

The Research of Green Transformation Practice of Existing Building of Historical and Cultural Block – Mianyang City Yuejin Road Historical and Cultural Block to Transform of Case

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Abstract. The study about protection and recycling of existing buildings in the historical blocks is very hot. At the same time, the transformation of the existing building's performance is the trend of green building's development. This study includes the reshaping of the functional value and the improvements of performance. The protection and recycle measure of these buildings in skin, space and spirit etc. were discussed. This study gathers experience of transformation of existing green buildings.

1 Background

1.1 Green transformation of historic blocks

With the rapid development of domestic urban economy and urban construction, urban interior is also being updated. Since 1986 the State Council announced the second batch of national historical and cultural city formally proposed "historic block" concept, The protection of the historic block, the continuation of urban culture began to be taken seriously, the historical block protection and reuse is an important issue facing the current our country city.

In China, the vast majority of non-historic block green "stock" problem buildings have high resource consumption level, negative environmental impact is too large, the urgent needs to improve the working and living environment, functions and other aspects still to be improved. A huge amount of existing buildings plus many defects, it become a major problem in the field of energy saving building work. Green building promotion practice have focused on the new buildings, the retrofitting of existing buildings to green building is less.

1.2 Yuejin Road historical and cultural block

Yuejin Road, Fucheng District, Mianyang City, Sichuan Province, street work area, the construction of this road began in 1958, a time when the country's Great Leap Forward in red, is a typical representative and recorded history, it is named: "Yuejin road." In 2012 the provincial government approved the "Mianyang City Historical and Cultural City Protection and Planning", Yuejin Road, as one of only two in the historic block of Mianyang City, it is a precious cultural heritage of Mianyang City.

Yuejin Road historical and cultural blocks characteristics reflected in its building structure and style, red brick building with no whitewash walls, also with red spell out "Long Live Chairman Mao", "Sailing the Seas Depends on the Helmsman" and other eye-catching red banners construction, is a symbol of Yuejin Road historical and cultural block, protecting and re-use of existing buildings and green transformation of heritage of historical context, carry forward the traditional culture,

improve the neighborhood environment, enhance the commercial value and so on.

2 Project Overview

Yuejin Road Historical Area is located in Mianyang City in the north of Fucheng District, north of Xishan Road, south of sword Road, west of Rainbow Boulevard, east to 25 meters road planning for the sector, with a total area of about 69.69 hectares, of which the core protected area of about 10.41 hectares. Now it includes a Changhong factory, Changhong quarters, Kyushu Electric Group, 204 factory dormitory area, Huafeng Machinery Factory and other regions.



Figure 1. Mianyang relics and scenic spots Distribution "Mianyang City Historical and Cultural City Protection Plan"

Yuejin Road historical and cultural blocks characteristics reflected in the existing building structure and style, existing buildings listed a century ago still retains the layout and style, in the street, red brick, old wall, revolutionary slogans and plane trees and other identification, as if times Back to the 1960s and 1970s, or even earlier.



Figure 2. Yuejin Road Historic Block



Figure 3. Old wall of revolutionary slogans

2.1 Status of existing buildings



Figure 4. Status of existing buildings

From the building's point of view, the historical and cultural blocks reserved Yuejin Road building was built in the 20th century, about sixty to seventy years; from the building style, the red brick building within no whitewash walls, also with red spell "Mao Long live Chairman ", " sailing the Seas Depends on the Helmsman "and other slogans striking red building, it is very unique; the house structure, existing buildings, mostly brick and concrete structure; from houses floors, the buildings are four, the first layer are currently in use as a facade. Yuejin Road in city planning documents buildings along the street were graded protection, divided into four levels.

Table 1. graded protection

Grade protection	Building delineated and uses
Building core protection	Auditorium, the 100 quarters, Changhong office, Hongyuan theater, Changhong hostels, office buildings Owen, Owen-power plant and Yuejin Road along the red-brick floor
Red's memory area	Auditorium, the 100 same style dormitory and the surrounding buildings form a set of business areas, restaurants, entertainment, cultural exhibitions of one of the area
The era of reform and opening up Area	Changhong Changhong office building and a typical plant, combined with a set CBD commercial office building, creative leisure, culture and entertainment, one of the high-end residential area
Commerce Street	Along Yuejin Road, as the axis connecting the two patches of red

2.2 Problems in existing buildings

After decades of social development, in absence of conservation policies specify detailed measures, Yuejin Road historical and cultural blocks inevitably exist a lot of problems. Outstanding issues are following:



Figure 5. Yuejin Road Historic Block Existing Building status quo



Figure 6. Yuejin Road Historic Block Existing Building status quo

(1)store down the street mixed colors, signboards advertising mediocre, both original building style is destroyed.

