

Foreign Experience in Renovation of Pedestrian Spaces in Coastal Territories

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Abstract. In this scientific work, pedestrian spaces of embankments, boulevards, streets of the central part of the city are considered from the perspective of architectural and planning principles and compositional techniques used in their formation. The foreign and historical experience of renovation of pedestrian spaces of the central part of the city, as well as coastal territories is considered. The interrelation of pedestrian spaces and the planning structure of the city as a whole is revealed. Variants of the organization of pedestrian streets in residential buildings have been studied. The reasons for the design that negatively and positively affect the creation of pedestrian spaces are determined. The ecological situation in Russia (on the example of Novosibirsk) related to recycling collection points is studied separately, possible ways of solving the problem for creating environmentally comfortable pedestrian and walking spaces of the city are proposed. Proposals are made to use the positively proven experience of European countries and the United Arab Emirates in the field of solid municipal waste management in the Russian Federation, successful domestic projects are presented. The results obtained show the importance of developing a network of solid waste collection points in Novosibirsk within pedestrian spaces.

Keywords: Pedestrian spaces, Coastal territories, Siberia, River, Riverine landscape, Recreational spaces, River facade, Re-functionalization, Historical analysis

1 Introduction

One of the incentives for organizing a pedestrian street is the assumption that its arrangement will contribute to solving transport problems. Practice shows that this happens in the following cases: either when the traffic schedule on a pedestrian street is strictly observed, or when traffic and pedestrian flows move without intersecting at different levels or in parallel. Mobile, transformable and stationary fences (grilles, barriers, bollards, chains, etc.) can serve as devices for spatial regulation.

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If a pedestrian street is organized in a residential building, local residents will have to put up with crowds of tourists walking under their windows almost around the clock, and develop a system for protecting private spaces. Entrepreneurs will have to reorient their services from motorist buyers to pedestrian buyers, change the assortment and terms of delivery of goods after the construction of a pedestrian street. Motorists will have to develop new routes, look for other places to park their vehicles[1].

The creation of pedestrian streets can simultaneously reduce the number of conflict situations between traffic and pedestrian flows and promote environmental measures, such as landscaping, reduce noise and air pollution. When a street acquires pedestrian status, there is a significant (about 75%) decrease in the concentration of carbon dioxide and other gases. However, the organization of pedestrian streets entails an increase in traffic intensity on adjacent streets and deterioration of road conditions on them. Accordingly, the level of traffic noise and gas pollution on adjacent streets increases without taking special measures.

Therefore, when a street turns into a pedestrian one, it is important to provide a solution in which nearby territories would not inherit its problems.

It is not always advisable to convert streets into pedestrian ones. There are situations when, taking into account the requirements of business activity, it is more reasonable to maintain high automobile accessibility to individual objects (office buildings, banks, shops selling bulky goods, etc.). In the city center, there is a need to re-equip parallel streets on both sides to accept additional load. For example, despite the ardent desire of the city authorities of the city of Herzliya to make one of the central streets pedestrian, the site commissioned this year still includes a thin fountain pen in the middle — neighboring streets were unable to absorb the fully increased traffic flow and provide reliable infrastructure connection for the new project [2].

The costs of converting the street into a pedestrian one depend on local conditions and must be carefully calculated. The main financial expenses are related to the installation of new paving, the installation of road signs, plastic . the processing of the relief and works on landscaping, lighting and decorative design.

Pedestrian streets are usually paved with stone or materials replacing it. The coating must be durable, environmentally and functionally safe, comfortable, resistant to mechanical and atmospheric influences, aesthetically attractive.

Decorative elements of landscaping are used to enhance the artistic expressiveness of pedestrian streets. The introduction of urban furniture and equipment, objects of monumental and decorative art, decorative landscaping, water devices and decorative lighting allows you to aesthetically enrich the space, create compositional accents, give individuality to the appearance of the street [2].

