

Research on the Protection and Renewal of Port Industrial Heritage Landscape Based on Place Memory - A Case study of Pearl River Back Channel in Guangzhou

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Received: 5 November 2024; **Accepted:** 27 November 2024; **Published:** 5 December 2024

Abstract:

Industrial heritage landscapes possess unique historical backgrounds and cultural values. Protecting and utilizing them in the renewal of urban public landscapes contribute to forming urban cultural identity and activating collective memory. Taking the port industrial heritage landscape of Guangzhou as the research object, this paper conducts research and analysis on the industrial heritage landscape of dock and warehouse area in the Pearl River Back Channel from the theoretical perspective of place memory. It discusses the experience, approaches and methods for the protection and renewal of industrial heritage landscapes, further interpreting the maintenance of dock place memory. Through case studies of typical areas in the industrial heritage landscape of the Pearl River Back Channel, this paper proposes pathways for the revitalization and inheritance of both material and intangible heritage in the protection and renewal of port industrial heritage landscapes. It also suggests strategies for constructing memory places to maintain the original sense of place attachment and belonging in the process of urban modernization, providing references for the current protection and renewal of port dock industrial heritage landscapes.

Keywords:

Industrial Heritage Landscape, Place Memory, Waterfront Space, Landscape Renewal, Revitalization Utilization

1. Introduction

Guangzhou, with its superior geographical location and special status in trade, has become an important trade port in modern China. The prosperity of its shipbuilding industry and port trade has left a large number of shipyards, port transportation, and storage industrial heritages. With the adjustment of China's urban industrial structure and the rapid development of transportation, the functions of traditional ports such as distribution, transportation, and storage have gradually declined. The original port areas need to be adjusted and renewed due to changes in land use and environmental pollution control. Port industrial heritage, as an important participant in the

development of modern port cities, is of great significance and value in preserving the historical memory of ports, enhancing the recognizability of port cities, and transforming the development momentum of port areas. It is necessary to continuously explore methods for the protection and renewal of port industrial heritage landscapes, so that they continue to carry the mission of continuing the city's industrial civilization.

Hong Chengli mentioned in “Port Planning and Layout”: The boundary of modern ports should go beyond the traditional concept, developing from the original closed port area to an open “port community” concept, extending the coverage of the port community to a wider range beyond the docks, even more than ten kilometers away, providing comprehensive operational facilities for the port[1]. Port, in a broad sense, refers to the general term for the port area of a country or region, including the waterfront area closely related to the port dock. The port mentioned in this paper belongs to the broad concept.

2. Literature Review

2.1. Research on Industrial Heritage Landscapes

Industrial heritage landscapes are the concentrated distribution of material and intangible industrial relics, reflecting the multifunctional values and potential for use of the economy, culture, and ecology, and possessing a certain degree of spatiotemporal integrity at a medium to large scale of industrial heritage areas. The protection and reuse of a single industrial structure and facility is a form of spatial dimensional dispersion and temporal dimensional fragmentation that artificially separates the systematic and holistic significance of industrial heritage, underestimating its comprehensive value and making it difficult to address the complex social issues associated with industrial heritage[2]. How to achieve systematic and continuous overall protection and reuse of port industrial heritage in terms of space, time, function, and society is the focus of current research.

With the advent of the post-industrial era, developed countries have widely launched urban central district renewal movements. Faced with social issues such as the decline of traditional industries, severe environmental pollution, natural resource depletion, poverty, and unemployment, the protection and reuse of industrial heritage are an important part of urban renewal. In the 1970s, the industrial heritage protection movement quickly spread in various countries that have experienced industrialization, and a relatively complete concept of industrial heritage protection gradually formed. The revival of ports such as London Docklands in the UK and Vancouver in Canada focuses on the construction of waterfront public places and the development of mixed-use land for commerce, office, residential, and tourism, leading to a global trend of transforming historical port industrial heritage and redeveloping port areas. In the 1990s, the concept of “port industrial heritage” was first proposed by Canadian architectural planner Geoffrey Stinson. The transformation of Albert Dock in Liverpool, UK, has achieved significant results, with the entire dock area restoring industrial building heritage and facilities and organically integrating with historical blocks. By hosting various major urban events, Liverpool continues to enhance its influence in regional culture and economy. Ports like Jackson Bay in Sydney, Australia, have focused more on the protection and development of natural features and historical cultural traditions in their transformations since the early 21st century. In 2003, the International Committee for the Conservation of the Industrial Heritage

adopted the “Nizhny Tagil Charter,” which states that industrial heritage, as a memory of production and life, has intangible characteristics and values, and the sites or industrial landscapes formed by production processes are historical memories of specific periods of historical development, with their own value being scarce. Nowadays, European and American countries pay special attention to the protection of spirit and values in industrial heritage protection, gradually forming a relatively mature industrial heritage protection system that emphasizes both the protection of overall material heritage and intangible heritage.

Due to the limitations of social development and specific conditions, China’s practice and research in industrial heritage protection started relatively late, and its concepts and methods are relatively lagging. In 2006, the “Wuxi Suggestions” clarified that China’s industrial heritage, as a part of cultural heritage, needs systematic research and protection. Since then, research in related fields has become more extensive and in-depth. In recent years, many representative cases of waterfront industrial heritage transformation have emerged in China, such as the dock renewal design of Shanghai’s Huangpu River taking the World Expo Exhibition Hall as the carrier, the transformation of Shanghai’s Suzhou River Art Warehouse Area with creative park clusters as its characteristic, and the transformation of the Yue Zhong Shipyard into Zhongshan Qijiang Park, all of which reflect the integration of the project with local history, culture, and natural environment. Domestic scholars, combining domestic and foreign practice cases, have carried out theoretical research: Liu Ping studied the evolution of “China’s modern new-style docks” from a historical document perspective; Lu Shaoming and others studied the protection of modern dock sites on both banks of Shanghai’s Huangpu River; Zhang Song and others, from the perspective of planning and design innovation and low-carbon ecological utilization, proposed suggestions from the overall protection of industrial heritage buildings and landscape regeneration strategies in Shanghai’s Yangshupu area.

