

THE INTERNATIONAL CONFERENCE
SYNERGY OF ARCHITECTURE & CIVIL ENGINEERING
SINARG 2023

PROCEEDINGS

VOLUME 2



International Conference

**Synergy of
Architecture &
Civil Engineering**

Niš (SERBIA) - Science & Technology Park Niš - September 14-15, 2023

**PROCEEDINGS OF THE INTERNATIONAL CONFERENCE
SYNERGY OF ARCHITECTURE & CIVIL ENGINEERING
SINARG 2023**

VOLUME 2

PUBLISHED BY:

FACULTY OF CIVIL ENGINEERING AND ARCHITECTURE, UNIVERSITY OF NIŠ
SERBIAN ACADEMY OF SCIENCES AND ARTS - BRANCH IN NIŠ

FOR PUBLISHERS:

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APPROVED TO BE PRINTED ON 7TH SEPTEMBER 2023. BY THE DECREE OF TEACHING SCIENTIFIC COUNCIL OF THE
FACULTY OF CIVIL ENGINEERING AND ARCHITECTURE, UNIVERSITY OF NIŠ, NO. 8/181

APPROVED TO BE PRINTED ON 4TH SEPTEMBER 2023. BY THE COMMITTEE FOR MANAGING THE WORK OF THE
SERBIAN ACADEMY OF SCIENCES AND ARTS - BRANCH IN NIŠ, NO. 1/23-159

TECHNICAL EDITOR: DUŠAN RANĐELOVIĆ, PHD

COVER DESIGN: LJILJANA JEVREMOVIĆ, PHD

ISBN 978-86-88601-81-8

ISBN 978-86-88601-82-5 (FOR PUBLISHING ISSUE)

PRESS: 100 COPIES

PRINTED BY: GRAFIKA GALEB NIŠ

ORGANIZED BY:

FACULTY OF CIVIL ENGINEERING AND ARCHITECTURE, UNIVERSITY OF NIŠ
SERBIAN ACADEMY OF SCIENCES AND ARTS - BRANCH IN NIŠ
SERBIAN ACADEMY OF SCIENCES AND ARTS - DEPARTMENT OF TECHNICAL SCIENCES

IN PARTNERSHIP WITH

SCIENCE TECHNOLOGY PARK NIŠ



**SCIENCE
TECHNOLOGY
PARK
NIS**

THE ORGANISATION OF THE INTERNATIONAL CONFERENCE
SYNERGY OF ARCHITECTURE AND CIVIL ENGINEERING - SINARG 2023
AND PRINTING OF THE PROCEEDINGS HAS BEEN SUPPORTED BY THE
MINISTRY OF SCIENCE, TECHNOLOGICAL DEVELOPMENT AND INNOVATION,
REPUBLIC OF SERBIA
AND
SERBIAN CHAMBER OF ENGINEERS.



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AFFIRMING THE CONCEPT OF CONTINUITY IN THE MODERNIST HERITAGE THROUGH THE NOTION OF BORDER: CASE STUDY OF THE MEANDER BUILDINGS IN NEW BELGRADE'S BLOCK 23

Vanja Spasenović¹, Bojana Sićović²

Abstract

City planning is shaped by urban, political, social, and other resolutions that are materialized in the spatial plan. As an example of post-war architecture of the 20th century, New Belgrade was developed on modernist principles focused on the essence of dwelling, along with the idea of continuity based on the formation of fluid, liminal spaces and designing "from the inside out". Taking into account that the blocks of New Belgrade are particularly valued in the modern-day as locationally desirable and spatially high-quality living units, the research motive is the observed change in the way that one block entity is considered in today's context against the system of ideas embedded in the object's design concept. In accordance with the aforementioned, the research premise is that the long-term recognition of the overall quality of New Belgrade residential blocks can be reflected in the preservation of human-scale continuity, which therefore also ensures temporal continuity - the sustainability of project over time. The proposed hypothesis will be researched through the analysis of continuity and observed in the form of ideology instilled in the spatial organization, relying on the user as a reference value. The continuity of the observed spatial zones is confined by their liminal condition. Therefore, the border significance is determined through spatially defined phenomena of different nature (physical, immaterial, social). The methods used in this paper are theoretical overview, case study, and graphic analysis of the meander objects and their wider spatial context in New Belgrade's block 23. Graphic analysis, namely mapping of relevant borders, sets the frameworks of spatial zones that participate in the construction of place continuity. Research result is the establishment of a concrete relationship between the concepts of spatial continuity in modernism, illustrated through the phenomenon of the border, which further influences the quality of living in the building after its construction. The research significance lies in a comprehensive understanding of the relationship between theory and practice, that is, in understanding the process of design and life of the chosen study objects, observing their development from the initial idea, through project realization, until its present-day existence.