The creation of a pedestrian street requires a thoughtful approach from the authorities and designers, a search for options taking into account the requirements of all stakeholders, a very careful attitude to the historical truth, a competition with a thorough examination and economic calculation of the proposed design solutions [3].

In historical cities, every year there is a need to renovate a large number of pedestrian spaces of coastal zones (embankments, sidewalks, roads, etc.). The relationship of pedestrian spaces and the planning structure of the city as a whole determines the basic principles of the inner-city road network with all its pros and cons. Pedestrian space is a specific kind of urban environment. It differs sharply from the environment of ordinary streets and squares with traffic in its architectural scale, saturation with pedestrian service items, interior character and some visual isolation, closer relationship between artificial and natural components, complex functional zoning. Buildings and structures surrounding pedestrian spaces, changes in regulatory documentation and the urban planning code, as

well as the approval of new master plans for urban development, require the attraction of funds, the payback of which depends on the quality of the elaborated design documentation, the development of architectural planning and conceptual design solutions, as well as the placement and distribution of functional zones, projected coastal areas, with taking into account all segments of the population, including people with disabilities. The principles and factors of the formation of pedestrian spaces considered in the article lead to the fact that the principle of "paper" architecture to elaborated working projects, taking into account the balance of territories, is the only correct solution aimed at the sustainable development of pedestrian spaces of coastal zones, as well as the development of proposals for renovation and "refunctionalization" of nearby design objects, in order to further comprehensive development, taking into account their features, as well as strengths and limitations [4].

After the fall of the Berlin Wall in 1989, the country's leadership faced a problem: what to do with the largest European city, which has turned into an abandoned suburb because of the state border that passed through it for forty years. At the initiative of Hans Stimman, a reconstruction plan was developed in which the system of ensembles, the grid of streets and the typology of the pre-war Berlin building used the concepts of its "renaissance". The first stage of refunctionalization (1989-2001) is known as "critical reconstruction". Berlin, which received an impetus for development, became the object of architectural debates, the focus of various avant-garde trends, a platform for experiments. One of the results of the interaction of the concepts of "respectable traditionalism" and modernism was the system of public pedestrian spaces that united the central part of Berlin. The planning nodes – Alexanderplatz, the recreated Nikolaifirtel quarter, Museum Island, Gendarmenmarkt, Pariserplatz at the Brandenburg Gate, the modern Potsdamerplatz complex – are connected by the main Berlin streets: Unter den Linden, Friedrichstrasse, Wilhelmstrasse, Ebertstrasse. The route with a length of about 4 km passes through well-maintained pedestrian areas, boulevards, wide sidewalks of highways that provide comfortable traffic. It is being developed along the embankments of the Spree, in the passages and atriums inside the blocks, cozy squares, green spaces of the Tiergarten and new buildings. Along the entire route there are U-Bahn stations and public transport stops, convenient pedestrian crossings, ground and underground parking.

The renovated Friedrichstrasse and Potsdamerplatz became symbols of the new Berlin. A walk along Friedrichstrasse is compared to "visiting the library of modern architectural theory," based on following the laws of evolution and searching for "a new tradition that would be able to survive in a dynamic future." Architects use the principle of embedding a modern structure into a traditional block, so that public areas and pedestrian connections are continued in spectacular interior spaces [5].

Frankfurt, in turn, aspires to the heights: the financial center of the continent, the European transport hub. At the same time, the pan-European city with its town hall on the Remerberg and restored historical frame houses has not lost the charm of a "dollhouse" and sometimes calls itself "the smallest capital of the world" with pleasure.

