

DOI: 10.32347/2076-815x.2022.79.103-114

УДК 69.059.7:725.4

Gong Zehong,zehong.g_a@knuba.edu.ua, <https://orcid.org/0000-0002-2890-3354>,

Postgraduate student

Department of architectural design of civil buildings and structures

Kyiv National University of Construction and Architecture

MASTER PLANNING STRATEGY FOR ADAPTIVE REUSE OF INDUSTRIAL BUILDINGS INTO HOTELS

With the rapid urbanization and updating of traditional production both in China and around the world, more and more abandoned industrial buildings appear. This study focuses on site planning strategies for repurposed industrial buildings into hotels, via numerous repurposed cases in China are analyzed, the master plan design approach is summarized. Based on analysis of cases and theory progressing research. There are several main aspects of master plans for such projects. Firstly, distinguish primary and secondary entrances and exits with design. Secondly, making rational planning for roads, passages, parking areas, leisure areas, and business zones. Thirdly, hold to the principles of building a barrier-free environment, compliance with sustainable development and a friendly environment. Fourth, maximum preservation of the natural and cultural environment, designing outdoor entertainment facilities with old structures. Fifth, highlighting fire safety issues, focus on laws and building codes for industrial buildings or industrial parks repurposed into hotels. Sixth, hold to the "industrial spirit" of hotels, which is especially attractive to visitors. It has a positive effect on urban contexts. Besides, it is important to use elements of regional architecture, traditional construction methods. This research can be useful for stakeholders involved, especially architects and designers. Further research is needed to study more completed related projects, particularly in regional designing of master plans in different developing countries.

Key words: master plan; repurposed buildings; renovation of industrial buildings; adaptive reuse; transformation of industrial buildings; refurbished building; hotel.

Instruction

In the past decade, affected by rapid urbanization and industrial upgrading in developing countries, the global vacancy rate of industrial buildings has risen to an unprecedented level. The research about vacant industrial buildings in four Portuguese cities shows that 613 buildings were abandoned which occupied 1.4 million m^2 (Fonseca & Ramos, 2019) [10]. In Singapore, the market overview of

Singapore's industrial real estate industry in 2018 propagates that the average vacancy rate in the fourth quarter of 2018 was 10.7%. The vacancy rate is expected to soar to 11.7% in 2019 and 12.1% in 2020 (Chart of the Day, 2019) [6]. According to the U.S. Industrial Market Report for the first quarter of 2019 from Transwestern, the overall vacancy rate of industrial buildings increased to 4.8%. In Hong Kong, the vacancy rate has been over 5% since 2001 (Statistical Highlights, 2019) [16].

On the one hand, China is also facing this acute problem. Taking Beijing as an example, at the end of 2018, Beijing has retired 242 old factories, covering a total area of more than 250 km², and more than 100 old factories are waiting for renovation. The old factories that have been transformed and used are 6.01 million square meters, and 1.38 million square meters are being transformed, and more than 200 general manufacturing enterprises will gradually move out within 3 years (Wei, 2018) [18]. At the same time, the current industrial land is about 498 square kilometers, accounting for 16% of the area of Beijing, which is far greater than 5.9% of Tokyo and 2.8% of New York (HanTong design, 2021) [12]. The relevant urban planning is clearly defined as reducing industrial land while improving efficiency. Hence, more vacant industrial land or buildings to be released.

