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XXIX INTERNATIONAL SEMINAR ON URBAN FORM

Urban Redevelopment and Revitalisation. A Multidisciplinary Perspective

6th June – 11th September 2022, Łódź–Kraków

Edited by

Anna Agata Kantarek – Cracow University of Technology, Poland

Małgorzata Hanzl – Lodz University of Technology, Poland

Tomasz Figlus – Univesrity of Lodz, Poland

Łukasz Musiaka – University of Lodz, Poland





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Scientific Editors:

Anna Agata Kantarek, Małgorzata Hanzl, Łukasz Musiaka, Tomasz Figlus

Linguistic editing: Joanna Pawliczak

Technical editing and typesetting: Aleksandra Gajderowicz

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Mr. Nikola Mitrović

Urban LAB, Department of Urbanism, Faculty of Architecture, University of Belgrade, Republic of Serbia

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Urban Highway Areas: Reconsidering Morphological Elements of the Approach to Urban Studies

Abstract This study aims to characterize and map morphological changes that occurred in urban areas crossed by capital transportation infrastructures such as highways. There are geographic, morphological and classification perspectives for considering these urban areas. Bearing it in mind, this paper tries to define a method between morphological and urban studies approach to these areas. The method is applied in the urban area of the E75 highway in the urban fabric of Belgrade (Serbia). Based on the historic approach, such as the evolutive perspective of the transformation stages, observation of the transportation infrastructure and the surrounding urban space through multi-scale morphological analysis includes modernization of the city from its construction, development period and transition to the actual times. Starting from specific criteria based on individual elements or clusters in the landscape, as a result of analysis, there are specific morphological elements that provide information about the characterization of urban highway and its urban space. Street as one of the primary elements of urban form is transformed. According to the fact that the infrastructure is a problematic formal element in the study of urban form, this paper can contribute to future urban morphological studies by identifying categories of morphological elements to study the relationship between transportation infrastructure and the urban space.

Keywords Urban highway, Nodes/clusters, Territory, Urban morphology, Methodology.

Introduction

The theme of this research – urban highways and the impacts on their construction and transformation throughout the territory – proposes a study about the impact of the transport infrastructure on the territory and the landscape since its construction until the present time. Furthermore, it assumes a systemic interpretation of what is the urban territory and which transformations have been registered throughout a period timeframe, from the implementation of the transport infrastructure, until our present time.

There is considered a multi-scale method of a morphological perspective, on a wide period necessary, as it allows to cover different territories in different periods and to draw parallels between transport infrastructure evolution and urban consolidation. In radical changes in modern tissue, there is a system formed of plots, streets, constructed, and open spaces. These elements are atomized and do not relate to each other – their scale has changed greatly. The transport infrastructure has played a dominant role (Levy 1999). So, is the urban highway transformed as an urban form or it can be transformed? This work aims to contribute to expanding that knowledge while focusing on a method of morphological reading of the territories that are shaped by the proximity to the urban highway.

This research focused on the construction and development of the urban fabric located nearby urban highway domains, here named Urban Highway Areas (Territories). The work was guided by two main questions, namely: i) who were the agents that built the transport infrastructure and the urban spaces, what identity lie behind such huge investment in the socialist period, and additionally, ii) how can the urban highway territories be characterized, while being spaces essentially marked by structuring or segregating morphological, architectural or geographical elements, while considering an analysis of the relationship between formal elements and agents of transformation, as these are spaces produced from trends during the urbanization process of highway activity. To achieve this, a diachronic historical reading was conducted from the whole highway level and gradually approached two points of interchanges as cluster scales. This work will focus on the findings of the results at the urban scale.

Generally, a morphological study on highway areas reveals how often this infrastructure acts as a physical barrier that defines and separates two parts of urban tissue which can be very distinctive from each other. To map these characteristics, it was sought to identify which are the morphological elements mostly identified.

