of time on the part of the professors.

Excellent counseling from learned educators cannot be replaced. There will always be individual student problems that require the help and advice of professors. But some of this load can be reduced by providing well planned options such as those currently found in structures, design and environmental control.

The remainder of this study is devoted to establishing just such options in the areas of architectural management and construction management.

Program Requirements

A few major universities have recognized the need for architectural and construction management education and have implemented, various types of programs to meet these needs. Most of the programs have relegated options and course work in business and management to

non-professional degrees. Examples of this can be seen at Virginia Polytechnic Institute and California Polytechnic State Institute. And the professional program in architecture remains basically as it was. This will not meet the demands of the profession.

Architectural education must incorporate business and management within the confines of the professional program leading to a license to practice architecture. The primary reason for this is that it is the professional who usually assumes the management role in the architectural office. This is due in some cases to an unfortunate flaw in human nature. Bill Caudill touched on this in his book, "Architecture by Team". He described the situation where a person, who is eminently qualified in management, but not having a professional or architectural degree and license, was viewed by his working partners as a "second class citizen".

This is because the "professionals" do not understand or respect his abilities or ideas. And then the manager is less able to perform his function. This is another reason to educate architects in management.

Although a couple of universities have been mentioned above, there is no intention to review or analyze many other architectural programs in order to pick and select from them to develop a management option for Oklahoma State University. This would be wrong and is simply unnecessary. Each architectural department and universities has its individual characteristics. These characteristics include strengths and weaknesses of facilities, faculty, and other colleges within the university from which architecture can draw support.

The intent is to work within the current framework of degrees and the option system used by the OSU School of Architecture. This is an adequate structure which emphasizes graduate study leading to a professional degree. Also all courses added will not be new courses, but will be ones currently taught within various colleges of the university.

In five to ten years a great deal of revamping of the programs will have to be done, and many new courses will have to be developed to meet the changing needs. Changes such as developing a completely new construction management program as a separate school of engineering. Also, when the time is right for its acceptance, a non-professional degree in architectural management will be offered. But more will be said about this later.

But for the present and the immediate future its best to modify the existing programs with existing courses.

FOOTNOTES

¹ Benjamin Handler, Systems Approach to Architecture (New York, 1970), p. 128.

CHAPTER IV

COURSE AND CURRICULUM REVIEW

(B.S. Arch. Studies)

First Year

First Semester

This semester was left as it appears on the 7/1/73 flow chart published by the School of Architecture, Oklahoma State University.

Second Semester

This semester has been altered by moving Political Science 2013 into the sophomore year, and moving Arch. 2002 and Arch. 2012 down into the freshman year. This increased the number of credit hours in the second semester, first year from 15 to 16, and decreased first semester, second year from 16 to 15.

A student who comes to college to major in architecture should be exposed to architecture as soon as possible. There are many decisions students must make, such as: whether to remain in architecture; which option to follow; whether to pursue architecture or architectural engineering; or whether to remain in the college of engineering at all. By putting off exposure to his major interest, you are helping to delay these decisions.

Also by being exposed to his major interest, the student will feel more involved in the program and be less likely to drop out due to a lack of interest in school or in the architectural program.

There is a vast amount of basic and background coursework that must be taken. But at the same time this basic curriculum must be tempered with enlightening courses in the students major interest area.

Architecture 2002 and Architecture 2012 provide an introduction into the concept and philosophy of architecture and the basic skills of visual communication. These will provide some criteria to students for making educational decisions at the end of their first year rather than at the middle or last of their second year.

Second Year

First Semester

In this semester Economics 2123 was inserted in the space vacated by moving Architecture 2002 and Architecture 2012 to first year. Requiring a basic economics course for students is one more effort to acquaint the student with the workings of the world in which he will hope to practice.

Economics 2123 is a basic theory course concerned with the national economy. Items which make it function and the philosophy behind it. Some areas covered are supply, demand and gross national product.

The other change during the first semester, second year, was the deletion of Calculus II; Math. 2365. In its place has been substituted Statistics 4033. The idea of requiring the second Calculus for those students other than the ones in architectural engineering has been the subject of many discussions. Based on experience and after many

discussions with students and practitioners, it is believed that the second Calculus is of no particular value to the architect. It would prove more beneficial to everyone to require Statistics 4033.

