

Vernacular Architecture

Lecture 5

Rajput Architecture – Introduction

Maru-Gurjara architecture, originated in the 6th century in and around areas of the state of Rajasthan in India. Maru is nothing but of significance to Mardesh which was the ancient name of Rajasthan and Gurjara is nothing but Gujarat. Maru-Gurjara architecture was what it was called initially. It originated in the 6th century in and around areas of the state of Rajasthan in India. The name has its genesis from the ancient times when Rajasthan and Gujarat had similarities in ethnic, cultural and political aspects of the society. The ancient name of Rajasthan was Marudesh and Gujarat was Gurjaratra. You have this image of intricately carved pillars, it is essentially a temple. You can see even the temple pillars, roof, every part of it was carved which shows that they showed a lot of attention to detail and believed in a extreme ornamentation. Rajasthani architecture is an outstanding arrangement of colonial, Islamic and hindu architecture. Essentially what happened was, initially the Rajput architecture was present but as in the case of most of the architectural types of India, the Islamic and the colonial types are prevalently there. Jain and muslim architecture had also influenced the architecture whereas later European influences were also visible. During the time of the British, the Rajputs were inspired by them and effect was seen in their architecture especially in the city of Jaipur. As much as the Rajputs were against the British and their Raj, they were still inspired by the architecture of the British and had those influence their works of architecture. Ornamented Havelis, elaborately carved temples and magnificent forts are important aspects of the Rajasthani Heritage. This is an example of one of the huge Havelis in Rajasthan. Rajasthan is one of the most beautiful and vibrant state in our country. The unique characteristic of its architecture is very popular in the whole world. The Rajasthani architecture is significantly dependent on Rajput Architecture school which was a mixture of Mughal and Hindu structural design. As I said in India, most of the architecture types are subject to Hindu, colonial, Muslim or Islamic architectural influence. Rajput carries the credit of creative builders. Which is why I have titled it Rajput architecture instead of Rajasthani architecture. They have the credit of creative building and of constructing in many regions of Rajasthan and Gujarat also. Few of the most striking and splendid forts along with palaces with parched Aravali land clearly depicts history of Rajasthan's celebrated heritage. Rajasthan is essentially a desert, if someone can carve a rich piece of heritage and culture in a place like Rajasthan, you have to give it to them for being creative builders.

Some features and styles of Rajput or Rajasthani architecture are; Jharoka, Chattri, Haveli, Baoli/Bawdi or the stepwell, the Jihad and the Jaali. These are some elements or spatial elements that are characteristics of the Rajput and Rajasthani architecture. We will look into

details of what these are. The Jharokha, it is kind of suspended or overhanging balcony. Generally characteristic of Rajasthani architecture. Jharoka balcony is basically stone window. A lot of stone was available in Rajasthan and Gujarat in the desert regions, that became a predominant material. Here, the Jharokha is a stone window that projects from the wall and is generally employed for additional architecture beauty. Maybe additional architecture beauty was an important thing but it was mainly used to house the women or the women could see what was going on, in a particular situation or in a particular street without being noticed. One of the most significant purpose it served was to permit women to witness events without being noticed themselves. They are carried chajjas or slabs which were used to place spies or archers. As much as spies were used to shelter women, they were also used in certain cases of security and emergencies. This is a Jharoka, it is intricately carved, over-hanging balcony and completely enclosed with stone latel screens. It's a stone window projecting from the wall in an upper storey essentially. It happens to be upper storeys. If you see in the previous images, there are a lot of Jharokhas and folded balconies. It is supported by two or more brackets or corbeling. You can see there are three layers of bracketing or corbelling and they can be covered by a balustrade, a cupola or a pyramidal roof. You can see there is this curved roof above it. These are technically closed by Jaalis but generally partly open for the inmates to peep out to see passing processions. We will see what a jaali is in detail but the latter screens are what Jaalis are essentially. The Jharokha is more formal and ornamental than the English or French 'oriel' and is one of the most distinctive characteristics of the facade in the medieval Indian architecture until the 19th Century. As I said, the European and British influence was very evident but it is more formal. As you can see, in English architecture or French architecture, these latel screens are more with figures or animals or more figurine creations but these are more formal and ornamental. They are just patterns more or less.

