

Morphology Development of Chinese Danwei under Marketization Process: The Case of Wuhan Iron and Steel Company

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Abstract

Danwei, a dual entity both in urban space and social institution, used to be an important way to organize urban construction and social production in socialistic China. In light of the Conzenian tradition of urban morphology, this article has taken Wuhan Iron and Steel Plant as an example to study the development of the spatial form of Chinese modern industrial danwei in different historic periods. Sources as local gazetteers, other local writings, historical photographs and existing historical buildings have been adopted to meet the research aims. By analyzing its plan, land utilization and building fabric, this article reveals the changes in the internal structure of this urban space unit with Chinese characteristics and summarizes its development process. A large danwei like Wuhan Iron and Steel Plant is often influenced more by macro policies than by specific operating methods. With the demise of danwei institution and the socialization of its facilities including schools and hospitals, the isolation was broken and the whole factory has gradually homogenized with other regional areas. Meanwhile, cities require extensive changes in order to meet new challenges of sustainability and adapt to new institutional characteristics of urban growth. A large number of traditional workers' residential areas have been gradually replaced by modern communities, commercial squares and public buildings, and the urban building fabric has been constantly mixed and reorganized. Industrial heritages provide "raw materials" for the construction of urban commercial space. The vitality and public services along the main roads have been greatly enhanced. Interaction between large industrial danwei and other urban units is also discussed, which is potentially valuable in exploring the reasonable layout of Chinese urban industry as well as preserving built heritage as asset for future prosperity.

Keyword: danwei, Wuhan Iron and Steel Company, industrial heritage, urban morphology, socialistic China

Introduction

After 1949, Danwei System has become an important way of organizing urban construction and social production in socialist China. As an important part of China's socialist practice, danwei generally refers to the institutions where individuals work. Social members always belong to certain danwei including government or state-owned enterprises. As medical, education and other resources are always monopolized by danwei, the relationship between individuals and danwei has become extremely close. On the one hand, danwei is the main body and division unit of urban structure, forming a special urban landscape. On the other hand, it is also the main venue where people live, work, and get education, which constitutes the basic unit of urban economic activities. Therefore, the evolution of danwei contains important information of China's social and economic development.

As one of the biggest steel production danwei in China, the construction and production of Wuhan Iron and Steel Company (WISCO) have a great impact on Qingshan District of Wuhan and even the whole city. In fact, most of the other facilities in Qingshan District was built to support the construction of WISCO, which indicates the absolute importance of WISCO to Qingshan District. Known as the "eldest son of iron and steel enterprises" after the founding of the people's Republic of China, WISCO witnessed all the great changes in Chinese society, from Reform and Opening to the reform of state-owned enterprises. It can be said that WISCO is a miniature of these great social changes in the local areas, and also a great case of the impact of administrative power and market forces on the urban form.

Literature review

Historical socialist spatial practice

The development of socialism can be divided into two stages, Utopian socialism and scientific socialism. The former is represented by Saint Simon of France, Fourier and Owen of England, while the latter is represented by the establishment of the socialist country of the Soviet Union. After reviewing social spatial practice of these two periods, we find that all of them show some similarities (Table 1). Their spatial organization always emphasizes the total management of residents' life and industrial production. They also attach great importance to the layout design of public space (Bray, 2005). Standardized architectural design is also a significant feature of them.

Table 1. Summary of historical socialist spatial practice.

Spatial organization	Social background	Planning thought	Spatial form
Practice of Robert Owen in New Lanark	Early stage of mechanized production	Space order provides social enlightenment.	Square and centralized space layout, individual space at the edge
Phalanstere designed by Charles Fourier	Scattered Agriculture and concentrated industry	Organized space helps with cooperative production and improves efficiency.	Village settlement space pattern with centralized production, life, welfare and other functions
"Social condenser" in Soviet Union	Early stage of the establishment of the Soviet Socialist Country	"Social condenser" replace family as the basic unit of society.	Functions of factories, workers' club and communal house unified in one spatial form

Development of China's socialist danwei system

There are many researches on China's socialist danwei system, which mainly focus on the realistic or ideal social structure and organizational system of socialism. Through the establishment of the danwei system, the state delimited the boundary of resource sharing. The possession of danwei resources is not only manifested as the exclusion of the public outside the danwei, but also restricted between and within different danwei organizations (Li, 2021). As the national system of centralized management, possession and distribution of various resources has been broken, the dependence of the danwei on the state and the superior danwei has

been constantly weakened (Li, 1996). In terms of spatial organization, the living circle composed of danwei community was the foundation of the internal living space structure of Chinese cities (Chai, 1996). The change of land use function and built environment will affect the material foundation of danwei community. On the other hand, the organization mode and management mode of danwei community will restrict the adjustment of urban landscape and land use function (Chai and Zhang, 2009).