It is started from the hypothesis that urban spaces are segregated from others and are not an exclusive result of the highway presence. The physical space crossed by highways is a segregated space that comes from a single scaled observation that is restricted to the local scale, but on wider scales, it can be said that areas are connected in different meaning ways and ideologies. The heterogeneity of urban fabrics around the highway denotes a clear mark on the landscape. The radical cuts and changes may arise from a complex relationship between technical intricacies and decisions taken before highway construction and socioeconomic processes.

Bearing in mind the mentioned problem, there was a need to create a method that best applies to this type of study. The further exposed method provides a multi-scale analysis that includes the development of area from the 1900s, but also the actual shaping and transformation stages. Methodology tested in the territory of urban highway area in the old part of the urban tissue of Belgrade to map changes, especially in the transition of post-socialist context.

The highway has changed ideology. It is constructed during the socialist period and it had one significance within the urban tissue and, a different one now for today's context. It is interesting to understand how each country's territory was structured in connection to the transport infrastructure and which morphological impacts can be identified. Along the urban highway, there is different urban tissue compared to the rest of the city. So, the study of suburban transport is important in the context of increasing expansion of urban areas and consolidation of suburban development axes.

According to Zwicky, the essence of the morphological method of analysis is to break a problem down into parts which can then be treated independently in determining the range of possible solution states for each component (Balkus, Olsen 1979). So, in this case, the highway broke into two important components that are connections between the urban highway and the city – two nodes: Mostar and Autokomanda interchange.

Theoretical framework

Infrastructure as a formal element

None of the European schools of morphology (English, German, Italian and French) have considered or identified infrastructure as a formal element in the study of urban form. So, there is a need to find approaches to analyze infrastructure as an element of urban form, especially in identifying morphological elements to study the relationship between transport infrastructure and the urban space.

Street as transformed urban form

'The modern city has undergone radical changes in its physical form, not only in its vast territorial expansion but also through internal physical transformation' (Levy 1999:81). In these changes, urban highways created a new kind of diffuse, loose, and discontinuous urban fabric. A shift has occurred from a closed fabric to a peri-urban fabric with imposing megastructures and relationships between buildings that are now only functional. These changes are especially noted nearby transport infrastructure, such as highway interchanges. There is a morphological phenomenon where roads and parking areas occupy a large proportion of land within cities. Ring roads, urban highways, bypasses, detours, interchanges and traffic circles replace avenues, boulevards, streets, crossroads and corners. Also, on the other side, elevated walkways, platforms, and shopping centers become new public squares. Zoning projects which are created one by one along the transportation routes impacted the urban tissue the most (Levy 1999).

There is a need to reconsider intervention and restructuring that space not only on point and plot but the whole zone as a part of the route of the urban highway. The separation of the different modes of transport and reduction of streets for movement only has killed the street as a public space.

Total systems analysis and norms

Planning and policy design is to define the role of the transportation system and its various modes among all other services systems and to specify how transportation is to be integrated with other services to maximize the effectiveness of all services systems in the metropolitan area (Balkus, Olsen 1979:203).

Planning and policy should be designed to articulate the role of transportation in the overall development of the metropolitan area. This articulation should be supported by a design for financing the various modes of transportation and for effective planning and management (Balkus, Olsen 1979:203).

So, there is a need to reconsider the role of urban (metropolitan) highways as a transportation system but also as a territory that could be transformed with changing roles.

Method and materials

The method of analysis explored to specifically address the highway territories is a key element of this work and will be briefly described. The selected methodology is based on a narrative and strategy (Groat 2013). A qualitative historical-interpretative strategy allowed us to create a narrative that deals with the highway's

evolution since its construction. Additionally, a qualitative analysis strategy allowed the creation a multi-scale and empirical approach to the two abovementioned case studies. Since the object of study is the territory and the elements that structured it - the forms and the actions – it is necessary to treat the two nodes of the case study comparatively.

