Discussion on the Value of Hanging Foot Building in Modern Design

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Abstract. Hanging-foot building is a unique charming form of traditional residential architecture, and its architecture itself contains a large number of architectural features that reflect the folk culture formed by local residents to a certain extent. However, with the development of modern design and the spread of Western design ideas, Chinese traditional architectural culture has declined rapidly. Through a large number of literature reading, field investigation and related image data research, it is found that the architectural structure, materials, spatial layout of the podhouse, respecting nature, scientific and reasonable, and harmonious and unified with the environment, have great value enlightenment for modern design. The refining and application of the architectural structure, traditional building materials and traditional elements of the suspended building can effectively inherit and carry forward the traditional Chinese architectural culture, and at the same time, it can also make modern design works more traditional.

1. Introduction
The creation and development of modern innovative art design in China is deeply influenced by western design concepts and methods, and is farther and farther from traditional design. Under the situation of vigorously promoting national cultural self-confidence, designers have also begun to try to explore and design practices of various design styles based on traditional culture. However, due to the decline of humanistic spirit caused by the cultural fault in a long period of time, designers have shown a state of eagerness for quick success and instant benefit in inheriting tradition. The phenomenon of ‘knowing what it is but not knowing what it is still widespread, making most of the design works mere formality. It is an urgent problem for modern designers to study traditional architectural forms, building materials and architectural styles and apply them to modern design.

Chengbu Miao Autonomous County is located in the southwest border of Hunan Province. Most of the landforms are mountainous and hilly areas, with many high mountains and steep slopes and streams. The ground rocks are uneven and not easy to be smooth. The hanging foot buildings are built according to the mountains. The local materials of building materials are the most representative architectural styles. It has the national spirit and its unique cultural connotation, like a textbook of history and culture. In-depth study, fully tap its scientific value and artistic value, and the results of research and modern design combined to study its modern value, can greatly promote the development of modern design.
2. Overview of hanging-foot building
Different natural environment produces different cultural forms, each cultural form can affect the architectural style of the cultural object. In order to adapt to the harsh terrain, the ancestors in mountainous areas formed the architectural style of hanging-legged buildings along the mountains after long-term development.

![Figure 1. Chengbu miao nationality settlements](image)

The hanging-foot building is the architectural style formed by the ancients who made full use of natural conditions, and after long-term development, along the ups and downs of the mountains and along the mountains. Pillar-supported house is mainly distributed in Wuling Mountain area, which is the intersection of western Hubei, western Hunan and southeastern Guizhou. This area is located in remote and inconvenient transportation, so the relatively independent living form is also due to this natural barrier to promote its preservation to a great extent, especially in Chengbu.

The most typical feature of mountainous landform in Chengbu area is that the mountains are high and the water is urgent, and the residents live according to the mountains, resulting in different types of suspended buildings, among which the most representative is the corridor type suspended buildings. The corridor-type hanging-foot building was named after picking a corridor from the second floor. Suspended buildings are often located on the terrain that is not conducive to the construction of buildings. Some buildings are stable through column support, and the main body is built on the ground. There are two to three floors of the cantilevered podding building, and the cantilevered corridor is set on the second and third floors. Columns are used to support the whole building, and the length of columns can be flexibly changed according to the terrain. Therefore, this type of suspended building has rich changes, which can greatly reduce the impact of terrain on buildings, and has strong flexibility, and can also maximize the protection of local environment.

3. Value characteristics of hanging-foot building
On the one hand, the purpose of the research on traditional houses is to preserve and continue the regional culture, and on the other hand, it is expected to inspire the current design. From the architectural characteristics of the foot building, it has a high Chinese architectural wisdom, the most cultural part of the building, Xiangxi area due to its original ecological closed living environment more complete preservation of the region's traditional culture and customs, for modern design is also very enlightening.
3.1. The scientificity of stilted building

The stilted building has high scientific value. The most important part of the suspended foot building is the pier timber frame system. Although this kind of frame is simple in structure, its stability is quite high. In addition, the tenon-mortise joint structure is used to make it more solid. The main columns of transverse and longitudinal girders can intersect vertically, forming a solid three-dimensional space. Through the pierced wooden frame system, the utilization of the internal space of the building can be maximized. In addition to the particularity of the architectural style of the suspended building, the bottom overhead building form formed by the combination of the two and the flexible internal space are rare examples of architectural art.

