Preservation and Utilization of Industrial Heritage from the Perspective of Scene Theory: A Case Study of the North Area of Shougang High-End Industry Comprehensive Service Zone

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Abstract. China's urban development has transitioned from an era of incremental growth to a period of steady-state development. Industrial enterprises were once a crucial driving force for economic growth in urban areas, but with the upgrading of industrial structure, heightened environmental protection requirements, and changes in business conditions, many industrial parks have become industrial relics. By applying the scene theory of the New Chicago School, represented by Terry Clark, this paper aims to create different elements and frameworks of scenes from a cultural consumption perspective, and providing a new paradigm for the protection and utilization of industrial relics. Using this theoretical perspective, the paper analyzes the North Section of the Shougang High-End Industry Comprehensive Service Zone and provides new insights and summaries for this case study, expanding the specific application of the scene theory originating from sociology in the field of urban renewal. The objective is to examine the protection and utilization of industrial relics from different perspectives, and provide theoretical references and ideas for future related research.

Keywords: scene theory · industrial heritage · preservation and utilization · North Area of Shougang Park

1 Research Background

During the early years of China's founding, numerous industrial enterprises were constructed in the outskirts of cities in order to achieve the goal of national industrialization. From 2011 to 2018, China's urbanization rate increased by 8.31%, with an average annual growth rate of 1.19% [1]. By the end of 2022, China's urbanization rate had reached 65.22% [2], with an average annual growth rate of 0.74% between 2018 and 2022. Despite the slowdown in the increase of urbanization rate, urban development still requires land, but with limited availability due to the scarcity of urban land resources. As a result, urban development has entered a period of stability. With the rapid increase in urbanization rate, many industrial heritage areas have been incorporated into urban development, becoming an obstacle to urban land use [3]. In recent years, the protection

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and utilization of industrial heritage has received increasing attention, with a growing number of relevant theoretical studies and practical applications. However, there are also issues such as slow theoretical development, suboptimal performance of transformed industrial heritage, and inadequate cultural value inheritance [4]. By introducing the theory of "scenes" and looking at the protection and utilization of industrial heritage from the perspective of consumers, pleasant "scenes" can be created to provide new direction for urban renewal.

2 Scene Theory and Industrial Heritage Renovation

2.1 Connotation of Scene Theory

Scene theory originated from the Chicago School and was influenced by the theory of comfortable physical environment. The Chicago School includes different disciplines, such as economics, architecture, sociology, etc. Scene theory was proposed by a research team led by Terry Nichols Clark, a professor at the University of Chicago. This theory belongs to the field of sociology, and its research object is mainly various groups of people in Chicago [4]. After the 1980s, as manufacturing industries withdrew from the city, cultural creativity became a new driving force for urban development [5]. The consumer-oriented scene theory emerged, promoting urban renewal and development. The purpose is to study from a sociological perspective how to attract different groups of people to live, work, and consume in cities that have shifted from production-oriented to consumption- and entertainment-oriented in different scenes. The scene in scene theory is a holistic concept composed of five elements: Neighborhood, Amenities, Persons labeled by race, class, gender, education, etc., The specific combinations of these and activities based on the first three elements, and Legitimacy, Theatricality, and Authenticity as cultural value features under these three characteristics, each corresponding to five small dimensions shown in Table 1. The first four elements are objective perceptions, while the fifth element is subjective perception [6].

Neighborhood refers to the urban community. Amenities refer to the material structures that shape the scene. Diverse population refers to various social groups based on class, race, gender, and education level within the scene. Activities refer to cultural, consumption, and entertainment activities that people engage in within the scene. The three dimensions of scene value characteristics include Authenticity, Legitimacy, and Theatri-

Table 1. Dimensions of cultural value characteristics of scene

Three main dimensions	Authenticity	Legitimacy	Theatricality
Five sub-dimensions	Locality	Tradition	Neighborliness
	State	Utilitarianism	Exhibitionism
	Ethnicity	Egalitarianism	Formality
	Corporateness	Self-expressive	Glamour
	Rationality	Charisma	Transgression

cality. Authenticity refers to the reflection of the genuine, Legitimacy pertains to moral, egalitarian, and traditional judgments, and Theatricality refers to aesthetic recognition [7].

