



The Spatial Transformation of the River Waterfront through The Three Historical Periods: A Case Study of Belgrade

*M.A. BRANISLAVA SIMIĆ

¹ Research Assistant at the Institute of Architecture and Urban & Spatial Planning of Serbia, Serbia and Ph.D. candidate at the Faculty of Architecture, University of Belgrade, Serbia

¹ E mail: kovacevicbrankica@yahoo.com

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ABSTRACT

Urban renewal of the coastal area has regained importance in recent years. The main problem with the city's coastal area is often the insufficient utilization of its potential. The paper analyzes the process of urbanization and treatment of the waterfront through the three historical periods: 1. traditional city, 2. during Modernism and 3. contemporary urbanism. Belgrade is chosen as a case study because it is located on the banks of the two rivers the Sava and the Danube, and throughout history, rivers had a significant role in the urban development of the city. A polygon for the methodology of urban morphological research for this paper was the contrast between the Old Belgrade and traditional city core and the New Belgrade created on the principle of the modern movement in architecture. The paper aims to research the relationship between the city and the river waterfront by the method of compare spatial-temporal transformations and to reveal the positive and negative elements of each period of urbanization. The result of the analysis indicates a changed treatment of the river waterfront through the time - from the fortified city isolated from the river to the gradual descent of the city center near the coast.

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1. Introduction

One of the most significant areas in cities all over the world is the waterfront area. The position of cities on the banks of rivers has always played an important role in their development.

Belgrade as the capital of Serbia has an exceptional geographical location at the confluence of two international rivers - the Danube and the Sava. Rivers are an integral part of Belgrade's urban tissue with about 150 km of length of river banks. During the long history, the rivers Sava and Danube play a specific role in

the life and development of Belgrade where various cultural influences meet.

Many development potentials are recognized in the entire Danube basin and it is very important for the establishment of economic, functional and cultural networks with Germany, Austria, Slovakia, Hungary, Serbia, Croatia, Romania, Bulgaria, Moldova and Ukraine (Radosavljević, 2008).

*Corresponding Author:

Research Assistant at the Institute of Architecture and Urban & Spatial Planning of Serbia, Serbia

Email address: kovacevicbrankica@yahoo.com

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The Belgrade fortress build by rivers is the oldest part of the city at which archeological layers from pre-history to today are noticeable. Belgrade has been often destroyed and rebuilt through these historic periods: Celts (3rd century B.C.), Romans (during the first centuries A.D) and Slavs (from the 7th century A.D.). Later it was settled by Hungarians, Serbs, Turks, and Austrians. The city did not descend on its rivers because there was fear of protecting the city from numerous armies that attacked from the river or natural disasters such as floods.

During the industrial period of the 19th century, the coastal areas were intensively used for the production and exchange of goods. The economic prosperity of cities was based on their ability to utilize coastal resources, but it also led to the degradation and pollution of these urban spaces. From the sixties of the XX century, where the process of regeneration started in Britain, the possibility of waterfront renewal and the idea of creating a new identity of cities by coastal area becomes a significant topic among the planners (Marshall, 2001).

Belgrade used its coastal area for centuries for defense purposes, so that only in the 20th century began to descend on the coast and conquer the left bank of the Sava by building New Belgrade. The ambivalent attitude of Belgrade towards its rivers is a logical consequence of these events through time. However, through the decades-long urban development of the city, many potentials of the waterfront area have remained unused. The shores of the Danube and Sava represent a significant part of an attractive, but inadequately used urban space. In the last few years, there have been plans for several potential huge sites in the coastal zone (Marina Dorćol, Port of Belgrade, Belgrade Waterfront Project) for their transformation with ambitious reconstruction proposals to future purposes.