2.2. Research on Place Memory (Spirit)

The daily life and production places of the public, while reflecting the collective memory of the group, also contain various ordinary yet typical “genes.” These places not only show the style and quality of urban daily life but also reflect a sense of cultural belonging and identity, thus they can be called memory places[3]. The theoretical perspective of this paper, “place memory,” points to “memory” in the temporal dimension and “place” in the spatial dimension. The place is the carrier of memory, and memory is the humanistic accumulation of the place[4]. Port industrial heritage landscapes are not only static material spatial forms or visual forms but also include basic elements such as people and time. This requires researchers to shift from the superficial “form” to the hidden “meaning,” from the isolated “material space” to the dynamic “historical view of time,” thereby highlighting the implicit and fragmented port cultural information more completely, intuitively, and continuously through redesign. Special attention should be paid to the behavioral bodies in the port space and their intentionality, exploring the activation paths of collective memory and experiential memory of spatial behavioral bodies.

Since the 1960s, the place has been a concern of philosophy, sociology, geography, and architecture. The definition of place spirit by Robert Schulz has had a greater impact on the architectural community. Kevin Lynch built on this to study the universal characteristics and structural patterns of places and their images. Aldo Rossi believed that the collective memory reflected in place spirit is materialized in

architecture and urban form. In 1978, French historian Pierre Nora first proposed the concept of “memory place,” which was approved by many European scholars. These studies highlight the collectivity and objectivity of place spirit, and the place moves from an abstract academic concept into various scales of real daily life, showing the deep connotations of “memory place” from the perspectives of daily life, popularity, diversity, and humanity[6].

The domestic academic community’s research on memory space or place memory has gradually expanded from the psychological research category to more humanities and social science research fields. In the field of architecture, related research mainly introduces Western theories, such as Shen Kening’s detailed elaboration on the connotation and semantic meaning of place and place spirit[7]. Zhu Rong, based on the concept of memory, rethinks the essence of cities and buildings from psychological and sociological perspectives[8]. Tang Ning and others, through the theoretical perspective of memory places, analyzed the memory places of the Grand Canal Cultural Belt. These domestic studies show that research on architectural and urban cultural characteristics has begun to include the concept of place, but it has not yet been systematically refined.

In summary, Western countries have carried out extensive practices and research from multiple perspectives, with both heritage registration systems and mature artistic techniques applied in the protection and redevelopment of industrial heritage, as well as the support of new ideas and concepts. In addition, in order to achieve systematic protection of port industrial heritage landscapes and the inheritance and development of port culture, the concepts and strategies of industrial heritage protection in European and American countries have undergone significant changes, shifting from specific industrial structures to a larger spatial range of industrial buildings (sites) and industrial heritage landscapes. China has less systematic research on port industrial heritage as a separate concept and system, although research on ports or waterfront industrial heritage has gradually expanded from individual buildings to heritage communities and landscapes, but there is still a lack of corresponding practical cases and systematic theoretical research support.

Research on Guangzhou’s historical ports has mainly focused on the history of port development, port trade, and port navigation relics, with relatively little research related to the protection and renewal of modern port industrial heritage. There is a lack of systematic research on Guangzhou’s historical port waterfront area updates that integrate with the city and reflect the characteristics of Lingnan regional features. Summarizing the experiences and lessons from domestic and foreign history, exploring a basic strategy for the overall and systematic protection of port industrial heritage landscapes in Guangzhou from a new humanistic perspective is an urgent task.

3. Significance and Value of the Study

3.1. Contribution to Industrial Heritage Landscape and Memory Place Theories

Most of China’s existing research on the protection and utilization of industrial heritage focuses on the industrial heritage buildings and facilities themselves. This approach may temporarily slow down the rate of industrial heritage disappearance, but it cannot protect the environment and intangible cultural heritage of industrial heritage in a holistic manner, and cannot fundamentally achieve the lasting protection

of industrial heritage and the sustainable development of the economy, society, and environment of the heritage site[2]. Taking port industrial heritage landscapes as the main body of research helps to strengthen the systematic, global, and complex research of port industrial heritage at the landscape level, and promotes the improvement of the protection and utilization level of port industrial heritage landscapes. Memory place theory can extend the new meanings and perspectives of industrial heritage landscapes in psychology and sociology, and also expands new ways for designers from the concept to the method of protecting and utilizing industrial heritage landscapes.

3.2. Carrying Local Cultural Characteristics with Port Industrial Heritage Landscapes to Promote Industrial Cultural Development

Guangzhou port industrial heritage is the product of the integration of Lingnan culture and industrial culture. Using port industrial heritage landscapes to carry Lingnan local culture helps to form Guangzhou's urban cultural identity and collective memory, which has unique emotional value and social significance. Port industrial heritage landscapes have rich cultural elements and complete spatiotemporal connections, which are conducive to industrial culture exhibitions, science popularization, and patriotic education activities, promoting the spirit of craftsmanship and the prosperity of industrial culture.

3.3. Discovering the Aesthetic Features of Port Industrial Heritage to Highlight the City's Characteristic Landscape

Guangzhou's industrial buildings in modern times have distinct Western classical and modernist style characteristics, showing the unique features of Sino-Western integration during the social transformation period, reflecting the style and aesthetic characteristics of Lingnan architectural art development in modern times, and are an important part of Guangzhou's modern architecture. The water network of the Pearl River Delta is the support for Guangzhou's industrial development, thus forming a port waterfront landscape with personality and Lingnan characteristics. The protection and renewal of port industrial heritage landscapes are of special significance for maintaining the historical style of Guangzhou's port waterfront landscape.

3.4. Achieving Sustainable Development of Port Areas and Promoting Regional Economic Prosperity

With the relocation of industries and docks in port cities, and the conversion of land functions and uses, historical port areas have been transformed into the most attractive waterfront public spaces and highlights of urban economic activities. The rational design of the spatial layout of historical port areas, the retention of industrial building relics, and the full use of existing resources can reduce the waste of resources and environmental pollution caused by demolition. The construction of nautical-themed industrial museums, waterfront characteristic blocks, and port navigation cultural and creative parks, etc., creates industrial tourism routes integrated with waterfront environments and port navigation features, promoting the sustainable development of port industrial heritage.

