

## Original Paper

# Research on Landscape Protection of Urban Railway Industrial Heritage Based on Zhengzhou Railway Industrial Park Project

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*Henan Province philosophy and social science planning project (Project Number: 2020CYS045 ); PhD Research Fund Project of Zhengzhou University of Light Industry (Project Number: 2020BSJJ020); Henan Province humanities and social science research project (Project Number: 2021-ZZJH-447).*

Received: December 6, 2021

Accepted: January 12, 2022

Online Published: January 17, 2022

doi:10.22158/assc.v4n1p10

URL: <http://dx.doi.org/10.22158/assc.v4n1p10>

### Abstract

*With the development of urbanization and urban industrial relocation, the remaining special railway lines are increasingly deserted and block the organic integration of urban space. As a material element of urban industrial culture, the abandoned railway line carries a profound industrial history and diverse cultural features. As a materialized industrial heritage, it also provides more feasible ways for the expansion of urban public space, ecological environment governance, and the renewal of industrial abandoned land. Through the analysis of domestic and foreign urban abandoned railway industrial landscape protection and redevelopment related cases, summarizes the landscape protection strategy: protect the original site form, reduce the later artificial intervention traces, reflect the beauty of existing industry, reshape the cultural landscape, reengineering industrial period historical scene, with dynamic railway line and its urban vitality, promote the industrial abandoned site function self innovation. Finally, according to the Zhengzhou Railway Industrial Park project as an example, through the analysis of its site transformation, style protection and functional renewal design strategies, to explore the reasonable application of the above key points, which is of guiding significance for the industrial cultural protection of the abandoned urban railways and the construction of landscape parks in China.*

**Keywords**

*urban abandoned railway, industrial heritage, landscape protection and integration, Zhengzhou Railway Industrial Park*

**1. Preface**

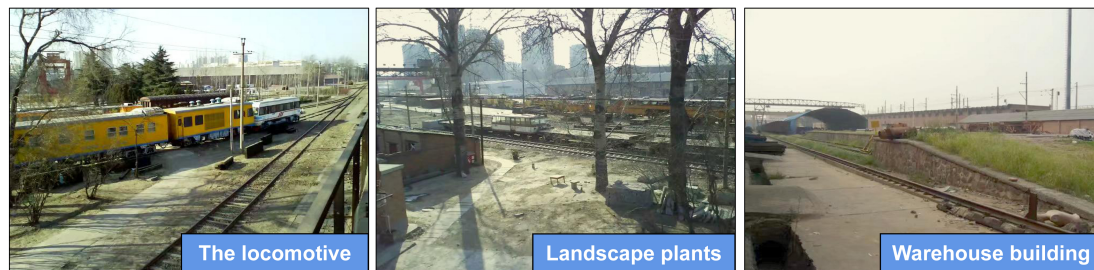
Since the birth of the first railway in Britain in 1825, railway transportation has become a popular travel choice, and has played an important role in urbanization expansion, industrial construction and industrial transformation. With the large-scale urban industrial construction, a large number of dedicated railways are laid with its passenger and cargo transportation, while providing convenient transportation for the factory also becomes the urban separation line, and is included in the urban areas in the promotion of urbanization, causing problems to the organic integration of urban areas and environmental governance. Today, with the sound development of three-dimensional logistics and urban bus, the passenger and cargo transportation function of the special railway is gradually weakened, and gradually abandoned with the factory relocation and transportation optimization. The barren railway and surrounding sites have brought many problems to the urban development.

In China, many special railways started with the socialist industrialization construction in the last century, and formed a strong industrial atmosphere in the railway and its surrounding areas. It is not only the component element of urban industrial heritage, but also the material witness of urban historical changes, with precious characteristics of The Times and cultural values. In the expansion of urbanization and modern style today, reasonable retention and scientific development of abandoned industrial railway, make abandoned railway and site through design transformation and urban development, organic life, inheriting its connotation of the time characteristics, industrial culture, design aesthetics, is not only for the planning department, designers professional problems, is also inclusive protection of urban landscape, diversified new way to create an urban environment.

