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INDUSTRIAL BROWNFIELDS AS MODERNIST LEGACY IN POST-SOCIALISTIC CITY – A QUALITATIVE ANALYSIS

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Abstract. *The aim of this paper is to investigate the potential redevelopment perspectives of the former industrial sites. A qualitative analysis of the post-WWII industrial site in Niš, Serbia, and its modernistic legacy was performed, related to the important issues of urban morphology. The qualities which are remaining behind the "rusty" industrial landscape were examined in view of the contemporary approach to the concept of the sustainable city. The research findings suggest the existence of need for interventions in the actual morphology of the examined urban space in order to fulfill the contemporary trends of placemaking.*

Key words: *industrial sites, brownfields, modernism, urban design, urban morphology*

1. INTRODUCTION

Abandoned and underused former industrial sites can be found in almost every part of Europe. Although the reasons for a decline in industrial activities may be numerous and different, depending on the country or region, there are certain common characteristics of these industrial residues which can be identified. While early industrialized countries challenged themselves with the brownfields and the heritage of the industrial development early stages (XVIII and XIX century developments), the others, and particularly countries of the former Eastern Bloc (and similar) are facing the challenges of the industrial brownfields originating mostly from the post–WWII period. During the twentieth century, almost all countries adopted the ideas of modernism in architecture and urban planning; the Athens Charter (CIAM) was adopted in 1931, while the whole modern movement profoundly affected the post-WWII reconstruction of Europe in particular (Carmona, 2003). Examples of the global post-war high-modernist city building phenomenon are found in both capitalist and communist countries, and equally in developed and developing economies (Scott, 1999). Furthermore, the socialistic countries were leaders in the consistent

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implementation of the modernist principles, partly because their political regimes used the modern movement to deploy the political ideas (Frampton, 1980). The ideas about the architecture and urban planning resulting from the works of CIAM and Le Corbusier were widely promoted and implemented by architects and planners working in these countries. Exemplary manifestations of the "tower in the park" urbanism and zoned cities can be found throughout that region. However, the last decades of the twentieth century were marked by problems in many social spheres, with consequences in the urban planning and architecture. The heydays of industrial development were over and many countries faced the post-industrial reality. The occurrence of industrial brownfields and industrial residues in developed European countries, with their long-term tradition in planning and industry, was a subject of analysis, discussion and active approach for quite a long period. Also, the care, revitalization and revival of the sites and buildings which are considered as cultural heritage became customary, and these measures were generally applied on the industrial buildings and sites from the distant history (XVIII and XIX c.) (Stratton, 2005). More recently, there is a growing interest and understanding of the industrial heritage from the closer past. Also the concept of the heritage (cultural, historical, and industrial) evolved into the broader sense, and more importantly, changed the treatment of the heritage. (UNESCO, 2011)

It can be noticed that in Serbia and the former Eastern Bloc countries less was done in redeveloping industrial brownfields in comparison to the developed countries, and that the remains of industrial activities originate mostly from the post-WWII period. Therefore, the aim of this paper is to identify problems and capacities for revival of these sites in relation to their origin, as socialistic and modernistic industrial heritage. Other goal is to define the characteristics of the post-socialist industrial brownfields based on the case analysis of the post-WWII industrial site in Niš, Serbia, and to create the relation between the initial ideas of modernistic architects and their vision of industrial architecture and the reality of the present days, after political changes, decline of industrial production, changes in discourses of architecture and urban planning and design. The prospects of the former (modernistic) industrial buildings and sites to embrace the contemporary demands in urban space are discussed.

2. CONCEPTUALIZING CONTEMPORARY CITY

In recent decades we have witnessed crisis and changes, decline and devastation of urban lands due to the industrial production decline, job loss, political, economic and social changes etc. Post-war urban planners and architects were predicting a prosperous world of continuous expansions, defined by the rapid industrial growth and new technologies (Carmona, 2003). However, contemporary society and trends in the world have showed us that modernity did have some shortcomings. Although it has started as a positive movement which offered the answers to the accumulated problems of earlier period of the industrial revolution, it turned out that the ideas of modernity were transformed into something else. It became clear that the urban language of older (previous) ages could better respond to the needs of urban people and urban life, which was pointed out by researchers as the placemaking tradition. The theory of placemaking was triggered by the overall dissatisfaction with the quality of urban environment of contemporary cities, after the boom in post-WWII period and unlimited expansion of cities by modernistic models. In this research we have defined the level of urban design as the starting point for discussion about possibilities

and problems of redefining modernistic industrial sites. Basically, seven objectives were identified in the literature – each relating to the concept of place:

