

Formation of innovative public spaces in railway areas

A F Ereemeeva, E M Rebrova, Y N Lobanov and G E Rusanov

St. Petersburg State University of Architecture and Civil Engineering, 4, Vtoraya Krasnoarmeiskaya, St. Petersburg, 190005, Russia

E-mail: arch.eremeeva@gmail.com

Abstract. The paper addresses the issues of railway areas in a modern city and their potential in the formation of public spaces. In the course of their study, the authors analyze the experience in the architectural and urban planning integration of railway areas into the urban space in such directions as interaction with facilities maintaining their transport (railway) function and re-purposing of closed railway lines. As a result, the authors conclude that railway lines can be structurally transformed, thus becoming not barriers between districts but elements of the green pedestrian framework. The authors also propose a concept of re-using railway infrastructure elements not used for their primary purpose to organize public spaces. In the paper, various scenarios of organizing an innovative adaptable square with the use of mobile modular units made from former train cars are considered through the example of a park along Finland (Finlyandskaya) Railway Line in Saint Petersburg and its filling with various objects.

1. Introduction

Railway infrastructure construction during the period from the mid-19th to the early 20th century resulted in the appearance of significant transport links in the largest cities. Arrangement of railway complexes, railway lines and stations affected the historically developed urban planning; new elements were introduced in the city fabric. Railway stations became a major phenomenon in society, serving as important transport links and centers of social attraction. Revenue at some stations is now greater from non-railway activities, such as shops and cafes, than from the sale of floor space to train operators [1].

Despite their significant role in the transport system, nowadays — due to urbanization and city growth — railway areas represent a barrier between city districts rather than a connecting link. Areas adjacent to railway lines are often occupied with chaotically located storage facilities or garages and separated from the rest of the urban environment. It can be seen by pattern method [2]. Besides, some railway routes gradually lose their urban planning importance and become obsolete in terms of their original function. As a result, "dead zones" develop in central districts. They represent abandoned sites with no functional or landscape relations with the environment, which sometimes occupy large areas. For instance, at the beginning of the 2000s, several railway lines were closed as some industrial enterprises were moved outside Saint Petersburg and overall production decreased. According to the strategy intended in the master plan, some shunting and freight yards soon will be moved outside the city as well. Therefore, recognizing railway areas as potential zones for the development of modern urban infrastructure is one of the most important aspects of environment development [3].



2. Results and Discussion

2.1 Architectural and urban planning integration of railway areas into the urban space

Modern trends in the modification of railway areas and areas adjacent to railway lines in the largest cities can be divided into two categories:

- Interaction with facilities maintaining their transport (railway) function.
- Rehabilitation and re-purposing of closed railway lines (mainly in former industrial territories).

The approaches to the formation of a quality environment in areas adjacent to railway lines depend, first of all, on performance features of a railway facility (in particular, the need to maintain or discontinue the transport function). It is a key characteristic affecting the specifics of developing volumetric and spatial solutions (Figure 1).

- Underground solution: development of deepened multi-functional complexes with the potential integration of transport hubs.
- Elevated solution: development of recreation areas in the place of elevated railway lines; development of a public space above an at-grade railway track (i.e. an eco-friendly footbridge).
- At-grade solution: development of parks, squares, boulevards in non-operating areas adjacent to railway lines or in the place of embedded railway sections. In this case, the established railway track structure plays an important role as it can serve as a potential structure for the master plan.
- Mixed solution: a combination of the listed types of volumetric and spatial solutions.