On the other hand, the prosperity of the hotel industry is often regarded as an important part of community revitalization. With the increasing economy, the number of tourists has further increased, and the diversified needs for hotels have increased at the same time. Data from the report revealed that in 2019, total tourism revenue was 6.63 trillion CYN (0.95 trillion USD) in China, achieved 11 percent growth compared to 2018. Domestic tourists reached 6.06 billion, which increased 8.4 percent compared to the same period in 2018 (CGTN, 2020) [5]. 230 million domestic tourists take trips during a 5-day national holiday in 2021 (Zhou, 2021) [19]. According to statistics, the ratio of population to the number of hotel beds in 2016 was 100:1.4 (China Statistics Bureau, 2017) [8], and the ratio of population to the number of hotel beds in 2019 was 100:2 (China Industry Information, 2019) [7]. Compared with the world level 100: 3.09 beds population ratio, there is still space for development (Lair, 2019) [14]. The growth rate of China's boutique hotel rooms was 12.7%, of which 56% were converted from old buildings (Zhu, 2018) [20]. At the same time, China's housing rental market is a market that serves more than 200 million people and the annual rent is more than one trillion CYN (Jones Lang LaSalle, 2018) [13]. Vacancy industrial buildings can be considered as stocks for boutique hotels and long-term rental apartments with cultural value. There are huge vacancies in the hotel market in China, and industrial buildings can be repurposed into boutique hotels with cultural heritage, and make them revitalized (Myers & Wyatt, 2004) [15].

The demand for solutions of vacant industrial buildings and the demand for boutique hotels in China both require the study of industrial buildings to transform

hotels. Moreover, studies of adaptive reusing vacant industrial buildings into hotels prove that it can achieve a higher area conversion rate (Gong & Bridnia, 2021) (Bridnia & Gong) [11], [3]. Proper organization of the master reconstruction plan can be the key to continued successful operation.

This study focuses on aspects of the master plan of adaptively reusing vacant industrial buildings into hotels. The research purpose is to clear the organic relationship between the various functions of the reused hotels from urban renewal, improved land use efficiency, cost-effective land, and reduction of waste during construction and operation.

Method

This study applied qualitative (or constructivist) and narrative approach. By studying a representative of developing county – China, with multi-cases study of industrial buildings renovation master plans, Data collection was conducted through a literature review, documentation, and interviews.

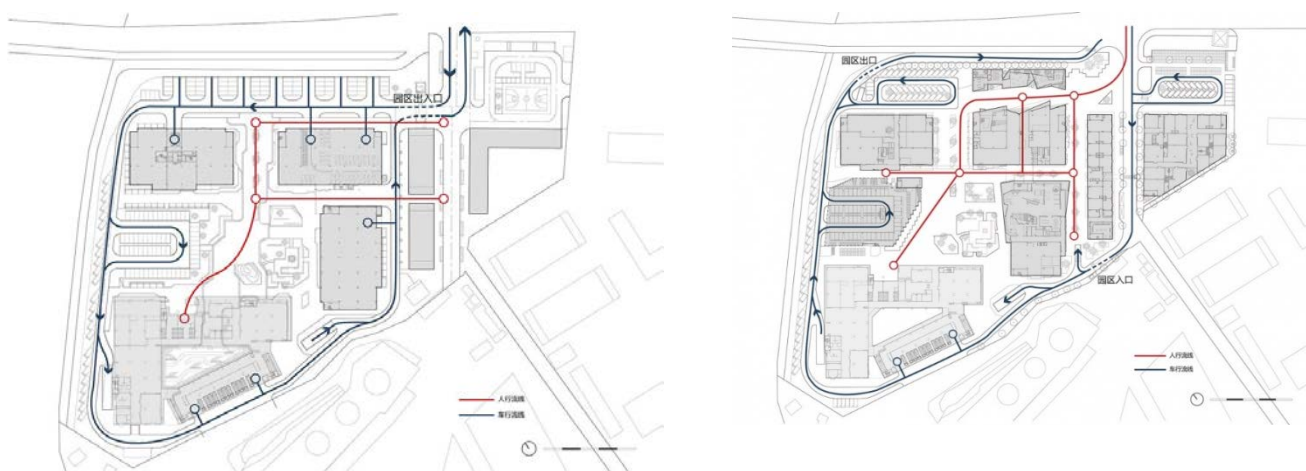


Figure 1. All to Technology Innovation Park Reconstruction (Mozhao, 2020). Traffic and pedestrian flows before and after reconstruction

Master planning strategy for RIBH learn from multiple cases.

