

2014

# BioTechnology

*An Indian Journal*

FULL PAPER

BTAIJ, 10(15), 2014 [8869-8874]

## Research on plane form application in architectural art

Qing Chen

Academy of Fine Arts, Huaqiao University, Quanzhou, 362021, (CHINA)

### ABSTRACT

As development product of modern industrial, pattern construction is a theory about pattern creation, and it is an important fundamental knowledge in design. Pattern construction has been applied in every field of life and economy. There are different deviations because it's operation scope. My study mainly research on application methods and application principle of plane form in architectural art.

### KEYWORDS

Architectural art; Pattern construction; Application; Research.



## INTRODUCTION

In architectural art, plane form is the soul for showing building's feature, because the external of building can determine its image for people for it's obvious to see. For design of architectural plane form, spot, line, area, and block are basic conceptual element, location, morphology, mechanism, orientation, color, and size are its visual elements. If architect wants to make overall coordination in architectural art, he must combine conceptual elements and visual elements tactfully in application of plane form, which demands us to know the application methods and principle well in architectural art plane form.

### APPLICATION METHODS OF PLANE FORM IN ARCHITECTURAL ART

#### Prototype and deformation

Prototype in plane form construction is the simplest geometry, which is the most basic and simple shape, and has character of high logicity, accuracy and integrity. Triangle pattern, rectangle pattern and round pattern are typical geometry. For example, Pyramid and the rotunda residence of Botha are the application of geometry prototype. Deformation means out of shape on the basic of prototype. There are methods for collapsing geometry: (1) Distortion: this kind of transformation mainly means twist and wind to the whole or part of basic shape and which is often to see in FrankOwenGehry's works. His work, Vitra Design Museum is the typical representation of distortion and brings special and different sense of movement to architectural. This method that makes geometry irregular and fantastic is becoming more and more widely in application of modern architectural art. (2) Shrinkage: From literally, this method means shrinking the volume of geometry gradually, by this way, to make people feel different. For example, Cymbalista Synagogue, where is full of reverie, as if you were fairyland. (3) Disintegration: This way means cutting the geometry and separating. You can split the whole or just a part, but remember that you should keep the unity and integrity. Eastwing of National Gallery, Washington D.C is a typical work of disintegration. The vitra Design Museum in Welkon, German is shown as Figure 1.

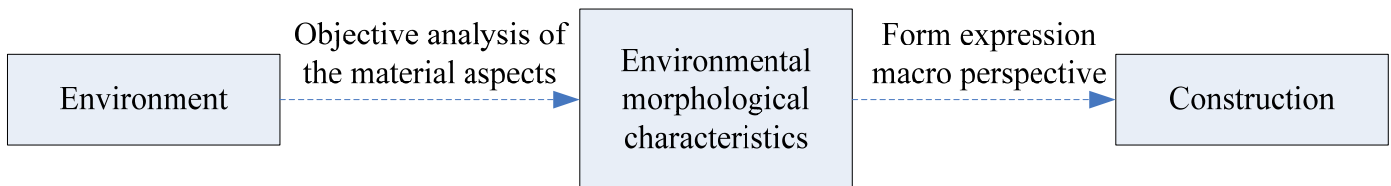


Figure 1 : Vitra Design Museum in Welkon, German

#### Splitting and recombination of geometry

Expecting deformation to geometry, the plane form construction of architectural can change into a new plane form by cutting and recombination. There are several ways for cutting of geometry form construction in architectural art. (1) Splitting with same shape, splitting with same volume: splitting with same shape means the shape after splitting is the same with geometry; splitting with same volume means the shape after splitting could be different with geometry, but the volume and proportion should be almost. (reference drawing 2) (2) Fibonacci Golden Ration: according to the harmony proportion, splitting the shape after splitting and keeping unity. (3) Free segmentation: splitting the shape that lack of similarity and making unity with principal and subordinate.

Recombination of plane form segmentation in architectural art refers to establish new relationship among shapes by recombination, in this way, to form new shape. There are 2 methods for recombination : (1) Contact: two shapes with different visual features could change the sense of visual continuity by contact. Practice shows that surface is the strongest contact method, next is line contact and spot contact. Surface contact has been used in Kennedy library (reference drawing 3), which make simple triangular glass wall contact with solid wall, forming the beauty of simplicity of artistic feature in the whole building. (2) Intersection: insertion, stack, clench and rotating between two different geometry are belong to recombination of intersection. Frank Lloyd Wright's Fallingwater is typical representation of recombination. In design, the contrariety is neglected for stack and alternate between different shapes, therefore, forming unique sense of harmony. Picture 3 Kennedy Library. The Architectural design strategies based on feature context-aware is shown as TABLE 1.

#### Plural form combination

Excepting reformation, splitting and recombination on geometry, the plane form construction could be completed by plural form combination, that is to say, regarding the same, familiar or different shapes as basic unit, making it into new shape on the basic of body structure. The fundamental methods include skeleton method and gather method. While each method includes different manifestation.