- *character* – a place with its own identity.
- *quality of the public realm* – a place with attractive and successful outdoor areas.
- *continuity and enclosure* – a place where public and private spaces are clearly distinguished.
- *ease of movement* – a place that is easy to get to and move through.
- *legibility* – a place that has a clear image and is easy to understand.
- *adaptability* – a place that can change easily.
- *diversity* – a place with variety and choice (DETR/CABE 2000)

These definitions were published by the UK competent Ministry, but other authors offered their own guidelines for design of contemporary (post-modern) urban space much earlier – among others, Kevin Lynch (1981), Nan Ellin (2006), Jan Gehl (1971), Bentley et al. (1985), Appleyard & Jacobs, (1982) etc. In this paper we will examine the applicability of such objectives in revitalization of modernistic industrial complexes providing their contemporary reuse.

This research was also based on the Historic Urban Landscape - HUL approach (UNESCO, 2011) in the field of the heritage management context. The HUL defines a complex framework of references in which new conservation policies are included:

- from conservation of monuments and archaeological sites to *management of living cities and cultural landscapes* (the context as a systemic interrelation between economic, social, environmental and cultural factors);
- from mono-disciplinary processes of restoration and urban regeneration, to *an integrative and participatory process of the management of change*;
- from preservation of buildings to *enhancement of value, integrating the aims of urban conservation and socio-economic development*.

The new vision of former industrial sites aims at preserving the quality of the human environment and at improving the productivity of urban spaces, integrating the objectives of conservation of urban heritage with socio-economic development, on the basis of a balanced and sustainable relation between the built and the natural environment. This approach, centered on the historic urban landscape, is inspired by tradition of local communities, recognizing the importance of historic areas and the values related to their history and collective memory in modern societies (UNESCO, 2011).

3. Characteristics of Modernism

Modernism was born when discontent with nineteenth century and early twentieth century industrial cities culminated. It is often seen as having an inherent anti-urban bias (Carmona, 2003). Modernists were seeking to derive new principles of urban form, so traditional, relatively low-rise streets, squares and urban blocks were being avoided in favor of rational, often orthogonal, distributions of slab and point blocks set in park land and other open space. Rather than being enclosed by buildings, space would flow freely around buildings to allow light in and air to circulate (Carmona, 2003).

The key element of the Le Corbusier's Athens Charter was the rigid functional zoning of city plan with green belts between areas reserved for different land uses. Cities were seen as machines for logical separation and direction of human movement and activities rather than place for people. The logic of functional zoning, reinforced by transport

developments and larger building complexes which internalized much of the traditional street life and activity, reduced the complexity and vitality of urban spaces (Frampton, 1980; Carmona, 2003).

Modernistic architects tended to express the function and functional requirements of the buildings. The design process started from the inside out, responding only to the architectural program and functional requirements – for light, air, hygiene, aspect, prospect, recreation, movement and openness (Frampton, 1980; Carmona, 2003). Following their own internal judgment which was not necessarily in accord with the immediate urban context, modern buildings were designed as sculptures, or 'objects-in-space'. Dissimilarity with the past was emphasized, while the past and history were seen as an obstruction to the future. Though this approach was largely 'rhetoric rather than reality', it was important in shaping attitudes and values. The comprehensive redevelopment was preferred, and during the post-WWII period it was dramatically accelerated and the physical scale of the urban change was accentuated. The social qualities of streets were underrated, the roads sliced up and fragmented urban areas, altogether causing problems of severance (Carmona, 2003). Modernism failed to produce 'good' streets or 'good' cities and there was recognition that '… the typical fabric and its overall orchestration were better in previous eras.' (Kelbaugh, 1997)

Modernist architects are accused of mastering the virtuosity of form and imagination, while undervaluing the spirit of place. Typically, modernists ignored the past, and rejected its heritage. Disappointment with Modernist architecture – or, rather, its debasement through industrialized production and construction techniques – has been well documented in books (Blake 1974; Wolfe 1981).

