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integration
Novelty
Design
interdisciplinarity
Sustainability

Proceedings

Editors: M. Trivunić, I. Džolev, M. Šešlija

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AND GEODESY

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iNDiS 2023

Department of Civil Engineering and Geodesy, Faculty of Technical Sciences, University of Novi Sad, is organizing the sixteenth international scientific conference "iNDiS 2023" - integration, novelty, design, interdisciplinarity, sustainability. From this year, the modified format of the event starts, therefore the conference will be held biennial in the future.

Topic of the first conference, held in 1976, was "Industrial construction of apartments" because of its modernity in that period. Later, conferences were held with a considerably broader theme of "Construction Industrialization", and soon papers from all areas of construction appeared at the conference, from urban planning and design of buildings of various purposes, to maintenance and major interventions on the built construction stock. This led to the expansion of the area of expertise, covered by this conference, in which, in addition to civil engineers, urban planners, architects, engineers of other professions, who work in construction, sociologists, economists and others participate.

This conference, like several previous ones, covers the problems of planning, designing, construction and renovation of construction, geodesy, geoinformatics and risk management of catastrophic events, which have come across to an adequate response from researchers and engineers of various profiles, both from our country and abroad.

Members of the International Scientific Committee actively participated in the preparation of the conference, both as reviewers and authors. It is expected that the presentations of papers and discussions at the conference will enable the definition of the main directions of construction development, in accordance with modern trends, since many ideas and results, experimental and theoretical researches in the fields of construction have been promoted.

For this conference, the Proceedings consists of two books, namely Book 1. Papers in English and Book 2. Papers in Serbian, which enables better and more fruitful communication and exchange of experiences with colleagues from abroad.

Additionally, the possibility of establishing new and strengthening existing professional and collegial ties is also of the great importance. This year, authors from 13 countries are participating in the Conference, and the Proceedings Book 1 contains 94 papers in English, while the Book 2 contains 23 papers in Serbian, in total 117 papers.

The editors express their sincere gratitude to all the authors for the effort invested in writing the papers as well as for their contribution to this event.

Editors of the Proceedings

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NOVI PAZAR CITY CENTER'S DETAILED URBAN PLAN FROM 1968. SEEN AS A STAGE

Enis Hasanbegović¹, Melisa Alcan², Lejla Zećirović³, Branko Slavković⁴, Džemila Beganović⁵

Summary:

Through this paper, we'll try to expound the detailed urban plan of the Novi Pazar city center, which dates back in 1968, as an attractor of events that creates an illuminated open stage that awaits the unfolding of a drama, in which the observer becomes a participant who engages all his senses. Further, we'll explain the inseparable connection of the scenic potential with the city space. In certain segments of the paper, the relationship between the spectacle and the city will be examined, like the issues of the city's spatial framework intended for that very spectacle as well. The goal of this paper is to find a new approach in the observation process of urban plans, as well as a peculiar call to respect the already existing architectural scenario. Looking at the urban plan as a scenic area - myriad of possibilities open up, both functional and aesthetic, both for the architect (director), and for the residents (spectators), who are also the protagonists at the same time.

Key words: stage, urban plan, scene, Novi Pazar, spectacle, city

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1. INTRODUCTION

Interpreting the meaning and significance of urban theatricalization, D. Konstantinovic and M. Zekovic (2011) provide a crucial definition: "The emergence of theater onto the streets, into the city, sought new stimuli that new environments brought. This process is not an isolated phenomenon of modern cities but a result of the desire to explore new spaces and investigate their scenic potential, as well as the aspiration for unhindered communication and the intention to engage ordinary citizens as the audience. The demystification of theatrical play by placing it within familiar urban contexts is just one form of new theatrical action. Simultaneously, there is a general theatricalization of various aspects of urban life, serving various socio-economic needs of the moment. Regardless of the reasons for these changes, this process has irreversibly altered the function of the theater building, permanently shifting the play beyond the boundaries of its constructed structure." This implies that the space for play, as a space of presentation, can be any environment within the city, whether planned for it or exploited for the purpose of artistic presentation [1]¹.

Experiencing urban space also demands the ability for scenographic perception of the city [2]. As explained by Tajana Dacic Dinulovic in her work, paraphrasing Roland Barthes, the city can only be semantically approached by viewing it as a structure and an abundance of offered signs, without attempting to fill the structure with definitive meanings, or, more precisely: "With every cultural or psychological complex, we find ourselves facing endless metaphorical chains, whose meanings are always different. [3]" Thus, this work not only explores the relationship between urban planning and theatricality in general but also specifically analyzes the urban project of Novi Pazar from 1968, shedding light on it in terms of theatricalization. This project will be regarded as a stage for the performance, consciously or unconsciously designed by architects, for the display of events.

William Shakespeare writes: "All the world's a stage, and all the men and women merely players: They have their exits and their entrances, And one man in his time plays many parts... [4]"

Therefore, through this work, I will attempt to read the urban plan of the center of Novi Pazar, a city in southern Serbia with a population of over one hundred and twenty thousand, as an attractor of events that creates an illuminated and open stage awaiting the unfolding of a drama, where the observer becomes a participant engaging all the senses. Additionally, this work will explain the inseparable connection between scenic potential and urban space. In various segments of the text, we will consider the relationship between spectacle and the city, as well as questions related to urban spatial frameworks intended for spectacle.

The aim of this work is to find a new approach to the observation of urban plans and to call for the appreciation of the existing architectural scenario. By viewing the urban plan as a scenic space, numerous possibilities, both functional and aesthetic, open up for the architect, i.e., director, as well as for the viewers, i.e., residents.