**2. Railway Industrial Heritage and Its Landscape Protection and Utilization****2.1 The Concept of Railway Industrial Heritage**

Special railway is a transportation facility serving industrial production. Through the cross-regional and multi-node series factory and the main railway network, a long-distance and large-scale traffic space is formed. Combined with its transportation coordination of the natural and cultural environment along the line, it constitutes a special landscape integrating industry, transportation and nature (Figure 1). Different from the rapid innovation of the railway main railway network, dedicated railway is given priority to meet the basic transportation, its own technology upgrading and environmental innovation is less, retained the long industrial community and its historical features, from society, literature, history, landscape, architecture, transportation and other perspectives to explore urban industry, cultural history, art aesthetics is of great significance. Railway industrial heritage covers a wide range of contents, involving site landscape, site construction, transportation facilities, tools and equipment, corporate

culture, spirit of The Times, historical allusions and other material and intangible content, It is an industrial historical wealth covering a wide range of, space-time linkage and far-reaching connotation for the city.



**Figure 1. Special Railway System Composed of Multiple Elements**

*Resource:* Author photo and drawing.

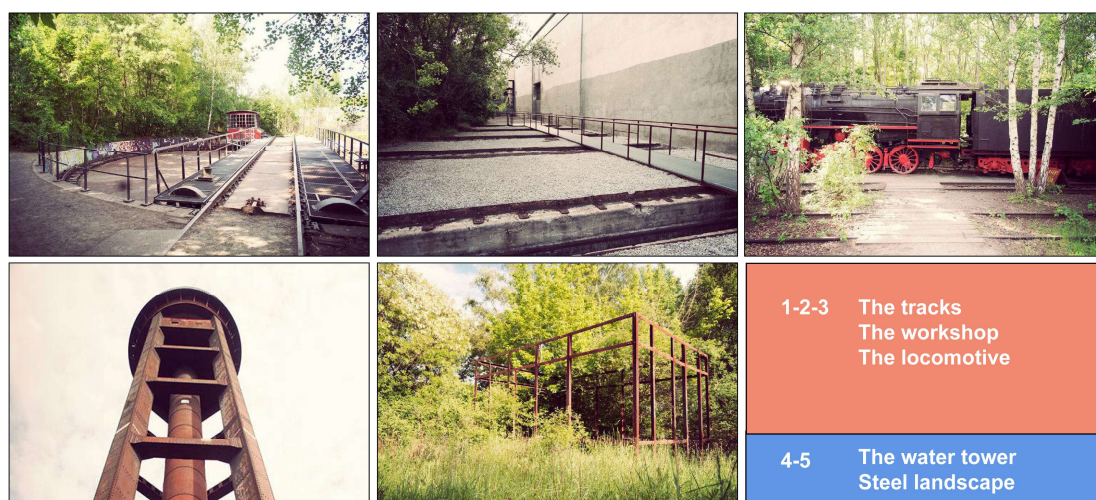
## *2.2 Landscape Protection and Utilization of Railway Industrial Heritage*

The increasingly severe urbanization problem has provided more opportunities for the transformation and utilization of railway industrial heritage. At present, domestic and foreign cities have carried out a number of abandoned railway landscape corridor transformation projects, which have achieved good social response. The industrial revolution and railway transportation were carried out earlier in European and American countries, and the rich research on the protection and development of railway industrial heritage has formed the guiding ideology and design method of the integration of “retention, governance and creation”, and successful experience was accumulated through transnational linkage. For example, the Green shade Walk (Promenade Plantee) in Paris, France, is the world’s first landscape project to use abandoned railway bridges, and its design experience has had many effects on the design of New York High Line Park (High Line Park). While learning from foreign experience, domestic railway industrial heritage also actively carries out the design practice of combining landscape protection and utilization, such as Beijing Beijing-Zhangjiakou Railway Site Park and Jingkou Railway Park, trying to integrate railway industrial heritage into urban functions and people’s life through design transformation. At present, the landscape transformation and utilization of railway industrial heritage at home and abroad reflect the following characteristics:

### *2.2.1 Native Element Retention and Environmental Creation*

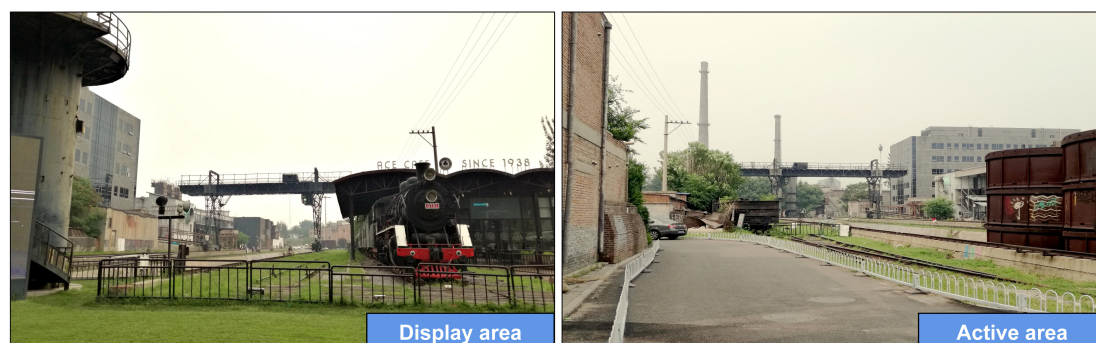
The exhibition of artifacts is the main way to protect the collection of railway industrial heritage cultural relics. By removing the cultural relics from the original sites and transferring them to the designated venues for display, the realization of comprehensive protection of cultural relics is achieved. For example, in the locomotive Exhibition Hall of Beijing Railway Museum and the History Exhibition Area of Zhengzhou Erqi Memorial Tower, this way makes the cultural relics “disconnect” with the original environment and historical background, breaking the cultural integrity of objects, venues and atmosphere. Therefore, through the local or overall restoration of the original site, and the reshaping of

the vitality of the site by means of functional replacement and environmental renewal, to achieve the organic integration of modern life, it has become the main choice of the current railway industrial heritage landscape protection and reconstruction. For example, Sudgelande Railway Cultural Park in Germany was built on the original site of Tempelhof of dispatching site. The project retains and uses the original elements such as railway, platform, maintenance room, office building and water tower to become the park scenic spots, and the abandoned steel frame, beams and columns are rebuilt in artistic sculpture to enrich the cultural vitality of the park (Figure 2); Domestic such as Beijing 798 cultural creative park (train block) project also focus on the original environment protection of railway industrial heritage, square planning cultural activity area and traffic channels, retained the huge gantry crane, steam locomotive and carriages, warehouse, and other markers, and fence isolated the north boiler room, smelting area, form real (touchable) virtual (untouchable) combined environment, strengthen the real experience of the original industrial landscape (Figure 3).



**Figure 2. Sudgelande Railway Cultural Park, Germany**

<https://huaban.com/boards/27450252/>



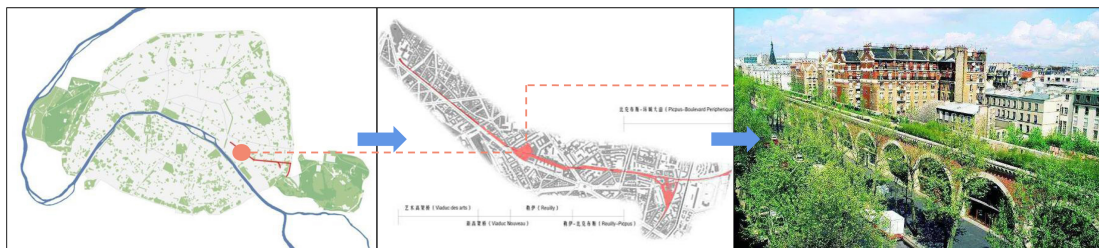
**Figure 3. Train Block of Beijing 798 Park**

