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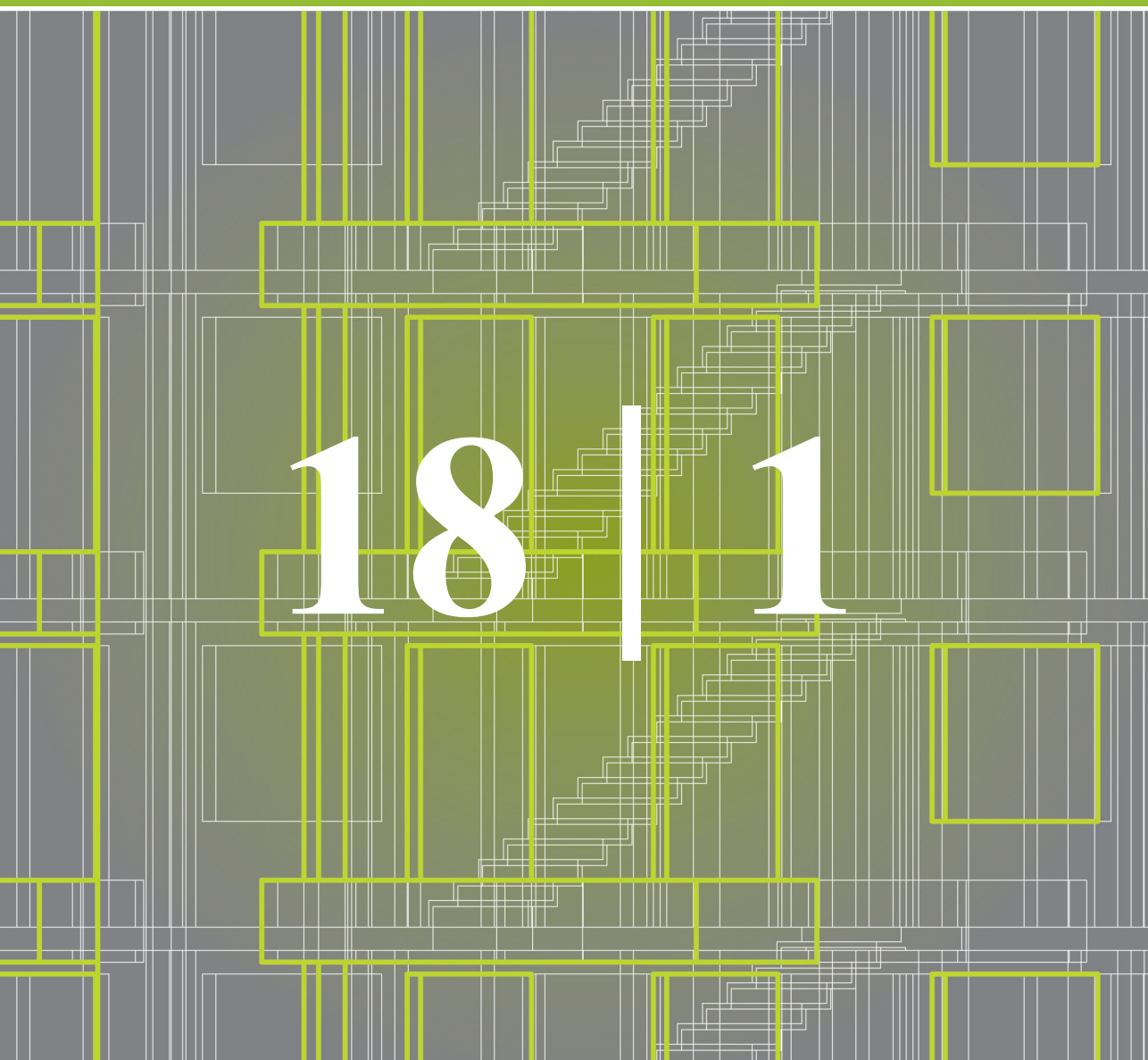

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REVITALIZATION AS PROTECTION INSTRUMENT OF CULTURAL HERITAGE OF LIBRARIES

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Ilda Koca Baltic, Ana Momčilović Petronijević

Faculty of Civil Engineering and Architecture, University of Niš, Serbia

Abstract. *Superior information technology and global network coverage - the Internet, have raised the issue of sustainability and library facilities in the 21st century. Architects across the globe endeavor to examine and improve the traditional concepts of designing a library in accordance with the complex needs of the contemporary society. In this paper, the tools for development and protection of the library buildings in the information age are presented. The goal is to shed light on the complex process of revitalizing the libraries that today, more than ever, are fighting for sustainability. In this endeavor, an analysis of the case study of some of the world-renowned libraries will be of particular importance.*

Key words: *libraries, cultural heritage, revitalization, sustainable development*

1. INTRODUCTION

The speed of the introduction of technological innovations dictates the adaptation of libraries to the new perception of reality. Changes that are constantly happening in all areas of human activity have led to the need to design buildings *"whose interiors are flexible and modular, allowing them to easily adapt to new functions."* [1] While traditional library spaces, characterized by stability and persistence are replaced by spaces that must respond to the imperative of "fluidity" and *"the increasing fluidity of information embodied in physical spaces."* [1]

According to Rizzo, modern libraries must "*meet the changing functional requirements of the community, but also its enduring social and emotional needs."* [2] That is why we often encounter revitalized libraries today, which offer a set of new services that should support collaboration between users. In this way, we are given a space *that "fosters contacts between people with common interests and concerns"* [3] and in which "*the two main reasons why a user goes to a library - research on the one hand, and relaxation on the other - should be equally stimulated "* [3] Furthermore, *"library space makes it*

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Corresponding author: Ilda Koca Baltić
University of Niš, Faculty of Civil Engineering and Architecture, Aleksandra Medvedeva 14, 18000 Niš, Serbia
E-mail: ildakoca@gmail.com

possible for people to learn, socialize, escape, and connect in ways that no other present-day space—private, governmental, or commercial—can." [4] This stems from the fact that "before we managed book collections, and today we're doing much more management of community spaces." [5]

The subject of this paper is the analysis and presentation of appropriate methods in the processes of library revitalization, through which adequate sustainability of these structures can be achieved, while preserving the original visual identity. The aim of this paper is to draw attention to the growing problem of abandoned libraries, and to point out the importance that these structures have in architectural, cultural and historical terms on contemporary society.

This paper will explain the new dimension of the library in relation to its historical status, as well as the process of revitalization in the service of cultural heritage protection, with an emphasis on library facilities. The comparative analysis of several libraries will determine whether there are common principles in the methodology of revitalizing library structures, especially with regard to new content programs in relation to traditional patterns of functional disposition, but also in typology and the level of design interventions. The paper is based on the following research questions:

- *What is the status of libraries in the modern, information age, which is characterized by changes in reading habits and user needs?*
- *What are the common principles in the process of revitalizing the library in terms of new programs?*
- *What are the common principles in the process of revitalizing a library in terms of design interventions?*
- *Can certain patterns and specific types (levels) of interventions in the process of library revitalization be carried out?*

At the end of the paper, the results of the conducted research will be presented and discussed, from which appropriate conclusions will be drawn and answers to the research questions posed will be given.

1.1. Protection of libraries as a cultural heritage

Revitalization in the broad sense of the word is *"any form of restoration, reconstruction and all measures aimed at rebuilding an object, area or city that has previously suffered a degree of degradation for various political, economic and social reasons."* [6] Considering that revitalization is carried out at the same time as conversion, we define them as *"methods of preserving and restoring structures of cultural and historical significance, returning them to reuse and transforming the original into a suitable contemporary purpose."* [7] In a world of rapid and continuous economic change, by revitalization of buildings, *"their usable value is preserved and increased and the requirements of modern use that set business, lifestyle and leisure use are fulfilled."* [8]

Transformation in the methodology of library design is an inevitable consequence of changing the needs of the modern reader, as well as the introduction of information technology into the organizational systems of library business. In today's society, "*public libraries should make every effort to demonstrate to the public the essential value of their spaces in and of themselves; should demonstrate that public library space is unique; and should explain, again and again, that public library space has a timeless value that transcends changes in technology".* [4] The problem of transformation and preservation

of library structures as cultural heritage and their protection through the use of revitalization methods has been the subject of much scientific study and research. An important new dimension in relation to the historical status of the library - as a place of gathering knowledge, learning and gaining experience is the experimental development of learning spaces and new, interactive experiences. The tendency is a clear continuation of society's growing interest in an individualistic approach to learning and learning through creativity and play, which is characteristic of the contemporary society.

The role of the revitalization process is reflected in the satisfaction of a number of existential needs of the modern human - the more content in the library (including multimedia) there is, the more she/he will stay in it and be relieved of their daily tasks and duties. The orientation of the libraries towards the users is justified as well - they have to become the main roles in the building, even more important than the book itself, which in the past centuries was a symbol of the library:

Many historically renowned libraries have been reconstructed to allow for the continuous flow of contemporary library workflows, as well as to create inviting environments for visitors with new, modified reading habits. However, in order to protect the integrity and historical character of the library, the revitalization process is done through three steps.

- Analyzing the historical significance of the library and determining the characteristics of the library
- Assessment of existing situation and required level of interventions
- Adopting a series of library revitalization measures in the context of heritage protection

Factors to consider when revitalizing a structures are: compatibility with the historical context and integrity of the library, quality in design and functional utility.

2. Comparative Analysis of Revitalized Libraries

On the basis of the data collected through the professional literature, an analysis of library facilities will be presented later. The aim of the revitalized structures analysis is to identify the commonalities and patterns of transformation and restoration of libraries as cultural heritage.

The research is based on a comparative analysis of four examples of successfully revitalized library facilities. The analyzed structures are structures of cultural importance, but due to changes in user needs and habits, they were almost unharmed or even out of function for a period of time, and then were included in the process of revitalization and returned for reuse as cultural heritage bearers. The analyzed library structures were selected based on the following criteria:

- structures are part of a country's cultural heritage and are of great importance in the preservation of culture
- structures recognized as representative of historically significant libraries have been restored using revitalization methods.

The analysis of each example involves identifying similarities and differences in practice with respect to functional and design changes. Comparisons of the revitalized library facilities were made on the basis of the analysis of new content programs, the morphology of the original structure, and the level of design interventions.

2.1. Boston Public Library, Massachusets

In order for the Boston Public Library, and especially the Bates Hall Reading Room, to remain one of the most significant structures of national historical significance, the process of revitalization of this structure has been carried out. The design of the upgrade is of a monumental character and follows the classic design of the first-built "McKim" building. In doing so, all details had to be replaced with materials and elements that matched the original in material, color, texture, size, shape, profile, configuration and installation details.

The architectural form took precedence over the functional requirements in this library. Renaissance style stands in contrast with romantic architecture. The renovation of the exterior of the building entailed: changing the window systems, paving and landscaping, improving signal and lighting, outdoor furniture and bicycle paths and parking lots.

The works included the correction of structural defects, the redirection of pavements and the repair of concrete structures. As part of the facades, elements that visually resemble the Boston Municipal Building are integrated, as well as elements of Augustus St. Gaudens and Domingo More, the statue of Bela Pratt surrounding the entrance, and a bronze front door (Figure 1). The windows have been refurbished with new insulated glass. The backyard arcade roof got a new waterproofing system, the windows were repaired and modified. Large roof works were performed between 1947 and 1955, which resulted in the removal and conveyance of all tiles.

In addition to the careful reconstruction of the facades of the building (Figure 1), the existing landscape and site characteristics of specific external features, such as a courtyard arcade, a courtyard, including fountains, plants, paving, etc., are largely preserved. Also, new additions / changes to the site (such as the ramp for people with disabilities) have been designed to be unobtrusive and preserve all the original features of the site.

Fig. 1 Boston Public Library a) Old layout of the library [9], b) Renovated library, 2005 [10], c) Detail of “Bella Pratta” statue [11]

In addition to the changes in the exterior, the functionality of the building has been greatly altered. The interior space brings together different functional zones, which are not separated by walls, but are intertwined and interconnected, in order to allow fluid movement of users. As part of the renovation of this facility, two phases are observed. The first phase involves the redevelopment and refurbishment of the second floor of the Johnson Building, with the following spaces being created: a children's library, a teen area, a reference point, public restrooms and a reading and learning area.

In 2015, the second phase of the Central Library renovation began, comprising the first floor, the mezzanine, the lower level, and the reconstruction of the exterior of the

Johnson Building (Figure 2). The second phase relates to the remodeling of the following functional zones: entry floor, new books section, lobby, retail space, fiction collection, rental services, movie screening and music venues, Technology Center, exhibition gallery, various BPL art installations, interactive digital displays and new toilets; mezzanine, new public classroom and meeting room, updated lecture hall and Wifi support, "green room", lobby outside "Rab", new digital space for innovation and toilets.

As a result of these works, a new space was provided *for "400,000 books on open shelves and a conference space for 2000 people. The open shelves system increased the number of books in the library by 75% in the first two months. "* [12] In addition, the revitalization process also included analysis of daylight, ambient lighting and special desktops lighting to meet a wide range of user reading needs. (Figure 2). The overall result is a space that is comfortable and provides a range of study conditions to meet the needs of Boston library visitors.

Fig. 2 Renovated Boston Public Library, 2015) Exterior view [13], b) Entrance to the Johnson Building [14], c) Renovated Interior View, Battes Hall Reading Room [15]

2.2. National Library of the Netherlands

The building for the National Library of the Netherlands contains not only the library but also the Museum of Literature, the Dutch Institute for the History of Art and various other related institutes (Figure 3). The aim of the revitalization of this library is to increase the level of functionality of the building, to provide accessible and attractive public facilities to the users, as well as to renewed accommodation capacities for various institutions located in the building. The purpose of the library, as a center of information and knowledge, is to provide materials and space for learning.

The process of revitalizing the building began in 1982. Since this year, this facility has been known as the National Library of the Netherlands. Ideas concerning the public role of the library were developed in the late 1970s. Since 1995, a new insight into the services of the new institute has expanded to a number of changes to the extension of the building.

The libraries were renovated, but now they have a spacious shelter, they have expanded the depot by adding new rooms to the existing volume of the building in another material and color. Catalog rooms, conference rooms, gallery, halls, restaurant, atrium stage were renovated. In addition, an event hall and an exhibition gallery opened (Figure 3). After the first phase of the reconstruction, a second phase followed, during which the possibility of additional extension of the extension, or the construction of a new entrance in the Museum of Literature (Figure 3) was examined. In the period 2001-2006, the National Archives Hall was opened, the Holocaust was opened, and the

premises of the Dutch Institute of History of Art and other institutes, as well as the offices of the Library's library, were carefully renovated.

In addition to these transformations, by equipping the interior with modern equipment and introducing information technology, the National Library of the Netherlands is beginning to support e-Depot, that is, a new model of electronic depository system.

Fig. 3 National Library of the Netherlands- a) a view of the main building [16], b) a view of the exterior of the library, viewed from the "Prince Bernard" viaduct [17], c) a view of the renovated interior [18]

2.3. Glasgow Women's Library, Scotland

In order for Glasgow Women's Library to respond to the growing interest of visitors to become users of this library, it was moved to the Mitchel facility in the West End, but subsequently re-examined in 2012, once again changed the seat of the library, this time to the Bridgeton Library. The reconstruction focused on meeting the spatial and functional requirements, opening new approaches and entrances, as well as discovering and accentuating some of the original interior features.

As part of the interventions in the exterior of the building, stone carvings, decorative fence details and engraved inscriptions were restored. On the south facade, a new elevator structure was built, lined with dark steel panels, into which were inscribed literary works (Figure 4).

Fig. 4 Glasgow Women's Library, Scotland - a) Exterior view of the building after revitalization b) Facade detail, c) Interior view after revitalization [19]

The main purpose of the revitalization of the interior of the building is to provide the facilities needed to host major events, screenings, talks, exhibitions and support services for women. A mezzanine with vertical wooden moldings was opened to organize an informal reading space. (Figure 4). The existing spaces of the library were also reconstructed by removing suspended ceilings, traditional lighting fixtures, carpets and service partitions.

Under the new program instead of warehouses, there is now a large meeting room, kitchen, bathrooms and gallery space. In addition, in the northern part of the building, a new two-level archive provides conditions for the storage of collections and exhibits, rare artifacts to be stored in a climate-controlled environment.

2.4. The State Library of Russia

The State Library of Russia, located in Moscow, was built in 1862 and is the largest library in the country and *"the second largest in the world regarding the number of copies it has* (Figure 5)." [20] There are around *"three hundred miles of shelves with more than forty-seven million books."* [20]

Given that the National Library's collection of books has grown so much over time, the library's premises have become scarce, and during the 20th century a second building was built next to the museum, which by its volume had to meet the demands of new space capacities. However, this solution was not adequate either, since, in the case of the Russian State Library, *"to maintain inventories, by the standards, it is necessary to own not less than 110,000 square meters, and the library has only 60 percent of this space available."* [20]

Fig. 5 State Library of Russia- a) Exterior view [21], b) Parterre design- Dostoevsky statue [22], c) Interior layout of the structure [23]

As part of the reconstruction, the following interventions were carried out:

- Construction of a new thirty thousand square meter facility
- Reconstruction of the old part of the building
- Interior reorganization
- Equipping the library with modern technology
- Digitization and integration of materials into the electronic library
- Joinery replacement
- Renovation of engineering systems and installations to improve the comfort of the building

The revitalization of the exterior of the building included an upgrade of the facility, in the form of a thirty thousand square meter depot, into which the bulk of the library stock is housed, was carried out. In addition, the facade of the "Mansion house of Shakhovskois" ensemble was reconstructed, with the construction of more than four thousand square meters, and the ensemble of the "Paskovo Dom" was restored.

Decorating the interior of the library was the most complex item of the revitalization of the State Library of Russia. The facility had to be primarily modified and upgraded

with new engineering systems: electrical installations, air-conditioning and ventilation systems, and two refrigeration plants were automated. In addition, automatic control of the system in case of fire was introduced.

3. Results and Discussions

The results of the conducted research are presented in a tabular form and are analyzed in detail within this chapter. Table 1 gives a comparative overview of basic data of revitalized industrial facilities.

Table 1 Summary of basic data of analyzed library structures (own source)

The name of the object	Location	Architect	Year	
			Foundations	Revitalizations
Boston Public Library, Massachusetts	Boston, Massachusetts	Charles FollenMcKim McKim, Mead & White firm	1852.	1947-1955; 2015.
National Library of the Netherlands	The Hague, The Netherlands	Arie Hagoort OD205	1798.	1983; 2010-2013.
Glasgow Women's Library, Scotland	Glasgow, Scotland	Collective Architecture	1991.	2012-2014.
State Library of Russia	Moscow, Russia	Vladimir Shchuko Vladimir Gelfreikh	1862.	1985-2000.

Diagram 1 shows the process or stages of revitalizing the analyzed libraries.

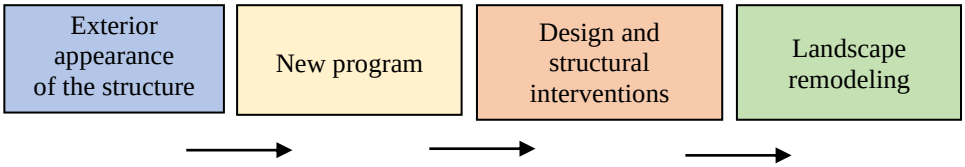

Diagram 1 Stages of library revitalization (own source)

Not all library revitalization processes entail a change in landscape design. In the search for the ideal library, architects most often revitalize the exterior of the buildings and the interior spaces. The interventions implemented to revitalize the exterior of the Boston Public Library, the National Library of the Netherlands, the Glasgow Women's Library and the State Library of Russia are shown in Table 2.

Table 2 Presentation of data as interventions within the external appearance of analyzed libraries (own source)

The Name of the Library	Interventions within the external appearance of the structure
Boston Public Library, Massachusetts	▪ change of window systems ▪ replacing the front door
National Library of the Netherlands	▪ entrance hall upgrade ▪ expansion of the depot ▪ adding new premises to the existing building volume in a different material and color ▪ construction of a hall leading to the depot
Glasgow Women's Library, Scotland	▪ new lift construction ▪ restoration of stone carvings, decorative fence details and engraved inscriptions ▪ carpentry replacement
State Library of Russia	▪ the facility was upgraded in the form of a depot ▪ the facade of the "Mansion house of Shakhovskois" ensemble was reconstructed, ▪ the facade of the ensemble "Paskov dom" was reconstructed

In addition to its external appearance, in the 21st century, when the subject of library design became far more familiar, the functionality of libraries was specifically treated and reviewed. Disposition of rooms in libraries prior to the revitalization process was most often determined according to the list shown in Diagram 2.

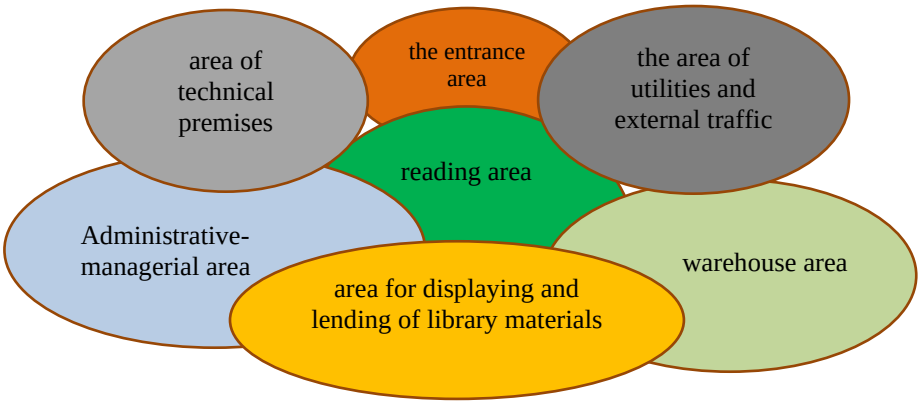

Diagram 2 Functional Zones of 20th Century Libraries (Own Source)

Today, only the focus of a functional organization is changing from the ground up, and the library building is seen as an institution that supports the increased need for users to work in groups, interact, meet and develop communication skills and a spirit of a community. Table 3 shows the program, which is included in the revitalization process into the functional characteristics of the libraries analyzed in the previous chapter. The table shows that the new contents offered by the revitalized libraries include: multipurpose

spaces, large event venues, screenings, talks, exhibitions and expanded archives to store the growing library stock.

Table 3 Comparative overview of the new program of revitalized library structure (own source)

The Name of the Library	New Content
Boston Public Library, Massachusetts	▪ accommodation of users ▪ studio spaces ▪ comic book competitions
National Library of the Netherlands	▪ expanded depot ▪ new facilities-gathering and meeting
Glasgow Women's Library, Scotland	▪ venue for major events ▪ mezzanine, multipurpose and exhibition space ▪ meeting room ▪ new archive
State Library of Russia	▪ cultural space ▪ museum space ▪ electronic material

Table 4 shows the interventions in the interior of the Boston Public Library, the National Library of the Netherlands, the Glasgow Women's Libraries, and the State Library of Russia. Based on this comparative analysis, it can be said with certainty that modern lighting, technological equipment and information technology, as well as special furniture models, are characteristics of revitalized library spaces.

Table 4 Comparative overview of the level of interventions in interiors of revitalized library structures (own source)

The Name of the Library	Interventions in the Interior
Boston Public Library, Massachusetts	▪ modern lighting ▪ floors with new final layers of expensive marble ▪ interior decoration - paintings by John Singer Sargent, Edwin and Pierre Puvis de Chavannes ▪ equipping the library with digital and electronic devices
National Library of the Netherlands	▪ renovation of the main entrance, staircase, halls, conference rooms, restaurants, catalog room and reading rooms, music institute ▪ new furniture and new information desks (1995-1996) ▪ technological equipment ▪ "e-Depot"
Glasgow Women's Library, Scotland	▪ removal of suspended ceilings, traditional lighting, carpets and service bulkheads ▪ technological equipment
State Library of Russia	▪ new engineering systems: electrical installations, air-conditioning and ventilation systems, automation of refrigeration plants and automation of fire-fighting systems ▪ modern lighting ▪ technological equipment ▪ special furniture models

As part of the revitalization process, some libraries have taken care of rearranging the parterre of the facility. From Table 5 it can be concluded that the tendency is to preserve the existing, historical appearance of the parterre. For this reason, two of the four analyzed projects for the revitalization of the analyzed libraries (the National Library of the Netherlands and the Glasgow Women's Library) are intended to preserve the landscaping completely, while at the Boston Public Library these interventions are to replace the damaged parts of the site and to add lighting that accentuates the library itself. With the National Library of the Netherlands, since the entry floor is not at street level, a ramp for disabled people is also planned.

Table 5 Comparative overview of the level of interventions within the remodeling of the partner environment (own source)

The Name of the Library	Ground Floor Remodeling - A New Landscaping
Boston Public Library, Massachusetts	▪ damaged parts of the site (decorative and functional), materials, elements, details and decorations have been replaced with material and elements that correspond to the original in material, color, structure, size, shape, profile and installation details ▪ building a ramp for people with disabilities ▪ lighting that accentuates the corners of the building
National Library of the Netherlands	The revitalization project does not provide for changes to the landscaping
Glasgow Women's Library	The revitalization project does not provide for changes to the landscaping
State Library of Russia	The revitalization project does not provide for changes to the landscaping

Table 6 Overview of basic differences between library offerings before and after the revitalization process (own source)

Basic offer of analyzed libraries before revitalization	Basic offer of analyzed libraries after the revitalization process
Information retrieving	Information retrieving and creating
Individual work units	Setting up a framework for individual and group work
Librarians provide information on access to books	Navigators- computers, tactile surfaces, sound systems provide information on access to work material, books, tools and computers
The opening hours of the library referred to the period from 7am to 8pm, during working days	Libraries allow users an average of twenty hours a day, including weekends
Library space rule - peace and quiet	Today's libraries allow loud talk in almost all functional areas, and consider "noise" to be inspirational and a sign that the library "lives"

Based on the analysis of the characteristics of the library facilities, the basic difference between the library supply before and after the revitalization process can be stated (Table 6). The main innovation in contemporary library offer lies in setting up conditions for creating information and group learning activities, supported by various technological devices. Furthermore, modern libraries enable expressing creativity through conversation, socializing, whereby a point is made to the concept of seducing absolute order and silence.

4. CONCLUSION

Today's libraries must adapt to the many possibilities and be open to what may come in the future. Many libraries have been reconstructed to accommodate a growing number of books and to meet the real needs of readers. Examples of successfully revitalized libraries include the Boston Public Library, the National Library of the Netherlands, the Glasgow Women's Library and the State Library of Russia.

With regard to the first research question concerning the status of the library in the modern, information age, the answer lies in the fact that libraries are designed as places for learning, research, but also for interaction, meeting and gathering with other users. In other words, the role of the library in today's individualistic society is not only in providing information, but also in setting the framework for socializing and amusing people.

The answer to the second research question concerning common principles in the process of library revitalization, from the point of view of new programs, lies in changing reading habits and user needs which lead to the prediction of multipurpose spaces, spaces for large events, screenings, talks, exhibitions and expanded archives to store the growing library stock.

The third research question was: what are the common principles in the process of library revitalization, from the aspect of design interventions? First of all, based on the conducted analyzes, it can be said that the design interventions concern the exterior and interior of the structure as well as the landscaping. Interventions within the exterior include a detailed reconstruction of existing, historically significant facades, replacement of joinery and implementation of modern lighting, which accentuates the library facility itself. Design interventions in the interior are related to: the introduction of LED lighting, technological equipment, information technology and modern urban furniture. Within the new design of the library parterre, it seeks to preserve the features of historical sites as much as possible, with minimal interventions in the form of the addition of new urban furniture - a bench, a fountain and lighting.

With regard to the latest research question concerning the establishment of common principles in the practice of library renewal, unique transformation patterns were found common to all the analyzed libraries. They are about creating and predicting libraries that contain:

- flexible interior spaces, with a minimum number of walls and partitions
- learning spaces adapted to new teaching and learning methods
- spaces for individual or group work and learning
- rooms dedicated and/or adapted to the use of new media
- spaces intended to support the teaching process, spaces for socialization, children's wards, etc.
- rooms equipped with up-to-date furnishings, lighting, digital media and information technology

In today's society, characterized by never-ending memory shortages and low levels of concentration in learning, the question of a crucial nature is- will the effort of architects to create inviting space result in arousing the enthusiasm and the will for the spiritual and intellectual development of individuals?

The answers to these questions are neither simple nor straightforward. They depend on the willingness of the community to attach importance to libraries, as a cultural treasure, and to revitalize them, in line with the challenges, responsive trends and real, modified needs of society.