2.2 Correspondence Between Scene Theory and Industrial Heritage Renovation Elements

The preservation and utilization of industrial heritage is a part of urban renewal, and it is closely related to the actual situation and development needs of the local urban community [8]. Scene theory takes a sociological approach to analyzing this issue, and this paper applies a new theoretical perspective to examine the current situation of cultural consumption and entertainment in the preservation and utilization of industrial heritage. When applying this theory to industrial heritage, it is necessary to correspond the concepts and elements in scene theory to those in industrial heritage (Table 2) according to their core meanings [9].

3 Renovation of Shougang Park North Area from the Perspective of Scene Theory

3.1 Development History of Shougang Park

In 1919, the predecessor of Shougang Park, the Longyan Iron and Steel Company Shijingshan Refinery, was established in the eastern part of Shijingshan, approved by the Beiyang government at that time. It was the largest refinery in the north at that time, but from its establishment until 1937, the refinery had never been put into production. In August 1937, the Shijingshan Refinery was occupied by the Japanese army, and many blast furnaces were newly built. After Japan's surrender in 1945, the Nationalist government took over and renamed the Shijingshan Iron and Steel Works as the Resource Committee Shijingshan Iron and Steel Plant. In 1949, Shijingshan Iron and Steel resumed production. In 1958, the Shijingshan Iron and Steel Plant was renamed as Shijingshan Iron and Steel Company, and in 1966, it was renamed as Capital Iron and Steel Company [10]. In the 1960s, the company actively updated its technology, reduced material losses, improved production efficiency, increased output, and gradually improved its position in related fields. In 1994, Shougang ranked first in steel production in China. In 1996, Shougang Group was established [10].

After entering the 21st century, society's awareness of environmental protection gradually increased [11]. In 2005, the shutdown of Blast Furnace No. 5 in Shougang Park marked the official beginning of Shougang's relocation [11]. In 2010, the Shougang factory area ceased production and the relocation work was completed. In 2015, Beijing successfully bid for the Winter Olympics. After layers of selection, the Organizing Committee for the Winter Olympics decided to settle in Shougang Park. In 2017, Shougang Park was positioned as a new Shougang high-end industrial comprehensive service area, a demonstration area for green transformation and upgrading of traditional industries, a high-end industrial innovation hub in western Beijing, and a post-industrial cultural, sports, and creative base [12]. The detailed planning for the northern part of Shougang

Table 2. The correspondence between elements in scene theory and industrial heritage elements

Elements and concepts in scene theory	property	Core Connotation	Industrial Heritage Elements Corresponding Urban Community Industrial park where the industrial heritage is located
Neighborhood	Objective	Urban Community	Urban Community Industrial park where the industrial heritage is located
Amenities	Objective	Material Structure	Renovated buildings, structures, equipment, and other physical elements in the industrial heritage
Persons labeled by race, class, gender, education	Objective	Diverse Populations	Original residents, new residents, tourists, etc.
Activities	Objective	Cultural, consumption, and entertainment activities involving diverse populations	Culture-related creation, exhibition, visitation, shopping, dining, and watching of movies and dramas
Cultural value features	Subjective	authenticity, legitimacy, and theatricality	The preservation of the original texture of the industrial heritage park, retention of building facades, accommodation of diverse user groups in architecture, practical functionality of the park, and contrast of building and equipment volume are all essential elements for demonstrating authenticity, legitimacy, and theatricality in industrial heritage preservation and utilization

Park was determined, and the park's functions were updated [13]. Meanwhile, it hosted some of the Winter Olympics projects and added cultural, consumption, and entertainment areas in the planning, laying the foundation for creating ideal scenes in the future. In 2021, the Special Exhibition of the China International Fair for Trade in Services was

successfully held, and in 2022, the Beijing Winter Olympics and Paralympic Games were successfully completed.