*Resource: Author photo and drawing.*



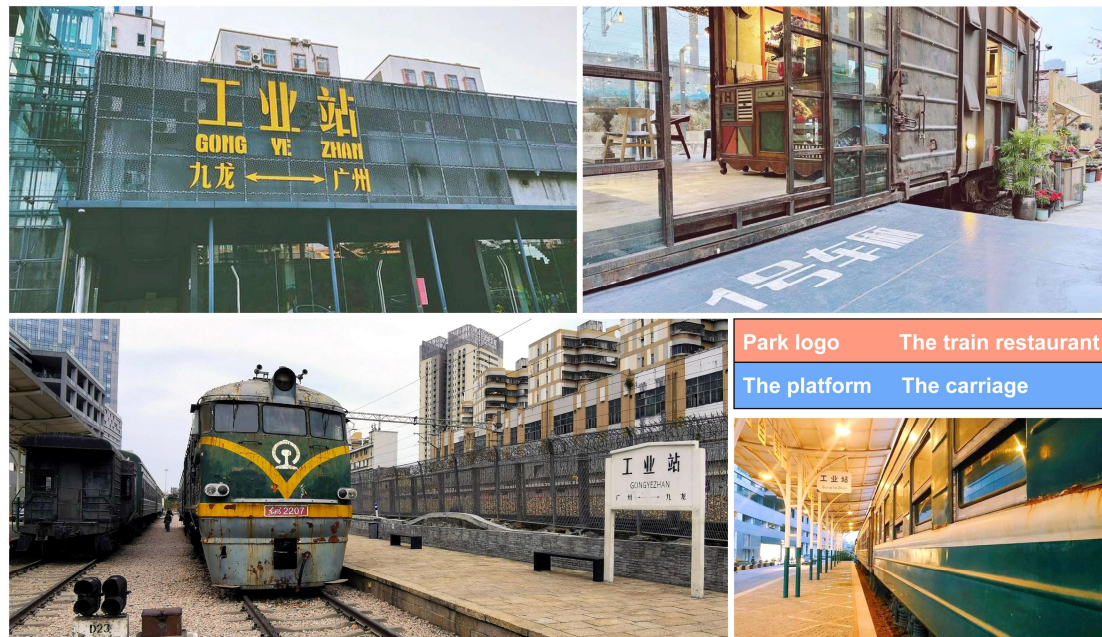
### 2.2.2 Site Functional Transformation and Comprehensive Development

Emotional resonance is an important way to improve people's awareness of industrial heritage protection. Industrial heritage is not only the material retention of industrial construction, but also a spiritual record of social changes and eventful years. Therefore, it also seeks the protection demand of material and nonmaterial combination for railway industrial heritage. While retaining the original site intact, new theme activity areas will be created through functional transformation and comprehensive development to improve the comprehensive experience of the public and the site environment, interact organically from audio-visual perspectives, guide their active understanding of railway culture and industrial heritage, and enhance their influence and publicity on the public. For example, while retaining the railway space, Paris, France set up commercial, cultural and catering functional areas through life and artistic transformation, which effectively uses the site space and enriches the interest and entertainment of tourist activities, and provides opportunities for the optimization of the old city environment and social re-employment (Figure 4); For example, Shenzhen Qingshuihe Industrial Station, as a railway cultural park in the bustling city, retains the main facilities of the station in the design, and the railway tracks, platforms, locomotives and freight carriages are transformed to shape a new node of the urban landscape to protect the original industrial style, and become the “web celebrity punching place” for the public (Figure 5).



**Figure 4. Green Shade Trail in Paris, France**

*Resource:* The author arranges and draws.



**Figure 5. Shenzhen Qingshuihe Industrial Station Railway Cultural Park**

[http://www.360doc.com/content/19/0819/23/45737231\\_855936800.shtml](http://www.360doc.com/content/19/0819/23/45737231_855936800.shtml)