Next, we move on to Chattris. Chattris as we already know is nothing but an umbrella. An umbrella shaped dome or Pavilion is called a Chattri in Rajasthani architecture. It means 'canopy' or 'umbrella'. In the context of architecture, it is used for two different things; 1. mainly for memorials, to depict or symbolize a memorial a Chhatri is used. You can see most of the memorials are places where people's funerals or their graves are present, Chhatris are usually symbolized over the site where the funeral of an important man is performed. Such memorials usually consist of a platform girded by a set of ornate pillars which hold up a stone canopy. The canopy is held or supported by a columns or pillars. These pillars are made ornate and carved well. The word Chhatri is also used to refer to the small pavilions that mark the corners, roof of entrance of a major building. In a building, the corners or the centres are emphasized by the Chhatris. They act aloof or skeletal to add to the solid roofs that are present in Rajasthani architecture. This is a memorial kind of Chhatri. Another fairly, common version in the north-western parts of India is the use of Baradaris. The Chhatris are also called Baradaris

and pleasure pavilions and is clearly understandable since they are invariably located in gardens or on high points or along water tanks and lakes. Apart from being used as a memorial and as an element of building facade, it is also used as pleasure pavilions. Huge Chhatris or canopies are built along water points or gardens to act as pleasure pavilions. These structures are so articulated with the landscape and the spatial order of a building complex as to provide the most strategic location for a good view, fresh air and general comfort. As I said, pleasure pavilion is placed in such a way that it is raised to have a good view. Obviously giving you fresh air from the garden near which it is placed. We will move on to Havelis. Havelis are the most important aspect of this presentation but it is also an important feature or style but we'll be looking at it briefly at the moment. Haveli architecture is a direct response to the regional climate while being a mirror of local art and landscape. Haveli is nothing but a mansion, a huge mansion, houses of aristocratic and wealthy people in the Rajasthani architecture and direct response to regional climate. Vernacular architecture as we are talking about is a direct response to climate. Here as well and in most of India for that matter, climate plays an important or the primary role in terms of the architecture is shaped. Apart from that the local art and landscape play an important role in its visual impact. Haveli means a mansion, the word was derived from Arabic, it means an enclosed space. This has evolved into becoming a very elaborate mansion, the term was first applied by the Vaishnava sect for their temples in Rajasthan and Gujarat. Later, the architectural form was adapted for individual mansions. Initially temples were referred to as Havelis, later they became individual detached mansions. This is a very elaborate and big Haveli. You can see the other features we talked about, the Jharoka, we don't have canopies in this, covered Jharokha, Chhatris are not present and as I said, overhanging balconies are visible. Lattel screens or Jaalis are very much visible. The intricate carving of the facade is very visible which is an important aspect of their architecture. The heart of the Haveli is a courtyard. A courtyard is a direct response to the climate of India essentially, all the diverse climates of India are answered generally by courtyard and its supporting elements. The centre of the Haveli was a courtyard, the centre point from which all spaces originate. The courtyard provided the transition between the public and the private spaces of the Haveli. Apart from being a climate responsive solution, it also happened to be a socio cultural instrument in terms of separating the private spaces and more common spaces and they also functioned as a micro-climate modifier and providing ample light and ventilation to all the spaces wrapping it. A lot of the architecture or the houses of dwelling units are either facing each other or are introverted to provide privacy. When you provide privacy, the building is rather introverted, so they don't have that many openings or the open spaces are not through. This is answered by the courtyard which is the case in Haveli as well. They act as micro climate modifiers, they change the microclimate or the immediate climate present in the place and they provide ample light and ventilation. Women and those serving the household performed everyday activities in the courtyard and the verandas wrapping it, while on summer

nights they would pull beds into the courtyard to sleep under the cool sky. These were used as different forms of spaces used for household work, used sometimes as place even to sleep on.

Rajput Architecture – Features and Styles

Next, we move on to Step Wells. Stepwells are pretty famous, they are UNESCO registered heritage sites. Stepwells are nothing but ponds that are elaborately designed. They are ponds in which the water may be reached by descending a set of steps. It is essentially a well but instead of throwing a rope or a bucket into it, you walk down to the well and fetch water. This has become more of an architecturally articulated space and not just a well. They may also be multi-storied having a bullock which may turn the water wheel to raise the water in the well to the first or second floor. Bulls or cows are used to raise water through a pulley, provide it to the first or second floor from where people could carry it. They are most common in Western India, especially in the Kutch, Gujarat or Rajasthani regions. They maybe also found in other more arid regions of South Asia, extending into Pakistan. The construction may be utilitarian, but sometimes includes significant architectural embellishments. The well is basically utilitarian, it is used to fetch water but everything else surrounding it, is completely immersed in architectural luxury and embellishments, lot of elaborate details, carvings, pillars, structural ornamentation, vistas and a lot of things. This is essentially a well. A well is simply just a circular or a square, deep pond but here it is elaborately and beautifully designed. The builders dug deep trenches into the Earth. This is how they were constructed, deep trenches were dug, year-round groundwater. They lined the walls of these trenches with blocks of stone, without mortar and created stairs leading down to the water. The majority of surviving stepwells originally also served a leisure purpose as well as providing water. You have a space for water, you have steps and the surrounding steps become more articulated and become social places, places of gathering and they also become places of leisure. This is because the base of the well provided relief from daytime heat. Going underground and being near water makes it a naturally cool space which causes it to be a great time relief from daytime heat. Stepwells also served as a place for social gatherings and religious ceremonies. Apart from being places of leisure and pleasure, it became an important aspect for religious ceremonies as well. Women were more associated with these wells because they were the ones who collected the water.