The cartography and textual documentation analysis were based on documents from the journal ‘Arhitektura urbanizam’ (‘Architecture urbanism’) from the socialist period. Mostar and Autokomanda interchanges, as selected nodes of the urban highway as a case study, are shown on the map of Belgrade and its urban tissue – Figure 1.

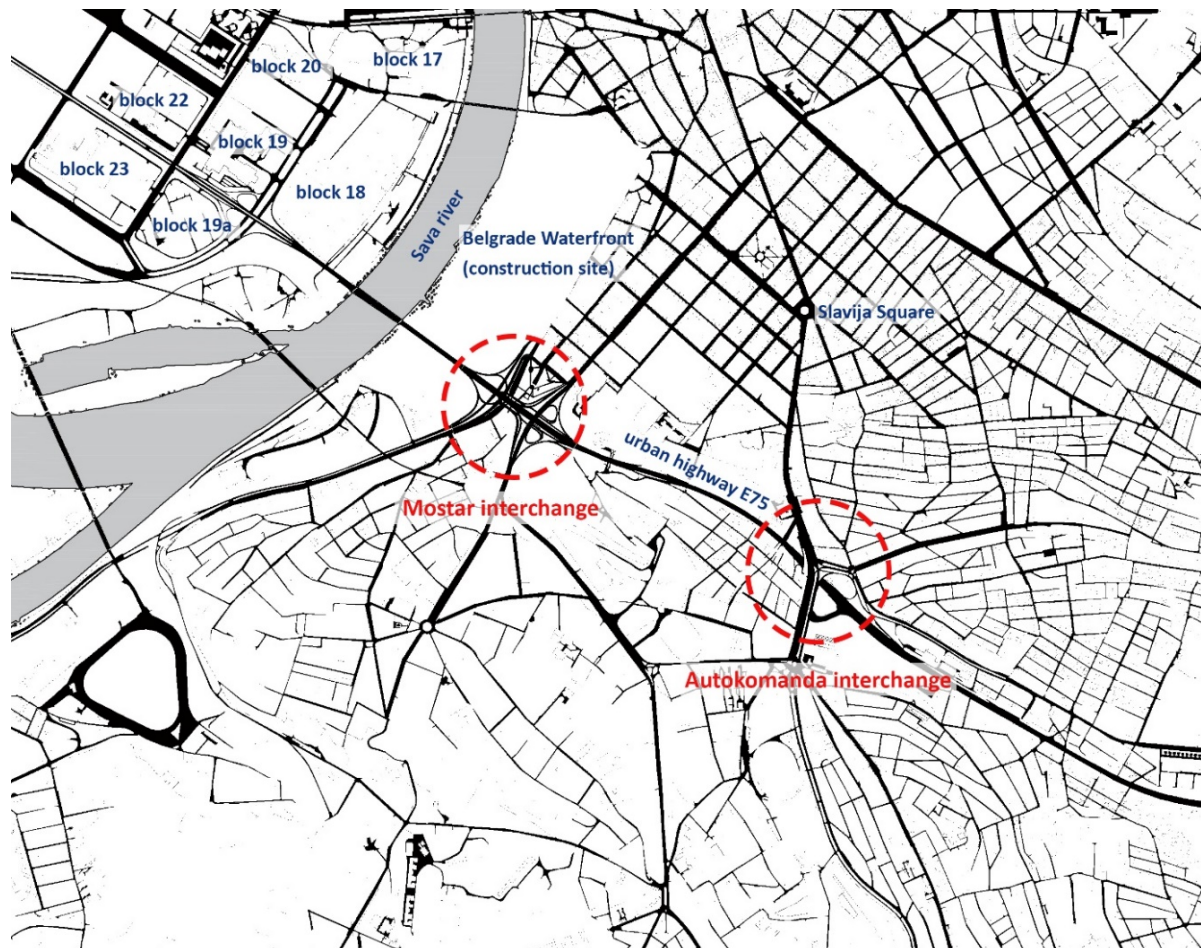


Figure 1. Urban tissue of Belgrade – the urban highway area. Selected two nodes: Mostar and Autokomanda interchanges
Source: Author's own work (September 2022).