2. THE STAGE OF NOVI PAZAR (DETAILED URBAN PLAN OF THE CITY CENTER OF NOVI PAZAR)

In an attempt to redefine architecture, B. Zevi distances himself from art and the images of bygone eras, focusing on architecture as a stage: "Above all, it is a framework, a stage on which our life unfolds. [5]"

¹ Paraphrased, Danilo Dragović in his text "City, Spectacle, Identity: The Stage and Semantic Variability of the City,"

This stage can be defined as the one that broadcasts intriguing scenes from the „grand performance.[5]“ It is the stage through which we experience the spectacle. After World War II, architects, including protagonists, directors, stage designers, inspectors, and virtuosos of this project, Amir Corovic and Toma Milovanovic, endeavored to create the grand stage. These two architects founded the Institute of Urban Planning in 1963, along with the later-established design bureau "Sandzakprojekt," which became the leading institution for the architectural and urban development of Novi Pazar and its surroundings. This project departed from the previous linear structure and made a sharp break from traditional construction. Work on the project for the city center began in 1965 and lasted until 1968 (see Figure 1).

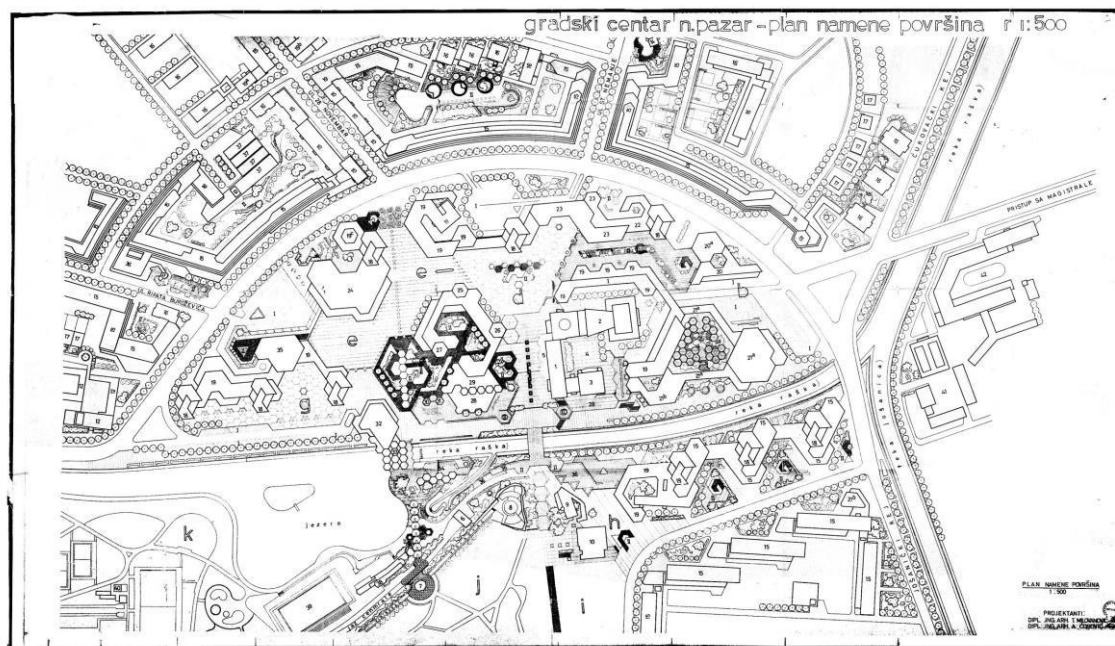


Fig. 1 Area plan of the city center of Novi Pazar, 1968.

Observing this plan, we notice that the design began with the historical core of Novi Pazar's fortress, known as the "old watchtower," specifically one of its three bastions—the northern bastion. This particular bastion served as a kind of center where a six-pointed star was fixed, and a circle was then described, outlining the framework of the newly designed central core of the city, which now serves as our main stage (see Figure 1 and 4).

AVNOJ Street tangentially surrounds the entire pedestrian zone, transforming it into a stage on one side, while on the other side, there are arc-shaped residential blocks, now serving as auditoriums, through their form, facades, and position in relation to the stage. AVNOJ Street itself will be the fourth wall of the theater, separating the audience from the actors. Behind the arc-shaped buildings, multi-family and single-family housing is planned, while in front, the center with all its public institutions is situated, with the arc-shaped buildings enclosing it, preventing its expansion to the north. This street collects and terminates all the radial street directions of the city, those leading toward the main stage (Figures 2 and 4).

"The life of the city has two aspects—one is public and social, where everything unfolds in the open and intertwines. This is the life of streets and squares, large parks and public spaces, and the lively activities and bustle of commercial districts... There is also another aspect of life in the city—private and withdrawn from the world, personal, secluded, life centered on the individual, seeking peace, shelter, and seclusion. [6]“

Expanding upon the earlier quote, when discussing this project, it is impossible to overlook its main criticism, specifically that the arc-shaped buildings undeniably segregate the city into public and private, lifeless and vibrant segments. Designed with

terraces, numerous loggias, and balconies facing the city center, these arc-shaped buildings in shape and form resemble the tiers of an arena, with the front rows predictably reserved for wealthier citizens. In both their form, materialization, and function, these arc-shaped residential buildings imitate the Novi Pazar fortress, more precisely, the bastion. (Figure 2 and 3).



Fig. 2 Arc-shaped residential buildings



Fig. 3 The bastion of Novi Pazar fortress

Consequently, if we regard this highly theatrical project as an expansive stage, we can observe that all the "spotlights" are directed toward the historical core, (Figure 3), which we now perceive as the principal actor on the stage, capable of delivering its monologue while the rest of the city slumbers. Conversely, the arc-shaped buildings rise (Figure 2), as the fourth imposing wall of the stage, with their residents forming the audience who react to events in the squares and scenes by venturing out onto their loggias and balconies.

Deeper scrutiny and analysis of the project as a theatrical scene, quite literally, enable us to perceive the space enclosed by the arc-shaped buildings to the River Raska as a space replete with squares that function as scenes. During major events, spectacles, and happenings, these squares collectively serve as a magnificent and diverse stage for performances.