4. MODERNISM IN INDUSTRIAL ARCHITECTURE IN EASTERN EUROPE AND SERBIA

The post-WWII industrial complexes are the typical exponents of the modernistic era. Although the modern movement was born decades earlier, this period could be qualified as modernistic due to the morphological, stylistic and building qualities which have characteristics of the modern movement. The industrial developments were planned and placed within the suburban area with the idea of splitting and "mechanizing" human activities (work, sleep, education, recreation…) into separate urban territorial zones. The consequence was the growing need for good traffic connections and speed roads that praised usage of public transport and personal cars. Unsurprisingly, the industrial zones in cities were isolated from other urban zones and separated by the spacious greenbelts; actually, detached industrial zones outside the urban matrix are the legacy of the modern movement which is still legitimately used in the contemporary city planning. The industrial complex in the post-WWII period was usually designed for the large area. The reason for that can be found in the modernist idea of the "garden city" (with low level of occupation ratio) which was applied despite the future industrial usage; at the same time, development of huge industrial complexes was the matter of political competitiveness. The complexes were designed in the rational architectural manner with orthogonal building schemes and modest materialization. Huge building formats ("big boxes") are multifactorial phenomenon: it is a demonstration of general enthusiasm of modernist authors with large-scale buildings and infrastructure, technological requirements of industry and aforementioned political uses. Prefabricated concrete which was used for structural elements, facade panels and elements of landscaping was the primary building material available for the majority of projects, although steel frame structures with lightweight metal panels were also used.

Concrete facades were often left grey and undecorated, although better examples incorporated colored panels or carefully detailed window assemblies. Overall, the practical and formal aspects of architecture had no measurable value, and therefore had little relevance to design decision-making. The resulting buildings were not valued as architectural objects, but rather as indicators of production performance. Meeting quantitative targets was more important than evaluating what had been produced, thus removing any incentive to improve architecture on aesthetic or functional grounds (Zarecor, 2014).

5. CASE STUDY OF THE ELECTRONIC INDUSTRY (EI) COMPLEX IN NIS (SERBIA)

This industrial complex located in the suburban area of Nis on 66ha, built from 1948 to 1973, is a typical modernistic complex in terms of urban morphology. It is located in the "garden area", as the complex of freestanding buildings, designed with the inconsistent architectural expression. In general, the language of industrial architecture was employed, which ranges from typical modern buildings with horizontal fenestration, flat roofs and white coatings, to more brutally conceived structures of prefabricated uncolored concrete; some buildings are less ambitiously designed, enclosed with other types of paneling which gives them more provisional appearance. There are several building typologies, varying from single-story to multi-story manufacturing facilities, storages and research facilities, but also administrative buildings, infirmary, secondary school and other specific facilities (boiler room, substation, gas station, above-ground fuel tanks, etc.), in total 119 registered buildings and 220,000 square meters of built space. The number of floors and the height of the buildings vary; multi-storey production facilities which are up to 10-15m high are dominant over the whole complex by their size and shape. Typical features of modernistic architecture and urban planning are present: the green buffer zone around the complex, orthogonal street system, open space around the buildings to provide enough light and air in circulation, prefabricated structures, simple facades, utilitarianism, and the absence of intensive colors. Special attention was set on design and building of the wardrobes, restaurants, infirmaries, even kindergarten facilities for workers' children, etc.

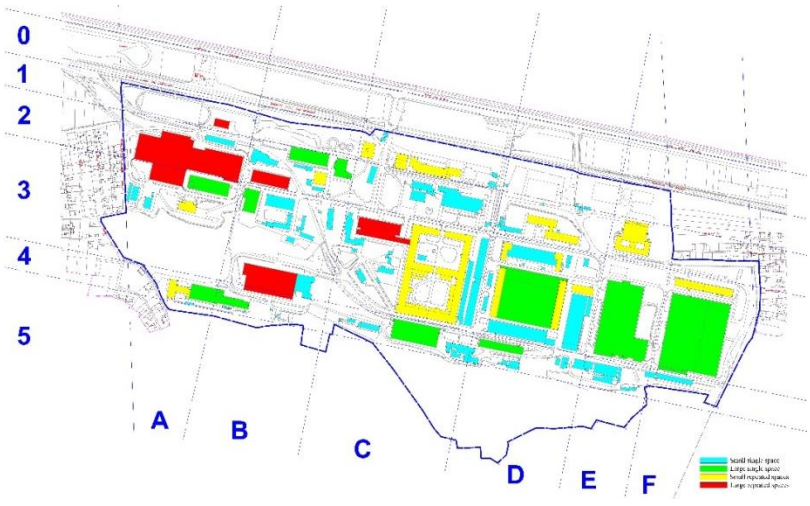

Fig. 1 The complex of EI Nis (Serbia) (source: Authors)

The architecture of the EI Nis is a mixture of modernistic and post-modern architecture, which is in accordance with the period of the complex development.

