

Modern Development and Utilization of Cave Museum - Taking Longdong Folklore Museum as an Example

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Abstract:

Longdong Folklore Museum as unique museum of cave dwelling type is closely related to the culture of cave dwellings, Longdong folk theme, based on caves architectural form, to Longdong folk life scenes, Longdong folk sachets, paper-cut Longdong Cave workshop, a form of folk art, shadow play and has carried on the omni-directional demonstration, Longdong characteristic architecture and folk exhibition will be the perfect unifies in together, Become Qingyang City culture propaganda in a very distinctive name card. Due to the objective defects of the cave itself, such as dampness and mildew, the daily operation and development of the museum have brought some difficulties. However, its full use of the architectural form and aesthetic feeling of cave dwellings is of great guiding significance to the modernization development of cave dwellings in Longdong.

Keywords:

Cave Dwelling, Folk, Civil Residence

1. Introduction

The Loess Caves is an ancient ecological construction produced according to natural factors such as geology, landforms, and climate in the loess plateau between Northwest China and the middle and downstream Yellow River, and under certain social and economic conditions, which has been the crystallization of collective intelligence of successive working people who recognized, utilized, and transformed nature during long-term production, life practices. Loess Caves are mainly distributed in Gansu, Shaanxi, Shanxi, Henan and Ningxia Provinces. However, the Loess Caves in Gansu are mainly distributed in the plateau areas Qingyang and Pingliang in Southeastern Gansu Province.

As pointed by Building with *Earth-Design and Technology of a Sustainable Architecture* [1]: "Earth was used as the building material in all ancient cultures." The Dongzhiyuan in Qingyang City jurisdiction is 1400 m above sea level and the maximum loess thickness reaches 150 - 250 m, making it one of the world's thickest regions. According to the Long Dong Traditional Adobe Building *Construction*

Technology Research and Development [2]: “The main body of traditional native dwellings in Longdong area is Loess Cave, which once existed as the main form of residential buildings for a long time, which is determined by the unique natural conditions of the Loess Plateau.” There are thousands of gullies here, the arid and less rainy climatic features, has led to the widespread application of this form of settlement in long East China. According to Sima Qian Historical Records - Zhou Benji [3]: “Bu Zhu lost his official position and ran between Rong and di.” After he arrived in Qingyang, he dug caves on the basis of primitive cave dwelling and according to the loess landform, which improved the local living environment. These records about the cave show the long history of the residential form of Qingyang cave. With the development of modern society and changes in people’s residency ideas, the non physical cultural heritage of the Longdong Cave Dwelling faced a gradual disappearance. Longdong Cave Dwelling, in turn, are an important part of Qingyang residence and folk culture, and how to modernize the utilization of some unique ancient old caves has allowed their continued use in modern society to achieve caves sustainability has become an important topic in the study of Qingyang residence and the exploitation and utilization of folk culture.

2. Overview of the Development and Utilization of Caves in Longdong Folklore Museum

Longdong Folklore Museum, also known as Xifeng District Museum, was established in 1986 and moved to Xiaokongtong scenic spot in Xifeng District in 2000. It is the only folk cultural relics collection, exhibition and research institution built by cave in our province. It is now a national third-class Museum and opened free to the whole society in 2000.

2.1. Basic Usage of Caves in Longdong Folklore Museum

The cave of Longdong Folklore Museum was built in the 1950s and 1960s. Since 2000, the museum has continuously transformed the cave.