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REVITALIZACIJA KAO INSTRUMENT ZAŠTITE BIBLIOTEČKOG KULTURNOG NASLEĐA

Superiorna informaciona tehnologija i pokrivenost globalnom mrežom-Internetom, otvorila je pitanje održivosti objekata biblioteka u XXI veku. Arhitekte širom sveta nastoje preispitati tradicionalne koncepte projektovanja biblitoteka i unparediti ih, u skladu sa kompleksnim potrebama savremenog društva. U ovom radu biće predstavljeni instrumenti za razvoj i zaštitu objekata biblioteka u informacionom dobu. Cilj rada je da se rasvetli složeni proces oživljavanja biblioteka koje danas, više nego ikad, vode borbu za održivošću. U tom nastojanju, od posebne važnosti biće analiza studije slučaja nekih od svetski poznatih biblioteka.

Ključne reči: *biblioteke, kulturno nasleđe, revitalizacija, održivi razvoj*

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AN APPROACH TO BUILDING HERITAGE AND ITS PRESERVATION IN SERBIA AND SURROUNDING AREAS

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Aleksandra Ćurčić, Ana Momčilović Petronijević, Gordana Topličić Ćurčić, Aleksandar Keković

Faculty of Civil Engineering and Architecture, University of Niš, Serbia

Abstract. *Cultural heritage represents a unique and irreplaceable cultural value of a nation. Preservation and protection of cultural heritage is an important moral role of the entire modern society. The paper singles out the notion of vernacular architecture and traditional houses as a significant part of the architectural heritage. The case study includes examples of traditional houses in Serbia, Romania and Bulgaria. The current condition of buildings, their purpose, the degree of preservation, as well as the applied methods of protection are considered in more detail. By analyzing examples of positive and negative practice, conclusions were drawn about the active approach to the architectural heritage of these countries. The goal of this paper is to consider the approach to the preservation of vernacular architecture and the relationship of these countries to this form of cultural heritage. The methods used in the paper are analysis, synthesis, comparative analysis, modeling method and case study.*

Key words: *architectural heritage, traditional house, preservation methods, active approach, vernacular architecture*

1. INTRODUCTION

The term "cultural environment" can be defined as the most complete understanding of a quality environment in which the best way of our existence and acting is enabled, and it contains all kinds of natural and cultural heritage (Marasović, 1983). Cultural heritage, on the other hand, represents the heritage of immaterial attributes and physical artifacts of a society or a certain group that constitutes the legacy of past generations, and which is carefully preserved in the present in order to be left as a legacy for future generations (Mikić, 2014). The protection of such entities imposes itself as an immanent task. If the entities have been degraded or devastated by irresponsibility and negligence,

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Corresponding author: Aleksandra Ćurčić
University of Niš, Faculty of Civil Engineering and Architecture, Aleksandra Medvedeva 14, 18000 Niš, Serbia
E-mail: ajkiro94@gmail.com

maximum effort must be made to restore them, which provides instills sense and confirms our existence. The most present part of the "cultural environment" in our everyday life are architectural monuments (Marasović, 1983).

Preservation and attitude towards cultural heritage are a very important aspect of the sustainability of a country's culture and tradition. The protection of cultural heritage, and therefore of architectural heritage, is a complex process and requires a thoughtful and careful approach. The paper deals in more detail with an active approach to architectural heritage, and the most commonly used methods of preserving vernacular architecture, especially on the example of traditional houses. The modern period of active protection refers to the development of conservation awareness and practice, starting from the period after the Second World War.

The problem of relations with these facilities was also considered, and in what condition they are, whether they are in active use or completely neglected. The case study includes selected examples of good and bad practice in Serbia and its surroundings, with special reference to Romania and Bulgaria.

The goal of this paper is to consider the approach to the preservation of vernacular architecture and its current state, as well as the relationship of these countries to this form of cultural heritage. The very notion of architectural heritage, hazard and methods of preservation will be discussed in more detail in the next chapter.

2. HAZARD AND METHODS OF PRESERVATION OF ARCHITECTURAL HERITAGE

Architectural heritage is the materialization of the essence of a nation, its identity, culture, value systems, possibilities and potentials. The term architectural heritage implies immovable cultural properties created by human work from prehistory to modern architectural achievements. This term includes historical cities, settlements or their parts, old buildings and their parts, archeological sites, as well as areas that have historical, cultural, artistic or ambient value. One of the classifications of the architectural heritage is into architectural units, historical buildings and archeological sites (Marasović, 1983). A special emphasis in the work is the condition of traditional houses, which belong to the group of historic buildings. Historical buildings reveal values both to an individual and to the entire society. These values primarily derive from their characteristics and functions.

Monuments of vernacular architecture did not receive much attention in the past, and very few researchers in our area have devoted themselves to their study. For years, the protection of cultural monuments has been mostly focused on sacral monuments. This contributed to the fact that many monuments of vernacular architecture were left to time and deteriorated, while others necessarily had to undergo changes. A large number of old buildings have been remodeled and partitioned, modified to adapt to new needs. Thus, the original constructions were violated, and many elements were replaced with modern ones that do not correspond to the traditional spirit (Findrik, 1985). All this speaks of the hazards of the architectural heritage and the possible causes of its deterioration.

From the very beginning, each building has been exposed to various influences that compromise its original or values adapted in time. The causes of degradation are very numerous and diverse, and can result in consequences such as complete or partial demolition of the building, inadequate upgrades, change of purpose (conversion), as well as environmental damage. The causes of endangerment can be long-term and momentary,

with the former existing from the very beginning of the building, and the latter implying damage caused by sudden changes. Also, there is an increasing presence of new causes of degradation, conditioned by the modern way of life, which endanger the complete environmental situation of our planet (Marasović, 1983). Long-term degradation implies the action of natural and climatic factors, but also the action of man. Momentary degradations are most often caused by natural disasters such as earthquakes, floods, fires, landslides. Along with these numerous examples, man often, consciously and unconsciously, causes the destruction of the architectural heritage by his actions.

Special emphasis is on the unconscious forms of degradation, them the most terrible consequences being left by wars. Also, there is negligence in the maintenance of the buildings that causes deterioration, or inappropriate use of the facility that violates the original values. Uncontrolled construction stands out as a problem, which usually involves construction of additional floors. These problems are present both in Serbia and in the surrounding countries. The cause of the problem is primarily related to changes in the social structure of the population and the economic crisis, as well as the emigration of the population from rural areas. There is a sudden deterioration of houses, both exterior and structural; and they become unsafe to live in (Ćurčić et al, 2019).

Throughout history, individuals and communities have taken certain measures in order to preserve cultural heritage, and thus the architectural heritage. Protection is the systematic implementation of legal and professional protection measures, in accordance with the rules of the conservation and restoration profession, with a goal of preservation (Mikić, 2014). Protection of a building requires a methodologically correct, logical and systematic approach; and certain principles must be observed. What is very important in the attitude of a country towards the architectural heritage is the organization of protection and arrangement. The contemporary approach to the architectural heritage allows the application of different methods of preservation, which are chosen depending on the character of the building, and the possibility of application. These methods involve different levels of intervention, such as:

- conservation and consolidation by which the building is protected on the basis of the existing condition,
- adaptations and revitalizations by which the building is converted for new purposes or the original purposes are revived,
- anastylosis which recomposes the destroyed original sections,
- restoration that to a greater or lesser extent restores parts of the building,
- reconstructions by which the demolished buildings are rebuilt, on the basis of precise reproduction of the original condition or with new forms harmonized with the environment
- interpolation by which a new part or building is incorporated into a historical entity,
- dislocations by which the buildings in their original condition are moved to a new place for protection,
- replicas with which buildings are built on the new location after the original buildings,
- new ambient construction which retains the traditional character of architecture in a certain environment with the help of a clear historical recollection (Marasović, 1985).

The paper includes case studies of examples of positive and negative practice, buildings on which various methods of renovation were performed, or those that were neglected and inadequately treated. In order to better understand the problem of attitudes

towards architectural heritage in the examined area, the notion of an active approach and the importance of population participation in the whole process is also treated.

3. Active Approach to Protection and Participation of Population

Access to cultural heritage is a complex concept. Throughout history, the attitude towards the architectural heritage has changed, one of the main changes occurred after the Second World War, when the development of a modern, i.e. active approach to protection began. The period of active protection was preceded by the period of biological protection, which in European countries began at the end of the 19th century and lasted until the middle of the 20th century (Marasović, 1985). This attitude was based on the protection of the entire biological growth of one building, however, over time an extreme view developed where the protective activity was reduced mainly to conservation, without allowing restoration activities. This has resulted in the fact that in many European countries, including the Balkans, the main protagonists of protection are exclusively conservation services, i.e. experts within the institute for the protection of monuments, or regional institutions.

Contrary to such an attitude and practice, in the middle of the 20th century, the development of a new protection doctrine and the formation of the concept of an active approach to protection began. This comprised the involvement of institutions and experts of various profiles in the protection process, as well as the transfer of heritage protection competencies to the authorities. The very notion of an active approach is used to emphasize the active role not only of the traditional service, but also of all other protagonists in this process, as well as the activation of architectural heritage in modern life (Marasović, 1985). It is important to emphasize that this type of protection now includes other methods, in addition to classical conservation, i.e. conservation methods that are listed in the previous chapter.

The new organization was accompanied by the formation of legal regulations, international documents and conventions. Local authorities, in addition to the great role played by the state itself, play an important part in the process of preserving vernacular architecture; regarding that many decisions are first made at the local level. International professional organizations such as UNESCO and ICOMOS, in addition to various institutes in the republic, play a crucial role. However, it is very important to point out that not only experts, but the entire population participates in shaping and preserving the built environment (Čuričić et al, 2019).

One of the basic features of the modern approach to the preservation of cultural heritage nowadays is the participation of citizens. In addition to acting through socio-political communities, the action of the individual is very important. Experiences in this area are very different in individual countries, and this practice is more common in Western European countries than in Eastern ones, thus in Serbia and the surrounding area. Therefore, in addition to research and conservation work on the study and protection of cultural heritage, equally important, but insufficiently developed and emphasized in our country, is the work on educating the population in recognizing the value of heritage in their own environment, and its active involvement in protection processes (Dimitrijević-Marković, 2010). Numerous conventions and charters dedicated to cultural heritage throughout history advocate this position, so the first Athens Charter indicated that "the best guarantee in the matter of protection of monuments and works of art comes from respecting and winning over the people themselves" (Jokileto, 2001). Charters, i.e. conventions that followed later, remained

consistent with this position, while adapting to specific examples, i.e. countries. The success of the protection and preservation of the architectural heritage in the future and in the long run depends to a large extent on the ability of an environment to provide the best possible education for the population. The importance of education and citizen participation is also shown by the data obtained in several studies in England, as a result of work on raising public awareness. There has been a significant increase in the number of people who really care about protecting their historic environment (Dimitrijević-Marković, 2010). The education of the population can take place in many ways, now also owing to modern technologies, and thus through public services and media, social networks, but also through the classic systems of primary and secondary schools, through colleges.

In addition to this, the participation itself, involvement, i.e. engagement of citizens in decision-making is also important. The population can participate in the active protection of buildings as part of the local community, as individuals: owners, natives, visitors, neighbors; more precisely as part of different interest groups. Through this approach, they have the role of consultants, support, as well as participants in the project itself. Also, residents can be part of active protection as volunteers. Representatives of the local community can become members of the working or advisory group and thus invest their expertise and knowledge to help in the implementation of specific and time-limited tasks. Volunteers are an important element of architectural heritage management. However, cultural volunteering has not yet been developed in our region, and there are no registers of such associations in the countries. The advantage of volunteering is that young people, unemployed citizens, and pensioners can participate in it. In general, there is a great need for training and education of the population and learning about volunteerism in this area (Čuričić et al, 2019).

4. Vernacular Architecture and Traditional House

Traditional culture is most prevalent in rural areas, less accessible and hilly and mountainous areas. One of the features of traditional culture is vernacular architecture as a harmonious combination of material and spiritual values in its original form (Vukanović, 2014). The image of vernacular architecture that is known to us today represents the experience of centuries-old architectural skills that have been passed down from generation to generation. Vernacular architecture is characterized by the use of natural building materials, mostly from immediate surroundings, local craftsmen, knowledge passed down from generation to generation, simple tools and aesthetic features focused mainly on the proportion of the building, and less on detail and decoration (Čuričić et al, 2019, Deroko, 1968).

Vernacular architecture is not just a set of spontaneously created buildings, everything that people build is based on experience. Over time, certain habits, patterns and rules were created, common to all construction. By analyzing the architecture and typological characteristics of vernacular architecture in the Balkans, it can be concluded that the basic principles of local architectural patterns are based on the model "nature knows better". The authors point out that hypothetically vernacular architecture is based on the following principles: "materialisation principle (material availability principle), coloration principle (availability of color choice) and mimicry-mimezis principle (relationship to the surroundings principle – ”spirit of place”)" (Vasov & Cekić, 2018).

Vernacular architecture in Serbia and the surrounding areas is the result of the influence of numerous cultures. It can be especially characterized as a mixture of Old Slavic

culture, which the builders brought from their native lands, with the indigenous, Roman, Byzantine, and later oriental culture. Central Europe (Austria-Hungary) also had a significant influence on the development of construction in the region. Traditional knowledge of construction meant observing building rules based on the use of anthropometric measures, knowing the characteristics of the material, as well as the skill of its processing, but also on finding a favorable place to build a house. Although the beginning of the development of this kind of construction originates in the countryside, over time, some local groups of builders began to work on orders outside their places of residence. Gradually, changes took place, and under the influence of the city and modern principles, educated masters began to build houses (Vukanović, 2014). Thus, this form of construction began to appear in urban areas.

In Serbia, as well as in Bulgaria and Romania, a large number of older buildings has been preserved. These are usually small and modest buildings, such as huts, in mountainous and hard-to-reach areas. At the same time, there are numerous examples of more spatially developed and structurally complex buildings, such as houses in the countryside or houses in cities. Most of the houses that have survived to this day were built in the 18th and 19th centuries, but they were actually built during a long period of time. According to a very rough and conditional classification, monuments of vernacular architecture can be divided into two larger groups: protected monuments in the city and protected monuments in the countryside (Findrik, 1985). The following chapter provides a case study of selected examples of “urban houses” and “rural houses” in Serbia, Romania, and Bulgaria. The terms "urban house" and "rural house" are formed in this way because the intertwining and mutual influences in construction are always present; thus, some urban houses developed directly in the image of rural houses, while numerous urban influences on the rural architecture are known. The characteristics and types of houses differ depending on the areas in which they were built and developed, on the soil and the climate. Although this is a very extensive topic, four basic features of houses can be singled out:

- One can observe the uniform attitude towards the choice of construction material, and materials used are those abundant in the immediate surroundings;
- Very often, unified material properties are utilized, and mostly two or three basic materials are present;
- Spatial organization is well designed in most of the cases;
- The buildings were constructed with good measure, good spatial relationships, and in harmony with the environment (Findrik, 1985).

However, in the past, due attention was not paid to the monuments of vernacular architecture, and a small number of researchers participated in the study. Until the 70s of the last century, the protection of cultural monuments was mostly focused on sacral monuments, mostly churches. Other types of monuments, and therefore houses, were more or less sidelined. As a result of such long-term treatment, in Serbia and the surrounding countries, the national monuments deteriorated or were adapted to new needs, whereby losing the original spirit of vernacular architecture. Although increasing work has been done in recent years on the problem of heritage preservation and restoration of buildings, there is still a large number of buildings that need to be rehabilitated and restored (Ćurčić et al, 2019).

5. Case Study – Serbia and Surrounding Areas

In order to better understand the problem of the attitude towards vernacular architecture and the degree of its preservation on the territory of Serbia, Romania and Bulgaria, a case study was done. Examples of good and bad practice were selected, i.e. buildings that were successfully preserved and renovated, as well as buildings that were in poor condition or treated inappropriately, were presented. The basis of this study was a traditional house from this area. Most of the buildings were built in the period from the 18th to the 19th century. Also, examples include both houses in cities and houses in the countryside.

5.1. Serbia

One of the most famous examples of vernacular architecture in Serbia is the open-air museum "Staro selo" in Sirogojno. Within this museum, the architecture, interior design of buildings, the way of farming and the organization of family life of people in the hilly and mountainous areas of the Dinaric region are presented. About 50 buildings are distributed on an area of five hectares. All buildings were dislocated and transferred from the surrounding villages of Zlatibor mountain. The permanent museum exhibition consists of two classical Zlatibor curtilages, with residential and commercial buildings such as those possessed by cooperative rural families in the second half of the 19th century and the beginning of the 20th century, Fig. 1 a). All buildings are equipped with authentic furniture,

Fig. 1 "Staro selo" Sirogojno: a) Permanent exhibition and one of the principal houses b) Interior of the houses with authentic furniture (Source: https://www.sirogojno.rs/)

Institute for the Protection of Cultural Monuments. The development of the museum complex began with the idea of creating an authentic ethno ambience in which wool-knitters would present the traditional procedure of making wool objects, and it was achieved through the persistence and engagement of experts, ethnologists, competent republic institutions and numerous associates (Vukanović, 2014). During the decades of its existence, the museum has received several awards. One of the most significant is the special recognition of the jury of the European Union in the field of education, training and raising awareness of cultural heritage in 2012, for the project "Houses of Zlatibor since the 19th century to the present day"; while in 2013 it was declared a cultural institution of national importance for the Republic of Serbia.

Master Vasa's Residence (*Konak gospodar Vase*) in Kraljevo was treated as one of the examples of an urban house, Fig. 2 a). It represents one of the numerous examples of lodgings and family houses that have been restored in Serbia, such as the Master Jovan Residence in Čačak, the Prince Miloš Residence in Topčider, the Princess Ljubica Residence in Belgrade, the Musselims' Residence in Valjevo and the like. This cultural monument of great importance is located in the city park, across from the Church of the Assumption of the Virgin. The bishop Janićije had it built in the middle of the 19th century. It was built in the style characteristic of the times of Miloš Obrenović, with elements of traditional Balkan architecture. Master Vasa's Residence was rebuilt several

Fig. 2 Master Vasa's Residence in Kraljevo: a) Current condition of the exterior b) Spiritual center and working salon (Source: http://infokraljevo.com/gospodar-vasin-konak/)

times and its purpose was changed. Until the end of the 19th century, it was used for diocesan needs. Then, the Šumadija Field Artillery Regiment was housed in it, followed by the boarding school of the Farmers' School. In the period between 1946-1951 it also served as a prison. For that reason, it has undergone significant changes. The porch on the first floor was walled up and threatened to collapse due to dilapidation, the rafters of the

roof structure and the eaves were shortened, and the former wooden entrance staircase for the first floor was replaced with a concrete one. The building was successfully renovated in 1951 with extensive and complex conservation and restoration works. After the renovation, the building became the National Museum in Kraljevo (Ćurčić et al, 2019, Milić, 1998) Nowadays, this building serves as a spiritual center, a bookstore is located on the ground floor of the Residence, while on the first floor there is a large working salon and a chapel dedicated to Bishop Nikolaj, Fig. 2 b).

Katić's house in Trstenik has been shown as one of the examples of poor treatment. It was erected in the second half of the 19th century and is a cultural monument of great importance. The original owner of the house was the merchant Stevan Katic (http://spomenicikulture.mi.sanu.ac.rs/spomenik.php?id=801). The building basically belongs to the Morava house type with oriental influences. It is assumed that the design of the house itself was brought from Lebanon or Syria. The building originally had a residential purpose with Katić's business premises on the ground floor. Later, the basement of the house and most of the yard were turned into a restaurant of national cuisine. For a short time, the house had the role of a gallery. Although it has been under state protection since 1947, it has not yet been adequately restored. It is currently abandoned and in very poor condition, Fig. 3 a). The facade is dilapidated, while the structure is visibly damaged, Fig. 3 b). Inadequately performed works on the facade are visible from the period when it had a catering purpose. It is currently privately owned, while the Municipality of Trstenik plans to purchase it and start drafting design documentation for restoration (Ćurčić et al, 2019).

Fig. 3 Katić's house in Trstenik: a) Current condition of the exterior b) Katić's house in Trstenik: Visibly derelict façade and ceiling damage (Source: http://spomenicikulture.mi.sanu.ac.rs/spomenik.php?id=801)

Unfortunately, there is still a large number of buildings in Serbia that have been neglected, inadequately treated, extended, and even demolished in some period. Also, the full potential of many buildings has not been used. One such example is Vlajković's house in Grocka, built at the beginning of the 19th century, Fig. 4 a). This house was not demolished, but it is in a very bad condition, as a result of unresolved legal property relations and lack of funds, Fig. 4 b) (Živković, 2011).

Fig. 4 Vlajković's house in Grocka: a) Appearance of the house in 1972 b) Current condition (Sources: M. Dedić, S. Negovanović)

5.2. Romania

One of the most positive examples of preserving Romania's cultural heritage is the "Dimitrie Gusti" National Village Museum. This open-air ethnographic museum is located in Bucharest and covers over 100,000 m2. It was officially opened on May 10th, 1936, in the presence of King Carolus II. The museum currently presents 346 houses, which are arranged according to the place of origin, Fig. 5. The museum has expanded over time, the houses have been transferred from different parts of Romania and have been adequately restored and rehabilitated. The museum was affected by two major fires in the past, in 1997

Fig. 5 Village Museum in Bucharest: a) example of a traditional house of 19th century, village of Trăisteni; b) traditional village house in the Maramureș region, village of Berbești built in 1775 (Source: http://muzeul-satului.ro/en/)

and 2002. However, with the help of the Ministry of Culture and National Heritage and sponsors, all damaged buildings have been successfully restored (http://muzeul-satului.ro/en). Museums of this type can also be found in Serbia - such as the previously mentioned museum "Staro selo" Sirogojno, and the ethno museum Etar, in Bulgaria.

Măldărești is a small village in Vâlcea county on the southern slope of the Carpathian mountains. In the village itself, several authentic houses have been preserved, which are now in the form of a Maldaresti Museum Complex representing a very important tourist location of this area. The most important structures are three unique buildings the Greceanu and Maldarescu Mansions (*Cula* in Romanian), and I.G. Duca Memorial House. Many other *cule* however are still derelict and in need of renovation all through the Oltenia region. Greceanu Mansion stands out as one of the oldest documented Romanian fortified house-towers, Fig. 6 a). This mansion has been a part of the museum complex since 1956, and currently serves as a museum, and the house owners themselves participate in preserving the authentic of the house. It was often used as a film set for making movies and series. Greceanu Mansion dates back to the Ottoman period, as it is suggested by its name. However, the present day appearance of the mansion dates back to 18th century, when it was restored by Gheorghe Măldărescu and his wife. The mansion, which features elements of the Brancovenesc style, was restored starting in 1967 and is now opened to visitors. Nowadays, after several hundreds of years, the exterior of the tower is almost unchanged, while the interior is also well preserved, Fig.6 b), (https://www.castleist.com/400k-maldaresti-romania-historic-fortified-house-for-sale).

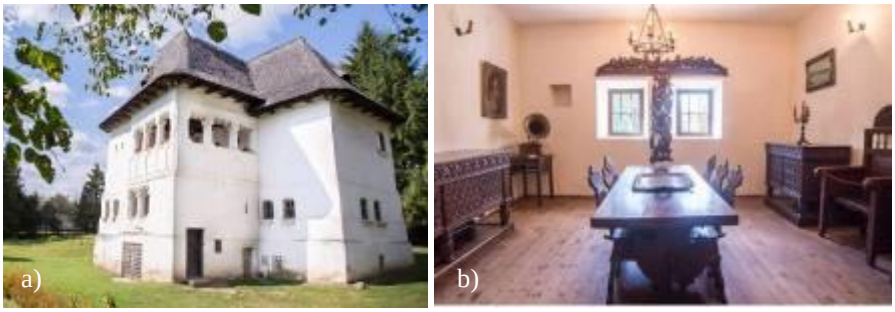

Fig. 6 Greceanu Cula: a) preserved authentic exterior appearance; b) one of the rooms in the museum with permanent exhibits. (Source: https://www.castleist.com/400k-maldaresti-romania-historic-fortified-house-for-sale)

On the other hand, there is a problem in many villages, where one can see an example of many neglected or inadequately renovated traditional houses, Fig. 7 a). A large number of buildings have been abandoned. Also, the local population, i.e. the owners of the houses that are passed from generation to generation, renew them in an uncontrolled manner, whereby the houses lose their original values. The examples given below are traditional Romanian country houses from the Tara Motilor area. Exactly on the topic of restoration and revitalization of these buildings, in 2012, an extensive case study was done with specific proposals for renovation and new purposes, Fig. 7 b), (Barbieri, 2012). Similar examples can be found in almost all parts of Romania, mostly as a result of leaving the village. This problem is present both in Serbia and Bulgaria (Ćurčić et al, 2019).

Fig. 7 Traditional houses in Tara Motilor area: a) some of numerous houses which are still used, but inadequately treated; b) one of the examples of derelict houses, with the initiated renovation process, and the presentation of the possible solution (Barbieri, 2012)

5.3. Bulgaria

In order to preserve the rich cultural heritage of Bulgaria, numerous architectural reserves have been formed. These reserves cover entire villages, districts or parts of the city, and enjoy a large number of tourist visits. Some of the examples are Koprivshtitsa, Old Plovdiv, Kovachevitsa, Melnik, Arbanasi, the villages of Bozhentsi, Brashlyan Delchevo, Dolen, Architectural and Ethnographic Reserve Etara, the villages of Zheravna, Stefanovo and Shiroka Laka. The example of one of the smallest cities in Bulgaria - Melnik - was singled out. The city has a rich and long history, while it is characterized by well-preserved buildings from the Revival period, Fig. 8 a). Some of the most important houses in Melnik are Boyar's House, as one of the oldest Balkan houses, the Kordopulova House and the Pashova House, Fig. 8 b) c). Boyar's House has been renovated and restored several times since the 13th century. Kordopulova House was built in 1754 and is one of the largest houses from this period. Pashova House was built in 1815 and it currently has the function of a historical museum. All three houses are protected by law as cultural monuments (Ćurčić et al, 2019, https://bulgariatravel.org/data/doc/ENG_57-Arhitekturni_rezervati.pdf).

Fig. 8 Historical city of Melnik: a) appearance of the town and tourist zone b) remnants of Boyar's House; c) the Kordopulova House (https://bulgariatravel.org/data/doc/ENG_57-Arhitekturni_rezervati.pd)

The village of Zheravna is located on the slopes of the Balkan Mountains and is one of the previously mentioned architectural reserves. As many as 172 houses in this village were declared cultural monuments in 1958, and Zheravna officially became a museum reserve. Most of the buildings in the village have been well preserved and renovated for many years, and some of the most interesting houses available to tourists are Chorbadzhi Rusi's house, the native house of the famous Bulgarian writer Yordan Yovkov and the native house of the publicist Sava Filaretov, Fig. 9. These buildings are one of those that

Fig. 9 Zheravna village: a) Chorbadzhi Rusi's house; b) the native house of the publicist Sava Filaretov (Source: http://www.jeravna.com/museums.php?language=en, photo by: Nikolay Dimitrov)

survived two shock periods for this village - in 1930, when there was a mass destruction of houses for the sale of scavenged materials, as well as the Second World War. The house of Sava Filaret now serves as a museum of the History of Zheravna. The authentic appearance of the building has been preserved, as well as its interior (https://bulgariatravel.org/data/doc/ENG_57-Arhitekturni_rezervati.pdf).

Every summer, the National Festival of Folk Costumes is held in Zheravna, and the village itself is very popular among tourists. Numerous hotels are actually revitalized houses from the period of the Bulgarian Revival, and operate in the form of guest houses, Fig. 10.

Fig. 10 Zheravna village-Prodanovata House: a) authentic appearance of the guest house in the Zheravna village; b) interior arranged in the image of vernacular architecture (Source: http://www.jeravna.eu/gallery.php)

As in the case of Serbia and Romania, there are buildings that have been neglected despite their importance as part of the cultural heritage and their potential, Fig. 11 a). This is most often the case in rural areas. Also, the sale of these buildings by the owners who inherited them is becoming more frequent. Their use for the development of rural tourism is promoted, but there is no guarantee how they will be treated by the new owners. The house of Hristo Karpachev is one such example, Fig. 11 b). It was restored several years ago and until recently served as a museum (Ćurčić et al, 2019, Metalkova, Traykova & Chardakova-Nakova, 2017).

Fig. 11 Negative practice examples: a) Bogdan Bogdanov house, Karpachevo village, completely derelict; b) Hristo Karpachev house, offered for sale (Traykova & Chardakova-Nakova, 2017)

6. Discussion and Conclusions

Vernacular architecture is one of the most important forms of cultural heritage left by the peoples of our region. The basic features that make vernacular architecture one of the most valuable works of folk art are diversity, richness of form, and above all, a high artistic level (Findrik, 1985). The countries covered in this paper are among the few in the European continent where a large number of preserved monuments of vernacular architecture have been preserved. However, folk architecture still does not have the place that belongs to it in terms of its value.