3. SCENES IN THE PEDESTRIAN ZONE

It is not only in the theater that the audience feels that the actors are larger than life. This is also a characteristic illusion created by the city, as the urban center is, in fact, a theater [7].

The conditions of urban space are diverse, ranging from ambient values to physical characteristics, and extending to social and cultural usage patterns of the city and urban environments. In terms of the physical characteristics of the city, places where artistic expression is most frequently manifested are squares, streets, and parks, where different forms of expression occur depending on the character and ambiance. Today, the design of urban space is approached from an interdisciplinary perspective, aiming to connect various scales of physical structure and disciplines, all with the goal of improving urban life.²

A prominently observable characteristic of the focal "stage" is the interconnectedness of its scenes or squares; differentiation is achieved through various pavements and levels. The transformation of the city into a stage begins at the bus station (Square B), where the visitor automatically becomes a participant in the scene upon arrival and the first step. The bus station itself is a reservoir of highly emotive scenes, making it quite spectacular because it is precisely on such squares that we can witness various life performances, including numerous farewells, as well as reunions and reconciliations (Figure 4).

² Danilović-Hrastić N., Vukotić-Lazar, M., AU34/2012, contemporary art in the public-political space.

This square borders the circular traffic road to the east and connects to the market square (Square A) to the west, where equally emotional and bustling scenes of bargaining, selecting, and touching the textures and colors of fruits and vegetables take place. You can hear the loud vendors, a constant presence in this scene. This vibrant scene is, in fact, an open market resolved in the form of a large atrium among the market buildings. It has an irregular hexagonal shape in a modular network, open to numerous passages through the market buildings or under wider pergolas. Stalls, each with its miniature scenography, are shaped and arranged in a modular network on the market square.

From the market square, there is a sudden transition to the somewhat cooler postal square (Square C), where the main post office, the district court, and various business premises are located. It is connected to the municipal or administrative square (Square D), whose central position designates it as the main gathering place. The actors on this square are young lovers who nervously meet there, clerks running late for work with a pastry in hand, revelers who do not notice the transition from night to morning, musicians, animators, performance artists, and more.

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Apart from the pavement, the postal and municipal squares are also separated vertically by a one-meter difference in height. This difference is overcome by a staircase interspersed with six seating platforms, each of them with a regular hexagonal shape and an area of 1.5 modules (which will be discussed later), functioning as mini chamber scenes for 8-10 participants, mostly high school students, who gather there at precisely the same time every school day to share their impressions (Figure 8).

Continuing our journey, we arrive at the cultural square, which consists of the Culture Centre, an open-air stage, and the Workers' University (the current municipality building). Across from the Culture Centre, there is Bezistan (Square F), where Amir-agin han has been preserved, a legendary scene that has continued to exist since the founding of Novi Pazar. On this square, several buildings have been designed: the museum, library, reading room, exhibition gallery, and clubs for various social organizations, including engineers, technicians, medical professionals, educators, and more.

Bezistan intentionally has the lowest plateau compared to other squares. Through its materialization, position, and content, it was intended to represent the most interesting and aesthetically arranged corner of the overall scene. This plateau has been vividly designed in a modular network. The objects on it offer extremely scenic views through the courtyards' passages of the museum building, towards all parts of the square, facilitated by its central position. Additionally, numerous terraces on the buildings located in Bezistan face south and overlook the river, the watchtower, and the old bazaar with the fortress.

To the west of Bezistan, we encounter the strictly commercial square (Square E), where the Beogradjanka department store (now Maxi) and numerous small retail shops have emerged. Here, we witness almost a television production of organized shopping scenes and casual snacks, with costumes featuring branded suits, dresses, and high heels.

On this somewhat futuristic set, along the left bank of the River Raska, stretches Freedom Square, which widens toward the lake and Vrbak island, Tvrdava city park, and the recreation center – the main green areas in the city center.

The park's greenery in the very center of the city is complemented by the vertical blooming of space; specifically, every window and balcony on the arc-shaped building has planters with soil that bring vitality to the monumentality and uniformity of the building.

