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Parametric in Indo-Islamic Architecture

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Abstract - *This paper discusses the relationship between parametric and Indo-Islamic architecture. Parametric is in easy terms nothing but to deal with patterns, symmetry, and geometry. Indo-Islamic architecture involves theses properties in which proportions play a vital role in the designing process. It mainly serves two objectives i.e order of patterns and their respective geometry. Indo-Islamic architecture has beautifully evolved up shining these properties over an era. The application and methods of these geometry's have also evolved with the passing of time.*

As a community which is increasing day by day and is holds a massive count in the worlds population , it is very important for us to recognize the sole purpose behind their initial creations and to trace them upon the present conditions so as to blend it with the current scenario without making it loose its original importance.

Key Words: Architecture, Indo-Islamic, Parametric, Domes, Proportions, Patterns, etc.

1. INTRODUCTION

Parametric in indo-islamic architecture is nothing but trying to give the indo-islamic style a geometrical outlook.

The need to study the relationship between Indo-Islamic Architecture and Parametric has become substantial as with the passage of time architecture is only focusing on aesthetics and not on the concepts and ideas that were put into designing the structures in those era's.

Every pattern and geometry had a reason and a concept which make them stand out even today ,looking at them we realize the amount of thought and calculation that had been put for such a masterpiece to be conceptualized.

What really is parametric ?

Parametric is not only having to deal with complex mathematics but it also relates to geometry, patterns, proportions and repetitions.

Indo-Islamic Architecture also involves many patterns, proportions, symmetry and repetition which were a key aspect while designing those structures.

Geometry has been very common in these structures for a very long time now.

What we really need to know is how these shapes and patterns were introduced in this style and how with the passing of time new aspects of design unfolded.

2. LITERATURE REVIEW

2.1 Domes

Domes originated as the availability of timber decreased making it difficult for constructing flat timber roofs. Initially mud and brick were used to construct these domes in the middle east using the corbelled method. Then later on they were supported by columns. By the 7th century wooden domes started coming into trend in Byzantine Architecture.

While the presence of these structures was becoming famous and common it also had many difficulties in constructing them. For the domes to be made a transition from square to circle had to be made with respect to area, which became an issue.For this conversion to become easier two methods were taken into practice. The first being the formation of squinches, i.e a mini arch which is made to support the diagonal Corners. The second method adopted was construction of pendentives which were the shape of inverted cones, whose base provided support at the top, forming a platform for the dome to rest on.

Then came one of the most extravagant forms of conical domes , known as the Muqarnas. This dome type came into construction in the early 11th century. This type made conversion from square to circular forms much easier. After this the idea of double dome was introduced.The basic principal was tall exterior domes with shallow interior domes.

2.2 Geometry and spirituality in Islamic Architecture

Geometry in Islamic architecture and its patterns have always been linked with proportions.The basic concepts in Islamic patterns have been derived on the grounds of these proportions.Islamic architecture and its patterns are mostly those styles and techniques which make an impact on the person entering the building and leaves a hint of knowledge.Sufism intends to believe in unity in divinity and their concept is to believe in all the moments of life as they are a gift from god. They had a system for understanding and interpreting the architectural elements they used in these designs for people to learn from and understand the purpose and reasons so as to why those forms were made and how they originated and the concept behind them.

Most of these intricate patterns are based on the proportions formed by the prime roots of $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$. These proportions are considered the proportions of beauty in Islamic Architecture. Circle was the basic and

the most common shape used, from which all the proportional geometrical patterns were inherited. They considered circle as a symbol of unity. It was used also because all other shapes could be formed from a circle including all polygons , proportions of roots etc.

Geometry and patterns in Islamic architecture are also derived from man, nature and cosmos. They say that it is because of the presence of patterns related to man , nature and cosmos in Islamic architecture the human mind is able to interpret harmony and creation. These mathematical patterns are the transformation and visual depiction of man, nature and cosmos. They believed that these geometries and patterns are depicted from the laws of the universe. They also believed that these geometries are based on the creator itself and by mixing them with music, art, and architecture the design formed gets its own fruitful character which depicts harmony and sacredness.

2.3 Method of creation of geometric designs

As we know that all the basic geometries in Indo Islamic Architecture are derived from a circle . Divisions are made so as to create harmony . Division of the circle is basically done in 4 stages :

1. The Planning Stage : Within the circle of unity regulating the proportional systems based on the single unit pattern . The final decision is made by using the denotation which underlies the geometric patterns and its connection with man, nature and Cosmo.

2. The division phase : where construction of the pattern is done by dividing and creating patterns using symmetry.

3. Order and structure of the pattern : crossing lines to form different patterns and regulations on natural nodes and junctions formed by these intersecting lines. This pattern formed can be further used in the evolution of patterns.

4. Forming Desired Pattern : Finalizing the geometric variations which are the be repeated by defining their border lines. It is basically derived from all the proportional systems that are used in the formation of the single unit. This process can then be repeated infinitely , using the same center.

This infinite repetition of geometrical patterns and the principles used for the construction of these geometries are said to be a reflection on the unchanging laws of God.

The most common formations are geometries of :

1. Fourfold to Eightfold pattern

2. Fivefold to Tenfold pattern

3. Sixfold to Twelvefold pattern

3. CONCLUSIONS

We can conclude that proportion is a characteristic of Islamic patterns, serving as a tool of self-guiding process for esthetically proven design. Muslim builders knew of the autonomy or ‘‘inner laws’’ in constructing spaces and patterns. In ancient buildings these relations are seen in various elements of the building. Buildings were designed with distinct care, manifesting mastery in pattern design of their spaces and surfaces.

Geometric proportions balance the order of patterns based on mathematical ratios, which is dominant in understanding the universe, man and nature; these proportions are, by their nature, the essential ingredients in sacred geometry, as Pythagoreans stated that these euphonic ratios render music in a balanced pattern.

Geometric proportion is strongly linked to Islamic cosmology, philosophy and metaphysical dimensions. It brings meanings and spiritual exercises for the viewer, deconstructing the meanings underpinning the geometric framework. As such, the viewer is more than an observer; he or she is a participant in the establishment of a strong link with geometry symbolizing man, nature and cosmos.

The geometry as well as its rhythm shown in Islamic patterns illustrates an infinite variety, permitting and encouraging contemplative reflections. It is one of the most powerful forms of sacred art . It is a source of contemplation that allows our minds to wander and contemplate the infinite. These patterns were developed with strict geometric rules, relating to the understanding of natural forms based on geometric ratios in the cosmos, set as the prime mover behind design.

Inculcating these design principles in modern day context, keeping in mind the forms Indo- Islamic architecture has taken over the years ,if we are able to give back to our society .

Giving back to the society simply means re creating these ethics in modern day architecture .So that man can feel the connections that designers have felt while creating these patterns. Spaces which make you feel these patterns and their concepts and proportions keeping their originality intact. Keeping their purpose same.

Connecting Islamic Architecture in Today’s Society To Ethics and Patterns. Getting people one step closer to humanity , society and its teachings.

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