A statistics course would be of more value to those persons wishing to pursue the architectural management or construction management options, since statistics are used to some degree in most business and management courses. It is also a prerequisite for many of these courses.

Since this is the engineering statistics, if the design major subsequently decides to go into architectural engineering, this course can be used as the math elective required in the graduate structures option.

This course contains the following material.

1. Sets and Probability
2. Random Variables
3. Discrete Probability Distributions
4. Estimation Theory
5. Linear Regression
6. Polynomial Regression
7. Variance
8. Factorial Experiments

Second Semester

The only change in this semester is the elimination of one elective, and the additional requirement of basic business law. This particular course covers in-depth the areas of contracts, agency, tort and fraud. These are the basic rules of our society which affect everyone regardless of profession. It's a necessary course for everyone who plans to engage in the general functions of living and working.

Architects will find this course useful from several standpoints. People contract with architects for their professional services.

Services which by law are to be of the highest competency. The higher the degree of competency required, the greater the liability demanded for failure in this performance. The architect should understand his duty to this performance and also his rights and means of recourse under any contract for his services.

Also architects spend a great deal of time acting as agents of the building owner. He must understand this relationship and his rights and duties under it, because the architect can get into trouble if he acts or makes decisions which are beyond the scope of this agency.

Third Year

First Semester

No change.

Second Semester

The only change in this semester is to delete the elective and to include those three credit hours in construction documents, making it a five hour course rather than two. This course has been a disappointment to many students and practicing architects for many years.

Students realize that after graduation their first few years will be in the production of working drawings. Students I have spoken to feel they have not been given, in this two hour course, an education which would prepare them to be useful in office production after graduation.

Architects are very reluctant in hiring fresh graduates without office experience because they are aware of this inability of students

to make money for them in production. And architects are aware of the lack of education in the area of construction documents.

This is not to say that this course is to make a student an expert in door and window details. It should be a broad educational experience, ranging from construction procedures to selecting finishes.

The first of the course should contain a sequence similar to that described below. The majority of the items below can be covered in lecture form with appropriate handouts.

Construction Sequence	}	Oriented toward CPM development in future course work
Concrete		
Steel		
Timber		

Reference and Source Material

Preliminary Construction Document Planning

Mock Sheets
List of Required Drawings
Sequence

Title Block Content and Design

Lettering

Principles of Reading a Survey

Reproduction Techniques

Drawing Types--Format and Content

Topography and Test Borings
Floor Plans
Elevations
Building Sections
Wall Sections
Details
 Building
 Door
 Window
 Flashing
Millwork
Reflected Ceiling
Foundation Plans
Floor and Roof Framing
Schedules

When dealing with the actual drawing exercises, it is felt that this has not been handled properly in the past. To have the student detail one of his past design projects is not a broad enough exposure to the problems that will confront him in practice. The drawing should consist of several exercises in each of the above drawing types, each covering a different type of construction.

For instance:

Wall Sections:
 Frame Wall
 Masonry
 Pre-cast Concrete
 Panel
 Tilt-up

Flashing:
 Gravel Stop
 Scupper
 Expansion Joint

At the end of the course the students will have been exposed to many different types of construction methods and product usage. And the students will have their own handbook of standard details. But most important they will have been exposed to the various reference materials and the procedures and techniques of finding answers to detailing problems.

Fourth Year

First Semester

The primary change this semester is the deletion of Architecture 4012 which is a seminar. It is felt that the undergraduate years are not the place for a seminar. In its place is substituted Architecture 5613. This is the third semester of structures, which is currently in the first semester of graduate school. However, this is not a graduate

structures course, but simply a basic course in concrete which should be covered in undergraduate studies.

No other changes are suggested for this semester but a comment on Industrial Engineering 4153 would be in order. This is a good course and should be retained. The title of the book being used is, "Quantitative Approaches to Management", which is fairly explanatory in itself. It is a course which gives a basic understanding of the methods by which, and criteria on which, management decisions are made.

The course beings by explaining the concepts and criteria on which decisions are made. This criteria is both economic, and mathematic. Some examples follow.

- Cost
- Volume
- Profit Analysis
- Probability and Statistics
- Expected Profit
- Marginal Analysis
- Utility
- Discounts

Finally, this course deals with operational modes of decision making, which are the actual methods of analyzing the above criteria in order to make a logical management decision. Some areas covered are:

- Markov Process
- Queuing Problems
- Matrix
- Gaming
- Network Models (PERT)

This is not a hard course nor an in-depth course. But rather it gives the student a broad overlook of what is involved in making a competent management decision.