All the sights and other objects of public attraction are concentrated compactly and can be walked around in less than half a day. One of the main shopping streets of Frankfurt is the so-called "golden mile" Zeil - Zeil. This green pedestrian zone – the center of successful trade in the city – stretches between the Hauptwache (Guardhouse) and the Konstablerwache, in the center of Frankfurt. On the Zeil, directly near the Hauptwashe, the Zeilgalerie and Frankfurt Hoch 4 (Frankfurth 4) – the shopping centers of Frankfurt - rise. There is an open-air observation deck on the roof of the Zeilgalerie, from where you can admire Frankfurt. There is another pedestrian zone between Hauptwashe and Escheimeg

Turn (Eschenheim Tower) - the Schillerstrasse (Schillerstrasse). As well as the pedestrian area of Grosse Bockenheimer Strasse. Stores are located in underground and aboveground spaces.

The cultural center of Frankfurt am Main is the Embankment of Museums or the Museum Embankment - the embankment of the southern bank of the Main River in Frankfurt in the area of the Eiserner Steg Bridge and the Friedensbrücke Bridge. The embankment got its name because of the large concentration of museums. The Museum Embankment is also a venue for various cultural events – on the last weekend of August, a "Holiday on the Museum Embankment" is held here, and in the spring – "Night of Museums", during which museums work all night. Schaumgasse Street (German. Chaimaipkai), where the museums are located, is partially blocked for traffic on Saturdays due to the holding of the largest flea market in Frankfurt.

Another attraction of Frankfurt is the pedestrian bridge over the Main. On the bridge you can get directly from the historical center from the City Hall to the Museum shore. On September 29, 1869, the "Iron Bridge" was put into operation. Made in the Neo-Gothic style, it has become a real monument of its time, a symbol of the industrial era.

Barcelona is a port city, but this does not mean that you are supposed to walk only on the beach here. There is a curious feature of the urban layout here: houses are often built in a "square" (this is especially noticeable if you look at the Eixample district on the map), and the interior space is inaccessible to the public – it is most often a patio for relaxing. Public areas – streets between houses, parks, squares, terraces, embankments – are filled with actively living people. Especially in the summer, when crowds of tourists pass through Barcelona – they will experience interaction with the surrounding urban environment, friendly and beautiful [6].

The Satalunya Square is a commercial center, the pedestrian Route de Gracia leads to the sea from it. Virey Amat Square is a large space for recreation and walking. In the center of the area, which occupies 15,000 square meters, there is an artificial pond with a beach and fountains, around which the structure of sidewalks, benches and spaces is already being formed. The gazebo, harmoniously coexisting with the trees growing around, is convenient for holding various social events.

Nou Vaggis Park. The park is located in a relatively new area of Barcelona, Nou Vaggis, in the eastern part of the city. Work on the project began in 1997. The park was opened in 2004. The total area of the territory is 170,000 square meters. It should also be noted – the Rambla Boulevard, which originates at the very port and stretches up to Plaza Catalunya.

Today, issues of spatial and social development, properties of the urban environment, optimization of infrastructure, balanced formation of territories are of particular importance.

Against the background of the urbanization of territories, the tendency to return the water spaces to their original significance in the life of the city, to restore the landscape component of coastal territories, in order to avoid the loss of natural components and the landscape originality of the coastal strips and the water area is of particular importance [7].

2 Materials and methods

The methodology for obtaining high-quality pedestrian spaces is cyclical and consists of three consecutive stages:

The first stage is a comprehensive analysis of the current state of pedestrian spaces. At this stage, a group of surveys is conducted and the parameters and characteristics of all components of the environment are determined, among the identified parameters, "conflict points of pedestrian spaces" are determined (discrepancy: landscaping systems - ongoing

social processes; main pedestrian flows - the purpose of the communication element; network components - the purpose and scale of the element);

At the second stage, the methods (design, reconstruction, optimization) and the direction (landscape framework, network components) of the project activity are determined. In accordance with the architectural and planning principles of designing pedestrian spaces (the principle of "complexity", the principle of "multifunctionality" and the principle of "sustainability"), a complex transformation of a specific element of the network is carried out;

The third stage - in accordance with the identified principles (the "network" principle, the "living environment" principle), after the implementation of the main measures for the transformation of pedestrian spaces, a mandatory stage of analysis of the operation of this element by residents follows, on the basis of which new "conflict points of pedestrian spaces are determined and the design cycle is repeated [8].