3.2 Renovation Plan for Industrial Heritage in Shougang Park North Area

The research scope covers the north area of Shougang Park, including the area north of Chang'an Street and the Shougang-owned land on the south side of Shilong Road, covering an area of about 2.91 square kilometers, with a building scale of 1.82 million square meters. It is the birthplace of Shougang, with magnificent industrial heritage, and is set against natural landscapes such as Shijingshan and Yongding River, unique to Shougang's characteristic style.

In the detailed planning of the north area of Shougang, the design concept of inheriting the cultural and spiritual connotations of Shougang, attaching importance to technological innovation, and multifunctional mixed development is proposed. Different protection and utilization measures are adopted for industrial heritage with different conditions and values, emphasizing the coordination of overall style and respecting the original texture. Guided by these principles, Shougang Park North Area has formed a functional structure of Three Belts and Five Zones, like Fig. 1, with the Three Belts referring to the waterfront comprehensive leisure belt, urban public activity leisure belt, and the green ecological belt of the west extension of Chang'an Avenue. The Five Zones refer to the Winter Olympics Plaza area, Shougang Industrial Heritage Park area, Shijingshan cultural landscape area, urban patching innovation workshop, and public service supporting area [14]. In subsequent construction, the Shougang Park North Area is divided by a central axis. The western side of the central axis features the Winter Olympics Plaza, Three High Furnace Museum, Six Works Mall, Winter Training Center, Freestyle Skiing Big Air, and Oxygen Innovation Center, dotted with Xiuchi Lake and Qunming Lake. The eastern side includes Shougang Extreme Park, Blast Furnaces No. 1 and No. 2, Blast Furnace No.4, Shougang Exhibition Center, and Desulfurization Workshop [15]. Most of these main buildings have cultural, consumption, and entertainment functions, and they will serve as the material foundation of ideal scenes, attracting diverse groups of people to engage in activities and demonstrate the value of the scenes.

3.3 Scene Theory and Shougang Park Reconstruction

3.3.1 Neighborhood

There are many forms of neighborhoods, such as streets and communities. Neighborhoods are an important component of urban space and are the foundation of cities. People typically share public buildings, facilities, and resources in neighborhoods. Neighborhoods serve as generators of human communication, social interaction, and the development of intimate relationships, satisfying social needs [16]. People engage in various activities within neighborhoods and experience their scenic value. As a part of the industrial heritage transformation of Shougang Park, Shougang Park North District has numerous public buildings, facilities, and resources of different types. People move through them, engage in various activities, communicate, and participate in social activities, making Shougang Park North District a manifestation of a neighborhood. Shougang Park has the following neighborhood spaces with large foot traffic, as shown in the Fig. 2.