The current state of vernacular architecture in Serbia, Romania and Bulgaria can be better understood through the previously presented examples and a brief case study. It is noticeable that a significant number of buildings has been qualitatively renovated and revitalized in an adequate manner. However, it can be concluded that there is still a problem in the approach to the architectural heritage. This includes not only the problem of attitudes of official institutions, but also of the citizens themselves. The examples of bad practice covered by the study prove that there are numerous problems related to legal property relations, inadequate use and attempts at restoration by non-professionals. Unfortunately, over the years, a large number of buildings were demolished in due to dilapidation, but also for other reasons. This can happen in a certain period to some buildings covered by this study, if there are no positive changes. "With the disappearance of these houses and the dismantling of valuable spaces, not only the form and grace of the past disappear, the architectural essence disappears" (Živković, 2011). Therefore, educating citizens about the importance of cultural heritage must be further developed. Furthermore, it can be said that these problems occur most often in rural areas and areas where it is more difficult to control the actions of individuals on a daily basis.

In everyday life in Serbia, there is a gap between the theory and desires of members of the professional community which deals with the protection and preservation of immovable cultural heritage on the one hand, and the daily practices of a large number of Serbian citizens on the other" (Vukanović, 2014) The wishes of experts are based on theoretical postulates of protection, i.e. to preserve the original appearance and function of the building. However the practice in the daily life of ordinary people poses a number of challenges to achieve this "because monuments are demolished, houses are dismantled, rearranged and changed according to the personal interests and interests of people living in or near the building" (Vukanović, 2014).

Based on the above examples, it can be seen that many successful actions have been carried out with the aim of reactivating the buildings, and they have been assigned different functions. This is very important because while working on the protection of architectural monuments, it is important to provide a long-term solution for one building by choosing the appropriate new function. Most often, these are cultural institutions such as museums, archives, memorial houses, then cultural centers and galleries, catering facilities and the like, but also apartments. Also, more and more work is being done on the use of traditional architecture in terms of tourism development, such as open-air museums, ethno villages with accommodation units or architectural reserves (Ćurčić et al, 2019). Furthermore, we must not forget the use of appropriate methods of renovation, because each facility must be approached in a special way and all aspects must be considered.

The previously mentioned problem of educating the population is being successfully solved in some parts of these countries, most often through projects, education programs and workshops for the renovation of traditional rural houses. Through such organized activities, participants gain knowledge about traditional methods of construction, adequate access to cultural monuments, and how to protect and restore them. However, mass interest and participation of citizens is necessary, in order to raise awareness of the importance of this problem, and in order for the programs themselves to give positive results. Activities aimed at preserving the legacy of the past that convey historical and artistic messages must, therefore, be raised to the level of primary tasks of a community (Ćurčić et al, 2019, Milić, 1998).

The paper briefly presents the current state of preservation and approach to the architectural heritage in Serbia and the surrounding area through the analysis of basic concepts and methods of preservation, and through a case study. It is noticeable that there is a growing awareness of the importance of vernacular architecture, and it is more and more is invested in its renewal. However, much remains to be done and special attention must be paid to active protection in several areas. The full capacity of what the modern way of life provides must be used to protect the values that we leave behind us.

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PRISTUP GRADITELJSKOM NASLEĐU I NJEGOVO OČUVANJE U SRBIJI I OKRUŽENJU

Kulturna baština ili kulturno nasleđe predstavlja jedinstvenu i nezamenjivu kulturnu vrednost jednog naroda. Očuvanje i zaštita kulturne baštine predstavlja bitnu moralnu ulogu celokupnog savremenog društva. U radu je posebno izdvojen pojam narodnog graditeljstva i tradicionalne kuće kao značajan deo graditeljskog nasleđa. Kroz studiju slučaja obuhvaćeni su primeri tradicionalnih kuća u Srbiji, Rumuniji i Bugarskoj. Detaljnije je sagledano trenutno stanje objekata, njihova namena, stepen očuvanosti, kao i primenjene metode zaštite. Analizom primera pozitivne i negativne prakse izvedeni su zaključci o aktivnom pristupu graditeljskom nasleđu ovih zemalja. Cilj ovog rada jeste sagledavanje pristupa očuvanju narodnog graditeljstva i odnosa navedenih država prema ovom obliku kulturnog nasleđa. Metode korišćene u radu su analiza, sinteza, komparativna analiza, metoda modelovanja i studija slučaja.

Ključne reči: *graditeljsko nasleđe, tradicionalna kuća, metode očuvanja, aktivni pristup, narodno graditeljstvo*

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MAIN FEATURES OF HOUSE-LIKE APARTMENTS

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Branislava Stoiljković, Nataša Petković Grozdanović, Vladana Petrović

Faculty of Civil Engineering and Architecture, University of Niš, Serbia

Abstract. *House-like apartments are intended as a compromise between the opposing aspirations of the modern city dweller – to live in a quiet family home in greenery in the suburbs and to live in a dense, bustling and vibrant city. These are apartments in multi-family housing buildings that have some features of single-family houses in order to increase the comfort of life, the feeling of dwelling in a family home and generally to improve the quality of housing in urban areas. This paper first deals with a comparative analysis of the features of family houses and apartments by certain criteria in order to determine what makes houses better than apartments, ie. to define what are the features of family houses that make this type of housing higher quality and more attractive and can be applied to apartments. Then, an overview of some realized contemporary housing schemes with apartments having the characteristics of houses was given. Finally, features of house-like apartments were identified, their detailed analysis with illustrations through appropriate examples was provided and the importance of their application was explained.*

Key words: *house, apartment, advantage, multi-family apartment building, quality, features*

1. INTRODUCTION

Few apartments can compete with the qualities of a house: 1) family house has its own yard, suitable for rest, recreation, gardening and connecting with nature [2], 2) living in a house offers greater privacy than living in an apartment building [2, 4, 22], 3) the resident of the house can more easily identify with it because he is the user of the building as a whole, not just of one part of it [10, 16, 21]. Apartments generally do not have these qualities and are often characterized by numerous problems: distance from the ground, access, security, privacy, identity, personalization etc. [8, 12, 22]. Therefore, when choosing between a house or an apartment most would choose a house [4, 5, 16, 17, 21, 22].

Received January 8, 2020 / Accepted August 28, 2020
Corresponding author: Branislava Stoiljkovic
University of Niš, Faculty of Civil Engineering and Architecture, Aleksandra Medvedeva 14, 18000 Niš, Serbia
E-mail: branislava.stoiljkovic@gaf.ni.ac.rs

Family housing has its downsides which can be best seen in the examples of cities that are expanding and spreading uncontrollably and unplanned over an ever growing area. This phenomenon is known as urban sprawl and is an inefficient urbanization model that must be kept under tight control. Numerous studies have shown that density and dwelling type are some of the main indicators in measuring the success of urban sprawl control [1, 5, 8]. Nowadays, in developed countries, one can see an increasing commitment to building more compact housing complexes with increased housing densities. By using multi-family housing as the dominant type, these goals can be achieved [14, 21].

The quality of life in suburban houses, as many aspire to, can be achieved in apartments in urban areas by designing and creating house-like apartments [17, 21]. This type of housing involves combining the benefits of suburban houses with ones of housing in a city, in order to make a life in an apartment more attractive and of higher quality. In this way, living in a multi-family apartment building can largely respond to the needs of the modern city dweller while at the same time it can be the antidote to urban sprawl and all the negative phenomena associated with it.

1.1. Literature review

The literature dealing with house-like apartments includes mainly reviews of some utopian projects, but also of some concrete realizations. Over the past hundred years, many architects and theorists of architecture have dealt with this topic. The concept of a quiet, individual home surrounded by greenery, built in a multi-storey apartment building – a synthesis of a villa from the suburbs and an apartment in the city – is a theme that has inspired many utopian projects. The 1922 Le Corbusier's Immeuble Villas are two-storey single-family homes arranged around a double-height courtyard, placed over one another [18]. In 1981, a group of architects S.I.T.E. presents the High-rise of Homes – a multi-storey building consisting of private homes with gardens grouped by floors in communities with internal streets; it offers residents the benefits of a yard and a personalized architectural identity in a multi-storey apartment building [3]. The 2005 Calatrava's Townhouses in the Sky in Lower Manhattan consists of 12 four-story volumes suspended from the central core of the tower, each of which is a modern expression of a four-story townhouse with a living room with a two-story space, private garden and separate entrances via their own elevators [17].

Some authors talk about a relatively recent phenomenon in housing history: regarding an apartment as a custom-made suit [7], and the challenge that architects are increasingly facing – how to provide residents with intimacy and identity within seemingly endless urban agglomerations [9]. As well as having separate entrances and private yards, these features are also closer to single-family housing than multi-family one. Numerous architects agree that individual expression, identity, personalized space, privacy, private green spaces – features that characterize single-family houses – are of great importance for the quality of multi-family housing [6, 11, 15, 16, 17, 21, 23]. By recognizing the positive characteristics of single-family houses and applying them to apartments, conventional multi-family housing is given an alternative. Reviews of realized buildings with house-like apartments, such as the 1921 Spangen Quarter in Rotterdam [18], the 1960 Däckhus in Gothenburg [17] or the 1979 Odhams Walk in London [12] also suggest that this type of housing is not a utopia, but a reality.

2. Comparative Analysis of Characteristics of Single-Family and Multi-Family Housing

Characteristics of single-family and multi-family housing were analyzed by applying a comparative analysis. It was conducted by certain criteria, thus identifying advantages and disadvantages of both types. In this way one can identify the positive characteristics of multi-family housing that should be retained in future multi-family housing construction, as well as the positive characteristics of single-family housing that can be applied in multi-family apartment buildings, which would significantly improve the overall quality of this type of housing. The criteria by which the advantages and disadvantages of both types are compared are grouped into 14 categories [13, 19] (Table 1).

Table 1 Spreadsheet view of characteristics of single- and multi-family housing

Categories	Single-family housing	Multi-family housing
1. System of grouping	Horizontal system of units grouping	Vertical system of units grouping
2. Public-private relation	Two categories: private–public	Three categories: private–semipublic–public
3. Entrance–public circulation space relation	Direct (horizontal) connection between public circulation space and entrance to units	Combined (horizontal and vertical) connection between public circulation space and entrance to units
4. Unit–ground connection	Direct: belonging open space	Units do not have connection to the ground: compensation in the form of loggias/balconies
5. Constructive system	Simple: from function to construction	Complex: from construction to function
6. Flexibility	More flexibility is possible: internal and external	Less flexibility is possible: internal
7. Number of unit levels	Multi-level units	One-level units
8. Level of socialization	Stronger neighborhood connections	Proximity of the units does not imply the sociological closeness of the residents
9. Urbanity and form	Less restricted form, less urbanity	More restricted form, more urbanity
10. Identification	Unit is unique and recognizable in the environment	The increased number of units makes an identification difficult
11. Infrastructure	Longer infrastructure flows	More rational use of infrastructure
12. Green areas	Green areas within individual yards	More public green spaces
13. Complementary facilities	Due to lower density, it is financially less profitable	More profitable inclusion of non-housing, complementary facilities
14. Traffic	Greater dependence on cars	Due to shorter distances, less use of the car

System of grouping. In single-family housing units are grouped horizontally, so this type is characterized by low-rise. In multi-family housing units are also grouped horizontally within a floor, but what distinguishes this type is stacking groups of apartments – floors – vertically, so this type is characterized by medium and high-rise. [11, 23]

Public – private relation. In housing, the term "private" means premises and areas owned by residents. In single-family dwelling, it is the house itself and its associated plot, while public space is outside the plot. In multi-family housing, only the apartment is a private category. The space within an apartment building and between the apartments (hallways, stairways, entrances, etc.) is a semi-public space and is used by the occupants of the building and their visitors. The space outside the building is considered public. [7, 11, 12]

Entrance – public circulation space relation. The relation between entrance to the unit and public circulation space is related to the relation between private and public zones. Only two categories are distinguished in single-family housing – private and public; public circulation space ends on a regulatory line and the connection between entrance and public circulation space is direct and horizontal. In multi-family housing there are three categories of public / private space – private, semi-public and public, and the connection between the entrance and public circulation space is combined, partly horizontal, partly vertical, and is done through semi-public space. [7, 12, 15]

Unit – ground connection. One of the main advantages that characterizes single-family housing and distinguishes it from multi-family one is the existence of its own open space – the yard, so the connection of housing unit to the ground is direct. Depending on the type, houses are more or less open to the vacant lot, and the yard itself is more or less enclosed from public circulation space and neighboring houses. In multi-family housing, by increasing number of floors, the connection to the ground is naturally lost and the lack of associated open spaces is compensated by the construction of loggias, balconies and terraces. [7, 12, 15]

Constructive system. Single-family dwelling facilities are generally simpler in terms of the applied structural system and construction techniques and technology; the structural system generally does not condition the organization of the unit, so it can be said that in designing process it goes from function to construction. In multi-family housing, the construction system is more complex, and the organization of the unit, and of the building as a whole, is significantly conditioned by it; that is why we say that it goes from construction to function in the design process. [17]

Flexibility. Greater flexibility is possible in single-family housing, both internal and external: an occupant of the house can upgrade the unit within the associated plot in accordance with the given legal documents; also, there is less dependence on the structural system and the position of the installations, so it is easier to make certain changes within the unit. In multi-family housing, the occupant of the unit spatially cannot achieve external flexibility due to very clearly defined physical contours of the apartment, while the adaptability – internal flexibility of the apartment – is the most commonly encountered in this type of housing. [15, 24]

Number of unit levels. Single-family houses are in most cases designed and organized on more than one level, so they have their own staircase, connecting different floors of the house. Common apartments in multi-family residential buildings are characterized by one-level living. [16, 21]

Level of socialization. Single-family housing complexes are characterized by stronger neighborhood ties than multi-family housing, which may seem illogical at first, given that the units are physically closer in multi-family residential buildings. However, the physical closeness of units does not imply the sociological closeness of its occupants. [19]

Urbanity and form. In the single-family housing architecture, architects have far greater freedom of expression and less restrictions – normative, constructive, technological, functional and often financial, so the forms of houses can be most diverse. Multi-family

housing is characterized by a more restricted form but also a larger urbanity degree, which is contributed by a higher density, a higher building cover ratio, a higher floor area ratio etc. [23]

Identification. Unlike single-family house, which is a small, simple and unique structure, recognizable in its surrounding, multi-family residential building is a complex structure, with large dimensions and capacity, which is more difficult to perceive spatially, and because of the greater number of housing units, it is more difficult to identify them. The apartment loses its spatial and visual recognition and becomes part of a system of the same or similar units. [10, 19]

Infrastructure. Due to their compact form, multi-family housing complexes require shorter infrastructure flows – roads, plumbing, sewage, heat and electrical installations. As the infrastructure is used more rationally, the price of the housing unit is far more favorable than in the single-family housing, so more housing needs can be fulfilled with less resources. Neighborhoods of single-family houses, with their dispersive form and low density, are characterized by a high cost of infrastructure and utility equipment. [19]

Green areas. Although residential areas with single-family houses have a lower concentration of population and plenty of vacant space, they have very little green area – due to an inadequate house position, they are often reduced to only narrow green strips along the street and small scattered parts of greenery within the block between houses, not sufficient for normal development of high vegetation. On the other hand, there may be more public green areas and generally more larger green areas in multi-family housing complexes due to their higher densities. [20]

Complementary facilities. As complementary facilities (retail, service, sports and children's playgrounds, health facilities, entertainment and cultural centers, etc.) require higher density and concentration of housing units within shorter walking distances, multi-family housing enables and makes it economically more profitable to include these kind of facilities into a residential environment. Due to their mixed content, these complexes are often more attractive than single-family ones, which are characterized by a lack of accompanying facilities. [19]

Traffic. Although it is a common belief that multi-family housing contributes to the creation of traffic problems in the environment, it actually can significantly reduce general traffic congestion when viewed in a wider area. Due to its compactness, higher density and the presence of complementary facilities in the immediate neighborhood, the distances to be traveled and the number of trips by car are reduced, resulting in reduced traffic and pollution. All this results in less dependence of residents of such neighbourhoods on cars, favoring walking and using public transport. [19]

Comparative analysis of single- and multi-family housing shows that both types have their own positive and negative characteristics. Advantages of single-family housing include: greater privacy, own access to the house and entrance to the house, owning your own yard, the integrity of the house, the possibility of personalizing the space etc, while the benefits of multi-family housing regard to higher housing density and lower costs of infrastructure equipment. It is clear that neither of these two types has an absolute advantage and that the most acceptable solutions will be those that combine the benefits of both types. Multi-family housing, as a synonym for city housing, can and should be more than necessity. This goal can be approached by applying some of the features of single-family housing that we consider to be original values [6].

3. RESEARCH OF CONTEMPORARY HOUSING ARCHITECTURE FROM THE PERSPECTIVE OF HOUSE-LIKE APARTMENTS

The rise of pluralism in society, noticeable in the last decades of the twentieth century – differences related to social status, education, family model, etc. – gradually led to an increased need for diversification in housing. It used to be a privilege to build an apartment according to one's wishes, ideas and dreams, but today it is a contemporary trend in a society that is increasingly insisting on the concept of individuality. Diversity, privacy, individuality and personalization largely characterize single-family housing, while it is more difficult to achieve in multi-family housing. Hence, when designing multi-family housing, architects often resort to some of the qualities of single-family homes. Separating the entrance to the apartment, increasing the privacy of the entrance, opening the apartment to multiple orientations, planning larger private open spaces, organizing the apartment at multiple levels, providing a visual identity, etc. are just some of the principles of applying single-family home quality in multi-family housing.

Fig. 1 Mountain Dwelling (2008), Copenhagen, Denmark / BIG

One of the schemes of this kind is Mountain Dwelling in Copenhagen. Program included 2/3 of the parking and 1/3 of the housing. Instead of constructing a garage and an apartment building side by side, the authors merged these two functions in a symbiotic relationship and made one facility, where the parking space was placed in the bases and terraced houses were set up over it, as if on a mountain slope. It looks like a neighborhood made up of single-family houses with their own gardens spread over a ten-story building. This complex combines suburban housing with an urban area density and offers the best of two worlds: proximity to the bustling life of the city centre and the peace and quiet of suburban living. All apartments have their own parking place in front of the entrance, as in single-family housing, even on the 10^{th} floor. The apartments are accessed through galleries that are glazed towards the garage space. The apartments have an "L" shape, forming a courtyard – a terrace on the roof of the apartment below to which all rooms of the apartment open. In front of the terraces, the apartments have small planted gardens that change the character of the whole building depending on the season. Unlike the noisy parking space below the slope, the apartments themselves are quiet and more like peaceful houses on a hill. (Fig. 1)

Hollainhof housing complex is intended for social housing. It contains 129 housing units, almost each of which has some characteristics of family houses. It consists of two tracts, one positioned along the street and the other along the river. There is a large central

courtyard between them and a shared underground garage below it. In the interior of the block, the design and aesthetics of the whole complex give the appearance which is closer to the typology of single-family homes, while on the side of the street it gives the impression of a monolith. Access to almost all apartments is from the central courtyard. Ground floor apartments are organized in two levels, with separate entrances and private gardens on the ground level. In the tract along the street, the apartments on the first floor are accessed through the gallery. These apartments, like single-family houses, have small front gardens that, with the main gallery, form a buffer zone towards a noisy street. Access to the upper floor apartments is through another gallery, on the second floor. The apartments on the upper floors of both tracts have large terraces, formed on the roof of the apartments on the floor below. They are located between cubic volumes of living rooms that are connected to these private terraces through large glazed openings. Different combinations of full and empty – cubes and terraces – form a very unusual silhouette of the whole building and determine that almost every apartment has a different, recognizable shape. (Fig. 2)

Fig. 2 Hollainhof social housing (1998), Gent, Belgium / Neutelings – Riedijk

At the Alfonso Reyes 58 apartment building in Mexico City, the authors deal with the need to express individuality in multi-family housing and explore the potential for variation in the design. The housing units are separated visually and physically on the facades, horizontally and vertically. Just like family houses that are separated by gardens, the apartments are physically separated horizontally by deep open spaces of varying widths, which are not just a mere gap between units, but private open areas of the apartments. In places where these 'voids' reach the facade, the delineation of the different apartments is enhanced by the use of transparent glass for railing. Vertically, the apartments are visually separated by highly positioned ribbon windows, which are actually the only openings on these rather closed facades. In addition, different types of aluminum sheet as facade cladding on adjacent apartments (smooth and corrugated in two shades of gray, giving a total of 4 different finishes), which create different effects by reacting to light, contribute to the fact that each housing unit is visually separated and easily recognizable in its surrounding. Several of the apartments are designed in two levels. The associated open spaces are spacious and innovatively designed; they extend across the entire depth of the building, from the street to the courtyard facade and are protected from views from neighboring apartments. (Fig. 3)

Fig. 3 Alfonso Reyes 58 apartment building (2003), Mexico City, Mexico / Dellekamp Arq.

Whether it be singular apartment buildings or large residential complexes, market or affordable housing, the examples presented in this chapter illustrate the tendency to design apartments with some characteristics of single-family houses within a multi-family housing buildings. What is notable is the desire of the authors to provide residents with privacy and a connection with nature, to design each housing unit according to its users, to give the residential space its dynamism and personality, etc.

4. FEATURES OF HOUSE-LIKE APARTMENTS

The previous excerpt from research on contemporary housing, the analysis of the literature dealing with this topic, as well as comparative analyzes of the characteristics of single-family and multi-family housing, can help identify the features of single-family houses that make this type of housing more humane, better quality and more attractive and which could be applicable to apartments; they relate to: 1) access to the apartment [7, 12], 2) treatment of the associated open area [7, 12, 23], 3) three-dimensional spatial organization of the apartment [16] and 4) the visual identity of the housing unit [10, 20, 21].

4.1. Access to the apartment

Each family house has its own entrance, while in apartment buildings there is one entrance to the building, and the entrances to all apartments are through common, semi-public spaces. Designing access to the apartment, as a transition from semi-public to private zone, is essential to preserving the privacy of the entrance to the apartment.

It is easiest to provide private separated entrances in multi-family apartment buildings to ground floor apartments, directly from the public or semi-public area (Fig. 4a) or by means of private open space, which is very similar to entrance to the family house via its own front garden (Fig. 4b). Apartments on lower floors above ground floor, e.g. on the 1st and 2nd floor, could be provided with separate entrances through separate access stairways which would connect them to the surrounding terrain (Fig. 4c).

Fig. 4 a) Separated entrance to ground floor apartment directly from the public area; b) by means of private open space; c) separate entrances to apartments on lower floors above ground floor by means of separate access stairways

Entrance to upper-floor apartments through the associated open areas, as an analogy to the front yard of a single-family house, would also contribute to the impression of a quality of family house (Fig. 5a). The entrance to the house is most often seen from the inside of it, which has a great psychological advantage because it allows the resident to see the visitor before he shows up at the door, so the feature of the house-like apartments would also be to provide a view of the space in front of the front door from their interior (Fig. 5b).

Fig. 5 a) Entrance to upper-floor apartment through the associated open area; b) providing a view of the space in front of the front door from their interior of the apartment

A multi-family apartment building in which one apartment occupies the entire floor is an exceptional solution in terms of privacy of the entrance to the apartment and personalization of the space in front of the entrance, thus showing in some sense characteristics of the house. Still, it is considered a more luxurious type of housing. In order to reduce costs, there is a constant need to provide access to a larger number of apartments per floor. In buildings with more apartments per floor, the separation of groups of several apartments, with semi-private space in front of their entrances, from vertical circulation spaces would contributes to solving the problem of disturbing the privacy and intimacy of the entrance to apartments (Fig. 6a). Furthermore, withdrawal of the entrances from horizontal circulation space contributes to solving this problem, which gives space in front of the entrance to the apartment a more private character (Fig. 6b).

Fig. 6 a) Separation of groups of several apartments from vertical circulation space, forming a semi-private space in front of their entrances; b) withdrawal of the entrances from horizontal circulation space

In terms of the similarity of apartments to single-family houses, gallery-access apartment buildings are very interesting. Due to their functional organization and way of grouping, apartments in this type of buildings are most often compared to row houses; they are blocked on two lateral sides, have only two facades and are often organized in two levels. Because of their appearance and function, gallery-accesses themselves resemble pedestrian streets on which residents could walk, children play, neighbors communicate (Fig. 7a, 7b).

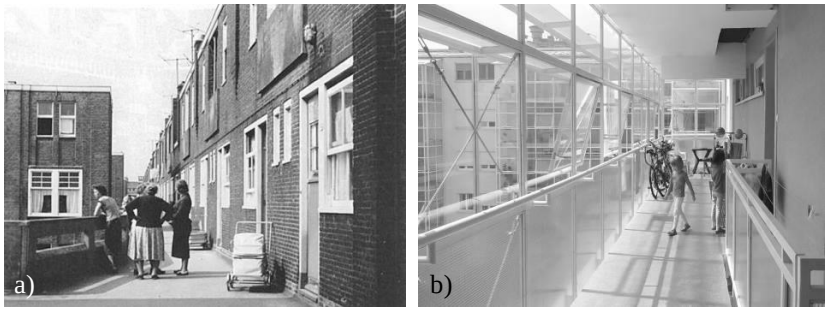

Fig. 7 Gallery access as a suitable place for a) neighbors' chat; b) children's play

4.2. Private open areas

One of the major advantages of single-family houses is the existence of their own garden. In multi-family apartment buildings, with the increase in the number of floors, the connection to the ground is naturally lost and the lack of associated gardens is compensated by the construction of loggias, balconies, terraces, and other forms of associated open spaces. Frequently, it is precisely because of the existence of these private open spaces that housing in an apartment becomes an acceptable form of housing for a wide range of different types of households.

In order for the open areas of the apartments to be, in some sense, a substitute for the gardens of the houses, they need to be larger than standard dimensions of loggias and balconies. That is why the architects should resort to some atypical design solutions such as making larger overhangs (Fig. 8a) or deeper setbacks on the facades (Fig. 8b). Double

height loggias have exceptional advantages and quality, and their use value is increased almost to the quality of house gardens (Fig. 8c). In addition to the appropriate open areas dimensions, adequate functional and technical solutions are also required in order to deal with more serious gardening.

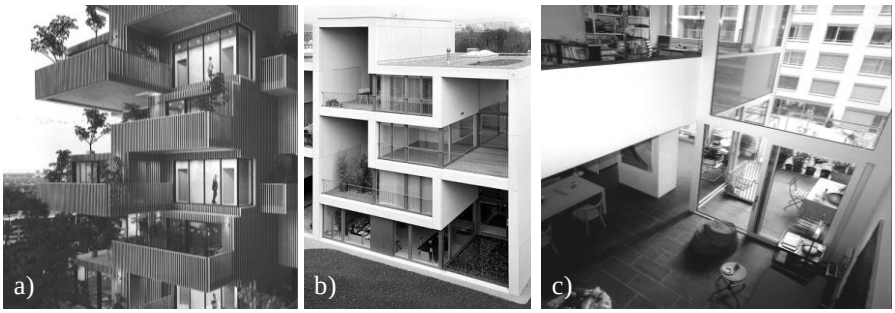

Fig. 8 a) Larger overhangs resulting in large balconies; b) deeper recesses on the facade providing a deep loggia; c) double-height loggia

The ground floor apartments are specific in this respect and have priority over apartments on upper floors. By forming enclosed gardens of the apartments on ground floor, the open area of these apartments can be significantly increased in relation to the standard dimensions of the loggia or balcony. Thus, the apartments receive one of the main features of family houses – their own yard (Fig. 9a). They could be more or less fenced, depending on the architect's idea, the resident's preferences, and the environment in which they are built.

The dwelling on the last floor of the apartment building provides the possibility of pulling the façade walls of the apartment in relation to the façades on the lower floors and forming a roof terrace that would become an open area of larger dimensions and take over the function of the yard of the family house (Fig. 9b). With appropriate technical solutions, roof terraces can become green roofs and be used for gardening and enjoying the nature, just like the gardens of family houses.

Fig. 9 a) Hedged garden of the apartment on ground floor; b) roof terrace of the apartment on top floor

4.3. Three-dimensional spatial organization

Single-family houses are in most cases multi-storey buildings, and the existence of their own staircase can be considered as a feature of this type of dwelling. Single-level housing, characteristic of common multi-family apartment buildings, puts great constraints on spatial diversity. Although it undoubtedly has its advantages (one-level apartments are barrier-free, so they can equally be used in all situations and periods of life), space differentiation and the abundance of variations that can be achieved in this way contribute to breaking the uniformity that often characterizes multi-family housing.

The concept of three-dimensional spatial organization of the apartment involves planning the space of the apartment at different levels, not limiting it to standard ceiling heights and spatial overlap of parts of the apartment. Its implementation significantly contributes to the enrichment of the residential space and to the increase of its resemblance to the spatial organization of family houses.

By designing apartments on two or more levels they get spatial organization which looks like spatial organizations of family houses. Usually, day and night zones are separated on different floors, just like in family houses (Fig. 10a). The spatial quality of the apartment can also be improved by designing with split-levels. By opening vistas from one level to another, one could get the impression of increased space (Fig. 10b). Designing apartments with increased ceiling heights of certain rooms is also a potential for improving the quality of housing. The space solutions in which the apartment extends beyond the two adjacent floors are based on the idea of assigning different floor heights to the rooms depending on their function. More public rooms, such as living room or salon, have the highest ceilings, dining room and bedrooms have the smaller height, and auxiliary rooms have the smallest floor-to-ceiling height.