### 2.2.3 Passenger Transport Function Repair and Tourism

Passenger and freight transportation is the core function of industrial railway, for abandoned industrial railway landscape protection and commercial intervention, help to restore its original traffic function, in the form of sightseeing train will be abandoned railway from static to dynamic, become the railway industrial culture mobile display platform, this way can effectively use the existing railway facilities to meet the market demand, in the development of emerging tourism resources while reduce railway industrial heritage waste, damage, in order to improve the old city vitality and employment rate. For example, in Japan, due to its developed railway transportation, the development of industrial railway heritage is mainly tourism, and SL steam tourism trains running on Jingchuan Line are mainly played by “Showa Culture”. Tourists enjoy the beautiful natural scenery along the way while experiencing the history (Figure 6); By its enlightenment, domestic such as Heilongjiang birch south forest railway is given priority to with the northeast forest scenery, the project contains 628 tons of steam locomotive and complete railway line, equipment plant, forest railway transport a complete set of architecture and forest railway facilities, equipment and other core items, visitors enjoy the natural beauty at the same time can also experience the original industrial history (Figure 7). With the urban ecological environmental protection, tourism transportation requirements, the use of abandoned old tram development tourism train for urban railway industrial heritage development provides a new choice, this is the flexible use of the original railway resources, is also the active exploration of local industrial heritage tourism development, for abandoned railway itself is also a kind of vitality. For example, the re-use of electric railway trains in Fushun, as one of the characteristics of industrial tourism projects,

not only uses the original railway facilities and human resources, but also injects new vitality into the development of urban tourism. Tourists can have a panoramic view of the brilliant industrial history and urban scenery of Fushun when taking the bus.



**Figure 6. Sightseeing Train of Jingchuan Line and the Scenery along the Way**

<http://quan-riben.cn/zh-tw/amp/article/7127/>



**Figure 7. Huannan Forest Railway and the Scenery along the Way**

<http://tour.dbw.cn/system/2019/12/20/058306363.shtml>

### **3. Key Planning and Design Points of Railway Industrial Heritage**

#### *3.1 Protect the Original Features and Reflect the Beauty of the Existing Industry*

As a transportation facility, the special railway is an important component of cooperating with the production and operation of the factory, and its site style, architectural style and environmental characteristics are highly consistent with the factory. The protection and development of railway industrial heritage should be an important part of the overall planning of industrial heritage, properly retain the original features of the site to continue its historical context, reduce or cancel the non-unnecessary artificial intervention traces, and protect the original and rough industrial characteristics of the site. At the same time, as a popular, open urban public places, appropriate site repair and design update is also necessary, in the track, vehicles, crane, platform, building, signal, turnout, crossings, publicity column on the original facilities at the same time, also to damage to damaged and characteristic buildings, facilities, improve cultural ornamental, and through humanized design to introduce new service function, ensure the safety of the people and increase the interest of

play. In addition, some of the seriously damaged buildings and equipment without protective value can be removed and implanted with new site functions, and cooperate with the urban reconstruction of the industrial zone of the old city by creating a new environment.

### *3.2 Remodel the Cultural Style and Recreate the Industrial Historical Scenes*

The characteristic theme is the design focus of the cultural and creative park. The landscape protection design of the railway industrial heritage should not only maintain the original industrial style, but also strengthen the theme in the scene shaping. The railway elements can fully inject the historical scene of the special railway for the factory, and reproduce the memory of the past place with the artistic landscape. In the design, primary and secondary logic can be arranged to arrange play routes, “main line”, “main line and 2 branch” and “main line” according to the site scale, and all kinds of exhibits can be arranged on the line, not only to improve the appreciation of the scene, but also conform to the narrative structure, and improve the overall industrial style and cultural atmosphere of the place. At the same time, can use the original construction facilities to develop new play projects, in the factory staff canteen, reading room, stadium introduced leisure catering, city book, intelligent fitness functions, break through the original viewing experience, make people deeply, enjoy life, for the railway industrial heritage into modern vitality, into the urban function.

### *3.3 Combination of Static and Static Interpretation to Promote the Innovation of the Site and Facilities*

While protecting the railway industrial heritage from the outside world, the railway system with intact structure and complete facilities can be tried to restart its traffic function, and deduce the vivid railway industrial heritage in the combination of dynamic and static way. Through the development of special industrial tour trains, it not only uses the idle railway system and reproduces the industrial historical landscape, but also helps to repair the environment along the line, integrate into the urban transportation infrastructure, and drive the reemployment of enterprise employees. At the same time, the old railway traffic passenger transport is not a simple restart railway system, vehicle facilities, for seriously damaged sections, signal facilities and railway vehicles, need to plan wiring, new equipment, introduce new energy train, this is the government, enterprises, social common problems, but also the planning department, tourism department, producers, academia through site facilities innovation guide railway industrial heritage revival and involved in the new opportunities of urban renewal.