Skeleton structure is the way that the basic unit of shape recombined into new shape in defined structure. The manifestation as follows: (1) Frame format: frame unit is a kind of neutral frame which based on cube. Planning of Tokyo Bay, Kenzo Tange's production is a typical frame format. (2) Tandem: in linear situation, many shapes prolong in different

distance repeatedly, combining the facade of closed space and outer space. Unit of every shape could be identical, and could be different shape or similar shape.

**TABLE 1 : The Architectural design strategies based on feature context-aware**

Architectural design strategies based on feature context-aware	Architectural generation by the use of visual perception of environment	Building generation by the guidance of static environment sight Building generation by the guidance of dynamic environment sight Complex expression of building on the environment synesthesia perception
	Architectural writing by the use of environment synesthesia perceive	Perception interpretation of environment images on buildings Penetration and level of context-aware features in the building Anchoring the environment as the images form
	Architecture anchorage by environmental emotional memory	Anchoring the environment as the scene form

Gather method is the way that unit with no extinct and no certain structure combined together in same or similar form by gathering, enhancing the combination of new shape. The main manifestation of gather method as follow: (1) Centralization: This method includes a center matrix which takes prominent position, and other different shapes are gathered around the matrix, making the whole building produce strong sense of centrality. Bach’s Chapel, Faribuz Sahba’s work, is a representation of centralization, making gathering shape just like a blooming lotus. (2) Freestyle: There is no certain geometric rule to this method. It is a free layout of scattered, and the connection among each shape is finished by functional relationship or city road skeleton. The Architectural design strategy based on morphological characteristics of the environment and feature context-aware is shown as TABLE 2.

**TABLE 2 : The Architectural design strategy based on morphological characteristics of the environment and feature context-aware**

Architectural design strategy based on morphological characteristics of the environment	Expression of the characteristics of the building on the environment image	Integration of building body mass and environmental image	Integration of residential buildings and topography
	Expression of the Architectural of the spatial characteristics environment	Use of spatial characteristics of mountain of building	The use of ritual construction of the spatial structure of the environment
Architectural design strategies based on feature context-aware	Expression of the architectural of the structural features environment	Architectural design to grasp the environmental axis features	
	Architectural generation by the use of visual perception of environment	Building generation by the guidance of static environment sight Building generation by the guidance of dynamic environment sight	Comprehensive environmental features to create the spirit of place
Architecture anchorage by environmental emotional memory	Anchoring the environment as the images form Anchoring the environment as the scene form		

**APPLICATION PRINCIPLE OF PLANE FORM CONSTRUCTION IN ARCHITECTURAL ART**

The design and application of plane form construction in architectural art is not freewheeling. There are principles that you must follow. Perfect architectural art can be presented only by basing on every angle, following application method and application principle, and paying attention to application problem.

**Design of plane form construction in architectural art must be true**

To reach fidelity in plane form construction, you must keep the principle of plane form construction in architectural in your heart that serves for people. Design and application of plane form construction in architectural art should not be blind just for satisfying designer’s vanity, and it should based on people’s mental feelings and reach to the depth of their heart. Pay attention to functionality and people’s demand to plane form construction in architectural art.

**The existence and development of architectural art depends on people’s requirement**

The designer must consider its functionality and people’s need. According to their different features, they have different function, and people have different need to them. For instance, the function of residential building is to meet the need of people’s living. The function of store building is to meet people’s shopping needs. The function of hospital building should be adapt for patient’s relax and recuperation. Beside this, plane form construction should meet people’s spiritual needs and artistic needs. Therefore, architect must take these social factors into consideration, and combine the building with people’s life subtly. Architectural design strategies based on Environmental Morphological characteristics and feature context-aware is shown as TABLE 3.

**TABLE 3 : Architectural design strategies based on Environmental Morphological characteristics and feature context-aware**

Architectural design strategies based on Environmental Morphological characteristics	Expression of the architectural of the structural features environment	Integration of building body mass and environmental image	Disappearance and blanking Coordination and isomorphism Simulation and symbol The intention of the repeat The construction of the digestion Remove the boundary
Architectural design strategies based on Environmental Morphological characteristics	Expression of the Architectural of the spatial characteristics environment	Echoes of the architecture skin to the environment image	Use of spatial characteristics of mountain of building The use of waterfront space features of Architectural The use of urban space features of architectural Building grasp the core establishment of core features of the Adding core
Architectural design strategies based on Environmental Morphological characteristics	Expression of the architectural of the structural features environment	Building grasp the core features of the environment	Axis system Association Become the axis node
Architectural design strategies based on Environmental Morphological characteristics	Architectural generation by the use of visual perception of environment	Architectural design to grasp the environmental axis features	Building generation by the guidance of static environment sight Building generation by the guidance of dynamic environment sight
Architectural design strategies based on feature context-aware	Architectural writing by the use of environment synesthesia perceive	Building generation by the guidance of static environment sight	Complex expression of building on the environment synesthesia perception Perception interpretation of environment images on buildings
Architectural design strategies based on feature context-aware	Architecture anchorage by environmental emotional memory	Building generation by the guidance of static environment sight	Penetration and level of context-aware features in the building Anchoring the environment as the images form Anchoring the environment as the scene form

**Design of plane form construction in architectural art should take lesson from traditional marks positively**

Every place has its developing history and character, so, the design of plane form construction in architectural art should learn from local history and culture connotation, emphasize and shape the traits of character of architectural form.