Fig. 10 a) Duplex apartment with day and night zones separated on different floors; b) apartment designed with split-levels and increased ceiling heights of certain rooms

4.4. Visual identity

In terms of its dimensions a family house is small, and in terms of its organization it is a simple architectural structure, easily visible in its immediate vicinity and recognizable in its surroundings. An apartment is a part of more complex and larger structure and cannot be easily visually distinguished from other units within the whole.

It is therefore desirable to make possible a visual separation of individual housing units, a certain degree and form of their individuality, so that they can be recognized in their surrounding and so that their occupants can identify with them. Considering the regularity and repetition of identical modules and architectural elements, typical of many multi-family residential buildings, individual expression becomes one of the important issues. Human need for housing is not only the need for physical protection, but also the need to identify with a particular place. The visual identity of the building and visual identification of housing units are important because of the residents' need to identify with their housing space and to recognize it in the multitude.

The simplest and most effective element of identification is the application of colour. Colours on the facades are observed before some other elements, such as material, texture, ornaments, etc. Application of colour makes it easy to recognize certain housing units, and also contributes to creating a general impression of the building. It is possible to make every residential unit visually recognizable, by applying a solution that implies different external appearances for each one (Fig.3). Sometimes it is not desirable to visually separate each residential unit individually, but only one (Fig. 11a), or several housing units (Fig. 11b), which will make it easier for residents to identify with them. When the number of apartments is too large to visually separate each unit individually, the groups of apartments could be visually distinguished. Apartments of the same or similar organization, or the same way of grouping in relation to circulation spaces, could form a recognizable unity by using different colours, materials, textures, characteristic combinations of facade openings (Fig. 11c). Such a group – a unity can easily be distinguished from other unities within the whole.

Fig. 11 Visual separation on the facade: a) of only one housing unit; b) of several housing units; c) creating recognizable unities of apartments of the same or similar organization, or the same way of grouping in relation to circulation spaces

5. CONCLUSION

Single-family housing is considered a more humane type of housing and has always been the desire of most people. However, it is characterized by low densities and is therefore an uneconomical and inefficient model of urbanization. On the other hand, housing in cities today implies increased housing densities and more compact housing estates, so multi-family housing is imposed as a social, moral, economic and environmental necessity. House-like apartments are residential units within multi-family housing buildings that have some features of single-family housing units in order to increase the comfort of life, the feeling of living in a family home and generally improving the quality of housing in urban areas.

This research shows that applying the quality of single-family homes to multi-family residential buildings is an extremely useful approach to addressing the housing crisis, urban sprawl, the need to confirm one's individuality, etc. It refers to the combination and synergy of already known types and forms of single-family and multi-family housing structures. It indicates that housing schemes within urban areas, which in addition to the benefits of housing in the city take advantage of house dwelling, provide the opportunity for individualization, humanization and improvement of quality of housing in the city. Putting this idea of housing space as one of the main topics for housing improvement offers considerable opportunities for future urban development and opens new fields for further research on this topic.

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STANOVI SA KARAKTERISTIKAMA KUĆA

Stanovi sa karakteristikama kuća predstavljaju kompromis između suprotstavljenih težnji savremenog stanovnika grada – za stanovanjem u mirnom porodičnom domu u zelenilu u predgrađu i stanovanjem u gustom i užurbanom gradu. To su stanovi u višeporodičnim stambenim zgradama koji imaju neke od karakteristika porodičnih kuća u cilju povećanja komfora života, osećanja boravka u porodičnoj kući i generalno unapređenja kvaliteta stanovanja u gradskim sredinama. U radu je najpre izvršena uporedna analiza karakteristika kuća i stanova po određenim kriterijumima kako bi se utvrdilo po čemu su to kuće bolje od stanova, tj. koje su to karakteristike porodičnih kuća koje čine ovaj tip stanovanja kvalitetnijim i atraktivnijim a koje se mogu primeniti na stanove. Zatim je dat prikaz nekih savremenih izgrađenih stambenih šema sa stanovima koji imaju karakteristike kuća. Na kraju je izvršena identifikacija karakteristika ovog tipa stanova, data je njihova detaljna analiza sa ilustracijama kroz odgovarajuće primere i objašnjen je značaj njihove primene.

Ključne reči: *kuća, stan, prednost, višeporodična stambena zgrada, kvalitet, karakteristika*

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USE OF COLOR IN ARCHITECTURE – INDUSTRIAL ARCHITECTURE PERSPECTIVE

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Ljiljana Jevremović, Branko Turnšek, Ana Stanojević, Marina Jordanović, Milanka Vasić

Faculty of Civil Engineering and Architecture, University of Niš, Serbia

Abstract. *This paper deals with the color theory and the application of this theory in architectural design. Since the modernist architects and modern era in architecture, the colors of the buildings were not in the focus of their authors. On the contrary, the modern movement has taught us that color, and especially artificial one, is almost a crime to use and in a way, it expresses a lack of a style. Through examining universal color harmony principles in this paper the problem and phenomenon of using colors in contemporary architecture was discussed, which had its roots in the modern movement and evolved through technological advance especially in material technology. The industrial architecture is used as an example, to narrow down the research field, but also for the reasons of extensive and creative use of color in this type of buildings. We have examined several industrial buildings that have been systematized into three categories. All three categories are analyzed for the application of general color harmony principles. Then discussion focuses on refining principles of color usage in architecture that appear in contemporary architecture in order to systematize those principles, particularly important for architectural education and new practitioners of architecture. In conclusion, it is stated that universal color harmony principles are applicable in architecture as well, as in other visual arts.*

Key words*: industrial buildings, architectural design, color harmony, architectural analysis, color, façade articulation*

1. INTRODUCTION

There is a theory in design that people respect and care about what they find beautiful and pleasing while they will disclaim and neglect what is unappealing [1]. The pursuit of happiness inevitably includes the pursuit of beauty. Beauty is a quality of an object that

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Corresponding author: Ljiljana Jevremović
University of Niš, Faculty of Civil Engineering and Architecture, Aleksandra Medvedeva 14, 18000 Niš, Serbia
E-mail: jevremovicljiljana@gmail.com

gives pleasure to one or more senses. Delight in the presence of beauty is as natural human condition as breathing [11]. People search beauty in their own environment, in everyday life. The built environment is an important milieu in which people are searching for beauty and satisfaction. [3] An important part of it is surely the environment of the working areas. Pleasantness and satisfaction of the visual experience are usually connected and related to the amount of the stimuli people can get and receive from the object of perception [9, 10]. Since the colors were not popular and welcoming in architecture until recently, our environment lacked the power of the color that consciously and unconsciously it usually has on humans [13]. Color is a deeply emotional subject. For most of us, it is also highly personal, we each have a unique response to color that we develop internally through experience and association [1,9]. The lack of this interaction is definitely one of the reasons why much of the architecture of modern movement and similar has never been substantially appreciated in the wide population. This paper will try to push some boundaries toward the revival of color usage in architecture.

Through selected built project examples, here usage of colors and color schemes on the façade will be discussed. The main answer we are searching for in this paper is what successful color principles used in architecture would be. We used the general color theory as a starting point and general aesthetic principles that are going to be examined through some cases of contemporary industrial architecture as examples. Our working hypothesis is that aesthetic principles are universal and therefore there is a successful way of using a colorful façade in architecture.

If there some deviations from this hypothesis are found, they will be highlighted. Although colors did not have a particularly good reputation in architecture in recent history, the paper sought the answers to the question of what is a good way of using color in the design of building façade. Our discussion is limited to specific building types, industrial buildings, and to usage on building envelope — façades. Narrowing down the scope of our discussion has several justifications. Firstly, this is the way to establish some boundaries; therefore the discussion can be more focused. But also, today in contemporary modern architecture, industrial buildings are conveniently open for using a more colorful façade perhaps more than other types of buildings except for possible buildings for children or similar types.

2. Color Dilemma in Architecture

The roles that different decorative elements play in façade design are gradually changing. In architectural history there are examples of vibrant usage of the colors at building façade, but in theory, may there be a bit of the hostility when it comes to the discussion of colors as a metaphor of a good taste and style. In western thinkers of the late 20th century, color and its potential followers seem to have diminished, become secondary, decorative, and deeming a colorful object or artwork less serious or intellectual than its less chromatic counterpart [11]. Essentially, the discussions of aesthetics in architecture are usually focused on form, material, size, and composition, and there is a common thought that a good architectural design must be monochromatic, maybe even color blind. Architects think in layers. There are so many layers of thoughts in the design process, so the color decision process seemingly comes after all other phases that supposed to ensure good architecture. Although it is not an excuse for non-using coloring in built environment, this is

maybe an act of recent history, fashion or act of engineering influences, through movements that called for honest uses of natural materials and its natural color tones, such as modernism, Brutalism, etc. [4] This rationalism, it may be said, is particularly characteristic of industrial buildings. Color in architecture simply faded in the modern movement. The use of natural, material color found in concrete, glass, and metal, celebrating chromatically devoid minimalism, has dominated architectural thinking since Le Corbusier. White has most often been associated with an elevated intellect and color consequently delegated to the arena of whimsical decoration with but a few notable exceptions. Unfortunately, color has either been used so badly on the outside of buildings, though, that is spawned a great fear of large-scale colorful architecture. Apart from an ill-conceived, short-lived trend in the 1980s, where cladding materials lacked durability and light-fastness, color has been, on the whole, conspicuously absent from our buildings. Since then, we do not have as much color in architecture, as it may be possible and appreciated. Modernists used "the play of light and shadow" together with form play in monochromatic experience, but this is surely not the only way of making successful architectural composition and the only means of expression in architecture. [4,11,13,14] People are not color blind, we see colors, we feel the colors, we do have feelings for them, they have meanings (not always the same) for us, so it is absolutely unjustified to colors be so detached from architecture that makes the humans' natural environment [15].

Recently a visible renaissance has taken place where intelligent, provocative and serious color is being used to serve form and function and take a leading role in architectural environments [11]. We have put aside our chrome-phobia, replacing the achromatic façade of the last several decades with a polychromatic celebration of new technology. What is most intriguing is the diversity of materials and applications. Color has become wholly integrated into the construction process with a vast array of techniques. Rather than a secondary afterthought, chromaticity is considered through material, surface, light and finish at an early stage in the design process [11].

In tandem with the visual qualities of the used façade materials, color is an extraordinary tool for giving a building both identity and presence. Such projects share an immediate recognition and iconic status. Another important element they share is their placement of color. The impact and strength of a color scheme are determined by proportion, shade, saturation, and location. A successful building can expose the intelligent use of one color to great effect and often one color can go a long way. Color must be explored in relation to size and location. Regardless of whether one or many colors are used on the building's façade, the color becomes the most significant and noticeable characteristic of the building.

3. Color Theory

Before the discussion on the particular usage of colors in architecture, specifically on building façade, it is important to make a short journey through a color theory in general. Writing about color is known since the ancient Greeks, but until late XVIII, color theory, in general, was not much in the focus of discussion in the science and art as well. Discussion on color is usually searching for answers to basic questions such as: What is the color? What does it mean? How to organize and display it the best? What makes the color combination harmonious? Putting aside questions of what is color and how to organize a color system, we here focus our discussion on applications of color, and

consequently, questions of meaning and harmonious color combinations are still our places of interest. Color order system or so-called “laws of color harmony” has troubled researchers, scientists and as well as artists for a long. While some of them, like Newton, searched for causes of colors; the others were more focused on the effects of colors, like J.W. Goethe. Since XVIII through the XX century dynamic search for the comprehensive color order system, an umbrella system of laws of color harmony has been visible. Overall color theory, history strives to find the laws of harmony and aesthetics in color schemes, but after decades, even centuries of discussion, agrees and disagrees, we can now agree then there is nothing that can be for sure considered as an absolute law. So we can talk about guidelines and principles, but not the laws [9].

Nevertheless, color harmony is based on the following main focuses. The first focus is definitely the relationship between hues, and the second character has value and saturation of colors. So, there are definitions of the color harmony as a balanced relationship between complementary hues. J. Itten (from Bauhaus) strove to replace subjective principles, and therefore non-scientific, with objective principles of color harmony that can be taken as absolute truth. He stated that the balance between complementary colors is the first principle of color harmony [10]. Furthermore, Schopenhauer was also interested in this topic finding a relationship between color and its light-reflectance. Although he admits, the light-reflectance of colors is not a function of their area, he concludes that it does illustrate the way we sense value differences between pure colors. Josef Albers has also influential thoughts about colors. He stated that true understanding of colors comes from an intuitive approach to studio exercises. He stressed instability, the relativity of perceived colors as well as the power of visual training. But he admits, although his starting point is basically the subjective character of color harmony principles that even in this unstable field there are effects that can be predicted and controlled [1]. The visual experience is not a part of the theory, it is paramount. It determines how we perceive colors. There is an enduring assumption, or a hope, that those elusive, timeless, and absolute laws of pleasing combinations of color really do exist and await discovery.

4. Defining Color Harmony

Harmony is a condition that follows when two or more different things are sensed together as a single, pleasing experience. Harmony is complete, continuous, and natural. It is intuitive; everything is in a balance. Consequently, color harmony appears when two or more colors are sensed together as a single. A key characteristic of harmonious coloring is they are effortless, natural. Each color senses naturally in its relationship to the other. No color is out of place. Goethe: “harmonious compositions seem to belong together according to our senses” [8]. A single color is not pleasing on its own, it is the relationship between the colors in composition to each other that creates color harmony, not the colors themselves. J. Itten said that “harmony is the joint effect of two or more colors” [10]. Harmony is more pleasing than chaos, but not necessarily more interesting or exciting.

Design concepts also may exploit (un)beautiful, starching, aggressive, even disturbing color combinations. Dissonant combinations of colors play a significant role in the design. Therefore, the more comprehensive term in design is color effects, instead of harmony. This term also includes color harmony as a traditional idea that represents pleasantness in color combinations. A second way of making color effects in design is the

so-called visual impact [9]. It is affected by color choices and combination of the visual flair of design. A successful color combination is realized in terms of goals, it is not possible to define color combination as harmonious or dissonant, but it is more appropriate to talk about the successful or unsuccessful color combination. The most important questions before making a color combination in the design are what to achieve? Whether it is for shock value or there is a need or an idea of high visibility, or suggestion of luxury, or wish to startle, excite, disturb, or to even evoke association.

The old laws of harmony are antiquated, but still fresh and valid and therefore useful as a starting point. No laws of color harmony are comprehensive, and no single factor determines it. The aspects of color compositions: hue, value, saturation, spacing intervals, completeness; all that contribute to harmonious effects. All this considered, it is possible to generate color harmonies that transcendent historical theory, individual taste, current trends, and cultural bias. In literature about design principles, colors and harmony there are some rules that can be called for design rules for successful color combinations. This is how we have defined them based on previously cited literature [1,9,12]:

1. Creating intervals between apparently incompatible colors run them into pleasing combination. Introducing colors that are a series of intervals between the two creates a visual bridge; a connectedness that responds to the human need for order.
2. Colors in a complementary relationship are physiologically satisfying. Goethe's phrase "completing colors," is a reminder that the eye finds equilibrium in the presence of three primaries. The eye is more comfortable at rest than at work, and comfort is pleasing.
3. Coloring is also harmonious when a single hue is used in a variety of values or saturation, as monochromatic schemes; or as analogous combinations, which contain two primaries but not the third. A range of values does not have to extend from the extremes of light and dark to be pleasing, nor does it have to be arranged in a linear progression.
4. Even intervals of value are harmonious; middle values are harmonious; Equal values in different hues are harmonious. Intervals of value will be seen as harmonious as long as steps are equidistantly spaced (almost invariably chosen as more preferable). It is true that middle values are often selected as preferable over their much darker or lighter variations. First, hues of close or equal value can be pleasing when they are used as carried colors against a contrasting darker or lighter ground. Hues of close or equal value also create elegant harmonies without a contrasting ground when no image is intended.
5. Color compositions tend to be most successful when the overall level of saturation is relatively constant. A relatively constant level of saturation does not mean that all colors are at the same level of brightness. Complex compositions that include different levels of saturation call for a studied balance between vivid and muted elements. Bright and dull elements are composed together to create a single, cumulative effect that is brighter or more muted. When a general level of saturation has been established, any atypical element is disruptive. A single pure color inserted into a muted palette will pop forward.
6. Color compositions in which two or more hue families compete for equal attention are often less successful than those with major-minor hue relationships. The much complex coloring has an additional characteristic. There is a dominant hue family; most often a group of analogous colors; this principal theme is enlivened by smaller areas of complementary or near-complementary colors.

7. Dissonant coloring can be dynamic and exciting — not pleasing perhaps, but certainly, a way to draw attention. When the guidelines of color harmony are deliberately ignored, the result may startle or repel, but it may also be memorable. Unpleasing color-ways have their own strengths. — Visual impact

8. High impact color can be used to direct attention. An area of brilliant color set in a more muted palette injects an element of surprise into a composition. The strongest images are created by the high-value contrast alone, a graphic power that requires no hue. The addition (not the substitution) of brilliant color to an already powerful image does not change the strength of the image. Instead, it affects the amount of time it takes to capture the viewer's attention. Colors that are both hue-intense and light-reflecting, like a strong tint of red-violet, or a saturated yellow-green, have an eye-catching immediacy.

9. A textured surface (or the impression of one) engages more of the senses than an area of flat color. Broken color, suggesting texture, invites a tactile response as well as a visual one. Fragmented color responds to the human need for connection to the natural world.

Naturally, it is not possible and therefore not necessary to have all these principles in the same composition in order to achieve a harmonious color combination.

5. Colors in Use in Industrial Architecture

As we set the basic color theory which is valid in general, here we are going to examine the presence of such cases in architecture.

Firstly the appearance of color effects in architecture is going to be established, specifically on the façade of buildings. Our focus of examination as already has been described are buildings from industrial architecture family. We used for discussion only buildings that have in use clear and visible hues of colors, so that all buildings that use, as dominant and only idea, too dark and too light tones (shades from white via gray to black) as well as all buildings using various tones of nonspecific natural colors of raw materials such as wood, metal, etc. have been excluded from discussion.

Our intent is to discuss buildings that have brave, outstanding usage of colors and therefore color combinations in architecture. The final goal is to find laws, more adequately principles of using colors in industrial architecture.

We started this analysis as an architectural analysis, examining structural elements of architectural composition such as volume, surface (façade) and point (detail). We were able to group all examined buildings in three groups that have specific and mutual different characteristics. The first group of buildings is characterized by color(s) applied on whole volumes in three-dimensional architectural composition. In the second group are buildings that use color(s) on the façade as two-dimensional composition and in the last one are grouped buildings that use color(s) just in architectural detail(s).

5.1. Colored volumes

Figures 1 and 2 represent the first group of buildings. The manner in which authors use colorings in this group as seen from these photos is as follows: most common is the usage of only one hue, which is contrasted with neutral other volumes in a composition that is used as a neutral background such as dark grey, white, etc. Also, there are possible combinations of two combined more or less equally dominating hues (Fig.1a) or a multiple-

Fig. 1 a) KP Alazraki Corporate Building, Mexico (ph. *Mito Covarrubias*); b) Stoby Winery, North Macedonia (ph. credits: *Aleksandar Radevski & Viktorija Stavrik*); c) Wildspace, United Kingdom (ph. *Tim Crocker*)

Fig. 2 a) Pago de Carraovejas Winery, Spain (ph. *José María Díez Laplaza*); b) Mapfre Automobile Services, Spain (ph. *Miguel de Guzmán*); c) Confectionery Factory Roshen, Ukraine (ph. *Oleg Stelmah*)

color combination (Fig. 1c). Single hue usage is not necessarily characterized by the monotone surface, but it is possible to use a combination of the several tones of the single hue, that from a distance act as a single color. The color choice is usually outstanding; highly contrasted to other parts of the building and the background. When using colors in this way, the highlighted volume is usually clearly defined and formed so it stands out not only by color but also by form. Color choice: Sometimes architects use corporate colors to strengthen the visual identity of the company (Fig 2a) that is now visualized through the building, but as well it is possible to use colors that are connected to the function (Fig. 2b – color of the wine in the winery), also color code can be used for nonverbal communication (way-finding) to make differences between separate parts of the buildings (Fig 1a and 1c).

Examining the presence of the named principles of color effects in this group of buildings is presented in Table 1.

5.2. Color(s) on façade sequence

Fig. 3 a) Docks in Aviles Port, Spain (ph. credits: *[baragaño]*); b) Fournitures Select, Canada (ph. *Steve Montpetit*); c) Umur Printing, Turkey (ph. credits: *Nevzat Sayin*)

The second group of buildings uses coloring at the level of the surface. Here, the design concept is in a two-dimensional sequence of composition that is applied in the envelope of the building. It cannot be necessarily connected with the size and shape of the volume(s) of the building and other parts of the composition — openings, etc. We found several ways of making composition, using one color with several tones of the same color (Fig. 3b and Fig.4a), or using two or more distinctive colors that are combined

(Fig. 3a, 3c, 4b). It is almost impossible to create a visually pleasing composition, but not using neutral tones that are used to calm down the composition. Sometimes those are panels of light color incorporated into the sequence of facade composition (Fig. 3a, 3c) or areas of window openings are used, or even other material that is contrasted to the vibrant-color surfaces (Fig. 3b, 4a, 4b). Table 1 systematizes the presence of the color harmony principles in this group of buildings.

Fig. 4 a) Urban Solid Waste Collection Central, Spain (ph. credits: *Vaillo + Irigaray*). b) Pcital Gardeny, Spain (ph. *Jordi V. Pou*)

Fig. 5 a) Epsilon Euskadi, Spain (ph. *Francisco Berreteaga*); b) CPT Office, Chile (ph. *Juan Eduardo Sepúlveda Grazioli*); c) Glacial Water Bottling Plant, Chile (ph. *Cristobal Valdes*); d. North Laser Centre, Germany (ph. *Martin Schlüter*)

5.3. Color in detail

In this group are buildings where color is used as a detail, usually to highlight a particular part of the building. Those are most frequently entrances or some other interesting parts of the building. It serves as a focal point of the composition so it is more usual to use saturated high-impact colors that are distinctive even from greater distances despite the size of the colored area (usually not very large) rest of the building is designed as a neutral basis, black and white, as much as shades of gray. Compositions do not use more than one main color. Functionally, this also can be corporate colorized. The usage of color harmony principles in the third group is also systematized in Table 1.

Table 1 Examination of the color harmony principles used in the presented architectural design of the industrial buildings

	Princ. 1	Princ. 2	Princ. 3	Princ. 4	Princ. 5	Princ. 6	Princ. 7	Princ. 8	Princ. 9
	Color scheme associated with corporate brand colors	Intervals & Harmony	Complementary colorings	1-2 hue of various values or saturation	Even interval of values or even values of hues	Saturation & Harmony	Major and Minor themes	Dissonant colorings	High Impact colors	Textured surfaces
Colored volumes										
Fig. 1-a	●		●				●		●	
Fig. 1-b				●	●	●			●	
Fig. 1-c								●		
Fig. 2-a	●								●	
Fig. 2-b	●								●	●
Fig. 2-c			●			●	●			
Color(s) on façade sequence										
Fig. 3-a		●		●	●		●			●
Fig. 3-b				●	●					
Fig. 3-c								●		
Fig. 4-a				●					●	
Fig. 4-b		●						●		
Color in detail										
Fig. 5-a	●								●	
Fig. 5-b	●								●	●
Fig. 5-c									●	
Fig. 5-d									●	

6. DISCUSSION

Here all examined buildings will be integrally discussed, irrespective of to which group they belong. This is because there is no clear evidence that way of applying colors on building envelope influences the rules of color harmony. With the exception of the last group that particularly uses a single principle of making color effects successful (so-

called use of high-impact color), the other two groups cover the whole spectra of color harmony principles named above.

It is possible to combine architectural analysis with the analysis of architectural objects as a simple graphical experience, the image, as one of the typical visual art forms, because discussed elements of design are primarily an artistic component of an architectural design. Only on the secondary level, those forms are connected with some logical function. Or not. There are examples of both cases. Firstly, color choice, if it is not chosen as a corporate brand color scheme, which is the case in several examples (see Table 1) or as an association for the function, is a purely artistic decision made by the authors. Architectural design is certainly not pure art, but also a functional form. Although sometimes it seems different, architects are more than usually conditioned in their own decision. Sometimes, it is a matter of investors' affinity, availability of materials for usage, quality of built materials, etc.

Principle 1: Intervals and harmony. - No matter how unlikely a color combination may seem at first, a series of intervals can establish a kind of order that the eye accepts as logical. Creating a series of intervals between unrelated colors is a principal way in which they can be transformed into a harmonious grouping. A series of visually logical steps between any colors are inherently pleasing. In the first case this is present (Figure 3-a), there is a combination of two hues that are not complementary, and the composition is amended with neutral intervals in the light and grey areas. Color with usage, red and blue are intentionally used as an association for the metal industry – red as the color of the coating against rust, blue as a cold color of metal products. Creating intervals between unlikely elements respond to a recurring problem in design: how to achieve a good result when forced to work with colors that seem at first to be hopelessly incompatible. Similarly, in the second example (Fig 4-b) here had been employed multiple hues that are not complementary nor close to each other, green-violet – orange, but here yellow spaces of the lower saturation are used to make a pause, an interval for the sequences of contrasting colors. It works together with a secondary level of surface that is used as underline in a similar light-yellow tone, and in the composition is used as a neutral background.

Principle 2: Complementary colors - Historically, color harmony has always been related to the relationship between hues, especially between complementary colors. Complementary schemes are commonplace in various kinds of designs and their applications, so as in contemporary architecture. Red and green, in our analysis appears in two examples, which is good enough to conclude that this old idea is still applicable and visually interesting. The first example is a corporate building (Figure 1-a) that uses the corporate red-green color combination on the façade. Although the color choice is not accidental, the composition does not bring any tension, but a sense of completeness. The second example (Figure 2-c) uses complementary colors at different levels. Here, unlike the first case, there is one dominant color (green) while the image is completed with the detail of the street bench (in red color) in front of the building. This is an excellent example when a tested recipe for success is used "in the last moment" is making the balance. The complementary-color theories of color harmony are supported by the visual experience at the most fundamental level.

Principle 3: Values and Harmony - The principle is used in three of our examples that can be seen in Figures 1-b, 3-a, 3-b, 4-a. While examples at Figures 1-b and 4-a employs small scale intervals, excluding extremes, brightest and darkest tones, in composition whole areas of the same hue tend to meld into a single color. Balance in the composition

in the first case is achieved with an additional neutral entity (grey basis), while in the second case large dark window area contrasts the intense color. In both cases, there is a change in a three-dimensional form that contributes to composition. On the other hand, in the case of examples in Figures, 3-a & 3-b intervals between color(s) are more apparent, which do not allow to be seen as a melted image. Each value is one entity and works as a single in the composition. When the two-dimensional composition is interesting enough, the overall form of the building is very simple.

Principle 4: Intervals & Harmony - This discussion continues the previous one. The same examples that employ the different values of the same hues are used with the even intervals, making the even distances, so the pleasing composition is made with the sense of order despite apparently chaotic and random disposition of the panels. (Figure 3-b)

The principle of equality of values (visible in Fig 4-b) tends to prove the idea that despite the image lacks the "forward and back" impression, associated with the contrast of dark and light, but the presence of many colors offers a different kind of interest and liveliness.

Principle 5: Saturation & Harmony - A muted color appears greyed or dirty, and recedes when it is included in a composition of brilliant colors. This appears in Figure 1-b and similarly in Figure 2-c. Both cases serve as examples where a different level of saturation allows brighter colors to come forward gradually, creating a softer impression rather than a sharply graphic one. It has been argued that muted colors are naturally more harmonious than saturated colors because the eye is at rest in the presence of muted color. This idea, too, fails the definition of harmony. Brilliant colors in combination are exciting and muted tones are calming, but neither is inherently more harmonious than the other. Only the relationship between colors creates color harmony, not the colors themselves. Harmonious compositions are possible with colors at any level of saturation.

Principle 6: Major and Minor Themes - The eye's need for equilibrium in the multi-chromatic composition is easy to achieve if there is even a slight difference between the dominance of colors. The example in Figure 1-a gives the advantage to the red color dominance that is more saturate while in Figure 2-c, by size green color dominates. Although they are in both cases, complementary colors, an additional level of successful composition is in this way achieved. Similarly, the example in Figure 3-a, a small advantage is given to red gamma over a blue in order to avoid the dilemma of color dominance. Here, this is achieved by the usage of more saturated and darker hues of red and less saturated and lighter hues of blue color.