Methodology

We adopt Conzenian traditional method of urban morphology to study WISCO. According to the comprehensive influence of three historical processes including the development of macro society, the development of danwei system and the development of industrial enterprise, the morphological period division of WISCO was carried out. To meet the research aims, we referred to statistical yearbooks and historical maps related to urban space and industrial development of Qingshan District, such as Wuhan City Annals, WISCO Annals, Wuhan Historical Atlas and Centennial Wuhan Atlas. In addition to the description of WISCO 's formation history, we tried to classify various urban plan-units of WISCO and Qingshan District. Through analysing and comparing the morphological characteristics of various urban public space in Qingshan District, such as road space, urban park, commercial square and residential community, this paper reveals their correlation with industrial relics.

Results and discussions

Morphological period division of WISCO

Qingshan District is one of the seven central districts of Wuhan City, which is located in the east of Wuhan city and adjacent to the Yangtze River in the north. Qingshan District, as a national key heavy industry base during the first five year plan period, has a large number of large and medium sized state-owned enterprises such as WISCO, Wuhan Petrochemical Company and Qingshan Shipyard. Before the founding of the People's Republic of China, Qingshan town already had a certain population and other urban construction foundation. At the initial stage of the construction of the industrial base, the local facilities can provide the necessary food, accommodation and other necessities for the majority of workers, which can effectively reduce the initial construction cost. By combing the evolution of urban space in Qingshan District after 1949, we can find that the timeline of urban space changes in Qingshan District overlaps with the corresponding historical events. In terms of industrial development, it is mainly reflected in the rapid expansion of land area of WISCO. The construction of large-scale enterprise's staff residential area has rapidly filled the urban space of Qingshan District (Figure 1).

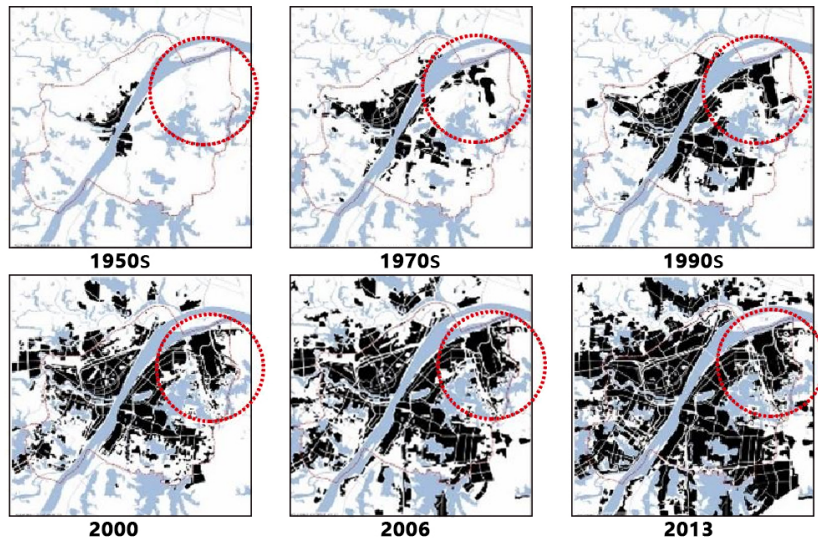


Figure 1. Urban spatial evolution of Qingshan District (Source: Wuhan Land Use and Urban Spatial Planning Research Center)

According to the morphological characteristics of urban construction land, combined with the social and economic background, this paper divides the morphological changes of WISCO into five major periods: initial expansion (1952-1959), internal adjustment (1960-1974), residential expansion (1975-1988), paid use of land (1989-2000) and demise of danwei system (since 2001) (Figure 2).

