

# Vernacular Architecture Of Jaisalmer

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**Abstract** - This research paper aims to study the vernacular architecture of Jaisalmer, a city located in the Thar desert of Rajasthan, India. Jaisalmer is known for its unique architecture characterized by the use of sandstone and intricate carvings. The paper examines the historical, social, cultural and environmental factors that have influenced the evolution of the architecture in Jaisalmer. It also analyses the various features of the vernacular architecture, such as the use of local materials, the adaptation to the climate. The study concludes that the vernacular architecture of Jaisalmer is an outstanding example of how traditional building techniques and materials can be used to create sustainable and aesthetically pleasing structures that reflect the local culture and identity.

**Key Words:** vernacular architecture, jharokhas, chajja, ota, khamba, chowk-courtyard, aedicules

## 1.INTRODUCTION

Jaisalmer is a city in the north western Indian state of Rajasthan also known as “Golden City”. It is located in the Thar desert and is known for its magnificent fort, havelis, and temples. The architecture of Jaisalmer is unique and has evolved over centuries due to various factors such as climate, culture, and local materials. The use of sandstone and intricate carvings is the most striking feature of the vernacular architecture of Jaisalmer.

## 2. HISTORICAL BACKGROUND

Jaisalmer was founded in 1156 AD by Rawal Jaisal. In its overall shape, Jaisalmer is an Irregular Polygon with a Double Line of Fortification. It is a city within a city. The inner city is more protected with a Stronger Wall and is set on top of a hill about 100 meters higher than the surrounding area. The city is Triangular in Shape due to the shape of the hill on which it is built. The Royal Palace with The Royal Square Forms the nucleus of Jaisalmer. The city structuring manifests itself in two strong ways: The location of the Royal Quarters on top of the hill with the strong fortification. Secondly the Dispersal of Communities is affected by caste groupings making distinct residential zones of different communities. The market square with its bazaar structures in the lower city and the Royal Square with the temples holds the upper city together. Streets act as linkages, activity and interaction spaces.

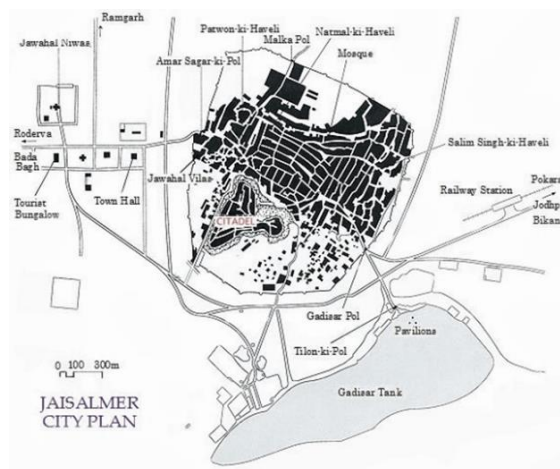


Fig -1: Jaisalmer city plan

### 3. CLIMATE

- The month with the highest relative humidity is August (61.52 %). The month with the lowest relative humidity is April (20.44 %).

- The month with the highest number of rainy days is August (6.20 days). The month with the lowest number of rainy days is December (0.37 days).

- Summer starts here at the end of June and ends in September. There are the months of summer: June, July, August, September.

### 4. SOCIAL AND CULTURAL FACTORS

Jaisalmer district is full of art, architecture, culture and traditions dance and music and it attracting hordes of Domestic and foreign tourists. The folk music of desert is an outstanding culmination of long traditions mixed with varied social customs and inherent concept of classical music revealing the life of desert. The Chowk or courtyard provided as the Centre for differing ceremonies & customs. The Holy Tulsi plant act situate here & glorify daily to heel growth to house.



**Fig -2:** Jhanki of Jaisalmer Fest



**Fig -2:** Jaisalmer desert Festival

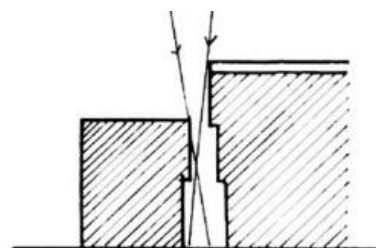
### 4. CRITICAL ANALYSIS

#### 4.1 Streets of Jaisalmer

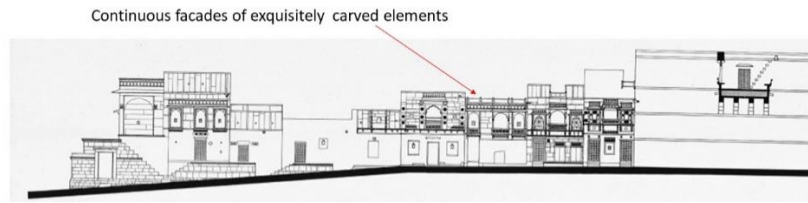
The general street orientation is south-east to north-west axis. Most of the havelis buildings are oriented towards east and west axis longer walls are facing towards north and south direction and shorter walls facing towards east and west direct to avoid the direct solar radiation.



