

## **Vernacular Architecture**

### **Lecture 04**

#### **Vernacular Principles**

"The Vernacular architecture of our past was based on certain principles of design." As much as it was a direct response, it was a very direct response in terms of man doing for his own building, for his own needs, it was governed by certain design principles. As a result of factors, they can be classified as region specific and culture specific, this is the most basic form of categorization. Region specific refers to site, landform, topography and climate, this is the direct form of classification. Culture specific - the living style, activity pattern, customs and traditions.

These are the two principles of design with respect to region and culture. As I said, we will compare Vernacular architecture principles and principles of design. These are the following principles of design. In design evolution, architecture cannot fulfill its function and generate its message unless it has some underlying principles of design. You just can't go about laying out a building, you need to have a set of principles, which are in this case; Axis, Symmetry, Hierarchy, Rhythm, Datum and Transformation. We study this extensively in principles of architecture or theory of architecture. These are what constitute principles of design.

Let's talk about Vernacular architecture. Vernacular architecture principles are not as such systematically termed or differentiated in terms of Axis, Symmetry, Hierarchy, Rhythm, Datum and Transformation. It is rather a direct response or an instinctive response to what was necessary or what was needed. If you look at the principles of Vernacular architecture, it becomes very simple or put in very simple terms. They are three determining factors which we talked about earlier; thrift which is nothing but money or means of expense and durability. These are the most important aspects which happen to be the principles of design in terms of Vernacular architecture. For principles of design, we had various orders or dimension orders but in Vernacular, the principles are rather simple and direct instinct to response. We will talk about constraint.

Indigenous builders use local climate, culture and materials to guide their processes instead of years of formal schooling. These principals of design have evolved and are highly respected and obviously very useful in coming out with a design but involved a lot of schooling and processes in the studies whereas in Vernacular architecture, it was rather a process of trial and error or just by learning from our mistakes, something which defines architecture and something which we have been discussing for a longtime now. Indigenous builders use local climate, culture and materials to guide their processes instead of years of formal schooling. You take principles of design, you take Vernacular architecture, this is guided by a set of principles which are derived

from a set of studies, this is directly guided by a set of principles of design which are not essentially principles but are rather available in contextual situations such as climate, culture and materials. The constraint of a locality may limit formal elements, materials and size to vernacular builders but making choices inside the presented constraints allows for innovation to take place outside of initial expectations. As much as its not a principal of design in itself or designing process order, it allows a lot of constraints which modifies forms as we have talked about. Once we place constraints on a certain form of building or on a certain form of construction techniques, the innovation or the creativity that comes from within these things are what shapes Vernacular architecture. This becomes an important principle design in terms of Vernacular architecture. Before the industrial revolution, around 200 materials were used in the building trades worldwide. Overall, around the globe before the industrial revolution, 200 materials were used to build different types of buildings. Most of these materials were same nearly everywhere. 200 maybe a number but still we are just talking about types of wood, types of stone, types of soil base brick type, etc. This is very repetitive in terms of various regions. You talk about middle east, you talk about America, you talk about Africa, you just have variations of the same material depending on the climate and availabilities of these materials. This is conducted Vernacular architecture. This is what happens to be an important principle in the design formation of Vernacular architecture. Most of the materials are same nearly everywhere. Wood, straw, brick, stone and Earth, these were the repetitive materials unlike today after the industrial revolution. Even with such a limited array of materials, widely different uses and forms evolved in different locations. You just can't term Vernacular architecture as something that does not have variety or something that does not have principles of design because within this limited variety of constraints it was able to come up with a wide variety of architectural types, styles and aesthetic approaches.

The first important principle in terms of Vernacular architecture which we talked about was Constraint. Next, as we discussed we talked about thrift. Once you decide what the climate tells you, if its raining or if its too hot, you come up with a solution for the building. The next factor that directly affects design is the expense or the money or the currency put into sourcing these building materials and making them available. Indigenous buildings to get the most building for the least material, money and time. Practicality is the focus. Being practical in terms of what to build, with what to build was important factor. Thus, it became an important factor in the principle of Vernacular architecture designs. Buildings begin with something small and necessary and is only added to as money, time and need allow. You have a dwelling unit, this evolves, grows and is added as per the requirements of the people and as per how much money permits to do so. These aspects became something that began to dictate or guide the design which makes it essentially a principle of design. We have lost sight of this contemporary design. Simply put, yes! money is an important aspect then, it was just a different form then,

