The Local Strategies for Guangzhou Vernacular Housing: A Case Study of Guangfu

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Abstract

The research goals of this article are to understand villagers and tourists' evaluations of traditional residences and self-built houses, as well as their preferences for new residences; to explore regional residence design strategies that adapt to Guangzhou's climate and cultural characteristics; to design economic and residential buildings with Guangzhou's regional characteristics. Beautiful new residential scheme. The study conducted random surveys among 250 local villagers and 200 foreign tourists in 10 villages, for a total of 450 people. Research tools include questionnaires, pens, notebooks, cameras, voice recorders, etc. The survey results show that traditional dwellings play an important role in the hearts of villagers and tourists, and villagers and tourists pay great attention to traditional villages and residential spaces. Therefore, this article proposes "reasonable layout and orientation, create a comfortable environment, continue the traditional spatial form, build the spirit of the place, continue the traditional spatial scale, meet the needs of modern life, innovate the architectural appearance form, inherit the cultural spirit, adapt to the climate characteristics of Guangzhou, be green and energy-saving, increase revenue and reduce expenditure , energy conservation and environmental protection, focusing on the economic cost of the entire construction process, and meeting the requirements of ordinary villagers." Seven strategies for new residential design.

Keywords: Guangzhou; Vernacular dwellings; Localisation; Design strategy

Introduction

Traditional dwellings carry local history, culture, art, and technology, and are an important expression of local civilization and spirit. They need to be well inherited and developed. Continuing traditional residential culture and building "new residential buildings" is a demand for spiritual and cultural construction in the new era, and a specific practice of cultural consciousness, confidence, and self-improvement in rural areas; It is an important lever for the construction and revitalization of beautiful rural areas in Guangzhou.

Guangzhou region is a subtropical climate, high temperature and heat, humid and rainy, long sunshine hours, large amount of solar radiation, therefore, the traditional houses in Guangzhou pay great attention to sunshade and heat insulation, ventilation and moisture-proof to adapt to the local climate characteristics. The traditional houses in Guangzhou countryside have flexible and diverse architectural forms; the buildings are mainly oriented in the south direction; the appearance of the buildings is distinctive, with the most representative features being the wok ear wall, the hard hill wall, the dragon boat roof ridge and the Bogu roof ridge; the building materials are represented by the green bricks, the oyster shells, the stepped bricks, the tube tiles; the doors and windows are rich in styles, with both safety and transparency, with

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the most distinctive features being the bar door and the Manchurian window; the building colours are dominated by the greenish-grey colour, which is fresh, simple and elegant, and gives the impression of a fresh, simple and elegant life. The colour of the building is mainly green-grey, which is fresh and simple, giving people a cool and comfortable feeling (Figure 1).

Figure 1. Traditional houses in rural Guangzhou
Source: Photo by the author

Guangzhou's rural self-built houses have gradually lost their traditional cultural characteristics and regional features. The architectural style is uniform and lacks characteristics. the building is basically a modernist "square box" shape, the exterior collage of various types of tiles, red, yellow, blue and white, bright and colorful, blind pursuit of the appearance of bright and shiny, individual houses and even strong implantation of Roman columns and mountain flower decorations, appearing to be even more fragmented and grotesque.(Figure 2).

Figure 2. Self-built houses in rural Guangzhou
Source: Photo by the author

The traditional folk houses in Guangzhou area have distinctive local characteristics and are the symbol and crystallization of traditional culture and ancient wisdom. However, the current problem of "homogenization" of rural self-built houses in Guangzhou area is becoming increasingly serious, and the problem of "one thousand villages" has emerged. Therefore, the regional characteristics proposed in this article Research on residential design strategies is of great significance and is urgent.

Research Objectives

1. Understand the evaluation of villagers and tourists on traditional houses and self-built houses, as well as their preferences for new houses.
2. Explore regional residential design strategies that adapt to Guangzhou's climate characteristics and cultural characteristics.
3. Design an economical and beautiful new residential scheme with Guangzhou's regional characteristics.

