

# Research on Regional Architectural Characteristics of Zhongshan Ancient Town, Jiangjin, Chongqing, China

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**Abstract:** Zhongshan Town, Jiangjin, Chongqing Municipality, shows distinct regional cultural features due to its unique natural geographical environment as well as social, economic and cultural background. These cultural features are significantly reflected in many aspects such as urban space structure, architectural treatment methods, and spatial levels of the town. How to innovatively apply them to modern architectural design on the basis of inheriting tradition is an issue worth exploring. This paper carries out a relatively in-depth study.

**Keywords:** Zhongshan Ancient Town, Regional Architecture, Architectural Features

## 1. Urban spatial structure with ecological characteristics

The southwest region of China, with its intricate mountain ranges and changing climatic conditions, has together nurtured a settlement culture with unique regional characteristics. Located on the northern side of the Yunnan-Guizhou Plateau and in the southern mountainous area of Chongqing, Zhongshan Ancient Town happens to be at the junction of three provinces and cities, namely Chongqing, Sichuan and Guizhou, and it is a representative of the urban and architectural culture of the region. It is situated in the middle of Shilao Peak and Zhiyan Mountain, and is nestled by the river side of Shooting Stream, showing the typical characteristics of a settlement in the mountains and by the water.

Zhongshan Ancient Town is situated in a place near the mountains and the water, and its spatial structure presents a fishbone-like hierarchy, with the main road as the extension axis. The main roads are laid out according to the contour, surrounded by buildings, and grow along the gentle slopes and flat dams at the foot of the mountains. This layout pattern is characterised by the smoothness of the roads, the relative reduction in the amount of earthworks, the complete delineation of plots and the ability to maximise the maintenance of the site's pristine ecological environment, and is therefore accepted and adopted by most traditional hill settlements.

In this part of the world, the dominant street is often considered to be horizontal. If an area of the main street extends beyond a predetermined depth, then depending on the topographical features, there may be vertical streets or secondary roads connecting to the horizontal streets, which may run right up to the riverbank jetty or connect to other streets at different heights. At key transport nodes, such as river crossings, vertical streets are often widened to serve as entrances to the main street area, as well as where commercial activity occurs most frequently<sup>[1]</sup> (figure 1).

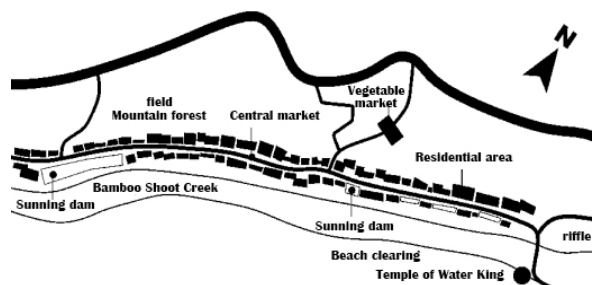


Figure 1: Zhongshan Ancient Town Settlement Structure (self-drawn)

This "main-secondary street" layout not only connects the main street to the peripheral space, but also carries significant ecological value. Similar to Zhongshan, many ancient towns in the southwestern mountainous region are built on mountains, and due to limited land, the spatial layout of the main streets is usually compact, which may have a negative impact on the ventilation of the streets, while the existence of vertical streets provides an effective solution to this situation. Zhongshan Ancient Town is unique in its location as it is situated on the side of a hill and close to a body of water. During daytime, the mountainous area is covered by trees, resulting in a relatively slow rate of increase in air temperature. As a result, when the air temperature reaches a certain value, there is a significant temperature change accompanied by dramatic fluctuations in physical quantities such as wind speed and direction. This phenomenon causes air currents to flow from the forest in the direction of the water surface, whereas in the presence of strong sunlight, the air above the water surface heats up rapidly, creating an updraft of hot air, which in turn produces winds blowing from the land to the water surface; during the night time there is not enough heat on the ground to allow the heat to be radiated out, so that the temperature of the surface of the sea is lowered, and at the same time there is a reduction in the amount of water vapour in the atmosphere, which results in the reduction in the speed of the winds blowing from the land to the water surface. During the nighttime hours, the temperature of the water surface decreases relatively quickly, while the temperature of the land decreases relatively slowly, a phenomenon that contributes to the generation of winds blowing from the water surface to the land. In the hot and rainy mountainous regions of the Southwest, the two microclimates, land-water and forest-source winds, clearly have an important and positive role to play<sup>[2]</sup> (figure 2, figure 3).