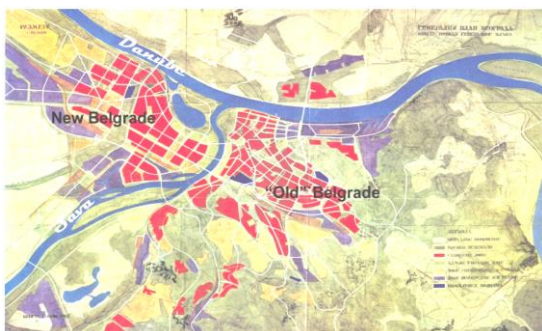


Figure 1. Belgrade: the city at the confluence of the rivers Danube and Sava (According to Master Plan of Belgrade of 1950)

2. The river waterfront in the traditional historic city

The first observed period was the time of the country's reconstruction after the Second World War. The characteristics of this period are:

- accelerated development,
- modest economic potentials,
- a country devastated by the war (the housing stock, infrastructure, public and industrial facilities were destroyed),
- development of residential settlements and administrative buildings on a swampy land on the left bank of the Sava River.

The rivers played a decisive role in establishing international traffic connections and the inclusive economic development of Belgrade in the 19th century and its transformation from an oriental settlement into a modern European city. After 1830 Belgrade was rapidly developing as a commercial and trading center (Bajić and Basarić, 2014). The coastal area around Kalemegdan fortress played an extremely important role in the period of liberation from the Turkish influence and the creation of the new Serbian Belgrade. The position at the confluence of the river enabled the city's commercial prosperity since the transport of goods was carried out to the greatest extent by river flows, and especially benefited from the intensive development of the industry which was the main carrier of modernization and urban development, especially in the period until the First World War (Bajić and Basarić, 2014).



Figure 2. Old Belgrade: the traditional historic city (Plan of Belgrade of 1850)

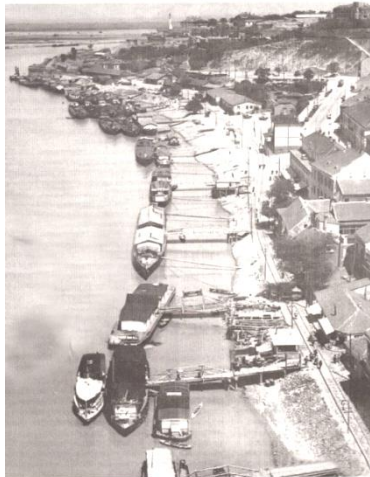


Figure 3. Old Belgrade by the river Sava (Photo of Belgrade 1920, according to: "Politika" newspaper 13.2.2013.)

Construction of the railway along the right bank of the Sava and Danube was a key factor in industrialization, but also represents the separation of river banks from the city core, which to this day has remained one of the biggest urban challenges and unresolved problems (Vuksanović-Macura, 2015). At the time of its formation, the industrial zone in the coastal area was located on the periphery of the settlement, but by its development and expansion, a significant part of this zone, as well as the Sava and the Danube riverbank, was at central city locations. Soon after the construction of a railway, the rapid development of this part of the city began. The railway station, the river port, and tram traffic have influenced the development of a long-standing market place in the coastal area, where the entire Belgrade trade. As a consequence, this part of the city became very attractive. Before the war in 1914, important public buildings were built in this area (Belgrade Cooperative, Hotel Bristol) became symbols of the accelerated development of the coastal area and its commercial, traffic and cultural significance (Bajić and Basarić, 2014).

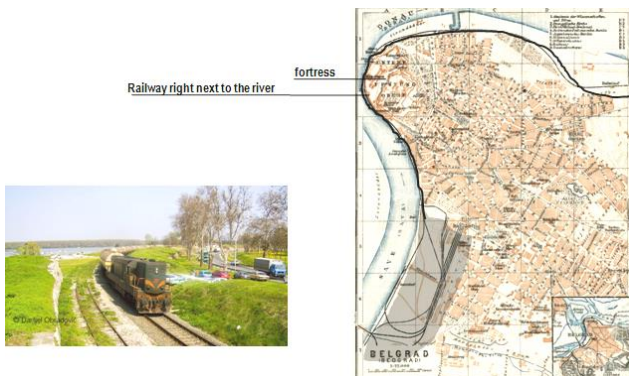


Figure 4. The railway next to river separating the Old Belgrade from its waterfront (Plan of Belgrade of 1929, author marked the railway https://www.discusmedia.com/maps/serbian_town_plans/4561/).

