

ENVIRONMENTAL CONDITIONS IN FREQUENT PEDESTRIAN STREETS IN CENTRE OF NOVI SAD

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Summary: *Central city zones are the busiest gathering places with many attractive contents and ambient units, which are at the service of increasing the gravitational force of the area. Environmental conditions are very important criterion for quality evaluation of the public space intended for gathering large numbers of people, hence insolation, ventilation, presence of vegetation, presence/absence of traffic can contribute to the experience of pleasure of being in open space. Pedestrian streets in the centre of Novi Sad are networked movement directions that connect objects of culture, administration, education, religion, and numerous squares, plateaus, parks and other urban forms of the city, which is why it is very important that the environmental conditions provide healthy and quality stay on each of them. In this paperwork different ecological conditions in four streets in the city of Novi Sad: Zmaj Jovina, Dunavska, Street Modena and Njegoševa Street, will be analyzed. Valorization will be conducted on the basis of characteristic influence factors such as: spatial orientation, the cross-section of the street that affects the sunlight and ventilation, the amount of vegetation types and its schedules. The results of this research can point out similarities and specificities of representative streets.*

Keywords: *environmental conditions, pedestrian street, Novi Sad*

1. INTRODUCTION

Originated as a series of factors, ideas and activities that human used to conquer the nature and adapt it to their needs, "the city is a sort of society's imprint in space." [1] The morphological structure and complex spatial levels have been developing for centuries as a result of the maturing of society, changes in needs and lifestyles, increase in economic, political and cultural aspirations of the community which builds a space.

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Henri Lefebvre, French philosopher and sociologist, observed the city as a whole, and defined a man's right to a city not only as "the right to visit or return to ancient cities," but rather as "the right to urban life - transformed and renewed." [2] What one sees during the visit is only a changed image created in the moment, without much background knowledge of all historical layers that have created the environment as currently perceived and experienced. To be a part of urban life, to become an initiator and a protagonist of transformation and to mature along with the city, it is the value of urban genesis and the connection between a person and a settlement.

Over three hundred years old, Novi Sad is a "relatively densely populated and built settlement, which has a sense of continuity, in which there is a possibility of choice and which has its own identity." [3] Historically significant for the region, the city of culture with great potential, Novi Sad has a sociological, economic, trade and ambiental centre of the settlement, which also represents the oldest part of the city. In the collective consciousness of the citizens, the downtown area is the most representative entity, most frequently stayed in, which offers monumental buildings, a cross-linked system of landmarks and focal points that represent the primary identity of the city as a whole.

2. AMBIENTAL SIGNIFICANCE OF THE PEDESTRIAN ZONE IN THE CITY CENTRE OF NOVI SAD

"To all the citizens of Novi Sad, the centre was a single and unique term, that was primarily associated with its institutional and functional contents" [1] and have in time become the sole place that brings together the largest number of visitors, tourists and inhabitant who take advantage of the pedestrian zone and ambiental values of the oldest streets and squares which are most numerous in this part of the town. The centre of the settlement fosters values through a distinctive architecture that preserves the spirit of time, where each individual place represents a unique scene in the urban milieu and buildings pose as a cultural scenery of everyday life. Navigating the streets of the city centre, passers-by can notice that the "role of the object within the street can be defined as static," and it is scenically designed as the backdrop and the framework of public life, while "the path, as a place and outline of movement, forms its dynamic process." [4]

Every settlement has a geometric, sociological, religious, cultural, educational, economic, political centre, but the drawing power of the historic centre is immeasurable when one considers the genius loci and the number of visitors of various social classes, interests and generational needs. In one part completely, and in the wider environment partially closed to vehicular traffic, the centre of Novi Sad has been, for years, defying the great transformations that would disrupt its current identity. Town politics has always been equally focused on preserving and gradation of the ambience of the area, hence the reduction of vehicular traffic, the introduction of unidirectional movement with limited speed and the complete closure of certain routes for this type of transport, proved to be a correct development policy fostered by all modern environments. A reflection of the right decision to adapt the city centre to pedestrians, is visible during the whole year in constant visits to a large number of trading, hospitality, service and cultural facilities that are located on the ground floors of buildings, by which "the first

rule of pedestrian streets/areas: pedestrians must have a motive to be right here" [1] is respected. A pleasant atmosphere, active events and rich social life are necessary to preserve the sociological picture of the city at a high level. When it comes to Novi Sad, the primary association to a large number of people, various events, concerts, workshops are Zmaj Jovina and Dunavska streets as well as the Liberty Square. These are areas that, at the same time, represent places every tourist will visit, areas each citizen of Novi Sad will be proud of and foci that best represent the historical authenticity of the city.