**Fig -3:** Plan of Street



**Fig -4:** Conceptual street section



**Fig -5:** Section of Street

## 4.2 Features of Vernacular Architecture

The vernacular architecture of Jaisalmer is characterized by the use of local materials, the adaptation to the climate. The buildings are made of sandstone, which is abundant in the region. The sandstone is durable, and its color blends with the natural surroundings. The buildings are also designed with the use of terraces and balconies that provide views of the surrounding area.



**Fig -6:** Openings with details



**Fig -7:** Courtyard of haveli

## 4.3 Havelis of Jaisalmer

Haveli is one most unique architectural features of Jaisalmer. The most detailed part of the Havelis in the facade which is defined by Jharokhas, Balconies, Canopies, and Eaves, all carved in every detail. The real openings might be tiny since the greater part of the spaces opens inwards. However, the elaborate treatment of the exteriors recommends more accessibility and openness than exists. Strangely, Havelis and more modest houses are many times viewed as close to each other, sharing a common wall, demonstrating that community grouping is a higher priority than economic status. Havelis in Jaisalmer have categorized are as follows:

1. HAVELIS OF RAJPUROHITS
2. HAVELIS OF RAJPUTS
3. HAVELIS OF MERCHANTS OR MARWARIS
4. HAVELIS OF HINDU SUB-CASTE

## 4.4 Principles of Design

The haveli's overall formal and spatial composition, including the design of the elevations, is one of the design elements (including external facades and internal rooms). Using a variety of architectural components and Aedicules, a detailed architectural expression demonstrates the importance of form at the micro level. The haveli's structural arrangement serves as the primary framework for the entire formal and spatial organisation from a planning perspective. It provides a framework for all design choices controlling the construction of spaces employing a range of architectural components. The structure plays a crucial part in how the elevations are designed.

#### 4.5 Formal and Spatial Organisation

The basic form of a Haveli

- A courtyard known as the “Chowk”, which is open to the sky, is the focal point of each individual house, which is by nature an introverted structure. The area of the house that is most visible to the public is a raised platform that is a few feet wide and has steps that lead up to it from the street.

- On this "Ota" platform, people engage in casual social interactions as well as some forms of household tasks like washing clothing, bathing kids, and drying homemade spices. “Pidhakiyas” are the stairs that go up to the entry door from the street.

- The front door of the home is never directly visible from the chowk the visual connection is missing. The peculiar position safeguards the residents' privacy by preventing a street view of the chowk.

- The aesthetic and geographical center of the house is the chowk. Its width ranges from a few feet in tiny buildings to quite wide-open areas in the bigger havelis. Larger havelis could even have more than one chowk. This room serves as the main meeting place for large formal social events as well as the majority of culinary activity. The chowk offers all the functions of an open area in the house, with the extra virtue of being fully private and secure because it is introverted.

#### 4.6 Planning of Haveli

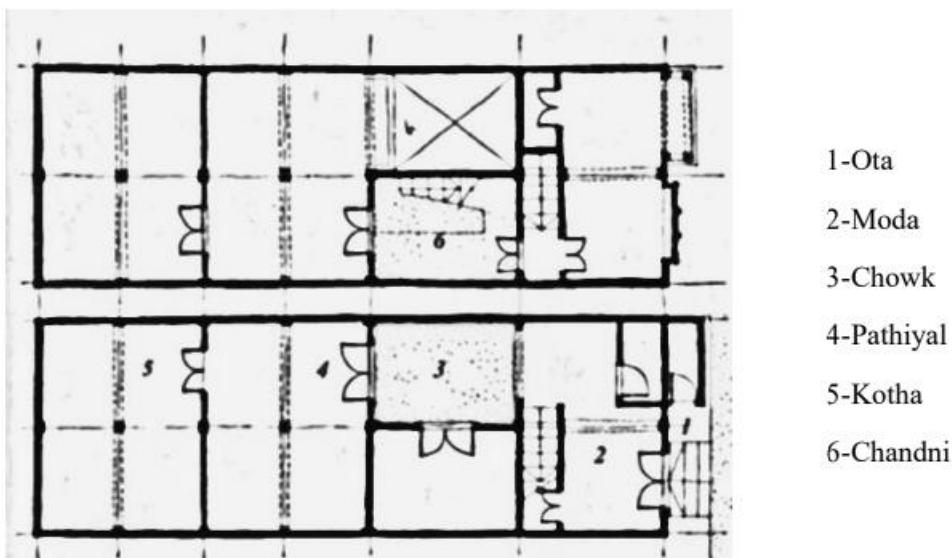


Fig -8: Plan

The general street orientation is south-east to north-west axis. Most of the havelis buildings are oriented towards east and west axis longer walls are facing towards north and south direction and shorter walls facing towards east and west direct to avoid the direct solar radiation. • The idea of “The Centre” has been a crucial one in form-making throughout the long course of this tradition.