Table 1. Table showing morphological, architectural, or geographical elements of two nodes of urban highway area in the analyzed period

Nodes	Morphological	Architectural	Geographical
Mostar Interchange	square (transformed open space), transformed street	system of horizontal and vertical communications with railings (stairs, walls, paths), elevated platform (public square), protective elements	hillside (scarp) pond (water)
Autokomanda Interchange	transformed open space, transformed street	system of horizontal and vertical communications with railings (stairs with walls), elevated walkways	steam (water)

Source: Author's own work.

Results and Discussions

Historical overview of the study area

The study area was a part of two unfinished modernizations of the city. The first modernization was railway construction, and the second one was radical highway construction. In this overview, Mostar and Autokomanda Interchanges will be considered as a part of the entire urban highway, because they should still be considered only as nodes within the wider system of that highway.

The area of the highway, in the old part of the city, from the Mostar to Autokomanda Interchange, in the period from the end of the 19th century until today is followed by complex and parallel historical events – the area of Bara Venecija (Pond/Plash Venice), a zone near today interchange, was filled with earth from Prokop (Trench) and a railway junction was formed, the informal settlement of Jatagan-mala was formed and demolished, the Topovske šupe camp (in World War II) was created, an urban highway was built with a collector leading Mokroluški Potok (stream) into the sewer, two parts of the city were permanently divided, BIP (Belgrade Industry Beer) was abandoned factory which is a symbol of Belgrade's industrialization.

