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THE PRACTICE AND ENLIGHTENMENT OF ARCHITECTURAL RENOVATION AND URBAN RENEWAL IN THE NETHERLANDS

ABSTRACT

Since the development of architectural disciplines, Dutch architectural style and architects have played important role in the world. In the wave of local urban renewal in the Netherlands, Dutch architects represented by Rem Koolhaas, Francine Houben, Winy Maas and Kees Kaan and etc. have shown rich practices and experiences, therefore, the architectural renovation and urban renewal have show prosperous scenarios. This paper focuses on the four types of architectural and urban transformation practices in the Netherlands, named as Regional renewal, architectural heritage refurbishment, adaptive reuse and industrial building renovation^[9], and analyzes typical cases such as Westerpark West, Speelhuis theater, Timmerhuis and Villa Industria project. Exploring the role and spatial stance of Dutch architects, the research tries to sum up the Dutch modes and experiences, and provides a new perspective and method for similar transformation practices in urban renewal of contemporary China.

Keywords:Dutch architect, urban renewal, adaptive reuse, transformation strategy, Dutch experience

INTRODUCTION

The Netherlands ranks first in the European population density with data of nearly 500 people per square kilometer^[6]. "Density" has always been a difficult problem for Dutch city builders. Compared with other European countries, the land area of the Netherlands is relatively tension, and most of the land is below sea level, facing the threat of flooding^[8]. "Sea Reclamation" has become a primary way in this country to create land for survival^[9]. Unique natural geographical conditions, a sense of survival, and innovation of urban construction make the urban renewal and architecture of the Netherlands become remarkable and unparalleled. Dutch urban renewal process is also unique, forming a typical Dutch mode.

The urban renewal in the Netherlands is primarily concerned with problems of regional chaos, scarce housing resources and insufficient public resources due to the excessive population density. In fact, from the mid-19th century, Dutch urban renewal has already begun, and the promulgation of the housing law has also marked a direct link between housing construction and urban renewal. In the past decades, the proportion of renovation projects for stock buildings in the Netherlands has increased year by year, with the most typical adaptive reuse and renovation projects. In January 2019, the author visited OMA and learned that the internationally renowned firms that focused on public architecture projects has participated in many building renovation projects in the past five years. Obviously, Dutch architects' involvement in urban or architectural renewal projects has happened more frequently than before. Their attitudes, standpoint, and strategies are therefore worth specifically analyzing and studying. Research and summarization of existing cases could provide some Dutch experiences and modes as well. Returning to the status quo of Chinese cities, population density and the pressure of social transformation is obviously enormous. Can the Dutch experience give us a new perspective or some operational strategies?

1 The development background and overview of Dutch urban renewal

With the end of World War II, European countries have entered a period of vigorous development of modern architecture. The postwar population explosion has brought a series of social problems in many European cities. In that period, the residential environment had deteriorated dramatically, construction of public buildings was chaotic, architectural heritage was destroyed and many cities have become overcrowded. With the progress of social productivity, urban renewal began to develop meanwhile. The current mode is that the original buildings and areas can be transformed and adapted to the new social status quo, under the premise of not destroying the ecological environment. There are three major stages in the development of urban renewal in the Netherlands: Phase I: small-scale regeneration and material renewal of historical towns and cities (1970-1988), Phase II: large-scale residential regeneration and social rehabilitation of new cities (1989-1995), Phase III: redevelopment of urban brownfield land (since 1998). Usually, the scope of urban brownfield land includes not only old industrial areas but also gas stations, ports, terminals, airports and any other places left over from the industrialization process such as industrial equipment, factories and entire areas that have been no longer in use^[10]. After the first and second phases, about 85% of the housing in the Netherlands have maintained a high quality, and most urban settlements have regained vitality and order^[11]. Unfortunately, traditional industrial areas have been gradually unable to adapt to the requirements of modern commercial mode and the service industry; such areas have been gradually and largely abandoned and degraded in regional development. Residential areas also began to decline. Many of these old factories, warehouses and docks have occupied the core areas that are important for the Netherlands, where land resources are scarce. There is no doubt that these declining industrial areas will be the areas for another round of urban renewal and redevelopment.

