

The Nature of the Architectural Surfaces and the Structural Relationships in Order to Build Stability and Formal Balance

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Abstract

The architectural surface represents one of the main pillars of formal configuration that work with each other to give the building external appearance and its formal properties. In general, the most important challenges facing the study of architecture is the analysis of The Structural Relationships under which the formal formation and formulas for generating its patterns within the different architectural directions to benefit from her in the process of architectural education. This research paper represented a step in the way of analyzing and establishing an information base for architectural propositions that dealt with surfaces according to Structural Relationships with multiple linking, modulating mechanisms, and applying that to selected models for outstanding architectural works throughout architectural history, Then these mechanisms were crystallized and explained precisely and in detailed drawings using the AutoCAD program, reaching the characteristics of the formal configuration at the level of balance and stability resulting from the nature of these architectural surfaces and the relationships according to which. The research methodology is based on building comprehensive theoretical framework on the form, architectural surfaces and structural relationships, as this is considered a necessity to explore the mechanisms by which the designer works within the Modernity and Deconstruction architecture.

Keywords: Architectural surfaces; Structural relationships; Formal configuration; Stability and balance

Introduction

The formal composition is produced by following the functional, physical, psychological and symbolic conditions of the project. The designer is considered as a scientist who collects and analyzes the facts of the design problem down to the structure of the shape. The formal composition is generated from the relationship between the elements forming the boundaries, which are represented by continuous horizontal and vertical surfaces such as ceilings, walls, columns which are organized in a way that enables the mind to perceive this formation.

The formal composition

Sometimes the borders are continuous and immediately perceived, or some of them may disappear and the mind can perceive them, but in multiple ways. The surfaces form a closed space and unite together to form the architectural and urban form. Architecture is one of the arts that express its producer and users, as the formal body in architecture is the product of the interaction of mental and material factors, within a specific manifestation strategy to translate this thought. Through the correlation of several architectural surfaces, whether horizontal or vertical or others with multiple structural relationships we obtain the characteristics of the group. Mitchell proposes to study architecture as a clear approach by establishing logical rules based on specific intellectual situations and clarifying the potentials inherent in them [1-3].

The Architectural Surfaces Forming the Shape

The surface is the indication of the movement of a line in a certain direction (and it forms an area of length and width, and is surrounded by lines that represent external boundaries that create volume). And the surfaces in the architecture may be horizontal, such as floors and ceilings, or vertical, such as walls, columns, etc. Form is an indication of the movement of the flat area of the surface in the direction to be a three-dimensional shape with a length, width and height, The surfaces forming the shape may be regular, geometric, such as the cube, pyramid, sphere, and others, or irregular, such as irregular organic shapes. And the mind is able to perceive space through the relationship between the elements forming its boundaries, which are represented by the regularity of architectural surfaces. Architectural surfaces can be divided into [4,5].

Vertical Surfaces

These surfaces are the most specific to the space and give a sense of closure and privacy to its users, in addition to its role in the formal formation and drawing the boundaries between internal and external spaces and its structural role that it plays in carrying horizontal surfaces. Sometimes vertical surfaces act as an added cover wall and affect the shapes of the interior spaces. Structures can be constructed using cover wrapping systems to represent the entire facade of the building or part of it (Figure 1).

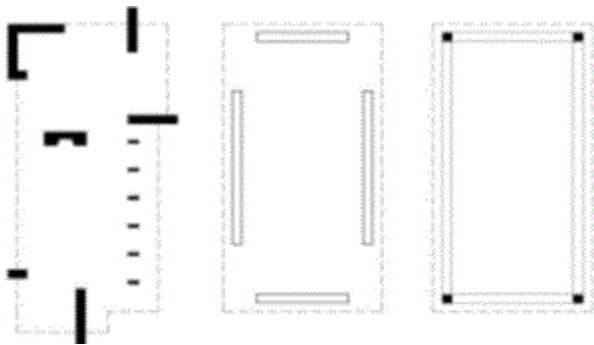


Figure 1: Vertical surfaces.

Horizontal Surfaces

The horizontal direction corresponds to the tension of gravity and stability, as it is static and the horizontal surfaces are often not apparent in the external shape of the building, but their effect can appear in the internal spaces. The designer's choice of the method in which he wishes to employ the horizontal surfaces depends mainly on the system's formal specifications, and his tools in this regard are what technology offer in terms of shape and, what they add to the visual impact on the facade of the building [5,6] (Figure 2).

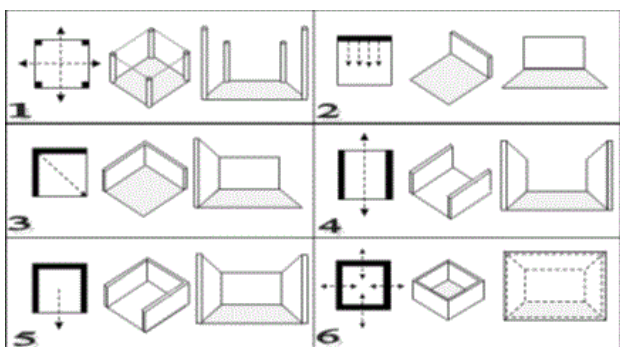


Figure 2: Horizontal surfaces.

Irregular Surfaces

Advanced technology has contributed to the development of new technical and industrial systems that contribute to the design manipulation of the model, whereby changes can be made to the surface element easily as organic and geometric shapes merge with irregular relationships to generate free shapes and surfaces as well as relying on tectonic architectural elements to generate physical shapes [7-9].