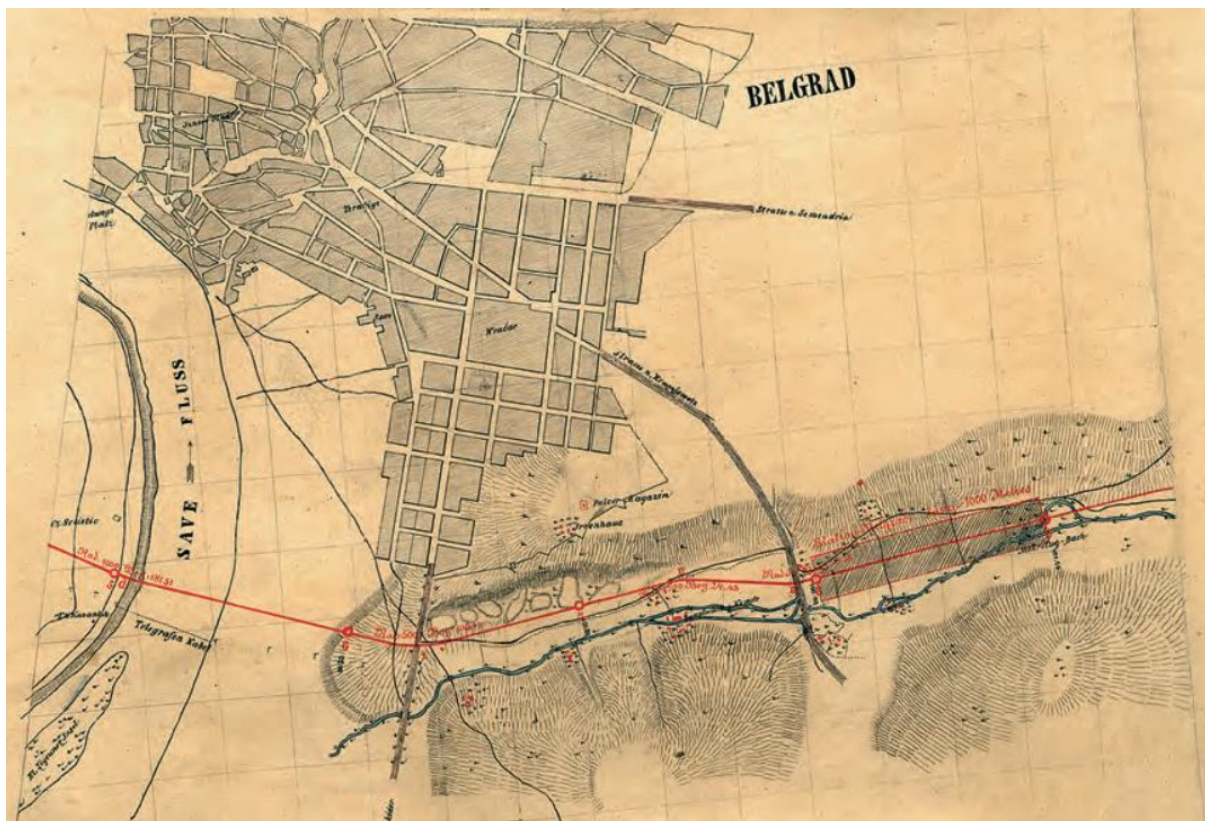


Figure 2. Plan for railway construction on the place of urban highway, 19th century
 Source: Злата Вуксановић-Маџура, 'Бара Венеција и Савамала – железница и град'
 Наслеђе 16 (2015) p. 10.

The study area, at the beginning of the twentieth century, is characterized by natural elements. The route of today's highway was the valley of Mokroluški Potok (stream), which flowed into the Sava, and its slopes dominated on the left and right. In the area of today's Mostar Interchange, Mostar Square was formed, where the tavern of the same name was located. They were named after a small bridge that crossed the Mokroluški Potok (stream) according to Serbian word for bridge – *most*.

At the end of the 19th century, at the place of the highway today, we can see a plan for a railway which is shown on Figure 2. Also, at the place of today's Mostar Interchange, there was a railway junction which is destroyed the 2010s due to the big construction site Belgrade Waterfront. So, when the focus is on the ideology of railway construction before highway construction in the socialist period, it can be said that it was the first modernization connecting Belgrade with the European railway network as the initial motive. Ideologically, until the 1930s there was the reconstruction and unification of the transport network as an imperative for economic integration of the Yugoslav space (First Yugoslavia).

The construction of highways to cross obstacles, such as terrain or water areas, is a very large investment. The urban highway in Belgrade, in the socialist period, was that kind of intervention with significant demolitions.

While it has been constructed, the informal settlement Jatagan-mala is destroyed. It was an informal settlement formed from the refugees of World War I. Ideologically, the role of construction of this infrastructure is exclusive of economic value. Some elements of the architectural program under the highway have never been finished, so this is one more unfinished modernization in Belgrade.

Today, in transport road meaning, the Mostar Interchange represents an important part of the road network in the city, but also in the European infrastructure system as a connection between the E75 and E70 highways. Autokomanda has an important role as a connection between boulevards. With the completion of the bypass around Belgrade, as well as Inner Main Ring Road, these two nodes will no longer play such an important role as a point on the highway, but will only become important for the further development of the city and its mobility.

If we look at neoliberal capitalism that reshapes and strives to radically change these spaces, there are currently large construction sites near the Mostar Interchange: Belgrade Waterfront (new housing and business district of big scales) and Skyline (Business Tower), as well as recently completed reconstruction of the Old Mill (Hotel Radisson). Also, near the Autokomanda Interchange, on the place of *Topovske šupe*, a camp from World War II, there is a plan for a shopping mall which can destroy and delete the history of this place.

Results

These two nodes of urban highway as a system had been analyzed through criteria of morphological, architectural and geographical elements. These elements compared to historical elements in aim to define urban studies approach. The results are shown in Table 1.

Mostar Interchange is morphologically transformed square area, or transformed open space, but at the same time is a part of transformed street in the city as a urban highway.