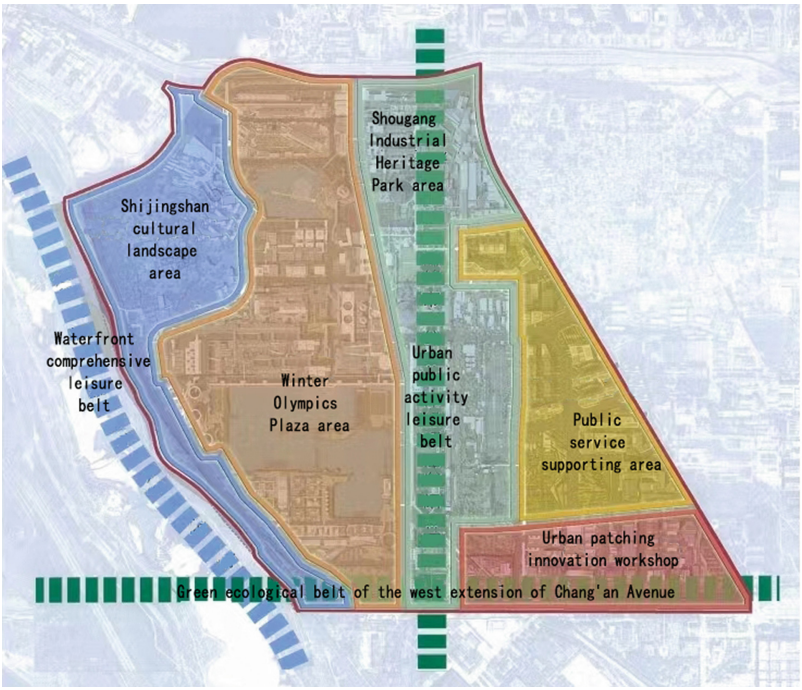


Fig. 1. The Three Belts and Five Zones layout in the Shougang Park North Area

Fig. 2. The neighborhood spaces in Shougang Park

3.3.2 Amenities

Comfort amenities are buildings with cultural, consumption, and entertainment attributes, such as restaurants, cafes, bars, bookstores, parks, galleries, and museums, where people can enjoy a sense of pleasure during their consumption. In the Shougang Park North Area, the important comfort amenities include the desulfurization workshop, the No. 3 Blast Furnace Museum (Fig. 3), the Liugonghui shopping center (Fig. 4), the Shougang Exhibition Center, and the Wuyi Theater, while the major constructions are the No. 1 and No. 2 blast furnaces and the No. 4 blast furnace.

No. 3 Blast Furnace Museum, No. 1 and No. 2 blast furnaces, and No.4 blast furnace are massive buildings and constructions towering over a hundred meters high within the park. The underwater art exhibition hall of the No. 3 Blast Furnace Museum allows visitors to immerse themselves in the lake while interpreting the century-old history of Shougang and interact with the artwork and exhibits or converse with No. 3 blast furnace furnace standing in the distance. The main body of the blast furnaces has been transformed into urban exhibition halls by updating the original industrial space [17].

The streamline design of the exhibition hall adopts the positive-negative double helix spiral line, allowing visitors to explore various exhibition halls in a rotating and surrounding manner [18]. The Liugonghui shopping center covers a total floor area of 62,739 square meters, with preserved buildings such as the 7000 fan room [19], the second pump station, and the nine total reduction, all of which have been renovated and protected, supplemented by multi-level landscape design and new buildings to create