The selection of hanging-foot building materials is also more scientific. Almost all building materials can be locally taken, and the local timber resources can be used to greatly reduce the construction cost. With the improvement of the bucket structure, the use of wood is more reduced. Simple wood by tung oil treatment, both to maintain the original wood texture, but also anti-corrosion and anti-borrow. The artemisia grass commonly used in its buildings has a wide source. Although it is a common material, it can not only prevent moisture and keep warm, but also play a certain seismic role.

3.2. The artistry of the stilted building

The podhouse has high artistic value. Only from the appearance point of view, the foot building in accordance with the mountains with water has a full beauty. In terms of architectural details, its carving is representative. Sculpture is an important manifestation of the art of hanging-legged building. The window flowers, hanging melons, and column foundations of hanging-foot buildings everywhere reflect the art of sculpture, with both stone and wood carvings. Sculpture is a kind of local folk art, both the traditional patterns of the Chinese nation, such as lotus, dragon and phoenix, Fulu Shouxi, but also the local minority unique totem, such as buffalo, wild boar.

| Region          | Nation                  | Details processing of architectural decoration                                                                 |
|-----------------|-------------------------|---------------------------------------------------------------------------------------------------------------|
| Chengbu         | Hmong                   | Details of doors, windows, columns, etc., due to the mountainous area, economic backwardness, details more simple |
| Xiangxi phoenix | Hmong, Tujia ethnic     | The doors, roof ridges and other decorative details are rich, and other decorative components are also finely carved |
| Guizhou         | Tujia ethnic            | Decoration details are less                                                                                   |

The hanging melon, located below the pick box, is a component that will be mainly decorated in the hanging building. Its main decorative patterns are lotus and melon. On this basis, it has evolved into hexagon, octagon, sphere, etc., and decorative patterns have also appeared in dragons and phoenix, flowers and birds, and gradually become a unique decorative element of the hanging-legged building. Column base stone is one of the building stone constructions in China. Since the column base is exposed to people’s eyes, it is also the focus of the hanging-foot building decoration. With the change of dynasties, its patterns also formed a variety of shapes and sculptures, but also become a major category of Chinese traditional stone carving art. Its shape has drum, square, hexagon, etc., decorative patterns change many ends, lotus petals, pan dragons, birds, etc. In the Ming and Qing Dynasties, the shape and decoration of pillar foundation developed to a very high level, decorative and practical unity, is a pearl in Chinese traditional architectural art.

4. Contemporary value of the hanging-foot building

On the one hand, the purpose of the research on traditional houses is to preserve and continue the regional culture, and on the other hand, it is expected to inspire the current design. Judging from the architectural features of the foot-suspended building, it has a high architectural wisdom of the Chinese
nation. Due to the relatively complete preservation of the traditional culture and customs of the region in the original ecologically closed living environment in Chengbu District, it is also very enlightening for modern design.

4.1. Science value
In traditional Chinese architecture, only the stilted building has achieved the goal of “occupying the sky and not occupying the land,” without fear of terrain restrictions, conforming to the laws of nature, building buildings according to mountains, and different from the necessary flat foundation of modern architecture, the stilted building is constructed by using the slope. The underlying overhead form, and the problem of rainy and humid mountainous areas, also provide a place for storage and poultry breeding.

At the beginning of the 20th century, Le Corbusier, a famous western architect, put forward that the first point in the five elements of his new building is the bottom overhead, but different from the bottom overhead formed by the hanging foot building conforming to the laws of nature, the bottom overhead of Corbusier is based on the use of new materials reinforced cement at that time, and the purpose is to broaden the vision of the urban bottom.

