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ARCHITECTURAL DESIGN PROCESS MANAGEMENT

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ARCHITECTURAL DESIGN PROCESS MANAGEMENT

Abstract

Creating a new building can be seen as an unequivocal process which requires input from a variety of resources, using a range of abilities and skills to arrange and manage factors as well as resolving combative and quarrelsome issues. The performance of the design process in the building industry has a great influence on the success of subsequent processes in construction projects and also on the outcome of the quality of the final product. Despite its importance, relatively little significance has been given to the management of the design process. The research will dissect and analyze the process of building design and identify the building designer's relationship with other role players in the design and construction teams, the ideas are further developed into proposals which are capable of being built and which will satisfy the needs of the inhabitants. The research aim to bridge the gap between the advanced design process and the architectural business field, this research addresses the design implications of business decisions and vice versa, this subject is concerned with value: the value of design and its management. There was a need for management thinking and tools that supported and enhanced, rather than distracted from, the act of creating architecture. Efforts to combine managerial thinking and architectural management design coupled with design organizations eventually gave rise to the establishment of 'Architectural Management' as a new research domain.

Keywords

Architecture, Design, Management, Organization, Evaluation

ARCHITECTURAL DESIGN PROCESS MANAGEMENT

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ABSTRACT

Creating a new building can be seen as an unequivocal process which requires input from a variety of resources, using a range of abilities and skills to arrange and manage factors as well as resolving combative and quarrelsome issues. The performance of the design process in the building industry has a great influence on the success of subsequent processes in construction projects and also on the outcome of the quality of the final product. Despite its importance, relatively little significance has been given to the management of the design process. The research will dissect and analyze the process of building design and identify the building designer's relationship with other role players in the design and construction teams, the ideas are further developed into proposals which are capable of being built and which will satisfy the needs of the inhabitants. The research aim to bridge the gap between the advanced design process and the architectural business field, this research addresses the design implications of business decisions and vice versa, this subject is concerned with value: the value of design and its management. There was a need for management thinking and tools that supported and enhanced, rather than distracted from, the act of creating architecture. Efforts to combine managerial thinking and architectural management design coupled with design organizations eventually gave rise to the establishment of 'Architectural Management' as a new research domain.

KEYWORDS

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1. INTRODUCTION

The performance of the design process in the building industry has a great influence on the success of subsequent processes in construction projects and also on the outcome of the quality of the final product. Despite its importance, relatively little significance has been given to the management of the design process.

The research will dissect and analyze the process of building design and identify the building designer's relationship with other role players in the design and construction teams, the ideas are further developed into proposals which are capable of being built and which will satisfy the needs of the inhabitants.

2. THE ARCHITECTURAL DESIGN PROCESS FOR BUILDINGS

The research analyze the process of creation a new building. This analysis will be based on an investigation of the generators of design problems, their domain of concern and their function. From this study we should be able to assemble the building blocks which make up a model enabling us to understand the nature of design problems in all their variations.

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2.1 Design Process and Characteristics

Design is the creation of a plan or convention for the construction of an object or a system as in architectural blueprints, engineering drawings, business processes, circuit diagrams and sewing patterns.

The design is the use of scientific principles, technical information and imagination in the definition of a structure, or it can be defined as the translation of information in the form of requirements, constraints and experience into potential solutions, which are considered by the designer to meet required performance characteristics.

2.1.1 The Characteristics of Building Design Process

It's a process start from the Preliminary Design when the architects or engineers started to prepare drawings illustrating possible solutions till they end to the final and detailed design.

- Design is a form of art: Looking at a building should be a visual experience.
- Design is a realistic solution to a problem, the designer uses many methods simultaneously, directed towards solving the problem and arriving at an acceptable solution.

A designer has his own standards. He is a professional, a craftsman, and if he is good himself, he knows when he has done a good job. It must be all of a piece, have wholeness, clarity, it must not be too strong at one point and not too weak at another.