Literature Review

In 1954, Swiss architectural critic S. Gideon published "The New Regionalism", pointing out the intrinsic connection between region and architecture. 1984, Greek architectural theorist Alexandre Chounis and his wife, Liana Lefebvre, put forward critical regionalism, which rejects globalism but at the same time rejects retrofuturism, arguing that modern architecture should be localised as an identity label(Shan Jun,2001). In 1999, the World Congress of Architects adopted the Context Charter, the core idea of which is to create a sustainable and liveable environment, emphasise the use of indigenous technologies and the

creative integration of local economies, and advocate a culture of harmony and difference in architecture.

New China has been committed to the contemporary architecture of regional design exploration and research.In 1997, in the "Contemporary Vernacular Architecture-Modernisation of the traditional" international symposium. "International Symposium, academician Wu Liangyong made a" vernacular architecture modernisation, modern architecture regionalisation" keynote report, suggesting that attention to regional architecture, in a critical and developmental approach to regional architecture. Emphasis on oriental thinking and Asian characteristics (Wu Liangyong, 2009). 2002, Professor Zou Dennon published "China's regional architectural achievements, limitations and foresight" (Zou Dennon, 2002: 4-7), summed up the achievements of China's regional architecture and the shortcomings of the "form-based", and proposed that in the future should establish "In 2004, Professor Shan Qide proposed in his book From Traditional Habitat to Regional Architecture that the most important thing for the inheritance of today's Habitat is the holistic mindset of Habitat at the spiritual level and the comprehensive utilitarian value, and the search for the harmonious coexistence of human and nature (Shan Qide, 2004). Xie Yingjun advocates the design concept of eco-friendly, low-cost. In 2008, during the earthquake reconstruction of Yangliu Village in Wenchuan, Xie Yingjun adopted light steel structures in the building structure in response to problems such as high local earthquake resistance requirements and poor economic capacity(Guo Yongjian，2020).

The research on regional architecture in Guangfu is thick and thin, with remarkable achievements. Xia Changshi, Chen Boqi, and Lin Keming have done a lot of architectural explorations and published a series of papers on the subtropical climate characteristics of Lingnan, heat insulation, sun shading, and ventilation of buildings(Tang Guohua,2005). Mo Bozhi summarized his theory of creation as: truth-seeking, identity, reversion and communication. He Jingtang proposed the concept of "two views and three natures", pointing out that architecture is a product of the region, rooted in the specific environment, influenced by the natural climate and topography of the region, and is a comprehensive response to the social, economic, cultural and technological aspects of the region (He Jingtang, 2002: 16-18).

These conceptual principles have significant value and significance, however, research on Guangfu dwellings mainly focuses on the study of the architecture itself, with architectural history and theoretical research as the main line, focusing on sorting out history, analyzing the current situation, and summarizing. There is a lack of practical application research in architecture, and even less research on the design practice of Guangfu new dwellings; Lack of comprehensive and systematic research from a holistic perspective, as well as a lack of comprehensive perspectives on natural climate, regional culture, building technology, and construction costs to study residential buildings and their design. This article will study the design strategy of regional new residential buildings from a comprehensive perspective.

Research Methodology

1.Research Methodology: Questionnaire survey method. In order to understand the evaluation and needs of villagers and tourists towards residential buildings, a survey questionnaire is used to understand the true thoughts of tourists and villagers through questions.

2. Source of Data: Collect data through on-site questionnaire surveys. Organize and summarize the relevant data based on 450 collected survey questionnaires.

3.Population and Sampling: The survey subjects of this study were local villagers and foreign tourists, with 250 local villagers and 200 foreign tourists, totaling 450 people. The survey was conducted through random sampling from 10 villages.