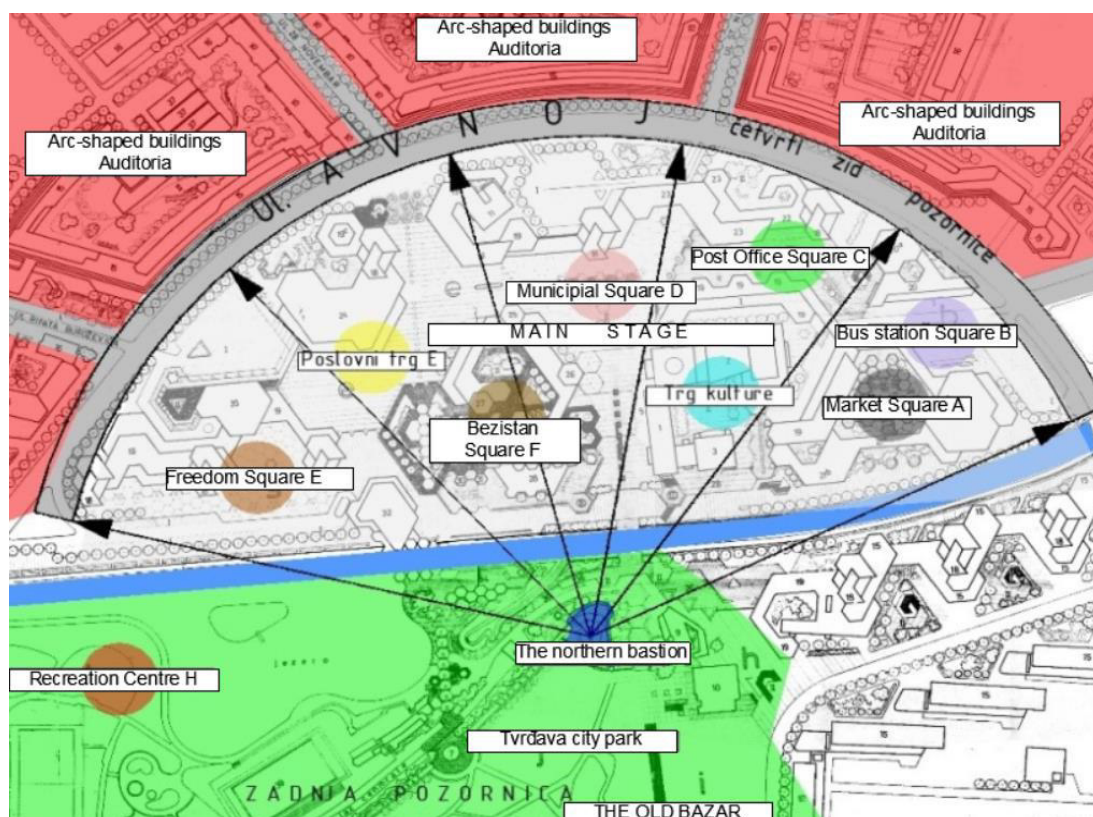


Fig. 4 Schematic Representation of the City/Stage

The most tragic character in this historical drama was the weeping willow tree near the hotel, after which the Hotel Vrbak was named. We can easily regard it as the narrator of all city stories because, by staying in the same place for many years, it accumulated the energy, tradition, and narratives that unfolded in this area. Despite all these and clearly decorative reasons, it was planned to keep the tree - although relocated to the Flower Square (Bezistan). Unfortunately, the new scenographers of this space decided that future performances on the city stage would take place without a narrator, and therefore, without memories.

In addition to all the mentioned scenes that rapidly change, there are many smaller ones that have not been mentioned but can be viewed as intimate stages and mini-stages, such as numerous rest areas in the form of semicircular plazas, fountains, Vrbak hotel bridge, Vrbak hotel terrace, and more.

Going south from River Raska, like a backdrop, lies the old bazaar with a hammam and Novi Pazar fortress, which towers over the newly designed pedestrian realm and, together with the viewpoint, the watchtower, Altun Alem Mosque, and Arap Mosque, create an ambient theater that "utilizes the city as a stage, as a scene that no one will need to construct and reconstruct because it already exists much more adequately than any subsequently designed simulation of reality. [8]"

4. MISE EN SCÈNE AND VISIBILITY OF THE STAGE

The shaping of the identity of the contemporary city is largely determined by the observer's position and how people experience the city. Thus, every city is characterized by multiple identities that define and shape the city's character, culture, and „personality.“ These identities vary depending on whether we perceive the city as a

street, neighborhood, center, or part of a region, or as a collection of positive and negative experiences held by an individual or a community.[2].

For a city to be truly experienced, it is necessary, above all, for the observer to actively participate in urban life. Indeed, movement through urban space determines how we perceive it and the extent to which we evaluate its quality. One of the fundamental elements of urban life is the activity of its residents or the specific "choreography of the city." However, the influence of urban space on its "readers" cannot be easily determined or generalized because it is not about a homogeneous mass but a group of individuals who use urban space, experience it, and then interpret it. These individuals are, like the audience in a theater, simultaneously both individual and a collective entity; "the audience, for whom the actor performs in the theater, although an individual, is by definition a collective phenomenon. [2]"

The architects of this project, while constructing the "stage" and scenography, also directed the *mise-en-scène*, which they referred to as pedestrian promenades (1, 2, 3, 4, 5, and 6). The pedestrian promenades (see Image 6) ensured visibility of the stage from any seat in the theater so that everyone in the audience could see all the events and scenography on this vast stage.

Each promenade had a different pavement compared to the rest of the squares they passed through, and this distinctive pavement guided pedestrians to follow a specific path, making it easier for them to traverse the entire stage. In this movement, pedestrians had the opportunity to experience views of all parts of the stage and beyond it.

The pedestrian, in this context, is a participant on the stage. The journey begins at the bus station (pedestrian promenade 1) located to the east, where they leave their belongings at the station square, and then proceed parallel to the River Raska towards the west, ultimately reaching the commercial square (E), which serves as the endpoint of this promenade, along with the National Bank (Figure 5 and 6).

The Commercial Square with Fortress Park connects to Promenade 2 (Figure 5 and 6) in a straight line to the Watch Tower (where the crosswalk Vidikovac is located, connecting two bastions in the park), passing over the bridge of the Hotel Vrbak, which, with its form and position, represents a unique scene.

On the path of Promenade 1, squares are lined up on both the left and right sides. After the station square on the left side, there is the marketplace square, and on the right, the postal square with the main post office building. Halfway through its route, Promenade 1 intersects with Promenade 3, which goes over the Culture Square and the bridge over River Raska, then continues along 1. May Street towards the old bazaar. It is precisely at the junction of these two promenades that the wide municipal square is situated. Other squares near the municipal square are closely connected to it, so they can serve as its expansion in case of event-related needs.

