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The problem of adapting historical railway station buildings for modern use: an overview of international practice

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ABSTRACT The article considers the problem of adapting historical railway stations to modern requirements and functional tasks caused by the development of railway transport and urban growth. Special attention is paid to the historical context, architectural and cultural value of railway stations as important elements of urban heritage. Since the beginning of the 19th century, railway stations, originally created as important transport hubs, eventually became the centers of urban life. By the end of the 20th century, changes in rail transport and requirements for passenger safety and comfort had called into question the expediency of abandoning many historical buildings. The demolition of train stations such as Euston in London and Montparnasse in Paris has led to an awareness of their cultural value. The article analyzes examples of adaptation, including museums and cultural centers, and describes modernization efforts that preserve the original functions of buildings. As examples of successful implementation of this approach, projects are presented that demonstrate the possibility of integrating historical buildings into modern transport complexes in Tokyo, New York, Antwerp, London and Paris. The use of underground space to increase the usable area and the creation of modern transport and transfer complexes is reviewed. The article highlights the increasing historical and cultural significance of railway stations as city-forming facilities and the need to find compromise solutions between the demands of modernity and the preservation of uniqueness.

KEYWORDS: railway transport; railway stations; modernization; museification; architectural monuments; reconstruction; historical buildings

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Научная статья

Проблема приспособления исторических зданий вокзалов для современного использования: обзор международной практики

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АННОТАЦИЯ Рассмотрена проблема адаптации исторических вокзалов к современным требованиям и функциональным задачам, обусловленная развитием железнодорожного транспорта и ростом городов. Особое внимание уделяется историческому контексту, архитектурной и культурной ценности вокзалов как важных эле-

ментов городского наследия. С начала XIX в. вокзалы, изначально созданные как важные транспортные узлы, со временем стали центрами городской жизни. К концу XX в. изменения в железнодорожном транспорте и требования к безопасности и комфорту пассажиров поставили под сомнение целесообразность оставления многих исторических зданий. Снос таких вокзалов, как Юстон в Лондоне и Монпарнасс в Париже, привел к осознанию их культурной ценности.

Проанализированы примеры адаптации, включая музеи и культурные центры, и описаны усилия по модернизации, сохраняющие оригинальные функции зданий. В качестве примеров успешной реализации данного подхода приводятся проекты, демонстрирующие возможность интеграции исторических зданий в современные транспортные комплексы в Токио, Нью-Йорке, Антверпене, Лондоне и Париже. Освещено использование подземного пространства для увеличения полезной площади и создание современных транспортно-пересадочных комплексов. Подчеркнуты возрастающая историко-культурная значимость вокзалов как градоформирующих объектов и необходимость поиска компромиссных решений между требованиями современности и сохранением уникальности.

КЛЮЧЕВЫЕ СЛОВА: железнодорожный транспорт; вокзалы; модернизация; музеефикация; архитектурные памятники; реконструкция; исторические здания

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INTRODUCTION

Since the second third of the 19th century, due to the active development of railway communication, a new type of architectural structure began to take shape – the railway station. As passenger traffic grew, the urban planning role of such buildings rapidly increased. Gradually, they became city highlights, having a significant impact on the social and economic life of the surrounding areas. By the beginning of the 20th century, in large cities, the small stations of the 1830s and 1860s were replaced by monumental complexes, the appearance of which was supposed to embody the national idea of beauty and amaze locals and visitors with its splendor and sophistication. Gare du Nord in Paris (*Fig. 1*), St. Pancras in London (*Fig. 2*), Grand Central in New York, Antwerpen Centraal, Sao Bento in Porto (*Fig. 3*), Chhatrapati Shivaji in Mumbai (*Fig. 4*), are often called “New Century Cathedrals”. Outstanding masters took part in their creation, using advanced architectural, technological and constructive solutions, which makes them unique monuments of their time.

The consistent development of railway transport in the 20th century, with the transition to electric and diesel traction at the beginning, and then with the introduction of high–speed technologies, required significant investments in upgrading infrastructure and rolling stock. In the new conditions, the requirements for passenger safety and comfort have changed significantly, which the historical buildings of railway stations often no longer met. Along with the increased

Fig. 1. Gare du Nord in Paris (France)[1]

Fig. 2. St. Pancras in London (United Kingdom)[2]

[1] https://travelask.ru/system/images/files/001/219/299/wysiwyg/Paris_facade_gare_du_nord.jpg?1541455115
[2] https://fb.ru/media/i/1/8/0/2/1/2/6/i/1802126.jpg

Fig. 3. Bento in Porto (Portugal)[3]

Fig. 4. Chhatrapati Shivaji Terminus in Mumbai (India)[4]

urbanization leading to the consolidation of buildings in large cities, this raised the question of the expediency of their continued existence. London, Paris, Munich, Warsaw, Berlin, Beijing, Tokyo and many other megacities faced such a problem in the 1950s and 60s. In many cases, it was solved by demolishing historic railway stations and building new edifices. The loss of the Euston railway station in London, Montparnasse in Paris, and Penn Station in New York attracted the attention of the general public and showed their special historical and cultural value not only for urban but also for national identity. This marked the beginning of a scientific study of the historical railway stations architecture and the search for ways to adapt them to modern technical, economic and other requirements.

