



Integration of Industrial Heritage Protection and the Utilization in Architectural Graduation Design

—A Case Study on the Protection and Renewal Planning and Design of Yiliang Station on the Yunnan-Vietnam Railway

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Abstract. In this paper, we explore the potential of integrating industrial heritage protection and utilization into the graduation design of architectural projects. We conducted a detailed case study analysis on the protection and renewal planning and design of Yiliang Station on the Yunnan Vietnam Railway. After reviewing the theoretical basis of industrial heritage protection, we assessed the historical and current condition of Yiliang Station on the Yunnan Vietnam Railway and proposed a specific design scheme with feasibility analyzed based on the selection principles of architecture graduation design. According to the research results, it is indicated that the integration of the protection and utilization of industrial heritage into the architectural graduation design improves students' professional abilities development, enhances their social responsibility, and effectively promotes the protection and utilization of industrial heritage.

Keywords: Industrial heritage protection, architecture, graduation project topic selection, Yunnan Vietnam Railway, Yiliang Station, teaching reform.

1 Introduction

Industrial heritage represents a crucial intersection of historical preservation and contemporary urban development, embodying both cultural memory and adaptive reuse potential. As a core component of architectural education, graduation design projects provide an ideal platform for exploring these complex challenges while developing students' professional competencies. This study examines the integration of industrial heritage conservation into architectural pedagogy through the case study of Yiliang Station on the Yunnan-Vietnam Railway—a site of profound historical significance facing urgent renewal needs amid rapid urbanization.

The research adopts a multidisciplinary approach, combining heritage conservation theory, field investigations, and design experimentation to develop adaptive reuse strat

challenge, the project demonstrates how pedagogical frameworks can simultaneously advance heritage preservation goals and cultivate critical design skills.

Ultimately, this study contributes a replicable model for architectural education, showing how industrial heritage projects can bridge theoretical knowledge and practical application while fostering social responsibility. The Yiliang Station case exemplifies how thoughtful design interventions can transform marginalized industrial sites into vibrant cultural hubs, ensuring their continued relevance in sustainable urban futures.

2 Research Background

2.1 Research Rationale

As a significant core course in architectural subjects, graduation design serves as a comprehensive teaching platform for students to transform professional skills into practical applications. It also assures that the students meet the highest graduation requirements in the profession. Building on the completion of the prerequisite courses, the graduation project of architecture integrates basic knowledge and professional skills. It focuses on practical application and the enhancement of professional skills and comprehensive literacy. In this way, the students cannot only enhance their ability to learn complex architectural design problems but also grasp more comprehensive abilities.

The architecture graduation project of Kunming University of Science and Technology covers a wide range of topics over the years, including residential building design, public building design, commercial building design, urban and rural planning and design, historical building protection and renovation, cultural and regional building design, and so on. The topic of industrial heritage protection and utilization is an evolving subject, covering various aspects of knowledge such as architectural design, structure, materials, environment, culture, and so on. Students need to independently complete the entire process starting from research scheme design to achievement presentation, providing solutions to practical problems. Based on the real project site and project background, students are encouraged to propose innovative design solutions and demonstrate their unique design thinking.

2.2 Protection and Utilization of Industrial Heritage

Since the 18th National Congress of the Communist Party of China (NCCPC), the Party Central Committee has recognized the protection of historical and cultural heritage as a core foundation for the promotion of cultural inheritance and development. In the new era it has made systematic planning and deployment to promote historic achievements and transformation in historical and cultural heritage in the new era. As an important component of historical and cultural heritage, industrial heritage covers a wide variety of legacy and has a huge volume despite its recent emergence. Besides, it is closely related to the transformation and development of urban and rural construction. With relevant research conducted, identification, protection, and utilization of industrial

heritage, we are sure to maintain urban roots, improve the urban environment, and enhance urban living functions.

In particular, railways have long been regarded as a symbol of the modern industrial revolution. The railway is at the core of various industrial sectors, including warehousing and other production and living functional areas that rely on railways. Many railways and adjacent areas have transitioned from the "spatial boundaries" to important strip corridors within the main urban area in terms of location conditions due to rapid urbanization, spatial organization expansion, structural changes, regional transportation system adjustments, production and lifestyle changes, and other factor However, in terms of functionality, when the initial function disappears or weakens, those areas face the issue of "marginalization." Thus, it is urgent to carry out overall renewal and utilization. In the context of the new development stage, innovation in the overall protection strategies of railway heritage and surrounding areas has become a new issue that needs to be addressed in China's urban renewal.