- The open central courtyard, which is frequently surrounded by Jharokhas facing the four cardinal directions, and the representation of the house’s center on the outside elevations through jharokhas are more obvious representations of the idea. When applied to the creation of the smallest individual building components, the same idea results in complex, frequently interesting architectural compositions.

- The structural bay is the unitary component. In composition, it serves as the cellular unit. All levels, whether inside and outside, have similar markings indicating the structural bay’s center.

- From the lowest level to the parapet, it is viewed optically as a single symmetrical object that spans its whole height. Although the architectural expression of the building varies from level to floor, each piece is symmetrically placed with relation to the bay's centre line.



#### 4.7 Elevations of haveli

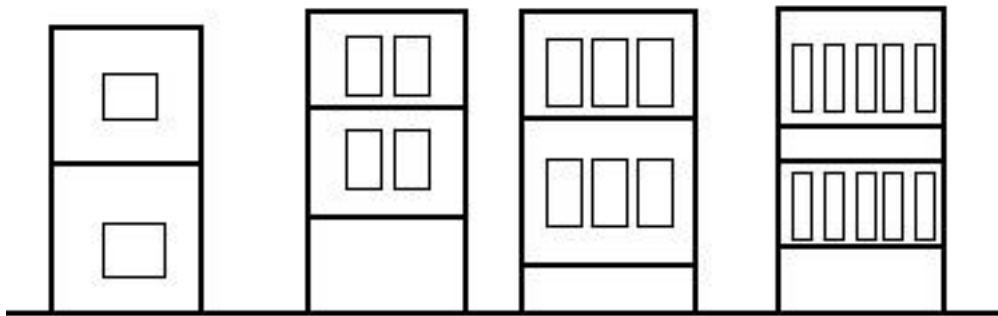


Fig -9: Conceptual Elevation with different proportions of openings

- The most basic structure consists of a foundation or plinth called a "Dasa," on which load-bearing columns, or Khambhas, are positioned.
- "Khambhas" have brackets at their top ends called margol that serve as support. These fixed brackets resemble arches but do not really function structurally as arches. They are part of the architectural style and have an aesthetic function. The load above the margol is supported by and transmitted to the load-bearing columns by a deep horizontal beam, or "Chabna", that is located directly above the margol.
- The name of this structural component—Chabna or Bharwar—depends on its orientation. A Chajja is a horizontal stone fin that is cantilevered from a wall and used to shade the wall surface, primarily from the vertical sun.
- The chajja is supported from below by a horizontal moulding with a curved profile, which is placed above the chabna.
- The "Galar" is the name of this moulding. A continuous cornice-like stone protrusion called the kane is seen on the wall surface above the chajja. The kane is topped by the "Kangra", a flat horizontal strip of stone that is typically adorned with relief designs, and the ensemble is completed by the chaap, a projecting course of stone.
- In multi-story structures, this elemental syntax is repeated on every floor. Formal variations are sought by combining different elements from the palette of forms and looking for novel arrangements. The centers of structural bays are the primary places for aedicule placement.

#### 4.8 Aedicular Composition

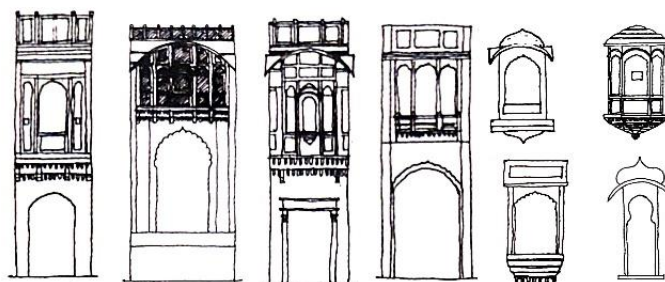


Fig -10: Types of Aedicules

- The notion of imagery and structural logic are linked in the architecture of havelis. When a shape is not actually required for practical reasons, imagery is the visual depiction of that form. The portrayal may include Aedicules like jharokha and baris as well as structural elements like khambhas, todis, and margol.
- Playing with size is a common theme in imagery. The aedicules, which are scaled-down versions of the greater structure, can provide the wrong sense of scale, especially when compared to actual items. a selection of important aedicular kinds (and variants within each type) that have been utilised historically.

