Problems of transit area interior space of railway stations including those referred to monuments of architectural heritage

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Abstract. Space planning decisions of the existing transit areas of railway stations do not meet the current norms in terms of transport security and transport capacity in many ways. The interior space designed for a far smaller passenger traffic flow does not allow all the new functions and does not have any free space to provide the information field in the confined conditions. The article is devoted to general matters that arise in the process of adaptation, modernization, reconstruction or restoration of existing railway station buildings.

1. Introduction
Space planning decisions for railway station buildings according to their functional requirements have always been taken for their interior space to be convenient and accessible for passengers through the route ‘the city– the railway platform’ and ‘the railway platform – the city’. Consumer demand and consumer activity have always been the key factors of developing pedestrian zones [1]. Entering the transit area of a railway station the passenger must have access to all necessary services on the route and must be provided with the necessary information quickly and in the most comfortable conditions. The location of facilities/functions is determined by their necessary sequence. With the rapid increase in the passenger traffic flow and changes in the functional occupancy of the main facilities of the stations, there is a need for restructuring the interior space. Architects and designers thoroughly and accurately search for design options when trying to take appropriate decisions [2]. Many buildings suffer a high level of deterioration and do not meet seismic standards. Since existing railway station buildings are often referred to monuments of architectural heritage, it is prohibited to change the structural layout of transit areas. New design algorithms can change the buildings significantly [3], but such typical decisions are not acceptable for railway stations referred to architectural heritage. While reconstructing and restoring can make the interior space more confined, it is demanded to set priorities within the project. In an effort to avoid the lack of visual variety [4], there is a rearrangement of the necessary services within the existing space. In 1970s the so-called "environmental approach" to the design of the urban environment began to take shape in the USSR. As a matter of fact, the method of "hidden reconstruction" offered by Alexey Gutnov provided the image of "foreign" lifestyle by disguising historical buildings. As for old buildings, they had to preserve their facades, but had to be
completely reconstructed inside [5]. This method is widely employed in existing railway station buildings.

2. The analysis of the target of research
Judging by the way the principles of modern architecture of the spatial environment are implemented, we follow the model of Northern Europe. They keep ahead to introduce new methods and have taken steps to expand public spaces, create open areas [6]. Long before the increase in passenger traffic flow, they began to design wide pedestrian areas while thinking long-term to make it possible to come out with required functions. The functional and architectural content of buildings must be preserved in the restoration process [7]. The integrated scientific approach to the restoration of units of architectural heritage, which involves the development of several options for design solutions, as well as determining the sequence of the work done, requires in-depth review of the unit. Long-term monitoring of interior space is necessary to determine the causes of deterioration of certain zones. The architect plays the role of intuitive interpreter that has to assess the degree of admissibility to change the building and the character of the interventions, since there are no clear urban planning regulations, as well as no clear list of the objects to be preserved as architectural heritage. There are different ideas about what you can and cannot do with buildings of architectural heritage and with the historic environment in general [8]. In the restoration process things to preserve may be reconsidered. Sometimes in order to preserve a building and create a comfortable environment in it, it is necessary to preserve only some elements for further use, or to dismantle them, and then restore them in their original form. In the worst-case scenario, they are excluded from the list of architectural heritage. This is usually due to the fact that many historical and cultural monuments do not meet seismic standards and strengthening structures affects the visible parts of the walls, changes the configuration of the space planning decisions.

Let us consider this problem through the example of the railway station building "Irkutsk – Passazhirskii", which is located in Irkutsk, Chelnokov Street, 1. The complex of the railway station buildings consists of two parts. The construction of the historical part of the building, which is a monument of architectural heritage, began in 1897. On August 16, 1898, the first train arrived (Figure 1).