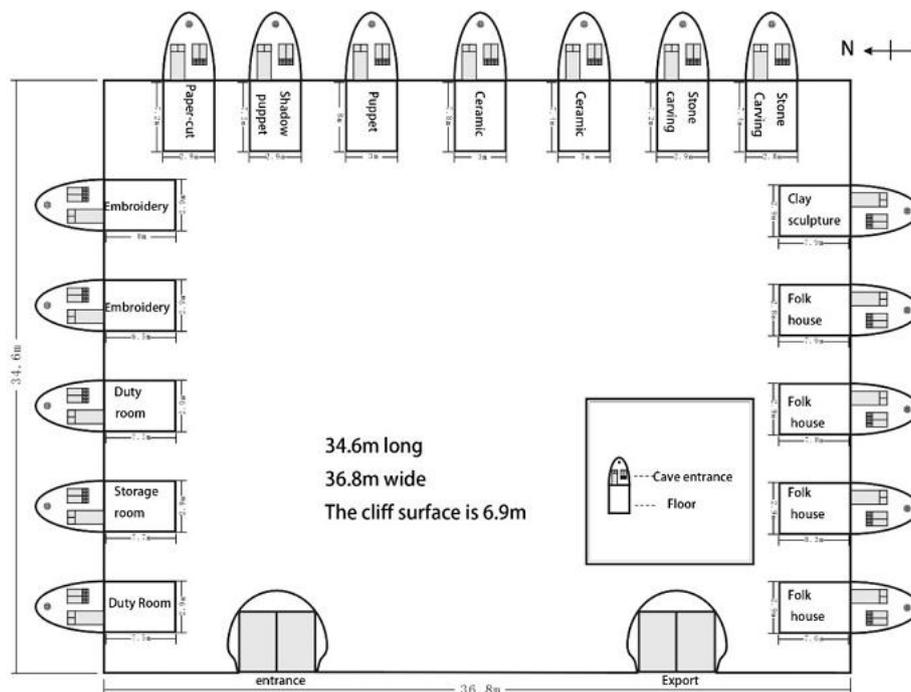


Figure 1. Layout plan of exhibition hall of Longdong Folklore Museum in 2009.

At present, the cave yard is a cliff type cave - Ming Zhuangzi in Yazhuang yard, and the whole yard faces west. The museum area is 34.6 meters long from east to west, 36.8 meters wide from north to South and 6.9 meters deep. There are 17 caves in the Museum: there are 7 caves on the east front and 5 caves on the north and south sides. The width and depth of each cave in the museum are different. According to the statistics on the architectural dimensions of caves as pointed by Chinese Cave [4], the general architectural dimensions of caves in Longdong area are: 3-4m wide and 5-9m deep. The specific dimensions are shown in the figure (Figure 1). The inner wall of the cave was reinforced with red bricks in 2008. During the project from 2014 to 2015, the cave was shrunk laterally inward with plates, making the width of the cave slightly smaller than the ordinary size of Longdong Cave.

The guardrail on the cliff surface of the museum is used as the guardrail of the scenic spot. It is made of cement and steel and painted with white paint. In order to consolidate the cliff body and promote drainage, a large area of deep-rooted plants are planted on the back of the cliff (Figure 2) to form a vegetation protective layer, and the cliff surface is reinforced with red bricks as a whole (Figure 3). These traditional solidification drainage technologies have also played a certain beautification role. In the later stage, on the basis of the red brick bottom layer, the cliff surface was painted for many times. For example, the red brick was painted gray blue in 2009 (Figure 4) and the loess was painted gray in 2013 (Figure 5). In general, the Longdong Folk Museum has not changed the basic appearance and internal structure of the Longdong Cave. It adopts the traditional architectural technology of Longdong Cave, which reflects the characteristics of traditional cave architecture.



Figure 2. *Panorama of Longdong Folklore Museum.*



Figure 3. *Schematic diagram of red brick reinforcement on cliff surface.*



Figure 4. *Schematic diagram of red brick painting with gray blue paint.*



Figure 5. *Schematic diagram of red brick painting loess color paint.*

1.2. Overview of the Exhibition of Longdong Folklore Museum

The Longdong Folklore Museum is divided into five parts (Figure 6): “Folk etiquette, Folk art essence, Folk sacrifice, Buddha light, Cave dwelling spring and

Autumn”. These topics closely focus on the noumenon of cave architectural form, and focus on the development of exhibition forms related to cave architectural features, such as more distinctive cave temples, cave workshops and other exhibition rooms. Compared with the exhibition area built by the modern museum away from the production and living environment, visitors feel a higher sense of reality.