The master plan design of RIBH need clear traffic and pedestrian flows.

The study of the master plan for RIBH (reuse industrial buildings into hotels) is significant. First, this study helps to better implement national policies, laws, and regulations. Compliance with urban planning requirements. Correct functional organization. Technical and economic feasibility of decisions. "Smart" complex scheme of vertical and horizontal communications, pipelines and other engineering networks; compliance with norms, specifications and regulations of health care, labor protection, fire safety, safety of human life, etc. Environmental protection, compliance with the principles of sustainable development of society. Sound approach to further renewal, development, and expansion.

For example, in the *All to Technology Innovation Park Reconstruction*, as shown in Figure 1, after the transformation of traffic and pedestrian flows, the relationships in the area became more logical and understandable.

When RIBH is located in an industrial park, proper visual information with road signs makes it easier for visitors to get to the hotel and facilitates the distribution of traffic and pedestrian flows. Independent lines of transport should be taken into account as clearly as possible when designing driveways to hotels as part of industrial parks.



Figure 2. Shenyao Art Center (Phase II), Shanghai. Aerial view. Master plan

Shenyao Art Center (Phase II), Shanghai (Atelier Liu Yuyang Architects, 2021) [2], as shown in Figure 2. When designing the building area, new clear transport roads and passages were provided, pedestrian passages were organized. The master plan was designed taking into account the restrictions created by the riverbed that washes the territory of the Art Center.

The designers tried to achieve the purity and expressiveness of the visual perception of the object by clearly organizing traffic and pedestrian flows, emphasizing and separating individual functional areas with bamboos. For example, the secondary service entrance is hidden by bamboo plantings, the main entrance is accented by a beautiful green recreation area, and cozy corners are created along the riverbank. The surface of the water is separated from the hotel by transparent steel nets, creating a visually open barrier between the building and the river. It is very important to clarify the primary and secondary relationships in the site design of RIBH.

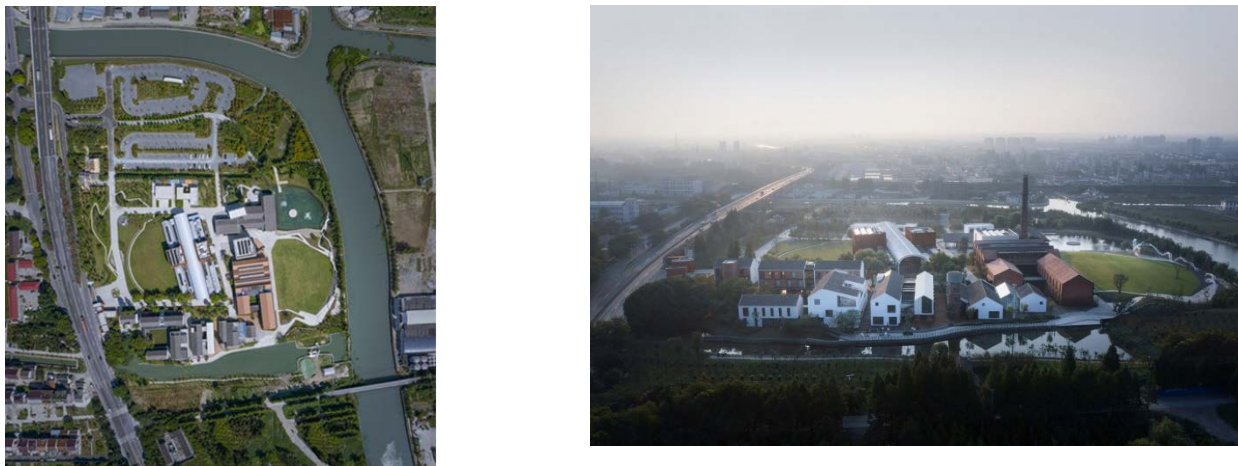


Figure 3. 8342 Yangtze River Delta Roadshow Center, Shanghai (from AND studio)

Shaping the landscape is also one of the key tasks of RIBH projects. It is necessary integration into the urban environment with maximum respect for its historical and natural components. Architectural details, expressive industrial features, original vegetation, water resources, initial decoration and paving of the territory-can become elements of the new landscape organization of the hotel. Out-of-town resorts should take full advantage of natural elements in combination with regional materials and design techniques.

