A CONDOMINIUM DEVELOPMENT

An Architectural Thesis Exploring the Material of Brick in the Design Process

Henry W. Stellema
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ABSTRACT

Ultimately architecture must be perceived by the human senses. By touch, smell and sight a space becomes an experience. In order to create this experience an endless variety of materials are used. If the experience is to be unique the selection of the proper materials is very important. This thesis deals with one material, brick, and how it influences the design process.

The vehicle for my exploration of brick is a ten unit condominium in Michigan City, Indiana. My approach was to go through the design process and investigate what influences the different variables of brick would have on the project.
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INTRODUCTION

There are numerous materials used in the art of architecture. Wood, steel, glass, plastic, and masonry are just a few. Each of these materials have their good points and bad points and each can be used in an endless number of ways.

One of these categories: Masonry (brick in particular) has been a great interest of mine.

My thesis will concentrate on how brick is used as a design tool in the field of architecture. This product of the earth has numerous variables. Some of these variables can be manipulated by man while others are inherent to the materials used in the manufacturing of brick. My thesis will attempt to investigate these variables and try to give a definition or meaning to them. After this investigation, I will apply these conclusions to an architectural project. At the outset of my thesis I understand that concrete and absolute definitions or meanings will not be achieved. Instead general conclusions will be drawn on each variable.

After my research into brick I will analyze the site I have chosen for my project. This analysis will be indepth and cover all the aspects which will effect the project. In order to be true to my thesis these aspects must be analyzed in terms of how they will effect the variables of brick. From this, some preliminary conclusions will be drawn as to the design of the project.
In almost every direction there is a favorable view. To the west is the N.I.P.S.C.O. complex with its smoke stacks and cooling tower, making it the least favorable view.
In order to make the exterior patio as pleasing as possible it should be open to the south and southwest. The building can form a buffer to the north and the northwest to block the winter winds.
Proposed Traffic Circulation

Because of the heavy amount of traffic on Franklin Street, vehicles will enter and exit the site from Brown Basin Road to the north. At this time, Brown Basin Road is one way going west. I propose to change it to a two way road which terminates with two parking areas at the west end.

PROPOSED TRAFFIC CIRCULATION
The project itself will be a condominium development. The number of units will be determined by the zoning laws, relationship to old lighthouse, and the number of boat slips that the site will accommodate. A program for the condominium will be developed and as with the site analysis each aspect of the program will be related to its effect on the variables of brick. The final design will not be an absolute definition of how the brick is to be used; instead it will be an exploration with brick as a major design component and how the site, project and brick blend into the whole.
THESIS

Statement

By having one major material that will be used in a project the design process is influenced by the variables of that material.

Argument

The design process has an endless number of variables to it. If one of those variables, the selection of materials, is already a given, then the rest of the process will be influenced and maybe even guided by the material selected.

Approach

To say that my material selection is the only constant in the design process would be untrue. What I am saying is that brick is the only material that is constant. With brick as the major material in the project, I will design the condominium development and investigate how the variables of brick effect the project.
VARIABLES of BRICK
applied to thesis

Size of Brick

Bricks come in a variety of sizes (see list). The most popular and widely used size is the standard modular. The standard modular is also the smallest size available. Being the smallest it can be used in a variety of ways. Arches, window sills and quoins can be manipulated easier using the standard modular size. It is also the size associated with "residential", since almost all housing executed with brick, use the standard modular size.

The larger sizes must be used in large scale projects in order to use them in the same way as a standard modular brick. Larger sizes are more economical because a mason can lay up more square feet per day using these sizes.

The size(s) of brick used in the project will depend on the situation. If at all possible only one size will be used so as not to complicate the building process.
NOMINAL DIMENSIONS of MODULAR BRICK
Color of Brick

Almost any color is available for brick. Brick does not come in "absolute" colors, instead they come into an acceptable range or tone. This slight change of tone from one brick to another gives the overall composition an interesting and lively appearance.

The right colors of brick for this project will depend on:

- Location
- Effect desired from a space
- Context

Texture

A wide range of textures are available for bricks. The proper or appropriate texture for the project will be determined by the character of the
Texture

A wide range of textures are available for bricks. The proper or appropriate texture for the project will be determined by the character of the project. Some of the available textures are:

1. Smooth
   - gives uniformity to the total composition
   - Sharp definition of brick and shadow lines
   - Mortar joints can be highly emphasized by a smooth texture
   - A mortar joint can be hidden by a smooth texture
   - Smooth texture can be the result of the mold used to make the brick or it can be applied after firing in the kiln

   - The overall effect is harsh; commercial more than residential.