## **4. Design and Analysis of Zhengzhou Railway Industrial Park Project**

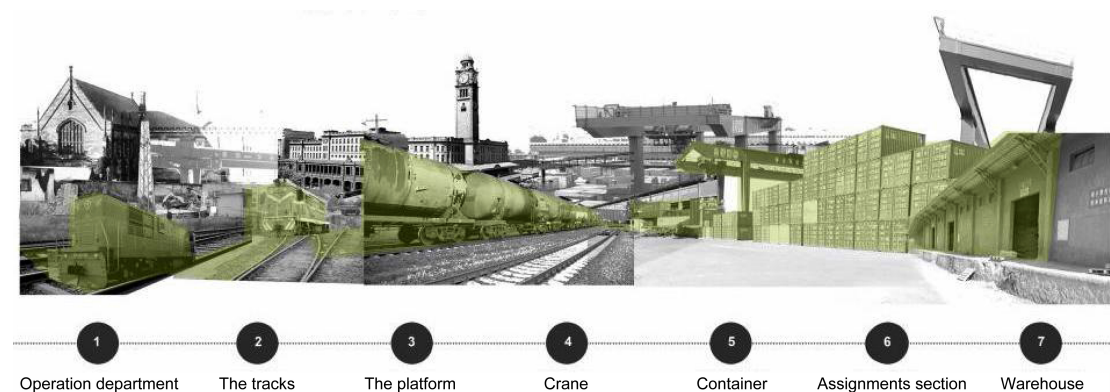
### *4.1 Project Overview*

As the capital of Henan Province, Zhengzhou is an important transportation hub and industrial center in central China. The Beijing-Guangzhou Railway and Longhai Railway meet here and extend a number of special railways distributed in the urban areas. With the reconstruction of Zhengzhou's old urban area and the relocation of factories, the remaining abandoned railway blocks the urban integration and construction, bringing about problems such as transportation, environment and people's livelihood. Based on the important contribution and historical significance of railway transportation in the modern



and modern development of Zhengzhou, the appropriate retention of abandoned railway land and transformation into urban park has become a reasonable choice to balance urban development and cultural protection, and the design project of Zhengzhou Railway Industrial Park planned by Zhengzhou University of Economics and Trade is a positive response to it.

The project is a park transformation of an abandoned material factory in Erqi District, Zhengzhou. The project has a superior geographical location, convenient transportation, surrounding communities, schools, enterprises, and a relatively dense population but a lack of outdoor activity places. The project is planned to use about 6 hectares, including the train parts production workshop and abandoned railway tracks, with a construction area of about 0.38 hectares. The target population is the surrounding residents, enterprise groups, tourists to Zheng, etc., which can accommodate 1,500 people to enter the park at the same time. In order to meet the needs of people at different levels, the project mainly builds an ideal industrial park integrating railway culture, creative exhibition and waterfront leisure (Figure 8).



**Figure 8. Analysis of the Site Status**

*Resource:* Zhengzhou University of Economics and Business.

#### *4.2 Park Planning*

The theme of railway industry is the main characteristics of the park. In this regard, the design scheme is mainly composed of three sections of building, square and waterfront. Using landscape design techniques, the space is mainly divided into railway industrial landscape square and urban waterfront leisure space. In the overall planning and design, on the basis of fully respecting the natural ecological wetlands and land, more attention is paid to people's personal experience and visual feelings after entering the space. At the same time, the railway facilities and waterfront space are the main design objects, and the two present the main secondary order, static separation and orderly space art (Figure 9).





**Figure 9. Overall Design of the Park**

*Resource:* Zhengzhou University of Economics and Business.