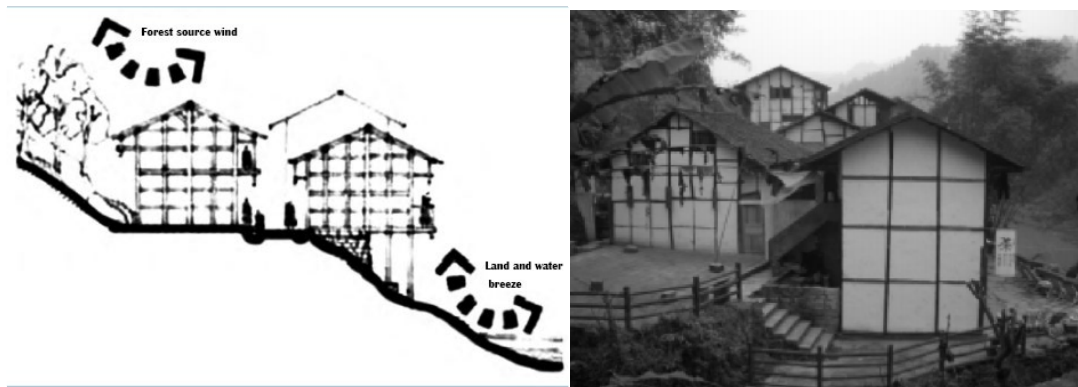


Figure 2: Spatial pattern of Zhongshan Ancient Town (self-drawn) (Left)

Figure 3: Zhongshan Ancient Town Environmental Elements Analysis Map (self-drawn) (Right)

## 2. Building treatments adapted to the local environment

Architecture is regarded as a natural existence with human qualities, and as such it is subject to the constraints of the environment in which it is situated. Especially in the agrarian era, when production and construction conditions were relatively backward, construction activities and buildings were more closely linked to the environment than in modern times. The mountainous areas of Chongqing are mainly characterised by subtropical and temperate climates, and their geographic and geological environments are quite complex, with a variety of forms, abundant rainfall and well-developed water systems. In this special environmental situation, the region has developed its own unique construction method, which is simply "occupying the sky but not occupying the land" and adapting to the local conditions<sup>[3]</sup>.

### 2.1. Architectural approaches to buildings and terrain

During the initial construction phase of the ancient towns in the mountains, which was an agrarian society with relatively low productivity, land became the main productive resource. In such mountainous areas, land that was flat and suitable for farming was a very rare resource. Therefore, when suitable terrain was available such as flat dams in the mountains or river valleys, the land was first used for farming, and the selection of plots with relatively poor conditions became particularly important for building sites. When confronted with unfavourable geographical conditions, the resulting settlement patterns and the associated technical means have become an integral part of the building's territorial character. As a result, when the temperature reaches a certain value, there are significant

temperature variations accompanied by sharp fluctuations in physical quantities such as wind speed and direction. After a long period of mutual adaptation and adjustment between human beings and the natural environment, the architectural layouts and forms with regional characteristics that we see now were gradually shaped.

The architectural design of Zhongshan Ancient Town follows the natural layout of contour lines and grows and develops along the flat dam land in the mountainous areas, with a spatial layout that is both compact and reasonable. It is a reflection of various material elements in the natural geographic environment, and at the same time contains the wisdom achievements created by people in the process of long-term production and living activities, as well as the cultural characteristics formed as a result. In many places where the construction environment is relatively harsh, the building adopts various methods such as bulwarks, hanging feet, drops and elevations, etc., with the purpose of allowing the building to extend as far as possible to the area beyond the flat dam, in order to ensure the flatness and comfort of the street space, so as to satisfy the public's usage needs.

This special "hammock" architectural design<sup>[4]</sup> is characterised by upward and aerial extensions, retaining as much as possible the flat ground and making minimal adjustments to the original topography. This architectural style not only demonstrates the diversity of architectural art, but also incorporates rich ecological and technological factors (figure 4).



*Figure 4: Picture of a hammock built on the waterfront (self-drawn)*

As the climate in the mountainous areas of Chongqing is characterised by hot, humid and rainy conditions, the use of partially elevated "suspended buildings" not only increases the heat dissipation area of the house, but also improves ventilation and effectively reduces the amount of underground humidity that enters the house directly, thus significantly enhancing the comfort of the occupants. Thanks to the elevated lower part of the building design, the layout is highly flexible. In a given technological environment, this method can greatly free itself from topographical constraints, thus enhancing the efficiency of utilising various unfavourable topographical conditions, reducing construction costs and bringing about significant land-saving benefits.