Key words: *Border condition, Mapping, Space analysis, Urban planning, Identity*

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1. INTRODUCTION

Modernist architecture was based on user-dependent ideology as its basic constitutive motive, according to which we define space and provide answers to the current socio-historical tendencies. This paper primarily discusses the topic of housing as an essential existential need in the post-war period, where the reflection of space is viewed through (a) horizontal plans, (b) the development of typology patterns for the improvement of use values, (c) "inside-out" design principle, (d) connecting spatial units while propagating the continuity of space, and (e) overcoming boundary determinants. The urban development of New Belgrade does not only overcome some of the natural limits in the spatial growth of the city, but it also expands on new conceptual block units that are created in favor of the aforementioned habitological values. In the formulation of the Central Zone made up of nine sections, Block 23 is structurally planned against its corner oppositions and morphologically developed in relation to Block 21 as its predecessor. During the development process, the aim was to weaken the rigid compositional relationships, open up the internal free space, and create smaller units within large object formations. Viewed as a continuous structure and a connecting element at the block level, the meander is fragmented and enriched with boundary spaces that, despite appearing discontinuous, additionally strengthen the relationships within the entire structure. By classifying border conditions and their characteristics, the paper strives to understand the initial design concept of the meander buildings in New Belgrade's Block 23, as well as a theoretical framework in relation to practical building aspects fifty years later. An important point for this analysis is the overall tendency of late modernity for the "blurring of boundaries" as a way to soften rigid standardized determinants and create transition zones made up of overlapping functions and programs [1]. The research hypothesis is that modernism and the "Belgrade school of housing" provided not only the modalities for creating spatial continuity through shaping existing spaces, but also a time-sustainable response to transformative needs. The modern movement is the only true tradition of the present because it implies that historical continuity does not include borrowed motives and ideals, but human values that must be conquered in new ways [2].

The research goal is to affirm the border as a building element of user-driven continuity through simultaneous analysis of the set hypothesis in theory and practice. In the first part of the paper, the theoretical framework of the border phenomenon in architecture is defined, viewed as a basic building element of continuity. The following research segment interprets knowledge from relevant literature and is later verified through a case study in the physical context of the meander building in New Belgrade's Block 23. The technique of graphic analysis used in this research is mapping, due to its ability to present and analyze different elements and conditions in one defined spatial framework. Concluding remarks include a discussion of theoretical and practical results. The result of the theoretical analysis is the formation of unified categorization of boundaries in architectural research, based on knowledge from scientific sources of relevant disciplines, while practical results include the use of mapping as a tool for detecting, illustrating and interpreting recognized boundary elements, and conditions that build continuity.

2. BOUNDARIES AS BINDING ELEMENTS OF CONTINUITY

2.1. The phenomenon of borders in architecture

A man tends to live within closed and limited space [3], which is a reflection of the anthropological search for shelter and security. Boundaries form the division of inside and outside, or rather being within or beyond the boundary frames, which becomes one of the primary architectural procedures and "the primordial act of architecture" according to Wolfgang Zucker [4]. The closing and dividing features of the border are determined by intermissions or openings that reflect continuity and/or discontinuity, a certain direction and rhythm of the architectural structure [5]. On the other hand, Martin Heidegger states that the border is not only a division line that determines boundary presence, but that it is also a place where something else begins its existence [5]. Therefore, borders can also be defined as places where two or more entities can meet. In these circumstances, the border is no longer a separating element or partition, but a spatial field within which the paths of encounter are located and framed. With the daily use of space in these encounter zones, the idea of a border as a solid dividing line is lost [6], and therefore borders become synthesizing elements, important for ensuring continuity within a spatial entity.

2.1.1. Border characteristics and forms of its objectivity

A conflicting interpretation of boundary features can be found in the research of Piero Zanini. Through discussing the meaning of the border as an above all dual phenomenon that "connects through separation" and "unites the unrelated" [3], Zanini highlights several complex forms of appearance, of which only the selected ones are relevant for this research. These are: (a) the boundary as a border [3], which arises with the need to define differences and limitations and has a divisive character, (b) the boundary as a transition zone [3], occurring as an intermediate space of different entities and has a synthetic character, (c) the boundary as a third element [3], which most often arises from the previous category as the border becomes an entity in itself, and (d) a portable boundary [3], which surfaces as temporary, weak and extremely transformable.