4. Case Analysis of Port Industrial Heritage Landscape Renewal in Guangzhou Pearl River Back Channel

As one of the bearing grounds of modern industrial culture, Guangzhou has a number of industrial heritage buildings along the Pearl River. In combination with the construction of the Pearl River high-quality development belt, Guangzhou has designated a total of 75 km of the Pearl River channel in the central urban area, including 17 km of the West Channel, 28 km of the Back Channel, and 30 km of the Front Channel. By the end of 2022, there were more than 200 industrial heritage buildings along the central urban area of the Pearl River channel, with the activated industrial heritage buildings accounting for about 48% of the total registered industrial heritage buildings in Guangzhou, mainly used as public facilities and commercial offices, while the unused ones are mostly vacant. The Pearl River Back Channel is one of the cradles of Guangzhou's industrial development and an important corridor that drove the development of Guangzhou in the early days. Its banks were once the gathering place of the shipbuilding industry, with many shipyards, docks, and warehouses. The industrial heritage of the Pearl River Back Channel dock and warehouse area is a witness to the history of modern Guangzhou's industrial trade and port development. It has completely preserved the style of modern foreign trade and demonstrates the development context of modern Guangzhou's commercial trade, which is an important basis for studying the shipping and economy of Guangzhou and the South China region at that time[9].

4.1. Evolution of the Pearl River Back Channel Dock and Warehouse Area

4.1.1. Formation and Development Stage

In the 1920s and 1930s, among the 11 foreign firms in Shamian, 8 built a batch of docks and warehouses along the banks of the Pearl River, with foreigners serving as warehouse managers. These docks and warehouses, as an extension of the functions of foreign firms and companies in Shamian during a specific historical period, are important historical relics and physical evidence of Guangzhou's and China's foreign economic relations and port trade development. Among them, two British firms - Butterfield & Swire and Jardine Matheson, dominated Guangzhou's shipping industry from the late 19th century to the first half of the 20th century. In addition, the three kerosene companies - Asiatic, Mobil, and Texaco, monopolized the kerosene business in South China at the time and all established warehouses and docks here. With the increase in shipping volume along the South China coast, in 1927, one of the most advanced docks and warehouses in Guangzhou at the time - Taikoo Warehouse, was established by Butterfield & Swire in Bai Xiansuo of the Pearl River Back Channel. At the same time, the British firms Asiatic Godown and Dragon and Phoenix Godown, the Japanese firm Osaka Godown, and the American firm Texaco Oil Depot, which have been basically well-preserved to this day, were also built[10].

4.1.2. Port Industrial Transformation and Relocation Stage

In 2000, Guangzhou's development strategy of "East Expansion and South Extension" allowed Guangzhou to gradually transform from a riverfront city to a seaport city, which led to the re-layout of ports. Guangzhou set up four port areas in the inner port area, Huangpu port area, Xisha port area, and Nansha port area according to the new port layout plan. The Mayor's Office meeting in 2004 decided that industrial production enterprises would gradually withdraw from the urban

waterfront and introduce modern service industries to the waterfront[11]. These strategic changes inevitably led to a significant reduction in freight demand in the inner port area, and the central urban area would largely divert the original water transportation functions to the outside, releasing the original port industrial land in the central urban area through functional conversion and replacement, while other comprehensive urban functions would replace the original central urban storage, industrial production, and other functions closely related to shipping functions to adapt to the new needs of urban development.

With the upgrade of urban industries and the relocation of industries, a large number of docks and storage-style industrial relics left behind along the waterfront of the Pearl River Back Channel also face the threat of large-scale development. These industrial cultural heritages, which are of great historical value, are precious and irreplaceable and must be protected and planned as soon as possible, otherwise, they will face destructive destruction. Including the Taikoo Warehouse Dock (built in 1927), Osaka Warehouse Dock (built in 1930), Xiehe Machinery Factory (built in 1911), Hadi Warehouse, Jardine Matheson Warehouse (built in 1913), and Xinyi Hall (built in 1960), and other 7 sites were included in the Guangzhou Municipal Cultural Relics Protection Unit in 2008. In 2024, the Asia Dragon Mai Warehouse site (built in 1906) was included in the third batch of Guangdong Province's industrial heritage list.

The Pearl River Back Channel has both the dock and warehouse area formed with the development of modern port shipping industry and the industrial area built for Guangzhou's industrial development between the 1950s and 1980s. It is an area where Guangzhou's modern industrial heritage is densely distributed and well-preserved, condensing the history of Guangzhou's industrial development. The Pearl River Back Channel has a history of more than two hundred years from the time of the Thirteen Factories to the present, and it covers a very rich and concentrated historical information, which is an important witness to the modern industrial development of Guangzhou.

4.2. Protection and Renewal Experience of Port Industrial Heritage Landscapes

In the past 20 years, the functions of the Pearl River Back Channel's waterfront industry and water transportation industry have significantly declined due to the rapid development of Guangzhou, and they are in urgent need of revitalization through industrial transformation and regional renewal. The landscape renewal and transformation in the area should start from improving public services, infrastructure, and spatial environment, fully respecting the historical and cultural value of the Back Channel dock and warehouse area, integrating into the broader context of urban development, and based on a comprehensive and holistic approach to historical and cultural protection and sustainable urban renewal, to establish a longer-term global goal and explore its potential and development value. The renewal and transformation goals are to have a strong industrial historical atmosphere, meet the requirements of modern urban development, and have a beautiful, vibrant, and livable urban important historical and cultural area, cultural activity center, and riverside open space, comprehensively balancing the historical, cultural, economic, and environmental benefits of the Back Channel dock and warehouse area. To maintain the authenticity and integrity of the historical environment of the Pearl River Back Channel dock and warehouse area, special attention should be paid to maintaining the original spatial

scale and characteristics of the dock and warehouse area during the renewal. For relatively intact factory buildings, overall maintenance and repair should be carried out according to their level of industrial heritage protection and current characteristics, while also retaining and repairing various buildings, structures, machinery, and equipment that reflect the characteristics of the dock and warehouse area.