This issue remains relevant at the present time, when the functional purpose of railway stations continues to expand. Researchers talk about the emergence of "Mega-hubs", which are not only transportation hubs, but also play an important social, business, economic and cultural role [1, p. 14].

MAIN APPROACHES TO THE ADAPTATION OF HISTORIC RAILWAY STATIONS

The difficulties associated with the modernization of historical buildings, the high costs of their adaptation, on the one hand, and their architectural, artistic, memorial, and urban value, on the other, generate conflict, which in each case is resolved individually. Conventionally, all of the existing approaches can be divided into three main variants.

The first one involves the demolition of the historic railway station and the construction of a new building instead. This practice has been widespread since the very beginning of the development of railway communication. In the 1860s and 1900s, most train stations in major cities in Europe, North America, and Asia were rebuilt. The second wave of mass reconstruction occurred in the 1950s and 60s, when the new Montparnasse Station in Paris, Euston Station in London, Pennsylvania Station in New York, Central Station in Warsaw, Munich, Beijing, etc. were built on the site of the demolished ones. In 1990-2000, the third stage of modernization began, which was characterized by the creation of multifunctional transport hubs united under one roof with shopping, social, business and cultural venues, such as Beijing South Station, built in 2008, or Vienna Central Station, opened in 2015. At the moment, this practice remains the most relevant for Asian countries, primarily China and Japan, where railways are the main method of intercity communication, and train stations are perceived as special urban areas combining transport, business, leisure, fashion, information technology and other areas of creativity and innovation [2, p. 243; 3, p. 10].

Against the background of rapidly changing cities, the historical and cultural significance of architectural monuments is increasing, determing the unique "spirit of the place". This fully applies of historical railway stations, which over a long period of their existence have become visual dominants and urban-forming objects that shape the perception of entire cities. The special value of such structures, which are often outstanding works of architectural and engineering thought of their time, led to the realization of the need to preserve them as an integral part of the national and world heritage. However, the difficulties associated with their modernization led to the search for a new functional purpose.

The most common adaptation option is a museum complex, such as the Hong Kong Railway Museum at the former Tai Po Station, the East Bengal Railway Museum in Kolkata at Howrah Station, the Station Rail-

[3] https://cdn.getyourguide.com/img/tour/574d870fb49e7.jpeg/155.jpg
[4] https://avatars.dzeninfra.ru/get-zen_doc/5236792/pub_6234b23e38571e0292ab007c_62e1174dc96b9320d774b451/scale_1200

way Museum in Warsaw, the Fan Museum at Monkwearmouth Railway Station, and the Southern Pacific Railway Museum in California. Large-scale work is currently underway to create an archaeological and industrial heritage park on the territory of the Haydarpasa Railway Station in Istanbul. The neoclassical style complex was built with the participation of German architects Otto Ritter and Helmut Conu in 1906–1908. Since the beginning of the 20th century, it has served as one of the largest stations connecting the capital with Anatolia. In 2010, the station was closed for restoration, during which a fire occurred that destroyed the roof and the fourth floor of the building. In 2012, due to the opening of the Marmaray tunnel connecting the European and Asian sides, railway transportation in Haidarpasha was completely stopped. In 2016, a comprehensive restoration of the monument of Ottoman architecture began, as well as excavations on the territory adjacent to it. Soon, it was decided to open a museum and exhibition complex "Istanbul Archaeological and Industrial Heritage Park" on the territory of the former Haydarpasa railway station, which should be completed by 2026.

The museification of historical railway stations, despite its many advantages, as well as other adaptations for residential, office, social, business or cultural purposes, means the loss of the original function, which largely determined the architectural originality of such facilities. Its preservation by modernizing and integrating old railway stations into modern transport complexes is extremely difficult and at the same time the most advantageous for the city and heritage as a whole.