Principle 7: Dissonant Colors - If color harmony is the "good child" of design, its polar opposite is disharmony or dissonance. Dissonant color-ways are disturbing. Colors do not seem to belong to each other. If harmony conveys balance and order, disharmony communicates imbalance, unease, edginess, chaos; a sense of things missing or "off-kilter". This principle, proven in the examples in Figure 1-c, 3-c, and 4-d, shows that this idea is not exclusively for pure modern art, but also applicable in applied fields of arts such as architecture. Although it is visually more disturbing than pleasing, this, nevertheless, makes an impression and draw the attention of the viewers. Although drawing attention is probably the main reason for employing this principle, there are also additional reasons for making such a design decision. So in example 1-c, different colors are used to visually divide different functional zones, or in the case of example 3-c, there is an association with the function of the building (a printing company).

Principle 8: High-impact colors - Some design problems call for colors or combinations that will draw instant attention. Only a few saturated hues are high-impact colors. Working

with high-impact colors is not necessarily an alternative to color harmony, i.e. color combination. Colorings can be both brilliant and harmonious. Brilliant colors used together without some intervening value contrast, are likely to vibrate, so although they draw immediate attention, they are poor candidates for good readability. Still, because these colors often contrast sharply with their surroundings, they are useful in communicating nonverbal warnings. It creates a point of focus that draws attention to itself and away from the composition as a whole. This case of making successful visual effect is visible on all examples of third of our examined groups (Figure 5). All mentioned above are found there; from drawing attention to nonverbal communication (highlighted details are usually entrances). Other examples that also employed this principle (Figure 1-b, 2-a, 2-b and 4-a) have the same goal, but a different scale. Here, attention-seeking is not from the perspective of one building, but from the whole area. Usually, those are industrial zones that are not frequently aesthetically pleasing and colorful.

Principle 9: Surface and harmony - Flat color has its own purpose and place in the design. Where broken color suggests nature, hard-edged, flat colors are dramatic and compelling. They have a discipline that responds to an entirely different human need: the need to control. A surface that is flat, sleek, and flawless offers an impression of precision. The decision to use flat or broken color is a small but meaningful side trip on the road to successful color choices. On the other hand, the natural world is rarely truly colorless. On the contrary, nature is a richly chromatic experience. The main characteristic of the colors of nature is that they are fragmented; they are better described as optical mixes, than as flat color. In our examples, although we did not choose to discuss natural materials and colors so that this principle looks like hard to demonstrate, in a few examples, there is evidence of the texture on the metal-panel surfaces that enriches the overall image. Appropriate for industrial architecture, in two of our examples (Figure 2-b & 3-a) architects use typical metal texture in the first one that is metal mesh in the second, its corrugated sheet metal. Although the colors in both cases are in absolute focus and dominate in the overall composition, this fine texture enriches the compositions in the way that large volumes of those buildings do not look lifeless and non-articulated. This is exactly how and why it is used in building in Figure 5-b. Natural wood is used for the surface that is not much articulated and the stress in the composition is not on it, but still, because of its size, there was the need to avoid making a simple flat surface, but the fully textured instead.

7. CONCLUSIONS

Now it is possible to conclude that despite the dilemmas about the subjectivity of color harmony principles, their universality and therefore objective character are proved. We have found all principles of color combination in the architecture of industrial buildings. This is to prove them as general and universal principles of aesthetics in the visual arts. The fact that in analyzing buildings we have found all given principles of color combining theory and we could not define any additional one is a contribution to the existing color theory that has been proven in this field of art (architecture).

Technological advancements over the last ten years have enabled the use of cheaper, repeatable and more durable materials than ever before, available in an extensive range of colors. This is probably the reason for the increasing appearance of colorful buildings, especially in industrial architecture. Large panel tables that have replaced cheap industrial

cladding popular, so many years brought in an industrial architecture new wave of positive energy into the aesthetics of industries. Nowadays, expressive specification of external color can also alter out pre-conceived ideas certain types of buildings should look; we have come to expect public buildings, in particular, to look in a specific way. The notion of a building as 'artwork on the landscape' can be encouraged by the use of interesting colors. In all projects, it is undeniably the color that has created these unusual dynamics.

To conclude, in the examined buildings, the most common usage of color principle that is most associated with contemporary aesthetic and architecture is creating a visual impact with high-impact colors. This is what seems most connected with the architect's vision of building aesthetics and the impression they want to create. Classical terms of color harmony, like complementary colors, even values of hues and even intervals of values are still not abandoned that speak in favor of everlasting principles or laws of harmony.

Much of the time, colors for buildings are chosen either to appeal to, or to attract the attention of, the widest possible audience. Following the guidelines for color, harmony does not guarantee that a particular color-way will have universal appeal. There is always an element of personal bias in color preference. But there is no way to escape the conclusion that a great deal of what we find harmonious originates as involuntary responses of the eyes and mind.

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UPOTREBA BOJA U ARHITEKTURI – IZ PERSPEKTIVE INDUSTRIJSKE ARHITEKTURE

Ovaj rad se bavi teorijom boja i njenom primenom u arhitektonskom projektovanju. Još iz peripda Modernizma i modernističkih arhitekata, boje nisu bile u fokusu arhitekture i njenih autora. Zapravo, moderni pokret nas je učio da boja, posebno ona veštačka, je praktično zločin u arhitekturi i da na neki način pokazuje nedostatak ukusa. Ispitivanjem univerzalnih principa harmoneije boja, tj. međusobnog komponovanja boja, ovaj rad diskutuje o problemu i fenomenu korišćenja boja u savremenoj arhitekturi, koja ima svojih korena u modernom pokretu ali je evoluirala kroz tehnološki napredak, posebno u tehnologiji materijala. Industrijska arhitektura je uzeta kao primer, kako bi se suzilo polje istraživanja, ali i iz razloga intenzivne i kreativne upotrebe boja kod ovog tipa zagrada. Ispitano je nekoliko industrijskih objekata koji su sistematizovani u tri kategorije. Sve tri kategorije su analizirane u kontekstu primene generalnih principa haromenije boja. Zatim, diskusija fokusira prilagođavanje ovih principa upotrebe boja u arhitekturi kako bi sistematizovali ove principe, posebno važne za arhitektonsko obrazovanje i nove autore, projektante u arhitekturi. U zaključku je istaknuto da univezalni principi harmonije boja mogu biti primenljivi u arhitketuri, takođe, kao i u drugim vizuelnim umentostima.

Ključne reči: *industrijske zgrade, arhitketonsko projektovanje, harmonija boja, arhitektonska analiza, boje, fasadna artikulacija*

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THE AGENT-BASED MODELLING AS A DECISION SUPPORT TOOL FOR BROWNFIELD REDEVELOPMENT

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Tanja Mitrović, Milica Vračarić

Department of Architecture and Urban Planning, Faculty of Technical Sciences, University of Novi Sad, Serbia

Abstract. *In recent history of urban studies there is a focus on sustainable urban development and long-term strategies. Dealing with brownfield redevelopment is of vital importance for the prosperous practice of urban planning. The current decision-making methods for brownfield redevelopment are mainly used for evaluating on-site situation, but not for future development plans. The purpose of this paper is to consider potential uses of agent-based modelling (ABM) in brownfield redevelopment decision support practice. In these models, agents are assigned with certain rules of behaviour that define their mutual interactions and allow simulations in a previously defined spatial framework. These collective behaviours influence the spatial patterns through interactions of individuals, which is reflected in the fact that the actions of the agents do not simply sum to the activity of the whole. This tool provides us with opportunity of observing possible scenarios of future brownfield development and making adequate decisions and strategies accordingly.*

Key words: *brownfield, agent-based modelling, decision support system, urban development, research tool*

1. INTRODUCTION

The improvement in brownfield sites planning has been recognized as an important issue in a considerable number of studies of sustainable urban development. There is a wide agreement that brownfield regeneration is a key element of urban development and as such has been the subject of research for many authors (Beames et al., 2018; Ferber et al., 2006; Perovic and Kurtovic Folic, 2012; Petríková and Finka, 2006; Rizzo et al., 2015; Schädler et al., 2011; Schädler et al., 2012; Schädler, et al., 2013; Wedding and Crawford-Brown, 2007).

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Corresponding author: Tanja Mitrović
Faculty of Technical Sciences, University of Novi Sad, Trg Dositeja Obradovića 6, 21102 Novi Sad, Serbia
E-mail: mitrovictasa@gmail.com

The term "brownfield" can be defined and translated into many languages in many different ways. In the United States, a brownfield represents a property on which expansion, redevelopment, or reuse can be complicated by the presence, or perceived presence, of contamination (EPA, 2006). In Canada, it is defined as a property, often a former industrial site left underused due to environmental contamination concerns (CREA, 2007). The European perception treats brownfield land as derelict, underutilized or vacant land; these lands may have environmental damage or not, on which previous use has ceased or subsided and which the market could not adequately reuse without some kind of an intervention (Ferber et al., 2006).

Redevelopments of brownfield sites became more frequent in the first decade of the 21st century. The increasing number of brownfields in cities around the world has conditioned the need for strategic actions directed toward sustainable regeneration and sustainable development (Perovic and Kurtovic Folic, 2012). Depending on the socio-political context in which brownfield sites are located, discourses to support brownfield redevelopment are various. In some countries this issue is addressed by massive national programs, supporting national and regional investment. The planning system in many European countries has supported brownfield redevelopment as an alternative to greenfield development. Furthermore, the reuse of brownfield land with taking advantage of existing urban infrastructure contributes to the reduction of urban sprawl (Petríková and Finka, 2006). All things considered, it is generally accepted that the reuse of brownfields provides many environmental, economic and community benefits, which made a large number of countries all over the world aware that investment in brownfields can pay off in many ways.

Although they include many challenges, brownfield sites at the same time represent a great potential for developers. The scale of brownfield sites in urban areas and the prospective benefit of using these places underline the necessity of providing decision support systems for their redevelopment.

The aim of this paper is to explore potential uses of agent-based modelling (ABM) in brownfield redevelopment decision support practice. According to Lawlor and McGirr (2017), agent-based modelling is a system science method to simplify and simulate complex phenomena. It is an increasingly usable simulation modelling tool that has aroused great interest in the past decade. The ABM framework allows one to simulate the individual actions of diverse agents, quantifying the resulting system behaviour and the complex characteristics of their outcomes over time. Agent-based models with their focal point on individual actions of agents have potential to be of benefit given that they potentially do not share the theoretical weaknesses of conventional models. In this paper, the use of ABM has been considered and evaluated with regard to other currently prevailing methods for brownfield development.

2. Conventional Decision Support Systems for Brownfield Redevelopment

Decision support systems for brownfield redevelopment are classified into two wide categories: indicator based multi-criteria analysis (MCA) tools and stakeholder participation frameworks (Beames et al., 2018). MCA is tasked with evaluating and choosing among alternatives based on multiple criteria using systematic analysis that overcomes the limitations of unstructured individual or group decision making (Belton and Stewart, 2002; Munaretto et al. 2014). Beames et al. (2018) make further division of indicator based

MCA tools into two categories: tools that include spatially explicit indicators and those that do not. The use of spatially explicit indicators provides the opportunity to operate with spatial data on specific locations by relying on automated computational processes. Contrary to that, stakeholder participation is the process of involving people who may be affected by the decisions which will be made, or who are able to influence the realization of these decisions. Stakeholder engagement methods and techniques most often refer to focus groups, workshops and questionnaires (Rizzo et al., 2015). In this paper we analyzed and compared seven decision-making methods for brownfield redevelopment, six of which belong to the MCA tools and one to the stakeholder participation frameworks.

The Sustainable Brownfields Redevelopment (SBR) Tool and SIPRIUS indicator system were designed to compare alternative redevelopment scenarios in hindsight (Wedding and Crawford-Brown, 2007; Laprise et al., 2015). Although they are primarily post-completion assessment tools, they can aid in the design of a project to some extent. SBR is a retrospective tool for evaluating the success of completed brownfield redevelopments, based on 40 indicators (grouped into 4 categories: environment-health, finance, livability, and social-economic) which are normalized to a percentage by assigning the indicator values for the redeveloped site by the values of the site before the renewal (Wedding and Crawford-Brown, 2007). Further evaluation of the results is carried out using an analytical hierarchy process (AHP). SIPRIUS is a digital monitoring tool composed of 21 criteria assessed by 42 indicators (Laprise et al., 2015). They are divided into two groups: context criteria (such as: mobility, proximity of commercial facilities, job, population etc.) and project criteria (such as: land, well-being, diversity etc.). Corresponding indicators are assigned to each of these criteria. For example, the diversity is assessed through three indicators: degree of functional mix, potential of social diversity and degree of universal access. Each of these indicators are compared to a scale of reference and the results are evaluated individually. Thus, contrary to normalizing and aggregating the results, it is avoided losing the sense of absolute scale.

The approach developed by Michael R. Thomas (2002) deals with the question of optimizing brownfield redevelopments regarding land-use siting decisions. The approach is supported by a geographical information system (GIS) tool called Smart Places and determines the optimal land-use for unused brownfield sites based on 30 indicators. Indicators are grouped into 5 categories: land resource base, social/cultural, economics/finance, environmental quality and infrastructure (energy and resources). The indicators include: adequate land area, education levels, land values, proximity to utility services, willing neighbors etc. Each site is evaluated through these indicators after mapping brownfields using Smart Places.

An assessment suitability method for land redevelopment from the aspect of sustainability was originally developed by Stadtregion (2010) as part of the research project SINBRA (Bartke and Schwarze, 2015). The SINBRA sustainability assessment tool (SINBRA-SAT) was then developed further by Schädler et al. (2011, 2012, 2013). SINBRA-SAT determines optimal brownfield redevelopment scenario design for the specific considered site (Schädler et al., 2011, 2012, 2013). This method uses an algorithm which generates all the possible combinations of three land-use types and then evaluates each according to a set of 23 Boolean indicators such as: residential areas in the surrounding area, commercial areas within walking distance, good supply and disposal infrastructure, site suitable for innovative industries and others.

The LEED rating system for neighborhood development (LEED-ND) is developed as a method to identify eligible locations for urban redevelopment (Talen et al., 2013). The system is based on a checklist of 56 indicators that can help communities to prioritize suitable sites within a city or urban centre. Indicators are organized into three main groups: smart location and linkage (SLL), neighborhood pattern and design, and green infrastructure and buildings. The approach of Talen et al. (2013) is developed as an effort to extend the green building principles to the scale of neighbourhoods.

The approach developed by Beames et al. (2018) focuses on spatial proximity in evaluating the potential for different redevelopment alternatives for a specific site. The proposed method is supported by a combination of GIS software platforms including the VITO GeoDynamiX Toolbox and ArcMap. Spatial proximity analysis supports efforts toward more compact urban planning. Beames et al. (2018) developed the approach with an aim to integrate both kinds of decision support systems for brownfield redevelopment. However, the social indicators of this system take into consideration only physical aspects of the built environment such as zoning, accessibility to green spaces and roads, percentage of sealed soil, historic buildings or nearby amenities in walking distance.

The RESCUE sustainability assessment tool (RESCUE-SAT) is developed in a five-year EU-funded research project (RESCUE, 2004). It is a participatory, consulting and procedural approach that highlights the role of stakeholder participation in the assessment of sustainability. RESCUE takes into consideration aspects of land quality, development planning and citizen participation in order to draw up recommendations for actors in land revitalization. This method consists of two assessment sets - by the approval body and the stakeholders. They are further merged to make an overall assessment, which is then compared to a fixed benchmark setting a minimum standard of quality. The final result represents the ground for deciding whether financing is to be granted for the project. To summarize, the RESCUE-SAT is a completely participation-based method practised to encourage the sustainable use of brownfields.

Table 1 shows an overview of all the methods described above. Existing tools are presented in the interest of demonstrating how the approach presented here contributes to the current state-of-the-practice. All considered approaches aim to facilitate decision-making process in brownfield redevelopment practice, but only few have been embraced by practitioners. When it comes to their implementation, the evaluation of their diverse qualities must be guided by the normative aspect of sustainability but at the same time be oriented toward the user's various requirements. Assessment tools for brownfield redevelopment are developed to fit a given norm-based aspect that involves selecting certain sustainability principles over others, e.g. broader participation or better practicability and flexibility or more systematic compliance with a holistic perspective (Bartke and Schwarze, 2015). In the frame of tools that include spatially explicit indicators, the SINBRA-SAT and Spatial proximity analysis are the only ones which use an automated computation process to get a result. The existing methods are generally used for evaluating on-site scenarios, but not for predictive modelling of different redevelopment scenarios. That prompted us to examine the potential use of ABM as a tool for improving current practice.

Table 1 Existing decision support systems for brownfield redevelopment

Decision support system	Method	Author	Computational tool
MCA tools	Smart places	Thomas (2002)	GIS software platforms
	SBR	Wedding and Crawford-Brown (2007)	-
	SINBRA-SAT	Schädler et al. (2011, 2012, 2013)	Visual Basic and GIS software platforms (MapWindow GIS)
	LEED-ND	Talen et al. (2013)	-
	SIPRIUS	Laprise et al. (2015)	-
MCA tools	Spatial proximity analysis	Beames et al. (2018)	GIS software platforms (VITO GeoDynamiX Toolbox)
Stakeholder participation frameworks	RESCUE-SAT (workshop, stakeholder groups)	European Commission (2004)	-

3. Theoretical Framework and Historical Background of ABM

The initial application of agent-based modelling was intended for the urban dynamics simulation on a micro-scale (Benenson, 1998). Only later the scope of its utilization was expanded. It took a long time for the ABM to emerge noticeably in social simulation and geographical information science. It happened only after Epstein and Axtell (1996) described the potential of its application to growing entire artificial cities.

Some of the first agent-based simulations used as support in making decisions in urban planning were models like UrbanSim (Waddell et al., 2003), and PUMA (Ettema, de Jong, Timmermans and Bakema, 2007). The increased presence of ABMs on an urban scale is considerably caused by the standardization of the modelling process through the ODD (overview, design concepts, and details) protocol (Grimm et al., 2010).

Agent-based models are mainly consisted of two components: the agents – implying a population of entities which are described by a set of attributes, and the environment – representing the area intended for agents' interactions (Benenson, 1998; Bonabeau, 2002). Agents interact with each other and with the environment, generating changes within the model.

The main issues with which are ABMs models challenged are: the rule definition of the agents, acquiring data and the spatial implementation structure (Kocabas and Dragicevic, 2013). It is not easy to define an agent, but according to Crooks et al. (2008) their main features are autonomy and heterogeneity. This means that agents can exchange information between each other and make decisions independently as well as implement independent control of a situation. According to Hatch and Dragicevic (2018) agents are also pro-active, reactive and perceptive, goal-directed and distinguished by bounded

rationality – meaning they may be restricted to only partial access to data; and then also interactive, mobile, and adaptive.

The focus of ABM framework is on agent behaviours and dynamics in terms of agent interactions. Agents are provided with a set of rules that define their interactions both with their surrounding environment and amongst one another. There are several methods within ABM which have been used to provide simulations. Some of them are based on hypothetical datasets (Crooks et al., 2008; Ligtenberg et al., 2001; Shan and Zhu, 2007), while the others integrate real geospatial data enabling better representation of agent's reasoning (Cabrera et al., 2010; Evans and Kelley, 2004; Hatch and Dragicevic, 2018). There is a wide range of parameters that could be used to define agents' behaviour and ability of making decisions. According to Sakamoto and Ferré (2007), almost everything can be internalized as parameter.

Agent-based modelling differs from many classical approaches because the global system behaviour manifests itself as a result of interactions of many individual behaviours. There is no room to impose the behaviour of the system directly by user, thanks to the parameterization of agents' behaviour. Its ability to display realistic processes, variety, behaviours and outcomes at different scales means that ABM can provide meaningful insights where many other methods cannot.

4. APPLICABILITY OF ABM TO BROWNFIELD REDEVELOPMENT

The employment of agents provides the opportunity to apply advanced behavioural models to simulate participants' behaviour in a more realistic way. Agents can be modelled as more advanced cognitive units, which are able to show pro-active behaviour, engage in long term planning and come to know about their environment. In addition, it is possible to model interactions and feedback effects at various levels (Ettema et al. 2007).

The approach we propose in this paper is based on defining agents' behaviour in the framework of brownfield redevelopment. According to Ferber et al. (2006) there are many actors in brownfield redevelopment that can influence brownfield reuse from several different levels: personal, local, regional, national and global (Ferber et al., 2006). All these interest groups need to be active and take part in enabling sustainable brownfield solutions.

In order to precisely define types of agents it is necessary to carry out stakeholder analysis, where the first step usually consists of stakeholder identification. Depending on which level the analysed brownfield site is considered, there will be different types of stakeholders defined for different case studies.

One of the most represented methods in stakeholder analysis is the interest-influence matrix (Reed et al., 2009). This method provides a classification of stakeholders that facilitates decision-making for the inclusion in participatory processes as well as setting priorities. This method can be implemented through surveys, workshops or on the basis of the criteria defined by researchers. After the types of agents are clearly identified, it is necessary to define their behaviour. Depending on the scale at which the research is conducted, inputs for agents' behaviour will be different. If the stakeholders are institutional entities, the input data could be well known as legal outcomes, while in the case of individuals, the defining of their needs requires additional research through questionnaires, meetings, interviews or employing other methods of participation. Individuals could be set to follow certain rules of movement, such as

avoiding obstacles (buildings, roadway, urban furniture…), selecting the desired destination, avoiding crowds or staying in sunny places etc. Through such rules and interactions different aggregate patterns emerge. The observation and analysis of the resulting outcomes can help in the process of predicting and deciding on the future development of brownfield sites. In other words, the main challenge lies in specifying agents' behaviour, and particularly, in choosing the rules they use to make decisions.

The approach proposed here can be appended to existing methods or employed as a standalone tool. The MCA tools can assist in the creation of decision-making algorithms of agent reasoning within ABM. Since the influence of the brownfield site location is as important for agents as their mutual interactions, spatial parameters could be obtained from some of the existing MCA tools. For instance, GIS might be used for preparation of inputs which are then passed to the modeling system, where the results of the model after the execution could be returned to the GIS for display and analysis (Crooks, 2010).

Figure 1 shows the schematic representation of possible interaction between conventional methods and the proposed approach. In order to create an agent-based model as a decision support tool for brownfield redevelopment, the following inputs are required: agents' behaviour rules, spatial brownfield framework and indicators. To define behavior rules, it is

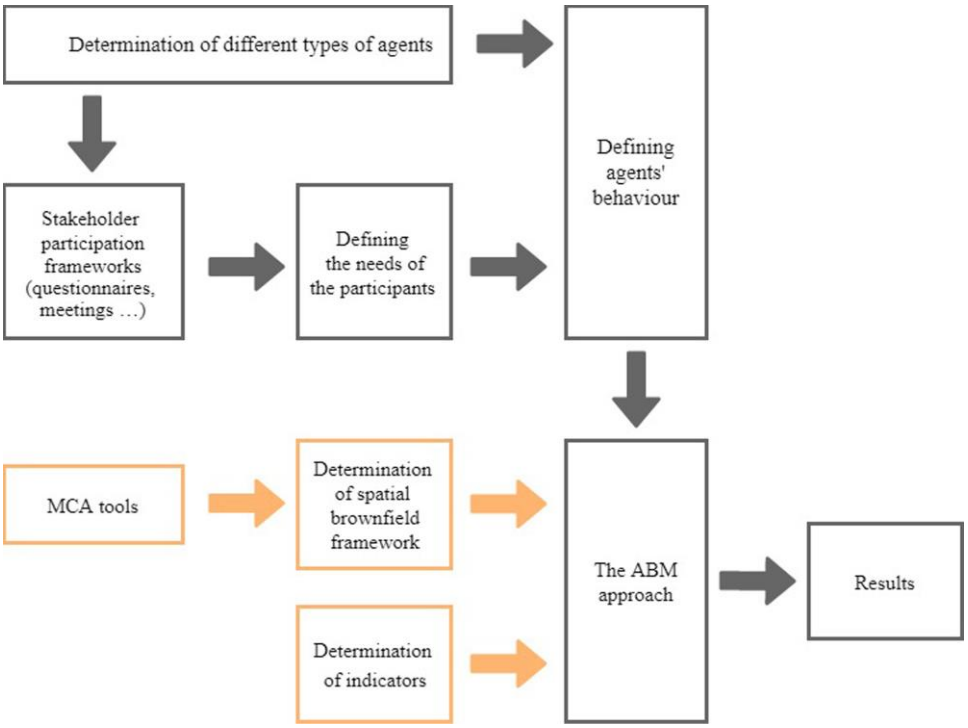

Fig. 1 Flowchart of interaction between conventional methods and the proposed approach (Source: Authors)

first necessary to determine the groups of agents and their needs. Stakeholder participation method can be used for identifying agents' needs through questionnaires, meetings, workshops etc. On the other hand, spatial brownfield framework can be obtained with the help of MCA tools, as stated above. Indicators can also be defined separately or with the help of some already existing groups of MCA tool indicators. Since different aims of heterogeneous interest groups have to be considered in connection with different sites, their sustainability cannot be evaluated using a fixed checklist of indicators (Bartke and Schwarze, 2015). Through the direct interaction, agents exchange information which can give rise to new knowledge or ideas. This new cognition may lead to the agent reacting and pursuing a new form of behaviour to reach its goal. That implies that indicators should be determined for each project individually, depending on the types of input parameters. Such a defined approach allows generating various possible scenarios of brownfield redevelopment.

The conventional methods described in Chapter 2 are generally post-completion assessment tools and they can help in choosing alternatives but cannot generate them themselves. Only SINBRA-SAT uses an algorithm to generate possible land use combinations, but it is limited to three fixed land use types. The ABM method could use different types and different number of land use, which would be established for each project individually. Also, the proposed approach could integrate both categories of decision support systems for brownfield redevelopment (MCA tools and stakeholder participation methods and techniques), unlike most of described existing tools. Compared to the approach developed by Beames et al. (2018), the ABM method could include other aspects of social indicators in addition to the physical ones, depending on the identification of the type of participants and their needs.

5. CONCLUSION

The greatest asset of ABM is its ability to model complex social phenomena. By generating heterogeneous individuals who can communicate with other individuals and the environment, we can monitor the emergence of new patterns or trends. This offers the possibility of creating new insights and knowledge about the direction in which the analysed model might develop in the future. Agent-based models cannot predict the future, but they can be helpful in better understanding of how a process might play out under a particular set of circumstances (Lawlor and McGirr, 2017).

In the context of brownfield redevelopment the emphasis is put on development of participative modelling as an interactive process that involves relevant stakeholders at every stage of model development. In such a model each agent ought to be able to proactively respond to changes in their environment. This flexibility is mitigated by the risks of making over-complicated models, as the final result is the product of a huge number of individual decisions. In proposed approach agents are rationally bounded, that is to say they do not have a universal knowledge but only that specific to their context. In that way it is possible to avoid too complicated models and provide only targeted outcomes. In this sense, the key task in this type of modelling is to define and manage input data appropriately. It can also be used in combination with other, conventional approaches to design the model environment.

Unlike conventional modelling approaches, there are no standard elements that can be used from the model library. Every ABM is different and the modeller must have sufficient

programming knowledge and experience. Therefore, determining the input parameters is the greatest challenge of the proposed approach since defining of indicators is also dependent on it. On the other hand, this approach provides generating a lot of different possible scenarios as well as their optimization through simulations.

There is no formal methodology for evaluating agent-based models, hence ABM results demand a comprehensive examination and represent a significant challenge for the researchers. The evaluation of specific planning strategies outcomes, performed by urban planners and policy makers, can be supported by informative assistance of geospatial simulations.

In order to evaluate the ABM model properly, it is not sufficient just to estimate the model results, but it is necessary to evaluate the behaviour of individual agents as well (Crooks Heppenstall and Malleson, 2018). The emergence of big data through sources like social media has given rise to sensitive individual-level data that offers a potential resolution to the problem of evaluation of these models. It remains to be seen whether this possibility is taken up. What is certain is that the ABM is accepted as a research tool, which provides us with new way of thinking and understanding about how urban systems have developed and what the consequences of future individual behaviours are likely to be. As such, ABM is capable to be applied to generate different solutions in the context of brownfield redevelopment at various spatial scales.

In Serbia, issues related to brownfield sites are particularly noticeable in the last two decades due to the deindustrialization caused by the privatization and followed by economic blockades and the devastation of war in the 1990s. There is still no comprehensive strategy and management platform for brownfield redevelopment at the state level. In this regard, this paper could be the basis for further research in making it easier to find a solution for the treatment of this problem.

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MODELOVANJE ZASNOVANO NA AGENTIMA KAO ALAT ZA PODRŠKU U ODLUČIVANJU U PROCESU OBNOVE BRAUNFILD LOKACIJA

U savremenim urbanističkim studijama fokus se stavlja na održivi urbani razvoj i dugoročne strategije razvoja. Rješavanje pitanja obnove braunfilda je od vitalnog značaja za prosperitetnu praksu urbanističkog planiranja. Konvencionalne metode odlučivanja u procesu obnove braunfilda uglavnom se koriste za procjenu situacije na terenu, ali ne i za buduće razvojne planove. Cilj ovog rada je da razmotri potencijalnu primjenu modelovanja zasnovanog na agentima (ABM) kao alata za podršku u odlučivanju u procesu obnove braunfild lokacija. U ovakvim modelima agentima se zadaju određena pravila ponašanja koja definišu njihove međusobne interakcije i omogućavaju simulacije u prethodno definisanom prostornom okviru. Dobijena kolektivna ponašanja utiču na prostorne obrasce kroz interakcije pojedinaca, što se ogleda u činjenici da je ponašanje agenata individualno i ne može se poistovijetiti sa krajnjim ponašanjem grupe. Ovaj alat nam pruža mogućnost sagledavanja mogućih scenarija budućeg razvoja braunfild lokacija i, shodno tome, donošenje adekvatnih odluka i strategija.