### 4.9 Materials and Construction Techniques

Two types of construction are used for roofs and floors:-

- There is traditional method used in the roof by laying closely spaced timber beams and covering them with a layer of reed or grass matting and a thick layer (0.45 to 0.60m) of earth on top and this is used in most havelis.

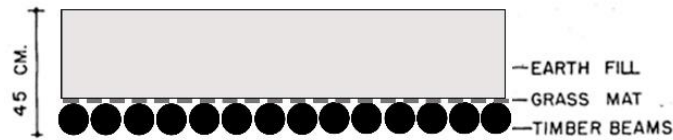


Fig -11: Roof detail section

- Due of the difficulty in finding timber in the desert, in some later houses the timber stone slabs have replaced by beams.
- In above cases the all the roof and floor are finished only with mud plaster. This also shows no problem of water seepage, as if there is little rainfall.

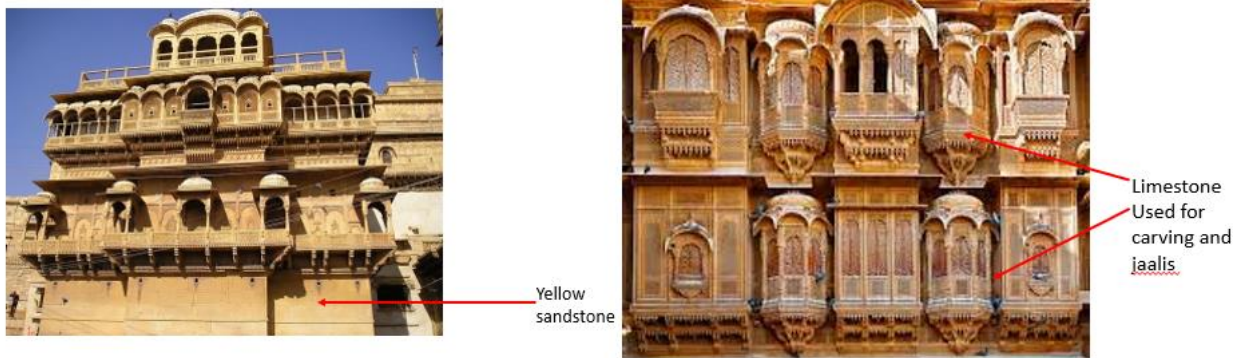


Fig -12: Materials used in elevation

### 5. PARAMETERS FOR STUDY

The literature study assisted with the list down the parameters based on which the case study analysis should be possible and the suggestions for the exploration can be outlined. The parameters include:

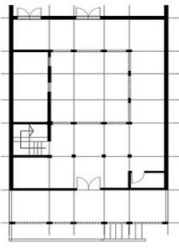
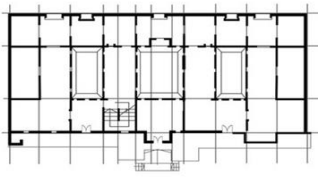
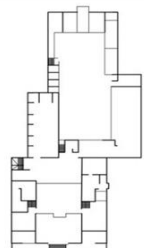
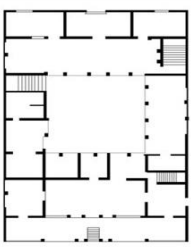



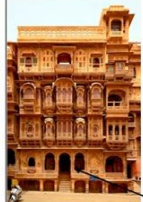
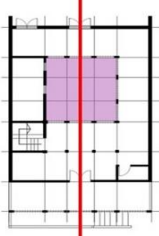
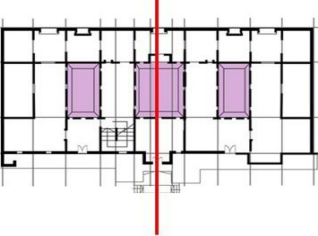
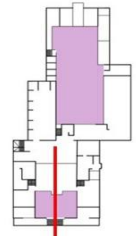
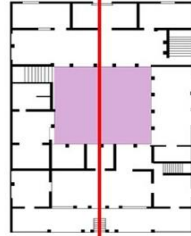
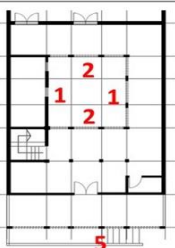

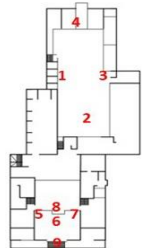
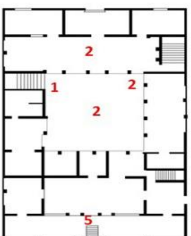
1. Typology
2. Orientation
3. Entrance
4. Courtyard
5. Space divisions
6. Elevation
7. Openings (Jharokha/ Jalis/ Chattris / Chajjas)
8. Materials and Construction Techniques

The analysis would be done on these parameters and the combination of these elements helps to create an architecture or building.