Such projects have been implemented in Tokyo (Central Station), New York (Central Station), Antwerp (Central Station), London (St. Pancras) and Paris (Gare du Nord). One of the iconic sites for its time was St. Pancras Station in London. It was built in 1868 by architect William Barlow, with the participation of engineer Rowland Ordish, and together with the Midland Grand Hotel, added to it in 1873, it became the largest Neo-Gothic building in London. Since the 1920s, the building gradually fell into disrepair and was closed in the late 1960s. Based on the inconsistency of the station with the new requirements of passenger transportation and its unsatisfactory technical condition due to the prolonged lack of repairs, the idea arose of building a new complex. However, due to the recent demolition of another historic train station in London, Euston Station, the public reacted extremely negatively to such a project. A large-scale public company in 1967 led to the inclusion of St. Pancras Station in the National Heritage List as a monument of the highest category (Grade I). Despite the fact that the building was saved from destruction, it was not used until the 1990s and gradually collapsed. In 1994, the tunnel under the English Channel was opened, which connected London with Paris. St. Pancras Station was chosen as the terminus of the railway route, and therefore its reconstruction began as an international transport hub. The work was completed with a solemn opening ceremony in October 2007 and included, in addition to the thorough restoration of historical buildings, the construction of new parts made in modern materials. This made it possible to increase the number of platforms and their length, as well as accommodate the necessary elements of modern infrastructure. Some of the premises: the waiting room, information desk and food court were moved to the underground part of the station, adapting a former beer storage warehouse for them. The modernization of St. Pancras has given impetus to the development of the surrounding King's Cross area [4, p. 195]. In the mid-2000s, the reconstruction of the station of the same name began as well as the development of the new city square in front of it, formed due to the dismantling of the 1970s buildings [5, p. 70].

The Gare du Nord railway station in Paris, the second terminus of the London-Paris line, followed a similar path in its development. Built in 1861–1865 under the direction of architect Jacques Ignace Hittorff, in the 1960s it was threatened with demolition according to the modernization program of Paris railway stations. Partial renovation was carried out in the 1970s–1990s as part of the construction of the London-Paris expressway (Eurotunnel). By the mid-2000s, Gare du Nord had taken the first place in Europe in terms of passenger traffic, and in connection with preparations for the 2024 Summer Olympics, it was decided to carry out a new large-scale reconstruction. According to the results of the competition, the project "city inside railway station" was selected, which involved the creation of a new multifunctional public space [6]. Subsequently, it was changed several times, but the basic concept remained the same. An important part of it is the construction of a 300-meter promenade with a glass roof between the historical blocks, opening towards the station square with the help of a new main entrance in the form of a loggia. The completion of the works, which were originally timed to coincide with the Olympic Games, was postponed until 2026 [7].

The adaptation of historical railway stations to modern transportation complexes requires a significant increase in usable area. In conditions of dense development in the central areas of megacities, one of the ways to solve this problem is to use underground space [8], such as during the reconstruction of Antwerp Central Station. The monumental Art Nouveau building, built in 1891–1905 under the direction of architect Louis Delacenserie, was seriously damaged during the Second World War and was under the threat of demolition. In 1975, the station was taken under state protection, but it was empty for a long time, slowly collapsing. In 1998,

its large-scale reconstruction began, which involved the creation of an international transport hub based on it. Historically, the station was a dead end it was a terminal station, and for its connection with other railway lines, as well as to increase capacity, a tunnel was dug leading to Antwerp-Birch Station, 3.8 km long at a depth of about 20 meters [9, p. 4–5]. Most of the tracks were placed under the historic platform on two underground levels, separating international and intercity trains, equipping a parking lot and part of the technical premises. To illuminate the underground platforms, the glass ceiling of the landing stage was restored and modern lamps were installed on 14-meter pillars. A new entrance was erected from Kivistrat Street, at the opposite end of the tunnel, and the historic station building was carefully restored. The works were completed in 2007, and in 2011 the project received the highest award of the European Union Prize for the Preservation of Cultural Heritage (Europa Nostra Awards 2011). In its conclusion, the jury separately noted the positive impact that the reconstruction of the Central Station had on the development of the surrounding urban landscape [10].

In general, as the researchers note, this is typical for most such projects, which are not limited to the restoration of a single building, but significantly transform the surrounding areas, allowing not only to improve transport links, but also to solve a number of urban problems [1, p. 13; 11, p. 8]. During the reconstruction of Leipzig Central Station, built in 1915, as in Antwerp, most of the traffic flow was transferred to a two-level underground tunnel, which began moving in 2013. This freed up more than 40 hectares of land previously occupied by the tracks [12, p. 102]. In 2011, the city authorities announced a competition for the regeneration of this area, and as a result, a new open public space appeared in the central part of Leipzig, a park that significantly improved the ecological situation of the city.

CONCLUSION

Projects related to the creation of modern transportation complexes involve enormous costs and difficulties and depend on many factors that increase several times while preserving historical buildings. However, the positive effect of their successful implementation, as shown by the examples of London, Antwerp, Paris and Leipzig, extends not only to the surrounding area, but also to the entire city, and in some aspects (the development of transport links, the preservation of cultural heritage) – the country as a whole [3, p. 4].

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