Additionally, when analyzing the importance of spatial experience complexity, Schoonderbeek defines four marginal states that are formed when two zones of different spatial, programmatic, functional, ambient, and other specific characteristics come into contact. They are the following: (a) Boundary as differentiation [7], characterized by spatial elements that initiate or maintain segregation, and define wholes as unique and separate entities; (b) Boundary as performance [7] that actively affects its "hindsight", that is, it is perceived as a performative zone within which several boundary conditions can occur; (c) Border as an encounter [7], which implies a border state of exchange within which the touching spatial zones are not mutually exclusive, but they mix, strengthen, highlight, and reduce other border activities; and (d) Simultaneous boundary [7], which implies that the opposite side is not a space of radical difference, but another place that can potentially condition certain similarities and simultaneously incorporates spatial as well as temporal differences and similarities.

By reviewing the theoretical knowledge on the interpretation of borders and border conditions in architectural and urban research, it can be concluded that the border is known as an extremely layered and complex phenomenon. The limited observation of the border through its ability to divide and separate, denies the existence of other boundary conditions that build spatial continuity. It can be concluded that for the evaluation and analysis of boundary conditions in architectural theory and practice, it is necessary to look at the phenomenon of the boundary as a whole, with all its potential modalities and phenomena. After reviewing the literature through the methods of critical analysis, selection, and systematization, we formed a new categorization of border typologies, their characteristics, and significance, based on previously presented scientific sources (Table 1).

Table 1. Border typology, characteristics and significance

Border typology	Border characteristics	Border significance
ESSENTIAL BORDER	stable and material, guides, suffers the least changes and deformations, contributes the most to the visual recognition of the object	enables physical continuity and the development of new boundary forms
COLLECTIVE BORDER	meeting and negotiation zone; creates communication centers and extensions; it networks and enables the establishment of utilitarian connections	enables communication and utilization of continuity
PRODUCTION BORDER	simultaneous, creates new zones, prone to manipulation, a reflection of personal affinities, more apparent in the interior than in the public space (due to personal control)	enables user-driven continuity
PORTABLE BORDER	light, changeable, mobile, weakest and least stable	enables permeability control

The objects of the meandering typology build a wide range of border conditions, and are imposed as suitable spatial components in the reading of previously presented theoretical viewpoints. They are also elements of continuity, clear physical structures that bind context components into a traveling and unified whole. However, they also represent a certain physical discontinuity in their interruptions and changes in the direction of extension, elements that layer the solid structure of the object and build a large number of micro-units within a unique formation. As objects of great length, they not only simultaneously separate or join the physical components of their environment, but they themselves, within the framework of their dimensional determinations, also become a multi-layered boundary element.

2.2. Mapping as a tool for spatial boundary analysis

Despite the fact that spatial analysis is an established practice in architectural research, boundary conditions and their characteristics are rarely research subjects. The multi-layered character of specific border spaces is almost never analyzed and discussed within the contemporary architectural discourse. When

we talk about the experience of space from a human perspective, the perceived environment is bounded by limits that establish it as a whole entity [8]. Heidegger argues that space can only come into being when the location allows it to appear: "space, something that is cleared and free, comes into being within the boundary" [5]. Marc Shoonderbeek points out that, if we consider borders as marginal urban zones in which new conditions develop, it is necessary to provide adequate types of space readings, such as mapping, with the aim of forming alternative models to illustrate spatial, social, and temporal conditions in the analyzed liminal space. The research on the continuity of the human dimension deepens the interrelationships between the physical elements of space and their boundaries through the social component. Taking into account the claim that mapping is considered a tool for "illustrating a social construct in a spatial framework" [9], it can be concluded that it is an adequate instrument for research within the framework of this paper because it allows the different modalities of analysis to be interpreted within a single graphic language. The instrumentalization of mapping in the architectural discourse implies the translation of a place, concept, state, process, or event into a spatial plan. Mapping as a tool for a better understanding of the environment does not interpret space exclusively as a set of elements, but as a unique system of visual language with a clear spatial logic. Visual representations have the potential to convey a great deal of information to the researcher that often exceeds the scope of verbal data exchange. The use of maps in architectural research enables the equal evaluation of all the relevant aspects of spatial analysis, such as place, program, volumetry, or materiality [9].