At the end of the 20th century, the Netherlands entered the "golden time" of modern architectural development^[12] in which the *Housing Act* was promulgated in 1901 and the *Social Rental Housing Management Act* was issued in 1993. These two acts have established the main and basic legal framework for the Dutch housing legislation system. In 2000, the Dutch national government introduced the fifth draft of the national spatial planning policy document, entitled *Creating Space, Sharing Space*. In 2012, the National Infrastructure and Spatial Planning Strategy were launched^[13], and it is worth mentioning that this planning strategy only serves as a guide rather than a decisive regulation. In general, the urban renewal in the Netherlands has been accompanied by the interaction between the evolution of an international architectural trend, the transformation of domestic policies and the Dutch people's adventurous spirit.

2 The main types and typical projects in the Netherlands

When it comes to the 21st century, the content of urban renewal in the Netherlands has extended to a much more broader scope. The movement has started from the renewal of old residential and industrial areas to the renewal of diverse architectural heritage of all aspects of values in the entire society. The advancement of social culture has led to the formation and changes of different types within the concept of urban renewal. Working together with architectural trends and policy changes, urban renewal has developed from an independent area transformation to a multi-domain complex update involving various aspects, such as surrounding environment, historical architecture and urban planning. This paper takes the 21st century as a time node and divides the urban transformation between 2000 and 2018 into four main types: Regional renewal, architectural heritage refurbishment, adaptive reuse and industrial building renovation (Fig. 1). Among these four categories, the types of regional renewal, architectural heritage refurbishment and adaptive reuse are classified according to their respective scale features and transformation strategies; according to the difficulty of the specific function that differs from general civil buildings, the classification of industrial building renovation is therefore extracted and divided into a separate type.

type	project	year	site	construction area	firm	picture	characteristic
Regional renewal	NDSM Wharf	2016	Amsterdam	100000m ²	Various architectural firms		Old shipyard transformed into urban creative paradise
	Westerpark West	2015	Amsterdam	70000m ²	MVRDV		Green sustainable living in the city center
architectural heritage refurbishment	Speelhuis Theatre	2013	Helmond	1597m ²	opporoot		The church is given a new life
	The restoration project of Rijksmuseum	2001-2013	Amsterdam	Exhibition 123000 m ²	Cruz y Ortiz		Restore historical feature and integrate modern space
Adaptive reuse	Timmerhuis	2009-2015	Rotterdam	48400m ²	OMA		The "brick" forms modular building mass
	Deventer City Hall	2016	Deventer	25000m ²	Neutelings Roodijk Architects		Seamless connection between old and new buildings
industrial building renovation	Villa Industria	2018	Hilversum	74000m ²	Mecanoo		Retain the original brick structure of the gas plant and transform it into an apartment
	De Productent department	2017	Gouda	5000m ²	Mai architects and planners		Valuable adaptive reuse of industrial heritage

Fig.1 Analysis of the example of the Dutch district and building renewal in 2009-2018 Priority by type. The list does not cover all the well-known firms mentioned.

Dutch architectural design has entered into a flourishing period in the 1990s, and the Dutch architects and institutes have become famous worldwide with a pioneering spirit, a distinctive personality and a group image with open and diverse attitudes^[14]. A number of excellent architectural design teams have emerged, such as OMA, MVRDV, KAAAN, MAI, Mecanoo, GroupA, V&B and etc. As a pioneering representative figure of the Dutch architectural firms, OMA has always been known for its large-scale public construction design and Rem Koolhaas' critical thinking as an architectural socialist; Kees Kaan as the founder of KAAAN Architecten prefers to integrate practical projects with his knowledge obtained in academia. Including interior design, headquarter, museum and educational building design as working scope, Mecanoo aims to integrate Dutch local culture into their architectural design, creating a large number of distinctive landmarks, such as the Delft Railway Station and the Polytechnic University Library. The collective practices and innovative thinking of Dutch native architects have inspired the new vitality of Dutch architecture in the 21st century.

• Westerpark West and NDSM Wharf

Located in Amsterdam, the Westerpark West (Fig 2) project is a large urban settlement, which is rich in green space and architectural diversity. Architects have attempted to create more green space in and on the buildings in many ways. Planning to increase green space, extending landscape to the river bank and adding public parks for the whole community, this project adopts a sustainable design concept and sets up a new energy and recycling system for a long-term future.

Located on banks of the IJ River in the north of Amsterdam (Fig 3), NDSM Wharf has become a public area for diverse and creative cultural activities and communication. Transformed from an old shipyard, most renovated buildings were historical industrial architecture, including container taverns, glass shed cafes and crane hotels. These outstanding examples resulted from the urban renewal practices in this region have brought colorful architectural types and a glamorous venue that is attracting a young people from all over the world.