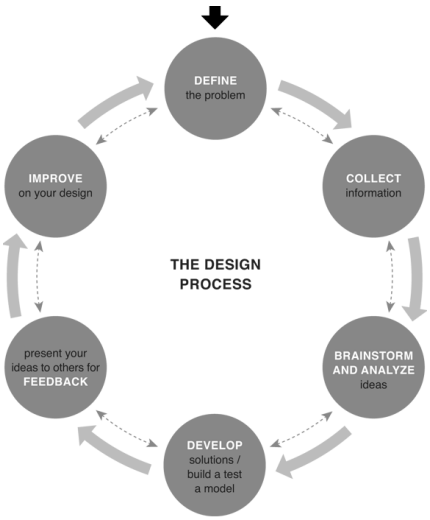

Fig. 1 The design process
Reference:www.discoverdesign.org/design/process

2.1.2 The Building Design Problem

The building design problems are difficult to specify in advance and the evaluation against many criteria is likely to lead the designer in unexpected directions and at any point in the process the designer is working within a set of constraints, internal and external, The research identify this problem on two levels, each level contains many factors.

a. Internal constraints

Internal constraints are the more obvious and easily understood in that they traditionally form the basis of the problem as most clients initially tend to express it, thus, for an architect the internal constraints frequently comprise the majority of the brief. The number and sizes of spaces of various kinds and qualities form the most obvious client-generated internal constraints.

b. External constraints

Sometimes external constraints virtually determine the whole form of design. What makes one bridge different from another are the site conditions, the span needed, and the position and quality of supporting ground, the external constraints come from many sources, but essentially fall into four categories:

- The client's needs.
- The technology.
- The construction process.
- Statutory control.

2.1.3 Strategies for Solving Problems in Design

It seems essential to the design process that the designer should propose one or more possible solutions to the problem at an early stage, even if this is only to obtain a clearer understanding of the client's needs, It is said that 'history is a good teacher' and everyone involved in creating new buildings would do well to study past successes and failures so that the same mistakes are not repeated.

Table 1. Four parts Stages example as an alternative for solving design problem Building design management. Routledge: Gray, C., & Hughes.

The four parts of the design process		
	The choice	The product
Interpretation	What is the shape of the problem?	A definition of the problem
Generation	What are the alternative solutions?	A range of alternative solutions
Comparison	What makes them different?	A set of comparisons and preferences
Choice	Where do we go from here?	A decision about policy and action

2.2 The Process of Building Design in Action

2.2.1 The Elements of Building Design

The elements of buildings are the same as the elements of any product; materials, processes, forms and appearance, As well as creating buildings to suit their physical needs, different cultures and successive generations created and continue to develop forms, styles and decorations reflecting additional values and concerns.

- Commodity: function and practicality.
- Firmness: construction and durability of materials.
- Delight: appearance and attractiveness.

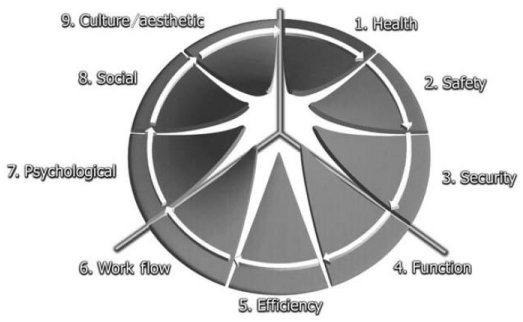

Fig. 2 Performance Criteria.
Reference: Jay Yocis, University of Cincinnati.

The elements of architecture can be grouped into the following broad categories:

- Basic physical needs: Buildings generally provide a sheltered, warm and secure enclosure or interior environment, appropriate for sustaining anticipated human activity.
- Cultural influences: The way that activity is undertaken includes consideration of present-day attitudes, beliefs and political organization, the meaning of historical precedent, the desire to express symbolic values and the extent of current legal constraint applicable to development.
- Means of construction: Creating appropriate environments requires the selection of suitable structures, materials, fixtures and finishes to maintain shelter, warmth and security and to withstand the effects of the local climate and the wear and tear of the regular use.
- Appearance: Structures and finishes can be seen and have a visual impact, both on the external and internal environments .The appearance of materials may be naturally finished or decorated, and will almost certainly change over time.

- Project-specific matters: The way that any new building can be created depends on the demands of the building type and the constraints of the site on which it is to be located. The requirements and expectations of the client and the costs of construction are factors unique to each and every new building, and Learning from mistakes has been a very painful and expensive experience for everyone involved.