Second Semester

The primary change this semester, as with first semester, is the deletion of Architecture 4022 which is the second undergraduate seminar. It is felt that the undergraduate years are not the place for a seminar. In its place is substituted Architecture 5623. This is the fourth semester of structures, which is currently in the second semester of graduate school. However, this is not a graduate structures course, but simply a basic course in timber which should be covered in undergraduate studies.

Although no other changes are suggested for this semester, it is felt that Architecture 4903 deserves some comment. It is titled, "Theory of Building Contracting". The title and content of this course should be tightened up to cover two areas.

This course should be broken into two parts: specifications and estimating. Specifications should be taught during the first half of the semester, and then estimating during the last half. Specifications must be taught first, since most estimating is based on what is required of the contractor in the way of: Performance Bond, Bid Bond, Temporary Utilities, Field Office, Performance Standards, Insurance, Time for Completion, Contract Type, Pumping and Bailing, Quality of Materials, etc.

Although specifications writing is best learned by "doing", as with estimating, there are many principles and procedures which must be taught through lecture, handout and example.

A specifications course should include:

- Definition and Function of Specifications
- Background and Requirements of a Specifications Writer
- Proper Words and Phraseology

Invitation to Bid
Instructions to Bidders
Proposal Form
Contract Types and Form
General Conditions
Supplementary Conditions
General Requirements

As much time as possible should be devoted to the actual writing of sections of example specifications. This course is not to make a student knowledgeable in specifications, but rather to show him how to learn specifications, and possibly stimulate an interest in specification writing.

The second half of this course will be concerned with estimating in primarily two categories.

1. An introduction into basic critical path programming with emphasis on construction procedure.
2. Actual estimating on various segments of different types of construction projects.

The actual estimating part must be emphasized because only by doing estimating, and lots of it, can you develop the feel, the precision, and the methodical procedure required for good estimating.

CHAPTER V

ARCHITECTURAL MANAGEMENT OPTION

Required Course Review

This option follows the same basic format as the existing options. It follows the same required courses and adds specialty courses in areas of allowable variance.

Besides the general business and management courses required for the management option, there are also suggested electives for specialization in two areas.

1. Office Management
2. Construction Management

The required option courses in this program deal with those areas of business and management found within the architectural office. Areas such as financial planning and economic and investment decisions. Also they cover the management of personnel and the motivation and human behavior in the work environment.

In this chapter are course reviews of the courses required for the management option.

Accounting 3103

Prerequisites: Junior Standing

The text used in this course is entitled, "Accounting Principles and Control". This text is designed for a first course in accounting.

The emphasis is on basic principles and concepts and on the uses of accounting information in making management decisions. Special attention is given to the needs of management in terms of day-to-day control of the enterprise and to those decisions involved in setting long-range goals, commitments, and policies. This is not a "busy-work" course of filling out ledgers, but rather it is aimed at understanding and using the information contained in those ledgers.

The text is divided into seven parts. Part I covers the basic principles of accounting and the balance sheet, the income statement, data processing and recognition of revenue and expense. Part II covers areas of accounting and control of cash and financial reporting. Part III is entitled "Asset Valuation and Income Measurement". This includes inventory, plant and depreciation, leases and intangibles. Part IV covers partnerships and corporations. This includes their formation, expansion and liquidation. Also the financial and managerial problems associated with each. Part V deals with financial analysis and statements of financial conditions. Part VI is possibly the most important, in that it deals with cost information for managerial control and decisions. Part VII contains further consideration and problems in contemporary accounting theory.

This course is a must for anyone who wants to pursue courses in business and management. This course provides the base on which all other courses must rest.

Finance 3113

Prerequisite: Accounting 3103

This is a basic finance course dealing with the analysis of operational and strategic financial problems, such as allocation of funds and asset management.

This course deals with the basic terms and methods of understanding money management. Items are covered such as cash budgeting, the present value of money, discount rates of firms, and the cash cycle which firms must take into account in order to plan their yearly production.

One of the most important items covered in this course is the concept of a rate of return. This includes the rate of return on investments such as immediate ones or those accomplished on the installment plan, or over a long period of time. Some of the other areas covered are listed below.