• Speelhuis Theatre and Rijksmuseum

The Helmond Speelhuis Theatre (Fig 4) designed by Piet Blom was destroyed in a fire in December 2011, and the City Council then decided to renovate the abandoned Assumption Cathedral, replacing the theatre temporarily^[15]. This renovated theatre was transformed from an architectural heritage, a Neo-Byzantine dome cathedral. All new facilities, such as the theater stage and auditorium, were constructed as non-fixed and removable components, in order to avoid changing the original appearance of the cathedral. The new construction of the theatre was arranged near the Assumption Cathedral (Fig 5). It is a two-story building with a cargo distribution area, an actor dressing room and an actor restroom, and its appearance is in contrast to the original environment of this historical site. Applying natural light, the interior design of this building tried to echo a mysterious image of the cathedral as a religious building.

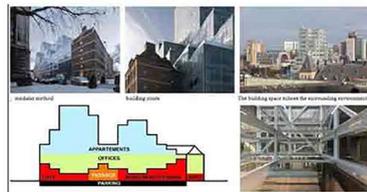
The restoration of Rijksmuseum has lasted for nearly a decade. In this project, Cruz y Ortiz Arquitectos (CyO) from Spain has a problem of building division by a road, and in their design, the architects lowered the central path and created an integrated entrance hall with two sunken courtyards. The internal space of Rijksmuseum is entirely connected from north to south by a passage, which increases population movement and communication from both sides of the building in Amsterdam exchange conveniently and effectively. A Dutch company Van Hoogevest Architecten subsequently took the restoration work through competitive selection. VHA has a rich history of modern architectural design, and carrying out this restoration work has been largely based on their aesthetic understanding and cognition. They advocated distinguishing the historical and authentic elements from the past into multiple layers, emphasizing the recognizability of added new components^[16]. After two rounds of repair, the initial appearance that the building looked like when it was first built has been fully presented.

• Timmerhuis and the Deventer City Hall

Located in Rotterdam, Timmerhuis (Fig 6) is a complex building, containing governmental services, headquarter offices and residential apartments. This building follows a modular design and grows along the street, gradually stacking out two irregular "peaks". Such stacked fragmented architectural volume is more flexible and naturally connected with the east side Stadstimmerhuis built in 1953. Creating a communicative atmosphere between the old and the new constructions, this design has maintained the same architectural height as its surroundings. Timmerhuis has been a new building



Fig 2 Westerpark West axonometric map
Fig 3 NDSM Wharf bird's eye view
Fig 4 The Church interior
Fig 5 Speelhuis Theatre General Plane



that blends perfectly into the urban environment in Rotterdam by ingeniously connecting with the old Stadstimmerhuis.

In the Deventer City Hall project, the architects got a balance between old and new from four aspects: the location and space, the surrounding environment, the details and decoration and architectural materials. The architects worked together with local artist Loes ten Anscher to design a series of aluminum grilles and mounted them in oak frames, which contained 2,264 fingerprints of different citizens in Deventer. These strategies have driven this municipal building truly become the "citizen's home" of Deventer.

• Villa Industria and De Productent department

The energy company site in Hilversum has been declining and the region's vitality has gradually lost as a result of the company's moving out. After renovation dominated by the local municipality, this area got a new name: Villa Industria (Fig 7). Dutch design company Mecanoo has developed a plan for 357 houses in this old industrial area, including diverse architectural typologies, such as affordable social housing, owner-occupied houses, small shops and a number of sports facilities. The most typical example is the three residential buildings that have been rebuilt from gas tanks, retaining the former steel pipe structure as a new facade element. The details of each building correspond to the specific history of the gas plant, giving the community different industrial characteristics.

De Productent warehouse in Gouda has been transformed into a residential loft building. In the center of this building, a new atrium has been added, surrounded by 52 unique and sophisticated loft studios. Although the internal functions have been replaced, old materials have been used as decoration in the interior space, for example, the original wooden structure has been perfectly preserved. These old materials and facilitative structure provide visitors and new residents here an opportunity to feel the long history of cheesemaking industry.