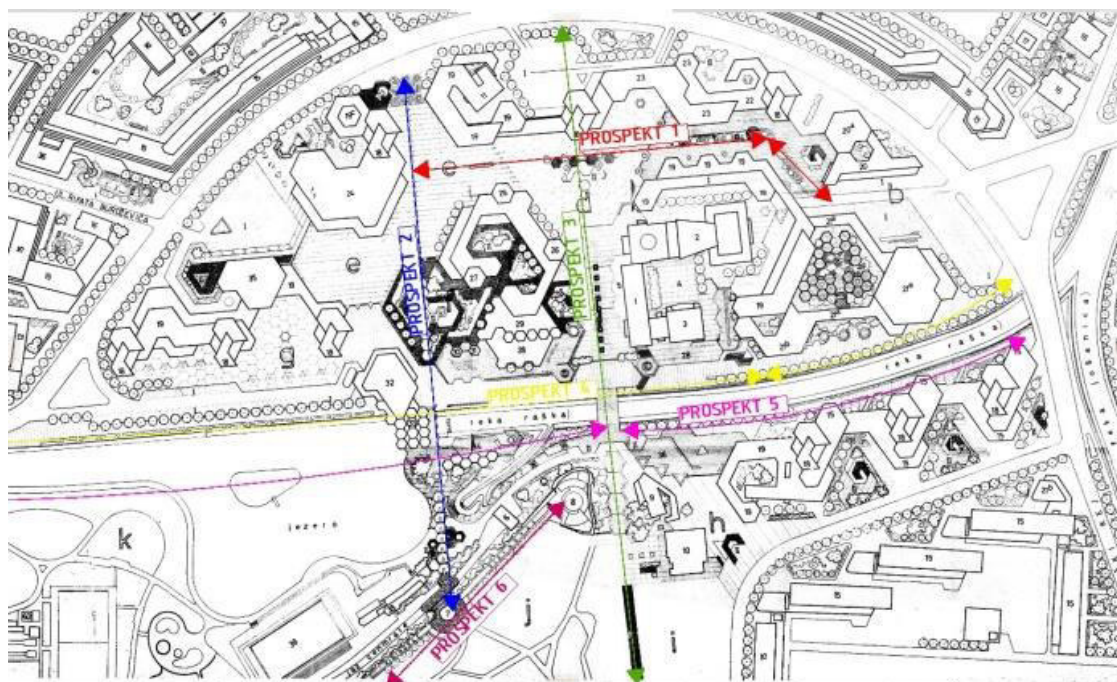


Fig. 5 – Pedestrian Promenades

The last two promenades serve as the primary pedestrian links between the two halves of the city center on both banks of the River Raska. They intersect both banks of the River Raska at the river's height, which is also parallel to the first station promenade (Figure 5 and 6).

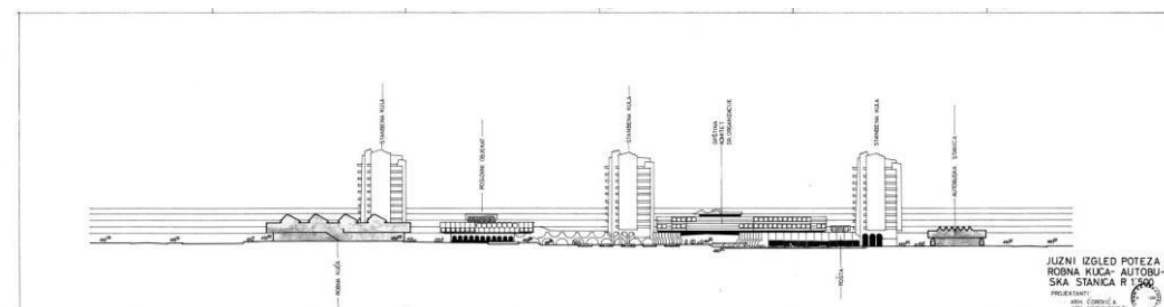


Fig. 6 – Pedestrian Promenade 1 - Section

The left bank of the River Raska connects the station and marketplace squares, the Culture Square, Bezistan, and the Hotel Square on its southern side, extending further to the Parice Quay at the western end of the center.

On the right bank of the River Raska, to the east, it starts from the Josanica River, runs along the residential and commercial block "Pothamam," proceeds along the bastion and the power plant, and enters the recreational center, where it branches out in four directions.

The sixth promenade is the Vidikovac promenade, corresponding to the rear stage or hinterba. This "stage" is the highest point in the center and serves, among other things, as a viewpoint for city observation, presenting another ambivalent space within the city. The entire southern part of the city center, located south of the river (with higher elevation than the northern part), forms the "overstage" of this stage.

It is noticeable that this orthogonal scheme is oriented toward the most important actors of this scene, including the River Raska, the Bastion, Hotel Vrbak, the Watch Tower, as well as 1. May Street, i.e., the old bazaar.

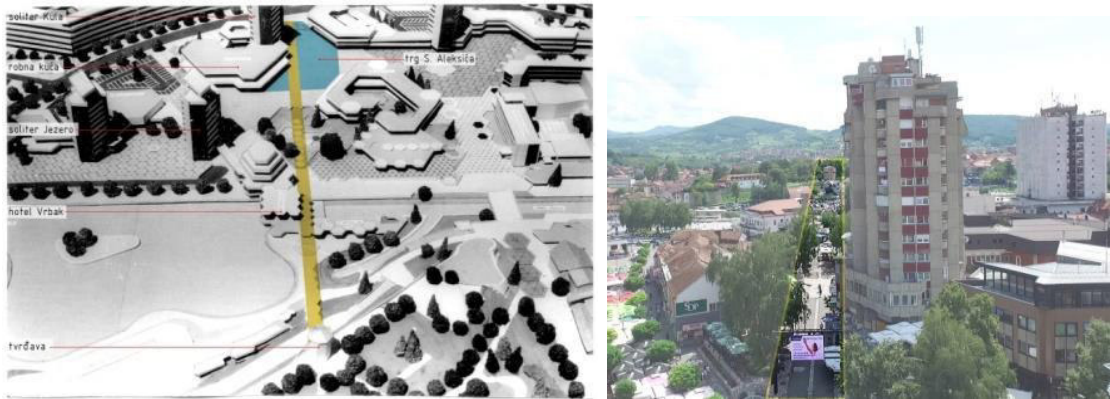


Fig. 7 – Pedestrian Promenade 2

In addition to the imposed movement and cleverly designed vistas, which establish the functional framework of the center, numerous secondary pedestrian pathways aim to immerse participants (i.e., residents) in a labyrinthine layout, guiding them through various passages. This approach places participants in a specific interactive state, where they constantly explore what lies around the next corner.