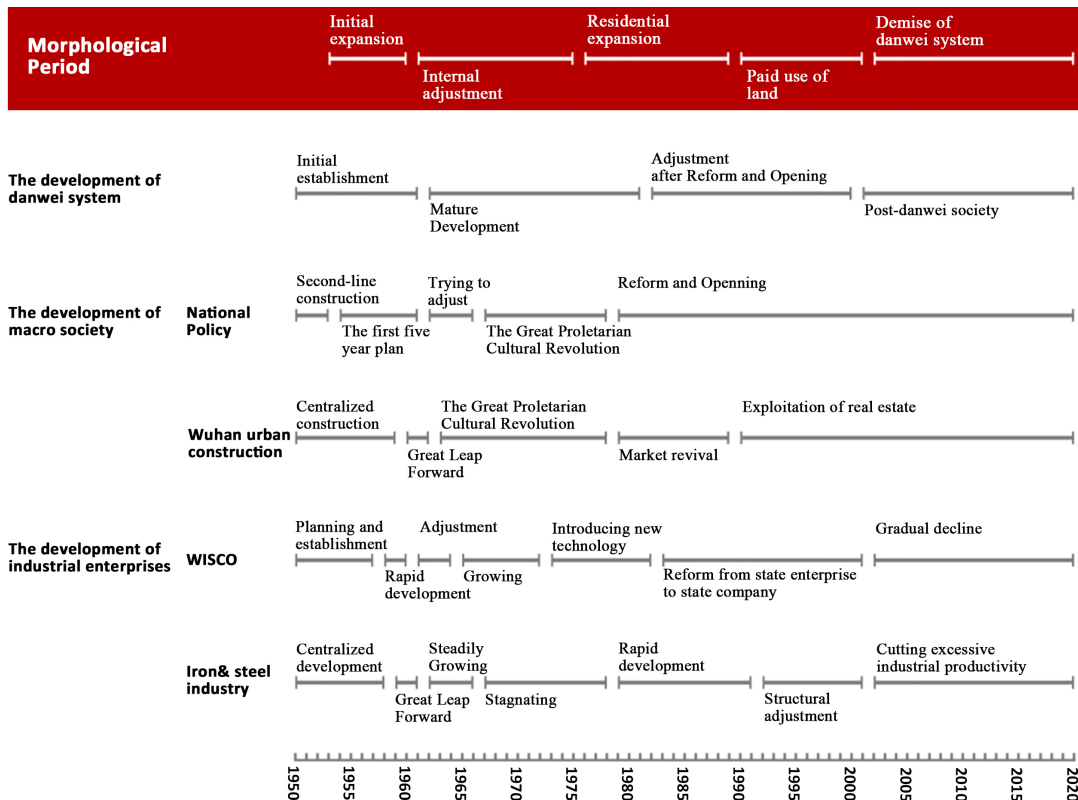


Figure 2. Morphological period division of WISCO (Source: authors)

Town plan of WISCO and Qingshan District

Considering the topography, natural resources and traffic conditions, the plant was planned to be built into two parts A and B after site selection of WISCO (Figure 3). One part is parallel to the road in the north-south direction, and the other part is inclined to it along the northwest southeast direction. Part A is mainly composed of ironmaking plant and pulverized coal plant, which require high water consumption. In order to minimize the water intake path, the plant is planned to direct to the water source. Part B is mainly steel-making plant, which is more closely connected with transportation line. There are two reasons why the overall form of the subsequent space of WISCO could be determined at the very beginning. On the one hand, the stability of the internal form of the plant is higher than that of other urban buildings. On the other hand, in the initial planning, the transportation line in the west and other industrial plants in the north become the fixation line of the form development of WISCO. The later spatial expansion of WISCO is all in east of the original site, parallel to the transportation line, which accounts for a very small proportion of the total area.



Figure 3. Morphological evolution of WISCO plant (Source: authors)

The development of the spatial form of WISCO plant presents several characteristics. First, it is consistent with the development of the enterprise, for the expansion of plant is basically caused by WISCO's construction or introduction of new production facilities and supporting facilities. For example, the second phase of expansion corresponds to the period of "2 million tons of annual output target", and the third phase corresponds to the introduction of "1.7 meter rolling mill". Second, the plane layout is relatively regular, and the spatial form is striped and linear, which is determined by the characteristics of industrial production. Thirdly, in the fourth phase of expansion, an enclave appeared on the northeast side, which reflected the limited land use of WISCO at that time. This is also reflected in the WISCO's striving for space in the north port area after the fourth phase.