In a city with an already existing history, there is inevitably a need to update significant sections of the territory of the existing development [9]. This is due to the moral and physical deterioration of buildings, changes in urban planning tasks and requires, as a rule, significant investments. Their sizes depend on the correct definition of new functional, planning and architectural solutions for future development, which is important both from the point of view of the quality of the urban environment and increasing the economic potential of the city. Thus, conceptual projects for the prospective use of the territory can be considered as a tool for architectural and urban planning forecasting, analysis of problem areas of the city and identification of relevant areas for investment. The main task of the conceptual project is to find an original solution that can bring a new quality to the formation of the urban environment and guarantee the high efficiency of the investment project [7,9].

3 Results

Public space is one of the most important elements of the life of any city. This is due to the fact that the interaction of people in the urban area has a positive effect on the development of the life of the city as a whole. The absence of such territories limits adaptive and communicative functions [10]. Therefore, for the development of the city and improving the quality of life of the population, it is important to organize such territories, making them as environmentally friendly, accessible and convenient for citizens as possible.

Being a multifunctional environment, the city promotes a closer and more concentrated process of communication between people and various systems. Walking is often the simplest and most natural means of transportation in the center of the cities considered for a person, since the structure of the center is more often compact, and all its objects are "within walking distance. The pedestrian framework of the city center is a system of mostly linear or branched pedestrian spaces, less often compact. The analysis of pedestrian spaces of the city today should be given special attention for a number of reasons [6,7].

Firstly, it is the process of spontaneous motorization, which has a negative impact on open pedestrian spaces and has led to the problem of antagonism between transport and pedestrians. A negative factor is also the deterioration of the environmental situation, which has a direct impact on pedestrians, since most of the pedestrian path in the city center runs along transport systems[8]. Due to the high level of motorization, the concept of, for example, an open linear pedestrian space in most cases today has been reduced to the concept of a sidewalk, which has become perceived as an appendix to the highway. Priorities in cities have shifted in the wrong direction, since the formation of the existing

environment takes into account the interests of a secondary participant (car) of the communication process, and not the main one (pedestrian).

Recently, the question of the safety of pedestrian spaces has been increasingly raised, since with an increase in the level of motorization, the risk to the lives of pedestrians has increased, which indicates the lack of necessary landscaping of pedestrian spaces capable of ensuring safe human movement [9].

Secondly, the growth and development of cities require a more responsible approach to the formation of pedestrian spaces, as the needs of its population grow along with the city. Of course, in the centers of the cities considered today there is a tendency to create and reconstruct pedestrian spaces, however, not all examples can be called successful. Most pedestrian spaces of cities remain unattractive and are often unable to meet the needs of residents of a modern metropolis. Often, pedestrians on a whim can only be guided by the criterion of "passability" and elementary convenience.

Thirdly, the question of the development of the sports function of open urban pedestrian spaces has long been raised, in particular, the development of cycling, for which a separate territory must be allocated in open pedestrian spaces. It follows from this that the existing communication system needs to be reviewed.

Fourth, open pedestrian spaces, in addition to connecting important urban sites, are themselves objects of historical and cultural heritage and should be adapted to the tourist function. As you know, pedestrian spaces play an important role in shaping the "face" and image of the city.

4 Discussions

At the moment, Russia is experiencing a serious garbage crisis. One of the main reasons for the growing volume of waste is the uncontrolled growth in the production and use of disposable goods, containers and packaging, especially plastic. At the same time, they are almost not recycled and, in addition to landfills, often end up in the environment: in forests, on coasts, in the seas.

According to the Ministry of Nature of Russia, only 7-8% of municipal solid waste is processed in the country, and 2.2% is destroyed, including at incinerators.

Every year at least 9 million tons of waste paper, 2 million tons of plastic and 0.5 million tons of glass end up in landfills and in the environment [11].