The plan included rows of red chestnut trees along the streets and squares. Even in the selection of these trees, the importance of vistas for the concept of this urban plan is evident. The crown of the red chestnut tree is of medium size, allowing for unobstructed views within the central complex and beyond. Additionally, rows of deciduous maples, catalpas, silver linden trees, large-leaved linden trees, silver spruces, shaped yews, and junipers were planned [9]. All the greenery had both ecological and decorative functions, outlining and emphasizing the highlighted vistas.



Fig. 8 – Urban furniture as mini chamber scenes on stage

5. POLYGONAL

In the development of the detailed urban plan for Novi Pazar, one of the essential elements of sound urban design is the establishment of clearly defined vistas, as discussed in the previous chapter.

For this reason, a polygonal geometric modular scheme for the city center was created. The primary modular scheme, which provides the dimensions of the center's buildings and plazas, is based on a network with the basic element being an equilateral triangle with a height of 6 meters. The base of the triangle runs from east to west, parallel to River Raska.

You might wonder why this particular module was adopted. The base of the triangle, functioning in the east-west direction, and the height, functioning in the north-south direction, align well with the orthogonal scheme of the main pedestrian promenades in the city center. These promenades include the station - department store, department store - tower in the park, station - Melaj Mosque, municipality - Altun Alem Mosque, as

well as vistas along River Raska promenade and through 1 May Street. The other two sides of this triangle roughly follow several main radial streets and directions in the city: Stevana Nemanje Street, 28. Novembar Street, Josanica Quay, and Cukovac Quay (see Image 1). This choice of module ensures and diversifies vistas [9].

Additionally, this module provides a hexagonal grid with a spacing of 6 meters, which offers rational structural spans for various types of buildings. In this grid, a regular hexagon, whose side is equal to the side of the equilateral triangle (6.928 meters), with an area of 20.78 square meters [9], appears as a secondary module. This creates a hexagonal grid for the center, expanding the possibilities for shaping the dimensions of buildings and plazas.

The dimensions obtained in this way harmoniously interact with the dimensions of the city walls and the Watch Tower, creating a delicate continuity between the old and the new. All volumes of buildings and plazas are given in a combination of triangular and hexagonal schemes, resulting in lively, scenic, interesting, and sculptural forms of dimensions. This module was also applied to the facades of some buildings (e.g., the business premises of Novi Pazar Branch of Belgrade United Bank, 1970) designed by this duo (Figure 9).



Fig. 9 The business premises of Novi Pazar Branch of Belgrade United Bank, 1970

Not only was it later used on facades, but this entertaining module was also employed to define the vertical playfulness of plazas and the buildings on them.

Besides the leveling differences as a secondary plastic element, these famous plazas also differ in terms of third-order spatial plasticity, or surface treatments.

For example, market and pedestrian areas were adorned with noble materials according to the importance of the square [9].

In addition to very scenic paving, all squares were designed with urban appliances such as fountains, channels, flowerbeds, pots, and vases, as well as staircases and benches, transforming public space into an open sculpture gallery (Figure 8).

6. PERMANENT PERFORMERS AND MAIN STARS ON THE STAGE

6.1. HOTEL VRBAK

While we perform live on this stage, it is impossible not to notice the main actors, leading roles, and stars of this scene. Besides the mentioned City Wall (Bedem), the unquestionable star is the Hotel Vrbak (Figure 10). With its unusual spatial and architectural structure [10], captivating presence, artistic and sculptural qualities, and attractive location on the main city square, this building has earned its position as the most essential element in constructing the visual and symbolic identity of the contemporary urban core of Novi Pazar.

Milan Popadic, in his text „How to Read a City“ [10], analyzes the architecture of Vrbak and paraphrases Charles Jencks, who posits that in contrast to multivalent architecture, which emphasizes the existence of many levels of meaning and complex

values, there is univalent architecture characterized by a simple accumulation of elements or parts. Popadic suggests that the architecture of Vrbak could be analyzed from both of these perspectives: „Its meanings are so numerous that they are simply very difficult to read or overloaded to illegibility. In a simplified interpretation, Vrbak's visual identity could be structured on several levels: synthetic tradition, which could parallel '1001 Nights' in literature, uncritical hybridity, and camp aesthetics, as an urban pastoral, as Susan Sontag would put it. In this triangle, or triad, of pseudo-tradition, hybridity, and camp, Hotel Vrbak is both a manifestation and materialization of the desire and will for 'otherness.' Certainly, unless it's something else. [10]“

Viewed as camp architecture, Hotel Vrbak suddenly becomes much clearer, more intelligible, and communicative, especially when we consider that camp is a form of historicism seen theatrically. The oscillation between the magnificent and the comical, broad gestures, a challenge to conventionality, arrogance, and other camp tendencies are aspects of camp architecture recognizable in Vrbak. Additionally, it is now possible to find explanations for the most problematic elements, such as the monumental dome of the accommodation part of the building. The camp stance on Vrbak's colonnade is straightforward, while we can speculate that the semantic interpretation might suggest that the hyperboloid shape of the columns (Figure 10) represents ecstatic dervishes, gnawed apples, or spinal columns, among other possibilities [11].

6.2. KULA MOTRILJA: WATCH TOWER

The most scenic sight is the staircase leading to Watch Tower itself, (Figure 10) which gathers all views from the main stage. This staircase starts from Vrbak, at an elevation of 493 meters over an earthen dam, and ascends to the tower at an elevation of 503 meters. A height difference of 10 meters is overcome with about ten step-like platforms of a hexagonal shape. Along this axis, there is a tiered water surface planned, where water flows from the gap into the fountain on Vrbak Island. From there, this water is channeled through ditches or underground pipes to the river on the left bank, starting from Bezistan, and from there, it flows to the other squares towards the municipal square. The tower in the park and the promenade connect two ramparts (which also have a semicircular shape and are often used as summer stages and viewpoints) serving as the highest points, and the canopies have an ambivalent role as an audience and a stage. The pedestrian paths branch off to the left and right from this staircase, with the right side leading to the recreational center and the left side passing by the electric plant to the craft bazaar. From this staircase, the waterfalls of the electric plant can be clearly seen, further enhancing the attractiveness/scenic quality of this pedestrian avenue. Each stepped platform, like other platforms on the squares that overcome level differences, is enriched with flower pots, flowers, and benches for sitting and viewing [11].