These charming and tradition marks will add more inspiration and temperament to architectural form, making it more harmony with the nature, history, culture and other local flavor. The Architectural design strategies based on feature context-aware and morphological characteristics of the environment is shown as TABLE 4.

**TABLE 4 : The Architectural design strategies based on feature context-aware and morphological characteristics of the environment**

Strategy research achievements	Case use way
Architectural design strategies based on feature context-aware	The use of campus environment characterize
Architectural design strategy based on morphological characteristics of the environment	The use of Waterfront features visual perception
Expression of the characteristics of the building on the environment image	Architectural design to grasp the environmental axis features
Architectural generation by the use of visual perception of environment	Building generation by the guidance of static environment sight Building generation by the guidance of dynamic environment sight
Architectural writing by the use of environment synesthesia perceive	Penetration and level of context-aware features in the building The expression level of campus environment into building

**EXPRESSION OF STRUCTURAL FEATURES OF THE BUILDING BY THE ENVIRONMENT**

Architectural design for the environment to grasp the core features of the core is in the appearance of the environment and the surrounding environment significantly different surface areas. Its size, shape, and other shapes heterogeneity reflect the difference between the whole environment, which is the point feature with command and central of the environment. The Core has important significance for establishing environment structure. For the buildings involved in the environment, the significance of the core is that it existence as a structural anchorage point, and establish the status of the building. There are two expressions of the core features of building for the environment: to establish a core or join the core.

**Establish the core**

Taking the building as the core of the environment is significantly different from the building's environmental image handling. Building on the environment through its own image than to improve environmental quality, and reshape environmental characteristics. This approach is commonly used in the environmental image of the order is more chaotic or plain lack of features of the case, or the case of the building itself has outstanding demand. More typical is a landmark for all types of design principles that are causing a significant difference with the surrounding environment, obtained uniqueness from the comparison.

In an environment structure with the lack of the core, the intervention of buildings which significantly heterogeneous with the environment will tend to be the central element of the structure, easy to get recognition, overall site structure and establish their status. Grasp and express the characteristics of this structure are important beneficial strategies to building or monument generated. The building is set to the core of environmental structure; you can reach in contrast to the form of construction and the environment. The main means are: ① select vertical high level wins stands in the form of extension of the matrix; ② choose a unique shape form, strengthen the building geometry and artificial, from out of a clear distinction between the matrix; ③ create the difference between the amount of building body and environment matrix composition. The core generally requires considerable scope matrix to bring, such as a more homogeneous area large area of water, desert, grassland or equal quality construction. In these types of backgrounds, building on the results obtained to establish the core structure is most clear.

**Join the core**

When the environment structure with the core needs to highlight their building, then it can be added to this structure homeopathic to use structure to support itself. For chicken Hollywood in Los Angeles suburb of mountain establish their own logo, architect Christian Bay-Jorgenens made a wonderful concept plan, in the matrix has some terrain features many hilltop plaque eleven selected the most striking an environmental structure as both core plaques, in this hilltop setting huge HOLLYWOOD word marks, logos luxury hotel after attachment to allow flag transformed into a long-term presence of the building, and can be a gathering place for contractors television activities. Christian resolves to: "This program can improve the understanding of signs for Los Angeles people, let them look at a whole new perspective of this flag." This is a fairly straightforward strategy on the use of core plaques, regardless of whether the final plan can be achieved; it is an interesting try for the application of natural environment structural characteristics.

## CONCLUSION

The importance of plane form construction to architectural art is self-evident. Comprehensive and unique building could be designed only based on the application method and principle in the application process of plane form construction.

## REFERENCES

- [1] Huafeng Chen; Planar Formation and Modern Design[J], Journal of Arts Education, **3(3)**, 24-25 (2012).
- [2] Zhiwen Lin; The Analysis of Plan Design to Hotel Building[J], Journal of Jiangxi Building Materials, **1(1)**, 60-61 (2014).
- [3] Dongdong Wang; Research of “Softening” Features to Architectural Form[J], Modern Commercial and Trade Industry, **7(13)**, 82-84 (2010).
- [4] Huang Hu; Analysis on the Method of Geometry Configuration in Architectural Modeling[J], South Architecture, **3(3)**, 105-106 (2011).
- [5] Guo Liang; The Fluidity of Houses Parametric Research on Coastal Villa Design System[J], Urban Environment Design, **Z2**, 43-45 (2010).
- [6] Yang Yi; The Application of Plane Form Elements in Architectural Design[J], Art Panorama, **2(2)**, 76-77 (2012).
- [7] Xuefei Zhong, Mengliang Shi; Harmonious Ecology: Calling for Architecture Patterns Breaking[J], Journal of Hunan City University(Nature Science), **1(2)**, 17-18 (2008).
- [8] Wang Ting, Liu Bing; Analysis on Building Plane Design[J], China Storage and Transport Magazine, **8(1)**, 99-100 (2012).