- How much in liquid assets should be held by a firm.
- Long-term and Short-term Assets
- Depreciation
- Uses of Sources and Funds
- Pro-forma Statements
- Mergers and Spinoffs
- Amortization
- Cost of Capital

This is a must course in order to begin to understand the workings of business. And this course begins to give the manager the tools and concepts necessary to making valid business decisions.

Finance 4333

Prerequisites: Finance 3113

The text for this course is entitled, "Essentials of Managerial Finance". It is the intent of this text and the course to define

exactly what managerial finance is, and the relationship of managerial finance to the other functions in the world of business. This course demonstrates how the financial decisions of management affect the basic goal of maximizing the wealth of the stockholder. Another objective of this course is to illustrate the effect of financial decisions on society at large and the relation between these decisions and economic efficiency.

In the latest edition of this text a new area of coverage has been added. Throughout the text the principles of risk analysis are recognized as an important by-product of financial decision making.

The text is divided into seven parts. The first is an introduction into the scope and nature of managerial finance. The second part deals with the tax environment, both from corporate and personal standpoints. The third part is concerned with financial analysis, planning and control. Sub-headings in this part include analysis by using financial ratios, profit planning and methods of budgeting. The fourth part is asset management through the use of short-term financing. The fifth part is long-term assets. This part covers interest, the market, common stock, loans, stock warrants and convertibles. Part six is entitled, "Financial Structure and Cost of Capital". This part includes definition and use of leverage and valuation. And it discusses the rate of return on investments. Part seven is managerial finance concepts which includes the timing of financial policy, mergers and holding companies and business failure and liquidation.

This is a good course dealing with basic finance and how management decisions are based on financial criteria.

Management 3013

Prerequisite: Basic Accounting, Basic Economics

This course is aimed at giving the student an understanding of the basis of managerial decision making, and how these decisions can be reached through set procedures. This is done by integrating (1) scientific knowledge from behavioral sciences about organizational behavior, and (2) the newer quantitative approaches to decision making.

A great deal of time is spent in studying the concepts and the research findings of the behavioral sciences, as can be seen from the following chapter titles.

Motivation and Behavior
The Leadership Process
Group Behavior
Human Factors and Organizational Change

After an understanding of human performance is attained, this course begins dealing with the procedures of decision making. These decision processes are covered in five basic decision categories.

1. Planning Process
2. Control Process
3. Analysis of Firm
4. Acquisition of Resources
5. Allocation of Resources

No other management course is necessary prior to taking this one. Although not prerequisites, any course work in sociology or statistics would be helpful.

Management 4113

Prerequisite: Management 3013

This is a personnel management course dealing with the relation between the individual and the organization. This course is divided into basically three sections.

1. Introduction
2. Personnel Management Functions
3. Personnel Operative Functions

The Introduction section defines personnel management and the principles on which it is based. It covers the behavioral and social sciences and their approach or affects on personnel management. It also discusses the future of personnel management.

Part two deals with planning, organizing, controlling and giving direction to personnel policies and programs. This includes different types of organizational structures and the relationships and responsibilities within these structures. It also covers personnel control points and different types of motivation.

The third part deals with specific techniques used in actual management functions. These fall into five categories.

1. Procurement
 - Manpower Requirements
 - Hiring
 - Tests and Interviews
 - Executive Manpower Planning
2. Development
 - Training Personnel
 - Executive Development
 - Advancement
 - Performance Appraisal
3. Compensation
 - Base Compensation
 - Incentive Compensation
 - Supplementary Compensation
4. Integration
 - The Nature of Man
 - Man in Business
 - Communication
 - Human Relations
 - Collective Bargaining
5. Maintenance
 - Safety and Health
 - Employee Service Programs
 - Personnel Research

CHAPTER VI

MANAGEMENT OPTION ELECTIVES

Elective Course Review

In this chapter are reviews of those elective courses suggested for specializing in office management or construction management.

Business Law 3323

Prerequisite: Business Law 3213

This is the second course in business law and deals with personal property and commercial law.

The first area covered is that of bailments. This includes the rights, duties and responsibilities that are attached to the transfer of goods from one person to another without the transfer of title to the goods. Such as giving goods or property to a warehouse for storage or to a carrier, such as a delivery or express company, for transport.