At the end of the nineteenth century, the construction of the first industrial enterprises started with the urbanization and the right bank of the Danube. Before, this was an empty terrain along the river. Since the beginning of the 20th century, the industry has become one of the most important holders of economic and urban development in Belgrade. The new factories in this industrial zone had formed along the river after the opening of the Beton Hall, Danube harbor and main Port of Belgrade (Mihajlov, 2011).

The 1923 Belgrade Master Plan's preparation and implementation process, a significant moment in Belgrade's political and urban history when, after the First World War, the city lost its centuries-long border position, becoming the capital of a newly established extended country, the Kingdom SHS, later the Kingdom of Yugoslavia. The goal of government and city authorities was to create a representative national capital and overcome the city's existential and functional problems. The 1923 Master Plan introduced very innovative and modern approaches to solving the city's problems and improving residential areas, traffic, and greenery. Although urban planning of Belgrade in this and the following period, had initiatives to move the rail traffic from the Sava river coast, none of them was realized (Vukotić Lazar and Roter-Blagojević, 2017).

It can be concluded for this period that the river coast became the main market place, the center of the gathering, that transport (railway) was a priority in the city's strategy of development, and that important public buildings with commercial or touristic purpose were built in this area.

3. The river waterfront during Modernism

The Second observed period is marked by:

- strengthening of the economic and political power of the State,
- technology improvement,
- massive industrial development,
- improvement of the standard of living and freedom of movement across the world,
- and international influences in architecture.

In the period between the two world wars, after the Sava ceased to be a border river, it was considered the possibility of the development of Belgrade on its left bank of the Sava river. In the years after the Second World War, on the left bank of the Sava River, the construction of New Belgrade was started as a new urban center. By the way of its development, New Belgrade represents a separate part of Belgrade, a "city in the city". Conceived and built in an empty

territory, according to Blagojević (2007), as a "city-symbol of the new state and ideology", New Belgrade was also a city-polygon, where principles of modernism and the ideas of the functional city inspired by of Le Corbusier were achieved. New Belgrade represents a relatively pure and rare example of consistent construction in the spirit of functionalism and Modernism reflecting a clear approach formulated in the Athens Charter (Blagojević, 2007).



Figure 5. A conceptual plan of Nikola Dobrović for New Belgrade on the left bank of the Sava river 1948 (<http://contemporarycity.org/2014/04/belgrade/>)

The architect Nikola Dobrović, who was appointed as the director of the established Urban Planning Institute of Serbia, took the task of solving the problems of urban development of Belgrade, where he considered that the key to solving all urban problems of the city lied in traffic. Blagojević (2007) pointed out that Dobrović treated greenery as a modernist idea of the Garden City, so it was realized in New Belgrade as a green zone of park-garden space near the river similar to modern landscape urbanism as Monclus (2018) suggests.



Figure 6. Museum of Modern Art in New Belgrade's greenery (<http://www.slkavest.rs/nove-linije-povodom-otvaranja-muzeja-savremene-umetnosti/>)



Figure 7. The river coast arrangement next to Hotel "Jugoslavija" (photo was given by the author Branislav Jovin)

Although the fact that in the period of industrialization, the areas beside the river became places of impure, working zones, economic and industrial facilities all over the world, in Serbia, exceptionally during the time of socialism, some important objects were located in exclusive locations in the coastal area. This thesis is confirmed by examples: the Palace of Federation- SIV 1961, the Central Committee building- CK 1965 (now Ušće), the hotel Yugoslavia 1969 and the Museum of Contemporary Arts 1965 and only built in the old town waterfront "25 May" Sports and Recreation Center 1971. Also, many objects were solved through an architectural competition and were planned at locations in the coastal area, such as the Museum of the Revolution, the Military Museum and the Belgrade Opera House. These decisions had the urban symmetry and architectural monumental impression more typical for the Heroic period than for the International style and Modern architecture, so it can be characterized as the specificity of Serbia and as a precursor to the time when the focus is again turning toward the rivers (Petrović Balubdžić, 2017).