- (2)wire chaotic streets, free to build a canopy, air conditioners, water heaters and other living facilities and other issues placed at random, style facade was destroyed.
- (3)wall defaced serious, on the ground floor facade was painted walls, contrary to the original building style.
- (4)traffic chaos, poor accessibility, it is difficult to meet the residents to travel and other basic needs of life, more difficult to adapt to the future development of the neighborhood.
- (5)The living conditions of poor hygiene, inadequate utilities.
- (6) Housing dark and damp, ventilation and lighting affected.
- (7)The color part of the new building transformation, volume and historical and cultural blocks style uncoordinated.
- (8)Severe shortage of public facilities, no system down pipes, drainage system behind.

3 Methods of protection and reuse of existing buildings

3.1 Principles of protection and reuse

Implementation of the "conservation priorities, conservation and reuse and transformation of combining" principle, maintaining the integrity of building style, as well as the protection of historical and cultural continuity and transformation of the economy.

3.2 Traditional methods of protection and reuse

Deal with the protection of neighborhoods and reuse of existing buildings, first, we should maintain the original appearance of the building. Protecting and recycling process, not only blindly dismantle built, on the basis of retaining the original shape of the building, to transform a small scale. Secondly, inheritance and innovation, in the transformation of the interior space of the building, considering local and can not destroy the original structure and the renovation and restoration, should be adapted to the functional requirements of modern society, with modern techniques will be improved interface architecture. Finally, integration with the surrounding environment, the protection and rehabilitation of existing buildings in the process, does not with the surrounding environment too abrupt, should be integrated symbiosis.

4 Conventional green transformation methods of existing buildings

4.1 Transformation principles

A "deposit table to go inside," the way, to retain the buildings for necessary maintenance, repair, maintain the original style of the building, the interior fully updated to accommodate the new functionality. Proper maintenance of dilapidated houses, do not want only transformation, keeping house integrity.

4.2 Conventional methods of transformation

The conventional method of retrofitting existing buildings have three points, first, energy-saving envelope member for building walls, balconies, staircases and other parts of the implementation of integrated partition wall insulation renovation, waterproofing, moisture and so on; second, optimization existing device configuration and property management of heating and cooling systems, energy metering system for system transformation; third, increase the use of natural energy, the promotion of renewable energy use, building replacement energy efficient lighting, the use of solar energy, geothermal energy and other renewable energy instead of conventional energy or consumption of energy, for the building to provide hot water, winter heating and summer cooling.

5 Update the conception and method of the protection of the historical and cultural blocks

5.1 Building place spirit

5.1.1 Building style

Planning should focus on coordinating urban neighborhoods in the old building functional layout, space form, etc., truthfully reflect the real historical relics, emphasis on the protection of "authenticity".

Given its building style in general, poor quality, take an updated protection, can be protected at the site, according to the original style features renovation, transformation. Does not at the site protection, the use of building materials to rebuild the site after its demolition, reconstruction of the original building as much as possible the use of materials and components, building forms should be consistent with local building morphological characteristics of traditional houses.

5.1.2 Plot ratio

Existing building floor area ratio should be appropriately reduced, bear lower density areas, providing mission-open space, improve the living environment and quality. The overall development of neighborhood planning in terms of building style and layout of freedom may be appropriate, but it should be in harmony with the surrounding neighborhood of historic buildings.

5.1.3 Element extraction

Red brick walls, whitewashed card without Yuejin Road Historic Block of existing buildings, transformation materials should make full use of the original materials and components, building perimeter to increase green pieces, sculptures and other cultural elements with the existing building style echoes. Building forms should be consistent with the morphological characteristics of local

traditional residential building, coordination and block the overall environment, unity. Facades, roofs and other building appearance as much as possible using traditional materials and traditional techniques, should not use aluminum, ceramic tile, rolling gates and other existing buildings in traditional style with incompatible materials.

5.1.4 Pedestrian environment

Planning a slum removable internal quality construction and green or open space, or parking, pedestrian dealers partial separation, the additional non-motorized vehicles and other measures to optimize the community environment, local updates neighborhood, for the protection and preservation of historic buildings, land part of the development, the two are intertwined, improve the quality of life and create a good environment for walking.