Next we move on to Johad. Johads are another form of stepwells but they are just rainwater storage tanks used to collect and store water, they are also called Khadins in Arabic. They are simple mud and rubble barriers built across the contour of a slope to arrest rainwater. Essentially the rain water is collected and stored, this is used to replenish the groundwater and also be used as storage for year-round water usage.

Now, we will talk about Jaalis that I mentioned earlier. Jaali is the term for a perforated stone or laticed screen. You have a screen with a lots of perforations or latices, usually with an ornamental pattern constructed through the use of calligraphy and geometry. In the European eras or European style of architecture, these latticed screens had figurines, were more ornate or more detailed. In India it essentially boiled down to being calligraphy or geometrical patterns. This form of architectural decoration is found in Indian, Indo-Islamic and Islamic architecture. In Islamic architecture if you notice, the latticed screens are more and more geometrical or gridiron pattern because the muslim or Islamic pattern does not encourage figurines or idol worship. Every jali work was built carving into stone, generally in geometric patterns. You have a huge slab of stone out of which the Jaali was carved out. Today the Jaali assembled its units or blocks but back then it was only carved out of a monolithic stone or a slab. These were very finely carved plan based design. As I said, figurines and idol based things were very few and plant based designs on the Taj Mahal. Even on the Taj Mahal, the latticed screens will be noticed a lot. Plant based designs are usually practiced, they often added pietra dura inlay to the surroundings. An inlay form of design, having inlay or mouldings from which the patterns were created was an often practiced method. Marble and semi precious stones were also added. This was more of a European style plant based intricately carved Jaali. The Jaali apart from being just ornamental or aesthetic form of design solution, it helps lower the temperature by compressing the air through the holes. The interesting thing about wind is, when wind passes through small holes or when they are perforated out, they become cooler and the velocity increases. That is the main principle behind a Jaali and how it lowers the temperature. When the air passes through these openings, its velocity increases giving profound diffusion. It has been observed that human areas like Kerala and Konkan have larger holes with overall lower opacity. As I mentioned earlier, the climate of India is diverse, you need wind movement especially in hot places. Most of India is hot or humid. In Rajasthan and Gujarat, its really dry. Hence, the perforations are really small such that the air passes through them thereby causing the velocity to increase and the temperature reduce. But in places like Kerala or for that matter coastal and Konkan, the air is humid. The air has to pass and the humidity also has to pass. When the holes are really small, humidity is hampered from being passed out, so the holes are larger. With compactness of the residential areas in the modern India, jalis became less frequent for privacy and security matters. In modern India Jalis are being less practiced because of the simple reason of it allowing privacy being hampered. Jaalis are more or less see through and it also creates issues of insects or security issues as well.

Havelis of Rajasthan

Now, we will talk about Havelis in detail. The special planning of Havelis - the heart of the Haveli was a courtyard, the centre point from where all spaces originated. The courtyard provided the transition between the public and the private spaces of the Haveli, while also functioning as a