Figure 1. The front view of the railway station building Irkutsk-Passazhirskii from the station forecourt.
The space-planning decisions allowed the passenger to pass through the station to the platform from any transit room of the first floor. There is a concourse layout, concourses are connected to each other along the building by the corridor from which you can get to the service facilities of the station that are grouped according to their functions. Today it is impossible to pass through the station complex. There is a separate entrance for each concourse from the station forecourt. And one can get to the platform only through the tunnel. This is due to the implementation of transport security measures. One of the concourses serves as a waiting room. It offers some services, but its capacity does not correspond to the estimated capacity of the station [9].

3. Results
The quality of public spaces and the level of development of society are interrelated [10]. In the process of reconstructing the station complex the quality of services and the level of comfort were analysed. As the conditions were constrained, it was agreed that some concourses should be free from the railway station functions. At the entrance there should appear an entrance hall. The entrance hall is a customer service area and must have the entrance from the station forecourt. The entrance hall, customer service areas and halls for selling tickets must have space enough to locate the facilities (booking offices, enquiry offices, etc.) with a quiet area where passengers use the services without being disturbed by people going to the platforms [11]. The concourse structure must be preserved when restoring the railway station (Figure 2).

The construction of the new building and making concourses less cramped contributed to it. It was possible to free up as much space as possible to create a visible information platform. There appeared a booking office and customer service area, as well as a first-aid station. It was decided that the second floor (Figure 3) would locate comfortable sleeping rooms after conserving the ceiling stucco moulding. Sanitary facilities and amenities were planned in the design to meet the existing standards [9,12,13]. The building facade (Figure 4) is being restored. The new building is of uniform architectural style [14,21]. But the key idea is to lay emphasis on the uniqueness of the original building [15]. The design of the building meets the accessibility requirements for the disabled people and other groups with limited mobility to the fullest extent. Entrances and the places where changes in elevation exist are provided with wheelchair ramps. Along the passenger areas there is navigation signage available as kinaesthetic contrasting guidance line on the floor and information plates or track indicators on the walls. There are means to provide their visual perception [16-19]. The station forecourt was also reconstructed. As it is not spacious, arrangements with the city authorities are necessary. So, a joint upgrading project was carried out to reconsider the traffic plan of public transport and the location of stopping points. The project involves optimizing the passenger traffic flow while satisfying commuters and long-distance passengers [20,21]. It was not possible to solve all the problems. But due to rearranging functional areas it was possible to free the transit areas from the services that make waiting rooms overcrowded and separate them from the pedestrian zones.
Figure 2. The first floor plan.
Figure 3. The second floor plan.
4. Conclusions

The railway station as a social institution dates back to the beginning of the industrial era. First railway stations go back to 1825 in foreign countries and to 1838 in Russia. Their interior space was studied and analysed, but it remained unchanged. Despite the numerous additions of services and functions, the main space of the station remains a transit one. Over the 150-year period, thousands of railway stations have been built on the railways of our country. They reflect the evolution of architecture, its diversity, contradictions of old and new styles, innovations in construction based on beyond materials and technological features caused by demands of society. High-speed traffic contributes to increasing passenger traffic flow, while pedestrian areas are expanding. Stations are a multifaceted phenomenon through their architecture and history. All types of stations often deserve criticizing for operational problems, poor hygiene service, untidiness and crowded conditions, as well as for bleak appearance of some buildings. They may cause people's being indifferent or commenting unfavourably about the modern "gates" of the city. Few people guess the difficulties to find and utilize the spaces properly because the layout of the stations do not meet the modern standards. Specialists have to overcome the obstacles to provide passengers with all necessary services there. Let us imagine this noisy crowded place filled with a number of symbols. It provides a variety of functions (transport services, food supply, shopping, accommodation, communal services, information provision, responsibilities of technical personnel and etc.). All these contribute to understanding that people need both improving the quality of the services and making their wearing journeys rich in an aesthetic way. It is quite obligatory to create a favourable atmosphere and provide an easy way to get to wherever they want through organising the process thoughtfully and finding proper architectural and artistic solutions [22].

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