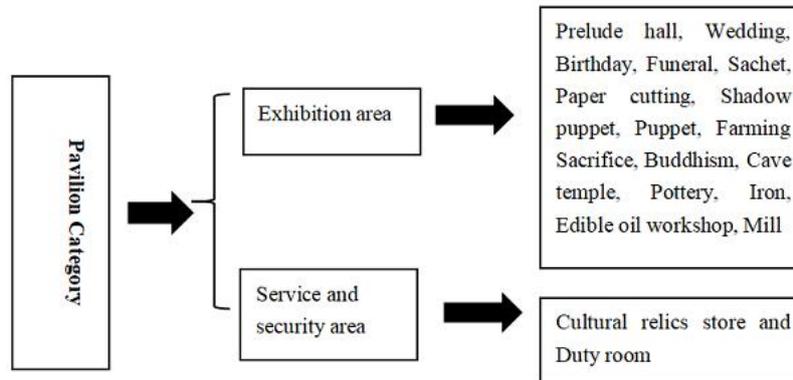


Figure 6. Classification of exhibition categories of Longdong folklore museum.

On the whole, the Longdong Folklore Museum completely retains the original characteristics of Longdong Caves and their courtyards. This way of exhibition integrating the museum and local characteristic buildings not only reflects the strong characteristics of local folk houses, but also directly combines the exhibition content with the actual cave scenes to more intuitively display the folk characteristics of Longdong. The development and utilization of Longdong Folklore Museum has a certain reference significance for the modernization of Cave Museum and the modern reuse of ancient caves.

3. Problems Encountered in the Daily Maintenance of Cave Museum

Due to the poor ventilation, humidity, poor lighting and other architectural defects of the cave itself, the Longdong Folklore Museum has encountered some problems different from other modern museums in its daily operation and development.

3.1. Limitations of Display Space

Modern museum buildings need to organize and arrange the exhibition space in a specific order to form a visiting streamline for the audience, so that the audience can have a clear goal in the process of visiting, and can continuously visit the exhibition of a complete museum through indoor channels. The single space of the cave is difficult to meet the requirements of the mobile space of the modern museum. After visiting a single exhibition hall, you can only reach another exhibition hall through the outside. Although there are guide signs, there are still problems of poor continuity and high randomness.

The exhibition space of the exhibition hall in modern museum buildings is relatively open. Each exhibition hall is composed of multiple spaces. The space division of the exhibition area is also complex and the available area is large. The cave is a single space, and the available area is very limited. The display space is limited to walls and less ground. The use of these display spaces should also ensure the capacity of visitors. In order to solve such problems, Longdong Folk Museum opened niches on the cave walls of funeral, agricultural sacrifice, ceramics and other exhibition halls, and then strengthened the walls locally to form a small exhibition

area. To a certain extent, this design not only expands the exhibition space, but also conforms to the actual environment of the Loess Cave, and highlights the exhibition characteristics of the Cave Museum.

In modern museum architecture, the rich lighting system of the museum is combined with appropriate natural light and indoor light. However, in the traditional cave interior, the natural lighting is difficult to be uniform and bright. The cave of Longdong Folklore Museum is nearly eight meters deep, which makes it difficult to achieve brightness and balance of natural lighting in the middle of the cave. In the actual exhibition, in order to overcome such problems, the decoration of track lights is added in the exhibition hall of Longdong Folklore Museum, all transparent places such as windows are blocked, and indoor lights are used instead of natural light, which basically achieves the symmetry and nature of the light from the cave palm to the middle of the cave, but it is still unable to avoid the impact of the reflected natural light on the display light of the exhibits at the door.