Ključne reči: *braunfild, agentno modelovanje, sistemi podrške odlučivanju, urbani razvoj*

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USING GIS TOOL FOR PRESENTING SPATIAL DISTRIBUTION OF DROUGHT

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Milan Gocić, Danilo Mišić, Slaviša Trajković, Mladen Milanović

Faculty of Civil Engineering and Architecture, University of Niš, Serbia

Abstract. *By using GIS tools, it is possible to improve the preview of hydrological processes such as evapotranspiration, precipitation, flood and drought. In order to quantify drought, different type of drought indicators have been developed such as Standardized Precipitation Index (SPI), Reconnaissance Drought Index (RDI), Standardized Precipitation Evapotranspiration Index (SPEI) or Water Surplus Variability Index (WSVI). In this paper the precipitation-based SPI indicator was applied to the monthly precipitation data from Serbia during the period 1948-2012. The data were processed in the QuantumGIS software package. For the purpose of application in the monitoring of drought at the national level, a spatial presentation of meteorological drought was obtained.*

Key words: *Drought, SPI, QGIS, Serbia*

1. INTRODUCTION

Drought is a part of natural climate changes, which occurs in all climatic zones, but without a clear formulation of the phenomenon. The complexity and specificity of drought is explained by the fact that there is no single definition of drought. Regarding the area of impact, droughts can be classified into four groups: meteorological, hydrological, agricultural and socio-economic drought (Wilhite and Glantz, 1985). Meteorological drought occurs because of the reduced precipitation intensity compared to average precipitation in previous years and this is one of the main causes of drought. Hydrological droughts occur when the lack of precipitation over a longer period of time causes deficiencies in surface and ground waters. This type of drought occurs with delay in relation to meteorological and agricultural droughts (from several days to several months), and especially groundwater (in which the delay is measured in months, even years).

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Corresponding author: Milan Gocić
University of Niš, Faculty of Civil Engineering and Architecture, Aleksandra Medvedeva 14, 18000 Niš, Serbia
E-mail: mgocic@yahoo.com

In order to determine the intensity, duration and frequency of drought, there are a large number of quantitative indicators, i.e. drought indices. Studies which analysed drought are particularly important in dry and semi-arid regions, where the data availability is usually limited. Therefore, the main criteria for selecting the indices were: a) to have relatively low data requirements, which allows application of software in many regions; and b) their results can be clearly interpreted for concrete and efficient use.

Based on these criteria, indices for different types of droughts have been developed such as Reconnaissance Drought Index (RDI), Streamflow Drought Index (SDI), Standardized Precipitation Index (SPI), Standardized Precipitation Evapotranspiration Index (SPEI) and Water Surplus Variability Index (WSVI). RDI, SPI, SPEI and WSVI are indicators of meteorological drought, because precipitation is their main indicator. RDI, SPEI and WSVI are also used to analyze agricultural drought, because they can adequately describe the water balance, and are especially useful in selecting a reference period that refers to the development phases of crops (Gocic and Trajkovic, 2014b; Tsakiris et al., 2007; Vicente-Seranno et al., 2010). According to the recommendations of the World Meteorological Organization (WMO), all national meteorological and hydrological services should use the Standardized Precipitation Index - SPI (WMO, 2012). By using the SPI index, it is possible to analyze drought through intervals of 1, 3, 6, 9, 12 and 24 months. In agricultural regions, SPI-3 can be more effective in determining availability of humidity compared to other indices. Therefore, by observing this index in May, it is possible to determine the state of soil moisture during the growing period (WMO, 2012). Detailed analysis of droughts based on SPI for stations in Serbia can be found in Gocic and Trajkovic (2013a, 2013b, 2014a), Tosic and Unkasevic (2014), Trajkovic et al. (2019).

Using GIS tools, in addition to widespread application in geography, it is possible to improve the preview of hydrological processes such as evapotranspiration, water circulation in the atmosphere, and drought, using data obtained from independent Internet services.

The aim of the paper is the development of a methodology for the calculation, input and processing of drought indicators for the purpose of visualisation of drought episodes using GIS software. In the literature, the papers related to the spatial distribution of drought GIS software in Serbia cannot be found.

2. METHODS AND MATERIALS

2.1. Standardized Precipitation Index (SPI)

Standardized Precipitation Index (SPI) was developed at the beginning of the 1990s (McKee et al., 1993). This index quantifies the precipitation deficit for different time scales (1, 3, 6, 12, 24, 48 months) and can be used for different types of droughts. SPI for short time scales (1 or 3 months) is used for meteorological droughts, for time scales of 3 or 6 months for agricultural drought, while SPI for long time scales (12 and 24 months) is used for hydrological droughts (Svoboda et al., 2016). SPI is the amount of precipitation recorded over a period of time represented by the value of a random variable that has a standardized normal probability distribution.

SPI is calculated using:

$$SPI = \begin{cases} -\left(t - \dfrac{c_0 + c_1 t + c_2 t^2}{1 + d_1 t + d_2 t^2 + d_3 t^3} \right), 0 < H(x) \le 0.5 \\ +\left(t - \dfrac{c_0 + c_1 t + c_2 t^2}{1 + d_1 t + d_2 t^2 + d_3 t^3} \right), 0.5 < H(x) \le 1.0 \end{cases}, \quad (1)$$

where $H(x)$ is a cumulative distribution of probability, while t is defined as:

$$t = \begin{cases} \sqrt{\ln \dfrac{1}{(H(x))^2}}, 0 < H(x) \le 0.5 \\ \sqrt{\ln \dfrac{1}{(1 - H(x))^2}}, 0.5 < H(x) \le 1.0 \end{cases}, \quad (2)$$

c_0, c_1, c_2, d_1, d_2 and d_3 are coefficients with the following values: $c_0 = 2.515517$, $c_1 = 0.802853$, $c_2 = 0.010328$, $d_1 = 1.432788$, $d_2 = 0.189269$, $d_3 = 0.001308$. The strength of this index lies in the fact that the mutual comparability of precipitation data from uneven lengths of time is possible, as well as data from the season and locations with different precipitation regimes. The most important weakness is the lack of a component of evapotranspiration that is very important for the water balance. Drought classes based on SPI values are shown in Table 1. SPI can be used for drought detection and for determination of wet periods.

Table 1 SPI classification

Class	SPI value
Exceptional drought	SPI ≤ -2.326
Extreme drought	-2.326 < SPI ≤ -1.645
Severe drought	-1.645 < SPI ≤ -1.282
Moderate drought	-1.282 < SPI ≤ -0.935
Minor drought	-0.935 < SPI ≤ -0.524
Near normal	-0.524 < SPI < 0.524
Slightly increased moisture	0.524 ≤ SPI < 0.935
Moderately increased moisture	0.935 ≤ SPI < 1.282
Considerably increased moisture	1.282 ≤ SPI < 1.645
Extremely wet	1.645 ≤ SPI < 2.326
Exceptionally wet	SPI ≥ 2.326

2.2. GIS tools

Geographic Information System (GIS) is a computer information system that collects, stores, analyzes and displays spatial entities and their attributes for solving complex research, design and management problems. GIS is a rapidly growing tool with great potential for hydropower applications. It can be defined as a system for recording, storing, analyzing and managing data and associated attributes that spatially relate to Earth (Longley et al., 2005). The

system usually includes hardware, software and geographic information. Through a GIS analysis, users in different disciplines can better consider geographic patterns in their data and explore possible spatial relationships between studied phenomena. GIS is envisioned as an invaluable tool for students for an extended understanding of geography because it provides a visual illustration of data (Bednarz et al., 2006).

GIS software can be commercial and open source software. Quantum GIS (QGIS) is open source software that provides a very good integration with Python, a script language for customizing or automating GIS functions. Python is probably the most popular programming language for GIS, because of that ESRI ArcGIS also adopts Python for its program functions. The software provides useful GIS tools for spatial analysis, geoprocessing, geometry, and data management tasks. Two unique features of QGIS include a link to the GRASS functionality and the support for the DWG file format. QGIS supports basic ESRI formats. GIS software has wide application in geodesy, ecology, tourism, cadastre and urban planning. Also, it can be applied in hydrotechnics as the most efficient tool for processing and managing spatial resources in water management and hydrology. Data integration and their processing result in automation of the procedures for spatial planning in terms of mapping, mapping of floods, analyzes of accumulation basins, integrated river basin management, as well as in terms of spatial distribution of drought, which has been elaborated in detail in this paper.

2.3. Study area

Serbia is located in the Balkans, a region of Southeast Europe. Geographically, and also climatically, it is partly included in the Mediterranean countries. The northern part of Serbia is flat, while the southern parts are dominated by hills and mountains occupying most of the territory and making it the mountainous region.

Serbia's climate can be described as moderately continental with more or less pronounced local characteristics. The spatial distribution of climate parameters is conditioned by the geographical position, relief and local influence, as a result of a combination of relief, the distribution of air pressure of larger proportions, the exposition of the terrain, the presence of river systems, vegetation, urbanization, etc. Among the geographical determinants important for the climate of Serbia should be mentioned the Alps, the Mediterranean Sea and the Genoa Bay, the Pannonian Plain and the Morava valley, the Carpathians and the Rhodope Mountains as well as the hilly mountain part with the valleys and plains.

3. RESULTS AND DISCUSSION

Precipitation data from 27 stations were used to determine the SPI index using a calculation program from the National Drought Reduction Center, the University of Nebraska for the reference period 1961-2012 (http://drought.unl.edu). According to Gocic and Trajkovic (2014a), the driest year was 2000, and the SPI values for different time scales (SPI-1, SPI-3, SPI-6, SPI-12) were analysed. The SPI-1 index in most of the stations during that year had negative values in September, and these values were lowest in June and August. According to SPI-3, the negative values begin from March, with the lowest values from June to August. Based on the SPI-6 values, it can be concluded that in Serbia there were no droughts until June from which started severe drought in most of the stations. Similar results are obtained with the SPI-12, with severe drought recorded at most of the stations in November and December.

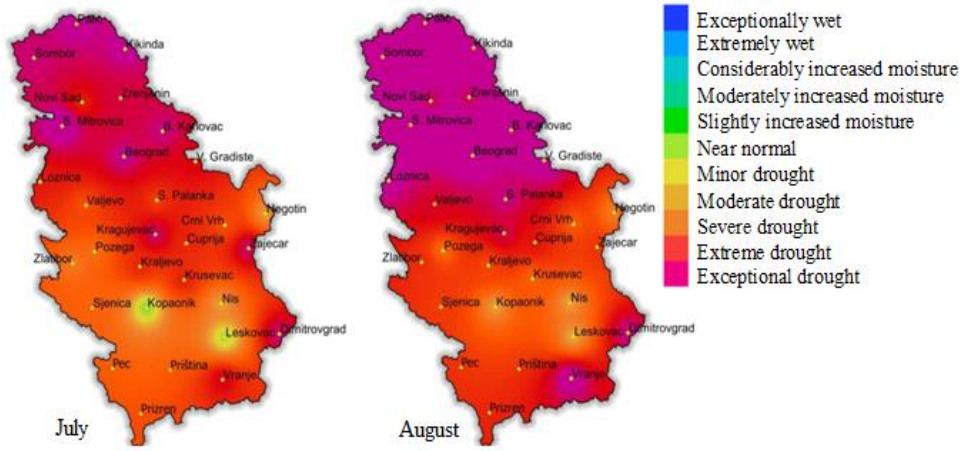

Fig. 1 Drought spatial distribution based on SPI-3 for July and August 2000

For the purpose of spatial distribution of drought in the GIS environment, the "open source" software package Quantum GIS 3.0.1 was used, which is available at qgis.org/en/site. At the very beginning, as the reference coordinate system, EPSG: 4326 - WGS 84 was selected. The procedure consists of two separate parts. In the first part, the map of the Earth was imported and the layer for borders of Serbia was created. In the second part, layers were created for locations of meteorological stations, SPI values loaded and interpolated data for distribution of drought.

As an illustration of the QGIS application, the spatial distribution of drought based on the intensity of SPI-3 and SPI-6 for July and August of the reference - the most severe year (2000) were presented in Fig. 1 and Fig. 2, respectively. The drought according to SPI-3 started in March and reached its highest intensity in August, but was also pronounced in December. Drought was the most intense in the north and southeast parts of Serbia (Fig. 1). The drought according to SPI-6 lasted in the period from June to December and was the most intense in August when extreme drought was recorded throughout the territory of Serbia, except for Kopaonik (Fig. 2).

Since 2007, RHMSS (Republic Hydrometeorological Service of Serbia) has been a member of the DMCSEE (Drought Management Center for South East Europe) and participates in the project of the European Union, which aims to improve the monitoring and preparedness for drought in the countries of South-East Europe. The results of this project are available on the RHMSS website (http://www.hidmet.gov.rs/podaci/agro/SPI.pdf) and are compared with the approach developed in this paper.

Fig. 3 shows the comparison of SPI-6 in the growing season (April-September) for 2007 and 2012 years. Bearing in mind that the method of data processing and display according to RHMSS differs from this paper, the comparison of the results can be concluded that they mostly coincide.

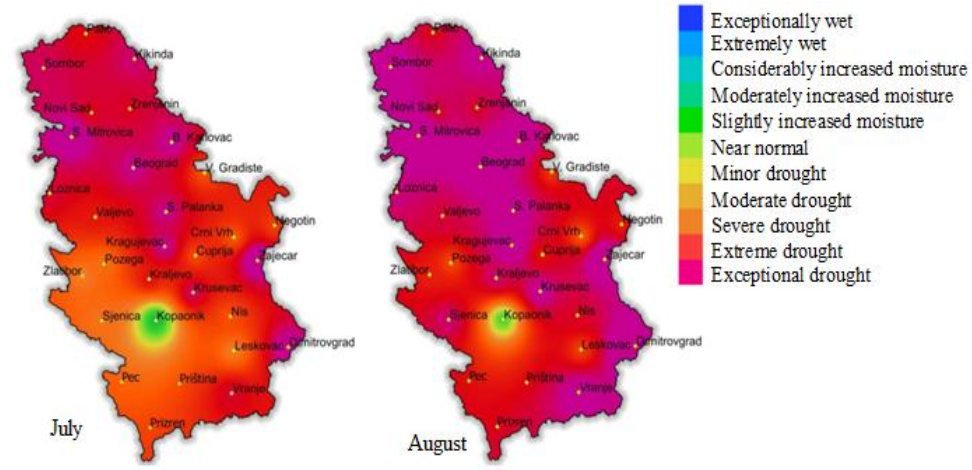

Fig. 2 Drought distribution based on SPI-6 for July and August 2000

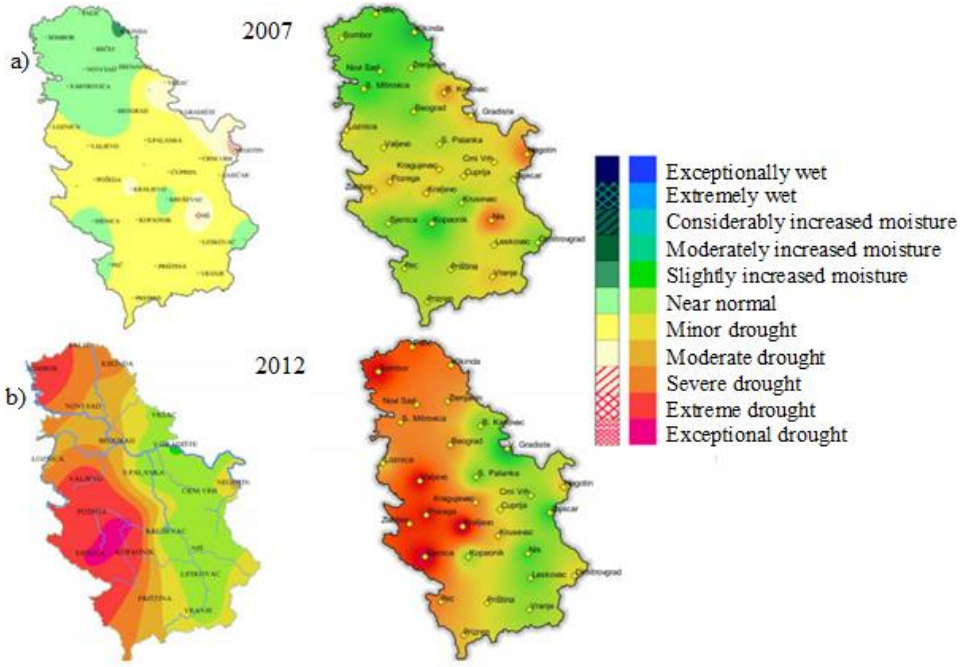

Fig. 3 Comparison results regarding drought in the growing season (SPI-6): a) 2007; b) 2012. Left: RHMSS results, Right: our achieved results

4. CONCLUSIONS

The aim of this research is to look at the possibilities of GIS software as a tool for presenting spatial distribution of drought. The methodology is based on the use of the Standardized Precipitation Index. In the first phase of the work, drought indices were calculated and a database was created. The database itself can have global character since the main feature of the SPI index is that it is neither time- nor location-limited. The second phase of work was concentrated on the development of maps, and locations of measuring stations. The database is imported into the GIS environment and they are processed by an interpolation algorithm. This methodology is limited only by the available historical and measured data. The density and position of the network of measuring stations greatly affect the effectiveness and precision of monitoring as well as the methods of forecasting drought. The analysis of the results showed the most intense drought during the growing season period in 2000 in the north, in Vojvodina, and in the southeast of Serbia.

The achieved results can be applied in ecology, tourism, urban planning, agriculture and water resources management. Our next steps will be to analyse different drought indices in order to better compare them using QGIS.

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KORIŠĆENJE GIS ALATA ZA PREDSTAVLJANJE PROSTORNE RASPODELE SUŠE

Pomoću GIS alata moguće je poboljšati pregled hidroloških procesa kao što su evapotranspiracija, padavine, poplave i suša. Da bi se kvantifikovala suša, razvijeni su različiti indeksi suše, kao što su Standardizovani indeks padavina (SPI), Reconnaissance Drought Index (RDI), Standardizovani indeks evapotranspiracije padavina (SPEI) ili Water Surplus Variability Index (WSVI). U ovom radu SPI indeks suše zasnovan na padavinama primenjen je na mesečne podatke o padavinama iz Srbije u periodu 1948-2012. Podaci su obrađeni u programskom paketu QuantumGIS. Za potrebe primene u praćenju suša na državnom nivou, dobijena je prostorna raspodela meteorološke suše.

Ključne reči: *suša, SPI, QGIS, Srbija.*

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EXAMINING THE EFFECTS OF URBAN PLANNING PRACTICES OF EMBASSY BUILDINGS ONTO PUBLIC SPACES

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Ivan Filipović[1], Dragana Vasiljević Tomić[2]

[1]Faculty of Science and Technology, Keio University, Yokohama
[2]Faculty of Architecture, University of Belgrade, Serbia

Abstract. *Past urban planning practices for embassy buildings have largely been indifferent to environments and the context of cities, oftentimes causing negative effects on the urban matrix. Implementing a more open, transparent building process for its diplomatic outposts overseas, Japan has managed to contribute to overall city development, quality of its public spaces and the image it holds in host countries. These processes will be examined and findings elaborated for the new Japanese embassy in Belgrade, Serbia, how utilizing such methodology presents an improvement, in engineering and urban planning terms, as well as a new method of cultural sustainability.*

Key words: *construction practice, embassy, Japan, city development, urban planning, cultural sustainability*

1. INTRODUCTION

This paper will highlight the importance of re-conceptualizing outmoded methodologies in urban planning practice for embassy buildings, focusing on new ways of envisioning sustainable, safe, smart cities of the future. Typologies recognized for their unquestionable potential in generating drastic changes within urban environments are found in diplomatic-consular outposts. Implementation of new approaches will be suggested, ensuring quality of urban environment during and after the construction processes of embassy buildings.

Any typology that is considered high-risk (including embassies) can have a detrimental effect on the urban tissue, its continuity and morphology. This fragility warrants the city spaces to be approached with the utmost care by architects and planning professionals, both with ethical and moral responsibilities and considerations.

When it comes to innovative practices of state-sponsored overseas development (e.g. diplomatic and consular outposts) Japan is shifting the paradigm on how the construction

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Corresponding author: Dragana Vasiljević Tomić
Faculty of Architecture, University of Belgrade, Bulevar Kralja Aleksandra 73/II, 11120 Belgrade, Serbia
E-mail: draganavt@arh.bg.ac.rs

process ought to be handled, from its inception, management stages, to produced effects in public spaces.

Although comparatively rarely constructed, the aforementioned typologies have potential of producing the most severe effects onto cities, so re-thinking processes in place must be considered. Furthermore, by definition, these buildings are exempt from any planning laws and regulations, due to their extraterritorial privileges. Not to be mistaken for an architectural carte blanche, these facts ought to serve as an invitation for opening an active dialogue between architects and urban planners.

Case study of the new Japanese embassy building in Belgrade, Serbia (completed in 2015) will be examined, with experiences and lessons learned from this process studied, presenting how they should be considered a new developmental model. The primary author of this text was employed as an architect – assistant coordinator for the duration of the construction process, so any gained insight has derived from first-hand experiences. This writing aims to combine theoretical background with a report on the building process of the new Japanese embassy in Belgrade, Serbia, thusly drawing importance to the change in methodology that Japan is now spearheading.

2. Embassy Typology and its Effects onto the Urban Environments

2.1. Architectural design process as a communicative tool

"The link between architecture and ideology is situated in an attempt to identify the extent to which social values and practices can be negotiated through architectural space: its concept, materialization and representation." (Vasiljevic Tomic et al 2013, p. 114).

Diplomacy efforts and tactics take various forms, both tangible and intangible, but are most pronounced in areas that use architecture and urbanism as a negotiating tool i.e. embassy buildings and urban planning practices serving as a facilitator for their integration. These typologies can communicate values the sending country wants to project, but can also have negative impact on relations and perception between various actors.

If we try to establish a framework of reference for architectural research for embassy/ consular buildings typology, it becomes evident that it is not solely based in architectural design and urban planning. This typology in particular is subjected to influence of a wide array of disciplines including, but not limited to international relations, politics, economy, sociology, psychology and others. The full extent of impact of embassy buildings on the city matrix must be researched in-depth. As previously observed, these typologies inadvertently devastate the city matrix, producing hyper-private spaces of secrecy. As stipulated, the most important facet that architects take into consideration whilst designing these buildings is the notion of safety.

Argument of providing safety/security is a valid one, non-negotiable in the sense of protection of human life, but the emphasis here is shifting to awareness of effects it causes, both on the built environment and on the bilateral relations. If policy makers are aware of these outcomes, they can employ more subtle strategies to avoid loss of soft power and beneficial perception in host countries. Several suggestions can be made to rectify the situation, from educating the general public on necessity of certain typology, to implementing various activities (predominantly cultural) encouraging citizens' participation.

Great responsibility also lies in the hands of architectural professional, who need to negotiate their design between stringent guidelines given by the Government and moral and ethical obligations of the profession and end users. This notion is not limited only to

functionality of the building, but also includes thoughts on city dwellers living in the proximity of the newly planned consular outpost. Involvement of the community is crucial, even if the utmost secrecy is required – it will provide beneficial input and establish connection and respect between the actors, as neighbors and hosts.

3. Security-Obsessed Urbanism and its Consequences

3.1. "Fortress urbanism" and the concept of "defensible spaces"

This section will examine extreme urban forms driven by providing safety and discuss how this approach has had detrimental effects on the city's matrix. Such extreme forms are also utilized for providing safe and secure spaces for the typologies in question, so it is necessary to re-conceptualize their form, in architectural and urban planning terms.

During the 1970s Belfast became a laboratory for radical experiments of "fortress urbanism". One of the most historically explicit examples of such measures were seen in Northern Ireland in the early 1970s and 1980s where `fortress architecture' and principles of 'defensible space' were used, by the security forces, to territorially control designated areas. This was most notably around the central shopping area in Belfast where access to the centre was barred, first by concrete blockers and barbed wire, and then later by a series of high metal gates which became known as `the ring of steel'. (Coaffe, 2004)

Urban structure research topic often mentioned in the 1990s, especially focused on Los Angeles, where a correlation has been made with the urban model implemented in Belfast. Whilst envisioning the future of LA, Mike Davis noted that in crime-infested future, car-bomb will become the main weapon of crime and terror, and suggested for the city authorities to prevent this situation and apply "steel ring fortress" model. (Davis 1992) This would ideally prevent future terrorist attacks. Although the concept "Fortress LA" became the vision of future city in 1990s, it is important to understand there are many ways to interpret urban planning of Los Angeles. Davis' critics, for example, argue that his 'prophecies' were likely fear-motivated, rather than emergence of real criminal activities (Friedman, 1998). Similar thoughts on 'fortress urbanism' were common after the terrorist attacks on September 11, 2001.

9/11 terrorist attacks were unique in the sense of applied tactics - simultaneous airplane hijacking and targeting of iconic buildings - as well as for the damages incurred during these attacks. These events have also sparked concerns about different types of 'postmodern' or 'catastrophic' terrorism (Laqueur 1996) and society based on terrorism dangers infused life (Ewald 1993).

After terrorist attacks of 9/11 and after re-conceptualization of the risks that attacks cause, new, dramatic changes in urban structure take place, as a reaction to terrorism threats; 'fortification' methods used in Belfast and Los Angeles are applied, as well as usage of sophisticated military technology. September 2002 issue of "International Journal of Urban and Regional Research", section "Debates and Achievements" underlines how the events of 9/11 influenced technological and physical infrastructure of affected cities so much that "urban flows can be examined through military perspective, so that imminent weakness that they produce could be significantly decreased". (Graham 2002, p. 589)

Presented findings underline the changing nature of urban planning approaches in contemporary practice. Furthermore, they highlight that, when introduced to a potentially

disruptive variable, urban planning will revert to its most basic form, overlooking far-reaching spatial consequences in favor of providing quick solutions.

3.2. Safety considerations and its effects in urban environments

Every age in history has its trepidations; nowadays we live in a day and age of constant vigilance due to potential terrorist threats in cities. This trend is not new, but it gained significant expansion after 9/11. Aside from the media that constantly inform on the dangers of everyday living, politics have great influence on the usage of fear, as it was proven that fear has best controlling potential in political discourse (Danilovic Hristic, 2013.)

Nonetheless, the issue of safety in cities is not new: it represents an ever-evolving process that is characteristic to all urban areas. These processes are inadvertently the same: communities (especially marginalized ones) and its people who do not know each other will seek safety in their own houses. If there are additional outside ideological stimuli of racism and xenophobia, a city or its parts will become vulnerable. This vulnerability is reflected in the feeling of neglect of the city or its part, which then gives way to potential negative occurrence in those areas. (ibid.)

Researching the "ecology of fear" Mike Davis also examined the changes in the urban form that have occurred in the face of fear of urban violence, as well as the change in social relations and citizens' behavior. Examining the examples of Los Angeles, CA and Orlando, FL, it is determined that different social milieus are capable of developing individual strategies and mechanisms, mainly in the form of isolating themselves from other social groups, especially the ones they perceive as a threat. This is the birthplace of "gated communities" and security gains more significance in the process of designing urban spaces. Cities are divided into enclaves (portion of territory within or surrounded by a larger territory whose inhabitants are culturally or ethnically distinct) in which the inhabitants live without personal contact. In the world of informatics age when the world is interconnected by the means of the Internet, in which seemly all boundaries, differences and spatial obstacles have been conquered, this occurrence becomes absurd. (ibid.)

4. JAPANESE PLANNING MODEL AS A PARADIGMATIC SHIFT

4.1. Construction practices as a tool of public diplomacy

"The fearful stance assumed by isolated, walled compounds that represent the United States abroad is cause for concern. At a time when administration officials […] are touting the urgent need for better public diplomacy, the State Department is building embassies that do not reflect that agenda. In fact, the inaccessibility of these buildings, coupled with the new standardized design, may be harming efforts to portray America as an open society." (Loeffler 2005, p. 44)

This segment will underline the importance of architecture and urban planning as a public diplomacy tool, recognized and utilized by Japan. By engaging in an open dialogue, respecting its hosts, during the embassy construction process, goals of securing cooperation were ensured.