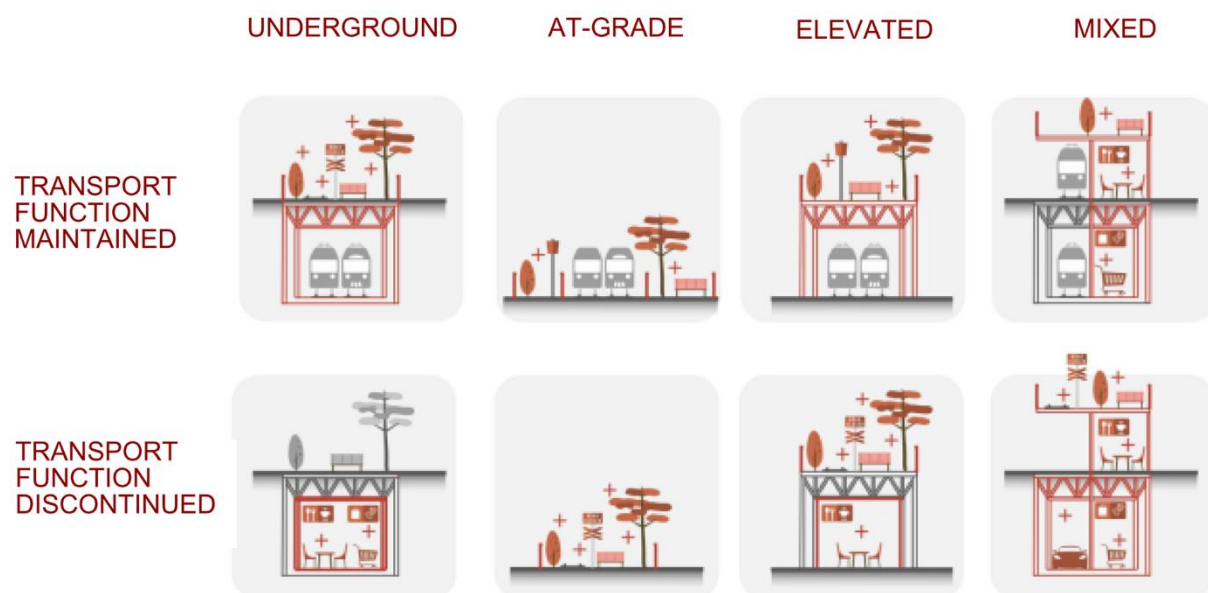


Figure 1. Volumetric and spatial solutions for the integration of railway areas into the urban space.

When maintaining the transport function, it is important to ensure the safety of movement around a facility, install barriers protecting pedestrians. When a railway facility is re-purposed, rails are often maintained and integrated into the environment as an element reminding of the history of the place. Such elements can be introduced into a greenery, navigation, or lighting system [4].

The High Line Park in New York located in the place of an abandoned elevated railway became not only a rest area but a driver for the development of the urban environment in the district as well.

This is evidenced by the growing demand for the construction of new facilities around the park, already recovered investments in construction, and increasing popularity among both city residents and tourists. The New York City Department of City Planning estimated that in five years from the moment of construction start (from 2006 to 2011) 29 new projects were built around the High Line, which accounted for 2,558 residential units, 1,000 hotel rooms, and 423,000 square feet of office space. The projects drew more than \$2 billion in private investment and 12,000 new jobs [5]. The success of the High Line Park gave rise to the appearance of a number of linear parks based on railway infrastructure in all corners of the world. The "High Line effect" became a common term.

Among elevated solutions with the transport function maintained, the Raised Gardens of Sants project in Barcelona can be mentioned. It is a green public space located above a transport route, utilized as a linear park. Based on climatic and insolation conditions, two routes were designed: one on the north side, with a shade provided by the trees, with sunshades to rest and sit, and another one on the south side, which represents an open space in sunlight. As the boulevard is elevated above the surrounding streets by a distance of 4 to 12 meters, it becomes an overlook onto the city.

The Midland Railway Square project in Melbourne is aimed at the activation of the adjacent areas, creation of an attractive space for daily use and public events in the place of the former railway junction. It is a new public space with an advanced functional environment: cafes and restaurants, cultural and educational facilities, areas of recreation and rest. One of its main features is preserved railway tracks across the entire territory, representing elements of space organization. The arrangement of rest areas visually reminds of train cars on rails.

International practices were used during the development of a pilot design for a linear park along Finland (Finlyandskaya) Railway Line in Saint Petersburg (Figure 2). The project was performed at the Saint Petersburg State University of Architecture and Civil Engineering.