The enlightenment of the bottom overhead of the foot building for modern design is mainly manifested in the construction of buildings on flat ground and the functional layout of the bottom. The construction of modern buildings does not need to be filled or excavated for all terrain, can draw on the advantages of foot buildings, according to the terrain, reduce the damage to nature, increase the flexibility of building construction. The bottom of the building can be used as shops, parking lots, warehouses and other purposes, and even directly use the terrain to establish rock climbing projects. For areas with low terrain, the underlying overhead can also achieve the effect of flood control.

Most of the materials used in the foot building are built in the form of pure wood structure, which reduces the loss of raw materials. Compared with brick and stone structure buildings, wooden structure buildings have absolute advantages in terms of transportation mode, construction time and mechanical properties of materials. However, due to the rapid development of society and excessive exploitation of resources, the extensive use of wood to build buildings does not conform to the principle of green design. The proper use of wood can continue the traditional building materials to a certain extent, but wood is not fireproof and should not be used as the main material in today’s high-density population environment. Modern new environmental protection materials should be used as the main building materials. The strength and plasticity of new building materials are incomparable to traditional materials. However, the historical implication of traditional materials cannot be replaced by modern new materials. The organic combination of the two can not only avoid the indifference of modern architecture and the defects of traditional building materials, but also give full play to the characteristics of new materials and increase the traditional implication of buildings.

In accordance with the construction concept of nature, in the process of construction, the suspended-foot building tries to save farmland, while the building is built on the slope and is in harmony with the local nature. Its material selection is also the selection of sustainable regeneration materials. Even if the building is used until it is abandoned, the construction materials extracted from nature will not form refractory construction waste, and can be effectively reused. With the rapid development of today’s society, people have ignored the importance of interdependence with the natural environment, and the construction concept of hanging-legged building is precious for modern design. In his organic architecture theory, Frank Wright, a famous American architect in the early 20th century, proposed that architecture should be coordinated with its environment. In Wright’s theory, although emphasis on the environment, but he also stressed the use of modern industrial materials, prone to waste of resources caused by construction waste. The idea of building a long-term harmonious coexistence with the natural environment is worthy of attention and learning by modern designers.
4.2. Aesthetic value
Dwellings with stilted building in Chengbu are the material carrier of Miao’s spiritual culture. Their architectural decoration art has strong ethnic characteristics. Today, when cultural self-confidence is emphasized, the artistic characteristics of hanging feet are refined and applied to modern design, which can not only increase the cultural connotation of modern design, but also make the audience have spiritual resonance.

Wood carving and stone carving are the most representative of the artistic value of the hanging-foot building. From the perspective of art, the combination of its decorative patterns and modern sculpture art can improve the national characteristics of the work, make it more valuable for collection, and promote people’s understanding of the architectural art of ethnic minorities. From the perspective of design, the decorative pattern of the hanging-foot building is processed by modern design language to extract the auspicious meaning of traditional patterns and the beauty of artistic conception. It is used in the design of all walks of life, which not only does not copy, but also enables traditional decorative patterns to conform to the changes of the times. Through this design, it is a tool for the dissemination of national culture and the inheritance and development of traditional Chinese architectural decoration art.

5. Conclusion
With the continuous improvement of people’s spiritual needs, modern architecture should not only meet people’s living needs, but also have the cultural connotation of the nation. After thousands of years of evolution, the hanging-footed building contains a strong wisdom of the Chinese working people and the construction concept of traditional Chinese architecture, which is integrated with natural thought. Its architectural technology, architectural structure and construction concept are rare treasures. Fully exploiting the advantages of traditional architecture and combining it with modern design can better play the value of traditional Chinese architecture, which is not only the inheritance of traditional Chinese architecture, but also the promotion of modern design.

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