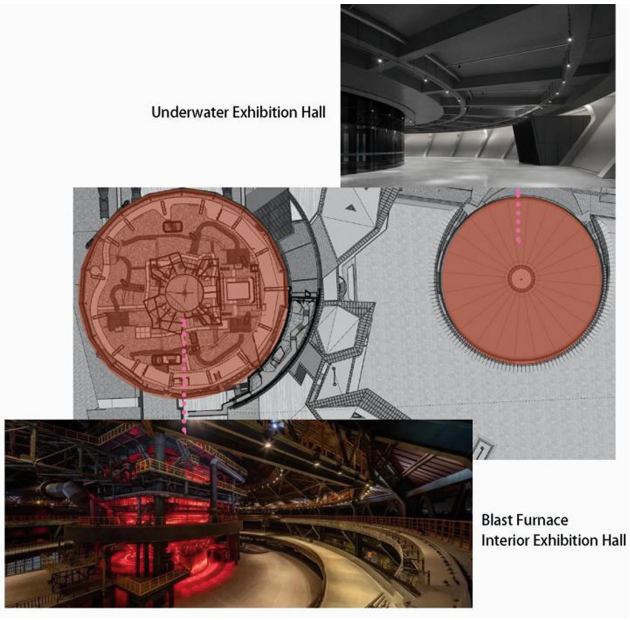


Fig. 3. Exhibition halls at the No. 3 Blast Furnace Museum

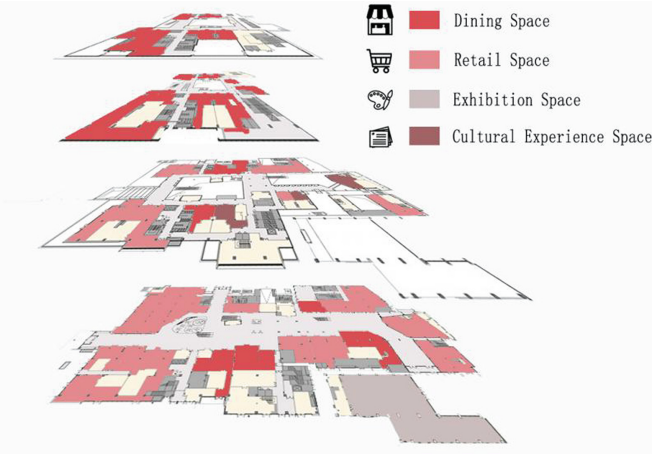


Fig. 4. The Liugonghui shopping center, which offers cultural, shopping, and entertainment experiences

a low-density modern and creative office space, a composite commercial area, a multifunctional activity center, and a green public space for a new type of urban complex [20].

These significant buildings possess one or more attributes of cultural consumption and entertainment, fulfilling the requirements of comfort amenities for cultural consumption and entertainment.

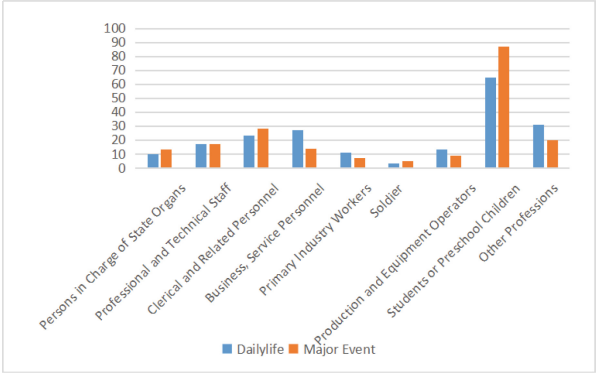
3.3.3 Diverse Population

Building upon a diverse range of amenities, the northern region of Shougang Park attracts a heterogeneous mix of individuals with varying ages, educational backgrounds, Incomes, nationalities, and objectives, like Fig. 5. By conducting sampling surveys and distributing questionnaires, and summarized the different demographic groups that participate in daily life and major events (Graphs 1 2 3 4 5).

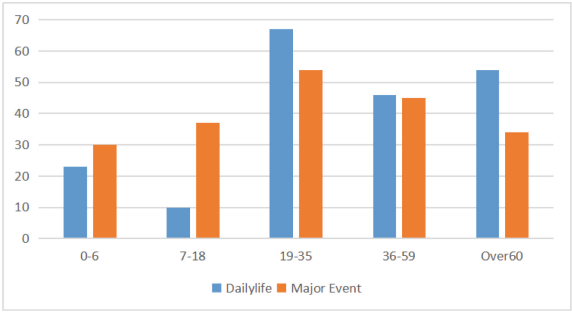
In daily life, the Six Works Mall, serving as an urban complex, appeals to numerous young people and nearby residents, while students, residents, and tourists interested in the history of Shougang and other cultural exhibits visit the Third Blast Furnace Museum. Young parents bring their children to explore the northern region of Shougang, while university students and professionals can experience emerging entertainment projects [21]. During major events such as the Winter Olympics, visitors from all over the world, with diverse characteristics and appearances, come to visit in addition to Chinese citizens [22]. The accommodating nature of Shougang Park in terms of its diverse population reflects its great inclusiveness and equality.