4.2.1. Characteristics of Industrial Heritage Buildings and Functional Replacement

Most of the buildings in the Pearl River Back Channel dock and warehouse area were built by foreign architects. Looking at the buildings that are still well-preserved in the dock area today, there are traces of both modernism and classicism, and they also reflect the characteristics of architectural art development during this historical period. In the renewal of the port area, the original form and appearance of the industrial heritage buildings should be maintained, and the damaged parts of the buildings should be repaired, and the building components should be replaced and reinforced to achieve a perfect combination of old and new.

Taikoo Warehouse is located on the east bank of the Back Channel and is influenced by modernist design thinking. The building focuses on functionality and has a simple shape. Its square doors and windows and gables have no decoration, and the horizontal sunshade board adapts to the hot and rainy climate of Lingnan. The roof support is a triangular lightweight steel truss and a mixed lightweight steel-wood truss structure, and it also uses cast-iron column structure technology. The roof structure is still well-preserved, showing a unique modern industrial architectural symbol. Taikoo Warehouse has now been transformed into a comprehensive historical exhibition area and commercial cultural scenic area, including foreign trade, port transportation history exhibition hall, museum, leisure and entertainment, catering and commerce, and other functions[12].

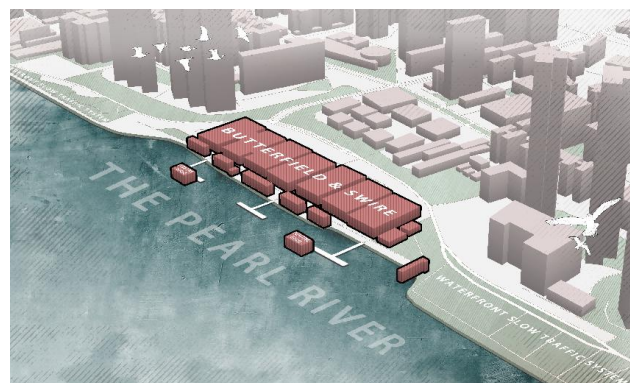


Figure 1. Site Schematic Diagram.

Located on the west bank of the Pearl River Back Channel, Fangcun Baihetan, Guangzhou Xinyi International Guild Hall, originally a Soviet-style factory area in the last century, is an abandoned warehouse and factory of Guangdong Province Water Resources and Hydropower Construction Company. It now preserves the basic structure of the factory building and, after retaining its architectural appearance and structure, has modernized the doors, windows, walls, and other parts of the warehouse and workshop. The exterior wall retains the original red brick, and the windows are transformed into metal-framed glass surfaces that echo the wall, with two doors made of old sleepers and the ground paving using a combination of old and new elements. The overall building, through protective planning and transformation, has formed a new architectural pattern and style, and is now an artist's studio, gallery, bar,

multifunctional exhibition hall, commercial center, cultural and creative design center, etc.[11].

Long Mai Warehouse is the earliest warehouse built by the Asiatic Petroleum Company in Guangzhou, mainly for storing kerosene. The large-span steel roof structure of Long Mai Warehouse has become a typical representative of the early Lingnan large-span structure, with a wide space and strong practicality. The office building of Long Mai Warehouse reflects a eclectic classical style, with a balanced proportion and aesthetic value. Now, the two remaining buildings of the Guangdong Petroleum Guangzhou Training Center convey the historical information and value of industrial heritage. In addition, the Osaka Warehouse and its staff building, originally belonging to the Japanese Osaka Corporation, located on the west bank of the Pearl River Back Channel, are typical Japanese modernist style buildings; the Jardine Matheson Warehouse and Xiehe Machinery Factory, built in the Baroque style, are located on the west bank of the Back Channel. These warehouse and dock buildings have been maintained, repaired, and repurposed internally, injecting new vitality into the heritage buildings.

Perhaps from an architectural art perspective, these individual buildings are not very prominent, but this group of buildings was built in the same region and almost at the same time. Due to the industrial and dock functions of the warehouse and dock, the overall area after overlay has a unique artistic value, thus forming a very strong individual characteristic of the overall landscape style.

4.2.2. Maintenance of the Sense of Place in Industrial Heritage Sites

In addition to the unique industrial heritage building complex, the Pearl River Back Channel dock and warehouse area also has many industrial structures, machinery, equipment, and ancient trees. By protecting and reusing these heritage buildings and elements, not only the cultural imprint of the times is preserved, but also the historical memory of the development of the dock and warehouse area is saved, achieving organic renewal of the traditional waterfront port area. Reusing and endowing the waterfront landscape with cultural connotations not only helps save resources but also integrates the once harmoniously developed context back into the modern city's renewal and construction, opening up a new path for the protection and renewal of Guangzhou's industrial heritage landscapes.

One of the landmark structures of Taikoo Warehouse, the Taikoo Dock area water tower, was repaired externally during the renewal to maintain the characteristic style of the area. In addition, the three T-shaped docks in the renewal design strictly protected the riverside landscape space formed with the warehouse buildings, which is one of the important historical witnesses of Taikoo Dock. The ship bolts in the site, the words on the walls, and the still thriving ancient banyan trees, and other precious cultural and natural landscape elements have been preserved. Taikoo Dock, through the protection and reuse of these artificial and cultural landscape elements, retains the integrity and authenticity of the original dock area while also preserving people's memories of Taikoo, making it more historical and atmospheric.

Located on the west bank of the Pearl River Back Channel section, the Hadi Warehouse, originally a storage oil depot and dock of the Dutch Royal and British Shell Transportation Company, is most characterized by the cylindrical metal oil storage tanks made of 15mm thick steel plates and rivets, with the largest oil storage tank being nearly 13 meters high and a maximum diameter of 20.7 meters. In addition

to oil storage tanks, Hadi Warehouse also has three barreled oil warehouses, two office buildings, and a riverside dock. This dock originally moored oil ships and loaded and unloaded goods and has existed for more than 80 years[12]. Texaco Oil Depot is also a municipal cultural relics protection unit, and the cultural relics themselves are a century-old dock with a seven-shaped reinforced concrete frame structure extending towards the river, covering an area of about 120 square meters, which was used for mooring and loading and unloading oil ships at that time. By preserving the dock and some unique industrial machinery and equipment, and carrying out landscape rectification of the dock shoreline, it has become a node of the riverside public landscape while continuing to play the function of the dock, providing urban residents with a highly place-feeling leisure and entertainment space.