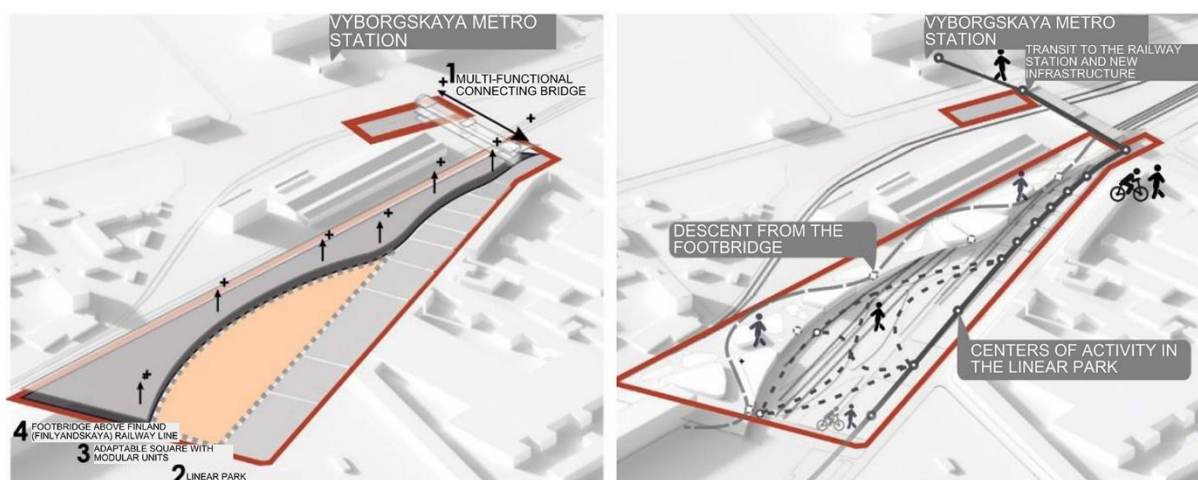


Figure 2. Park zoning along Finland (Finlyandskaya) Railway Line.

The park has two levels: the upper one above the functioning railway tracks, and the lower one in the place of tracks leading to the freight yard, which is to be removed. The park represents a connecting link between historical buildings on the Vyborgskaya Side and new buildings in the Kalininsky District.

2.2 Use of railway infrastructure elements in dynamic scenarios for the organization of a public space

The innovative component of the design for the park along Finland (Finlyandskaya) Railway Line is represented by the formation of an adaptable square with dynamic modular units. The design of such modular units is based on railway infrastructure elements (in particular, moving part of train cars not used for their primary purpose). Two types of universal platforms are suggested: two-axle (module N1

3x5 m) and four-axle (module N2 3x11 m) platforms with varying height depending on the unit's purpose. Depending on the purpose, season, and day (weekday or weekends and holidays), the following scenarios can be distinguished for the area [6]:

- Fair
- Performance or concert venue
- Outdoor cinema
- Lecture hall
- Venue for exhibitions and cultural events

In addition to that, the following modules can be built: cafes, WC, playgrounds.

Seven modular units were designed in detail based on functional characteristics. Module N1 covers view points, cafes, WC. Module N2 covers playgrounds, open exhibition pavilions, stages, outdoor cinemas with roofs, and lecture halls that can be used in winter (Figure 3, 4).

Such modular units can move on the rails that earlier led to the freight yard. Those modular units that are not used in a particular scenario can be stored in a special technical area in the upper park platform. The use of written-off train cars and rails as design elements is economically reasonable and makes it possible to make the most out of the existing resources, which, in turn, corresponds to the ideology of sustainable development regarding the urban environment [7].



Figure 3. Mobile modular units made of former train cars.



Figure 4. Scenarios of using the adaptable square: a cafe/market (on the left), a concert venue (on the right).

3. Conclusion

It is very important to draw attention to railway areas as zones able to ensure the active development of a modern city. As it is proven by global experience, a railway line can be not a barrier but a part of the green city framework, a point of attraction for residents and tourists, space not dividing but linking the city fabric. In other words, a railway line can serve as a space activator. Architectural and landscape complexes based on railway infrastructure can add missing public functions and provide new centers of activity in various districts. The construction of linear parks along (or in the place of) abandoned railway lines actually improves the environmental characteristics of the urban space.

A systemic approach combining urban planning as well as architectural and planning solutions with environmental design solutions (small architectural forms, outdoor furniture) can be recognized as the most promising approach in terms of the modification of railway areas. When developing a design, it is important to consider specific features of the place, its history, and the industrial past. The use of railway infrastructure elements (train cars, rails) in the object and spatial design allowing for the identification of space is an innovative solution.

References

- [1] Edwards B 1997 *The Modern Station: New Approaches to Railway Architecture* (London & New York: E&FN Spon)
- [2] Gashenko A 2019 Pattern method in urban studies and practices. *Architecture and Engineering* **4** (2)
- [3] Dingjan M 2014 *A Railway Station as a Public Space. The Case of Tokyo* (Leiden: Leiden University)
- [4] Nefedov V A 2012 *Urban Landscape Design* (Saint Petersburg: Lyubavich)
- [5] Reichl A 2018 Manufacturing landmarks in New York City parks. *Journal of Urban History* **44** (4) pp 736–754
- [6] Zukin S 1995 *The Culture of Cities* (Cambridge: Blackwell Publishing)
- [7] Castells M 2003 *The Process of Urban Social Change (Designing Cities: Critical Readings in Urban Design)* ed A R Cuthbert (Oxford: Blackwell Publishing) pp 23–27