The next area covered is that of sales and sales contracts. This includes definitions, title and ownership, acceptance of goods and rejection of goods.

One of the more important areas covered is that of secured transaction. This is the use of chattel or collateral to obtain loans.

The next area covered is that of commercial paper--form and content. This is checks, drafts, promissory notes and certificates of deposit. This section describes the difference between negotiable and

non-negotiable instruments. Additional material in this area includes, "Transfer and Negotiation", "Liability of Parties", and "Bank Deposits and Collections."

This is a good course which will help anyone who hopes to transact any type of business.

Accounting 5103

Prerequisites: Graduate Standing, Accounting 3103

The title of this course is, "Managerial Accounting". It is basically a study of the interpretation of accounting data in planning, controlling and decision-making. The objectives of the text in this course is to provide an understanding of various theories and concepts, thereby forming a general frame of reference which will enable the student to better understand the vast number of books and articles on the many controversial topics in the area of accounting theory. The text critically evaluates many of these controversial topics.

The first four chapters present the general background for the development of accounting theory. The next six chapters present the basic framework of accounting theory relating to income determination, cash and funds flows, and the basic problems of asset measurement and classification. The next six chapters discuss the applications of accounting theory to the reporting problems of specific asset and liability groups, particularly those problems relating to the measurement of assets and liabilities and the related problems of income determination. The last three chapters cover the basic problems regarding ownership equities and the disclosure of relevant information

to investors, creditors and other interested readers of financial statements.

The text currently used in this course is, "Accounting Theory", by Eldon S. Hendriksen.

Industrial Engineering 5862

Prerequisites: Statistics 4033

This course is entitled, "Project Management with CPM and PERT". It begins by describing critical paths networks and the concepts leading to their development. This includes procedures, uses and advantages.

Next the course describes how the network is developed. This includes areas such as basic terms and rules, the logic involved, and the more common mistakes made in critical path methodology.

The third area of concern is time estimation. Methods of estimation are discussed and how these activities are arranged to produce a condensation of the network.

Next the basic computations required in scheduling are covered along with special symbols, definitions and procedures.

After the basics of CPM are understood, it is used in specific areas of concern. These areas can be seen in the remaining chapter titles listed below.

- Using Computers and Critical Path Program
- Other Networking Schemes
- Computer Programming of Basic Scheduling Computations
- Scheduling Activities to Satisfy Resource Constraints
- Time-Cost Trade-Off Procedures
- Network Cost Control
- The PERT Statistical Approach
- Summary on Practical Applications

Chapter 12 covers areas such as:

- Preparing Project Proposals

Contractual Requirements
Project Control
Multi-Project Scheduling

Finance 4223

Prerequisites: Accounting 3103

This course is entitled, "Investment Principles and Policies". This is an excellent course, broad in scope, covering everything from savings accounts to stock warrants and convertible bonds. This course will not only be valuable in the business world, but it will possibly be even more important from a personal standpoint. Since a great many people will want to indulge in the stock market at some point in their lives, they will need to know the language and the workings of the brokerage business. This course will teach that. Also everyone will buy life insurance. Life insurance is covered in this course as a basic investment everyone should have before other investments are considered. The types of insurance are covered and methods by which the return on the premiums can be evaluated.

As stated, this course covers many more areas than stocks and insurance. Listed below are some of the section headings.

- The Brokerage Business
- The Securities Market
- Corporate Bonds and Preferred Stock
- Bonds and Stock Evaluations
- Common Stock Investments
- Put and Call Options and Stock Warrants
- Market Analysis
- Investment Planning
- Portfolio Analysis

One of the most important advantages of this course is the chance to do a complete investment analysis of a large corporation. The book is well written in simple English and is fully comprehensible.

General Administration 4433

Prerequisite: One Economics course

This is an excellent course for anyone who hopes to get into the upper echelons of management or who wishes to operate his own firm. This course deals with business risk. It deals with it in two respects: (1) indentifying risk, (2) and how to control risk. These two categories are not complicated or difficult to understand but they are extremely broad and varied and cover items of our business world that the ordinary person never thinks about.

This is especially useful to a person who wishes to get into construction management. The additional responsibilities accepted by the full service construction manager bring with them additional business risks and liabilities. And these risks must be identified before they can be transferred, assumed or avoided.