Making full use of the original structures can better express industrial. Taking *8342 Yangtze River Delta Roadshow Center, Shanghai as an example* (And studio, 2021) [1]. Conic chimneys and water towers are carefully maintained and repaired, as shown in Figure 3. Due to the structural strengthening and improvement of their visual qualities with the help of special lighting, they act as a kind of regional elements that enliven the overall architectural and figurative solution of the complex. The landscape of this territory after reconstruction is organized according to the principles of sustainable development and energy efficiency of the architectural organization of the building territory: collection, preservation and processing of rain water is carried out; the rate of landscaping is over 61%; passages, driveways and parking lots are partially made with a hard " sponge" coating. Adapting new building codes after retrofit is often difficult, ingenious adaptation to current rulers and codes is an area worthy of research. The original structure can be torn down, creating arcades, patios and inner streets in the master plan to fit new building codes. Take the Green Hill № 1500i, in the Yangpu district of Shanghai as an example, where vehicles can pass at the bottom of the building (TJAD Original Design Studio), as shown in Figure 4. It solves the fire problem and enriches the space experience in the site. This opportunity is also used to establish public transportation on the ground floor of the building, weaving it into the regional transportation network.



Figure 4. Green Hill” № 1500. Yanpu. Shanghai. Driveway under the building and general layout plan

The parking area plan of hotels must comply with certain rules. The size of the parking area and the number of spaces are calculated according to the capacity, type and category of the hotel. The number of parking spaces for the city business hotel is $0.6 * N$; for conference hotels- $1.0 * N$; for recreational - $0.8 * N$ (where N is the number of rooms). To ensure safety, the distance from entrances / exits from parking lots to intersections and pedestrian crossings, from schools and other institutions where children and people with special needs can stay, the width of the road, etc.

Proper organization of parking can significantly improve the overall organization of space. During the reconstruction of Henri Dunant Square in France, as shown in Figure 5, for example, the original car park in the center of the square was moved to the side and beside the road, which not only improved traffic organization but also streamlined site design (Espace Libre, 2021).

If it is not possible to arrange parking spaces on the ground and near the road, underground parking or involving the surrounding areas to solve parking problems are usually considered. However, it is still necessary to focus on the length and rationality of the streamline.

The problem of aging in China is becoming increasingly prominent. In 2021, the proportion of the aging population will reach 13.5 % in China, which is already a country with an elderly population, and it is expected to become a super-aging society with a proportion of more than 20% around 2033 (China Statistics Bureau, 2021) [8].

