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Ecological Exploration and Practice of Tradition Residential Buildings in Qinba Mountain District

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Abstract: Through on-the-spot investigation analysis on the Qinba mountain district, this study discusses ecological construction and deficiency of tradition residential building. We Urgently need to explore the appropriate strategies about the level of economic development of the local eco-building technologies in Qinba mountain district. The research on traditional residential building provide the reference and theoretical development and practical operation for other areas. It is expectation on traditional local-style dwelling houses to make a supplement.

Key words: Residential buildings, ecological exploration and pratice, qinba mountain district

INTRODUCTION

The Chinese nation has thousands of years of historical process. It depended on hard work and high quality of wisdom and created the splendid oriental culture. There are many cultural geographic features in traditional residential building. The vitality and sustainability of traditional residential buildings depends on the adaptation to living style changes. Into the 21st century, the living conditions in rural areas reflect the development of agriculture, rural areas and farmers and the villages as a geographical unit of rural social settlement space and living form of various rural development activities in the economic and social basis (Fig. 1). Harmonious construction of villages, to improve the living conditions of rural residents, adjust the mode of their living space to carry out a sustainable eco-energy saving strategy, help to promote urban and rural economic and social co-ordinate the development, to solve the "three rural" issues, building a new socialist countryside and comprehensive building a harmonious society, is of strategic significance. Building a conservation-oriented society of the spirit of the times and the strategy of developing the requirements of environmental protection, the development of eco-energy saving residential is the only way, is also the only way for the ecological transformation of existing residential.

PRESENT SITUATION ANALYSIS OF RESIDENTIAL BUILDING IN QINBA MOUNTAIN DISTRICT

Lack the overall planning: The residential building in Qinba mountain villages is the family unit, the villagers often based on personal preferences and household economic capacity site to build a house, leading to the settlement space messy. Disadvantage of most residential, but also widespread collapse, tidal, dark plugs (poor ventilation). In addition, the concept of feng shui, the gradual disappearance of the internal destruction of the village and the villagers thought, many villagers in ditches, channels and other public land site build houses contaminated water, the destruction of the village of internal harmony and unity. The extensive village roads to pieces by the farm house Unicom, taking up a lot of arable land, destruction of the environment of the settlement (Xia *et al*., 2001).

Serious waste of land resources: Qinba mountain towns original residential, mostly single-family homes alone, distributed layout, new housing standards are getting

Fig. 1: Feature of tradition residential building in qinba mountain regions

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higher and higher, more and more area of this trend will lead to a large number of rural land resources wasted. At the meantime, the relationships of homestead and residential building also showed many questions about land wasted. First, homestead no uniform allocation criteria, the villagers according to their own needs to select land. Second, homestead layout confusion, the base waste land, households defined not obvious, ownership is complex, there are many house loss the land. Third, part of the homestead in the process of the sale or inheritance, some villagers moving out in the village still occupied homestead, or more than one home, there are a large number of homestead idle. At last, many settlements homestead is gathering mixed.

Unreasonable design of residential building: The residential building in Qinba mountain villages is dedicated to the ancestors of the "main room". It is in the center position of the entire residential building. The most frequent of the day-to-day activities is in the main room, but it lack sunshine and poorly ventilated. The lack of rational design of villagers' self-built residential indoor ventilation and sunshine have not reached the indicators of building the technical requirements. Residential building generally is relatively moist, light, dark, poor ventilation (Yan, 2008).

Excessive energy consumption of residential buildings: Qinba mountain villages is multi-ethnic, multi-mountains, many people, little land, arable land dispersed village residential building backward. It still have single storeyed detached house more, the village also very dispersed. Detached house in winter, "the six-sided cold summer hexahedral into heat" and maintain the structure of the thermal resistance (including the effect of air infiltration) is much lower than the energy-saving thermal resistance requirements.