Architectural Surfaces within the Different Architectural Trends

Technology had direct effects on architecture during the twentieth century, whether in terms of materials or construction methods, which appeared through many architectural trends that prevailed throughout that century from modernity architecture to deconstructive architecture. The architectural form, as a sculptural volume, is a three-dimensional image and with the effects of shadow and light and the prevailing structural relations between the parts and the surrounding

and the nature of the structural or raw material used on the surfaces of the mass with all its divisions and the diversity of its texture, luster, color and coded messages that affect the shape and change the psychological character when looking at it, causing a reaction receiver [10,11] (Figure 3).

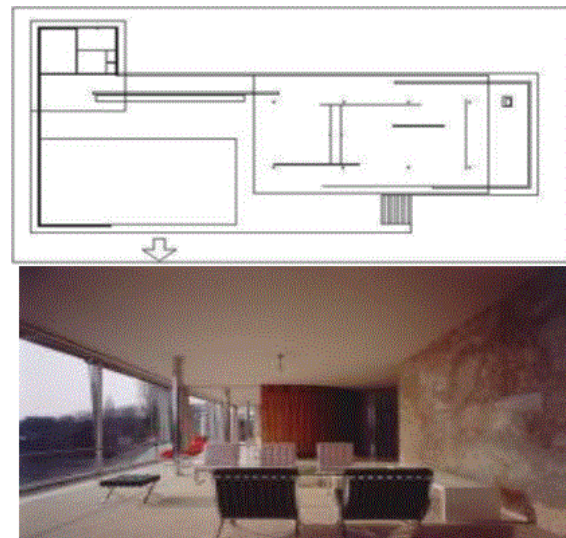


Figure 3: Mies Vandro home.

These architects presented strange buildings bearing the characteristics of contradictions without a fixed formation in order to reach a new language, and the formal formations of these buildings turned into attractions [12]. Architecture is looking for new form fixtures, and contemporary architects have sought to employ the latest available technologies to serve architecture and its purposes, by developing their designs. At the end of the twentieth century and the beginning of the twenty-first century, modern digital technologies and their applications were adapted to serve the creative process and produce architectural formations with new structural relationships. Therefore, it was important to study the technological effects of the digital revolution and its applications in areas related to architecture, and the reflection all of this on contemporary architectural thought, which represents a new architectural innovation, so that many modern trends emerge [13].

There are many models that Jerry implemented within the framework of this architectural orientation, such as the Hall Concert Disney Walt in Los Angeles in 2003, and the dancing building project, which is a model for deconstruction architecture and its orientation towards the production of architecture of shapes, collision and sloping surfaces [14] (Figure 4).



Figure 4: Architects presented strange buildings.

Stability and Formal Balance

Balance means the stability of everything in its place, and balanced architecture responds to the necessity of human needs at all times and places and one of the ways to achieve balance is to take into account the neighborhoods and the surrounding nature. The balance can be reached static, moving or unbalanced. When paying attention to the masses and surfaces and their details, we find in it the consideration of gravity by memorizing the constants and variables and emphasizing the regular lines in the design of the shape in order to obtain the visual balance. Among the means of balance is to preserve the structural system of the building and its link to gravity and take into account the neighborhoods and nature.

Architecture is considered the most visible art, as it closes our surroundings and our environment wherever our eyes are directed, hence the designer's interest in the Structural relations that surround the formal formation of the building. We get the vertical plane and thus create objects and spatial perspective. This is the vital realm for the imagination of artists and architects [15].

Corbusier assures me that the perception of a building is carried out according to a general reading of the elements and relationships, and this feeling is perceived by the viewer to generate the final impression of the changing physical characteristics and characteristics of the form the human mind understands the change of those architectural surfaces, draws their deviations, and distinguishes the sensory aspects, not the purely physical or structural aspects, in an attempt to control the transformations that took place on the entire architecture and its functional and sensory multiplicities represented by the shape, its dimensions, the surface conditions, its geometry and its texture [16].

Practical Application

To understand the structure of the form, it is necessary to analyze the form, a descriptive and structural analysis, the research focuses on analyzing the nature of the architectural surfaces and the structural relationships according to which these surfaces are organized in both the trend of modernity and deconstruction and its impact on stability and formal balance and their transformations across time-space. Therefore, workings will be analyzed for the most important modern architects who left an imprint with their creative works such as Lee Corbusier, Frank Lloyd Wright and Hermann Hertz on the one hand, and the works of the most important architects of deconstruction.

Conclusion

The structure of the shape in modern architecture is dominated by flat geometric surfaces of floors, walls, ceilings, and the rest of the structural elements, whether transparent or solid, the square angles based on the structural relationship that connect these surfaces prevail. As for deconstruction, we find radical changes in the relationships between architectural surfaces, where organic forms with curved surfaces or irregular geometric shapes, in which the shape turns into a sculptural configuration and generates infinite extensions of the surfaces.

The style of designing architectural surfaces has a great impact on achieving stability and formal balance and stimulating the mind of the recipient and his sense of pleasure and beauty. The architecture of modernity has shown a revolution on what is familiar and prevalent in dealing with surfaces in Renaissance architecture, Baroque architecture and classical architecture in the 18-19 centuries and it generates multiple visual images and achieves stability and formal balance to a large extent. It was distinguished by its engineering geometry of the surfaces, which after a period, the mind can be simplified and does not satisfy the viewers or satisfy their tastes. While we notice in the architecture of deconstruction a remarkable change and revolution on the regular architectural surfaces of modern architecture, this architecture was characterized by the demolition of the well-known rules in the compositional relations by which the surfaces are organized, for example, the works at the level of stability and formal balance, it requires circling around the building and seeing it from many angles and actions of thought in an attempt to perceive, understand and identify the formal formation. Deconstructive architecture has provided tremendous potentials for surfaces and produced new architectural forms that are not based on well-known rules that can be simplified and drawn, as they stimulate ideas and attract attention in multiple ways.

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