micro-climate modifier and providing ample light and ventilation to call the spaces wrapping it. Women and those serving the household performed everyday activities in the courtyard and the verandahs. Hindu Havelis often had a corner dedicated to the family deity with the tulsi plant adorning it. Havelis were not exclusive for the hindu or muslim architecture. It is a part of both the religious beliefs. It transformed according to the religious beliefs of each religion. Hindu Havelis had their sacred space with the tulasi plant of their deity. The design of the courtyard was a symbolic status of their family's social status, lifestyle, wealth, art and cultural inclinations. Vernacular architecture from being just utilitarian began to evolve and started becoming an implication of the aristocracy, wealth of a particular individual who owned a mansion or the Haveli. The courtyard was the main area and the way the courtyard was designed, the social status, the lifestyle, wealth and art representative in the way the courtyard was designed. The householders often invited reputed artists. As I said, people placed more importance to art and aristocracy. The culture was more significant in courtyard. They went to the extent of inviting reputed artists to paint scenes from religious scriptures, everyday life or their social beliefs on the courtyard walls. Most spaces in the Havelis were flexible for use, they had a grand hall, usually close to the entrance, which would have a pronounced threshold on either side. Havelis had the courtyards, the courtyards weren't restricted to any particular use, that was the most important aspect or space usage which is prevalent in India. India has a varying climate, it has a season which is very hot, it has a season which is in contrast i.e cold. The space has to be used for various seasons. It made most of the spaces flexible for use. This is an example of a huge Haveli, you can see its on a raised platform, the latticed screens, the corbeling which is all visible and if you notice the Havelis become two or three storeyed instead of just being one storeyed. These halls could have private Jharokhas or screened Mezzanine galleries, the Zenana or women's quarters with its own reception room. As wealthy and as the Havelis became separate spaces for men, separate spaces for women, individual reception areas, separate working areas all developed on their own. Larger Havelis could have about four courtyards. The courtyards are the most important, four courtyards show that people could use more and more spaces and also an increase in storeys. Especially used for horses. Apart from being used for daily use by humans, they also happened to be used for cows, cattles, horses and elephants. We will talk about some characteristics which are not just architectural. Socio-Cultural aspects - the chowk or courtyard served as the centre for various ceremonies and rituals. Security and Privacy - as much as it being a socio-cultural thing, it also provided security and privacy for not just men but women as well. Climate - treating open space in building design to respond to the local climate. Air movement caused by temperature differences is utilized in the natural ventilation of the building. Courtyard is a direct response to climate. This is an example of one of the modern converted Havelis that happens to be hotels or five star hotels. Different activities at different times - the day time activities are covered by women, the evening had pleasure or relaxation time for men. Mostly women carried out their work and

interacted with other women in private open spaces. The merchant at Havelis had separate spaces where they could interact with their traders and business. Articulation of space - apart from being used for household purposes, the space could also be used for performing arts. As such, Mor Chowk in the city palace of Udaipur, the concept of courtyard is a dancing hall. Materials such as; baked brick, sandstone, wood, marble, plaster and granite; these are the most commonly used materials as they are available in plenty. Decorative aspects are influenced by local culture and traditions. Regionally the culture and tradition influence the materials further. This is an example of a splendid well-maintained valued Haveli. You see the balcony spaces, the inner Jharokha. The Jharokha were also private, apart from being Jharokhas for the streets, they also had Jharokha to see the proceedings of the house incase there was an occasion or a festival or a wedding that's happening inside the house, women could look at people or the proceedings without being seen by the guests. Now we will be talking about the climate response specifically in the Havelis of Shekhawati. We will talk about the climate of Shekhawati, the temperature. Obviously being a desert, it extremely high and the winters are extremely cold. The rainfalls are very scarce. Humidity apart from monsoon season is terribly low. Down south in Kerala and Konkani, the humidity is higher, here it is very low. This is essentially a hot dry climate, winds are terrible, sandstorms are created. We will see how the Haveli happened to be direct responses to the questions raised by these conditions.

Compact settlement plan - the planning was generally compact, common wall to make it possible to have common shading. The heat production from the building is really low. The compact planning helps in reducing heat gain. When buildings are packed compactly, the heat accumulated by the intensity of the sun is very less, hence, the heat will be emitted into the building very less as well. Narrow streets with tall buildings all around, it helps in shading the streets. Thus, allowing less of direct sunlight. The same principle extending to the street. The streets are narrow, two or three storeys high such that the streets always remain shaded apart from the peak sun. It also helps in lowering the ambient air temperature surrounding the building envelope by shading. As much as it is important to reduce the heat inside the building, it is also important to reduce the heat outside the building making it an ambient air temperature. Courtyard planning which is an important method to use ventilation, lower the temperature, cause convective cooling and natural lighting. Adding water sources in the courtyard makes it convective cooling. The construction technology - heavy building envelope stores larger amounts of heat due to large heat capacities and creates a larger time lag. As I said, Jaalis were used to form a skeletal form of architecture to contrast the heavy and solid massing. The solid massing is required so that the heat does not flow through. Instead you have Jaalis that are perforated screens that send in cooler air instead of hot air. All constructions were 1 foot 6 inches thick. General walls or conventional walls are 9 inch thick, this is 1'6" which means that the heat that passes through is hampered and fixed. Columns are either assembled

with laterite stone or are monolithic with timber type joints. Flat roofs with insulation layer. Like the walls, the roofs are flat. Since there is very less range, it doesn't have to be a pitched roof and flat roofs are really thick such that they form as insulation. Small openings such as the Jaali screens that make velocity of winds flow better and cause natural ventilation and cooler air. These are the Havelis of Shekhawati, direct response to the climate. They have wind towers and also materials of construction which add to the cooling and are climate responsive.