The Yunnan Vietnam Railway, as a significant industrial and cultural heritage in Yunnan Province, holds high historical and scientific value. Its protection and utilization not only help preserve a precious historical heritage but also promote related research and promotion of this history, enhancing public historical awareness and establishing cultural identity. Developing tourism along the Yunnan Vietnam Railway is also considered an important means to promote the high-quality development of Yunnan's overall tourism industry, which can integrate a large amount of tourism resources in central Yunnan, eastern Yunnan, and border areas, thus forming a world-class tourism economic belt.

In the context of establishing cultural confidence, in this study, we focus on the protection and reuse of industrial heritage in the preservation and inheritance of historical and cultural heritage. By taking the Yunnan Vietnam Railway as our case study object, we research and analyze its important stations, explore the overall protection strategy and revitalization and reuse of the Yunnan Vietnam Railway heritage and surrounding areas in urban renewal in the principles of comprehensiveness, independence, practicality, and innovation.

3 Theoretical Basis and Methods

3.1 Theoretical Basis and Methods of Industrial Heritage Protection

This study is conducted based on the basic theories and methods of protecting and developing railway architectural heritage both domestically and internationally. We build upon the basis of understanding the principles and theories of protection and renewal of railway heritage and architectural heritage. We also integrate relevant examination of the planning of individual functional replacement, regional revitalization and renewal, contextual and spatial weaving and patching strategies, and internal spatial architectural and enclosure structure architectural design methods for the reuse of railway architectural heritage.

3.2 Investigation of the Historical Background and Current Situation of Yiliang Station on the Yunnan Vietnam Railway

We have conducted a comprehensive literature review on relevant research, books, and other materials on the Yunnan Vietnam Railway in China and the world. To fully understand the current status and trends of research in China and around the world, we organize and summarize existing relevant research theories and practical achievements. We also conduct research on station location and traffic conditions, including location, highways, train stations, and information infrastructure. On-site research was done on the current status of railway heritage, including station buildings and ancillary buildings, railway structures, railway facilities, railway communities, and so on. We also evaluated cultural heritage and tourism resources, including the background of cultural resources and their potential to transform cultural resources. Examination of the current status of infrastructure is also conducted, including infrastructure, public service facilities, and cultural and tourism service facilities.^[1] Lastly, we investigated the integrated development of the cultural and tourism industry, including project construction, product development, tourism route design, and the development of cultural and creative tourism products. Based on the above research and related findings, we integrate them into a complete research report, serving as the basis for subsequent design research.

3.3 Strategies and Designs for Protection and Utilization

Based on the principle of heritage protection, we explore how to reasonably develop and utilize the Yunnan Vietnam Railway. One of the potential approaches is tourism development. By creating a Yunnan Vietnam Railway cultural theme park, we can attract tourists to experience the historical and cultural significance of the Yunnan Vietnam Railway. Alternatively, some of the ancillary buildings of the Yunnan Vietnam Railway can be transformed into creative industry parks to attract innovative enterprises and talents and promote the growth of cultural and creative industries. Also, the Yunnan Vietnam Railway can be integrated into the renewal of surrounding cities. By doing this, we can build on the Yunnan Vietnam Railway to drive infrastructure improvement, economic development, and environmental optimization in the surrounding areas. In addition, it is also possible to consider transforming some railway facilities into cultural exhibition halls, museums, and other constructions to better preserve and promote the historical and cultural value of the Yunnan Vietnam Railway. These strategies aim to form specific protection and reuse strategies and protection and renewal planning and design schemes for 1-2 stations.