4. Data Collecting: In this study, tools such as questionnaires, pens, notebooks, cameras, and recording pens were used. Before conducting the survey, print out the questionnaire form. During the survey process, the survey subjects can fill out the questionnaire form themselves, or the researcher can fill out the questionnaire form through a question and answer format. The questionnaire form can be filled out using a signature pen. During the investigation, the investigators recorded the investigation process with cameras, recording pens, notebooks and other tools.

5. Analysis of Data: The article uses quantitative analysis methods to statistically analyze and classify the questionnaire survey forms. Organize the questionnaire results and obtain corresponding patterns and conclusions through quantitative statistics of option data.

Research Conceptual Framework

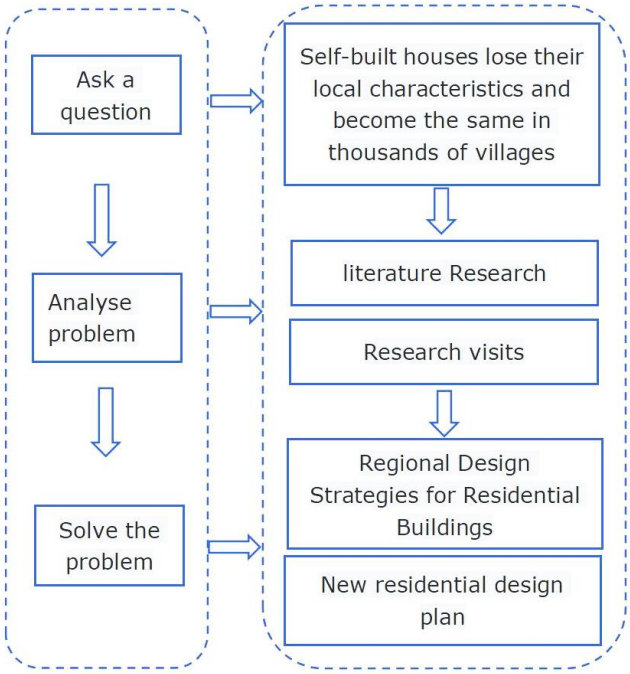


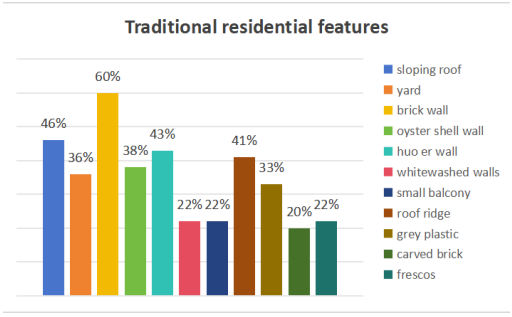
Figure 1 Research Conceptual Framework

Research Results

Objective 1: Villagers and tourists' evaluation of traditional houses and self-built houses, as well as their preferences for new houses.

In order to understand the evaluation and needs of villagers and tourists towards residential buildings, a survey questionnaire is used to understand the true thoughts of tourists and villagers through questions. The survey subjects of this study are local villagers and foreign tourists, with 250 local villagers and 200 foreign tourists, totaling 450 people. According to different administrative regions, 10 villages were selected for research. The questionnaire was addressed to local villagers and tourists. The purpose of the questionnaire was to understand the villagers' and tourists' evaluation of traditional houses and rural self-built houses, the villagers' existing housing situation and satisfaction, and the villagers' preference for the need of new houses. A total of 450 questionnaires were distributed and 420 questionnaires were returned, of which 400 were valid.