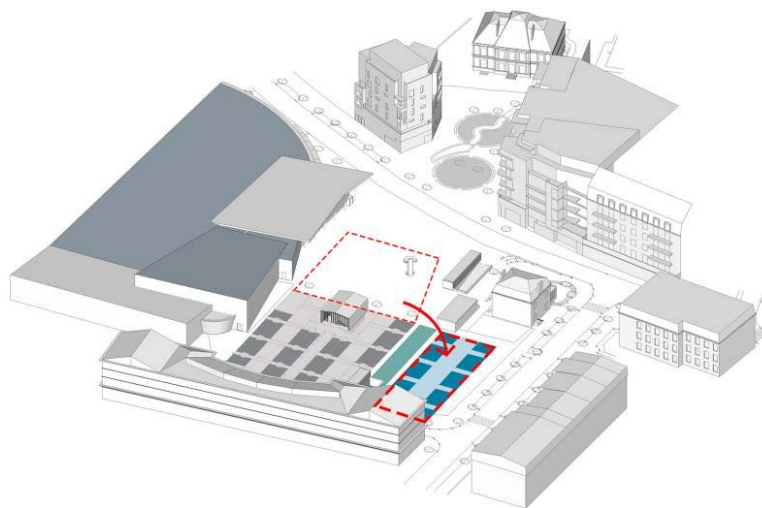


Figure 5. Reconstruction of Henri Dunant Square in France

Under the background of the aging problem in China, the organization of entrances and exits from underground parking should be concerned when making decisions on the master plan. So does the vertical and horizontal communications; crossings through travel areas; paving of footpaths; special platforms for lifting and transporting wheelchairs; installation of inclusive bathrooms on the territory, etc. Moreover, meet the needs of the intelligent, such as, smart parking space search, automatic parking fee payment, paying by swiping faces, scanning the QR code to find the parking location.

Entertainment, sports, and wellness facilities need to be developed for hotels located in recreational and recreation areas. This may include the organization of beaches, solariums, outdoor and indoor pools, etc. For example, during the renovation of the industrial complex for Caterpillar House, America, a pool was built by five 100 cm standard containers, six 50 cm standard containers and another 100 cm open-top container (Sebastian Irrázaval Arquitecto, 2012). Functional integration of renovated hotels into the urban environment and proper organization of their master plans can significantly affect the further effective operation of such facilities or RIBH is located outside of urban or suburban areas, master plan should avoid entrances to highways and transit highways, and at the same time provide convenient transport plans. If the RIBH is located away from the main road, usually using expressive and attractive environmental solutions, such as building natural and artificial landscapes. In case of Alila Hotel, the designers chose horizontal and horizontal cuboid as the shape of the main body of the new building, hoping to make it artificial. The horizontal geometric volume and the natural mountain form a mutual relationship. In addition, the public trail system is also. The result of the geometrical and spatialization of the plank road and cave in the karst landform area (Dong et al., 2018) [9].



Figure. 6. Caterpillar House, American. Using containers to build outdoor entertainment facilities



Figure 7. Alila Hotel in Yangshuo Guilin, Guangxi. Photos of the successful combination of artificial and natural

For scenic hotels located in scenic areas, it is necessary to rationally calculate the distance from site entrance to hotel gate, pay attention to visual informatics, and ease of orientation of visitors (Carstens, 1993) [4].

Discussion

Based on analysis of cases and theory progressing research. The main tasks of the RIBH master plan are the organization of the entrances, formation of a network of roads and passages, designing landscaping, designing fire protection, barrier-free design, parking arrangements, etc. The entrance should be accompanied by a clear

visual definition of pedestrian flows, provide convenient communication with sidewalks, public transport stops, taxi stations, train stations, parking areas. It is necessary to provide a place for personal transport for residents, visitors and staff, parking lots for the temporary parking of taxis, "ambulance" cars, etc.

There are several main aspects of master plans for such projects. Firstly, distinguish primary and secondary entrances and exits with design. Second, making rational planning for roads, passages, parking areas, leisure areas, and business zones. Third, hold to the principles of building a barrier-free and intelligent environment, compliance with sustainable development and a friendly environment. Fourth, maximum preservation of the natural and cultural environment, designing outdoor entertainment facilities with old structures. Fifth, highlighting fire safety issues, focus on laws and building codes for industrial buildings or industrial parks repurposed into hotels. Sixth, hold to the "industrial spirit" of hotels, which is especially attractive to visitors. It has a positive effect on urban contexts. Besides, it is important to use elements of regional architecture, traditional construction methods. Because the site entrance of the hotel is the first influence of the hotel, site entry needs to focus on realizing the theme of the hotel.

This research could be useful for architects and designers, as well as for other stakeholders involved. Further research is needed to study more completed related projects, particularly in regional designing of master plans in different developing countries.