3.2. Damp Proof and Mildew Proof of Cave

According to the *Code for Design of Museum Buildings* [5]: “The protection of collections shall include the requirements of temperature and humidity, moisture-proof, waterproof, light, smoke and dust prevention, harmful gas prevention, insect prevention, rat prevention and anti-theft.” Longdong Folklore Museum, a museum transformed according to caves, has the disadvantages of humidity and uneven temperature, which directly affects the daily management and operation of the museum.

The temperature distribution in the cave is uneven, and there is a temperature difference in the cave, the middle of the cave and the door. Under extreme weather conditions, the indoor local temperature may exceed the protection temperature range of museum collections. The long-term unbalanced and unstable temperature will cause certain damage to the exhibits. Longdong Folklore Museum conducted heat insulation treatment at the cave windows and shading the windows to minimize the temperature difference in the cave and reduce the probability of damage to exhibits. But at present, the effect is still not very ideal.

When the cave is separated from the human living function and the drying function of the heated kang during human living is removed, the humidity in the cave is not only high but also changes greatly, which can not meet the constant humidity principle required by modern museums. In rainy seasons, the humidity in the cave will greatly exceed the requirements of the specification, which will not only directly affect the preservation safety of the collection in the cave, but also directly affect the service life of the wall coating and the overall safety in the cave. In the exhibition promotion project of Longdong Folklore Museum from 2013 to 2015, natural ventilation is set at the upper vent of the window and dehumidifier is used to keep the indoor humidity constant, so as to meet the basic requirements of the museum for humidity, but these technical means have little effect. The rainfall in summer and autumn of 2020 is larger than that in previous years, and a large number of mildew spots appear on the wall and display cabinet in the cave. Dampproof is still the biggest challenge in the operation and development of Longdong Folk Museum.

3.3. Daily Maintenance of Cliff Body

Based on the architectural noumenon of cave, the maintenance of cliff body is an important part of Longdong Folklore Museum to maintain the safety of visitors and the overall safety of the museum. Based on the architectural noumenon of cave, the maintenance of cliff body is an important part of Longdong Folklore Museum to maintain the safety of visitors and the overall safety of the museum. In the former Longdong Cave, the soil of the cliff body was exposed, and it was easy to be washed out in rain. In order to solve this problem, Longdong Cave began to use red bricks to reinforce the cliff surface, and plants to consolidate the loess layer on the cliff body. During the wall maintenance in 2013, a comprehensive coating composed of pigment, cement and loess was used to coat the cliff surface, which has the effect of rain water erosion. Because it is close to the color of loess, it has the geomorphic characteristics of the Loess Plateau and plays a certain decorative role.

4. Development and Future of Cave Museum

In the development and utilization of traditional houses, we should not only explore the cultural connotation of traditional houses, but also explore the possibility of “modernization” of traditional houses. According to the *A Study on the Characteristics of Ecological in Contemporary Architecture* [6]: “The Ecological designing emphasizes the harmony with the ecology, putting natural elements in the planing process, which can make natural formation progresses be considered.” Reconstructing the cultural connotation of Longdong Cave with the concept of green ecological architecture is particularly important for the inheritance and development of cave culture. In the process of reconstruction, we should not only solve the architectural defects of the cave itself, but also expand the architectural and cultural characteristics of the cave, so as to realize the sustainable development of ancient folk houses.

4.1. The Exploration of the Formal Beauty of Cave Museum and Its Unique Publicity Function

The particularity of the role of Cave Museum in spreading folk culture. Folk custom is a living culture. As pointed by *The Natural House* [7]: “Focusing on the protection of natural beauty, any construction, even if it is only a path or a small house, will cause damage to nature. If it must be built, the damage must be minimized and integrated with the environment.” The traditional folk custom in Longdong area occurs and develops in Longdong Caves all the time, and is intertwined with the daily life of the people in Longdong all the time. In the previous folk culture publicity in East Gansu, the more mainstream is the display with the theme of folk products and folk activities. The display effect is generally separated from the daily production and living environment itself, and the form is relatively single. But folk culture not only depends on the situation, but also goes beyond the situation. The Longdong Folklore Museum combines folk culture with the architectural landscape with the characteristics of Longdong. It displays folk art and folk culture activities in the two modules of “folk etiquette” and “the essence of folk art”, and restores the daily life scenes in Longdong district. For example, in the cave in the shadow puppet exhibition hall, the curtain for performing shadow puppets is displayed. This scene is the typical situation of Daoqing shadow puppet singing from house to house.