A new stage in the development of New Belgrade marked the 1950 year where the idea of New Belgrade as a governing city was abandoned (Blagojević, 2007). Instead, the program priority in the coming period becomes housing for the working class, so a large number of open residential blocks were built with freestanding buildings in a lot of greenery. On the large public green surfaces of the coastal belt of New Belgrade, continuous paths have been formed for recreation, primarily walking and cycling.

The mass construction at a new part of the city noticeably neglected the reconstruction of the old city core, resulting in its devastation. At the same time, the Sava river coast served for the consent of ships and the unloading of goods, and heavy road traffic was directed through the

street around the Kalemegdan fortress. The revitalization of river banks, the relocation of the railway station and the use of tourism potentials have not been achieved during this period.

It can be concluded for this period that the river coast becomes park-garden space for recreation, but where important public buildings with cultural and administrative purposes were built.

4. The river waterfront in the contemporary urbanism

The third observed period has these characteristics:

- Considerable development mainly through interpolations both in Belgrade urban tissue and in New Belgrade,
- Due to the global economic crisis over the past years, this development stopped. The most important projects for which international competitions have been announced and quality results obtained have also stopped,
- Great interventions in urbanism – huge scale projects near rivers.

Coastal spaces play an important role in processes marked as decomposition of the urban matrix. The regeneration and activation of the area of the Sava and Danube coasts is an important aspect of recent initiatives of Belgrade's urban development, which are being carried out through various planned proposals and studies, architectural and urban competitions, as well as the ambitious ideas of private investors. Today the coastal area is treating as a space of special interest for the development of the city, where various activities and facilities are envisaged. The specific strategic goal is the orientation of Belgrade towards the rivers.

Projects of the transformation of the Belgrade coast into a potentially high-level urban area were made in the period after 2000 for several important locations. In 2001, an architectural and urban design contest was announced for the program solution of a complex of the marina "Dorćol". The competition solutions enabled the main purpose of the marina to be maintained with the necessary accompanying facilities, as well as the revitalization and conversion of valuable objects of industrial heritage in the area. It should transform this devastated area on the Danube coast into an exclusive mixed-use zone with residential, commercial, sports and cultural facilities within the marine complex of the total area of 76,000m². The Master Plan for the Belgrade Port, created in 2009 by Daniel Libeskind Studio in cooperation with Gehl Architects, envisions a complete urban

reconstruction of the existing port complex. The project covers an area of 96 ha. A network of public spaces, the formation of a new city park, the introduction of mixed content and greater density of construction are strategic elements of the plan. The site is generally upgraded to a new level because of flooding, with low-level routes and platforms providing access for low water levels. In many places, the stairs will lead to the river, allowing direct contact with the water surface, which is generally the lack of all existing Belgrade river banks.



Figure 7. Revitalization of Port Belgrade /Daniel Libeskind& Jan Gehl (<http://www.lukabeograd.com/en/city-on-wather/master-plan/strategy.html>)

There was an international competition in 2011 for the architectural and urban solution of "Beton Hala" where Sou Fujimoto and their vision of building as "floating cloud" become an answer to the accurate problems of the coast. Another urban regeneration project in the coastal area was the master plan "Beko" in 2012 of Zaha Hadid architects, planned to build right in the oldest part of the town, near Kalemegdan fortress, a complex of residential, business, commercial and hotel spaces.