This course deals primarily with insurance since this is one of the main methods of transferring risk. However, it is not the only way, and in some instances, it is not the best way. And before any insurance is bought all the risks that this insurance is to cover must be analyzed so that the proper insurance is purchased. This course deals not only with methods and items of analysis but also methods of measuring the loss or loss potential.

This course has a good section on liability. This covers areas such as: Torts, Negligence, Bailments, Workmen's Compensation, Employee Benefits, and Professional Liability.

As was stated earlier, a great deal of time is spent on insurance; its types and applicability. The largest section on insurance is divided into six parts.

1. The Fields of Insurance
2. The Insurance Policy
3. Insurance Covers
4. Insurance Coverage
5. The Insurance Market: Services Available
6. The Insurance Market: Pricing and Costs

Business Law 4523 (Real Estate Law)

Prerequisite: Business Law 3213

This is a very comprehensive course in real estate law, management and practice. Successful completion qualifies persons to sit for Broker's and Salesman's State Licensing examination.

As discussed in Chapter II, an architect who wishes to provide the fullest and most comprehensive services must know enough about the business of real estate to advise his client of his various options and requirements in acquiring property. This knowledge in real estate becomes even more important when viewed from the role of a construction manager or one who is in the management position where you are essentially the owners representative in the architect's office.

This course would have been included in the required graduate courses in the management option but for some administrative problems associated with it. Reasons being:

1. Only one professor teaches the course
(consequently)
2. Only one section is offered each semester
3. Graduating seniors have entrance priority over graduate students.
4. A student must sign up for the course several semesters in advance on a list kept in the registrars office.

Before this course can be required for architectural graduate students, these administrative problems will have to be cleared up. This

will more than likely require some consultation and cooperation between the architectural department and the business department.

This course covers these areas.

1. Real Property Law and Practice
2. Nature of Real Property
3. Land Descriptions
4. Title Information
5. Conveyancing
6. Listing and Sales Contracts
7. Loans and Mortgages
8. Brokers and Salesmen
9. Landlord-tenant Relations
10. Condominiums
11. Shopping Centers
12. Trust Estates
13. Estate Planning
14. Wills, Law of Descent and Distribution
15. Probate Administration
16. Gift and Estate Taxes
17. Fiduciary Management of Property

Civil Engineering 6763

Prerequisite: Graduate Standing

The text for this is an introduction to cost and optimization engineering, including engineering economy. This text covers three major categories: cost comparisons and profitability; optimization; and cost engineering. It covers these areas extensively and in depth. The following is an outline of chapter titles and the content of those chapters.

Depreciation and Taxes

- Straight Line Depreciation
- Sinking Fund Depreciation
- Declining Balance Depreciation
- Comparison of Methods

Profitability

- Investment Evaluation
- Payout Time
- Return on Original Investment
- Discounted Cash Flow
- Continuous Interest

Technological Advancement

Displacement vs. Replacement

Inflation

Cost Comparisons under Inflation

Probability--Uncertainty--Simulation

Distribution Functions

Continuous Frequency Distributions

Inventory Problems

Optimization

Analytical Method for Optimization

Graphical Method for Optimization

One Variable Optimization

Multivariable Optimization

CHAPTER VII

SUMMARY AND CONCLUSIONS

Summary

The purpose of this study is to identify the needs of the architectural profession from the standpoint of business and management. And then to propose changes or additions to the architectural education curriculum in order to better meet these needs. These needs were analyzed from four basic areas of architectural practice.

1. Comprehensive Services
2. Profit Oriented Management
3. Architecture by Team
4. Construction Management

Based on these needs, an academic proposal was made as a means of alleviating the problems facing the profession due to the lack of training in business and management. This proposal includes flow charts containing course deletions and changes; and new program developments. Also included are descriptions of and reasons for course changes, and recommendations for restructuring of course material. Finally, there are included course reviews of those courses required for the management option and those courses that may be used as electives.

Conclusions

It was concluded that there is a need for a broad basic education in business principles during the four undergraduate years leading to a Bachelor of Science degree. This is done formally by adding Business Law and Economics to the list of required courses. It was done informally by offering some suggestions for the restructuring of Architecture 3522, Construction Documents, and Architecture 4903, Theory of Building Contracting. It was felt that this introduction to economic theory and the legalities of business contracting is essential to any architectural student regardless of which of the existing or future options of graduate study he or she wishes to follow.