4.2.3. Optimization of Water and Land Transportation at All Levels

The Pearl River Back Channel dock and warehouse area, as an open waterfront area of the city, cannot be separated from a diversified and efficient road traffic organization in reshaping its functions. It is necessary to adhere to a public transportation-oriented approach and strive to establish a people-oriented, sustainable transportation network[13]. Public transportation connection efficiency and accessibility are the core of regional revitalization and the premise of spatial integration, and they are also key to the interactive development of industrial heritage protection areas with other urban areas.

The “Urban Master Plan of Guangzhou” upgrades Fangcun Avenue to an urban expressway, forming a closed loop with the industrial avenue on the east side, connected to the He Dong Bridge and Zhoutou Zhu Tunnel, providing a prerequisite for the land function replacement within the base. To facilitate the overall protection and comprehensive development of the dock and warehouse area and to closely connect the area with the Pearl River, the original planning road along the river within the 40-meter red line is not implemented, but an 8-meter-wide riverside landscape road is built within this range. On the west bank traffic organization, the route is adjusted westward, and the traffic connection with the main urban area on the west side is strengthened to avoid the old dock area being penetrated by urban secondary trunk roads. The original planning road red line of Haizhu Island Road on the east bank has also been appropriately adjusted. Through combing, adjusting, and optimizing the regional road network structure, this area has become a highly water-friendly and accessible urban public waterfront space.

The internal roads of the dock and warehouse area are the skeleton of the regional landscape and the main channels for bearing passenger and logistics flow. The focus is on transforming, dredging, and optimizing the existing road system to build a complete, convenient, accessible, and comfortable road network system. The slow traffic system is not only the infrastructure of the regional landscape but also the main place for tourists and residents to engage in leisure, sports, and fitness. By creating a regional internal slow traffic system, industrial heritage parks, museums, cruise docks, shopping centers, and other places are organically connected, and the slow traffic paths are integrated with green belts and waterfronts to create a cultural landscape corridor that displays the port culture and industrial history.

In addition, combined with the planning of the Pearl River water tourism route, it forms an important part of the Guangzhou water tourism route experience, together with the northern Zhoutou Zhu, Fangcun, and Huangsha docks, as well as the Pearl

River front channel route. The renewal and transformation of the Asia Hadi Godown Dock, Xin Guangzhong Dock (formerly the Nissin Dock), Lao Guangzhong Dock (formerly the Longhu Warehouse Dock), Bai Xianshuo Dock, and Taikoo Dock into sightseeing cruise docks make the water tourism route an important part of experiencing the mountains and rivers of Guangzhou[10].

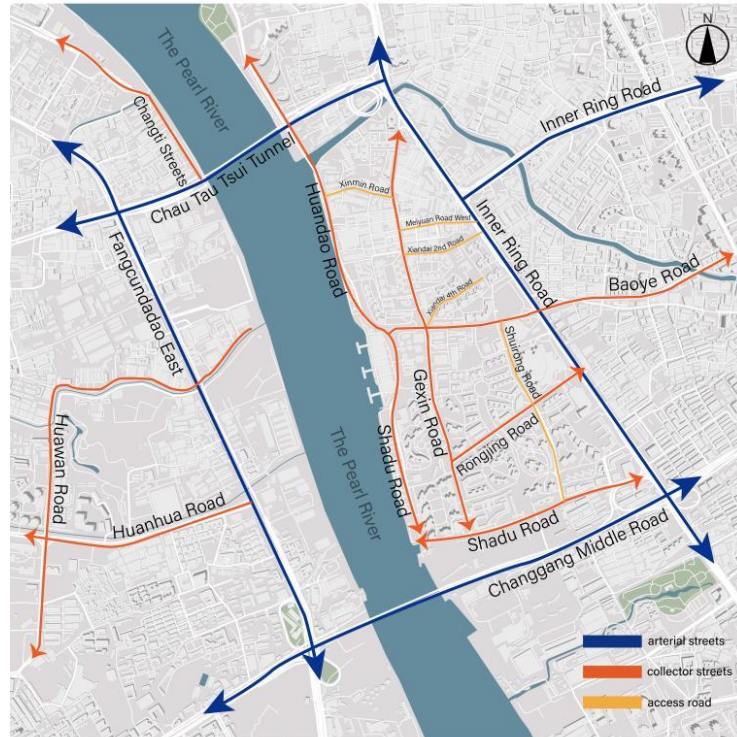


Figure 2. Road Plane.

4.2.4 Integration of Industrial Heritage Sites and Waterfront Open Spaces

In the process of updating industrial heritage sites, the land use functions and structures will be adjusted and reorganized, including the injection of new functional spaces such as cultural display, commerce, office, and leisure and entertainment into the original heritage areas. The change in spatial functions has, to some extent, affected the integrity of the original industrial heritage area's spatial structure, and the region urgently needs to organize and further create space by strengthening node spaces and stitching linear corridor spaces, integrating the waterfront open spaces of the industrial heritage area with the urban structure to form a complete form. The urban design philosophy is implemented in the protection and development of the dock and warehouse area, using modern urban design theories of place and context to sort out the original characteristic spaces of the dock and warehouse area for renewal and transformation according to different specific situations.

Firstly, the focus has shifted from protecting individual buildings in the past to focusing on the overall renewal and transformation of the entire industrial heritage area. The spaces within the planning and protection areas on both banks of the Pearl River maintain the original spatial pattern and characteristics of the old dock and warehouse area, reflecting the overall landscape of the historical and cultural district. New public buildings are mainly low-density and high-openness spaces. Secondly, attention is paid to the landscape transformation of the waterfront open spaces along the coast. The renewal and transformation process fully respects the original industrial

production relics, maximizing the integrity and continuity of the industrial historical style and historical information[9], while also opening up green spaces and squares in the open spaces of the old dock area to inherit the context of the old port area. Thirdly, this area belongs to the urban public waterfront space, which requires a transparent view. The main feature of greening is to retain the original large trees and plant micro-topography grass slopes. Public courtyard landscapes are equipped with wooden platforms, pools, and other leisure facilities, and the courtyard plants are mainly large trees and natural ground plants combined with architectural styles. The greening around the buildings mainly uses simple and atmospheric styles to set off the beauty of the buildings. The greening of the embankment and road green spaces has a strip-like characteristic, focusing on the combination of tall trees and regular hedges to form a sense of rhythm and rhythm.