Nicholas J. Cull, a scholar on international relations, makes several interesting observations: public diplomacy efforts (albeit used under different pretenses) are not new and the cornerstone of this type of communication was primarily cultural exchange. Furthermore, public diplomacy ought to be viewed as an element of foreign policy – having this in mind, and always going back to official policies of the Government, we can make meaningful conjectures. By extension,

one can view construction process as a form of foreign policy, which was the case for the new embassy building in Belgrade, Serbia.

Furthermore, Cull addresses the notions of 'propaganda' and 'public diplomacy': both are dealing in the sphere of 'influence', but unlike propaganda, public diplomacy is not a one-way street to the intended audience:

> "At its best, public diplomacy is a two-way street: a process of mutual influence whereby a state (or other international player) facilitates engagement between publics or tunes its own policies to the map of foreign public opinion. In the ideal case, public diplomacy treats the foreign public as an active participant – not just as a flock of sheep waiting to be ideologically shorn."
>
> (Cull, 2009)

By examining previously collected data, conclusion can be drawn that the Japanese government, using a transparent construction procedure and open dialogue for its new embassy building, has engaged in a mode of public diplomacy, embodied in a transparent construction procedure. The results of such approach, in architectural and urban planning terms, will be examined in the following section.

4.2. Construction process of the new Japanese embassy in Belgrade, Serbia

In recent years, Japan has started to expand its foreign policy presence in the form of constructing new diplomatic-consular headquarters. For example, during the fiscal 2015, then Foreign Minister Fumio Kishida and Finance Minister Taro Aso had agreed to open six new embassies and two consulates under the fiscal 2015 budget. The main motivation can be found in the statement that: "…Japan is trying to enhance its diplomatic influence and better communicate ITS views overseas…in the year [2015] that marks 70 years since the end of World War II." (the Japan Times online, January 12, 2015) It is important to note that the Foreign Ministry [of Japan] originally requested nine new embassies and six new consulates. This is telling of the status and importance of embassy building construction and promotion of Japan's interests overseas.

Be it out of desire to show respect to its host country of Serbia, desire to increase their already impressive soft power credit or due to long-term geopolitical strategy, Japan elected to implement a transparent construction procedure for its new diplomatic headquarters/embassy, located in Block 11a of New Belgrade.

The plot itself was acquired by the Japanese government in the nineties, but owing to the volatile situation at the time in the Balkans, the construction was postponed indefinitely. The entirety of Block 11a was, in its early, conceptual stages, designed to house various diplomatic missions and their corresponding residences and diplomats' accommodation. Due to speculative urbanism and land-use machinations, this particular place lost its original purpose, with the exception of the Chinese embassy, that occupied the plot opposite the street, until it was damaged and abandoned during NATO intervention in FR Yugoslavia in 1999.

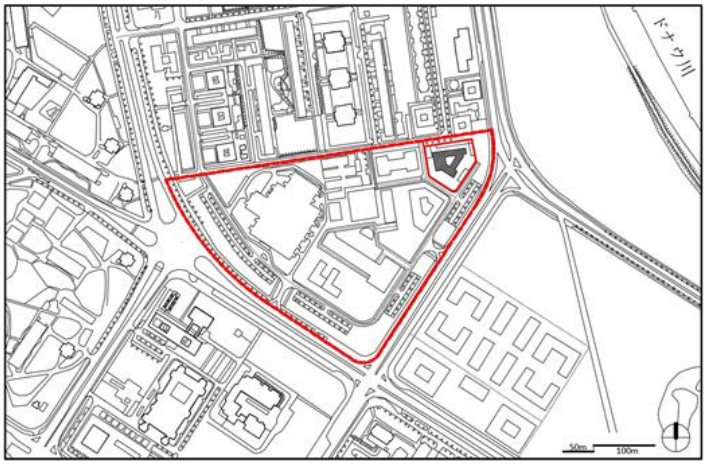


Fig. 1 Wider urban tissue of New Belgrade neighborhood, with Block 11a in focus

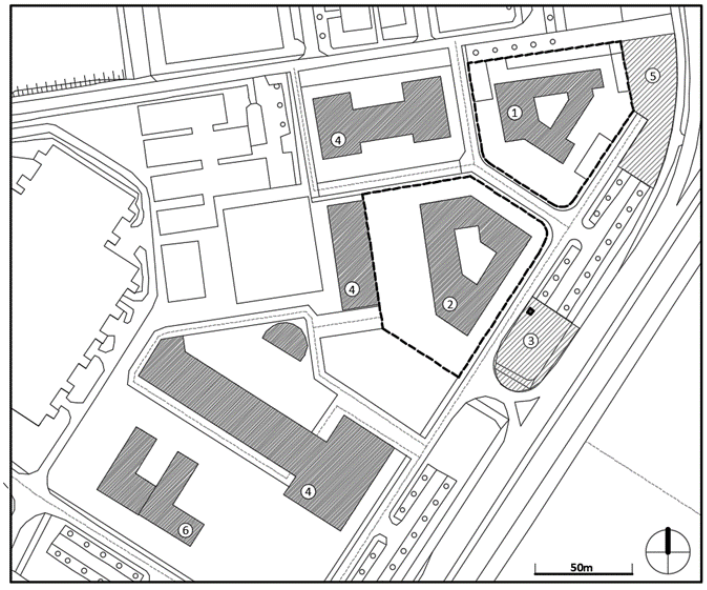


Fig. 2 Block 11a and its new building developments: 1. Embassy of Japan; 2. Chinese cultural center (under construction), previously the site of the Chinese embassy; 3. Square of Chinese-Serbian friendship; 4. Mix-used, high-end residential building; 5. Square of Japanese-Serbian friendship and Japanese garden (planned); 6. Falkensteiner hotel

After an extensive preparation period, the Japanese government green lighted the new development, starting in May, 2013. The construction procedure implemented was that of transparency, or to be more precise, the idea of implementing transparent construction process. Design plans were re-worked to fit Serbian regulations (handled by "Arhi.pro

LLC" in its inception stages), as Japanese construction regulations (expectedly) differ from Serbian. This was particularly obvious for fire protection design, part of the design documentation that was notoriously under heavy scrutiny to follow the stringent Serbian regulations to the letter.

Ultimately, through its many trials and tribulations, the new embassy building was completed and moved into in March 2015. Interestingly, the response from the general public was negative, having predominantly commented on the aesthetic characteristics of the building (high perimeter fence, lack of openings, lack of aesthetic appeal and the sense of Japan-ness), linking these failings with feelings and/or relationship that the Japanese have in lieu of their perception of Serbia and its people. As a consequence, one of the most dominant questions arising was that of authority over "handing over" a "prime piece of real estate" for such an "architectural atrocity" ("Politika" daily newspaper printed article "Urban planning failure" [Serbian: "Urbanistički promašaj"] by Mr. Branislav Jovin, engineer, dated March 3, 2015 [in Serbian]).

What was failed to be realized it that, although built within a high-density urban environment, the new building did not produce any negative effects in said environment, otherwise typical for embassy typology. These effects will be examined in the following section.

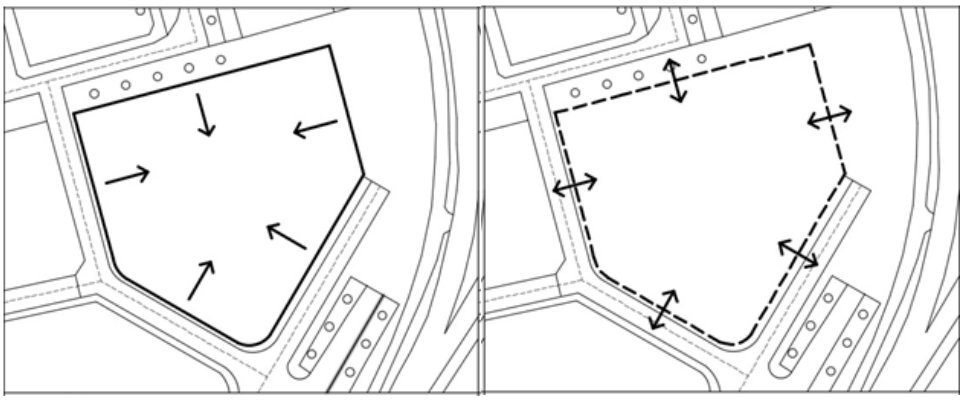
5. EXAMINATION OF PROJECTED IMPACT ONTO THE URBAN ENVIRONMENT

5.1. Factors and indicators of successful embassy construction process

These sections will overview the findings of examination of the impact of urban environment. Several key factors will be examined and discussed how urban planning practice can benefit or suffer from the (in)correct usage of said factors. These factors were chosen as a direct consequence of the author's experience and subsequent academic research on the topic. It is important to underline that the approach taken by the Government of Japan is not commonplace.

Simultaneously, these indicators will be applied for a concrete case, the new Japanese embassy in Belgrade, to showcase the extent of its successful application.

1. Preparatory process– indicating the level of willingness for collaboration between professional vis-à-vis urban planning and architectural laws and regulations. Given feedback will be utilized during the design stages, in order to fit the new structure to the particular context in which it will be built. The new Japanese embassy, prior to its design, obtained necessary guidelines for construction in the New Belgrade area. Additionally, the plot was visited by designers, in order to fully understand the built environment and implement specific findings into their design. With such obtained data, combined with the requirements of the Government, the preparatory process was thorough and gave a good starting point for the building construction.



a) b)

Fig. 3 Preparatory process. a) Inward-looking, ignoring the existing urban matrix, solid boundary. b) Preparatory process. Consulting with local professional, contextual design, permeable boundary.

2. Contextualized design – indicating how the specific morphological aspects of the built environment were observed and implemented into the final design. In order to ensure a visual and aesthetic continuity of an ambient whole of the built environment, this is an imperative for any new development. This can include the overall built aspect ratio, floor height, materials, style … etc. For the case study, the new embassy building has followed all the given criteria; built aspect ratio was adjusted for the built environment/density of New Belgrade, floor height similarly reflected the height of the neighboring buildings and architectural style and materials were the same as the ones utilized in the inception phase of the urban environment.

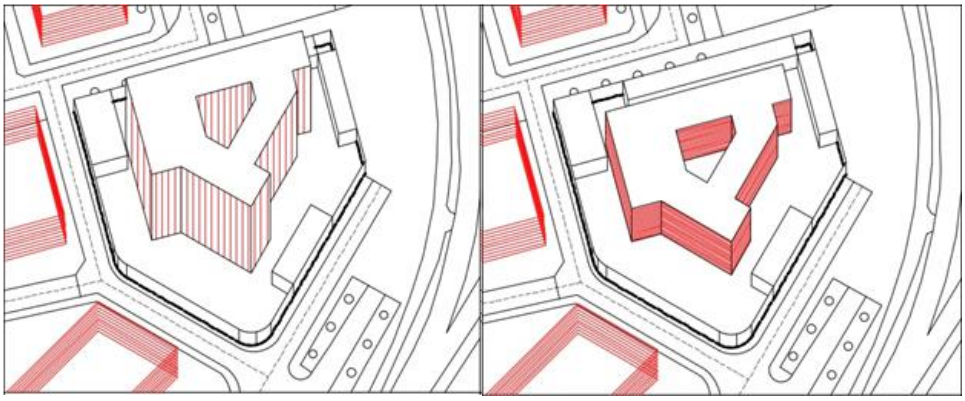


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Fig. 4 Contextual design. a) Disregarding the urban context (height, building aspect ratio, materials…) b) Implementing the existing context into the a harmonized design.

3. Accessibility – examining whether the new development fits into the established movement patterns of the built environment. Closely related to indicators 4 and 5. The building in question utilized the available access paths, without closing or compromising parts of the streets.

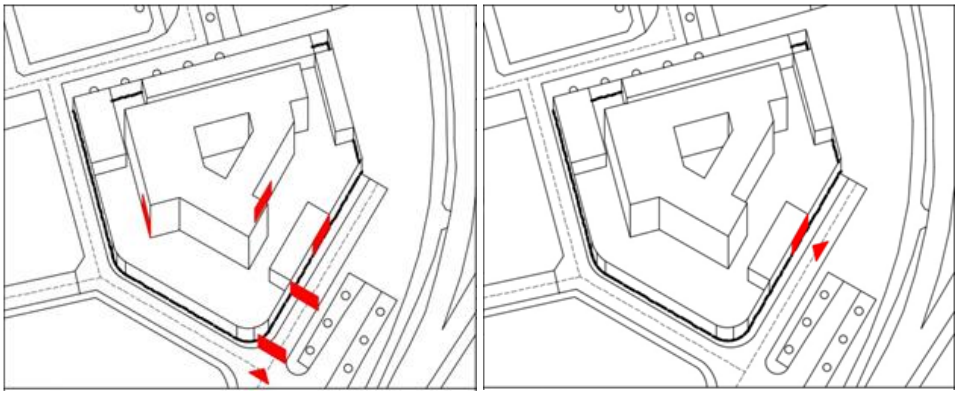

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Fig. 5 Accessibility. a) Multiple access/checkpoints oftentimes usurpin the public space. b) Secure checkpoint utilizing the existing access roads and points.

4. Security– as consular headquarters are protected under international law and the Vienna Convention on Diplomatic relations, the host country is obligated to provide assistance when required and the newly built structure will be considered high-risk. New Japanese embassy has not made any interventions in the existing urban environment to increase its level of protection (CCTV cameras, conspicuous security, boulders … etc.) Additionally, it has coordinated with relevant authorities to prepare for a case of an emergency.

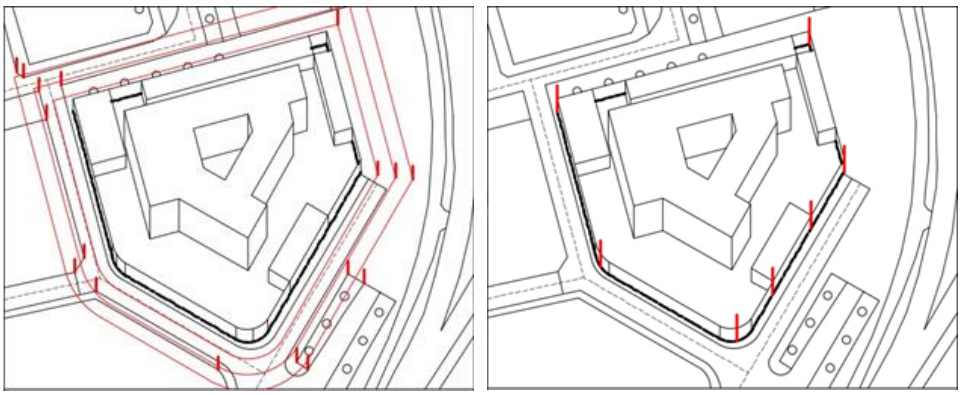

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Fig. 6 Security. a) Security perimeter extending beyond the plot, CCTV cameras in public spaces. b) Security perimeter within the boundaries, checkpoint CCTV surveillance.

5. Disruption of established urban patters – signifying limitation of freedom for users of public spaces e.g. controlled movement (pedestrian and vehicular), claiming adjoining

pieces of public space for official usage, imposing a ban on taking photography … etc. New Japanese embassy building did not impose any restrictions onto the surrounding urban environment, it remains one of the rare examples of typology that people can freely access, walk around and view from all sides.

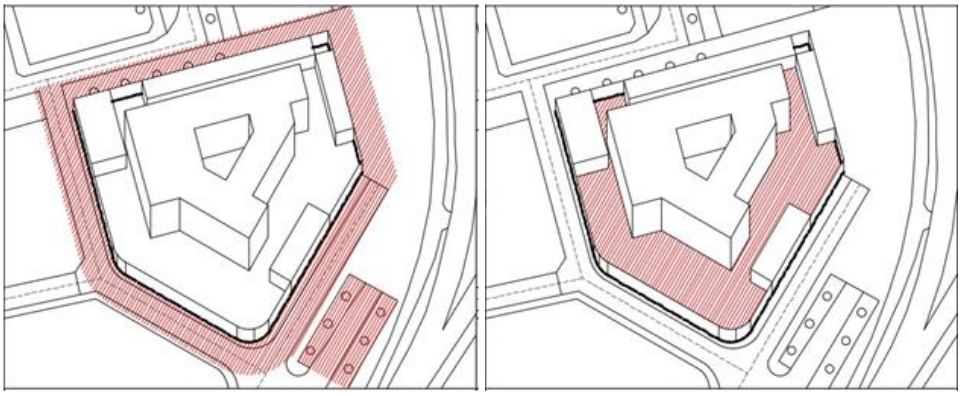

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Fig. 7 Disruping of established urban patterns. a) Prohibited pedestrian and vehicular movement, prohibited parking. b) No special security requirements, limited within the embassy compound.

6. Change in urban structure – similar to 5, but signifies removal of existing buildings/paths/urban furniture for the sake of new development. The examined case study has not damaged the built environment, however, it had intervened on its plot (which is within its purview and only mentioned as a curiosity) and removed significant green fundus (evergreen and deciduous trees). Due to the proximity of the neighboring residential building, there were some altercations, as the tenants have mentally mapped the greenery as their own. However, legally speaking, this was not the case, and the Japanese government has reimbursed the city of Belgrade via the greenery cutting/removal fee.

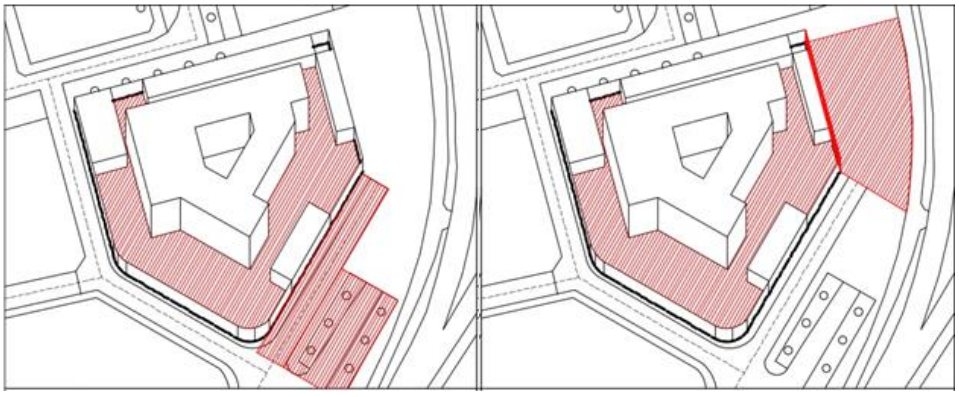

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Fig. 8 Change in urban structure. a) Usurping public spaces for security purposes, disruption of movements. b) Extension of activities (e.g. Japanese garden) with clear boundaries.

7. Long-term development potential– refers to the new development being introduced into the existing urban tissue in such a way that it will allow for a natural progression of the city development. This means following the urban planning strategies in place and not disturbing them. The examined case study, by its placement and previous construction processes has enabled this urban development progression to take its course naturally, and will not pose any obstacle for its expansion.

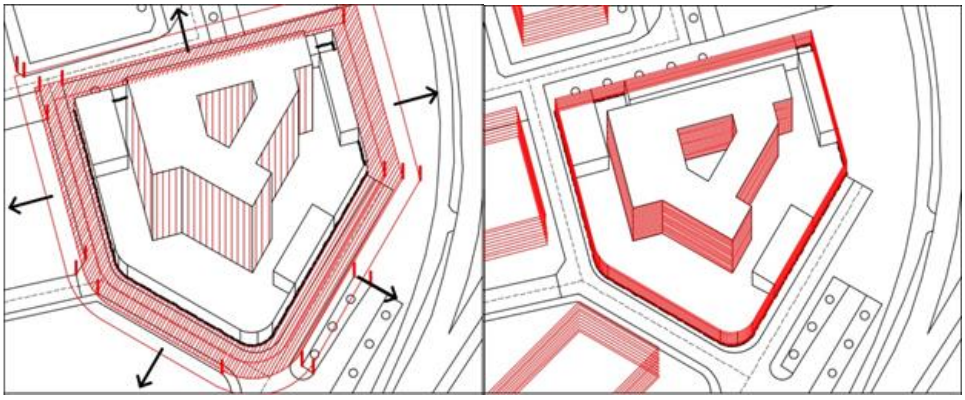

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Fig. 9 Long-term development process. a) Disruption of normal development, pushing away any possible interventions. b) Designing within the boundaries, allowing for unhindered development.

One of the examples that must be noted is the development of the new American embassy in Belgrade, which did not follow almost any of the indicators, especially 4, 5 and 6. The overall General Urban [developmental] Plan (GUP 2021) was amended to facilitate the requirements of the American government. These alterations of the urban matrix have had a severe impact on its continuity and uniform development, and, although working within the lawful framework, these negative effects could have been mitigated or avoided altogether.

6. Conclusion

Primarily, it is essential to stress the significance of the public interest Japan (and any other country implementing this methodological approach) can achieve. By implementing a transparent construction procedure and having an open conversation with architects and urban planning professional from, one can only increase its soft power potential abroad and ensure achieving its geopolitical goals more effectively.

It is necessary for the urban planning profession to be aware on the potential severity of impact of certain typologies deemed high-risk (including, but not limited to embassy and diplomatic-consular headquarters typologies), proceeding with research and development stages accordingly. One option is to conceptualize a diplomatic typology cluster of sorts and although this concept has some drawbacks, like any other, they can be managed relatively simply, with involvement of other groups and professionals.

When dealing with typologies within dense urban environments, there should exist a clear overview of spatial disposition and usage, and then identify triggers of discontinuity of the urban tissues. Focusing on the wider context, then zeroing on the specific space, with its own set of problems, will greatly help in providing solutions that will be viable for the long run, giving back the right to the city to its users. By having a subtler approach in dealing with these issues, images of a defensible city/spaces and rings of steel can be avoided: e.g. using heavy urban furniture that limits vehicular movement only highlights existing issues and can be re-conceptualized if properly handled.

One of the suggested tools that can be used, during the inception phase, is behavior modeling software: computer generated data can be instrumental in determining e.g. pedestrian flows and if/how imposing movement limitations affects the quality of spatial usage. This software modeling is normally utilized to examine and amend public space designs, such as squares and plazas. Main focus generally lies in identifying possible places of [pedestrian] congestions and bottlenecks, but in the case of an embassy building the methodology in place would be somewhat different. If the new embassy building requires certain security interventions within the public space [limitation of pedestrian movement, prohibition of parking… etc.] a virtual simulation can be made to examine how such interventions in the public environment affect the everyday life of spatial users. By extension, any noted negative effects can be mitigated with careful intervention within the built environment.

In a similar vein, additional layer can be overlapped with users' experience, layer of security. This layer can include routes to be utilized in cases of emergency (fire, medical, riots, evacuation… etc.) as well as possible extremes and subsequent damages to the urban environment (terrorist attacks, car bombs, gun violence… etc.). Having possession of a number of most likely and/or extreme scenarios, professionals, with obligatory public review and input, can elect the best course of action when building these typologies or mitigating possible negative effects in already built environments. The necessary number of scenarios of spatial usage is to be determined either by observing the extremes or most probable ones, keeping in mind that their number in not finite and not all contingencies can be foreseen.

Future challenges and recommendations that can be extricated from the previously presented material are mainly focused on empowering architecture and urban planning professionals in host countries. The intent is not to uproot or unconstructively question the diplomatic laws and conventions, but rather to draw attention to the notion of accountability for typologies under its jurisdiction. Embassy buildings will inherently have the power to change urban spatial usage dynamics, and as such, must be put under closer scrutiny by professionals and the general public, that ought to be educated on this pertinent topic.

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ISPITIVANJE EFEKATA URBANISTIČKE PRAKSE PLANIRANJA ZGRADA AMBASADA U JAVNOM PROSTORU

Dosadašnja urbana praksa, planiranja kompleksa zgrada ambasada uglavnom pokazuje ravnodušnost prema okruženju i kontekstu gradova, često proizvodeći negativan uticaj na urbanu matricu. Time što je sprovodio otvoreniji, transparentniji proces izgradnje svojih diplomatskih ispostava u inostranstvu, Japan je uspeo da doprinese celokupnom razvoju gradova, kvalitetu njihovih javnih prostora i imidžu koji ima u zemljama domaćinima. Ti procesi koji se tiču nove japanske ambasade u Beogradu, Srbiji, će biti proučeni i zaključci kako korišćenje takve metodologije predstavlja poboljšanje u inženjerskom i urbanističkom smislu će biti elaborirani, kao i nova metoda kulturne održivosti.

Ključne reči: *urbana praksa, ambasada, Japan, razvoj grada, urbanizam, kulturna održivost*

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PLACEMAKING: ELEMENTS OF CRITICAL REGIONALISM IN THE ARCHITECTURE OF MIHAILO TIMOTIJEVIĆ

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72.01(497.11)

Milica Malešević, Maja Milić Aleksić

University of Banja Luka, Faculty of Architecture, Civil Engineering and Geodesy, Banja Luka, The Republic of Srpska, Bosnia and Herzegovina

Abstract. *Using elements derived from what marks a place as singular is key to contemporary placemaking, understood as a primary objective of the theory of critical regionalism. The need to create humane, remarkably local architecture and to minimize the effects of universal and international clichés, in order to avoid the danger of making architecture locally unfounded and to invest it with meaning and a sense of place, certainly poses a challenge for every modern architect. This paper deals with the issue of contextuality and approach to the character and urban matrix of a place, as characterizing the buildings in the Western Serbian city of Užice designed by architect Mihajlo Timotijević. A critical approach is adopted in analyzing Timotijević's architectural plans and buildings constructed in Užice, in the attempt to show that the architect takes a genuine interest in the local topography and that which is called placemaking. The main goal of this research is to underline the fact that Timotijević's ability to perceive and read the messages sent by a place, materialize its distinctivness and easily incorporate a "sense of place" in architectural spaces has given the city of Užice a new image, by integrating the spirit of the regional with that of the contemporary. The research results are particularly pertinent to contemporary architectural theory and practice, both in Serbia and the region, as a comprehensive, multifaceted example of a good practice of critical regionalism.*

Key words: *critical regionalism, placemaking, Mihailo Timotijević, Užice.*

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Corresponding author: Milica Malešević
University of Banja Luka, Faculty of Architecture, Civil Engineering and Geodesy, Vojvode Stepe Stepanovica 77/3
78 000 Banja Luka, The Republic of Srpska, Bosnia and Herzegovina
E-mail: mgocic@yahoo.com

1. INTRODUCTION

In theoretical considerations, the term *critical regionalism*, taken as a concept, indicates the idea of placemaking. In accordance with this theory, a place, in present circumstances, is defined in a way that visibly and purposely reflects the identity of a local environment and community, while embracing the values of global and universal achievements and modern technology. In other words, the concept of critical regionalism is to be understood as a concept of placemaking, with places constituted as local forms of *manifestations of world culture*.

In this paper, a critical approach is adopted in analyzing the buildings in Užice designed by Mihailo Timotijević, with the aim of showing that they manifest the concept of critical regionalism, whereby the architect succeeded in integrating the spirit of the regional with that of the contemporary, thus drawing the attention of both the professional community and general public to the phenomena and value of the local architectural heritage. The architect's treatment of the character and cultural matrix of the locality, more precisely, his ability to materialize the distinctiveness, customs, and cultural and social traditions of this part of Serbia reveals the kind of critical deliberation and reading of messages sent by the place that permitted him to respond effectively to a number of challenges in a rather peculiar local setting such as the city of Užice. Beside the problem of contextuality, this research also addresses that of creative reinterpretation of architectural heritage in the context of latter-day approach to materials and technologies. Therefore, the principal objectives of this paper are to give a scientific description, systematization and explication of Mihailo Timotijević's legacy in the city of Užice, as observed in the framework of the theory of critical regionalism, and by doing so make a contribution to the scientific study of architecture in Serbia at the turn of the 21st century.

The paper has two parts. In the first part, the etymology and meaning of the term "critical regionalism" are expounded, and the factors that led to its emergence identified. There is a special focus on the concept of critical regionalism as understood by the renowned US-based architectural critic Kenneth Frampton, as well as on the elements characteristic of the practice of critical regionalism.

The second part is conceptualized as a qualitative research into Timotijević's architectural work in Užice and his approach to design, in line with the theoretical postulates of critical regionalism. This part of research takes into consideration primary sources, above all the plans published in the Timotijević's monograph *Architect and Place* [*Arhitekt i mesto*][1], those obtained directly from the architect, and texts and papers previously published on the buildings under consideration herein, as well as an analysis of secondary sources. The conclusion provides a summary of the analysis and defines Timotijević's stance as an architect and the poetics of his designs.

2. DEVELOPMENT OF THE CONCEPT OF CRITICAL REGIONALISM

The concept of critical regionalism in architecture was framed by Alexander Tzonis and Liane Lefaivre in the early 1980s. In their essay "The grid and the pathway. An introduction

[1] The monograph *Architect and Place* presents the author's designs in the Užice area and his treatment of and relationship with a place, i.e. a particular city with its distinct spatial and cultural identity, to which the architect dedicates his art and ability to the fullest of their potential.

to the work of Dimitris and Suzana Antonakakis," they present critical regionalism as the third and most recent type of regionalism in Greece, as continuing the legacy of the picturesque "national regionalism" and the neoclassical version of "historical regionalism" (Alexander Tzonis and Liane Lefaivre, 1981:177). According to Tzonis and Lefaivre, the concept of "regionalism" has its roots in ancient Greece. It was in the context of politics of rivalry between poleis and the protection of their colonies that the ancient Greeks used architectural elements to mark the identity of a group which would occupy a certain area. The terms *Doric*, *Ionic* and *Corinthian* were not only abstract decorative concepts. They were coined in a certain historical context in the process of "fission and fusion" of the region and its identity, and their usage is often determined by complex political meanings (Lefaivre, 2012:10).