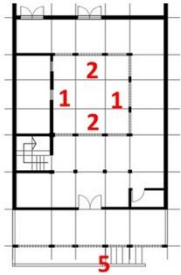


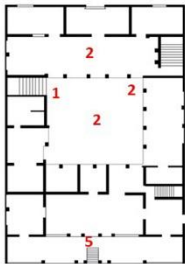


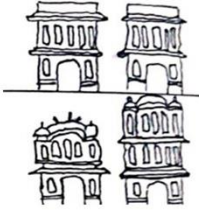
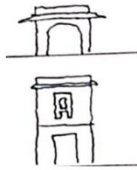

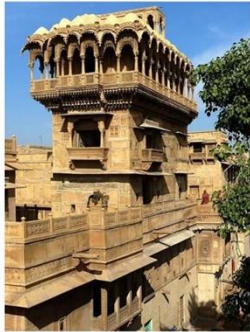

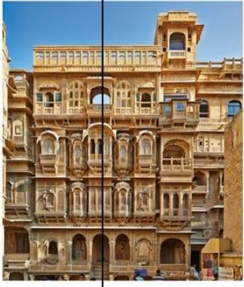
### 6. CASE STUDY

This chapter aims at finding the different design strategies from the vernacular of Jaisalmer. The case studies took up for this purpose are taken from different typologies.

Four case studies are analyzed which include Suraj Kanha Haveli, Salim Singh’s Haveli, Nathmalji ki Haveli, and Patwon ki Haveli. All these Havelis are belongs to different communities (Typologies)

	HAVELIS OF RAJPUROHITS(BRAHMINS) <u>SURAJ KANHA HAVELI</u>	HAVELIS OF RAJPUTS(KSHATRIYA OR WARRIOR CLASS) <u>SALIM SINGH’S HAVELI</u>	HAVELIS OF HINDU MERCHANTS OR MARWARIS(VAISHYA OR TRADERSCLASS) <u>NATHMALJI KI HAVELI</u>	HAVELIS OF HINDU SUB CASTE(KOTHARIS, BHANDARIS OR DHABHAIS) <u>PATWON KI HAVELI</u>
ENTRANCE				
ENTRANCE	 Direct Entrance	 Otta at the entrance	 Otta at the entrance	 Otta at the entrance
The movements and openings along the same axis and direction.				
COURTYARD	Extrovert planning of courtyard as they usually used courtyard for interaction like bhajans. And at centre, they plant tulsi for pooja	Central courtyard for the men’s interaction and other two for womens. Both introvert and extrovert planning Direct entrance to the first courtyard for interaction as it belongs to prime minister.	The first courtyard for the men as they are traders so they used this for interactions or meetings. Second courtyard for the women it’s private	This is common space for them to work . Fraternal cluster planning are there.
ELEVATION	 Around the courtyard, they have jharokha and jalis and the opposite side of the courtyard has the same details.	 First Courtyard has walls around with jalis to maintain the privacy. And opposite direction has same details or openings	 Courtyard has balcony with jalis.	 Chajjas are around the courtyard



<p>Chowk have different openings with different proportions and ratio.</p>	 <p>Chowk view Shows jharokhas</p>	 <p>Chowk 2 view</p>  <p>Chowk 1 view</p>	 <p>Chowk 1 view</p>  <p>Chowk 2 view</p>	 <p>Chowk views</p> 
<p>ELEVATION</p>				
<p>OPENINGS</p>	 <p>Upper Level Projected-Chattri roof</p>	 <p>All levels Projected Flat roof</p>		
<p>SYMMETRY IN ELEVATION</p>	 <p>There is no line of axis in the elevation of haveli.</p>	 <p>There is no line of axis in the elevation of haveli.</p>	 <p>There is line of axis in the elevation of haveli.</p>	 <p>There is line of axis in the elevation of haveli.</p>



## 7. CONCLUSIONS

Vernacular architecture of Jaisalmer is an outstanding example of how traditional building techniques and materials can be used to create sustainable and aesthetically pleasing structures that reflect the local culture and identity. The preservation and promotion of Jaisalmer's vernacular architecture are crucial for the preservation of the city's cultural heritage and identity.

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