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## RENOVATION OF RIVERSIDE SPACE FROM INDUSTRIAL PAST TO SUSTAINABLE FUTURE

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**Summary.** *Ukrainian cities are on the stage of industrial development, some of them have just started the process of transformation into post-industrial sustainable city. Majority of Ukrainian cities are stagnating. Ukrainian urban areas also have a particular feature. Major cities, for example, Dnipro, are no longer simply industrial cities, because today industry doesn't play a leading role in the city development. The purpose of the work is studying of problems the riverside of industrial territories in the post-industrial cities. The following tasks have been revealed: improvement of the territory; exception of holes in city fabrics; inclusion of this territory in structure of the city; revitalization of the territory by of creation of public spaces; restoration of an ecological framework by creation of the green corridors; preservation of economic activity on the basis of the industry which has historically developed and is common for the city with development of modern technologies; preservation of the developed system of spaces and constructions. The purpose of the project is not just improvement of the territory; it is also creation of new type of cultural spaces.*

**Keywords:** *revitalization, renovation, riverside industrial territories, post-industrial city.*

### Introduction.

Nowadays almost 70% of Ukrainian population lives in urban areas, from small towns to big cities with several millions of inhabitants. Ukrainian big cities are industrial, administrative, touristic and commercial centers. Good metaphor of the city is a car, a human body, a beehive. They are similar in their level of self-organization and self-regulation. A city is an open dissipative system. It lives and develops itself. The developing is going through time. Something that is useful now can be a problem for the city in future. Dnipro illustrates a strong example of problems of Ukrainian cities. Dnipropetrovsk has been founded in 1787 on the hill of the right bank of the river Dnipro. The river was a source of water and a transport route. Later, in 19th century, the city became an industrial center of iron and steel industry. Factories were located along the banks of the river on the outskirts of the city. This was useful for water supply, transportation and infrastructure. The riverbank was not used as a recreational area. It was converted into lumber storage for timber floating. More than 100 years passed, the city grew and developed.

### Main text.

Naturally, that the importance of urban areas and centers varies in different historical periods. Thus, during a period of industrialization from 1910 to 1930, the priority part of the city was located near the industrial area. Here the best architectural complexes of that time were built: housing, commune houses, club, hospital etc. For now, this industry is outdated, economic interests and territory priorities have changed, so this district lost its prestige.

Huge metallurgic plants happened to be in the city center beside the riverbank.



Economic and political crises of last 25 years didn't help ameliorate the industry. Historically, the stages of the formation of the Dnieper depended on the development of industry. [2, 3] Unsustainable production patterns pollute the environment, obstruct citizens from the river and the methods of production are obsolete. According to Central geographic Observatory of Ministry of Emergencies of Ukraine, 14 regional centers of Ukraine have high concentration of hazardous substances in the air. In Dnipro, Odessa the level of atmospheric pollution classified as very high. This survey shows how big negative environmental footprint of Ukrainian industrial cities is. Industry is still very important for economy of the city, but it is obvious, that it has to be removed out of the city center. The process of urbanization is still going on. The study analyzed the general plan of the city, identified significant industrial areas that are located in the central and coastal areas of the city. The total area of industrial zones is 23% of the city's area. [4] Migration of rural population to the cities ruins villages. This situation requires an immediate response. Dnipro has several industrial areas, which ring the city. Some of them are adjacent to the city center. Riverside industrial territories are areas of special interest. Dnipropetrovsk has four riverside industrial districts, each with its own features.

The first one is relatively small zone of about 1.5 square kilometers. It is located on the western outskirts of the city on the left bank. There are small companies, warehouses, boat repair shops. Among the most acute problems in the use of coastal territories is landscape organization and ensuring the population's access to the water surface [1]. It is possible that this territory needs to be renovated, but on the first sight, it doesn't have deep problems. This part of the city doesn't function actively and it doesn't have developed infrastructure.

The second one is a large industrial area of about 15 square kilometers, which is adjacent to the confluence of the Dnipro and Samara rivers in the north of the city. There are large factories, including pipe plants. Some of the plants have been built recently following latest standards to limit emissions. The other factories need to be modernized but the area is likely to keep its function in the near future. Its role in the planning structure of the city is not the most important one.

The third area is a small territory of approximately 1 square kilometer. A thermal coal power plant that provides energy to the city is situated here. It needs modernization because the city needs energy.

The fourth is a large area of about 4 square kilometers. This is the most problematic and interesting of the riverside areas of the city. There are enterprises of iron and steel industry in the district. They use outdated technology including blast furnaces. In addition, these companies pollute the environment with noise and hazardous waste and the area creates an unfavorable environment. The problem is compounded by the fact that the site is adjacent to the city center and cuts off residential areas from the river. PSACEA researches and develops projects for the renovation and revitalization of this area since 2008.