Гун Цзехун,

Київський національний університет будівництва і архітектури

СТРАТЕГІЯ ГЕНЕРАЛЬНОГО ПЛАНУВАННЯ АДАПТИВНОГО ПОВТОРНОГО ВИКОРИСТАННЯ ПРОМИСЛОВИХ БУДІВЕЛЬ ПІД ГОТЕЛІ

Зі стрімкою урбанізацією та оновленням традиційного виробництва як у Китаї, так і в усьому світі - з'являється все більше покинутих промислових будівель. Дане дослідження зосереджене на стратегіях генерального планування при перепрофілюванні промислових будівель у готелі.

Проаналізовано численні випадки такого адаптивного повторного використання у Китаї, узагальнено підходи до проектування генеральних планів.

На основі аналізу прикладів та прогресивних досліджень за даною тематикою визначено основні аспекти організації генеральних планів таких проектів: чітка візуальна диференціація первинних та додаткових входів та в'їздів до готелів за допомогою елементів візуальної інформації; раціональне

планування доріг, проїздів, паркінгів, зон відпочинку та бізнес-зон; відповідність принципам побудови безбар'єрного середовища; дотримання вимог сталого розвитку; максимальне збереження природного та культурного середовища, а також підтримання «промислового духу» у новостворених готелях; чітка відповідність нормативним вимогам та правилам проектування.

Визначено позитивний вплив такого адаптивного повторного використання на оточуючий міський контекст. Відзначається важливість використання елементів регіональної архітектури та традиційних методів будівництва.

Дане дослідження може бути корисним для всіх зацікавлених сторін, особливо - для архітекторів та дизайнерів, що займаються архітектурним проектуванням за даною тематикою. Окреслені напрямки можливих подальших досліджень, зокрема - врахування регіональних особливостей формування генеральних планів такої реновації у різних країнах, що розвиваються.

Ключові слова: генеральний план; реконструкція; реновація; реконструкція промислових будівель; адаптивне повторне використання; готель.

Гун Цзехун,

Київський національний університет будівництва та архітектури

СТРАТЕГИЯ ГЕНЕРАЛЬНОГО ПЛАНИРОВАНИЯ ПРИ АДАПТИВНОМ ПОВТОРНОМ ИСПОЛЬЗОВАНИИ ПРОМЫШЛЕННЫХ ЗДАНИЙ ПОД ОТЕЛИ

С учётом стремительного роста уровня урбанизации и значительным обновлением традиционного производства как в Китае, так и во всем мире, - появляется все больше заброшенных промышленных зданий и территорий.

Данное исследование посвящено стратегии генерального планирования территорий при адаптивном повторном использовании промышленных зданий под гостиничную функцию.

Проанализированы примеры такого адаптивного повторного использования в Китае, систематизированы общие подходы к проектированию генеральных планов таких гостиниц и гостиничных комплексов.

На основе анализа примеров и прогрессивных исследований на данную тему определены основные аспекты организации генеральных планов таких проектов: чёткая первичная визуальная дифференциация и дополнительные входы и выезды в отели с помощью средств визуальной информации; рациональная планировка дорог, проездов, паркингов, зон отдыха и бизнес-зон; соответствие основным принципам построения безбарьерной среды;

соблюдение требований устойчивого развития; максимальное сохранение природной и культурной среды, а также поддержание «промышленного духа» во вновь созданных отелях; чёткое соответствие нормативным требованиям и правилам проектирования.

Определено положительное влияние такого адаптивного повторного использования на окружающий городской контекст. Отмечается значение использования элементов региональной архитектуры и методов строительства.

Данное исследование может быть полезно для всех заинтересованных сторон, особенно для архитекторов и дизайнеров, занимающихся архитектурным проектированием в данной области. Определены основные направления возможных дальнейших исследований, в частности – учёт региональных особенностей формирования генеральных планов при такой реновации в развивающихся странах.

Ключевые слова: генеральный план; реконструкция; реновация; реконструкция промышленных зданий; адаптивное повторное использование; гостиницы; отели.

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