Waterfront open spaces are the connecting line and organizational space benchmark of the port dock industrial heritage area, linking the port area with the city's main public green spaces, squares, viewing platforms, and other landscape nodes and public areas, forming an open space network. As the link and extension of the overall spatial structure of the industrial heritage area, waterfront open spaces will enhance the environmental landscape quality of the industrial heritage area, making the entire area's functions more comprehensive and driving regional development.

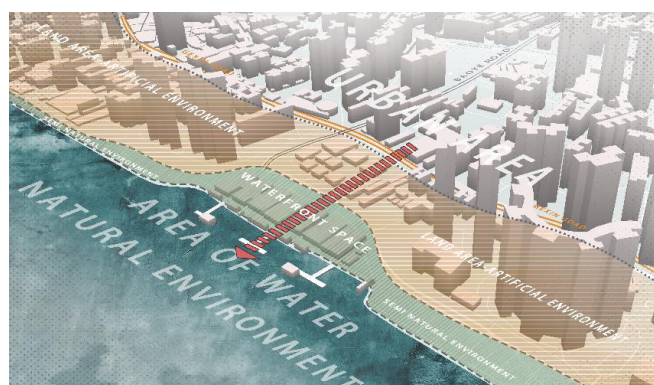


Figure 3. Environmental Structure.

5. Insights into Protection and Renewal of Port Industrial Heritage Landscapes

The renewal and transformation of port industrial heritage landscapes are complex and comprehensive, involving multiple disciplines such as urban planning, architecture, landscape ecology, human geography, and behavioral psychology. It requires comprehensive research from various aspects to maintain and create, strengthen its own personality and characteristics, in order to provide a beautiful scenery line for the entire city. The protection and renewal of the Pearl River Back Channel port industrial heritage landscapes have not only enhanced regional vitality and adapted to the needs of modern urban functions but also maintained the traditional industrial heritage area's style, which has targeted reference significance for the renewal of old port areas in Guangzhou and other cities in China.

5.1. Protection and Renewal of Port Industrial Building (Facility) Heritage

Industrial building (facility) heritage refers to the collection of various industrial structures and facilities, equipment that have protection value and carry important industrial cultural information [14]. As a distinctive material element that

distinguishes port cities from other industrial cities, port industrial building heritage belongs to the micro spatial level, mainly including: buildings (shipping stations, storage rooms, shipyards, lighthouses, etc.), shipping hydraulic engineering facilities (bridges, breakwaters, gates, etc.), transportation vehicles (ships, navigation marks, etc.), and engineering machinery and equipment. In the Pearl River Back Channel, conducting extensive research on the port dock's iconic material relics is a prerequisite and foundation for the protection and renewal of the port industrial heritage landscape and is also the basis for constructing the port memory place. The specific research mainly focuses on the following points:

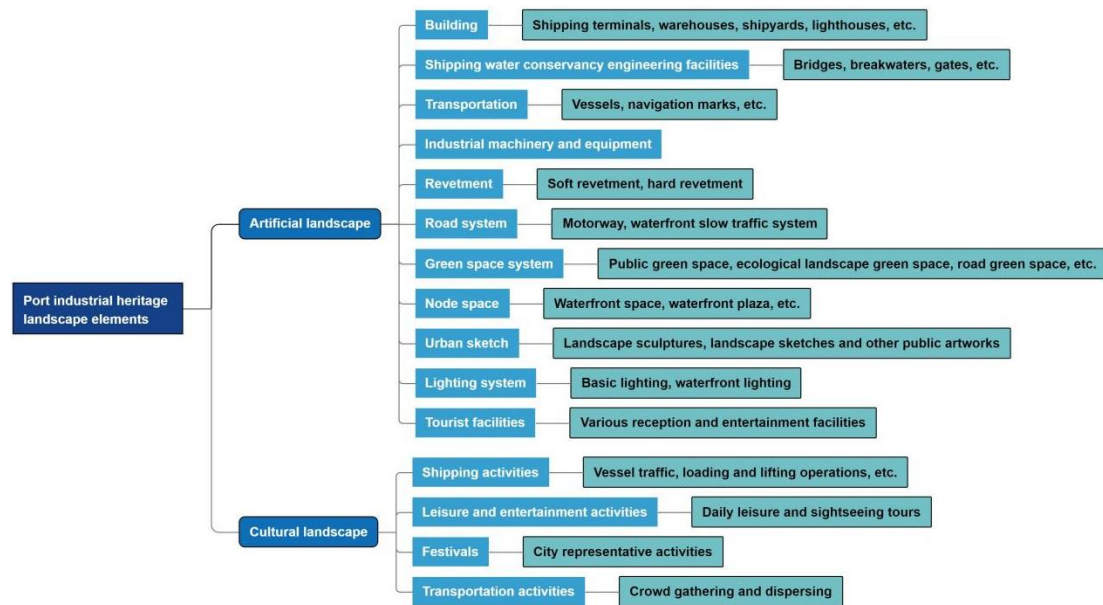


Figure 4. The construction of port memory place.

Under the principle of maintaining historical authenticity, clean and repair port industrial heritage buildings, and use the characteristics of materials, colors, and shapes in the port heritage to protect and strengthen the building structure, making the building have a dialogue between history and the new era.

(1) The internal space of old buildings is given new life through functional transformation, and the cultural and scientific and technological exhibitions are introduced into the large-scale indoor space of warehouses, etc., to carry the site's historical and cultural memory.

(2) Make full use of the residual engineering machinery and equipment, and through public art design, enhance its engineering aesthetics and mechanical aesthetics, integrate the different places and atmospheres in the port area, awaken the port area's place memory, and stimulate new vitality in urban space.