2.2.2 The Design Process Stages

Designing is a continual process of selecting and organizing elements, trying to establish which are the most important and how they might all play their part in the creation of the new product, and inevitably ideas change as possibilities are added or discounted, as proposals are conceived and considered, The aims of design can be summarized as follows:

- Identify all the relevant elements pertinent to the project.
- Discover or understand how the elements interact with one another.
- Plan or arrange the elements so that they fit together in an appropriate or meaningful way to create a competent product: Analysis > Synthesis > Appraisal > Feedback > Finish

1. Analysis: Analysis means splitting up the 'whole' into its constituent parts. it is useful to find out what the essential design criteria is for the major elements of function, appearance, cost, image and so on, which can each be analyzed in more detail to determine what they mean, Analyzing the task, collecting additional information and splitting the task into sub-problems (decomposition) on the basis of various dimensions such as user function, aesthetics, construction and urban design.
2. Synthesis: Synthesis is the re-assembly of the parts into a meaningful 'whole'. The information gained through analysis can be used to suggest a possible design for the shop front, solving sub-problems and then solving the total design problem by synthesizing the solutions to the sub-problems. The aim of the synthesis is to integrate the solutions to the sub-problems for each dimension individually and then to integrate these solutions to provide a single overall solution.
3. Appraisal: The proposal for the shop front can be checked to see if it matches the analysis, critically assessed by interested parties such as the client, the Planning Authority and other members of the design team.
4. Feedback: Critical comments received following appraisal in the form of further information, advice, recommendations, approvals or instructions will either confirm that the proposal is acceptable, or that some elements must be analyzed again in more detail.
5. For all but the simplest of design tasks, the process will not be in the progressive linear form of start, analysis, synthesis, appraisal, feedback, finish.

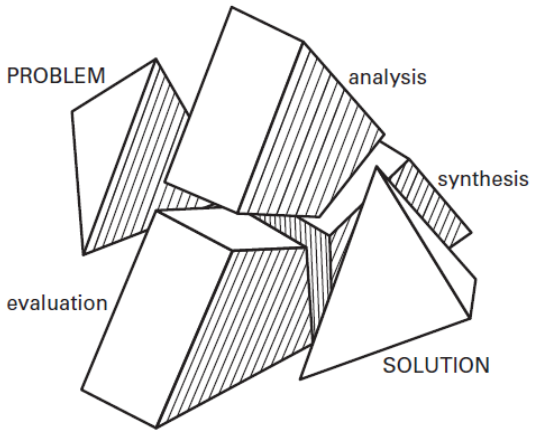

Fig. 3 The design process seen as a negotiation between problem and solution through the three activities of analysis, synthesis and evaluation
Reference: How designers think
Author: Lawson, B 2006

2.2.3 Stage by Stage Programming

The plan as examine in many architecture sources is shown in 9 stages:

1. Inception – meeting the client: This is an open-ended stage, but may be limited by the client's determination to establish working relationships so that meaningful design work can begin. The client must decide which form of procurement to adopt, possibly after seeking independent advice about.
2. Feasibility – formulating the design brief, considering basic options: This is depending on the complexity of obtaining sufficient survey information and the extent of research and consultations needed before being able to think about possible design options. Specialist advice about site conditions, structural design and cost planning may be essential at this stage. Outline proposals – establishing a practical proposal in principle.

   Sketches will be prepared and sent to authorities for initial advice. Formal presentations are made to the client for approval to proceed. The design team must be certain that the idea can be developed, and that proposals match the client's budget.
3. Scheme design – developing an agreed idea into a coherent working proposition, In terms of the overall program, there will be a fixed point at which the sketch idea is agreed as the basis for more detailed work. The outline idea may only illustrate parts of the building like the front elevation, or simplified plans with little detail. Continued analysis and further information may alter the initial ideas, but at some stage the whole building must be illustrated showing,

   The scheme design stage must include**:**

   a. Architect:
      - Floor plans showing the details of all spaces and their use
      - Details of main cores and risers and Finishes schedule for all spaces.
      - Sections through the building showing the key relationships between spaces
      - Elevations of all facades showing the characteristics and relationships of all components
      - Perspectives and details of key architectural features
      - Site layout
      - Main services layouts and Existing site surveys.