The research results show that 88 per cent of the respondents believe that traditional houses have local characteristics, 95 per cent believe that traditional houses have preservation value, 64 per cent do not like rural self-built houses, and 76 per cent believe that rural self-built houses are not in harmony with traditional houses. The research results show that most ordinary households have 3-4 rooms, accounting for 42 per cent, followed by 5-6 rooms, accounting for 28 per cent. Regarding the size of rural homes, they are generally within 80 m^2, more than half of them. This is followed by 81-120 square metres, accounting for 42%. Regarding the floor of the residence, villagers generally choose 3-storey or 2.5-storey, accounting for 54 per cent; followed by 2-storey, accounting for 29 per cent. Regarding the total construction cost of new dwellings that the villagers can afford, 34% of the villagers can afford the construction cost of new dwellings within 500,000 yuan, 33% can afford the construction cost of 510,000-800,000 yuan, and about 500,000 yuan is appropriate. The research results show that tourists are most impressed by traditional dwellings with green brick walls, accounting for 60% of tourists choosing that item; followed by sloping roofs, accounting for 46%; then wok walls accounting for 43%, roof ridges accounting for 41%, oyster shell walls accounting for 38%, patios accounting for 36%, and grey sculptures accounting for 33%. Therefore, blue brick wall, sloping roof, wok wall, oyster shell wall, patio, and grey plastic have the most local architectural characteristics (Figure 3). Regarding the relationship between the architectural combinations of the new residential buildings, 81% of the visitors thought that they should be in a single-family style. Regarding the architectural style of new residential buildings, 60% of tourists chose traditional Chinese style and 25% chose modern Chinese style, accounting for a total of 85%, indicating that tourists preferred with Chinese style (Figure 4).



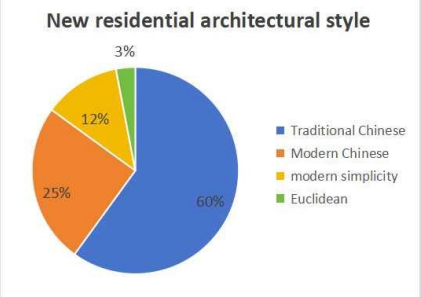


Figure 3. Traditional residential features **Figure 4.** New residential architectural style
Source: Author's own work

The research results indicate that traditional dwellings play an important role in the hearts of villagers and tourists, who are very mindful of the traditional villages and residential spaces. Therefore, the design of new residential buildings should inherit the local characteristics of traditional residential buildings in terms of shape, space, materials, colors, etc; Secondly, traditional residential buildings have the climate adaptability characteristics of warm winter and cool summer, and their ventilation, insulation, and shading effects are excellent, which is worth learning from; Thirdly, due to the limited economic conditions of villagers, consideration should be given to building energy efficiency and the economic cost of building houses.

Objective 2: Regional design strategy for new rural residences in the Guangfu area of Guangzhou.

1) Reasonable layout and orientation to create a comfortable environment.

Under the climatic conditions of Guangzhou, the new residential houses in rural Guangzhou should follow and learn from the comb-style layout techniques of the Guangfu villages in order to facilitate the ventilation and cooling of the villages and buildings. Residences should be orientated in a south-eastern or southern direction, avoiding east-west orientation, especially north-west orientation, so as to strive for cool south-easterly winds in summer, avoiding western sunshine and cold north-westerly winds in winter . The location of residential buildings should respect the topography, minimise the modification and destruction of the natural environment, make full use of the topographical features, combine the buildings with the environment, lean on the mountains and face the water, rely on each other, and merge the contexts to create a safe and comfortable building ecological environment.

2) Continue the traditional space form, build the spirit of place.

The spirit of place is people's perception of the space of the place, the emotional and cultural connection to the space based on life experience, and the spirit of place can evoke memories, recall the past, and nurture a hopeful sense of belonging. In Guangfu villages and buildings, the most typical spatial images are cold alleys, patios, courtyards, concave porches, multi-level balconies and other spatial forms.

Cold alleys are the core channels for village ventilation, with good self-shading and wind-conducting effects, and have obvious thermal buffering and cooling effects for both villages and dwellings, e.g., the Cold Alley of the Fifth Garden of Vanke in Shenzhen, where

bamboos are also planted on both sides of the alleys in order to add a better sense of coolness(Cao Ying，2020: 105-107) (Figure 5).