3.3.4 Activities

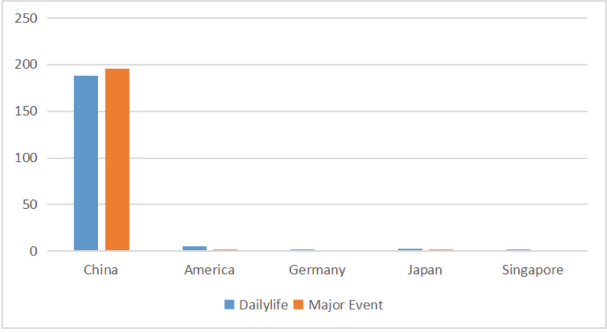
There is a wide range of activities available within the park. With the comfortable facilities provided by Shougang Park North and its internal amenities, a diverse group



Graph 1. The different occupations of the demographic groups identified in the sampling survey

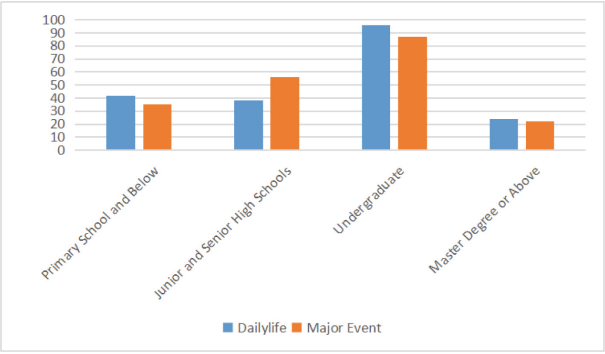


Graph 2. The different ages of the demographic groups identified in the sampling survey

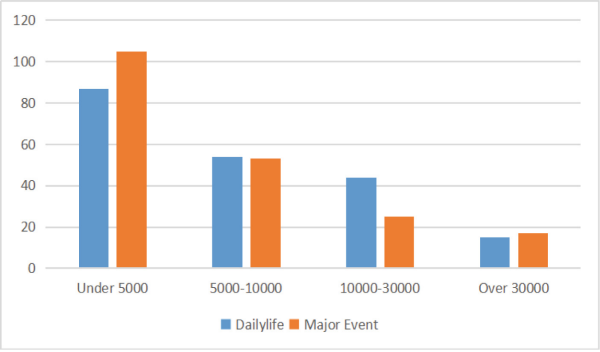


Graph 3. The different nations of the demographic groups identified in the sampling survey

of individuals are attracted to engage in various activities such as watching movies, enjoying dramas, shopping, and more, like Fig. 6. Culture-related exhibitions and social interactions can be hosted on the large steps connecting different buildings and scattered platforms and commercial boxes on different levels. Four sedimentation tanks separate the commercial space and the winter training center, while the steel-frame pedestrian



Graph 4. The different educational background of the demographic groups identified in the sampling survey



Graph 5. The different incomes of the demographic groups identified in the sampling survey

Fig. 5. Diverse population in the Shougang Park North Area

bridge in an industrial heritage style, with a streamlined terraced boundary, provides a theater stand and rest facilities for the public [23]. The Six Works shopping center also accommodates activities such as dining, shopping, partying, family-oriented sports, and experiential consumption. Additionally, the park has hosted major events such as the Winter Olympics [24] and the China International Fair for Trade in Services.