5.1.5 Heighten atmosphere

On the restructuring of land use and land layout, the scientific basis for the rational allocation of the status quo rational function zoning, facilities on the formation of the "three areas along" by the various functional areas, open space walking system, Green Square and other organic link together the interests of functional layout. Insist on the protection of pluralistic coexistence, a vibrant street life history should be two new buildings, where there is an ancient building. Let representing different historical periods and age old hand in the new buildings to achieve a total of three dimensions of the presence of old and new buildings within the city limits.

5.2 Building Space

Not only the stock of large blocks of existing buildings, and security is not high, the difference between the indoor environment and energy efficiency is weak and other issues, optimization and adjustment will facilitate the use of functional re-energize neighborhood vitality. Existing buildings can be replaced by function which uses "keep going in table" approach retained the external image of the building, replacement of the internal functions of ways to meet the needs of the present era.

5.2.1 Function replacement

Through field research, Yuejin Road Historic Block surrounding residential communities, schools, hospitals and other social functions are available, the population of many commercial activities with strong positioning radiation through commercial and residential area ratio analysis, Yuejin Road Historic Block section replacement of existing residential buildings can be adjusted by using the function for the hotel.

1) Maintain

To maintain external image building, maintaining the status quo or a combination of residential functions the same function, the functional layout of hotel rooms.

2) Recovery

For existing buildings mixed color layer facade, walls defaced and poor living conditions, the hotel on the first floor space layout should be considered to restore the building to its original state, truthfully reflect the true historical relics, emphasis on the protection of "Authenticity" in the overall outlook on the recovery of existing buildings to make replacement functionality.

3) Replacement and upgrade

Poor living conditions existing building blocks, energy efficiency is weak, you can change the status quo for the new residence features functional, use as a hotel, to enhance the level of functionality to achieve change on the scale or level.

4) Deletion or addition

Use as a hotel, the case features a combination of a plurality of functional components of the building, in order to optimize the allocation of new features, weakening when certain functions are not available for this feature has been a combination of these functions, reducing the size of its occupied space or intensity of use, as some already have features for the future use of effects produced hinder, the deletion of the way to completely remove the use of functional categories.

5.2.2 Light and ventilation

Original tightness, insulation, poor noise performance of exterior windows were "bulldozed flattened open, single glass becomes hollow, the species becomes broken bridge" transformation, promote the use of "triple-glazed" new energy-saving windows, not only guarantee the amount of light, but also depending on the season, heat can be introduced into the indoor or outdoor heat block.

The hotel can also be separated by open space inside the house with a glass of sunlight into the depths favorable. The hotel can set air cooling system according to the principles of natural ventilation, make the building can be effectively used in summer the prevailing wind direction. Improve lighting and ventilation conditions, can effectively enhance the living quality of the hotel.

5.3 Building Skin

Renovation of buildings containing epidermis wall, facade fitting repair, building materials and color finishes, removal of illegal structures, etc., in the historical and cultural Block of Yuejin Road green transformation of existing buildings in practice, planning should be based on the overall retention oriented, while fully maintaining the original architecture, and follow the principles of sustainable development.

5.3.1 Color of Building

The preservation of existing buildings, mostly brick-red walls, without whitewash, and there is a red brick spell out "Long Live Chairman Mao", "Sailing the Seas

Depends on the Helmsman" and other slogans striking red building , conducting protection and reuse and transformation process, should maintain the original building style, not the removal of the skin or epidermis big change color, especially on the first floor of the facade should be renovated, and the integration of existing buildings.

5.3.2 Building doors and windows

Tinted glass should not be used to maintain the integrity of the building style, building doors and windows color and form should blend with the existing buildings should not be unexpected, can be hollow glass plastic windows on the material, not only can effectively prevent dust can also be effectively isolated from noise.

5.3.3 Awning, air conditioning equipment and other life systems

The space shall be arranged harmony and unity, in harmony with the building style and street style, the overall style contrary removal and transformation equipment and facilities, to enhance the neighborhood environment, improve the quality of the living.

5.3.4 Building Material

It can be arranged in brick-red exterior glass skin or plants, not only beautify the environment can play a role in energy conservation, can effectively improve the neighborhood environment while maintaining the overall style neighborhoods.

6 Conclusions

Protection of urban renewal and rehabilitation of historic neighborhoods and each city unavoidable realities and challenges, but to reduce building energy consumption is building, reducing energy consumption of building materials are building renovation, energy-saving green buildings and more buildings are an important part of the inevitable trends, existing buildings should think about building green energy work with full life-cycle assessment. Green energy transformation of existing buildings is a large complex systems engineering, and actively promote the transformation of green energy, to be alert to simplify the work of green energy, superficial, label, pattern tendency building to prevent high input, low efficiency phenomenon.

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