CHAPTER 6.

THE DESIGN PROCESS

6.1 INTRODUCTION

The proposition in this chapter is that the design process analysed should indicate what type of input should be given and how design patterns can be implemented in this process.

The argument begins with the precept that the design process is cyclical. The designer will be involved in a recurring cycle of analysing information, thinking it through and exploring different options. This should be a creative process and the emphasis in this chapter will be on the creative aspects of the process.

The design process, patterns should present itself to the designer in the form of a design problem. Each designer is unique and develops his / her own way of working. There is no fixed method of design and different authors define the design process differently. Smithies (1981:55) summarises the design process as follows:

- Problem statement,
- Tentative solution,
- Criticism of the solution,
- Restatement of the problem,
- Next tentative solution, and so on.

These steps illustrate the cyclical nature of the process but also show that time to achieve a desired solution is limited. Hence the value of developing a rapid and accessible graphic design instrument. Smithies says that the first step is a tentative solution, which is developed or changed. Others say that there are more possible solutions.

Laseau (1980:164) defines the process as follows:

- Problem definition,
- Developing alternatives,
- Evaluating alternatives,
- Selection,
- Communication.

This definition shows that alternatives (or patterns) can help the designer, but also shows that at some point choices and decisions must be made.
For Laseau the designer is constantly looking at different options, developing one of these to bring about the appropriate design solution.

The design process can vary for different projects and for different designers. Designers would give weight to each project. Can designers be guided by menus and checklists, and will they (within the constraints) be inspired to think creatively at the right time through examples or patterns? The design process includes searching for a solution. In a normal architectural practice situation time is limited. A design tool could assist in the research and decision making; it may mean that fewer alternatives need to be pursued. It should, however be open-ended enough to allow scope for its user’s preferences. How are patterns applicable to the design process and how can they be introduced in a successful instrument to assist the designer? (See diagrams of the creative design process and how patterns can be introduced, Fig 6B.)

In the design process, patterns should present ideas to the designer in the form of graphic images. The final concept is influenced by these ideas. The value of an idea, whatever the significance, should not be discarded because of biassed reasoning. The following statement by Walter Gropius summarises the practical nature of the value of ideas that would need to be implemented in any design process:

'I have found that words and particularly theories not tested by experience, can be more harmful than deeds. When I came to the United States in 1937 I enjoyed the tendency among Americans to go straight to the test of every newborn idea, instead of snipping off every new shoot by excessive and premature debate over its possible value, a bad habit that frustrates so many efforts in Europe. This great quality should not get lost in favour of biassed theorising and fruitless, garrulous controversy at a moment when we need to muster all our strength and originality in trying to keep creative impulses active and effective against the deadening effect of mechanization and over-organization that is threatening our society.'

Gropius’s remark supports the value of a study such as this: the idea must be investigated and developed before biassed theorising or prejudice overrides its newness and significance. There should be a practical test of every newborn idea. Testing can be done early if information on the constraints and needs of the project or site is available. Mostly, in practice, these issues are addressed almost at the start. A user-friendly design tool should help the designer think about the right issues early on.

1 Recorded in The Decorated Diagram by Klaus Herdeg. See Bibliography
6.2 TYPICAL DESIGN PROCESSES IN PRACTICE:

The design process could vary for different projects and for different situations. Design patterns could give input to each process, in different ways. The following possible situations are distinguished from the author's personal experience, for the situation in architectural practice:

A. A NORMAL CLIENT / ARCHITECT RELATIONSHIP: The process is regulated by Institutes of Architects and broken down into stages for fee purposes, (for example, see fig 7.1.) Design patterns will assist the architect in finding the design concept for the final sketch plan presentation.

B. AN ARCHITECTURAL COMPETITION (TO BE ADJUDICATED):
Generally time is very restricted, especially for research or creative inspiration. The design patterns should be most helpful, keeping in mind the pressure that will be on the designer to find a good appropriate concept to present.

C. A PROPERTY DEVELOPMENT SITUATION WHERE THE ARCHITECT IS PART OF THE DESIGN TEAM: The feasibility of the project is related to certain factors that determine the design principles.