A cross-linked system of pedestrian streets of different lengths, cross-sections, typology and character of buildings that form the physical framework, is typical for the central core of Novi Sad. These are interesting places that possess and nurture the tradition and culture of past periods, and also have a great ambiental value and a spirit that is difficult to recognize in the main pedestrian streets of other settlements in Vojvodina, even if they originate from the same period. "The names of streets, odonyms, simultaneously represent the landmarks in the urban area and the carriers of symbols that may largely participate in creating the identity of the city" [5] which is why the centre is an unambiguously determined unit where Zmaj Jovina, Dunavska, Pašićeva, Miletićeva, Njegoševa Street, Street Modena, Ilije Ognjanovića, Kralja Aleksandra and other streets are located. Each of these routes represents a unique axis that connects major places and buildings, monuments and attractions, connects people and events, cherishes the legacy and keeps it from falling into oblivion.

3. ENVIRONMENTAL CONDITIONS IN THE MOST FREQUENT STREETS OF THE CITY CENTRE

A precondition for a person to visit a certain place is primarily the content that will attract the visitor, as was previously mentioned, but there is also the important issue of a comfort, of a healthy and pleasant stay in the open space, which is greatly conditioned by environmental factors. The climate comfort proved to be very important when choosing a space in which people like to spend time, because the user's needs are initially associated with a pleasant feeling and comfort that the space offers. In order to check the existing environmental conditions in representative streets, their cross-sections, orientation, the impact of wind and sunlight, the existence, types and spatial distribution of vegetation were viewed. In the following analysis, only pedestrian parts of Dunavska, Njegoševa Street and Street Modena will be considered, while parts with vehicular traffic will be exempted since they would require the research of different influencing factors.

Zmaj Jovina street "with its configuration and character, is one of the paradigmatic streets of the Vojvodina region, as it harmoniously synthesized social and environmental layers in a milieu of a unique spirit, atmosphere and urban energy." [4] The pedestrian route that connects the main Liberty Square on one side, and Vladičin court on the other, is about 250 m long, with a cross-section that varies from 40 m in the widest, to 20 m in the narrowest part. Oriented in the northeast-southwest direction, the street is in the morning partly sunny, partly shaded which leaves passers-by with a choice to enjoy the shade formed by the buildings usually GF + 1 storeys high, or to stay in the pleasant sun

that shines on the odd side of the street. The influence of the dominant winds in the area of Novi Sad, southeast and northwest, is lessened by the favorable orientation the street's direction has, and the spatial arrangement of the objects creates a physical shelter and allows a partial reduction of the impact of strong currents of air. Vegetation in the street is typical for most major axis in Vojvodina, and it consists of a single line of trees on each side at the point where the cross-section expands near Vladičin court. "The central pedestrian artery of the city" [1] in addition to deciduous trees, has smaller green surfaces along the building of the Name of Mary Church and directly in front of Vladičin court. High vegetation visually emphasizes the pedestrian course and directs the gaze toward Vladičin court, and also has a functional significance, because it allows residents and visitors to rest on the benches placed around the trees. Rows of trees also create favorable microclimate conditions, providing natural shade and a better climate comfort. Zmaj Jovina street, as the hierarchical spine of the city centre, is a space where numerous events and various types of gatherings are organized throughout the year, thus setting up fixed environmental barriers would diminish the flexibility of the open space and differentiate the route into smaller segments.

Dunavska street is the second most frequented street and second main pedestrian route in the city centre which has a similar ambiental and visual character, typological organization and period of origin as Zmaj Jovina, but it is different in an environmental sense. A narrower cross-section from 10 to 30 m wide, and the length of the street which is approximately 180 m long, influenced the stronger visual link that exists in the perceptual sense between the beginning and the end of the route. The perceiving of Vladičin court and the monument of Jovan Jovanović Zmaj at the point of intersection of Dunavska with Zmaj Jovina, is possible from the opposite end where the largest and most decorated park in the city is located. Lewis Mumford suggests that "parks and gardens are not a luxury outlet for the wealthy elite - they are essential for everyone assuming cities will become the permanent habitat of man." [6] This is precisely the attitude that the citizens of Novi Sad have towards the Danube Park, and the connection between the street and the green area of the city is adapted to pedestrians. There is no high vegetation in this street because of the narrow cross-section. Pedestrians navigating Dunavska Street do not feel the need for greenery in the visual sense, because of the clear view of the park. At the end of the street, next to the park, a monument to Jaša Tomić (whom the street was formerly named after) is situated, and is incorporated into a small green area that primarily has a decorative function. The orientation of this street in the northwest-southeast direction is extremely unfavorable due to the occurrence of a flash in the morning hours and due to the direct action of the wind. The principle of setting up and hanging decorative greenery (flowers) in pots on candelabras, is noticeable in both Zmaj Jovina and Dunavska Street. In space almost perpendicular to one another, these two streets are integrated in the collective memory of the population.