In addition to the obvious advantages mentioned above, this building treatment method also has more far-reaching ecological significance in the mountainous areas of Chongqing. Due to the relatively large slopes of hills and mountains, their waters move much faster than in flat areas. With the increase in precipitation and the sudden eruption of flash floods, the flow of surface runoff will rise sharply in a very short period of time, which will not only cause erosion of the soil in mountainous areas, but may also lead to natural disasters such as landslides and faults. When house construction is carried out under such environmental conditions, the interrelationship between the building and its base becomes particularly sensitive. Hammock buildings are generally located on land with a large slope and are designed to create a flat space by having an elevated bottom. Due to topographical constraints, some traditional dwellings are not built directly on flat land, but are instead modified to be sloping or gently sloping. The connection between these buildings and the base is achieved through the piles supporting the buildings. This design reduces the contact area between the buildings and the base, maximises the preservation of the original ecology of the base, and makes the original topography of the base become minimised. This ensures that the original ecosystem of the mountainous area has good water stagnation and soil retention functions, thus providing a guarantee for the safe use of the buildings.

## **2.2. Use of localised materials**

In the Zhongshan area, all kinds of trees grow in abundance, with bamboo growing in particular. The river that once flowed through the town was named Qingxi River, but the name was changed from "Qing" to "Shao" because of the dense bamboo forests that covered both sides of the river. Elders in the

town recall that long ago, the statue of "Bamboo Lord" was enshrined in the town's old temple, reflecting the local people's deep reliance on the natural ecosystem.

Bamboo is closely related to the daily life of the town's residents, and of course, the construction of houses is not an exception. It is a grid-like wall made up of multiple layers of bamboo sheets of different materials and thicknesses, one of which is a wall core made of wood, and the rest are layers of bamboo mesh bonded together with mortar. In addition to basic masonry and wood, bamboo is an essential building material in the construction of ancient towns. From traditional dwellings to modern town construction, people have gained a deeper understanding of bamboo culture. No matter where you go in Huanbu Zhongshan Old Street, you can clearly observe a protective structure called "gabion wall". This is a traditional form of residential wall made of woven bamboo. This design is often applied to a wooden pierced frame wall by fixing and weaving bamboo strips into a mesh on the wooden posts, and then applying plaster on the surface of the mesh to form a complete wall structure. These bamboo strips consist of a number of smaller diameter moso bamboos, which are cylindrical or elliptical in shape, with the direction of the long axis parallel to the wall. There are numerous gaps in this wall made of woven bamboo to which the mortar easily adheres, and when it dries thoroughly, it shrinks and is unlikely to form cracks. This method of construction is simple and inexpensive in its choice of materials, and it is quick to build and has excellent ventilation. In the season of high humidity, it can effectively prevent indoor dew, so it is known as the "breathing wall", which is also one of the architectural characteristics of the Chongqing area (figure 5, figure 6).

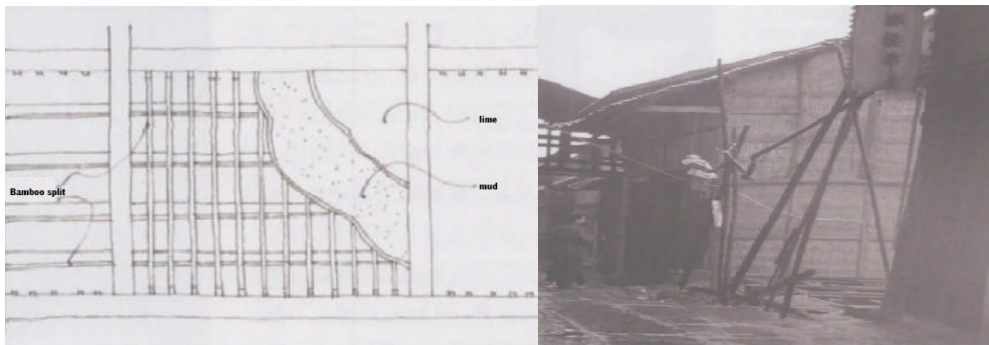


Figure 5: Zhongshan Ancient Town Building Wall Map (self-drawn) (Left)

Figure 6: Gabion wall made of bamboo strips and sandwiched between bamboo and clay (self-drawn) (Right)

### 3. The spatial hierarchy of towns and cities as places of life

Unlike many ancient towns that have been developed as tourist attractions, most of the residents of Zhongshan Ancient Town still live in the old streets, and they have retained many traditional ways of life, which together build a real sense of "living world"<sup>[5]</sup>. Bamboo is one of the most common building materials used in the construction of dwellings because of its toughness, beautiful texture and resilience. Schulz's phenomenological view of architecture emphasises that the notion of place should be a complex of specific geographic locations, specific buildings and specific people that are mutually reinforcing and closely connected in a meaningful way. This sense of wholeness can lead to a greater understanding and appreciation of place and help us to better grasp the behavioural activities as well as the spiritual needs of the people in the place. Therefore, only when a place is truly filled with the atmosphere of daily life can people truly feel the atmosphere of that place.