Here design patterns in case studies of previous, similar projects would be helpful.

D. COMMUNITY DESIGN GROUP: The architect has to present his/her design ideas to the local community and communicate at different stages in the development of the design. Design patterns could help identify alternatives that can be presented to the community for them to give their input for choosing the final design concept.

E. A UNIQUE DESIGN PROCESS RELATED TO VERY SPECIFIC DESIGN REQUIREMENTS: This process may be determined by the use of existing facilities or the specific operating conditions of the end-user. Design patterns in case studies of similar projects could be helpful.

Zunde (1982:v-vii) analyses design procedures in the design team, design methodology, problem definition, functional constraints, technical constraints etc. An interesting chapter is the seventh, dealing with aesthetics where aspects of design principles are discussed. Aesthetics is regarded as an almost separate entity that needs some of the architect's attention. The book nevertheless has some value for this study in the way it analyses constraints and the sources of information.
Most processes can be illustrated successfully through flow diagrams. The illustration of the process of design in all its phases is shown in Fig 6A as drawn up by Zunde (1982:9). This is a typical process where a client appoints an architect for a specific project.

When design patterns are investigated, however, only the creative part of this process is applicable. It is shown in the first part and a 'sketch' is then presented, which will be the design concept. The designer is the architect or part of the architect's team.

Specialist input from other consultants is shown - this is normally part of the design development stage in which the design is developed to its optimum solution, shown here as the 'sketch scheme'.

According to Zunde the design process as analysed from a technical perspective is:

- You have role players
- Information is provided
- Experience is needed
- The architect 'thinks' to produce a sketch.

The creative process in design is illustrated from information by Lawson (see Fig 6B)

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2 Design Procedures: a mostly technical manual written for students of Architecture, Construction and Civil Engineering.
6.3 DESIGN AS A CREATIVE PROCESS:

6.3.1 CREATIVE ACTIVITIES

Laseau relates these actions to the various stages of design and the role each one plays in each stage: the design tool being investigated in this study will assist each of these activities in some way, depending on the designer's preferences. The 'discovery' action shown here by Laseau states specifically 'patterns and case-studies' which constitute the propositions of this study.

<table>
<thead>
<tr>
<th>Representation</th>
<th>Includes Sketches, Plan Elevation, Sections, Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstraction</td>
<td>Graphic Symbols working as keys to describe something</td>
</tr>
<tr>
<td>Manipulation</td>
<td>Artful Management or control: Transform, Distort, Structure, etc.</td>
</tr>
<tr>
<td>Discovery</td>
<td>(A Process) Invention, Analogies, Concept Forming Patterns, Case Studies</td>
</tr>
<tr>
<td>Verification</td>
<td>Articulation, Evaluation, Consolidation, Elaboration</td>
</tr>
<tr>
<td>Stimulation</td>
<td>Creativity, Direction, Focus, Energy, Vitality</td>
</tr>
</tbody>
</table>

TABLE 6-1 DESIGN PROCESS - CREATIVE ACTIONS: LAESEAU
6.3.2 THE CREATIVE PROCESS IN STAGES

The creative process in design will require thinking in two spheres: imagining and reasoning. The former is a right-brain activity and the latter a left-brain activity. These are the root processes of design, the creative actions which every designer has to go through, no matter how long it takes for each of these stages.

The special requirements of a design or the creativity of the designer could play a role in speeding up or slowing down the process.