Still, during the Archaic, Classical and Hellenistic periods no specific word was used to describe the concept. An explicit reference to "regional" design in antiquity can be found in Vitruvius' treatise *De Architectura*, a Roman text that introduces the concept of "regional" architecture, and also considers its political implications (Lefaivre, 2012:3). According to Vitruvius, this concept aimed at researching human habitats in the frame of their geographical environment, both physical and climatic.

The concept of "critical regionalism" as formulated by Tzonis and Lefaivre differs in its essence from most of the "regionalisms" from the past, which were applied "regionally" only as a protective or binding concept, as a political or marketing construct which promoted nationalistic movements, often in combination with chauvinism, folklore and commodification. As a matter of fact, the term "critical regionalism" was coined to draw attention to a new concept in architecture, adopted by a certain number of architects in Europe, who were trying to find an alternative to Postmodernism, the dominant movement of the period.

It is known that Postmodernism in Europe and the USA resulted from the general disillusionment with and loss of faith in the legacy of Modernism. The emergence of Postmodernism meant a revival of the concept of architecture as an art, with its value increasingly tied to its communicative power as a cultural object. In order to deconstruct and disarm the functionalistic and purist concept of modern architecture, Postmodernism promoted eclecticism as a way to counter the dysfunctional, contextual, decorative and scenographic aspects of contemporary art, relating to or replicating the classical and regional in a way that was often inherently incongruous. Such a pluralistic approach was readily accepted, and at the time of the financial recovery back in the 1960s it became a new corporative style in architecture. In the 1970s, in response to the modernist emphasis on universalism, Postmodernism rediscovered history, which became a significant characteristic of its development. As soon as the next decade, this new duality of Postmodernism is increasingly highlighted: "How to become modern and to return to sources; how to revive an old, dormant civilization and take part in universal civilization" (Ricoeur, 1965:277). However, in the late 1980s, Postmodernism significantly changed from a movement criticizing aesthetic and social parameters, to one confirming the *status quo*. Charles Jencks believes that, just as Modernism suffered from the overproduction and vulgarization of its language, Postmodernism started turning into a weak eclecticism of "anything goes," that is, into "ornamentalism," as it was nicknamed by American authors, thanks to its propensity for promoting "multiple-voice discourses" (Jencks, 2007:148).

In such a climate of never-ending conflict between the global and local, critical regionalism appeared as a new concept that hoped to reconcile these two phenomena in a

unique way. Tzonis and Lefaivre, realizing the disintegration of global Modernism, criticized by Postmodernism as reducing architecture to a mere "communicative or instrumental sign," proposed the introduction of foreign paradigms to the domestic *genius loci.* In this way they tried to provide a framework for overcoming the negative aspects of globalization, without rejecting what was valuable about its legacy. In order for this approach to differ from the merely sentimental and dated principle of return to the authentic and local, Tzonis and Lefaivre combined the concept of regionalism with the Kant's idea of the "critical." It implies that architects, in facing issues and exploring possibilities, should think critically – in Kant's sense. They should overcome prejudices and conflicts between the local and global, and intervene in accordance with the specificities of the actual situation, that in a specific region. While open to and embracing everything the "globalized" world has to offer today, including the possibility of constant interaction and exchange, architects should still appreciate the uniqueness of a "region," the quality of social connections, and the physical and cultural resources of a certain locality. In its contemporary sense, especially that which is also "critical," "critical regionalism" is seen as one of the most significant alternative approaches to design, one which enhances the creative power of globalization and at the same time minimizes its destructiveness. It is an approach which takes account of the context, thus avoiding the making of architecture that has no base in a certain space, in order to give it a sense of place.

The idea of critical regionalism as a new concept inspired a series of debates and new criticism. The US-based architectural theorist Kenneth Frampton is credited with popularizing the concept of critical regionalism. Frampton first introduced his understanding of critical regionalism in his 1983 essay "Towards a Critical Regionalism: Six Points for an Architecture of Resistance," which he then revised in 1987 in an essay titled "Ten Points on an Architecture of Regionalism: A Provisional Polemic."

In his first essay, Frampton claims that the "fundamental strategy of Critical Regionalism is to mediate the impact of universal civilization with elements derived *indirectly* from the peculiarities of a particular place" (Frampton, 1983:21). Frampton called this concept "architecture of resistance," in the sense that it represents a reaction against universal standards, cultural commodification and technology worship. Seeking to encourage the process of integration of tradition with modernity, Frampton developed a theoretical framework with a set of characteristics that describe *critical regionalism*, which he explained as the following points: 1. Culture and Civilization, 2. The Rise and Fall of the Avant-Garde, 3. Critical Regionalism and the "World Culture," 4. Resistance of the Place-Form, 5. Culture versus Nature: Topography, Context, Climate, Light and the Tectonic Form, and 6. Visual versus Tactile (Frampton, 1983:17-29). Each of these points deals with specific issues related to the concept of "placemaking" in contemporary circumstances. While Frampton attaches a great significance to each of them, it is not his intention to enforce upon anyone the recipe for design in the spirit of the regional, but to offer wider conceptual guidelines for introducing a good practice of critical regionalism, and as strong as possible incorporation of the "sense of place." In his essay, Frampton endorses the idea that architects should search for regional variations instead of continuing to design conforming to global uniformity.

Frampton laid the foundations for his critical theory on tendencies and trends in contemporary architecture in his "Six Points for an Architecture of Resistance," which he then revisited and developed further in his essay titled "Ten Points on an Architecture of Regionalism: A Provisional Polemic." The second essay provides the same elementary guidelines as the previous one, but it can be interpreted as a detailed conceptual proposal

for critical regionalism and considered as forming a comprehensive, sound basis for a critical analysis of concrete buildings (Frampton, 2007:375-385).

Even though Frampton gave a detailed explanation of the concept of critical regionalism in his essays, his seminal work that allows a full understanding of the concept is *Modern Architecture: A Critical History*, especially the fifth chapter, "Critical Regionalism: Contemporary Architecture and Cultural Identity." In this chapter Frampton points out the significance of both the local peculiarities of an area or region and of modern technologies, whose use in contemporary architecture is unavoidable. Here, Frampton refers to the French philosopher Paul Ricoeur and his essay "Universal Civilizations and National Cultures" (Ricoeur, 1965:277) as the foundation for his arguments. According to Ricoeur, the phenomenon of universalization leads to a kind of subtle destruction, of not only traditional cultures, but also of what Ricoeur calls the "creative nucleus of great civilizations and great culture." This philosopher also points out that "as if mankind, by approaching *en masse* a basic consumer culture, were also stopped *en masse* at a subcultural level", which often leads to the weakening – if not to a complete severance – of ties with the cultural past (Frampton, 2004:314).

For both Ricoeur and Frampton, the main goal of architecture is to keep its social values and to ensure the built environment preserves the meanings of the past, but in accordance with the imperatives of the future. Therefore, not even regional culture should be taken as something given and relatively unchangeable, but as something that needs to be cultivated thoughtfully and advisedly. Referring to Ricoeur, Frampton emphasizes the importance of regional or national cultures being constituted as local forms of "manifestations of world culture." In full awareness of the dangers coming from contemporary technology, Frampton does not support the revival of either great historical styles or rather modest vernacular building. On the contrary, he supports the stance shared by Tzonis and Lefaivre, that critical regionalism must not be considered as synonymous with vernacular architecture. The climate, culture and spirit of a region, as well as its traditional crafts and alike, must not be reduced to local patterns. Neither ancient nor contemporary cultures are products of one heritage, but hybrids of several cultures interacting and impacting on one another in a region in the past. Therefore, critical regionalism may be said to be lying somewhere between the eras of Neo-Historicism and Neo-Avant-Gardism: "Neo-Historicism was said to have a newfound faith in complete and strong links with the past; Neo-Avant-Gardism, while recognizing, does not subscribe to it, and moves only with an inventive eye to the future" (Jadhav, 2002:47). In this sense, critical regionalism depends on the architect maintaining a high level of self-awareness and sensibility, and having and developing the ability to find inspiration primarily in things such as the quality of local light, or in the tectonic drawn from a locally specific structural modality.

Based on the works quoted previously, which explain thoroughly the essential attitudes and principles of the concept of critical regionalism, several key criteria may be derived, whose application would allow the practice of critical regionalism in architecture, as especially pertinent to the case study that is researched in the following chapter of this paper:

- Critical regionalism should give *placemaking* precedence over *spacemaking*; a *place*, which is in fact a group of *spaces*, reflects the identity of a local environment and community;

- Critical regionalism is regional to the point that it highlights the specificities of the context being intervened in, from its topography to light and the call to create architecture in response to that particular context (which also favors local materials);
- Critical regionalism is architectonic rather than scenographic;
- Critical regionalism obligatorily considers light as a primary factor that reveals the structure and tectonic properties of a building; beside light, tactility and the visual effect are of special importance. Thus, special attention is paid to the atmospheric and ambient sense of warmth, cold, air humidity and flow, to creating a variety of colors, smells and sounds by using different materials, and to different impressions that are made by means of floor coverings, which help the body experience the unconscious change of position, movement, etc.;
- Even though it opposes the sentimental use of local forms, critical regionalism does at times allow for a reinterpretation of local elements, in an attempt to combine, as naturally as possible, the assets and resources of contemporary culture with local tradition.

Accordingly, critical regionalism, first and foremost, forms a basis for a mindful mediation between such opposite terms or concepts as the global and local, center and periphery, nature and culture, tradition and innovation, technique and technology. In other words, the concept of critical regionalism aims at a more humane architecture in the light of universally perceived abstractions and international clichés. Reinterpreting old traditions through the use of tectonic forms and local architectural vocabulary, as well as ensuring of social relevance can result in buildings characterized by contemporary architectural expression.

3. Elements of Critical Regionalism in the Architecture of Mihailo Timotijević

3.1. Mihailo Timotijević's Užice architecture – observing and reading spatial messages from macro space planning to micro space planning

Užice began taking on the appearance of a modern city in the 1960s. The aftermath of the Second World War was a time of reconstruction and building of new streets, squares and modern high-rises. Today, the city is the economic, social and cultural hub of West Serbia. In the post-war period, Tito's Užice[2] symbolized the renewal brought by the socialist Yugoslavia. Leading Yugoslav architects participated in its regeneration, with Stanko Mandić, who designed a number of Užice's landmark buildings, including the well-known Partizan Square, one of the most prominent among them. In that period, Užice had all the features of a socialist city: it grew thanks to the country's industrial development and opening of state and society-owned macro-enterprise, state-owned construction land, and a focus on the development of social infrastructure. Post-socialist transition largely retarded Užice's architectural development, both due to the lack of vacant land in the city, given its peculiar hilly topography, and the lack of new funding. Today, the city is composed of single-family houses, mainly located on the outskirts, and high-density high-rises found in the historical

[2]In the fall of 1941, Užice was the headquarters of Partizan forces, so its name was changed to *Titovo Užice* (Tito's Užice) at the end of the People's Liberation War, more precisely, in 1946, in honor of Josip Broz Tito. The city was renamed Užice again in 1992.

core, as new visual elements of the cityscape.[3] The first comprehensive urban plan of Užice, developed between 1960 and 1970, ordered the demolition of a large number of the then existing building stock, to provide space for the expanding city core. The historic part of the city remained the public, cultural, business and administrative center, but it was reconstructed to allow high-density residential developments (Kuzovic, 2016:548).

Mihailo Timotijević first designed buildings in Užice in the 1990s. Having earned the trust of the local authorities, Timotijević was hired to manage an urban project seeking to redesign Megdan, a neighborhood located in the city center; today, Megdan is home to by far the greatest number of mixed-use (office and residential) buildings designed by Timotijević in Užice. The urban renewal of Megdan, which is located next to the river, lasted several years, with Timotijević continuously involved. It is not very common in either Serbia or the region for architects to continuously participate in decades-long urban renewal of an area, and also to stay involved both in the creative aspects of the project and take part in decision-making at different levels of the process, all the way through the construction stage.

The Megdan neighborhood (a Turkish word meaning fight or contest), as its name suggests, was part of the demarcation line between the Serbian and Turkish parts of the city. It was mostly home to small, mixed-use buildings, and although it extended along the river Đetinja, the urban development of the city disregarded it as a natural regulating element. In the 1960s, as Užice's urban development accelerated, this part of the city was mostly ignored and remained mostly unchanged. Consistent with the ideology of the era, the focus was put on the main street, which typically housed all the important buildings, such as the town hall, city hotel, theater, and the main square. However, in the early 1990s, it was decided to reconstruct Megdan, with architect Mihailo Timotijević hired to do the urban design.[4] The urban design specified the construction requirements for concrete micro-locations and gave contours of the buildings-to-be. According to the architect, the design was innovative and courageous in its proposal to line the river bank with convexly shaped blocks, and thus reinforce the existing urban matrix, while diminishing the dominance of the skyscrapers built after the Second World War, resulting in their blending in the outlines of the future riverfront city center (Timotijević, 2004:41).

Between 1993 and 2004, Timotijević participated in the construction of several residential and office buildings in Megdan, and also co-developed a number of urban designs. Analysis of the buildings constituting the Megdan complex reveals that the concept underlying the development that replaced part of the old town quarters sought to take into account and reaffirm the inherited outline, including the course of the river Đetinja, naturally regulating the area (Figs. 1, 2).

This resulted in buildings whose most prominent façades form the edge of the of the city center, simultaneously making the city along the left river bank distinct and giving it a "face".. The sophistication and heightened sensitivity to the terrain peculiarities and the concept of place building of the result is in line with the architect's critical approach to regional principles of construction as a way of expression.

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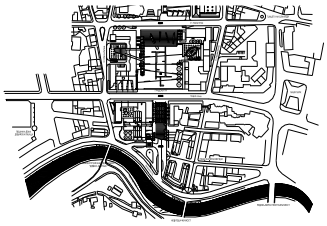
[3] A number of conflicts characterized Užice's development, mostly due to the natural limitations caused by the altitude, great height differences between different parts of the city, and the small area of the alluvial plain along the river Đetinja available for construction.

[4] Timotijević collaborated on this project with architect Miroslav Petrović-Balubdžić. The team accepted the commission, on condition the design specified by the then applicable urban plan was abandoned, as it proposed the construction of skyscrapers in Megdan of the type erected around Partizan Square.

Figs. 1, 2 Megdan after reconstruction

The characteristics of Timotijević's designs which more obviously relate to the concept of critical regionalism are, on the one hand, his permanent concern for what he calls location building, i.e., place building, and on the other, his conviction that restraint and moderation are beautiful, which is why he gives priority to tectonic and visual formation. The play of light and shadow has an important role in the overall concept. Also, Timotijević has an extraordinary capability to enrich his shapes with craftsman's touches. In order to inspect all these elements more closely, i.e. to exemplify how the principles of critical regionalism are employed in Timotijević's work, several mixed-use buildings in the Megdan neighborhood are analyzed below.

The office and residential buildings constructed first (1993-1994[5]) are of great importance, as they line the city square, a small plaza and a strip mall. Beside the ground-floor colonnades in these buildings, the colonnades, eaves and canopies of the small stepped plaza are the elements that shape the public space, subtly connecting the new block with the existing structures and Partizan Square (Figs.3, 4).


Figs. 3, 4 Megdan, mixed-use buildings, with small stepped plaza

Unlike the ground-area dynamics, the regularity of openings on the upper floors ensures the occupants have privacy. With the offices set back, prominent cornices and long roofs, the volumes of the buildings seem less conspicuous and simpler, thus blending in with the adjacent 19th-century edifices, their roofs jointly giving the area an urban appearance (Timotijević, 2004:101). The simplicity and serenity of the residential floors is disrupted only by prominent bay windows, which the architect uses to ensure

[5] Timotijević and Petrović-Balubdžić won the Grand Prize of the International Salon of Urbanism for this project in 1994.

view of the green outskirts of the city. According to the architect, thanks to Užice's topography, regardless of the building density in the city, it is almost always possible to find a way to provide views of the green slopes of the surrounding hills from the buildings. Therefore, designs can always allow for such little "green outlets" (Figs.5, 6.).

Seeking to combine elements of contemporary culture with the local tradition in as natural a way as possible, the architect permanently built in one of the new buildings a cornerstone containing an inscription from the 19th-century building that stood there previously, and a wrought-iron fence of an adjacent building that had also been demolished (Fig. 7, 8.). As the architect himself puts it, elements that were once part of the houses and buildings demolished to make room for the Megdan complex were purposely built in the new buildings as reminders of – or memorial "references" to – their predecessors. Details such as these, which are both historical and cultural, result in the new interpolations being grounded in the local building heritage and mentally embodying and preserving the spirit of the place (Timotijević, 1995:393).

Figs. 5, 6, 7, 8 Architectural details showing the new blending with the old

The mixed-use facilities in Omladinska Street, which overlook the river, are particularly interesting thanks to their convex frontages extending along the riverfront, also parallel with the convex bank revetment just below the street. The proximity of the bank revetment and the almost exact convex shape of the building give the street surface and the sloping stone bank the appearance of a solid base that the new buildings stand on (Timotijević, 2004:42). This combination of elements creates the effect of a natural, symbiotic relationship between the natural and man-made environments (Figs. 9, 10, 11).

Figs. 9, 10, 11 Mixed-use buildings in Omladinska Street

The buildings occupy the block corners and extend along the future pedestrian precinct and the riverfront, with a lot of potential for the ground floors to be used for movement. Therefore, it was only logical for the architect to insert colonnades and design the ground floors as an office area, which is no longer simply a sidewalk along the length of the walls, but public space extending into the buildings. This solution also emphasizes the division of these simple, straightforward frontages into three parts. The glazed bottom level, which runs parallel to the riverfront, is set back and features a massive central block of proportionate dimensions, which reinforces the rhythm of the simply arranged windows above. The jettied upper floors additionally enrich the visual dynamics of the façade. The regular arrangement of the openings on the protruding frontages is an expression of discipline and simplicity, while the particular window design is varied on the different floors with elements differently installed at the glass level. That is how the simplicity of the design, which characterizes the whole complex, but is also visible as the buildings are approached – and especially as one focuses on the residential floors, is represented with specific recognizable elements. The windows are visibly drawn in, with the effect of making the wall mass more conspicuous and the shadows more strongly accentuating the structure of the façade openings. Simultaneously, in functional terms, the wall edges around the openings protect against excessive sunlight (Timotijević, 2004: 46). The fifth facade consists of sloping roof planes, which is in harmony with the character of the place, with the building prominently occupying the block corner. Equally, the roof design reveals the wish to combine a contemporary solution with traditional building. The roof edges are clad in copper, which adds a touch of craftsmanship, whereas the projecting eaves make the overall appearance modern.

Even though the individual Megdan buildings were erected over a relatively long time span, the architect strictly stuck to and insisted on the cube shape for all of these office and residential buildings, with the effect of their forming a continuous series of blocks. The latest addition to the development, the building constructed in 2009, reveals the same solution that choosing to continue using the forms found on the spot. Simple window openings are still the most prominent elements on the main frontage, although their arrangement is now slightly more “playful” compared to those built previously (Figs. 12, 13, 14).

Figs. 12, 13, 14 Mixed-use facility built in 2009

This is probably due to the fact the building is an infill located in a narrow street, which does not allow a full frontal view of it. Of course, like with many other buildings by this architect, the use of bay windows ensures the right to a view. Since contemporary designs seek to meet the requirements of functional and functionalist architecture first,

relinquishing space between buildings, once a major constitutive urban element of cities, with growing numbers of infills in today's building practice, bay windows are the only way to provide wider views to occupants. Critically observed, their use as motifs on the building facade, compounded by the dimensions and proportion of the openings, makes an impression of the vertical regularity and stability marking the more recent architecture of Užice.

The foregoing analysis allows us to conclude that the buildings under consideration were created primarily through observation and reading of the messages of the area in which they were built, and that the architect was essentially concerned with the problem of contextuality and creative interpretation of local specificities. Thus, with the concept of a critical approach to the existing urban matrix at the site and the critical principles of addressing the issue of identity of Užice's future riverfront, it is clear that contextuality lies at the heart of Timotijević's architectural "production." This indeed is the only right starting point to create good architecture. The architect himself holds a similar view:

> The process of integrating new architecture can take a lot less time, to the extent that balance has been found between the expression of one's own identity and visible structural agreement with the adjacent buildings. To influence those processes adequately, an architect has to develop a sense and sensitivity for each individual location. Because its potentials, memory, symbolic content and energy are motivating for constructors and dwelling at that particular place (Timotijević, 1995:394).

3.2. Tectonic versus the scenographic in Mihailo Timotijević's designs

In one of his six points of "resistance architecture," Frampton states that, in spite of the critical importance of topography and light, *the primary principle of architectural autonomy lies more in the tectonic than in the scenographic* (Frampton, 1983:27). Frampton also believes that the tectonic should not be perceived only from a technical perspective, because it is certainly more than simply an expression of a frame. Citing the American architecture historian Stanford Anderson, Frampton says the tectonic is not only related to the activity of making the basic physical structure, but also to activities that help raise it to a higher level, i.e. to an artform. Frampton places emphasis on "structural poetic" rather than on "re-presentation of facade" (Frampton, 1983:28). By keeping the volumes simple, arranging the openings harmoniously, choosing a polychrome palette in response to the monochrome spectrum of the adjacent facades and paying close attention to details, Timotijević reaches the high-water mark of "structural poetics" in his designs of office and residential buildings in Megdan in Užice (Figs. 15, 16).

Quite certainly, the way local light has been put to use is telling of the structure and tectonic qualities of these buildings. The simple, elegant colonnades found along most of the length of the edge of the block at the ground level engage in play with daylight, creating ever-changing patterns of shadow and light. When it comes to the approach to design that exploits daylight and shadow as architectural *materials*, it can be said that Timotijević's simple geometric formulas are supported in a subtle way by these passing and transforming *materials*. *Light and shadow that transform*, beside the unavoidable contrast that makes architectural phenomena more dynamic, also leaves an impression of presence of the spiritual, in both the structure and materialization (Fig.17).


Figs. 15, 16 Pure and plain-looking facades of mixed-use buildings (1993-1994)

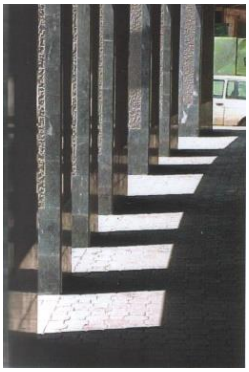


Fig. 17 Light and shadow as architectural materials

In terms of Timotijević's approach to architectural detail, it is worthwhile highlighting his capability to amalgamate the artistic with the critical potential of the region, and then also assimilate and reinterpret external influences. His simple and strict geometric building envelopes, manifestations of perfectly streamlined architectural design, are complemented with façade elements in a special way. The attention the architect pays to architectural detail, along with the shape and depth of his openings, can be seen as the next characteristic of his approach. Lintels, frames, portals, balustrades, cornices and stepped elements create the perfect balance in his designs between the strictness of contemporary aesthetics and the inner human need for detail. In Timotijević's architecture the clear and strict arrangement of openings is enriched with simple details executed in colors and materials which enhance the aesthetic quality of the overall architectural expression. It is not by chance that nearly pure colors are used here. The architect chose to do so because of the strong sunlight the buildings, with their position and orientation, are exposed to for a good part of the day, with the effect of color being sucked out of the material, i.e., made "subdued."[6] In other words, when in direct sunlight, color partly loses intensity, while keeping its chromatic value. The differential treatment of details on the windows observed vertically and the shadows created by the jetties enrich the overall appearance of the building. This makes architectural details significant elements of identity building.

Based on the above interpretation, the architectural language and details of Timotijević's designs are perceived as extremely precise, visually simple, yet upgraded with finishing touches evocative of tradition and craftsmanship, and the robust bodies of his building as tectonically simple. There is no difference between the structure of his buildings, with their ascetically simplified facades, and their spatial definition. There are no scenographic solutions, spectacle or designed effects. In the architect's words, "The need for unpretentious and restrained form is simply the imperative of city and civil culture, expressed as tolerance for the surroundings and horizontally and vertically oriented material, as intimations of abundance, not as ostentation" (Timotijević, 1995:394).

[6] From a lecture held by Mihailo Timotijević in a doctoral seminar at the University of Belgrade, Faculty of Architecture, in November 2006.

4. CONCLUSION

This research, which focuses on a selection of buildings in the city of Užice designed by architect Mihailo Timotijević, qualifies his work as having characteristics typical of the practice of critical regionalism, as formulated theoretically by Kenneth Frampton, and recognizes a critical distinction between his treatment of the building tradition and the far more frequent sentimental vernacularism. The architect's approach to that which is particularly regional, the tangible and intangible resources of the city of Užice, and the local light and materials are clearly indicative of his dedication to the concept of placemaking, as central to the theory of critical regionalism. This research is of special importance for contemporary architectural theory and practice, both in Serbia and the region, at the turn of 21st century, as it critically presents a good, comprehensive example of urban transformation that seeks to connect the assets and values of contemporary culture with that which is distinctly local.

The urban transformation of the Megdan neighborhood may be considered an exceptionally successful project owing primarily to the architect's critical approach to Užice's skyline silhouette. He displays a heightened sensitivity in the design process – he is receptive to the signals that are distinctly contextual, local, and boldly makes them part of the design process. The volumes of the mid-rises in the foreground, erected along the river, were carefully made to match the height of both the buildings on the bank across and those in the background. The cityscape thus created leaves an impression of a stepped group of buildings, whose height increases gradually from the southern side, all the way to the residential high-rises in downtown Užice. By producing this effect, Timotijević also made a new downtown outline, accentuating the significantly symbiotic association of the natural and man-made environments, while ensuring the wider city center remains residential.

Each individual segment of Timotijević's Užice designs indicates a sense of measure, refinement and consideration for both the surroundings and his own work, compounded with uncompromising contemporaneity. The place identity and distinctive local characteristics such as light, topography and climate are fully appreciated, and also enhanced and transformed. Timotijević's reliance on the context is his point of departure in his architectural reflections, and also constitutes the single most important aspect of his design process. Only this kind of architectural logic is capable of avoiding the trap of global uniformity which, obsessed with design and aesthetically pleasing images, easily succumbs to the dominance of the world's great monolithic cultures, unification of the architectural image of the world, and the dictates of the limited number of stylistic and functional design parameters, oblivious to and disinterested in the quotidian and social aspects of architecture.

Lastly, it may be concluded that Mihailo Timotijević's Užice designs, more precisely, his manner of expression of the identity of an environment – from topography and atmosphere to light and architectural details – is a clear demonstration of his adherence to the concept of placemaking and is illustrative of a good practice of critical regionalism.

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All photographs by Mihailo Timotijević.

STVARANJE MJESTA: ELEMENTI KRITIČKOG REGIONALIZMA U ARHITEKTURI MIHAILA TIMOTIJEVIĆA

Stvaranje mjesta u savremenim okolnostima, elementima izvedenim iz specifičnosti određenog lokaliteta, jedan je od primarnih ciljeva definisanih u okviru teorije kritičkog regionalizma. Problem postizanja humanije i lokalano specifične arhitekture te ublažavanja uticaja univerzalnih i internacionalnih klišea, sigurno je izazov svakom arhitekti danas, kako bi se izbjegla neutemeljenost arhitekture u određenom prostoru i kako bi joj se mogao pripisati smisao i osjećaj za mjesto. Ovaj rad se bavi problemom kontekstualnosti, odnosom prema karakteru mjesta i njegovoj urbanoj matrici u kontekstu stvaralaštva arhitekte Mihajla Timotijevića u gradu Užicu. Kritičkim pristupom u analizi realizovanih objekata i projektne dokumentacije, se nastojalo ukazati na činjenicu da je u arhitekturi Mihaila Timotijevića u Užicu iskazan poseban interes prema lokalnoj topografiji i onome što se naziva građenje mjesta. Osnovni cilj ovog istraživanja je bio da se ukaže da je Timotijevićevo posmatranje i čitanje poruka prostora, način izražavanja senzibiliteta, te snažne integracije „osjećaja za mjesto" u arhitektonskim prostorima, dovelo do stvaranja novog lica grada Užica, u kojem je objedinjen duh regionalnog i savremenog. Rezultat istraživanja je od posebnog značaja za savremenu arhitektoonsku teoriju i praksu, kako u Srbiji tako i u okruženju, jer predstavlja sveobuhvatan primjer dobre prakse kritičkog regionalizma.

Ključne reči: *kritički regionalizam, mjesto, Mihailo Timotijević, Užice.*

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