(3) For buildings and industrial relics that have been destroyed or changed, modern technology can be used for restoration or addition, and a reasonable capacity can be set in combination with old and new buildings to improve leisure, fitness, service, and other functions. Or use the remaining relics, waste building materials, etc., in new structures and landscapes, so that the site retains its original mark while integrating public activity participation.

5.2. Overall Collaboration of Port Heritage Site Environmental Elements

In addition to the building (facility) heritage elements contained in the port industrial heritage landscape, it should also include the environmental elements formed in history and modern times that are related to the industrial relics. They are interconnected and constitute a complete industrial heritage landscape through certain ways, belonging to the meso-spatial level. Drawing on the experience of the renewal of the Pearl River Back Channel port industrial heritage landscape, the research on environmental elements should focus on the natural background, river systems, traditional alleys, architectural complex styles, road network patterns, and spatial forms of the surrounding and influencing areas of the heritage site. Centering on the theme of port industrial culture, in-depth research on the industrial cultural mechanism of each port area is carried out to further expand and deepen the spatial connections and overall collaboration at the micro and mesolevel, playing a role in constructing the ties of port memory places. The main research is carried out in the following aspects:

(1) In the renewal process of the port dock area, the road network pattern and the spatial composition relationship between streets and buildings in the old dock area should be sorted out, and the texture and spatial form of important historical areas should be strictly protected, respecting the authenticity of history. Research on how to extend the deep space of the industrial heritage block and take into account community development to avoid updating the space scale too urbanized. Provide a variety of behavioral paths and open spaces for gathering and dispersion to enhance the water accessibility and interactivity of the port waterfront landscape place.

(2) For the degree of spatial texture fragmentation of the site, targeted measures should be taken to control it, such as landscape remolding and visiting routes according to the geographical characteristics of the site. Redefine the order of landscape composition elements, and strengthen the connectivity and recognizability of elements to make the sequential relationship between landscape composition details clearer, creating a vibrant dynamic space.

(3) Through overall lighting transformation, highlight the important nodes of the port area and connect the entire port area with linear spaces such as streets, waterfronts, and green belts, enhancing the image of the heritage site and the development of the night economy.

5.3. Revitalization Utilization of Port Intangible Heritage

Protection-led port industrial heritage landscape renewal cannot stop at the level of material space renewal; it must also focus on the activation and utilization of intangible heritage. Within the historical, present, and future temporal and spatial scope, it is necessary to regenerate the port heritage holistically and dynamically while building a dialogue platform between historical places and the public, injecting new vitality into old port spaces. In the existing intangible heritage of the Pearl River Back Channel dock and warehouse area, relatively more data such as signs, trademarks, account books, contracts, dock numbers, drawings, and corporate records are preserved[15]. Intangible heritage also covers important contents related to it, including representative historical events, technical activities, dock commercial trade, festivals, customs, and cultural entertainment. It also includes typical events such as the daily life, work, and production experiences of ordinary dock workers, sailors, and managers. The main activation and utilization methods are:

(1) Whether real or fictional, the historical value of dock heritage can be demonstrated through re-enacting historical events and life, virtual historical figures, shaping prop scenes, and presenting images or sounds.

(2) Plan regular water-related activities to activate the potential value of port heritage. It can be organized through traditional festival celebrations, related media promotion meetings, trade fairs, expositions, city anniversaries, and other activities to promote the protection and activation of the inheritance of dock intangible cultural heritage.

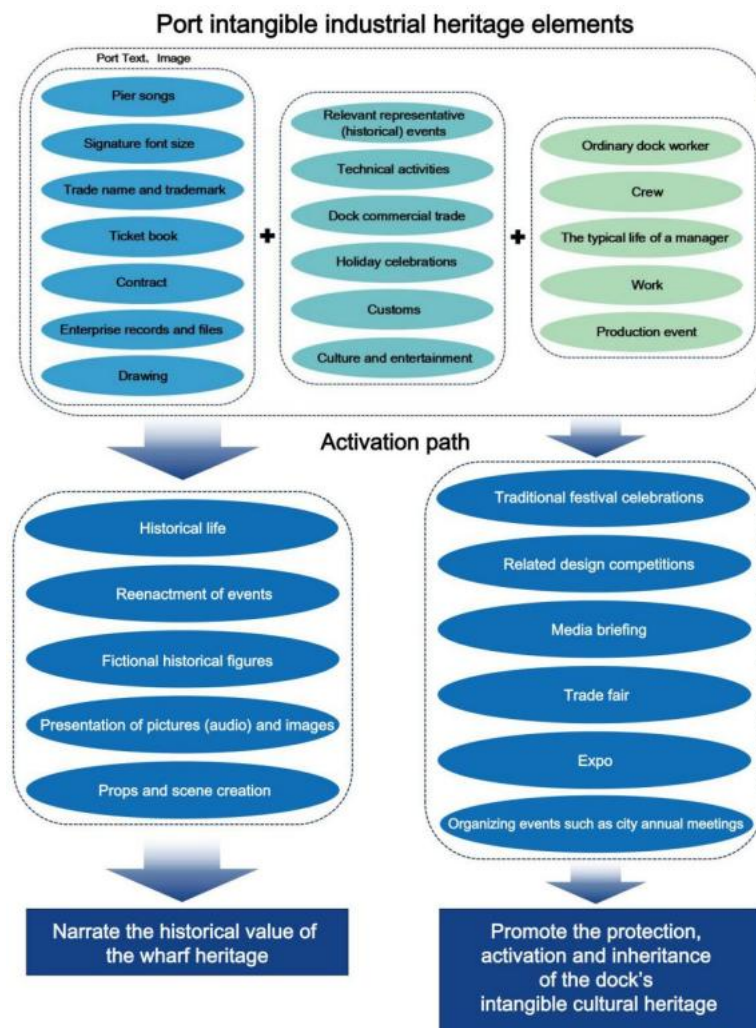


Figure 5. Port intangible industrial heritage elements.