Fig. 10 Hotel Vrbak and colonnade of hyperboloid columns

Fig. 11 - Watch Tower

7. SCENE DESTROYERS AND THE ABSURDIST DRAMA

After the construction of the first phase of the Novi Pazar center, this urban plan, in its initial phase, was taken over by other architects whose aspirations leaned towards the theater of the absurd. The new protagonists of this scene, along with the *claque*³ and less-educated prompters, continue to act and encore uninvited.

Unfortunately, to this day, only two-thirds of the mentioned project has been built, and instead of completing the story, entirely new objects (mostly residential) have been introduced that do not communicate in any way with the rest of the plan; on the contrary, they are completely disconnected from it. Without a sense of scenography and the dynamics of the city, these new architects, mostly politically biased, have blocked almost all the views that were carefully planned before. Thus, most of the scenes in the city are now fenced off, and life „performances“ take place under the same veil of secrecy under which such projects are approved and sponsored.

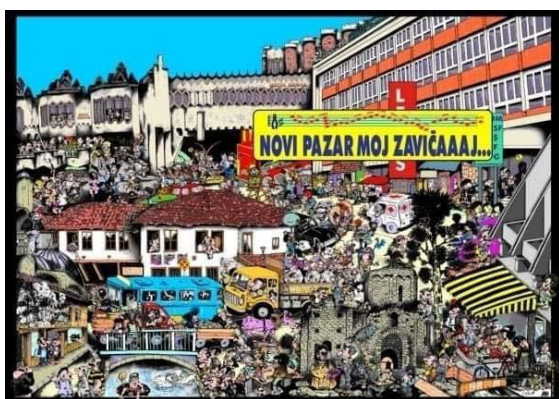


Fig.12 Illustration of N. Pazar, F. Hajdinović



Fig.13 Blemish on the urban fabric

Failing to grasp the depth of Tomo and Amir's idea to create a unique urban plan with a strong sense of the city's heritage using a triangular and hexagonal modular network, the architectural political milieu that followed rejected all aesthetic norms (but not in a good way) and focused purely on the capitalist value of the objects. This means that objects are built using the offset technique in relation to the plot, without considering either the previous modular network or the future one.

In an effort to profit as much as possible from each square meter, various protuberances and gaffes appear on the objects. For the latest example, one only needs to look at the newly emerged blemish on the urban fabric of Novi Pazar (Figure 13), right in front of the Vrbak Hotel. Even to complete amateurs, it is clear how this object is in complete contrast (again, not in a good way) in terms of form, style, and function compared to the object that was once a symbol of the city, but also compared to the entire surrounding area. This cube in front of the hotel partially blocks the passage from the square to the Parice Quay and is built illegally on the plot of the city square. The Vrbak colonnade (Figure 14) has been demolished, and instead of the recessed part of the ground floor of the accommodation part of Vrbak, there are business premises that will never be read as an integral part of Vrbak, on the contrary.

Right across from Vrbak is the largest architectural transformer in the city. The building of the Islamic religious community, formerly Grmija department store and now the Islamic Faculty building, has expanded and continues to expand to the detriment of the main square. Namely, the part of the building that serves as a restaurant extends onto Isa Beg Ishakovic Square with its terrace.

³ Klaka (from French "claque" - slap): Paid support through applause (and sometimes shouts like "bravo" or "encore") in the theater. A paid group of the audience that, on command, supports specific performers or plays in the theater. Claqueurs can also be helpful - they train inexperienced audience members when to applaud without disrupting the performance.



Fig.14 Business premises replaced the Vrbak colonnade, 1999 - 2020

This, by itself, would not be so problematic if, every year, the terrace were not covered, becoming a closed part of the building, while at the same time, a new terrace is formed, occupying a new part of the square. With this move, unimpeded by anything, the Islamic Faculty building is moving deeper into the square, consuming the most public space in the city.

However, when viewed from the perspective of the 1968 urban plan, the most detrimental aspect of this intervention is that the illegally constructed object intersects with Prospect 2 and obstructs the view of the Watch Tower. Moreover, just beneath the tower, residential houses have been erected, further obscuring the tower's visibility. The tower now timidly peeks out behind houses whose yards are often occupied by livestock, resulting in a transformation of the city center into a village (Figure 15).



Fig.15 A view of the Watch Tower today; The Islamic Faculty building

Lejlek and Melaj's Mosque are now entirely concealed behind oversized residential buildings that exceed the legally permitted height. All the meticulously selected pavement has been replaced, and the squares have been surfaced with new concrete pavers, chosen with an emphasis on maximizing material utilization and minimizing waste. On the "subscene," residential buildings with ground-floor commercial spaces now stand, completely obstructing the former stage.

These are just a few examples drawn from the portfolio of the new builders, and there will undoubtedly be many more. Much like an absurd drama, these new builders adhere to principles such as the instability of value, a lack of communication, irrationality, illogicality, and alienation – embodying the absurdity of existence.

Despite persistent efforts to dismantle the stage, numerous scenes continue to unfold in Novi Pazar, and the spectacle persists, unfolding and being experienced. A theatrical performance endures even in the absence of the demolished stage, echoing the sentiments of Tatjana Dacic Dinulovic in the conclusion of her work, "The Contemporary City as a Space of Spectacle: Stage or Scene." She writes, "The city today becomes a performance that cannot be said to ever end. Thus, this permanent

theater, open to the 'audience' as well as to the participants, continuously unfolds throughout the entire day, featuring its own program that is not entirely anarchic, improvised, or entirely devoid of form." (...) [2].