The planning structure of Dnipro has two specific features and bundles two planning types: linear and centric structure. Historic settlements on the territory of modern Dnipro were closely associated with the river Dnipro. The first major settlement, New Kodak, developed with the ferry. New city of Ekaterinoslav (1787)



was built on a hill, around which the river makes a sharp turn to the south. In the process of territorial growth, the city developed linearly to the west, so did the industry. Gradually Ekaterinoslav connected with New Kodak. Reaching certain parameters of linearity (about 8 kilometers), the city began to develop in the perpendicular direction becoming more compact. In that period a system of suburban settlements developed around the city.

Linearly nodal framework of the city develops along the river Dnipro and turns along with it. A number of watersheds — the seven hills, — give the positions of cross-links; they alternate with draws — green corridors. This structure also sets the rhythm of the links and nodes of the left bank, although its terrain is flat. Central nodes in this elegant geometry are developed in different ways, depending on the functional activity of the area. The right bank has more advanced system of nodes and links than the left bank, because the left bank was forming with lack of adequate planning. Centric planning structure exerts itself with radial links. This type of structure emerged because the territorial growth of the city was going in all directions. Therefore, the urban area of 332 square kilometers is now rather compact. The combination of these two structures created a very interesting spatial planning situation. During 1970-1980, a concept of “Great Dnipro Ensemble” was designed. It included a system of spatial focuses, silhouettes, which regarded the terrain: the river, the hills and the turn of the river around the main hill.

The urban space of Dnipro is utilized patchily. The density of the streets and buildings is not regular. The population density is 3,170 persons per square kilometer. Public and living areas occupy 53% of the city; low-rise housing covers a half of this territory. It means that the average density of land use is quite low. The functional activity rises in the central part of the city and in living quarters built in the 20th century. Priority of the coastal zone is declared in the concept of development of the city. It is partly implemented: there were a few periods, when riverside areas were actively developing, but we didn't achieve the integrity. Along the banks of the river Dnipro several active areas have formed, although they were not coherent.

The actual system of the centers of Dnipro is different from the one that was designed in the master plan. The master plan supposes the development of the city centers on the both banks and a uniform system of centers in living quarters. In reality, these centers only develop in densely populated areas, which demonstrate the potential to become multifunctional.

### **Conclusion.**

The riverside territories of the city were considered. The most part of city functions and working places are concentrated in one city center on the right bank. However, this center is not the absolute point of the city because of the planning structure. The structure of the city is not tied to the center, as in the concentric structure. The center does not get excessive load. Thus, the city has perspective of becoming a polycentric structure through the development of a system of public facilities and spaces of various functions next to living areas, including working places. The polycentric structure of local centers will gravitate to coastal zones. So a complex central region will form along the right bank, the system of dispersed centers will emerge along the left bank and existing centers will remain where they



are. Conclusions were drawn about the need for a comprehensive renovation of the riverine areas of the city. The study of these areas involves a certain block of measures aimed at determining the new function of industrial areas, their new planning structure, taking into account the entire urban organism. Post-soviet Ukrainian industrial cities demand an adequate planning on each level. To create a comfortable environment for citizens we should start with the new concept of the master plan of the city. These new plans should be consistent with the Ukrainian motion vector. At the moment they should comport with European standards and principles of sustainable development. The creation of a comfortable environment for people should be based on eco-humanistic principles.

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**Аннотация.** Украинские города находятся на стадии индустриального развития, некоторые из них только начали процесс трансформации в постиндустриальный устойчивый город. В большинстве украинских городов наблюдается стагнация. Украинские городские районы тоже имеют свою особенность. Крупные города, например, Днепр, Харьков, перестали быть просто промышленными городами, потому что сегодня промышленность не играет ведущей роли в развитии города. Целью работы является изучение проблем приречных промышленных территорий в постиндустриальных городах. Выявлены следующие задачи: благоустройство территории; исключение разрывов в городских тканях; включение этой территории в состав города; озеленение территории за счет создания общественных пространств; сохранение хозяйственной деятельности на базе исторически сложившейся и присущей городу отрасли с развитием современных технологий; сохранение развитой системы пространств и построек. Ревитализация территории с помощью создания рекреационных пространств, и восстановление экологического каркаса с помощью создания зеленых коридоров, сохранение экономической активности на основе промышленности, которая исторически сложилась и является характерной для города, развивая современные технологии, сохранение сложившейся



системы пространств и сооружений. Цель проекта - не просто благоустройство территории; это также создание нового типа культурных пространств. Методика. Для исследования использовались графоаналитические методы, а также изучение и анализ зарубежного и отечественного опыта реновации и ревитализации приречных промышленных территорий. В исследовании был проанализирован генеральный план города, определены значительные промышленные районы, которые расположены в центральных и прибрежных районах города.

**Ключевые слова:** ревитализация, реновация, прибрежные промышленные территории, постиндустриальный город.

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