The specific research process and framework are shown in the following figure 1:

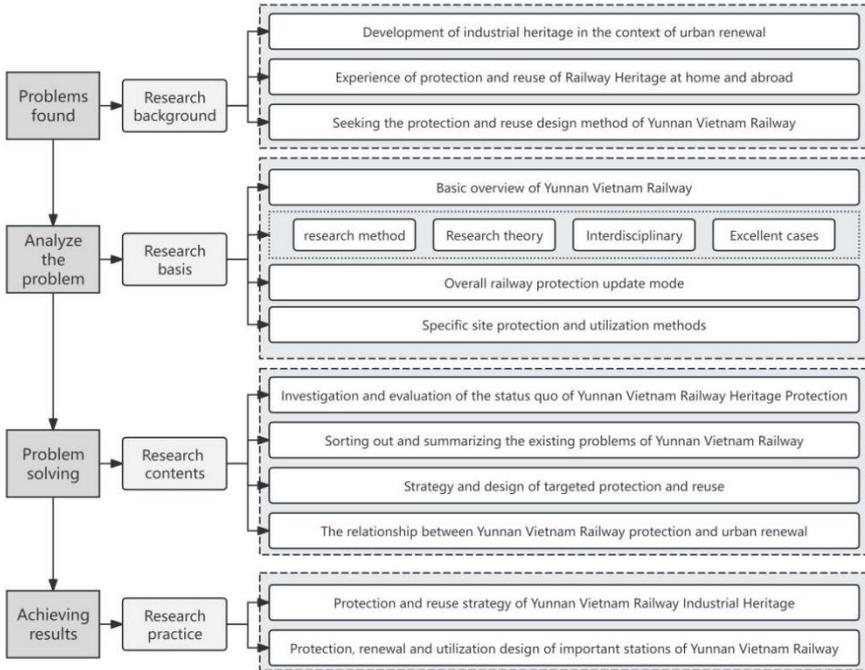


Fig. 1. Research process and framework diagram

4 Benefits of the Protection and Renewal Planning and Design of Yiliang Station on the Yunnan-Vietnam Railway

4.1 Benefits of Cultural Inheritance and Education

The construction of the Yunnan Vietnam Railway helps demonstrate the social conditions of modern China, from its early development under French colonizers to its later role as a driving force for China's development. This process can inspire Chinese people's patriotism by reviewing the history and Chinese people's spirits. At that time, when China was facing foreign aggression, it was the foreign forces who intervened in the construction of the Yunnan Vietnam Railway. However, later, the Chinese people effectively used this railway as a platform to promote national development, such as the establishment of the Southwest Associated University. All these have reflected the tenacity and wisdom of the Chinese people, triggering pride in Chinese people in terms of the development and progress of their motherland and thus inspiring patriotic feelings.

4.2 Benefits of Economic Development and Tourism Promotion

The protection and utilization of the Yunnan Vietnam Railway have significant strategic significance for promoting the high-quality development of Yunnan's tourism industry. The Yunnan Vietnam Railway serves as a link to the diverse tourism resources, including the breathtaking natural scenery and rich cultural connotations scattered on the mountainous land of Yunnan across scattered on the mountainous land of Yunnan mountainous regions. Its geographical advantage transformed the railway into a world-class tourism economic belt. In addition, many areas along the Yunnan Vietnam Railway are linked to high mountains, deep valleys, and areas with limited transportation, which are mostly underdeveloped and lack effective industrial driving.^[2] Thus, tourism development along the Yunnan Vietnam Railway can effectively promote the economic and social development of underdeveloped areas along the route.

4.3 Benefits for Urban Renewal and Community Development

By implanting finger-shaped penetrating service facilities and open spaces, it is possible to transform the negative state of the surrounding urban space. Instead of a closed transportation connection space, those railways can be transformed as a platform linked to multidimensional urban life experiences. In addition, by optimizing the urban structure, we can better plan the land use of cities on both sides of the route, combining it with renewable opportunity land to lay public services, culture, tourism, and other functions. This can comprehensively improve the quality of the urban environment, drive people's attention and cultural appreciation of land along the railway route, improve the urban vitality network, enrich multi-dimensional urban life experience, and protect and reuse industrial heritage, driving urban renewal and community development.^[3]

4.4 Benefits of International Cooperation and Cultural Exchange

The Yunnan Vietnam Railway serves as a significant bridge for Yunnan to participate in China's national "Belt and Road" initiative construction. Spanning China and Vietnam, its protection and innovative utilization can become a theme and platform for international cooperation. A joint declaration of the railway as a World Cultural Heritage in collaboration with Vietnam will not only enhance the international popularity of China's Yunnan Vietnam Railway, but also help to enhance cultural exchanges and mutual understanding between the people in the two countries. The protection and utilization of the Yunnan Vietnam Railway requires cooperation among China, France, and Vietnam. Studying international cooperation mechanisms can provide an example for the protection of transnational cultural heritage.