Figure 5. Cold alleys, Vanke Fifth Park, Shenzhen
Source: Zhu Jianping.2006

The patio is an important element in the spatial organisation of the Guangfu residence, and is the central hub for climate regulation and air conversion within the building, playing a prominent role in both wind-pressure ventilation and heat-pressure ventilation. Courtyard is the ideal living pattern of Chinese residential buildings, which is influenced by the Chinese view of feng shui and humanities, and conforms to both the subtle aesthetics of the Chinese and the feng shui view of "hiding the wind and gathering the qi". A recessed porch is a recessed form at the entrance area of a building that forms a retreat from the building façade. The Guangfu area has long sunshine hours and high solar radiation, the concave space is shaded to reduce solar irradiation, thus lowering the temperature of the entrance space and creating a cool, comfortable and stayable grey space. Multi-level balconies include different forms of balconies such as concave balconies, convex balconies, balconies, terraces and verandas. The balconies, usually on the south side of the building, provide shade from the sun and rain, insulate against heat and conduct wind, and are particularly suitable for the hot and humid climate of Guangfu.

3) Continuing the traditional space scale to meet the needs of modern life.

Continuing the compact and suitable spatial scale of traditional houses, which is not only friendly and pleasant, but also saves energy consumption, meets the requirements of contemporary rural people's life and production and humanistic care, and adopts moderate decorations to enhance the architectural aesthetics and quality of the building, and creates a cultural atmosphere.

Traditional Chinese architecture contains a profound "moderate moderation" philosophical ideas, from the emperor's house to the ordinary people are so,which is not too big, more pleasant, and gives a sense of intimacy and spatial domain.The design of new houses needs to pay attention to the current living and production needs of villagers and meet their human needs. Secondly, it should also meet the spiritual needs of the villagers, especially in terms of folk beliefs, and should retain the ritual space of folk beliefs in the building. Moderate decoration can improve the architectural aesthetic value of new residential buildings, enhance

the quality of the building, and at the same time, give the building cultural connotation and spiritual support, and evoke the beautiful nostalgia of the local people.

4) Innovative architectural appearance and form, inheriting the spirit of culture Using traditional residential building symbols, building materials, abstract restructuring, heterogeneous reconstruction, clever use of new materials and new technologies to express the traditional architectural form qualities, architectural imagery, the continuation of the local architectural expression of colour, to evoke the local architectural and cultural memories, and to pass on the spirit of local culture.

Wang Shu, in the design of the new residence in Dongziguan, Hangzhou, extracted the characteristics of the curvilinear shape of the roofs of the residential houses in Zhejiang, and through dissecting, abstracting and restructuring, he designed the curvilinear sloped roofs with variations of the long and short slopes, the flexibility of the longitudinal and transversal roofs, the combination of single-sloped and double-sloped roofs, and the continuous but asymmetrical curvilinear sloped roofs, which is like a poem, and demonstrated the modern roof form with a full of traditional flavour (Figure 6).

Figure 6. Dongziguan Returned Agricultural Residence, Fuyang, Hangzhou
Source: gad.2017

5) Adapt to the climate characteristics of Guangzhou, green energy saving

The core of adapting to Guangfu's climatic characteristics lies in solving the cooling problem of buildings under hot and humid climatic conditions, so as to reduce air-conditioning energy consumption and realise green energy saving. Xia Changshi published in 1958, "subtropical buildings of the cooling problem - shading, insulation, ventilation" clearly put forward the key to solving the problem in the building shading, insulation and ventilation, which is a milestone in the development of the Guangfu regionalism thought.

6) Open source and reduce expenditure, energy saving and environmental protection.