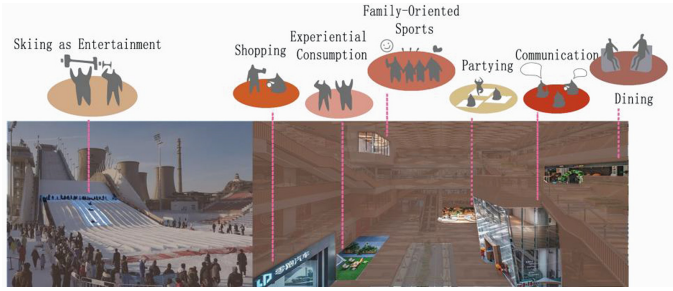


Fig. 6. Activities that can be carried out in Shougang Park

3.3.5 Scene Value Features

In terms of scene shaping, the Shougang Park North Section has preserved and created a significant number of buildings and structures that provide a sense of authenticity, legitimacy, and drama for visitors. The authenticity of the North Section is reflected in the preservation of industrial buildings and structures within the park, while the legitimacy is demonstrated through the creation of spaces and functions for different groups and activities. The drama is evident in the enormous production buildings and equipment that break the typical size and volume of buildings and create a unique aesthetic. The May 1st Theater (Fig. 7), due to its unique historical and cultural value, preserved the original architectural style of the east facade and conducted only minimal interventions and component updates while preserving the integrity and ceremonial feel of the square on the same side [25]. The theater's interior was reinforced with localized shear walls and additional sprayed concrete lining walls to enhance the overall rigidity of the heritage without destroying the original large space atmosphere, thus emphasizing authenticity [26]. The Oxygen Production Innovation Center (Fig. 8) was transformed from industrial relics [27], such as the original 3,350 workshop, 6,500 workshop, 16,000 oxygen production workshop, air separation tower [28], liquid nitrogen tank, gas pipeline, into a space with multiple functions, such as offices, studios, and exhibition halls, reflecting legitimacy [29]. The blast furnace (Fig. 9) houses numerous technological relics and fully retains the industrial characteristics of a tall and sturdy furnace body. Various observation ports, water inlets, hot air, coal injection, oxygen, nitrogen, water cooling pipelines, and maintenance bridges and platforms [30] present a dazzling scene of an industrial complex system, emphasizing the drama.

The park emphasizes the shaping of cultural value, which is a product of long-term interaction between users and various material bases within the park, reflecting and reflecting cultural values and beliefs.

Fig. 7. The May Day Theater preserves the original architecture to the greatest extent, showcasing the contrast between the old and the new

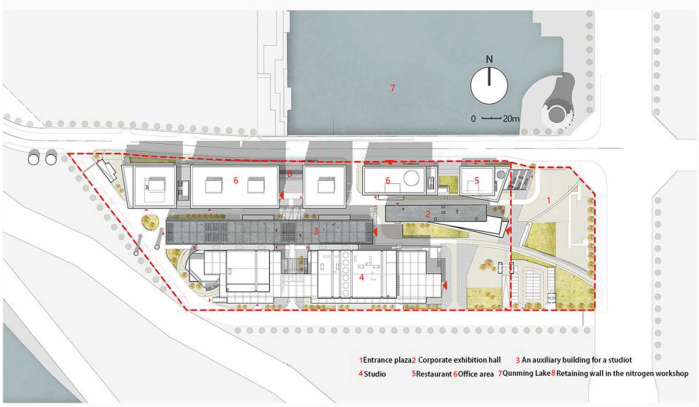


Fig. 8. The different functions established in the Oxygen Production Innovation Center

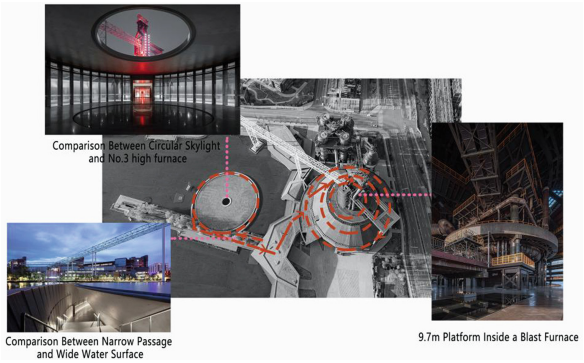


Fig. 9. The interior of the blast furnace museum is full of contrasts

4 Conclusion

The transformation of the northern section of Shougang Park is one of the important cases in the protection and reuse of industrial heritage. It is worth analyzing and studying. By introducing the theory of scene, the elements in the industrial heritage are corresponded, summarized and the reference value of the case for subsequent research is explored.

Through analysis, subsequent industrial heritage transformation should focus on creating industrial heritage parks with multiple functions, enriching spatial changes; paying attention to consumer and entertainment demands, providing new offline experiences, and enhancing cultural appeal. This article needs further improvement in researching different types of industrial heritage transformation. It is hoped that it can provide a new perspective for the theoretical development of industrial heritage, enrich relevant research, meet people's cultural consumption needs and value demands in the process of urban renewal and development, realize benign interaction between people and buildings, and drive urban renewal and development.

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