5 Overall Conclusion

Integrating the protection and utilization of industrial heritage into the graduation design of architecture proves to be an effective teaching reform strategy. This approach

not only helps students integrate theoretical knowledge into practical applications, but also cultivates their innovation and problem-solving abilities. Through this approach, students can engage in the historical background, cultural value, and architectural features of industrial heritage in their graduation design. Building on this, they are empowered to propose reasonable protection and reuse plans. This not only enhances students' professional skills, but also strengthens their sense of responsibility and mission towards cultural heritage protection.^[4] In addition, this teaching reform strategy also helps cultivate students' team spirit and communication skills, laying a solid foundation for their future career development.

Through the design and implementation of practical cases, students can better understand the theories and methods of industrial heritage protection. They delve into the stories and spiritual connotations behind industrial heritage, including self-reliance, hard work, patriotism and dedication, and selfless dedication. By doing this, it can provide students with abundant learning materials and practical opportunities. At the same time, the protection and utilization of industrial heritage has various social, economic, cultural, and environmental impacts. Through comprehensive development forms such as industrial museums, landscape parks, and artistic and creative participation, we can better achieve the sustainable development of industrial heritage.^[5] Therefore, through the design and implementation of practical cases, students can not only master the theory and methods of industrial heritage protection, but also cultivate their ability to comprehensively apply knowledge to solve practical problems.

In our case study, the protection and renewal design plan for Yiliang Station on the Yunnan Vietnam Railway not only preserves its historical value, but also endows it with new functions and vitality. Specifically, in the design of the station, we combined the regional characteristics of the Yiliang area and carried out restoration and protective reconstruction of the buildings around the station. At the same time, the existing old buildings, such as factories and warehouses, have been updated, re-designed, and spatially reconstructed, transforming them into facilities such as youth hostels, restaurants, and museums, thus achieving effective protection and rational utilization of railway heritage.^[6] This approach not only preserves the historical and cultural value of the Yunnan Vietnam Railway, but also revitalizes it with new vitality and energy in modern society.

Overall, the research findings provide new perspectives and methods for the teaching reform of architecture majors. This can help cultivate students' professional skills and innovative thinking, provide practical and feasible design solutions for the protection and utilization of industrial heritage, promoting the sustainable development of industrial heritage. Thus, by protecting and utilizing industrial heritage, these strategies can enhance public awareness of historical and cultural heritage and promote harmonious societal development.

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References

1. Bideau G F ,Deng H ,Roux H .Dominant discourses framing the reuse of industrial heritage in the context of mega-events: a relationship matrix approach[J].Built Heritage,2024,8(1):45-45.
2. Andrade J M ,Morales J E ,Ramos R R , et al.Reuse of port industrial heritage in tourist cities: Shipyards as case studies[J].Frontiers of Architectural Research,2024,13(1):164-183.
3. Shunyi W ,Jiayin Z ,Fang W , et al.How to achieve a balance between functional improvement and heritage conservation? A case study on the renewal of old Beijing city[J].Sustainable Cities and Society,2023,98
4. Jiazhen Z ,Jeremy C ,Vincent B , et al.Stewardship of Industrial Heritage Protection in Typical Western European and Chinese Regions: Values and Dilemmas[J].Land,2022,11(6):772-772.
5. S. G ,H. M .RESEARCH ON THE STRATEGY OF INDUSTRIAL HERITAGE PROTECTION AND RENEWAL[J].The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences,2021,XLVI-M-1-2021279-283.
6. Å½ydrÅ«nÅ— MorkÅ«naitÅ—,Darius Kalibatas,Diana KalibatienÅ—.A bibliometric data analysis of multi-criteria decision making methods in heritage buildings[J].Journal of Civil Engineering and Management,2019,25(2):76-99.

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