Dr Anna Tibaijuka, Under-Secretary-General of the United Nations and Executive Director of UN-Habitat, once said that "sustainable urban development must depend on energy-saving development", and by the same token, sustainable rural development also depends on green energy-saving development. Green energy-saving ways include "open source" and "cutting back" two methods, "open source" that is, the use of renewable energy, solar energy is a renewable source of energy, low-carbon and non-polluting, residential application of solar water heaters, solar photovoltaic, solar power, and other energy-saving technologies. Solar energy is a kind of renewable energy, low-carbon and non-polluting, which can be applied to

residential buildings. The "cost-saving" method is the use of rainwater, water, recycling of old materials and the use of environmentally friendly energy-saving equipment.

7) Focusing on the economic cost of the entire construction process to meet the requirements of ordinary villagers.

The construction of new homes should take into account the economic capacity of villagers, and on the basis of ensuring building quality and safety, it should be built independently through low-technology, i.e., indigenous technology, locally sourced materials; standardised design, with a combination of unit modules, is conducive to assembly-type standard work, improves the efficiency of design and construction, and reduces the cost of construction and maintenance. The labour cost of building houses can also be reduced through the mutual help of villagers in exchanging labour.

Objective 3: New residential design plan: regional design practice of new residential buildings in Daling Village, Panyu District, Guangzhou City

The project is located in Daling Village, Shilou Town, Panyu District, Guangzhou City, Guangdong Province . The base of the building is a flat area of 120 m² with a length of 12 m and a width of 10 m. It is bordered by the street to the east and south, and by neighbouring buildings to the west and north .

The residence is rectangular in plan, 10 metres long and 8 metres wide, with an area of 80 square metres. The first floor of the building is mainly a public space, with functions including foyer, living room, dining room, kitchen, bathroom and stairwell. The living room and dining room are orientated towards the east and connected to the courtyard, which not only enjoys the beautiful scenery, but also ensures the lighting and ventilation. The first floor is arranged for the elderly room, which ensures the convenience of the elderly's life. The first floor is a private space, including bedroom and living room. The living room and master bedroom on the first floor have balconies, which ensures the ventilation and lighting of the space on the first floor, as well as the sense of proximity to nature, and the windows and doors on the first floor are cleverly designed to take into account the convection of air between the north and south. The third floor is the tower and rooftop. The tower serves as a storage room, and the rooftop can be used for drying clothes and crops, and at night it is also a venue for family members to relax and enjoy the moon, entertain friends, and have fun (Figure 7).

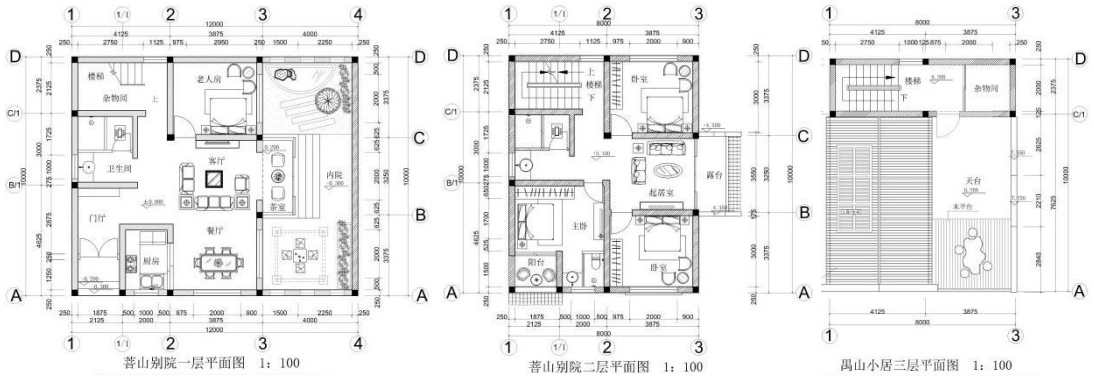


Figure 7. Architectural plan
Source: Drawing by the author

Architectural style and appearance. This scheme adopts modern Chinese style, the building uses geometric shapes, simple colour scheme and large floor-to-ceiling glass to reflect the era and modernity. At the same time, combined with local architectural characteristics, the design incorporates local architectural elements wok ear walls, herringbone walls, sloping roofs, flower windows, green bricks and white walls, etc., highlighting the local characteristics of Guangfu and passing on local culture (Figure 8).