   b. Engineering
   c. Mechanical services
   d. Electrical services
   e. Vertical transportation
   f. Briefs
   g. Cost and time budgets
   h. Method statements
   I. Approvals
4. Detail design – finalizing the scheme: This stage leads to a full understanding of all the parameters relating to the site layout and the building. Regular exchanges of drawings

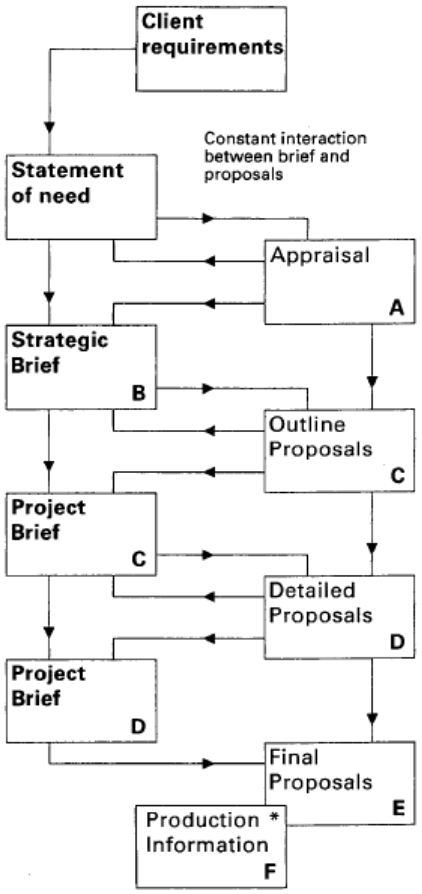

Fig. 4 The process of brief and design programming development
Reference: Architects Job
Author: RIBA 2000

and information will refine the layout and appearance; finalize methods of construction, selection of materials, fixtures, fittings and details for installations and the operation of machinery.

5. Production information – working details and practical considerations: The design team begins to prepare working drawings to illustrate the arrangement and assembly of the detailed parts of the new building with detailed specifications describing requirements for materials and construction. The design may change in some respects as a result of detail considerations at this level.
6. Measurement – BQ: The BQ is a summary of all materials and labors involved in construction of the building and any other associated costs. It is used in the traditional procurement process to obtain tenders from contractors, control the costs of development at pre-contract and post-contract stages and helps to ensure that everything needed has been accounted for.
7. Tender action – obtaining competitive prices: This stage is only relevant in the traditional procurement method. The design team arranges contract matters with the client and put together a package of information which is sufficiently comprehensive to enable contractors to understand the potential cost of the work. Selected contractors will be approached to check their interest and time must be allowed for them to price the work and submit their offers to the client. The drawings included in the tender package are indicative only, so that contractors can see the extent of works required. Throughout the tender period, the design team will continue to prepare information to complete the description of the building.
8. Project planning – tender analysis, appointment of contractor, confirmation of construction methodology, CDM considerations and construction programming.
9. The completed program: In practice, preparation of the program reflects the circumstances of each project. The length of time allowed for the completion of each activity or the point at which it is appropriate to start one activity which depends on partial completion of another, will not be the same every time and cannot be given as universally applicable figures. There are many points in the design process where timings may vary, where individuals need more or less time to make their contribution.

2.3 Drawings Process as an Essential Part from Concept to Detailing

The majority of drawings used in the construction industry are technical drawings, drawn to scale using the metric system of dimensioning and this process requires that design ideas are developed and decisions made for the building designer, it is useful to have some free-hand drawing ability, and an individual style can be developed through experience. And those drawings associated with design and construction communicates in two different ways:

- As a general indication to show what a building will look like, or what being in spaces might feel like: experiential presentation drawings
- As a detailed explanation of how the building's parts are arranged and constructed: scaled working drawings.

2.3.1 Drawings Levels:

There are five levels of drawings, prepared and used at different stages:

1. Survey drawings: as existing; Design work for some projects may be done in the abstract, but generally design ideas are sketched against the constraints of a particular site; a plot of land or an existing building, Architects need an accurate set of survey drawings as a basis for their working drawings.