today money is an important aspect. But what's missing from today's contemporary design is the practicality or the focus or to do something that is necessary or when it is allowed. When we look into a design, we make sure something is designed or some element is included and we make sure we source it out and it is done as and when before the building is occupied as such. So, it's been designed consciously. But in terms of Vernacular architecture or back in those days, before the industrial or postindustrial era, what was done was building was built and it was allowed to evolve as per the time allowance, money and need. It makes it a very important guiding factor in the principles of design for Vernacular architecture. We often seek the cheapest solutions monetarily, but we don't always seek the all-round least wasteful solutions. We do look at money as an important aspect and in today's current scenario money is an important aspect in shaping up the principle design element of a building but we do not concentrate as much into being the least wasteful but those days that was a very necessity or an instinctive approach. That's the second aspect which is a direct principle of design in terms of Vernacular architecture.

Next, comes durability, it is just a step by step process. At first you respond directly to the climate, then you find out what is available, what you can source and what is possible and then you live in it and make sure it lasts for a long time or make sure you do things in order for it to last, that's durability which is the third principle of design in terms of Vernacular architecture. The long lifespan of buildings is part of what allows them to grow, adapt and evolve. Lifespan of a building is essentially an important aspect. We did talk about kutchha and pucca houses. Kaccha, they were aware that regular replacement and maintenance was necessary and in pucca houses, it was rather less regular. Understanding this was an important aspect of the design, this shaped kutchha and pucca which means that this is an important aspect in the design element, it becomes the principle of design and the third one, in Vernacular principles of design. With that comes consideration of material and maintenance. This is a direct result of the material and also the methods of maintenance. Most of the materials used in vernacular building practices are by very nature durable, stone and large timbers. Man responded unlike today to direct instinctive needs. When they looked into a material to use, they made sure it was durable. Hence, by the very nature they were durable, stone and large timbers. This durability was a measurement or a dimensional factor in terms of principals of design. Ephemeral materials such as straw, thatch or wooden shingles are used in ways and places that allow them to show their wear and provide for easy repair and replacement. Obviously along with these materials, other materials used were straw, thatch or bamboo but they used them in places where they do not cause an issue in terms of durability. These materials were for example used in roofs. Roofs after a particular precipitation or a particular set of rainfalls or a rainy season were replaced as they wore out. Hence, the durability of this material becomes an important aspect in design.

## **Principles of Design – Ancient City**

We talked about the three principles and the principles of design as well.

Now, we will be looking at Vernacular architecture of vernacular settlements in terms of the design elements that we have been talking about. The first example that we are going to be talking about is Mohenjodaro. We have all heard about the Indus Valley Civilization or the Harappan. As much as this was very predated, it was very well planned and comes as a shocking surprise as to how well planned our ancestors were. The Principle of Design here is the underlying geometry that was 'The Gridiron Pattern'. Mohenjodaro was actually unearthed or excavated and they found that they were well planned. Obviously Vernacular architecture was very prevalent and had principles of design that were helpful in terms of guiding their process. Houses were designed in close proximity to each other built around a central courtyard. As I said, when it comes to Vernacular architecture, you have single dwelling units, a group dwelling units, a community and then a settlement. Here, in Mohenjodaro, it was clearly evident that a group of houses were designed together in close proximity to each other around a courtyard. There are various aspects that go into this certain kind of formation. Obviously, it is a direct response to the climate, direct response to a socio - community feeling, it is also a direct response to the way they need to exist in terms of being attacked or provide a sense of security. The facades were solid, windows open to the courtyard and passages. About being introverted and extroverted. Window and passages were all open to the courtyard, creating a community feeling, a place of social gathering. This was obviously a part of a social reaction. Introverted design planned around the main depression 'the tank', that acts as a community space. What they did was, as I said, the 'Gridiron pattern', The tank or the depression, the water area acted as a community space around which the whole design was planned out. In terms of construction, mud bricks were used. These were available materials and were used as a direct response. Series of enclosures for security reasons with gates at strategic locations. We talked about climate, available materials, social concerns, after a period of time, it became a necessity for groups to exist together and defend themselves from being attacked by other people or other tribes. This became an important aspect of the design. This is a photo of the excavated Mohenjodaro, this is the depressed tank or the water body I talked about, this place was rather extroverted and seemingly acted as a community space. While the rest were all arranged in gridiron pattern, again in the bath area.