Figure 8. Revitalization of Port "BetonHala"/ Sou Fujimoto (<https://www.archdaily.com/286381/beton-hala-waterfront-center-sou-fujimoto-architects>)



Figure 9. Urban regeneration of "Beko"/ Zaha Hadid Architects (<http://www.zaha-hadid.com/architecture/beko-masterplan/>)

The most ambitious in the scope of the planned construction, that is now building, is the project of transformation of the Sava coast "Belgrade on the Water, Belgrade Waterfront" from 2014. On the surface of about 177ha, it has over one million square meters of living space, about 750,000m² of commercial and commercial space and more than 62,000m² of public

facilities. As one of the conditions for the realization of the project, the relocation of the railway node and the bus station is envisaged. Until now, four residential towers have been finished and the shopping center next to the river is under construction.



Figure 10. Transformation of the Sava waterfront "Belgrade on the Water"(<https://www.belgradewaterfront.com/en/>)

One of the last projects going on in Belgrade is the construction of cable cars that would connect the Old and New Belgrade, going over the river Sava, and pedestrian bridge connecting Kalemegdan fortress with a low level of the coastal area. It is projected for solving the part problem of public transport in Belgrade, as the metro does not exist.

Different authors criticize urban megaprojects as an instrument of urban planning and development, with specific reference to the Belgrade Waterfront Project that induced a change of the institutional framework (introduction of specific legal and policy instruments) (see Grubbauer and Čamprag, 2018; Lalović et al., 2015; Zeković et al., 2018), which led to: slow development and economic effects, low transparency, social inequalities, marginal social mobilization and weak networks between the key actors, public funds overuse, impact on law-making, displacement impacts, high public financial risk, deep urban transformations, environmental impacts, medium-technological modernization, etc. This way, the quality of solutions of large-scale urban projects directly depends on the socio-economic and political context, and hence varieties of private interest that each stakeholder defines without considering the public interest.



Figure 11. Cable car Project and pedestrian bridge for connecting Belgrade with the rivers (<http://beogondola.com/>)

It can be concluded for this period that the river coast became connected with the center of the city where the railway and heavy transport were moved, so it consists of megaprojects of buildings with different usage such as residential, commercial, touristic, sports and recreational, mostly as private property.

5. The method: the comparison of urban morphology of the three observed periods

Comparing the three ways of treatment of rivers coast through the time from the 19th century till now, it can be concluded that the Belgrade position on the banks of the Danube and the Sava River has greatly influenced the establishment of traffic connections, economic and cultural development of the city. Through different periods, the usage and role of the river coast have been changed.

Table 1. Main characteristics for the three observed periods with different treatment of river waterfront

	Positive	Negative
The Period Of Traditional Historic City	<ul style="list-style-type: none"> from the defensive role of the river coast to the main market place, the center of the gathering 	<ul style="list-style-type: none"> industrialization brought the factories, warehouses, and landfills, shipyards, industry and transport facilities occupied a wider part of the coastal area
	<ul style="list-style-type: none"> transport as a priority in the city's strategy of development 	<ul style="list-style-type: none"> railway going through the city historic core, next to the river, separated it from the city
	<ul style="list-style-type: none"> important public buildings with commercial or touristic purpose were built in this area 	<ul style="list-style-type: none"> without adequate greenery
Period Of Modernism	<ul style="list-style-type: none"> green zone of park-garden space near the river 	<ul style="list-style-type: none"> difficult maintenance of large public spaces of greenery making the devastated surrounding
	<ul style="list-style-type: none"> A place for recreation, primarily walking and cycling 	<ul style="list-style-type: none"> lack of other activities for the attraction of people to stay longer near the river
	<ul style="list-style-type: none"> important public buildings with cultural and administrative purpose were built in this area 	<ul style="list-style-type: none"> the appearance of illegal rafts and various floating objects
the Contemporary Period Of Urbanism	<ul style="list-style-type: none"> residential buildings next to the river with a great view 	<ul style="list-style-type: none"> the high density of population
	<ul style="list-style-type: none"> the used advantage for the most attractive part of the city, railway and heavy transport is moved from the city center 	<ul style="list-style-type: none"> the lack of large enough real public spaces along the river (shopping mall is just for public use, but not ownership)
	<ul style="list-style-type: none"> a lot of different activities such as commercial, touristic, sports and recreational 	<ul style="list-style-type: none"> huge occupancy of the plot, almost without public greenery
	<ul style="list-style-type: none"> people are close to the river as there is an accessible narrow path for walkers but also and bicycles next to the coastline with stairs and terraces 	<ul style="list-style-type: none"> lack of cultural spaces and buildings
	<ul style="list-style-type: none"> it is connected with the rest of the city 	<ul style="list-style-type: none"> residential segregation as it could afford the only rich level of society