Longdong Folklore Museum can also rely on the architectural facilities in the museum to hold Longdong social fire performance, paper cutting and sachet making exhibition activities in the park (Figure 7), so as to set off folk houses and folk customs. Window flowers are pasted on the windows of the cave, sachets are hung in the cave, shadow plays are performed, Daoqing is sung, and social fires are danced in the courtyard, vividly showing the unique humanistic atmosphere and cultural characteristics of Longdong area. It has played a unique role in publicizing Longdong folk customs.



Figure 7. Folk cultural activities of Longdong Folklore Museum.

The particularity of the role of Cave Museum in spreading folk house culture. Longdong Cave has been one of the main ways of production and life for thousands of years. According to the *Discovering the Vernacular Land Scape* [8]: “It records the history of a place, including natural and social history; Telling moving stories, including beautiful and sad stories; It tells the ownership of land, as well as the relationship between people and land, people and people, and people and society.” In the long river of history, cave has always been one of the simple and architectural forms. As pointed by *Design and Research of Cave Museum* [9]: “As the extension of green culture in the construction industry, green building is the product of living environment based on green thought. The overall purpose of green building is to establish a system similar to natural green organisms and realize the balance of overall investment and return in the sense of architectural ecology.” The building environment of Longdong Folklore Museum takes the green building as the construction standard, and uses the natural terrain of Xiaokongtong scenic spot to maintain the original ecological environment and highlight the local characteristics of Longdong.

4.2. Possibility of Further Development and Utilization of Cave Museum

According to the *Preliminary Study on the Protection and Regeneration of Cave Dwellings during the Course of Urban Growth in Qingyang* [10]: “The ultimate purpose of the protection and regeneration of Qingyang Cave Dwellings in the process of urban growth is to make the new observation dwellings that meet the living needs of contemporary residents survive and regenerate widely in Qingyang.” The development and utilization of caves and their surrounding environment by Longdong Folk Museum provides a certain reference significance for the reconstruction of the architectural value of ancient caves in Longdong when modern buildings gradually replace traditional buildings. In the later development and utilization of Cave Museum, the transformation and design of cave buildings can refer to Longdong Folk Museum for further environmental planning from the following aspects:

Make effective use of local natural and cultural resources. The use of traditional building materials and construction techniques in Longdong Cave building techniques makes the Cave Museum more prominent in folk customs.

Adapt and coordinate with the surrounding regional environment. Guided by the concept of vernacular architectural design and green ecological architecture, relying on the natural ecological environment of the surrounding areas, and using the basic principles of ecology and building technology science, we strive to achieve the coordinated and sustainable development of man, architecture, nature and environment.

Provide a more constant temperature and humidity display environment. On the premise of inheriting its original natural ecology and using modern technology to solve the defects of cave, such as uneven temperature, high humidity and poor ventilation, we should do a good job in the moisture-proof protection of exhibition halls and exhibits.

5. Conclusions

With the development of society, the traditional residential culture gradually declined. As an important carrier of Longdong folk culture, the appropriate transformation of Longdong Cave can make it adapt to the new life concept of modern people and continue to inherit the traditional construction skills of Longdong Cave. The establishment and operation experience of Longdong Folklore Museum has important reference significance for the development and utilization of ancient caves and the construction and development of Cave Museum. In the transformation and utilization of ancient caves, Cave Museum can not only carry the inheritance of Longdong culture, but also carry the publicity of Longdong culture and the display of folk activities. The constant “folklorization”, “localization” and “modernization” of ancient cave dwellings will also make the ancient dwellings glow with new vitality on the land of Qingyang.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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