ECOLOGICAL CONCEPTS AND PRINCIPLES OF RESIDENTIAL BUILDING IN QINBA MOUNTAIN DISTRICT

The Qinba mountain villages of residential ecological design not only absorb the advantages of traditional local Village Houses, respect the habits of the residents of local towns and villages, based on traditional inheritance and development, green building, environmental protection and energy saving building design concept, embodied ahead durability and flexibility. Towns dwelling as a residential building, while at the same time to meet the multi-functional requirements of rural production, feeding, storage, reasonable and orderly organization plane function is to ensure the comfort, the premise of the applicable the layout done public-private separation, food and sleep separation, ranking sleep separation, clean sewage separation. While optimizing the traditional courtyard arrangement, considering the traffic flow lines, wind direction and other factors, the health requirements of environmental protection, rational development and use of various energy sources, most of their energy overall efficacy, reduce energy consumption, in order to better protect the ecological environment.

The residential building ecological design principles should be followed as: Low-power principle, comfort principle, Local principle, economical principle.

ECOLOGICAL DESIGN STRATEGY OF RESIDENTIAL BUILDING IN QINBA MOUNTAIN DISTRICT

Ecological architectural design to adapt to the natural environment and gradually formed over a long period of groping, by specific geographical environment, climate conditions and the impact of different cultures around the ecological architectural design strategies specific manifestations very different. The Qinba mountain village residential construction eco-design strategy is systematically from the top down throughout building siting and toward, the layout and the combination of space, building structure selection, construction materials applications, all reflect adaptation to natural conditions and the use of natural protection natural, simple, smart and economical way to create the built environment eco-building ideas and design strategies.

Good suitability site and residential building toward: Select avoiding disadvantages living environment, good venue to capitalize on the trend with outdoor microclimate create. On the one hand, through the analysis of the terrain, the terrain and water, select livable area. The other hand, make full use of land resources, maintaining farming land, land for construction of land balance.

Very important in the layout of the residential, toward select winter should have the right amount of sunlight indoors to avoid the cold winds. Summer to minimize direct sunlight indoors and outside walls, there should be good ventilation. Visible, from energy efficiency and thermal environmental considerations, the residential to the north-south or near the north-south as well, to avoid the things to, if not for the north-south main room should be located in parts of the winter leeward and turn towards, reduce the amount of cooling of the building envelope.

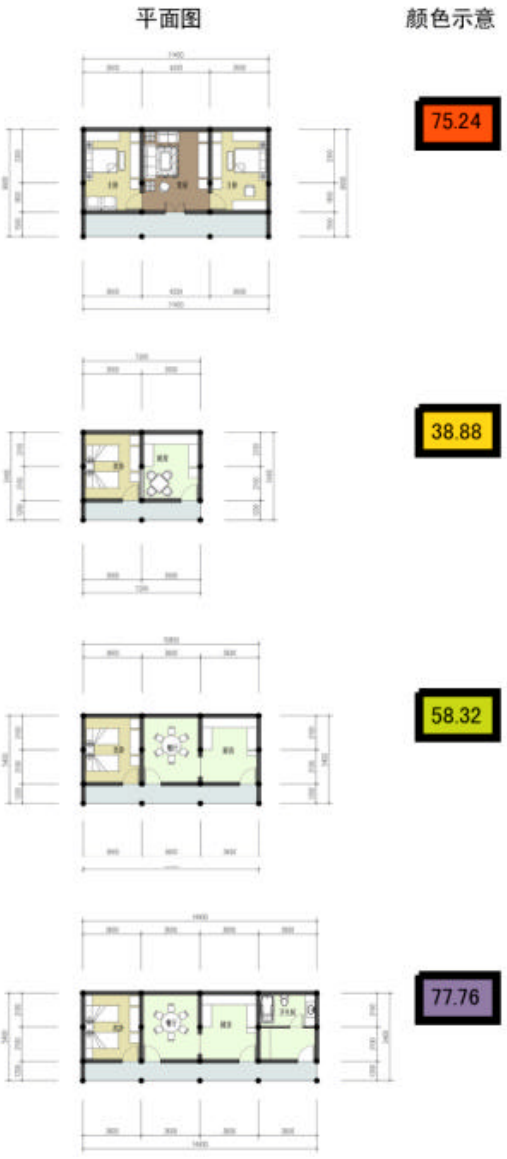

Fig. 2: Basic module

Reasonable ecological form of residential building: Through the confrontation of architectural forms, it is seek to rational organization to adapt to the various elements of the climate. Choose a rational layout of the building and construction area by a different population. Architectural form with gable shaped building "L"-shaped and "U" shaped, while the establishment of the basic unit of the basic module with multi-function module, the use of two types of different modules to a combination of a variety of meet villagers needs of the residential areas. And then according to physiological and psychological needs of households design basic module (Fig. 2) and