The inadequate use of land resulted in the inability to connect the city with its rivers and harmed the quality of the environment. The unsolvable problem of the railway and the transit traffic for many years has made the coastal part of Belgrade a deserted transit zone in the city center itself. The connection of the inhabitants of the city to the river, which reached the peak of the development of the trading zone and the construction of representative elite facilities in the first observed period, was interrupted by the construction of a railway at the beginning of the 20th century. After that, the coast lost its significance and became a transit zone. This leads to a gradual degradation of its urban and ecological qualities. Cutting the flow of people and greenery between the two axes - the Sava and railway - be a key problem of these two zones.

One of the problems with the treatment of river waterfront during modernism, except for the lack of the different content and objects, is that was built a rigid hydro-technical concrete fort system along the whole coastline. It can be part of the reason why Belgrade never completely descended on its rivers. Such systems have been overcome, both functionally and esthetically and since it shows over years that they are insufficient and that their upgrading is necessary. The system with water canal incorporated into the urban tissue of the city which can be useful control during floods, that suggested Libeskind and Gehl in their proposal for Port Belgrade, is more contemporary. However, the future development of the New Belgrade riverside and re-functionalization of the broadly planned greenery, which was planned during modernism, could be now considered from another perspective according to Blagojević, that "its

failure and unfinishedness now become its main resource" (Blagojević, 2007).

The water line has a great influence on the design of the city structure. In the case of Belgrade, two more factors have been identified, which have been determined by the urban landscape: dynamic topography, on the one hand, and a huge amount of water, which is not typical for most cities along the river. These features once have played an important role in defensive function, but today they are again a feature that contributes to a unique urban identity.

6. Conclusion and results

The creating of the new architecture, such as public buildings or squares near rivers, can contribute to the completely new identity of the entire surrounding area, which shows a great impact that they can do. After overcoming the industrial zones, contemporary cities are increasingly competing in the plans for the future of the coast. These areas become competitive with the center of the city, influencing the developing of representative architecture as well as open public spaces.

The analysis of the development of the coastal area of Belgrade over time reveals the dynamic and rapid changes that are caused by economic, demographic, political and doctrinal changes that are recorded in its tissue through urban and architectural solutions, plans and new ideas. It can be concluded from the used methods in this research such as spatial analyses through the use of urban morphology and temporal analyses through the use of the historically defined urban process from different aspects (economic, political, social, environmental...), that every period has a positive and negative consequences of any urban decision. Even though period of Modernism was very criticized at the beginning, now, after some time distance, the results of this study shows that it has great potential, that it was flexible urbanization with sense of width (for space, air, greenery, view, sunshine, traffic, parking, etc) which gives opportunity for next generations to intervene in urban tissue or to keep grown greenery. Some of the main problems that contemporary old part of city waterfront have today, the Modernism, as it is shown on the example of Belgrade, still function well. On the other, contemporary urbanism doesn't have one great vision of the whole city perspectives but more mega projects in different parts of the city, so it gets the impression of disconnection. These results allow us to better understand the process of renewal and could

help a lot for the future development of the waterfront area.

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Conflict of interests

The author declare no conflict of interest.

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