Lawson (1980) illustrates this creative process as a five stage model (it is well thought through):

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 First Insight</td>
<td>Formulation of Problem</td>
<td>Could Be Revisited, Redefined and Reformulated Moving Between Stage 1 and 2</td>
</tr>
<tr>
<td>2 Preparation</td>
<td>Conscious Attempt At Solution</td>
<td>This is Hard Work: Labouring to Solve the Problem</td>
</tr>
<tr>
<td>3 Incubation</td>
<td>No Conscious Effort</td>
<td>Thinker is Unwittingly Reorganizing and Re-examining Previous Deliberate Thoughts</td>
</tr>
<tr>
<td>4 Illumination</td>
<td>Sudden Emergence of Idea</td>
<td>Terminates Incubation Process</td>
</tr>
<tr>
<td>5 Verification</td>
<td>Conscious Development</td>
<td>Outline Idea is Tested, Developed, Elaborated Upon</td>
</tr>
</tbody>
</table>

TABLE 6-2 THE CREATIVE PROCESS OF DESIGN: LAWSON

\(^2\) Sperry (1981), won the Nobel Peace Prize for his experimentation on left and right hemisphere functions, Virkle (1983)
FIG 6B  BRYAN LAWSON: THE CREATIVE PROCESS OF DESIGN - Sketches of Ronchamp Chapel by LE CORBUSIER (1965) Added by author.
These stages of creative search and discovery constitute the basis for the design process for any designer, not only architects. The author found this to be true of his own design method and attempted to introduce the stages into the design pattern chapters as a regular test of creative influence and inspiration.

See also diagrammatic illustration of the creative process - Fig 6B on the previous page (The sketches of Ronchamp Chapel were added by the author to illustrate the stages.)

6.3.3 CREATIVE INTUITION

Allsopp (1977) observes:

‘Design is not a process: it is an intuition, but it is well known in western art and eastern philosophy that the powers of the mind to intuit can be cultivated.’

It is in these creative stages of design as shown by Lawson, that the intuitive aspects of the creative process are defined. The right brain activities of intuition involve incubation and verification, whereas the left-brain reasoning activities are first-insight, preparation and verification.

The intuitive aspects of the process are probably what cause each designer to be different and their way of working to differ. Le Corbusier (1887-1965), is known to have used painting to develop the aesthetics for his projects. After 1918 there was a growing relationship between his painting and architecture. He states\(^4\) that it was the intuitive nature of painting that liberated him:

‘The key to my artistic creativity is my work in the field of painting which I continue to practice daily. The basis of my intellectual quest and production lies in the active pursuit of painting. It is there that the source of my open-mindedness, my disinterestedness and of the independence – the

\(^4\)Le Corbusier, the Creative Search 1996 , recorded by Geoffrey H. Baker, (see Bibliography)
integrity of my work - is found.'

As a young architect he was influenced by Cubist painting before designing the first modern buildings. These forms probably led to the first 'cubist' buildings.

Lawson (1996) conducted interviews with ten different architects on their preferred design method and analyses the way they experience the design process:

To all the architects drawing was very important. Robert Venturi was one of the designers analysed. As Denise Scott Brown, his spouse and partner, says of his sketches:

'They are never done as works of art but as communication with self.'

Santiago Calatrava, also interviewed, says of drawing:

'My graphical output is never as a result of a wish to produce a drawing but rather to understand a problem...'

Calatrava, being also a qualified structural engineer, depends heavily on the development of structural forms in his design process. There is extensive use of the section in his design sketches. Lawson also records the following warning from most of the designers in relation to drawing:

'There is also a distrust of drawing as being dangerously seductive, which seems a mature attitude. Perhaps only good artists are able to recognise the power of drawings to mislead or even to deceive.'

Most of the architects regard drawing as a tool rather than an end-product. When designing in groups, many architects draw while they talk, communicating design ideas to each other, which demonstrates the graphic thinking of designers and the importance of drawing. Architects need to sketch so as to allow the spontaneity and intuition required and to increase flow in creating the design. This does not eliminate the use of computers, but implies that designers could move to and fro between computer and hand sketch to develop a design.
Many of the architects interviewed by Lawson use CAD systems to design but want the computer to remain only one of the tools that can be utilised. It can be argued that creative intuition is not encouraged by working with computers. Lawson though, found that some architects make considerable use of the computer as a design tool. All of the architects that Lawson interviewed felt that the computer images are to be used as just another technique, equivalent to, for example, drawing and physical model-making.