If we follow the idea that „the theater represents every kind of visibility that, performed on stage, is applied and experienced by the viewer, or the audience“ [1], in Novi Pazar, now on narrow squares and streets lined with illegal construction that blocks all views, we can still experience and see scenes of children playing, street fights, young people walking, and old people chatting, who become extras or main actors in an endlessly long performance. Not only that, there are also various performances, festivals, and fairs, but also numerous protests against the authorities and the illegality of certain (not only) urban procedures; we can also experience other spectacles - familiar to this city.

In the example described by Tatjana Dadić Dinulović: if we give each visitor a small bell, with a small effort, we create the sound of seventy thousand bells, creating an incredible spectacle of sound. I recognize the spectacle that occurs in Gazi Isa-beg Ishaković Square⁴, where every year, on the night of Laylat-UI-Qadr⁵, thousands of people perform the night prayer⁶.

As passive observers (if we can even be such in the face of such a spectacle), without religious involvement, we notice that with each synchronized ritual movement, „thousands of small bells“ can be „heard“, enriching the city and reminding its residents of the theatrical potential of this wounded space (Figure 16).



Fig. 16: Nighttime prayers at Isa Beg Ishakovic Square as a spectacle.

8. CONCLUSION

As mentioned in the introduction, the scenic potential of the city and the desire for unrestricted communication are closely intertwined. The need for communication is not one-sided; it does not solely originate from an architect desiring to connect with the audience but also from the viewers or residents seeking to engage in a dialogue with architectural elements individually and with entire urban plans. The project conceived and partially realized by Amir Corovic and Toma Milovanovic aimed at fostering open dialogue and transparency between the stage and the audience. Respecting key elements of the city, such as the ramparts, Watch Tower, and Vrbak Hotel, was just one of the initial ways in which the architects conveyed to the residents that their voices were heard. Open and expansive vistas, along with diverse pavements in the squares, encouraged viewers to engage in discussions about past and future aesthetics while simultaneously inviting them to participate in new dramaturgy.

⁴ It is usually prayed in squares and streets because all the mosques are too small to accommodate such a large number of worshippers on this special night.

⁵ Laylat-UI-Qadr, The night of Power, the holy night, more valuable than a thousand months; Muslims believe that this night should be spent in various forms of worship, such as reading and reciting the Quran, performing the night prayer, seeking forgiveness, and repentance.

⁶ Namaz (Fiker – e- akhira) is the Islamic ritual prayer that involves various bodily movements and recitations, including Quranic recitation. Namaz is prayed five times a day at specific times, while the mentioned nightly voluntary prayer, the „nafila“ namaz (*nafl*, *nafil*, *nawafil*), is performed on the eve of the twenty-seventh night of the month of Ramadan, in the third third of the night.

A simple change of architects reveals that the architectural scene is continually interlinked with society: the curtains have been lowered on many stages within the grand stage. This transformation can be observed on both sociological and behavioral levels in the city: segregation is on the rise, and opacity is cultivated as a virtue.

Nonetheless, this socio-economic shift does not extinguish the architectural theater with its off-set moments and the utilization of space. The stage still endures, albeit in a state of disrepair; it functions as long as people interact within it. The scenery and costumes of the city evolve, and with them, the roles played on the stage.

Just as in any congestion or blockage, in architecture, the closing of vistas, unlawful segregation, and the privatization of public spaces lead to the emergence of new assertive roles, including protests and engaged performances.

The lingering question is whether this severely wounded space can ever rejuvenate and once again provide participants with a comprehensive sensory experience.

REFERENCES

- [1] Danilo Dragović (Autor poglavlja), Radivoje Dinulović, Velimir Savić (Urednici), *Prostor u scenskoj umetnosti; Grad, spektakl, identitet: scenska i značenjska promenljivost grada*, 2016, SCEN – Centar za scenski dizajn, arhitekturu i tehnologiju, OISTAT Centar Srbija, Departaman za arhitekturu i urbanizam, Fakultet tehničkih nauka Novi Sad, 90, ISBN 978-86-7892-879-6
- [2] Tatjana Dadić Dinulović, (2010) "The Contemporary City as a Space of Spectacle: Stage or Scene," Singidunum University, Academy of Fine Arts, Beograd, Serbia no. 126-1, p. 84-93
- [3] Bart R. (1973) according to Eco U., "Culture, Information, Communication," Nolit, Belgrade.0
- [4] William Shakespeare, "As You Like It," Jacques (II, VII), 1938, Belgrade.
- [5] B. Zevi, "Architecture and Space," edited by C. Norberg-Schulz in "Existence Space and Architecture," 1971, page 12.
- [6] Laurens Halprin (1974) : "Cities," Construction Book, Belgrade.
- [7] L.Mumford (1988), *The City in History*, Publisher: Naprijed, Zagreb, Croatia, p.70
- [8] Milena Dragičević - Šešić, "The City as a Space of Spectacle."
<http://www.scen.uns.ac.rs/wp-content/uploads/2017/11/Dragicevic-Sesic-M-grad-kao-prostor-spektakla.pdf>
- [9] T. Milovanović, A. Ćorović, *Detailed Urban Plan of the City Center in Novi Pazar – Program Document*, Institute for Urban Planning - Novi Pazar 1968.
- [10] Milan Popadić, "How to Read the City," 2014, Belgrade.
<https://bif.rs/2014/08/milan-popadic-kako-citati-grad/>
- [11] Milan Popadić (2007), "On the Architecture of the Hotel 'Vrbak' in Novi Pazar," *Novopazarski zbornik no.30*, Publisher: Muesum Ras, Novi Pazar, Serbia ISBN 0351-3017, UDK 930.(08).