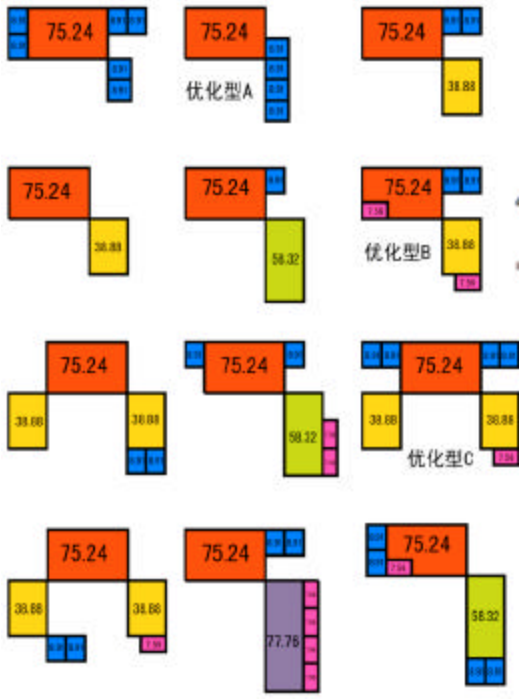

Fig. 3: Combination module

combination module (Fig. 3). The appropriate form also be selected in accordance with the size of the population and module which are different can be combined. Reminded of construction and the combination of the virtual design settings courtyard, to reduce the impact of the outdoor climate indoor physical environment, the use of building self-cover effectively prevent sun radiation.

Adapt to the climate of the building structure: In order to reflect the regional culture, showing the charm of Qinba mountain building, under the premise of ensuring the seismic safety of using the deposited walls of the wooden structure of the system (Fig. 4) and wood-two light steel structure system, wood bamboo fence. Close due to the Qinba mountain winter construction indoor temperature and humidity with the outdoor, the villagers need warming himself winter, the traditional residents of the housing in the form of continuation and development down winter insulation problem has not been able to be resolved in the cool in the summer and cold winter areas. In order to improve the the winter insulation performance of the traditional wall, the wall is improved as a folder the earth or folder polystyrene board insulation wall (Fig. 5), the sun wooden grille to build in order to reduce the heat loss in winter, at the same time reflect the Qinba Mountains Vernacular Architecture Features.

Fig. 4: Wooden structure system

Fig. 5: Wall insulation

Use of local materials and resources: Qinba mountain rich in forest resources, to follow local materials principle in traditional local houses followed the wooden skeleton room, small tiles or wood roof; surrounding mountains rich in forests and abundant bamboo resources, bamboo processing is simple, with as a retaining wall more simple,

Fig. 6: Bamboo fence wall

breathable, harmony with mountains landscape effect. Therefore widely used in the residential envelope walls, the history thus forming a large number of restaurants, bamboo fence wall (Fig. 6), but because of its wall is thinner and the poor insulation resistance, is widely used in kitchen monomer maintenance. Residential design should take into account the combination of the map to use to wipe the soil as a wall, can improve the room insulation, sound insulation effect, the construction of low-cost and can also increase the atmosphere's carbon dioxide (Zhang, 2006).

CONCLUSION

The eco-technology pursuit is to keep between man and nature resources, access to and consumption of energy, the balance of the cycle of the input and output. In order to achieve this goal, you must take into account the local conditions, such as land, resources, climate, vegetation, economic, lifestyle and combined the ecological technology level, selected in accordance with appropriate local ecological technology. Selection and technical aspects in the building, according to local conditions and actively develop the appropriate use of local technology and local materials, to learn from the local traditional construction technology and ecological experience, the only way China's towns and villages the ecological residential building will have a lasting vitality, so that man and nature harmony.

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