The architects interviewed used the computer for CAD-programmes and not for inspiration and exploring possibilities and ideas, as this study proposes. In creating a design assisting tool on a web-site, the designer will use the computer at times during the design process, but he/she should still have the freedom to use his/her preferred design method.

6.4 CONSTRAINTS / LIMITS

Constraints play important roles in shaping the design and making it appropriate. (See also chapter 7 where the principles of design are introduced into a typical constraint checklist in architectural practice.) Constraints should be part of the information necessary to compose a design.

The design concept can be unique and well composed but if it does not take the relevant constraints into consideration, it could fail. The constraints are shown in chapter 8 and introduced into different fields of architectural design, in proposed menus. Constraints are part of formulating the problem. After verification they form part of the reasoning. Having constraint-checklists should assist in making the design appropriate.

There is probably no project that does not have constraints or limits. Students of architecture are confronted with this reality early on, having to present a design scheme from a formal assignment.

6.5 INFORMATION

Relevance of information and sorting the correct information is of critical importance, especially in the early stage of the design process. Irrelevant
<table>
<thead>
<tr>
<th>DESIGN:</th>
<th>CONSTRAINTS:</th>
<th>OTHER INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGNER'S EXPERIENCE</td>
<td>THE DESIGN INFORMATION SUPPLIED BY PATTERNs COULD SERVE AS INSPIRATION TO</td>
<td>TECHNOLOGY</td>
</tr>
<tr>
<td>EXAMPLES</td>
<td>ASSIST THE INCUBATION PROCESS AND HELP TO COME TO A POINT OF ILLUMINATION.</td>
<td>COST LIMITS / COST PLAN</td>
</tr>
<tr>
<td>PUBLISHED MATERIAL (OR PATTERNs)</td>
<td>THE CONSTRAINTS CAN BE DIFFERENT FOR EACH FIELD:</td>
<td>LOCAL AUTHORITY</td>
</tr>
<tr>
<td>PUBLIC INFORMATION</td>
<td>THE FIELDS FOR THE PURPOSES OF THIS STUDY ARE SHOWN IN CHAPTER 7.</td>
<td>TOWN PLANNING LIMITS</td>
</tr>
<tr>
<td>THE SITE:</td>
<td></td>
<td>(CHAPTER 7: FIELDS FOR CONSTRAINTS</td>
</tr>
<tr>
<td>INSPECTION</td>
<td></td>
<td>SITE</td>
</tr>
<tr>
<td>SURVEY</td>
<td></td>
<td>FORM TYPE</td>
</tr>
<tr>
<td>SITE INVESTIGATION</td>
<td></td>
<td>COMPOSITION OF FORM</td>
</tr>
<tr>
<td>GEOTECHNICAL</td>
<td></td>
<td>SPACE</td>
</tr>
<tr>
<td>MINING OWNERSHIP</td>
<td></td>
<td>ENVIRONMENT</td>
</tr>
<tr>
<td>THE INTERNET/ WORLD</td>
<td></td>
<td>GRID/MODULES</td>
</tr>
<tr>
<td>WIDE WEB</td>
<td></td>
<td>INDOOR/OUTDOOR, ETC.)</td>
</tr>
</tbody>
</table>

**TABLE 6-3 EXAMPLES: SOURCES OF INFORMATION**
information could mislead designers and have them fail to find the appropriate design solution. In most cases the site should be the most important source of information; buildings are not satellites that can be placed in orbit anywhere. Information is not always available and the architect has to search for all the relevant information required. In this regard architects regard the brief of the client as critical. The client’s needs have to be spelled out and they have to be accurately listed.

Once the designer is in possession of the relevant information, the design principles spelled out in the following chapter can be employed to inspire and help in the process of discovery.

(SEE TABLE 6-3, PREVIOUS PAGE)

6.6 CONCLUSION

The design process analysed has shown:

- Some definitions,
- Practise situations,
- Flow Diagrams,
- Creative activities,
- Creative stages,
- Creative intuition (questioning the use of computers to design),
- The importance of constraints,
- Relevance of information.

The next three chapters will look at different manners of analysing design patterns - to be implemented in this process.