Fig 7 Old gas plant renovation - Villa Industria

3 Design strategies of Dutch architects involved in urban renewal

3.1 Regional Renewal Strategy

In the 21st century, the urban regional renewal of Dutch is moving towards a complex mode. In terms of the development of Westerpark West and NDSM Wharf, regional renewal is not only a response to residential housing issues but also a response to green sustainability; the Dutch industrial area has a large number of industrial heritage. Through the practices of architects, the traditional urban districts that have been degraded have been transformed into new industrial complex areas, including commercial and cultural creations, and so on, giving new life to the old district.

Specifically, from these cases we can roughly extract the strategy outline of Dutch Architects involved in urban renewal:

1) Like MVRDV, they use the means of interventional pre-planning to analyze the status, characteristics, and relationships of urban renewal. For the repetitive planning of residential areas, it should meet the needs of people with different purchasing power, pay attention to housing diversity, and solve the housing problem that caused by oversize population density. In addition, architects should consider landscape system as a flexible damming strategy to connect various building groups as a whole.

2) Architects also integrate green technology into regional renewal. In 2018, the Rotterdam International Architecture Biennale was based on The Missing Link, focusing on sustainable development such as climate, ecology and nature. They have designed a low-carbon sustainable method for the individual buildings, ensuring green sustainability in building technology and regional renewal.

3) Architects use local culture as the basis of their design philosophy, and they put modern culture into the new regional renewals. The J-Kantine, Faralda Crane Hotel and DoubleTree by Hilton Hotel Amsterdam (Fig 8) in NDSM Wharf are typical renewal projects in the region. The purpose is to change the industrial structure, increase the diversified functions such as hotels, restaurants, bars, music festivals, etc. and enhance the vitality of the region, while also catering to the urban renewal.



3.2 Strategy for Architectural Heritage Refurbishment

Dutch architectural heritage is plentiful. Born in the 17th century Royal Palace, Dam is still standing on the Dam Square. Het Rijksmuseum Amsterdam has continued its life for two centuries^[17]. It's still played an important role in society; architectural heritage refurbishment has also become an important part of Dutch urban renewal. To a certain extent, architects could dominate design principles and strategies for architectural heritage within a certain range:

Distinguish between inside and outside: Protection and renewal of architectural heritage is differentiated by inside (interior structure and space) and outside (external environment and facades) of the building. The principle is to maintain reversibility, keep the valuable external form, and to repair the exterior Fig shapes of historic buildings such as sculptures, murals, etc. Architects can make suitable changes to functions and materials in refurbishment work of the interior space.

Space Permeability: For public buildings, architects can enhance the fluidity and openness of space, making the functional space and non-functional space permeability; For monumental ones, architects try to increase the level of space while maintaining seriousness of the space. The treatment of the interior space can also use some colonnades, walls, decorative statues, windows, creating the mystery, depth, the solemnity of the building, and creating a space atmosphere by details.

Implant new functions: Architects can also add new functions to historic buildings, Such as Speelhuis Theatre's stage and seats, Selexyz Diomnicanen Bookstore that was converted from Diomnicanen Church. Most structures can be dismantled without damaging the original shape of the historic building. Some structures are built outside of historic buildings, it can also echo the original features.

Microcosmic Involve: Architects can focus details, in case of materials and construction. It is also possible to use marble in contrast to the original material, like the atrium of Het Rijksmuseum Amsterdam (Fig 9); The construction method can be used by original techniques, or it can be a modern concrete pouring. The key is what style the architect wants; Designers can also focus on architectural details, such as lighting, furniture, color, lighting. For example, the color of exhibition hall wallpaper in the Het Rijksmuseum Amsterdam restores the appearance of the 19th century, and the atrium lamps use metal-shaped geometric ring lights.

3.3 Adaptive reuse strategy

In the history of architectural development, there are still a huge number of generalized historical buildings, but their protectable value is slightly lower than designated architectural heritage. That means the renewal strategy for generalized historical buildings might be more flexible than the heritage ones^[18]. As time goes by, it's inevitable for the built environment that more and more buildings would be included in the general historical building list. For the transformation of such buildings, adaptive reuse is always a common consensus strategy.

Space fusion between new and old: Architects emphasize the spatial communication and functional symbiosis between old and new buildings. OMA adopts a modular spatial mode in Timmerhuis, which enables new space to echo the original space and eventually reach the realm of harmony. Meanwhile, the juxtaposition between old and new should also be considered. In Deventer City Hall (Fig 10), architect adds new functional plugins (public access) to connect old and new building spaces. In addition, architects also can bring together old and new functions, incorporate new functions into the old functions and design a reasonable transportation route to connect the old and new functional spaces to achieve the integration of old and new buildings.