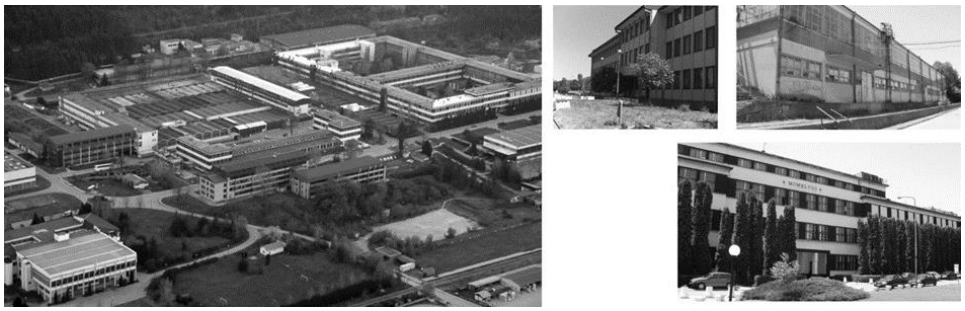

Fig. 2 The complex of EI Nis (Serbia) – *old photo-documentary* (left photo – aerial photo of the complex; right down corner – building Type C; right up corner – building Type B; right middle photo – building Type C) (source: Archival photo documentation, found at http:// www.eicorp.rs : viewed 25 December 2014)

Fig. 3 Complex of EI (Serbia) – *current condition of the complex* (left photo - building Type C; right photo - building Type D) – (photo source: Google Maps, "Streetview", digital images, http://maps.google.com : viewed 16 January 2016)

6. ANALYSIS

We have analyzed the post-WWII industrial complex transformation on the case of EI Nis (Serbia) in order to apply and concretize the goals for contemporary city, mentioned in the Chapter 2. The analysis of EI Nis was focused primarily on its physical structure, which consists of buildings surrounded by the open space, articulated through elements of urban design – streets, squares, greenery etc. The built area is materially defined by the qualities of the buildings – their size (length and width), form, height (including number of floors), façade articulation (openings – size, rhythm, shape; materialization, ornaments), etc. The interrelation between the built area and the open space is best presented at the level of the façade, which acts as an interface between the open (external) and closed (internal) space.

Table 1 Categories of the building types in the complex of EI Nis

Nature of space	Building type	No. of stories	Number of buildings	Area under the buildings
Small solitary or repeated space (*Type A*)	Workshops, Garages	Single story	83	37150.71m^2 (24.1%)
Large solitary space (*Type B*)	Manufacturing facilities, Warehouses	Single story	12	59460.23m^2 (38.6%)
Small repeated spaces (*Type C*)	Offices, Laboratories, Research facilities	Multi-storied	18	29279.75m^2 (19.0%)
Large repeated spaces (*Type D*)	Manufacturing facilities	Multi-storied	5	27957.54m^2 (18.3%)

In the spotlight of this analysis are the two main elements: the buildings and the open (unbuilt) space. For the purpose of this research, all industrial buildings in the European urban areas have been classified in five groups: production buildings, subsidiary industrial buildings, energy industrial buildings, transport buildings, storage facilities and warehouses. (Fetisov, 2013) This categorization has been done according to the general use of buildings in the complex. However, it was more important here to classify the buildings based on the building typology. Therefore, the classification was made as shown in the Table 1. By analysis of the EI complex in Nis, we were able to identify all categories and their disposition within the complex shown in the Figure 1. Table 2 shows the results of analysis which was conducted in order to establish the qualities of different building types in the EI complex.

Table 2 Qualitative analysis of the different building types

Criterion:	Openness towards street	Visual attractiveness	Communicativeness	Accessibility	Natural light	Possibility of partitioning
Type A	+	-	+/-	+	+	-
Type B	-	-	-	+	-	+
Type C	-	+	+	-	+	-/+
Type D	-	-	-	-/+	-	-/+