2. Vertical Markings
   - Gives vertical emphasis to surface by vertical shadows
   - Can help balance a long horizontally emphasized wall
   - Brings out horizontal joints

3. Horizontal Markings
   - Gives horizontal emphasis to surface by horizontal shadows
   - Can balance a tall vertical wall
   - Can bring out vertical joints
4. Rugs
   - Similar to vertical and horizontal markings but deeper and heavier

5. Barks
   - A rustic effect
   - Individual brick has its own character
   - Not as uniform as horizontal and vertical markings
   - Varied shadow patterns

6. Stippled
   - Gives a uniform appearance

7. Sandmold
   - Gives a "soft" surface

8. Waterstruck
   - Gives a "soft" surface

9. Sandstruck
   - Gives "soft" surface
The possible patterns for brick is endless. Through the years there has been some traditional patterns that are commonly used. These patterns include:

- Running Bond
- Flemish Bond
- Common Bond
- Stack Bond
- English Bond
- Double Stretcher Bond
- Garden Wall Bond

Most of the patterns vary in how active or how often the pattern is repeated in a given area. The running bond is the least active, giving the surface a sense of stability, mass, monotony and strength. The garden wall bonds are the most active. They can give the wall or surface a sense of motion, lightness, and activity. These patterns can be given more emphasis by the use of different tones of brick to accentuate or bring out the pattern.

With each bonding, pattern variations can take place to increase the variety.
MORTAR JOINTS

Mortar joints fall into two classes:

1. Tooled joints
2. Troweled joints

Mortar joints do more than provide a transition from brick to brick. The joint physically bonds the brick together so the individual units are united as a whole composition.

In order to be effective, the joint must be finished off in a proper way suitable to the weather conditions.

Each of these categories are divided into types:

Tooled Joints
- concave
- vee

Troweled Joints
- weathered
- flushed
- struck

The tooled joints are the best. Both compress the mortar into the joint and shed water, making them weather resistant.

The troweled joints do not compress the mortar as well as the tooled joints and are not as weather tight. These joints can be used in situations where the weather is not a problem (indoors).
There are other types of joints which do not fall into these categories.

- beaded
- squeezed or weeping
- grapevine or ruled

Each of these can give brick surfaces a dramatic visual effect.

MORTAR JOINT TYPES
SITE HISTORY

The site for my thesis project is located in Michigan City, Indiana, a city of approximately 40,000 people on the southern edge of Lake Michigan.

For the past twenty years the city has steadily lost many of its industries. The area around my site consists of the central business district, Washington Park, which runs along the lake, and a variety of light industries.

In the mid 60's Coho salmon was introduced into Lake Michigan to balance out the enormous amount of alewife that were dying. This introduction gave birth to the sport fishing industry in Michigan City. At the same time pleasure boating was increasing in popularity. The small existing harbor was reorganized into a summer home for 400 boats. This combination of fishermen and recreational boaters has changed this part of town so now it accommodates summer vacationers.
The site for my thesis was once the home for the Smith Brothers Cough Drop Factory. Soon after closing in the mid 60's the factory was demolished leaving the site vacant ever since. Trail creek provides a southern border for the site. This creek provided access to Lake Michigan for ships carrying goods to and from Michigan City. Today it provides access for fishermen and pleasure boaters instead of goods.

To the west of the site is the Old lighthouse. It was the first lighthouse in Michigan City and was used until the 1930's, when the present lighthouse and breakwater were built. The old lighthouse is now a museum and is on the National Register of Historic Buildings. On the north side of the site is Washington Park. This grass and wooded area provides a forecourt for a view of Lake Michigan just beyond. The East side of the site is bounded by Franklin Street. This street is the main artery for automobiles in and out of Washington Park and the Lake front.
MICHIGAN CITY, IND. PLANT OF SMITH BROTHERS, INC. MAKERS OF S. B. AND MENTHOL COUGH DROPS.
Some of the other buildings close to the site are the National Guard Armory to the East, Georg Marina to the South, the Michigan City Yacht Club and the Michigan City Coast Guard Station to the Northwest and the Michigan City Port Authority to the North.
Bricks in a radial pattern above arched window.