The domination of architectural elements as a system of horizontal and vertical communications with railings (stairs, walls, paths) is presence, especially elevated platform which can be considered as a new kind of public square. Also, because this interchange has elements under and above the highway, it can be said that some parts have a role of protective elements in this construction. Geographical elements are historically conditioned. The construction of this interchange is related to terrain and natural boundaries, so the important elements are hillside as a scarp and Venice pond (*Bara Venecija*) as water element.

While, Autokomanda Interchange morphologically could be seen as transformed street and open space at the same time, like overlapped areas or roles. In architectural domain, as a system of horizontal and vertical communications with railings (stairs with walls), with a elevated walkways as a new dominating kind of public square, too. Geographical element is connected with historical. Under the urban highway, in zone of this interchange, there is Mokroluški potok (stream). So, this waterway as a river lives its life under the ground.

Discussion

The repetition of history in this area can be seen through two topics – ‘the delete of space’, as well as through ‘the attitude towards the infrastructure space’. ‘The delete of space refers’ to how the modernizations of the city have erased the natural features of this space, and today neoliberal capitalism is trying to ‘swallow’ and erase the infrastructure in the same way. Also, ‘the attitude towards the infrastructure space’ can be seen in the context that at the beginning of the twentieth century the settlement of Jatagan-mala was a mockery of the city, an unsafe space, a neglected space and the space of the urban highway and traffic interchanges, from the transition period to today, in the same way, it is neglected and marginalized about the rest of the city.

It can be concluded that both modernizations are the result of economic value systems and the consequences are the ideology of both interwar and socialist Yugoslavia for connection and unification. Unfinished modernizations enable redefining of space and transformation today.

Due to its cultural and historical value, highway contributes to better understanding of history dialogue between infrastructure and the city, in different languages. This territory is a place of overlapped ideologies. It can be said that there are three ideologies. First one as a natural element – water system that still exists under the highway. Water, which flows, it has own story and history that brings to us today. Second one is socialist ideology of unit and share resources – period of construction of transport infrastructure system. And third one could be new layer of transformation of socialist construction in post-socialist period with neoliberal impact and other forces or it can be seen as a ideology of possible transformation stage in the future.

The position of two analyzed nodes in this system and overlapped ideologies can be defined as a potentials for transformation or crucial clusters for redefining whole the system in the context of changing role in transport system of the city and other connections.