It is the common participation of people in the separate collection of waste that makes their subsequent recycling likely. The main obstacle on the way to this goal remains the lack of the necessary infrastructure: in order to hand over this or that type of waste, sometimes you have to spend too much effort: time and money to move around the city. According to a survey by the Public Opinion Foundation conducted in June 2021, 71% of respondents replied that they did not have conditions for separate garbage collection near the house [12].

5 Conclusions

The walking accessibility of recycling collection points can be a guarantee for increasing the percentage of recycling. The main number of MSW reception points falls on the adjacent territories. House-side separate waste collection is most effective for areas with individual and low-rise residential buildings (apartment buildings, townhouses, cottages, the height of which does not exceed 2-3 floors in most cases). Attempts to organize separate waste collection in apartment buildings often give lower results in terms of the volume and quality of separately collected waste. However, the barrier to the introduction of a separate

house collection is often the high cost. Therefore, a good alternative is a well-planned, dense network of waste collection points that can significantly increase the volume of recyclables collected [13]. To obtain maximum results, such a network should be integrated into the pedestrian and walking spaces of the city. Such spaces are divided into the following types:

- pedestrian street;
- boulevard;
- square;
- embankment.

When implementing the integration of recycling collection points into public spaces, it is important to supplement them, for example, with information stands with information about the rules and benefits of recycling, since at the moment only a small part of the population in Russia has high-quality information about this. In addition, it is necessary to take into account the mistakes and positive experiences of other countries. There is such experience – Spain, Lithuania, Portugal, Poland and others.

In Dubai (United Arab Emirates), you can find both the usual urns and urns divided into fractions for collecting different types of waste on the streets. Such bins are integrated into pedestrian and walking spaces and allow you to increase the amount of recyclable waste. Currently, all environmental projects implemented in the United Arab Emirates allow reducing the amount of waste that is sent to the landfill by 20% per year.

We can observe that Novosibirsk containers are often overflowing. This happens for a number of reasons: firstly, residents are poorly informed about the sorting rules, since there is garbage in the containers that does not belong to the specified fraction. Secondly, there is a significant disadvantage of containers: often one plastic container belongs to 2-3 multi-storey buildings. Containers in Novosibirsk are much larger in size, since they are mainly located on garbage sites belonging to apartment buildings, and are not inscribed in the walking spaces of the city. Containers in Dubai are placed on pedestrian streets, squares and other public spaces. However, in the examples from both countries, psychological nuances are successfully taken into account: the task of putting recyclables in a container does not include lifting the lid, since people subconsciously neglect to take up the handles of waste containers. In Dubai, the holes for recyclables are suitable for the type of waste collected, but do not allow you to put garbage of another fraction into containers.

As a successful implemented project within the framework of the topic under consideration, one can cite the walking territory of the 300th Anniversary Park in St. Petersburg. As part of the overall strategy in the field of sustainable development, HEINEKEN has been implementing the Clean Shores environmental project in Russia since 2007. The aim of the project is to form a responsible attitude towards the environment among the population; to create the necessary infrastructure for cleaning and recycling waste in the pedestrian spaces of the city. The project covers St. Petersburg, Nizhny Novgorod, Olkhon Island (Irkutsk region), Khabarovsk [11].

Another positively proven domestic project in this area is the "Recycle map" – on the website of the Russian association Greenpeace there is a map on which you can find the nearest waste disposal point. A suitable recycling collection point can be searched for in 11 categories (paper, plastic, glass, metal, clothing, hazardous waste, batteries, mercury lamps, electrical junk, tetra pak). It is possible to look at the list of the nearest points by location or all the points of the desired type in the city [6,7,8,9].

These and other factors confirm the need for the most thorough study of pedestrian spaces in the centers of large cities and their problems, reassessment of their importance

taking into account foreign experience, which shows that the potential of pedestrian spaces can be used many times more effectively, simultaneously solving transport and environmental problems of the city [14,15].

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