2. Sketches or feasibility studies: The sketch of the front of the building illustrated is rough and inaccurate and lacks dimensional definition, but is useful for investigating possibilities. Floor plans and sections may be developed to the same level to test the general feasibility of the idea.
3. Outline design drawings: The outline design drawing, progresses the idea for the front of the building in sufficient detail to indicate the main elements in principle. This is an accurate, scaled drawing of the selected idea developing the theme of the design although the other sides of the building may not all are illustrated at this stage. Floor plans and sections may be advanced in the same way.
4. Scheme design drawings: The scheme design shows the appearance of all the building sides accurately, so that all the members of the design team have an agreed basis for developing subsequent detail, this stage should have fully defined floor plans and vertical sections, At this stage the drawings must finally approved by client and the statutory authorities, and it should repaired using drawing specifications for each country, In Egyptian authorities called 119/2008 Law.
5. Working drawings :Once the scheme has been accepted by the client and the relevant statutory authorities, a working drawing,, is completed with exact dimensions and construction detailing, showing how all the parts of the building are to be put together, All the other sides of the building would be shown to the same level of detail at this stage. This stage includes Site plans, floor plans, sections and individual construction details would all be developed to this level.

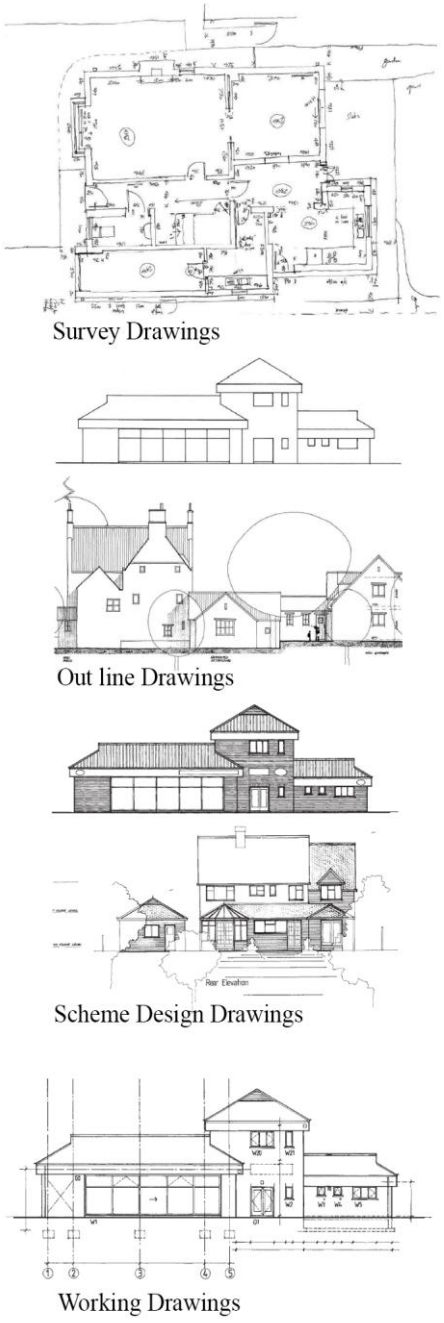

Fig. 5 Drawings Levels
Reference: Managing the building design process
Author: Tunstall, G. 2012.

2.3.2 Managing Drawings

As ideas are developed, information is regularly exchanged between the members of the design team. Possibilities and constraints come to light, adding to or revising what had previously been agreed.

- Graphics and text can quickly be deleted, added or repositioned electronically, but there is a limit to the number of times that original paper drawings can be altered

before they are ruined. The author of any drawing must take care to identify and protect the 'master' copy as additional information is added or alterations are made.

- Sometimes drawings require so much alteration that they are replaced by completely new ones. The originals become redundant and should be marked 'SUPERCEDED', and stored for reference only so that they are not used or issued in error. This problem can be managed by maintaining an up to date list or register which is regularly issued to all members of the design team.
- Drawings should be clearly marked 'NOT FOR CONSTRUCTION', or 'FOR CONSTRUCTION PURPOSES' to distinguish between ideas which are still under consideration and those which have been fully agreed for implementation.
- Numbering drawings: As design work proceeds and the number of drawings begin to multiply, they need to be carefully and systematically identified so that they can be conveniently stored and easily retrieved for reference. There are alternative ways that this can be done.