In Zhongshan Ancient Town, due to the diversity of living space patterns, a large number of semi-enclosed areas have been formed, which are part of the streets and provide an ideal living environment for the residents; the height of the residential houses inside the streets is generally low, and together with the narrowness of the streets, this makes the spatial sensation of the streets similar to that of interiors, thus creating the indoor scale of the streets. This traditional way of life is not only reflected in daily life, but also in the way people feel about places. In such a design criterion, the exterior walls of the dwellings are oriented towards the side of the street, realising the function of the interior partition walls. The interior of the alley is equipped with a variety of facilities such as stone tables, stone benches, stone mills, and laundry sinks. On the street level, various shops, small shops, food service outlets, and resting places are predominantly located. This layout not only perpetuates the daily lives of the families, but also has a direct impact on the general atmosphere of the old street,

injecting a strong sense of life into the old street (figure 7, figure 8).

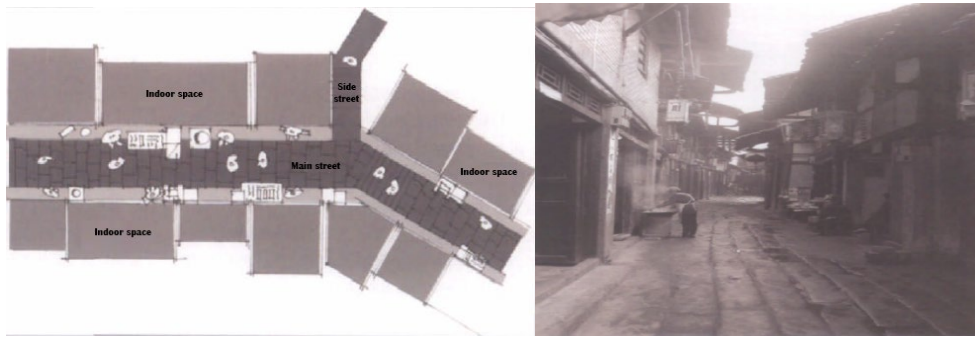


Figure 7: Zhongshan Ancient Town Street Space Map Zhongshan Ancient Town Street Space Map (self-drawn) (Left)

Figure 8: Analysis of the street space use situation in Zhongshan Guzhen (self-drawn) (Right)

In Old Street, most households choose to face the street, resulting in many families going beyond their boundaries in their daily activities, such as chatting, playing mahjong, doing laundry and cooking outdoors. In effect, Old Street has become a "living room" shared by many families. The relocation of these families' living spaces is not due to the fact that the limited indoor space is unable to satisfy these needs, but rather to the fact that the frankness, humour and optimism of the local residents and the special topographical conditions make them more inclined to use the shared spaces in the alleys. The high level of activity and extroversion in the streets and alleys reflects the philosophy of life in traditional field towns: neighbours and a few families form a fixed living group, and they display a high degree of alertness externally while maintaining harmonious relationships internally when dealing with internal and external relations.

#### 4. Conclusions: Regional Architecture Revelations and Reflections

After an in-depth investigation and study of Zhongshan Ancient Town, we can clearly feel the uniqueness of the town structure and architectural culture of Zhongshan Ancient Town. These uniquenesses are precisely the precious heritage left for us by the culture of the mountain city, which has significant reference significance for the current development strategy of the city.

Firstly, in the context of modern mountain cities, we should recognise the positive impact of walkable spaces on public life. In designing the public space layout of the city, we should aim to create a space similar to the "vertical street" of Zhongshan Ancient Town, and build a network of contour walking paths perpendicular to the terrain, which will provide strong support for the city's motorised roads. Existing street resources will also be actively utilised to create a distinctive landscape environment. Secondly, given today's social needs and technological environment, we should aim to find architectural design and implementation strategies that are in harmony with the area's natural topography and cultural context; ultimately, we should recognise that the design of multi-level, semi-enclosed public spaces in traditional old towns has had a positive impact on strengthening neighbourhood relations. We can try to apply this design model to the development of modern urban residential areas, so that they can play a better function in today's context.

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