The second aspect is the open space - the network of streets, squares (also, handling areas) and parking lots. Although the modernistic industrial complexes do not have the same model of urban disposition, which is in general a consequence of the industrial process specificity, in our case study all elements of the modernistic urban developments can be recognized. Having in mind that this complex was developed for entirely different dynamics and usage (manufacturing and transportation processes for goods and workers), an attempt was made to exploit the qualities of these areas and convert them into the urban area. Therefore, it was important to establish the analogies which impose themselves. If the incremental approach in the recycling of the industrial complexes for any other procedures is used, it is expected to adopt the matrix of existing internal corridors for the official access streets to the buildings. Similarly, existing areas of greenery with mature trees which have been used as protective zones and decorating elements are expected to be transformed into regular park areas. Although it is unlikely to identify the typical city square in the urban

morphology of the industrial complex, it is possible to foresee the transformation of the existing areas in front of the buildings' service entrances into such form. In the Table 3, we have defined the criteria for the evaluation of the open space composite elements in the complex based on the goals explained in the chapters above. The estimation of the criteria fulfillment for the complex in general is given, as well as the overall assessment of the possibilities and difficulties for reaching them. Placemaking concept implies that the devastated areas' transformation should strive towards creation of the vibrant outdoor space. This approach includes accessibility, connectivity and appropriate dimension for all kinds of users - pedestrians, cyclers, public transport, and private cars. Also, it is important to produce activities which would unite the open and closed (inside) space and the communication between these two – communicative façades up to 5m high with appropriate openings. At the street level, a positive approach should be to integrate the existing service corridors. Avoiding the traffic speed reduction, the pavement surface should emphasize the advantageous status for pedestrians and cyclers.

Fig. 4 Complex of EI industry (SERBIA) – *current condition of the complex* (left photo - building Type C & Type A; right photo - building Type B)
(photo source: Google Maps, "Streetview", digital images, http://maps.google.com: viewed 16 January 2016)

This complex and many similar examples are usually not problematic concerning connectivity with the main roads and high speed traffic lines. In this case, the complex is situated near the main road (60km/h speed limit), separated from it by the buffer zone (a typical modernistic plan). Contemporary urban design rejects a buffer zone in order to avoid creation of an "urban crack", and suggests the creation of a content which by the syntax and character matches the position close to the high speed roads, e.g. "big box" building formats. With the new awareness of the qualities and scale of the 'traditional' city, some theorists and practitioners advocate a morphological approach to urban design, based on existing 'tried-and-tested' spatial precedents and archetypes, and stressing continuity with, rather than a break from, the past. (Carmona, 2003) The size of buildings should decrease in direction of the central area where lively and active pedestrian friendly (but not exclusively pedestrian) place should be created. Different to the modernistic emphasis on cars, there is a desire to create pedestrian-dominant environments – environments accessible to cars, but designed to suit the scale, pace and comfort of pedestrians. Street corridors should be continuous, connected the outer street matrix and able to approach to the complex from

the different directions and access points. Potential squares and plateaus should be adequately sized – open space enclosed by buildings, up to 70m wide, roughly square or rectangular shape; thereby, the position of the streets will be kept along the perimeter, while the square could also contain standing and sitting posts.

Table 3 Components of the open space – the criterions and the evaluation

	Criterion	Existing conditions	Capacity for improvement
Traffic access to the complex	Higher ranking (HR) road – necessary connection	+	-
	Transversal footbridge connection	-	+
	Lower ranking (LR) roads - integrated within the complex	+	+
	Multi-directional access to the site	- / +	+
	Integration with the outside street matrix	-	- / +
	Developed pedestrian and cycling paths in the site and integrated with city's network	-	+
	Public transport terminal	+	+
Streets/ Sidewalks	Pedestrian friendly (pavement, equipment)	-	+
	Uninterrupted sidewalks	-	+
	Space for standing/waiting and sitting/resting	-	+
	Integrated streets (mixed usage of street corridors – cars, cyclers, pedestrians)	- / +	+
	Direct connection to the buildings	- / +	+ / -
Squares	Appropriate size	+ / -	+ / -
	Form and proportions	+ / -	+ / -
	Sitting places	-	+
	Standing / Gathering areas	+ / -	+
	Urban equipment	-	+
Parks lands	Appropriate greenery	+	+
	Walking paths	-	+
	Sitting places	-	+
	Good outdoor lighting	-	+