3. PEOPLE AND ORGANIZATIONS

The relationships between education, training and practice are very important. The development of close relationships between academic institutions and engineering practice are very encouraging, this paper illustrate the rules and responsibilities of the design team and come to illustrate who people involved in Architectural design process and the communication between them.

3.1 People Involved and Responsibilities

Creating a new building involves contributions from many individuals, exchanging ideas and instructions as the project is developed. They can be grouped as clients, consultants, authorities and builders or contractors.

1. Clients: The client is responsible for commissioning the new building and must approve design decisions as work proceeds, The client can be individual or organization commissioning the building project and directly employing the designer, the project manager and the works contractors, The different types of client include the following: Owners, Representatives, Committees, Users
2. Consultants: The consultants supply design and management expertise and can include the following: Measurement surveyors and investigators, Quantity surveyors, Designers and Engineers
3. Authorities: An administrative unit of local government; the authorities' advice on design and construction, and have statutory duties to exert control with respect to their individual responsibility. The authorities involved in building development include: Local Authorities ,The Fire Officer, The Environment Agency, Health and Safety Executive, Police, and Other Governmental Agencies, Heritage Organizations, Insurance Companies.
4. Contractors: A contractor is a person who undertakes or contracts to provide the materials, equipment (plant) and labors required to construct the new building.

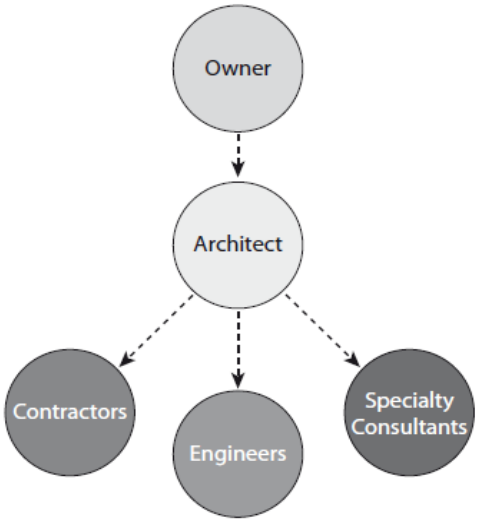

Fig. 6 The traditional team model and an integrated design team model
Reference: BIM: successful sustainable design with building information
Author: Krygiel, E., & Nies, B. 2008.

- Subcontractors: A subcontractor is a person who is hired by a general contractor (or prime contractor, or main contractor) to perform a specific task as part of the overall project and is normally paid for services provided to the project by the originating general contractor.

3.2 The Professional Architectural Design Team:

2.2.2 The Development Professional Architectural Design Team Members

The number of the architectural team members varies according to the organization size and the project requirements. Hence, the largest size and the optimum project requirements are considered. Accordion to this, the architectural team members are: (1) Principal / Partners, (2) Team Leaders or Associates, (3) Project leaders, (4) Architects and (5) Architectural Technicians.

- The Architect**:** An architect is a person trained and licensed to plan, design, and oversee the construction of buildings. To practice architecture means to provide services in connection with the design and construction of buildings and the space within the site surrounding the buildings that have as their principal purpose human occupancy or use, the Architects team levels shown in the table below :

Table 2. Architect professional team level guide
Reference: www.aianova.org/pdf/BP_Arch_Positions.pdf

Architect professional team level guide		
Experience	**Knowledge**	**Usually Reports to**
Level 1 - Entry/Junior		
0-2 year's professional experience. Entry level for employees with Bachelor's Degree or equivalent	Knows fundamental concepts, practices and procedures of particular field of specialization.	Lead Level
Level 2 – Intermediate		
2-5 years professional experience.	Knows and applies the fundamental concepts, practices and procedures of particular field of specialization.	Lead Level
Level 3 – Senior		
5-8 years professional experience. Fully competent professional - the first career level in the ladder	Possesses and applies a broad knowledge of principles, practices, and procedures of particular field of specialization to the completion of difficult assignments.	Lead Level or Middle Management
Level 4 – Lead		
More than 8 years professional experience. Management is typically the next higher level.	Possesses and applies comprehensive knowledge of particular field of specialization to the Completion of complex assignments.	Upper Middle Management or Top Management

3.3 Teams and Team Building

A team is defined as a group of people with a high degree of interdependence geared towards the achievement of a goal or completion of a task; they agree on a goal and agree that the only way to achieve this goal is to work together.