There also needs to be a vehicle through which those students who wish to do graduate study in the area of business and management can find direction. It was concluded that this be done in the form of an option of study similar to those already existing in the areas of design, structures and environmental control. This option follows the design option primarily with general business and management courses inserted in the areas allowed for variance between the options. Then concentration electives have been selected for additional specialization in the areas of Office Management and Construction Management.

The possibility of developing a separate option in construction management was investigated. However, it became obvious that there were not enough courses available in this area at the present time to put the option together. The best construction management courses are currently taught within the school of technology and therefore are not recognized for credit by the college of Engineering.

It was felt that the single management option with concentration electives in Construction Management is the proper direction to follow at this time.

Recommendations for Further Study

Currently the schools of Architecture, Technology and Civil Engineering are working together to develop a degree of Construction Management. Because of the scope and complexity of this field, this is the best way to approach it. It will take a great deal of cooperation, study and course development to attain a program which will meet the needs of these three schools and the professions they represent.

When study is done in this field it should encompass the possibility of a program which can be followed for a degree in technology or can be followed by architects or civil engineers as a graduate program leading to a professional degree acceptable for licensing.

The course work in this option should include the following topics. By no means is the list all inclusive.

- Design and Construction Scheduling (CPM)
- Methods of Communication
- Human Relations Management
- Job Cost Accounting
- Insurance
- Construction Law
- Construction Procedures
- Specifications
- Estimating

Another direction in which further study would be done, is to investigate the possibilities of a six year degree in architecture entitled, "Master of Architecture in Business Administration". This would be a non-licensing degree. Due to the current professional frame of mind, as discussed previously, this degree would not be acceptable

at the present. But eventually the architectural profession will accept the architectural manager as a "first class citizen" without him having to be a "licensed professional".

As the needs, problems and complexities of architecture continue to expand, the need for the person with these qualifications will also expand. Although the basis of this degree would lie in architecture (first four years), the two years of graduate study would be relegated solely to business and management with the exception of two seminar courses with other architectural students and some cooperative work with students in other options.

This cooperative work is extremely important. It could be handled in many ways but essentially it is the concept of the team project. The designer doing design. The structural student doing engineering. The environmental student developing comfort systems. And the architectural manager should be developing manhour forecasts and scheduling and monitoring these items; setting up lines of communications; controlling dissemination of technical information; developing contracts between consultants; consulting on economic requirements of project, and land values and availability; developing and coordinating promotional services such as real estate and land assembly, financing package, and public relations.

This is not a complete list of management roles but just a few which could be incorporated in a student project. This type of project would benefit all students on the team by allowing them to view the duties and responsibilities of other team members. And by allowing designers and engineers to become familiar with the architectural

manager in school, they will be more likely to accept him as a full fledged team member in real world practice.

This concept of team work between students in various options is simple in form but is not easy to implement or control. The few times this has been tried on a limited scale served to point up the major problem areas. These are:

1. Personality conflicts--Since students know each other so well there tends to be more emphasis on likes and dislikes rather than competence in an area of study.
2. Organization--Programs need to carefully set up in order to provide as much definition as to duties and responsibilities of team members as possible.

Since an architectural manager will be added to the team, some of the coordination and communication problems may be reduced. But this still remains to be seen.

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APPENDIX A

UNDERGRADUATE FLOW CHART

APPENDIX A

UNDERGRADUATE FLOW CHART

On the following page will be found a flow chart of courses in the four undergraduate years leading to a Bachelor of Science degree in Architectural Studies. The legend below refers to these undergraduate courses and the boxes drawn around them.



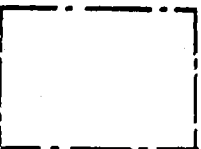
Existing course, to remain.



Existing course, to remain, but relocated in sequence.



Existing course, to remain, but material to be restructured.



New course added to curriculum.