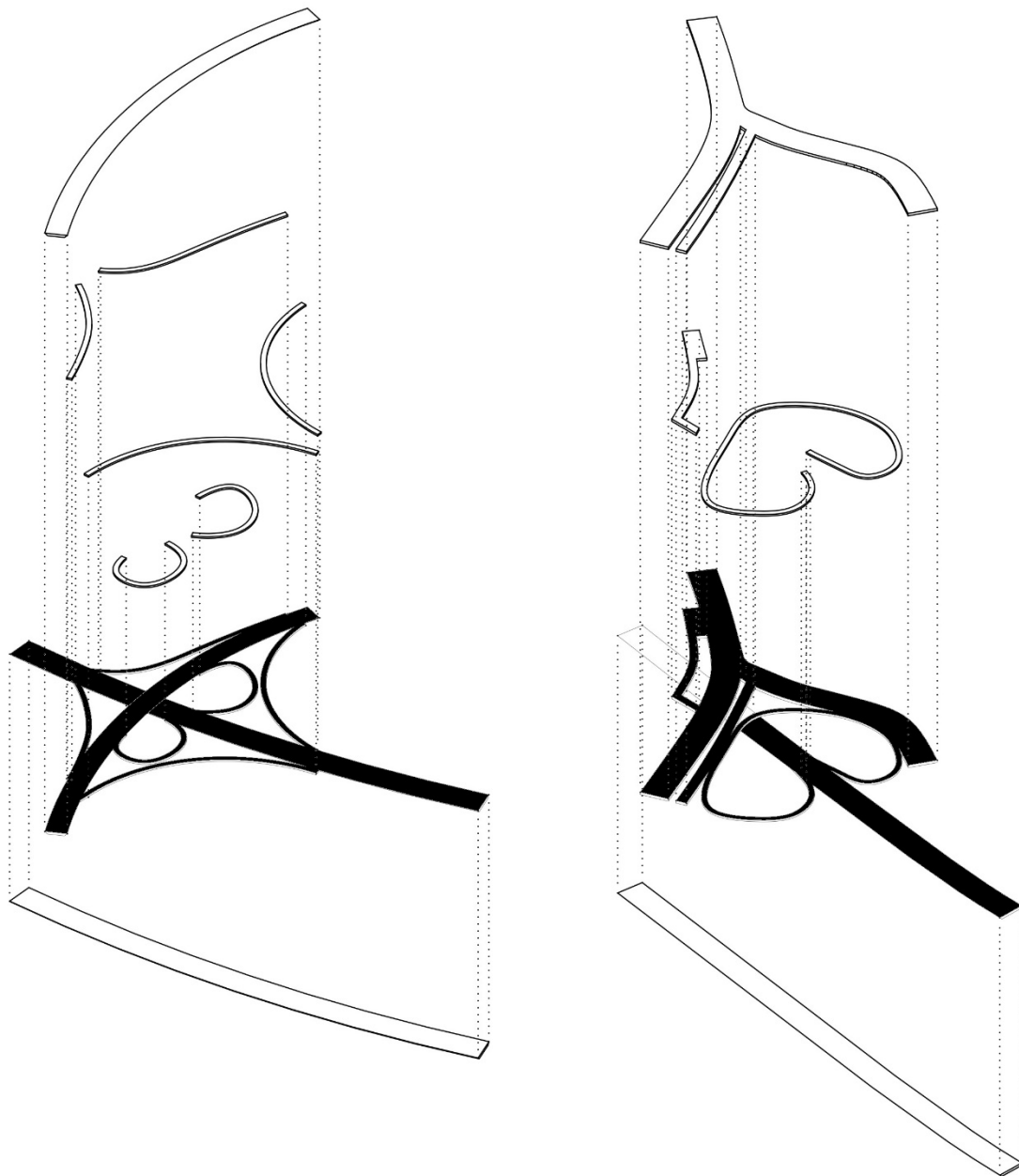


Figure 3. Two nodes: Mostar and Autokomanda interchanges
Source: Author's own work (September 2022).

When we compare the size of these two nodes to other urban tissues in the rest of the city, it can be concluded that these areas can be seen as a new development zones in many ways (Figure 3). Especially, according to rethinking transport infrastructure planning to extend its value over time and new active-mobilities, these areas could be seen as important in that aspects (Givoni, Perl 2020).

The main advantage of historical overview in this work is that it shows us the elements that are recurring and that have influenced the phenomenon of fragmentation of this space today. While, the main disadvantage of this methodology is the lack of quantitative data with which we can prove and measure the morphological elements that exist in this area according values and ideology. The future strategy needs to be interdisciplinary and to include some important aspects which are erected from this methodology with approach to urban studies.

Conclusions

We can conclude that there is analyzed territory which is indeed transformed urban form as infrastructure, according to historical morphological fragments and layers on one side, and new usages and neoliberal impact on the other side.

A multidimensional view of the space of the infrastructure should help define the collective relationship to the space of the urban highway. The decision must be a compromise between the social, cultural-ideological, economic and environmental requirements of the space. It is necessary to activate city policies in accordance with local needs. New investments can contribute to the public interest, only if it is the policy of the city administration. The goal is to prevent the erasure of history and identity or to use the opportunity to redefine the space of urban highway.

This research can contribute to developing future methodologies in between urban morphology and urban studies in integrated way. We need to reconsider new approaches as a synthesis of different observation and analysis scales. This work contributes to future research of methodology in interdisciplinary way, where it needs to combine architectural, urban and geographic approaches to identify and characterize territory and help its transformation. Also, it provides better understanding of contemporary urban fabrics and developing urban morphology theory.

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