The form of small danwei will often hinder the continuity of the overall urban landscape, even split the urban texture in some serious cases. For the large-scale danwei like WISCO, the change of external town plan characteristics is more special. As we can see from figure 1, Qingshan District developed around the isolated core enclave outside the built-up area of Wuhan city at first. Then it attracted the city centre to gradually expand towards it, blended into each other at the junction, and finally integrated the core into the urban built-up area.

Land utilization of WISCO and Qingshan District

The main feature of the land utilization of WISCO is the unity of opposites of centralization and decentralization. That is, the production activities are concentrated in the core plant area, while the functions of living, social services and commercial activities are scattered in residential areas. This is also a significant difference of Chinese large danwei from socialist spatial practice of other countries. The large-scale industry facilities are not allowed to centralize living and other functions, so there is a certain separation between work and housing. However, places of non production activities were mostly not far away from places of production. For example, Worker's New Village is only a few blocks away from WISCO plant.

The layout of residential areas is dense and orderly. The communities built in the same period are arranged in a grid form with rectangular blocks as the unit and road network between neighbourhoods as the partition. Houses are numbered continuously and uniformly. Residential areas built in different periods are arranged adjacent to each other along the road boundary. Although the internal layout is different, their block sizes are generally similar, thus eliminating the obvious boundaries between residential areas built in different periods.

After the reform of state-owned enterprises and the demise of danwei system, the purity of residential areas in WISCO has been destroyed. The first is the decoupling between the residential area and the factory, which means that the former staff quarters belonging to WISCO enterprises has become a socialized community. Residents of this area changed from simple workers to mixed professionals. The second is the socialization of the service function of the residential area, which is manifested in the opening of hospitals and schools that originally served workers to the society. Meanwhile, the former subordinate danwei of WISCO has been transformed into holding subsidiaries or directly separated from the enterprise, so as to be publicly owned. These changes were essentially caused by the change of administrative relationship. As a result, social capital and modern business model began to invade the land originally belonging to the danwei. Marketization means include the transfer of land, the demolition of old houses, the construction of new commercial housing communities, and the establishment of large commercial centers.

Due to the continuous expansion of Qingshan District, the original relatively independent WISCO's residential areas was gradually connected with other parts of the city. The internal roads in the communities were upgraded to urban roads and determined the basic framework of urban transportation of Qingshan District.

They connected the residential areas of danwei and other parts of the city, and further blurred the boundary between them. This homogenization also showed up in the unity of external architectural form and internal land ownership, which promoted the “de-danwei” process of WISCO’s residential areas and gradually realized the transformation from industry land to urban land.

Building fabric of WISCO and Qingshan District

In general, the building fabric of residential area of WISCO strictly reflects the architectural style of its period. Due to the different construction years of different communities, the construction specifications and target uses of buildings are very different (Table 2). Architectural form developed from the Soviet style to Chinese style and was gradually enriched. Residential communities built in strict accordance with socialist principles often have completely duplicated building units, highly simplified functions, strict symmetrical relations, open walls and large central square. These characteristics used to exist in the residential area of WISCO. But the residential areas constructed in the later periods gradually appeared more characteristics of modern communities under the background of marketization, such as closed walls, diversified architectural forms, scattered green space, rich supporting functions. Its ideological colour in morphology is gradually replaced by the design that pursues the maximum utility.

Table 2. Building fabric of different residential communities of WISCO

Residential Community	Time of Construction	Characteristics of Building Fabric
Red Steel City	1955	Semi enclosed courtyard; Soviet style
Huoguan Temple	1955	One layer; Unreasonable arrangement; Gradually abandoned
Worker’s New Village	1955	Original shanty town; Transformed into modern high rise residence
Metallurgy Street	1972	Open community without walls; Tube-shaped apartments
Baiyu Village	1975	Modern six storey unit buildings
Ganghua New Village	1984	Parallel arrangement; Dense outside and sparse inside
Gangdu Garden	2000	Modern six storey tower block

After the Reform and Opening up, in order to achieve economic benefits and promote urban development, commercial housing, as a kind of new building type, began to enter the process of urban construction. During the demise of danwei system, as the residential communities were no longer subordinate to the danwei, some residential areas were replaced by modern commercial communities and commercial office buildings. The old urban building fabric was invaded by the new building fabric, forming the morphological characteristics of spot distribution (Figure 4). It is expected that as the old residential buildings continue to age, the new spots will develop into contiguous areas and eventually replace the old residential areas, with only some of the original buildings preserved as historical heritage. In general, the formation, development

and dissimilation of the residential buildings in west of WISCO plant reflect the progressive process from danwei's monopoly of living space to the loss of control.