3.3.1 The importance of team work in design

A successful and competent team is the one that succeeds in producing a product that meets or exceeds client expectations within time frame, allocated budget and quality standard required. Such a team is a healthy indicator of the organization growth and stability. In addition, team work helps the organization retain and keep its clients loyal and win new customers.

4. MANAGING DESIGN PROFESSIONALLY

4.1 The Design Management

Managing is to conduct things and people in order to achieve some end, Design management is an important activity in the design process as it involves the coordination, analysis and testing of the design, as well as the management of the different stakeholders involved, It is important at the outset to clearly set out the responsibilities of everyone in the Design Team.

Design Management in Architecture, comes with 5 compelling facts that we should always keep in mind:

- Architecture is a Service industry
- Design is a team work
- Design Management requires strong Systems Management
- Balance between Design, Technology and Resources is a must
- Orchestrating a Management plan for your Design is a must

4.2 Design Management Goals and activities

To reach the end of the project on budget, on time, safely, error free and meeting everyone's expectations.

1. Reaching the end of the project: The end" means finishing the project while meeting its unique set of objectives, the words goals and objectives sound like synonyms. =
2. Reaching the end on budget (Cost control): "To reach the end on budget" has two equally important but different meanings for most design projects have both design budgets and construction budgets .If the project is to succeed, the substation design and construction costs must stay within their respective budgets.
3. Reaching the end on time (Time Management) Time equates to money for many clients. Most clients want to know how long it will take before their project is complete and they can start using it for its intended purpose. Time is money to design firms as well.
4. Reaching the end safely (risk management) Safety does apply to design projects and it is not just construction sites that are dangerous .Many design projects require field investigations of one type to another.
5. Reaching the end error-free (Quality Control): This goal should really read "To reach the end as error-free as possible". No project is perfect.

Clients expect quality products from the design firms they hire. This means a project must meet or exceed all the client's project requirements and expectations. The purpose of project quality control is to make sure the following goals are being met:

- Meeting or exceeding client requirements and expectations.
- Preparing accurate documents (deliverables)
- Finishing the design on time and on budget.
- Designing a project that can be built on time and on budget.

6. Reaching the end meeting everyone's expectations: This is the most challenging of the six goals. It is also the most subjective, with the most diverse and illusive requirements.

Five basic phases are common to design projects .They are:

1-Start > 2-Planning > 3-Design > 4-Production > 5-Closeout

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4.3 Systems from CAD to BIM

4.3.1 Computer-Aided Design System:

CAD system is the use of computer systems to assist in the creation, modification, analysis, or optimization of a design, CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing.

CAD output is often in the from electronic files for print, machining, or other manufacturing operations, Computer-aided design is used in many fields, The output of CAD must convey information, such as materials, processes, dimensions, and tolerances, according to application-specific conventions. The advantages of CAD system include the following:

- Handling large drawings: The size of manually produced drawings is limited by the size of the drawing board and the ability of the draughts person to reach the extremities.
- Changing the scale of drawings: Manual drawings can only be produced at a single scale. Larger- or smaller-scale drawings would have to be drawn separately. CAD drawings can be converted to any scale or unit.
- Designing to a grid: CAD drawings can be constructed to a grid based on absolutely accurate dimensions.
- Improves design team co-ordination: Information can be immediately transferred between members of the design team in a matching style and format, so that drawings can be developed more accurately and precisely with much less risk of error or omission of important elements. Drawings can be published on the Internet or a local intranet, aiding rapid communication.
- Direct use of survey information: Electronically obtained survey data can be obtained in a form that can be used immediately for preparation of design drawings.
- Generating alternative views: The computer can transform basic information to generate alternative views of proposals, particularly 3D images based on 2D plans and elevations.
- Direct measurement of quantities: It is possible to quantify elements of construction as design work proceeds related to specification data bases. This may be a useful way of testing the economy of design ideas, automatically generated schedules, quantities and cost estimates may help the design team to better rationalize ideas.
- Takes the ‘drudge’ out of repetitive drawing work: Repetitive elements such as columns or window reveals can be copied from a standard library of elements and quickly duplicated rather than be laboriously reconstructed manually. CAD helps designers to easily move copy, enlarge, reduce, merge, stretch, transform, etc.
- Standard packages: CAD supports packages of standard graphics, text and visual aids, which can be easily managed, changed, edited, etc. It is simple to change lines, fonts, symbols, figures, color, etc.
- Standardization of drawing style: CAD enables all the drawings to be prepared in the same format, standardizing drawn elements, including consistent titling and annotation.
- Releases more time to think and design: The time spent actually constructing drawings can be reduced, particularly once revisions are necessary leaving designers more time to think about the design itself.

4.3.2 BIM System

Building information modeling (BIM) is an emerging tool in the design industry that is used to design and document a project, This tool has already begun changing how designers work with their consultants and with builders, but it also has the ability to help guide the industry in a more sustainable direction by allowing easier access to the tools necessary to quantify a greener design approach.

BIM is still Computer Aided Design, but it allows the user to add an 'n' number of dimensions (like costs, scheduling, time etc.) and strongly modifies the work process to design, build and maintain a building but since it is in most of scientists point of view an evolution of CAD that illustrated in the previous part, Building Information Modeling (BIM) is a process involving the generation and management of digital representations of physical and functional characteristics of places, The processes of BIM related to the project simulation and the virtual 3D models of the project can be separated into several major groups:

- The processes enabling the owner to develop an accurate understanding of the nature and needs of the purpose for the project
- The processes enabling the design, development, and analysis of the project
- The processes enabling the management of the construction of the project
- The processes related to the management of the operations of the project during its actual use.

The Benefits of the BIM:

Many of the benefits of the BIM will be viewed as direct benefits, although the largest benefits actually are the indirect benefits.

- Direct benefits are qualities such as the improved visualization and the centralization of (project) building information.
- The indirect benefits include the necessity for collaboration and the resulting better project understanding, and the reduction of project risk.

Visualization, collaboration, and elimination are the three main headings under which the benefits of the BIM are organized.

5. CONCLUSIONS

A. The research carried out in this paper aimed at exploring the importance of management in architectural design field.

B. Design is the creation of a plan or convention for the construction of an object or a system as in architectural blueprints, engineering drawings, business processes, the design is the use of scientific principles, technical information and imagination in the definition of a structure, machine or system to perform prospected functions with the maximum economy and efficiency

C. The research identifies the problem of building design in two levels: Internal and external constraints; and illustrate the strategies for solving problems in design.

D. The elements of buildings are the same as the elements of any product; materials, processes, forms and appearance, selected and arranged to meet the demands and needs of manufacture and use; The aims of design process are Identify all the relevant elements pertinent to the project, discover or understand how the elements interact with one another and Plan or arrange the elements so that they fit together in an appropriate or meaningful way to create a competent product.

E. The design process stages could be summarized in Analysis > Synthesis > Appraisal > Feedback > Finish

F. The Building design programming stages are Inception > Feasibility > Outline proposals > Scheme design > Detail design > Production information > Measurement > Tender action > Project planning.

G. Drawings process is an essential part in architectural design process from concept to detailing that has five levels of drawings, prepared and used at different stages start from survey to working drawings

H. In design process the relationships between education, training and practice are very important. The development of close relationships between academic institutions and engineering practice are very encouraging.

I. This Research illustrates the rules and responsibilities of the design team that they can be grouped as clients, consultants, authorities and builders or contractors.

J. The number, level and qualification of professional architectural team members vary according to the organization size and the project requirements.

K. The research elucidates the influence of managing design professionally and illustrates the Architectural Management goals and activities.

L. The research could is a brief study to illustrate the development from CAD system that leads to BIM system those systems that make a huge revolution of architectural design management.

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