Setting sun with sun in lighter tone of brick, than the sun rays.
THE PROJECT

To start the design process I came up with a rough program for each of the condominium units and for the project as a whole. Each unit was to have a living room, kitchen, dining room, mechanical/laundry room, a half bath, full bath, two bedrooms, and exterior balconies. No square footage was assigned to each space; instead they varied as to their location within the building. The project as a whole was to have a common exterior space which consisted of a pool, jacuzzi, gazebo and patio space. Inside the building itself the common spaces were the garages, two per unit, exercise room, and the mail room.

The number of units in the project was partly determined by how many boat slips the site could accommodate and the massing of the building. A final count of ten units allowed ten spacious boat slips and a massing not too large for the site and its surroundings.

In order to give the building and each unit an uniqueness, bays on the facade and dormers on the roof were used.

During this whole process the variables of brick were investigated and applied to the project. My conclusion of each variable are as follows:
Size of Brick to be used

A standard 4"X 8"X 2
2/3" brick was chosen
because of its
availability and its
appropriateness for the
project. As a larger
size brick is used it
becomes increasing
harder to manipulate it
in the areas of patterns
and arches. Also the
larger sizes begin to
imply a scale to the
project, a scale larger
than this project. The
standard size is also
the size most associated
with a residential
building, which my
project is to resemble.
Color of Brick to be used

Trying to relate my project with the old lighthouse to the West, I began my design with the idea that the brick in my project would be the same color of that in the old lighthouse. The brick in the old lighthouse is a sand color with a small tonal range. As my elevation studies progressed I felt that this sand color was too light for the size of my project. I also began to divide the building up into three zones: the base, middle, and the top. This brought out the idea to use more than one color of brick for the building, a technique I had seen used in several buildings during my research. My final decision was to use the darkest color for the base of the building, a medium range color for the middle and a lighter sand color (similar to the old lighthouse) for the top. This lighter sand color would also be used to highlight areas in the base and the middle parts of the building. I do not consider the three tones to be of totally different colors but instead the tones get lighter as the building gets taller, blending it with the sky.
Texture of Brick to Used

Texture was determined after the character of the building was evident. The massing with its dormers and bays of windows gave the building a residential old world feeling. In order to keep in line with this I chose a bark texture for the bricks. This texture would strengthen the character of the building by giving it a rustic effect. This texture also gives the impression that the bricks were hand made. This is because each brick is slightly different. This variation strongly adds to the overall character of the building.
Bonding Pattern to be Used

This is the strongest and most visible variable of the brick. With the elevation divided into parts I decided to use a different type of pattern in each part. The base, which is the first level of the building would have the bricks that contact the ground in a soldier position to give the impression that the building is emerging from the earth. The rest of the base would be executed in a flemish bond setting the stage for the middle of the building. With the middle being the largest portion of the building it could sustain an active pattern. The pattern that is most fitting is the double stretcher garden wall pattern. This pattern gives the surface a lattice of intersecting diagonals. Within each diagonal is a parallelogram of bricks. These will be a lighter tone than that of the diagonals, giving more life to the pattern. At the top of the building I used a basket weave pattern. This pattern stays in line with the intersecting theme set up in the middle part of the building.
Mortar Joint Type Used

Since my project is in a severe weather climate, my choices of mortar joints were limited to a concave or a vee joint. The vee joint was chosen because of the stronger shadow line it gives, which would make the bonding pattern visually stronger.
CONCLUSION

This investigation of brick has shown me just how versatile brick is; but at the same time has given me a better understanding of the design process. No area of this process can stand alone. Every area must be investigated to the fullest in order to make the project special. Concentrating on one area of the design process as I have done in my thesis has shown me how much more there is to fully investigate in architecture. As my career in Architecture continues I hope I will be able to study all phases of the design process as I have done with brick.
GRAPHIC CONCLUSION
BUILDING/SITE SECTION
FIRST FLOOR PLAN
RESEARCH IDEAS
RESEARCH IDEAS

The Mayer Center at Tuft University and The Eigan Haard Housing in Amsterdam both helped in my research of brick and its variables. These are some of the conclusions of how brick was used in each project.

- Basic Design Unit, Modified Where Needed
- Decoration at Base of Columns
- Double Row of Vertical Bricks Enhance Openings & Run Around Building Tying Pavilions Together
Brick work at base ties pavilions together.

Shadow lines.

Brick rhythms give the building rhythm.
Eigen Haard Housing, Amsterdam. Michel De Klerk
transition, terminating

slight arching to relate to human height
terminating elements

transition
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