1		2		3		4	
ENGR 1112 Intro. to Engineering	ARCH 2002 Intro. to Architecture	ARCH 2122 Basic Design	ARCH 3114 Design I	ARCH 3124 Design II	ARCH 4125 Design III	ARCH 4225 Design IV	
	ARCH 2012 Architectural Graphics I	STAT 4033 Engineering Statistics	ARCH 2022 Architectural Graphics II	ARCH 3014 Hist. & Theo. of Arch I	ARCH 3024 Hist. & Theo. of Arch II		
PHYS 1114 General Physics	PHYS 1214 General Physics	ENGSC 2113 Mech. /Rig. Bodies	ENGSC 2123 Mech. /Def. Bodies	ARCH 3613 Structures I	ARCH 3623 Structures II	ARCH 5613 Structures III	ARCH 5623 Structures IV
HIST 2483 American History	MATH 2265	ECON 2123 Intro. to Economic Ana.	BUSL 3213 Basic Business Law		ARCH 4713 Environmental Control I	ARCH 4723 Environmental Control II	
BASIC SCIENCE		POLSC 2013 American Government	ELECTIVE	ARCH 3513 Materials in Architecture	ARCH 3522 (5) Construction Documents	INDEN 4153 Operations Research	ARCH 4903 Specifications & Estimating
ENGL 1113 Freshman Composition	ENGL 1323 Freshman Composition	SOCIO-ELEC.	SOCIO-ELEC.	ELECTIVE	ELECTIVE	ELECTIVE	ELECTIVE
Total hours 16	15	15	16	16	16	16	16

B.S. ARCHITECTURAL STUDIES (ARCH)

APPENDIX B

MANAGEMENT OPTION FLOW CHART

APPENDIX B

MANAGEMENT OPTION FLOW CHART

On the following page will be found a flow chart of courses in the management option which can be selected for graduate study leading to the degree of Master of Architecture. The legend below refers to these graduate courses and the boxes drawn around them.



Existing course, to remain.



New course added to curriculum.

5		6		Required Architectural Courses
ARCH 5216 Advanced Design I	ARCH 5226 Advanced Design II	ARCH 6312 Professional Proj. Res.	ARCH 6326 Professional Project	
ARCH 5013 Urban Design I	ARCH 5023 Urban Design II	ARCH 6012 Professional Seminar I	ARCH 6022 Professional Seminar II	
ACCTG 3103 Survey of Acctg. Prin.	FIN 3113 Business Finance	FIN 4333 Financial Management		Required Business Courses
		MGMT 3013 Management	MGMT 4113 Personnel Management	
				Electives
BUSL 3323 Commercial Law	ACCTG 5103 Managerial Accounting	FIN 4223 Investment Principles	GENAD 4433 Risk Management	Suggested electives for Specialization in office Management
CIVEN 4763 Construction Estimating	GENAD 4433 Risk Management	INDEN 5862 Project Management	INDEN 5003 Engineering Econ. Anal.	
	BUSL 4523 Real Estate Law		CIVEN 6763 Construction Management	Suggested electives for Specialization in Con- struction Management

MANAGEMENT OPTION

VITA 2

Ronald Jay Reid

Candidate for the Degree of
Master of Architecture

Thesis: ARCHITECTURAL EDUCATION FOR MANAGEMENT

Major Field: Architecture

Biographical:

Personal Data: Born in Enid, Oklahoma, January 23, 1945, the son of Mr. and Mrs. William V. Reid.

Education: Graduated from Enid High School, Enid, Oklahoma, in May, 1963; attended Oklahoma State University from the fall of 1963 until the spring of 1966; received Bachelor of Architecture degree with a major in design from Oklahoma State University in May, 1973; completed requirements for the Master of Architecture degree at Oklahoma State University in May, 1974.

Professional Experience: Highway draftsman and surveyor, Taft & Williamson, Civil Engineers, Enid, Oklahoma, Summer 1965; Architectural draftsman, Day, Davies & Poe, Architects and Engineers, Enid, Oklahoma, April to September 1966; Draftsman and surveyor, J.B. Payne & Associates, Consulting Engineers, Enid, Oklahoma, October to November 1966; Architectural Draftsman, Benham Blair & Affiliates, Architects, Engineers and Consultants, Oklahoma City, Oklahoma, November 1966 to January 1970, Summer 1971, Summer 1972, Summer 1973; Graduate teaching assistant, School of Architecture, Oklahoma State University, August, 1973 to June, 1974.

Self-employment Experience: Edmond Veterinary Clinic, Edmond, Oklahoma, Construction completed March 1973; Consultant on Bid Estimate, for John Starkey Construction Company, Oklahoma City, Oklahoma, Fall 1973; Consultant on Specifications, for Keele Enterprises, Oklahoma City, Oklahoma, Fall 1973.