The pedestrian segment of **Street Modena** is a very wide part of the street with a cross-section of almost constant 35 m. Parallel with Dunavska, and perpendicular to Zmaj Jovina Street, for a long time it represents a route that, except for trade and catering facilities, can hardly offer a reason for a visit for the citizens of Novi Sad. Due to historical courses and the traffic concept that the street was supposed to have, as an axis that flows directly into the main square, Street Modena remained disproportionately wide, which is atypical for the narrow ambiental streets in the centre of Novi Sad. A

further differentiated zone for a planned vehicular traffic and a big green island in the street, are an insurmountable barrier between the opposite sides, facilities and buildings. The effect of the wind in the street is perceptible, and the broad surface further reduces the attractiveness and the reasons for stopping in the windy days. In a visual and ambient sense, characteristic for Street Modena is its existing vegetation, which has primarily decorative character. A rectangular type grassed island, is set linearly along the entire segment of the street. Ornamental flowers in different colors create a pleasant atmosphere in summer days and bring liveliness into this area. Few residents of Novi Sad, as well as tourists, know that special attention may be given to the high and broad tree at the beginning of Street Modena, with a resting area. The oldest tree "Koprivić" is set in a sociologically unsuitable place, because of the frequent traffic intersection and parking in its immediate surroundings, which is why passers-by rarely pause around the tree that offers a pleasant shade. The existing high vegetation is insufficient to prevent the negative impact of the vehicular traffic on the pedestrian part of the street.

As a route that is a spatial continuation of the direction of Street Modena, the pedestrian segment of **Njegoševa Street**, with the same spatial orientation, is even less visited. The ground floors that are partially closed for visitors are one of the most important reasons for scarcer visits to this public space. Moreover, high buildings create shadows in the larger portion of the day, and the influence of wind is direct, sometimes very strong. The microclimate in this zone is generally unfavorable and sometimes entirely different than in areas in its immediate vicinity. This street is most often used as a shortcut, a linear axis that connects the Liberty Square and Trifković Square. The cross section of the street is 8.50 m wide, with a change in the part closer to Trifković Square, where the shifting of the construction line in comparison with the regulatory line and the width of the profile of 17.50 m, created the ability to set high vegetation which is at the same time the only vegetation in this street segment. The importance of individual trees in a short row is not particularly great due to the very frequent vehicular traffic on Trifković Square. The lack of urban furnishing and equipment additionally reduces the value of the segment, so there are no places for the users to stop and rest. What this street is missing is a new character that can be reached via planting fixed or mobile greenery "which not only equalizes the temperature and refreshes the air, but also provides the necessary relaxation for body and mind" [6] and thus becomes an invitation for people to spend more time in the street that has an excellent location, but poor attendance.

4. CONCLUSION

Perceiving the orientation and conditions derived from it (insolation and aeration) and the cross-sections of the selected streets in the centre of Novi Sad, it was determined that there are factors which can reduce the negative environmental impacts caused by the morphological and geographic characteristics of the area. "For urban sociology, a street is one of the most representative examples of a social aggregate" [1] and by a planned policy of spatial reorganization, the magnetic power to attract pedestrians to spend time in it can be much stronger. It was observed that there is no water surface in any form in the city centre, thus an interesting fountain or a drinking fountain could enrich the environment and contribute to the interesting effect that the water produces in the space

in the visual and acoustic sense. Functionally, there is a justification why Zmaj Jovina and Dunavska Streets are, for the most part, free and without fixed vegetation, but setting up mobile flower pots, temporary but attractive canopies and gazebos for sitting, could reanimate the space. Recommendations for Njegoševa Street and Street Modena, in environmental terms, could be more radical. Disconnecting the continuous green area, forming cross paths and setting high vegetation in the seating areas, could attract more visitors, because the opposite sides of the street would be more adequately linked, the impact of wind would be reduced and protection against too strong insolation could be ensured. It was noted that the environmental conditions change depending on the orientation and characteristics of the cross-sections of the streets, their dimensions, height of the buildings and the presence of vegetation. Therefore, the re-greening of Dunavska and Njegoševa Street and setting up canopies in Zmaj Jovina and Street Modena is proposed. Such a concept could become a new tendency of the city, with the aim to attract citizens and tourists to more often stay in these urban areas, and for longer periods of time.

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ЕКОЛОШКИ УСЛОВИ У НАЈФРЕКВЕНТНИЈИМ ПЕШАЧКИМ УЛИЦАМА У ЦЕНТРУ НОВОГ САДА

Резиме: Централне зоне градова представљају најфреквентнија места окупљања са многобројним атрактивним садржајима и амбијенталним целинама, које су у служби повећавања гравитационе силе самог подручја. Еколошки услови веома су битан критеријум приликом вредновања квалитета јавног простора намењеног окупљању великог броја људи, у својству чега инсолација, проветреност, заступљеност зеленила, присуство/одсуство саобраћаја доприносе доживљају и пријатности боравка на отвореном. Пешачке улице у центру Новог Сада представљају умрежене правце кретања који повезују најпосећеније тачке у граду, због чега је веома значајно да еколошки услови пруже здрав и квалитетан боравак на сваком од њих. У раду ће бити анализирани различити еколошки услови у четири улице у центру насеља: Змај Јовиној, Дунавској, Улици Модене и Његошевој. Валоризација ће бити спроведена на основу утицајних фактора као што су: просторна оријентација, попречни профил који утиче на осунчаност и проветреност, количина зеленила, врсте и распоред, а добијени резултати могу указати на сличности и специфичности репрезентативних улица.

Кључне речи: еколошки услови, пешачка улица, Нови Сад