#### *4.3 Landscape Construction*

The entrance of the park is a simple and simple industrial style, with the overall color of gray. The entrance square adopts concrete and square brick, which is more harmonious with the red corridor frame, and loses the industrial style. In this space, the Qiao irrigation grass collocation is reasonable and orderly to complement each other, bringing landscape vitality to the industrial theme of the park (Figure 10). The industrial wind art corridor area is at the connection between the entrance and the garden, allowing people to feel the railway culture while entering the park to enjoy the scenery (Figure 11).



**Figure 10. Design of the Park**

*Resource: Zhengzhou University of Economics and Business.*



**Figure 11. Design of the Art Gallery Frame**

*Resource: Zhengzhou University of Economics and Business.*

- The train exhibition area makes tourists intuitively feel the railway theme culture. The designer will reuse the abandoned rails, and maximize the use of existing resources and intensive design costs while reflecting the design theme and beautifying the park, so as to realize the sustainable use of the site resources. And in the use of waste steel design for the sports running villain sculpture, so that the space is full of dynamic and vitality. In the cut facade design, steam locomotive mainly to show the railway memory, the train black painting more age, beautiful and clear theme, matching mechanical gear for obvious sign of industrial style, in gear design, the middle dial instead of gear plate, more reflected as a blend of industrial wind and modern style



(Figure 12).



**Figure 12. Design of the Train Display Area**

*Resource:* Zhengzhou University of Economics and Business.

The design theme of the landscape gear square is “Industrial hot land, Urban Memory”, so that tourists can review the railway memory after walking, and have flower beds, seats, lamp posts and other landscape sketches. The square Joe irrigation grass adopts the collocation technique of high and low scattered to make the space more harmonious and orderly, and the design technique of near real and far real is virtual to open the hierarchical relationship and have a stronger sense of substitution (Figure 13).



**Figure 13. Design of landscape Gear Square**

*Resource:* Zhengzhou University of Economics and Business.

The wind and rain corridor waterfront footpath pays attention to the hydrophilic function in the design. The red iron gallery frame can not only block off the wind and rain, but also highlight the space height and enhance people's visual feeling. The footpath is mainly for visitors to enjoy water. While enjoying the waterscape, feel the railway culture, the riverbank has slope protection, and plant vegetation for landscape construction and wind protection. The light post on the footpath and the wind and rain corridor are more industrial color, highlighting the design theme (Figure 14).



**Figure 14. Waterfront Trail Design**

*Resource:* Zhengzhou University of Economics and Business.

#### *4.4 Design and Analysis*

Zhengzhou railway industrial park project to “retain the history, heritage context, functional innovation” as the design theme, through artificial landscape of the industrial site, natural landscape, retain the abandoned railway elements, the original industrial features at the same time to create a new natural landscape and artificial sketch, the train, rail, sculpture, square, waterscape landscape fully communion and intertwined with urban space. At the same time, the development of artificial water system introduces the urban river channel into the park, forming a self-circulating water feature system, which effectively deals with the urban environmental problems. Zhengzhou Railway Industrial Park project pays attention to the integration of railway industrial culture and natural ecology, but also considers the future development needs of the city, and obtains social recognition with the time and space construction of the combination of movement and movement. In addition, the designer adheres to the principle of sustainability, retains the original landform to the greatest extent, and designs the landscape sketch locally, while reasonably controlling the development cost, and creates an open city garden with rich artistic conception and natural simplicity.

## 5. Summary

Railway is the lifeline of urban operation and development. In today's development of three-dimensional intelligent transportation, industrial transportation has shifted to diversified modes of transportation, and the traditional special railway has been gradually abandoned, which brings transportation, environment, people's livelihood and other problems to the urbanization construction. As a part of urban industrial heritage, abandoned railway and site also contains rich cultural characteristics and unique industrial atmosphere, for the protection of industrial heritage development should not ignore the research of abandoned railway, develop railway industrial heritage helps from history, culture, aesthetics, environment, people's livelihood and other aspects to reshape the urban style, continue the urban context, and expand the direction of diversified urban design. To develop the railway industrial heritage from the perspective of landscape protection, we should pay attention to protecting its original features, reshape the industrial historical scene, innovate the original facilities by combining static and static methods, integrate the urban functions and people's life through design and transformation, and inject new vitality into the railway industrial heritage.

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