The principles of design - we talked about direct responses in terms of Vernacular architecture, now we will talk about the principles of design which was later derived but can still be applied in Vernacular architecture. There is an axis, a line that is established by two points in space. Series of lines cross each other to form gridiron pattern. What they did was, as I said they established a street around which other streets were formed in grid iron patterns, this axis

formation was rather a direct response to climate, a direct response to the socio-economic aspects but it derived into being the axis. Furthermore, the Hierarchy, articulation by variations of form and size of space. Hierarchy of spaces, we talked about a courtyard, we talked about a larger water body which added to this community space, hence there are hierarchy of spaces in terms of Vernacular architecture also. Here in design we can classify it as hierarchy of spaces. Transformation - alteration by various forms, manipulated in design can be seen. A place evolved from its time, for instance, a community could develop, a group of people could develop to become important, they could move closer to the communal space, nearer to the head, the king or similar people. These transformations were very visible.

### **Principles of Design – Ancient Village**

We will move on to another example, this is in Africa, it is called Dogon village. These are cluster formation of settlements with very crude and vernacular way of construction and a response to climate. We are talking about Dogon village, Africa. The organizing principle again is a central courtyard. We talked about different areas having Vernacular architecture but having very similar ways of answering to the social and climatic changes. The Dogon village designed by hierarchy of spaces, the social and spatial fabric generated out of few simple design principles. Design is either along the main axis or the diagonal axis. What they looked at was a main street around which to settle houses. This is termed as the axis or the design principle. A design is either along the main axis or along the diagonal axis. Building walls seen at an angle along the diagonal axis as perspective with vanishing points shifting along axis creating an ever changing perspective view. When they created this space, when they created these group of buildings, they did not essentially look at perspectives, one-point and two-point perspectives, how were they essential etc. But the way they practiced architecture, it resulted in ever changing views. These are very much correlated to Vernacular architecture and principles of design. Furthermore, we are talking about individual dwelling units. Low ceilings supported by carved pillars. It was necessary for low ceilings to be present to keep the heat away but these were supported by pillars. What they did was, they carved the pillars. Pillars are structural things but they made sure it was curve, thus applying a social and aesthetic approach to it.

Spatial character evolved to defend against warriors. Beyond a point of time, it was necessary for them to safeguard themselves from other people attacking their own people. Spatial character had also evolved with respect warriors attacking their places. They built their houses in clusters that acted like fortresses. It was a direct response to a threat. Geometry of design adopted in dwelling includes pure geometric shapes like square, rectangle and circle design. These are direct geometric principles of design but this was used in Vernacular architecture not intentionally but with simple understanding of design. You can look at this picture, they have just rubble, brick with flat roofs and also sloping roofs. Built in clusters to form fortress kind of

settlement. We move on closer to home, this is Dhordo Village - Rann of Kutch. Here the streets has a space for community. We talked about how important spaces play when it comes to hierarchy, in the way the design turns out. Here again, street is a space for community. When the village had evolved or design, street was an important aspect of the community where activities and other forms of socialization happened. This became a guiding factor of the design which is nothing other than the axis. Streets are narrow with a wide opening to the main court and spaces. Again, courtyards are repetitive features. These streets are very narrow, so close to each other, they are not separated, giving a community feeling. They had wide opening to the main court and the main spaces. The main communal spaces had wide openings in a way to welcome each other. It can be with or without a variety. Variety might not be a necessity as much as it is today but it wasn't a necessary aspect in terms of Vernacular architecture. The geometry can be curves or zig zag to meet the multiple needs of the culture. Spaces or geometrical spaces evolve slowly and people were allowed individual freedom to do it the way they wanted it. Radial pattern, in terms that the design generates from one central focal point welcome the court. In designing a settlement or in the evolution of settlement we talked about access and symmetry and all. Radial development is a further important type of design where a particular settlement, a building, a specific space is designed with a central focus from which other things evolve. This was done instinctively in those times. Radial pattern in terms that the design generates from one central focal point, welcomes the court. The main communal area, or the main courtyard was radial part from which the dwelling units developed. The Street Pattern - bannis clustered around the axial street, the lower caste kept away from the main settlement area, the main court is near the heads house. Bunnis are nothing but single dwelling units in the outer village. These were clustered around an axial street. Apart from being in a courtyard setup, they were also clustered around an axial street. We talked about central focus areas from which the village developed, around these were the dwelling units called Bannis. The main court is near the head's house. The hierarchy of spaces in terms of social, political aspects happen to be that the main court is near the head of the village's place. This is an example. The Dhordo village is more or less lost, today it is done as model villages, these are examples of that. You see the court area, around which the sample bannis have been made. Radial pattern is what has evolved, you don't have linear or axis based pattern like in the previous studies of Mohenjodaro grid iron pattern. This is more of a radial pattern.