7. DISCUSSION

Comparing the observed complex and positive model of contemporary urban space, it is possible to underline a few key points or issues. The most significant "problem" of the analyzed industrial complex are overly large dimensions, in every aspect; the size of the buildings, the distance between the structures, the length of the streets, the size of paved plateau etc. This is generally a legacy of modernistic architecture, but in the case of industrial buildings also the matter of the functional requirements. However, contemporary architecture, and more importantly urban design returns to some pre-modern conceptions, emphasizing the importance of the human scale. In this context it is evident that there is a need to physically transform the existing industrial complexes (the buildings as well as the open space around them) in order to consider them for future use. On the other hand, the size also suggests the physical capacity which can be fruitfully used – new buildings could be interpolated within existing ones to reduce distances in the open space, the existing mega-

structures by partition could be segmented and used for different uses. A positive and mitigating aspect in transformation of modernistic industrial complexes is also the fact that these structures, in most of the cases, are not listed as a cultural heritage, so the transformation is not constrained by a rigid conservation plan. However, this does not exclude the need to evaluate and to respect the (industrial) architecture, only the transformation plan should have the capacity to be more creative and less legislative. In order not to repeat the mistakes of the modernists and to stress the need of placemaking instead of virtuosity of good design (architecture/sculpture) it is necessary to preserve our history in our cities. Many of the post-WWII industrial buildings are not the examples of exceptional architecture, but the past, the history of the place, and the context are the qualities which deserve attention and incline toward contemporary understanding of revitalizing urban areas (HUL approach). It is important to cherish the history and culture of place, use and potentiate the uniqueness of the site, its appearance, position, history and destiny. Furthermore, modern, purist form (volume) of the industrial architecture is an excellent basis, without any conflict with potential additions which reflect the needs of contemporary society.

Open space around the industrial buildings should be carefully mixed with green areas which, with proper improvements, may acquire the role of city gardens and parks – the areas so much needed in any contemporary city. The modernistic industrial complexes have interesting spatial composition of low- to mid-rise buildings which have the capacity to be developed for mixed-uses, as a positive model for developing contemporary urban areas and blocks. Adaptability of the wide structural spans and wide range of building typologies gives the opportunity to introduce a multitude of different uses within the complex. The main flaws of the former industrial complexes are perceived as the modest quality (durability, thermal comfort, etc.) and aesthetics of the façades as well as the problems of insufficient natural lighting in the large building blocks.

The former industrial buildings from the post-WWII period are not of exceptional aesthetic and artistic value, but they represent the history of an era, which should be remembered. On the other hand, if the modernists are criticized for misunderstanding of the spirit of the past and irresponsibility towards the history and context, contemporary architects and urban planners must recognize the modernism as well as the pre modernism as their heritage. Preservation and evaluation of everyday architecture (which includes industrial architecture) thus fit in with the placemaking concept, although without ambitions typical for spectacular buildings. What is emerging as the task is to improve the modernist industrial environment with new layers of architecture and urban design, which should contribute simultaneously to the preservation of the city but also its revival.

8. CONCLUSION

It is not difficult to understand the need for change, for the city reconstruction in order to fulfil the current needs of new generations. However, the essential rule in that process should be that the new developments arise by creating the new layers of architecture which merge with the old ones. This is also the principle of the sustainability – recycling the existing material and space.

We have tried to demonstrate that one has to start from the city, from the local urban morphology and transform the challenges into opportunities. The contribution of this analysis could be also considered as an attempt to start the discussion about the transformation of

urban space and contemporary architecture; and the management of this transformation based on scientific principles. Without it, such transformation threatens to become a project of aesthetics of space that (usually) fits only to the author(s) themselves, fulfilling only some partial goals of transformation.

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INDUSTRIJSKI BRAUNFILDI KAO MODERNISTIČKO NASLEĐE U POST-SOCIJALISTIČKOM GRADU – KVALITATIVNA ANALIZA

Cilj ovog rada jeste da izrazi perspektive potencijalne obnove nekadašnjih industrijskih kompleksa. Fokusirajući se na kvalitativnu analizu jednog kompleksa građenog u periodu posle II svetskog rata u Nišu, u Srbiji, ovaj rad se bavi ispitivanjem modernističkog nasleđa ovakvih industrijskih kompleksa ukazujući na glavne probleme povezane sa urbanom morfologijom kompleksa. Kvaliteti koji su ostali na "zarđalom" industrijskom prostoru su ispitivani u kontekstu savremenog koncepta održivog grada. Rezultati istraživanja sugerišu postojanje potrebe za intervencijom na postojećoj morfologiji ispitivanog urbanog prostora u cilju ispunjenja kriterijuma savremenog trenda kreiranja mesta.

Ključne reči: *industrijski kompleksi, braunfildi, modernizam, urbani dizajn, urbana morfologija*