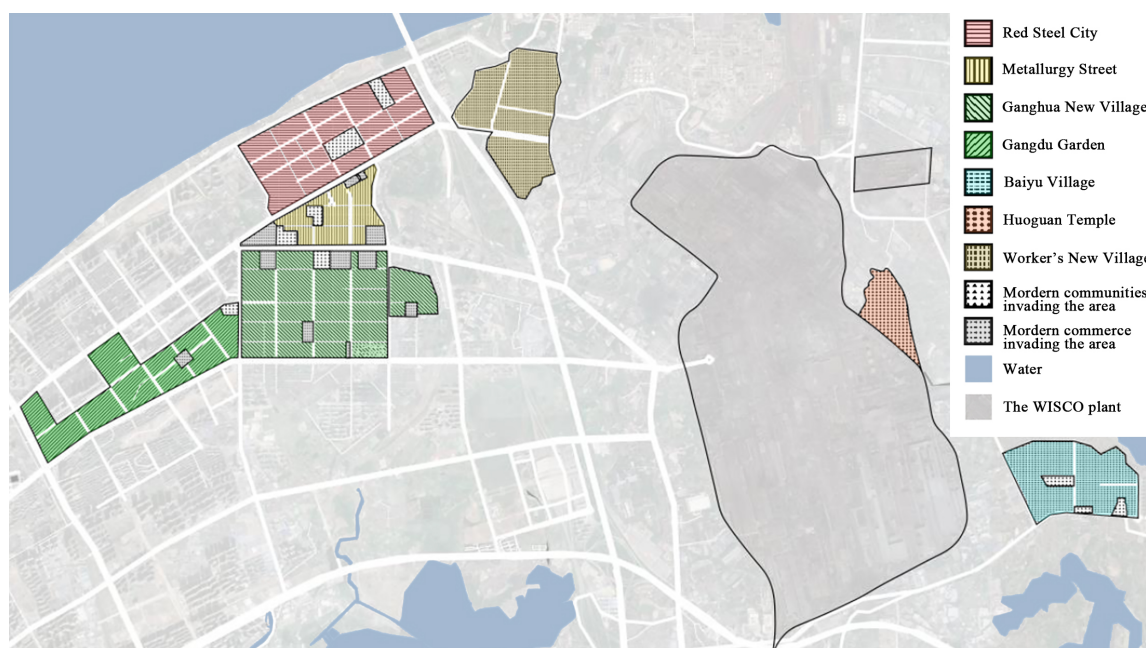


Figure 4. Building fabric of residential areas of WISCO (Source: authors)

Conclusions

Taking WISCO as an example, this paper makes a preliminary study on the Chinese industrial danwei morphology using Conzenian traditional methods of Tripartite Division of Urban Landscape. It is found that the development of large danwei like WISCO is more influenced by macro policies than by specific business practices, so they have a clearer morphological development context than small danwei. At the same time, due to WISCO's large scale, it can isolate the internal society from the external society, and form the phenomenon of "danwei governs society" in some urban areas. Therefore, the impact of state-owned enterprise reform and "de-danwei" process is more obvious in morphological changes and easy to analyze. In terms of the relationship between the danwei and other city built-up areas, they have experienced changes from isolation to integration, from differentiation to homogenization, which reflect the process of the rise and fall of the danwei system. Danwei can drive local economic and infrastructure development, while leaving a profound impact on the urban spatial form.

This paper combs the impact of large local danwei on urban morphology, and the research results will play an important role in studying the transformation of China's industrial heritage and predicting the future development of urban morphology in China.

Acknowledgements

This research work was supported by Principal Fund of Undergraduate Scientific Research Training Program of Peking University. The authors appreciate Bo Wang for his valuable suggestions and comments.

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