A) Elevation view B) Top view

Figure 8. Rendering of residential design
Source: Drawn by the author

The study found that through "reasonable layout and orientation, we can create a comfortable environment, continue the traditional spatial form, build the spirit of the place, continue the traditional spatial scale, meet the needs of modern life, innovate the appearance of the building, inherit the cultural spirit, adapt to the climate characteristics of Guangzhou, be green and energy-saving, increase revenue and reduce expenditures" Measures such as "energy saving and environmental protection, paying attention to the economic cost of the entire construction process, and meeting the requirements of ordinary villagers" not only make the new residential buildings have traditional architectural characteristics and advantages, but also meet the living needs and aesthetic quality of modern people, and are also economical and environmentally friendly.

Discussion

1. In terms of residential design concepts, this article proposes a regional design concept, insisting that the design should respect local culture and local climate, make full use of local building materials and construction techniques, and at the same time oppose the immutable plagiarism tradition and emphasize innovation on the basis of inheritance. This is consistent with the critical regionalism proposed by the Greek architectural theorist Alexander Chunis and his wife Liana Lefebvre, respecting nature and respecting local culture, emphasizing respect for local characteristics and the spirit of the times.

2. In terms of the spiritual value of folk houses, the research results of this article show that traditional folk houses have an important spiritual status in the hearts of villagers and tourists. Villagers and tourists are very fond of traditional houses and have deep feelings. They regard traditional villages and houses as the roots of their own culture and feel nostalgic. The source is the beautiful spiritual sustenance of villagers and tourists for their hometown. This is consistent with Professor Shan Qide's view that "the most important thing in the inheritance of folk houses today is the spiritual level." Folk houses carry the sustenance of villagers and tourists for the roots of history and culture. .

3. In terms of climate adaptability of residential buildings, the rational layout and orientation proposed in this article mainly adopts the "comb layout" to facilitate ventilation, the southeast orientation is mainly used to facilitate the influence of sunlight and monsoon, and the reasonable spatial scale is adopted to enhance the building's Feeling of intimacy and reducing energy consumption, focusing on building shading, heat insulation and ventilation, and achieving ecological energy saving are consistent with Xia Changshi's core points of green building design for Lingnan's subtropical climate.

4. In terms of residential building structures, this article advocates the use of concrete frame structures, and the walls are constructed of aerated concrete bricks and foam cement concrete blocks, which are fast in construction, safe and durable, have good thermal insulation performance, and are economical and affordable. This is inconsistent with the view of light steel structures advocated by Xie Yingjun. Although light steel structures are fast in construction and low in construction costs, they have limited building floors, weak corrosion resistance and fire resistance, and require regular inspection and maintenance. In Guangfu area, Typhoons prevail every year and it is humid and rainy, which is not conducive to the stability and durability of the light steel structure, so it is not accepted by local villagers.

Suggestions

1. Based on the research results of this paper, it is suggested to establish a Guangfu residential design scheme resource base to provide design schemes with different base area, plot shape, building floor and building appearance, so as to facilitate villagers to choose schemes according to their own conditions and preferences.

2. As for the promotion of the design scheme, it is suggested to promote it through the government and the Internet. The government can spread the design scheme to all districts, towns and villages through administrative departments for centralized publicity and peer-to-peer introduction. The Internet is more flexible, can be widely publicized, and has a wider audience, especially young people.

3. It is suggested that the research team and the government set up a joint guidance organization to provide all-round guidance for villagers in the process of declaration, design, approval, construction application, construction and acceptance during the renovation and new construction of residential houses, so as to promote the smooth development of villagers' housing construction.

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