5.4. Construction Strategies for Port Memory Places

The construction of port memory places mainly includes the expression of place context and information, the reconstruction of place spatial order, and the activation through spatial experience activities, jointly awakening place memories. The protection and renewal of the Pearl River Back Channel port industrial heritage landscapes are not to isolate the dock warehouses and other heritage buildings and relics but to connect them with the “field” of their context, making the three interdependent and jointly recreating the historical place context. Whether it is the inheritance of the noumenon, the reproduction of the place, or the reproduction of events, a global and systematic protection concept must be adhered to, and protection

and renewal must be carried out according to the principles of historicity, authenticity, readability, sharing, and sustainability. The main construction strategies are designed from the following aspects:

(1) Collect and analyze comprehensive information of the port dock area to determine the narrative theme and carrier of the landscape space.

(2) Through the transformation of the creative subject, reconstruct the order of the landscape space structure, project the information with historical and cultural stories or collective memories into the port's material and intangible elements and scenes.

(3) Integrate and arrange spatial plots through appropriate narrative methods and rhetorical strategies, connect scattered and hidden place information, construct a continuous aesthetic experience, and integrate into the life paths of users or the travel routes of visitors. Specific simulations of narrative scenes and their meanings can be designed using virtual reality technology; integrate thematic props, set public art or landscape features in landscape spaces, and unify the atmosphere of the place.

(4) This kind of plot existing in the spatial structure relationship connects many spatiotemporal elements through “people’s” spatial experiences and daily activities, and gradually accumulates as the cultural image of the port[5], becoming the place memory of the port.

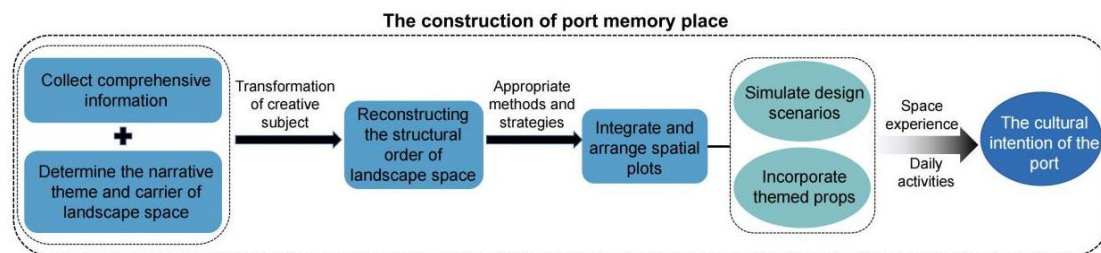


Figure 6. The construction of port memory place.

6. Conclusions

The renewal of port industrial heritage landscapes is crucial for the sustainable development of port cities. The Pearl River Back Channel dock and warehouse area in Guangzhou has retained the traditional style of the original dock and warehouse area, preserved the cultural imprint of the times, and promoted the redevelopment of the heritage site through measures such as the replacement of industrial building (facility) heritage functions, the maintenance of the sense of place in heritage sites, the optimization of water and land transportation at all levels, and the integration of heritage sites with waterfront open spaces. It has reference significance for the renewal of old port heritage areas in China. Different port dock industrial heritage areas have different resource endowments and development trajectories[16]. In the actual application process, it is necessary to explore renewal strategies that meet their own conditions in combination with the functions and spatial forms of different heritage areas, and gradually promote the sustainable development of China's port industrial heritage landscapes.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

Funding

This work was supported by the Guangzhou Philosophy and Social Science 14th Five-Year Plan Project (2021GZGJ274).

References

- [1] Chen, H.L. Port Planning and Layout. People's Communications Press, 1999, 110.
- [2] Tong, Y.Q.; Han, F.W. The connotation and overall characteristics of industrial heritage landscape. *Urban Science*, 2009, 11, 14-17.
- [3] Yang, T.; Bai, X.; Liu, Y. Spatial flow memory remodeling in urban renewal: A case study of the urban renewal of North Sichuan Road in Shanghai. *Journal of Architecture*, 2016, 7, 17-21.
- [4] Tang, N.; Pan, T.B. Construction and activation of the Grand Canal cultural memory Site in Jiangsu. *Nanjing Social Sciences*, 2020, 2, 150-156.
- [5] Lu, S.M. Place narration and its exploration on the construction of urban cultural characteristics and identity: A case study of the renewal of Shanghai waterfront historic lot. *Human geography*, 2013, 3, 51-57.
- [6] Shen, J. The Game between Memory and History: The Construction of Memory History in France. *Chinese Social Sciences*, 2010, 3, 205-219+224.
- [7] Shen, K.L. Architectural Phenomenology. China Architecture Industry Press, 2008.
- [8] Zhu, R. Memory. Place. City--Rethinking City and Architecture from the perspectives of Psychology and Sociology. *Journal of Chongqing University of Architecture*, 2007, 5, 23-25.
- [9] Heng, W.H. Study on the activation and utilization of waterfront industrial heritage. *Smart City*, 2023, 11, 61-63.
- [10] Yang, J.Q.; Luo, C. Protection and redevelopment of the Yangxing Wharf warehouse Area in the back channel of the Pearl River in Guangzhou. Urban and rural Planning from the perspective of Ecological civilization -- Proceedings of the 2008 Annual Conference on Urban Planning in China, 2909-2924.
- [11] Yao, R. "Loft" organic landscape--Approach to modern industrial heritage protection and landscape regeneration in the Back Channel of the Pearl River in Guangzhou. *Chinese and foreign architecture*, 2009, 8, 61-64.
- [12] Yang, X.W. Protection and reuse of industrial heritage of port and wharf in the back channel of Pearl River in Guangzhou. *Journal of Railway Science and Engineering*, 2011, 6, 123-128.
- [13] Chen, K.S.; Lou, Q.; Zhao, Y. Research on waterfront regeneration strategy of Port City interface: A case study of the Old Port of Marseille, France. *Urban Planning*, 2016, 4, 27-31.
- [14] Tong, Y.Q. Exploration on the path of Industrial landscape heritage and its structural protection. *Urban Development Research*, 2015, 8, 107-111.
- [15] Lu, S.M.; Diao, J.H. The collective memory of port cities "Dock Heritage" -- taking Shanghai as an example. *Modern urban research*, 2012, 10, 39-49.

- [16] Yuan, N.Y.; Mei, L.; Zhang, Z.Q. Strategy and practice of revitalization of waterfront industrial area. *Planner*, 2021, 7, 45-50.



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