Comparison of old and new: It mainly involves the comparison of the material and shape of the building. Designer pay attention to the proportion of buildings scales in adaptive reuse, and use special materials to improve the quality of buildings. In Timmerhuis, the transparency of the glass maintenance structure contrasts sharply with the solemnity of the brick wall of old house. In the Deventer City Hall, the exterior is decorated with wooden frame that colour and texture contrast with the facade of the old city hall.

Building function replacement: In contemporary society, lots of original functions of historical buildings were abandoned, because it did not adopt the needs of society, which caused waste of



Fig 9 the restoration Project of Rijksmuseum



Fig 10 Deventer City Hall detail comparison

sources and was the disadvantage of urban development. Architects should replace old functions with new functions that adapt to the needs of the times. It can be communication, entertainment, office, reading, exhibition, which enhance the vitality of space, increase interpersonal communication, and promote the adaptive reuse of old architecture.

3.4 Industrial Building Renovation Strategy

The renewal of industrial buildings can be a single industrial building renovation, or progress of the industrial area, most accompanied by the government's intervention. In terms of regional industrial zone renewal, the industrial area can be transformed into a new residential site with certain preserved industrial traditional symbols. For example, the program of Mecanoo's Villa Industrial retains some parts of the old industrial elements. The strategy for industrial building renovation (Fig 11) could be carried out in several ways:



Fig 11 Industrial Building Renovation Strategy outline

Original architecture retention: In some cases, architects tend to completely preserve the historic values and restore the historical features of the building. The most typical case is the Dutch windmill's renovation. The Dutch windmill was preserved on a large scale and was used as a historical industrial site for people to visit. The residence of workers remained intact, providing people with a true historical review. Some sites have been renovated as exhibition halls. The shape, structure, assembly line and machinery have been restored, showing people a precious industrial memory. These valuable industrial buildings have been redactively protected, retaining more significant historical and cultural values to contemporary society.

Structure retention: Architects can retain the structure (beams, slabs, columns) of industrial plants. In the renovation of Villa Industria, the designer retained the steel structure of the gashouse, which became the new building skin. In the De Productent warehouse project, the architect re-established the structural layer and retained the original wooden structure as part of the interior. In addition, the traffic structure of the building can also be preserved and reinforced. Architects combine old structures with new functions to promote the industrial building renovation.

Protect the exterior and change the interior: Sometimes, architects have different design strategies for updating inside and outside space. Architects transformed the interior space and added new functions by expanding the atrium space and remodeling the ventilating roadway. The designer can also convert internal functions as a whole to get new building types. They often transform the factory site into bars, cafes, restaurants, homes, libraries, etc. In addition, architects perform recovery to the exterior of the building such as the surrounding environment, styles, facades, decorative materials and construction methods.

4 Conclusion and enlightenment

In the past ten years, Dutch urban renewal development has gradually formed its own mode. The type of renewal almost covers all the built environment. This paper mainly combs the most typical four types and strategies. In the analysis of the collective practice with different scales or types, the author comes to summarize Dutch experience and pattern with a common solution strategy from the perspective of architects. Whatever it's transformation about Old Antique and New Revolution, context and identity, space and form, structure and construction, there indeed have some methods that contemporary architects could learn from. In a sense, innovation and compromise are inseparable, restrictions and creation are mutually constrained. Architects who work in a historical environment need more wisdom and courage.

Especially now, China has entered a new era. Under the background of new economic development, our architectural education mode, construction laws and regulations, and architects' responsibility are constantly improving. In China, we are facing to a large amount of housing demand, the decline of industrial and rural areas, the acceleration of urbanization, the destruction of traditional architecture, what are reminding us to catch up with the huge changes in society. The countermeasures for urban and architectural heritage are strongly complex and require synergy strength of architects, governments and social groups together, however, architects still play a dominant role in design, whose attitudes and positions would create diverse and energetic human settlements for future. Dutch mode can provide concrete and multidimensional forward-looking and guiding experience for similar reform practices in the urban renewal of contemporary China. If we could regain historical memories in new time and space, that might be the best answer to the architectural renovation and urban renewal.

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