### **Principles of Design – Jaisalmer Fort**

The Thar desert, Jaisalmer fort is a good example. This is not a rather a traditional settlement, it is rather a fort around which a settlement came about. Jaisalmer fort is a traditional settlement, not exactly a vernacular settlement. The city is a network of streets, high buildings and narrow streets. The fort was developed as a strategic location and then the streets were developed around which houses of the dwelling units came about. The hierarchy of size, the design layout

shows a network of space that vary in size. A space dominates when it is significantly different in size from all other elements. Here size was an important aspect in showing the design pattern of the layout of the place. Hierarchy of shape was also important - visually dominant by the shape from other elements in composition. A discreet contrast in shape is critical. Design principles evolve with each dwelling unit. Thus, visually dominant by the shape and other elements in composition. The elements in the buildings were discrete in contrast and happened to be dominant. Standing out in such a way that hierarchy of shape is such an important design. Rhythm - patterned recurrence of elements in design such as Granary areas in the design. Repetition as a dense organization of repetitive pillars. We talked about principals of design - rhythm which makes nothing but repetitive elements or repetitive design features and this began to be visible slowly. This was done rather instinctively, just as a direct response or a repetitive feature. But today it's rather called rhythm or systematic way of designing, this is very much visible in vernacular architecture. Repetition as a dense organization of repetitive pillars. Pillars became a repetitive feature and thus constituted rhythm and vernacular architecture. This is the Jaisalmer city, the view from the fort. You'd notice clusters, the shapes, the way streets are present. The sizes are prominent. The villages or cities I have been showing you have very small size or rather regular size. You'd notice it's become rather chaotic but nevertheless sizes are distinct. The shapes are not defined either. Shapes become individually prominent with respect to each dwelling unit.

We move on to Bidada in Kutch again. In the Kutch region, the architecture is a result of hot and dry climate. Climate is the first design principle, it is directly applied. The village is situated near a river, the house has a geometric circular form. Though a river is a strategic location for a civilization or for a group of people to live. Strategically, the village has settled or evolved there. The house has geometric circular form. These circular forms can be a direct response to aesthetics or a direct response to climate. This is also a designing factor. The layout of village is based on caste hierarchy, Brahmins, Harijans, Darbari and Muslims. We looked about examples of how the hierarchical spaces came about. Here the hierarchy is based on caste which is an important socio-cultural aspect, the Brahmins, Harijans, Darbari and Muslims. Accordingly the minority were phased out and the Brahmins and the Harijans were one after the other. That is how the layout became an important aspect of the principles of design. The network of streets is organic, resembles the branches of trees. The underlying geometry is the ring with branches. The streets have ever-changing views. We talked about axis or symmetry which has perspective views and as much as those organic or chaotic development of houses happen, the streets have an ever-changing view. You have differing views in every point such that it is not repetitive as in a gridiron pattern or in a street or axial street pattern. This is an important or unique aspect. Chowks or Y shaped junctions make the intersection of streets. In axial streets, there are main streets and sub streets. That's how streets are formed when buildings are shaped. Here,

obviously its all organic, there are junctions, these junctions become important spaces and happen to be Y shaped junctions in these cases and they have a spatial character of their own. This also happens to be a feature of the design. These are called Chowks in this region. As I said, circular forms. They have a connection to each other in terms of many things; Climatic as they support each other's shade, Community in terms of being a family, being related in terms of occupations or the purpose in the tribe or local area. Accordingly, the principles are shaped to vernacular architecture.