The process of boundary mapping illustrates the relationship between the reality of an architectural object and the complex system of messages, ideas, and influences embedded during the analytical phase of the design process. The mentioned relationship between the object and concept (in this case, the meander and the idea of modernism in residential architecture) will be expressed through defining the border as an architectural element that carries social, political, and cultural ideologies. The phenomenon of the border, interpreted through its previously recognized complex character, requires that in addition to the physical presence, specific atmospheric qualities of liminal zones are also carefully researched. Schoonderbeek recognizes the atmospheric qualities of borders in the objective arrangement of spatial entities – objects and light, temperature and material properties [7]. The previously defined potential of a map as a tool is particularly important for the graphic representation of borders because it includes the complex character and liminal spatial ambiguity of encounter, separation, performance, or simultaneity.

3. CASE STUDY OF THE MEANDER IN BLOCK 23

3.1. Central zone – Block 23 – meander buildings – apartment

After the post-war depression, there was a need to increase the capacity of collective housing for about 40,000 inhabitants, which is why the construction of the third, most extensive phase in the development of the new Yugoslav capital on the left bank of the Sava was started [10][11]. As a result of a long-term planning process, aligned with the ideology of creating a modern and functional

city, the center of New Belgrade was conceived as a solid and stable core consisting of six residential blocks, grouped around three central blocks of city-wide public use [12]. In the plans for the Central Zone from the 1960s, the blocks were projected in relation to each other, like symmetrical fragments of a wider urban whole [12]. Thus, Block 23 is coordinated with the compositional features of other corner blocks of the Central Zone (21, 28, 30), morphologically defined by towers, as corner benchmarks, objects, as reinforcing elements placed along the peripheral boulevards, and meanders as a connecting element at the block level. However, the plan practically only served as a "schematic indication of compositional relationships and the grouping of high and low buildings" [13], and was never completely implemented. Socio-historical changes were the main focus in block realization, but the concept did not neglect experientially observed opportunities for improvement by listening to technological innovations, market needs, and qualitative values of space.

The meanders as the lowest building elements with prominent spatial continuity in terms of their length had the task of connecting the tall peripheral objects into a unique block formation [13]. Positioned inside the block complex, imbued with greenery and pedestrian communications, it was supposed to create new micro-ambiances in the form of internal courtyards and to enhance the dynamics of otherwise monotonous space. During the building of Block 23 (1969–76), the meander retained its morphological task, but its initial volume changed due to the experiences with the previously built block of the Central Zone – Block 21. Its unique structure, which is almost one kilometer long and split into two segments, results in two objects compositionally defined as a mirror reflection with the central break. The increase in tract depth and definition of atriums as internal gaps are accompanied by the fragmentation of the volume into smaller horseshoe-shaped structures, as well as overhangs in the form of bay windows, "caesuras" (stair overhangs), balconies-loggias, etc. [11]. As a result of all the abovementioned, the meanders are constituted by two lamellae joined in the typology of two tracts. The breakdown of the meander facilities was largely influenced by the need to increase the square footage of the apartments, while fostering the continuity and flexibility of space, as well as the possibility of expansion in accordance with the variation in the number of household members. The transformation of the building concept caused by the reflection on the validity of the apartment as a basic building element, reflects the principle of designing "from the inside out", but also the evolutionary implementation of the "Belgrade apartment concept" during the late modern era, which nurtured the abovementioned qualities. This primarily referred to the flexibility of the apartment, which would ensure time continuity in terms of purposeful duration and adaptation to new users and the demands of time [14].

3.2. Mapping of the collected data

The cartographic process itself consists of four steps: (1) data collection, (2) cartographic abstraction, (3) map reading and analysis, and (4) map interpretation [15]. In this specific case study, the graphic apparatus of mapping included all the mentioned cartographic phases. Data collection aimed at understanding space volumetrics and the information previously obtained from literature, while graphic plans and the resulting photo documentation were first translated into axonometric

diagrams (Fig. 1). In the second phase, the narrative diagrammatic input was reduced to abstract drawings with accompanying legends that were further analyzed and interpreted at several different scales, from the level of one residential unit as a building element (Fig. 2) to the level of a block (Fig. 3). The drawings show the directions of border blurring, their overlapping, synthetic effect, and they also illustrate that more stable borders support those that have unstable character, at least in a physical sense.

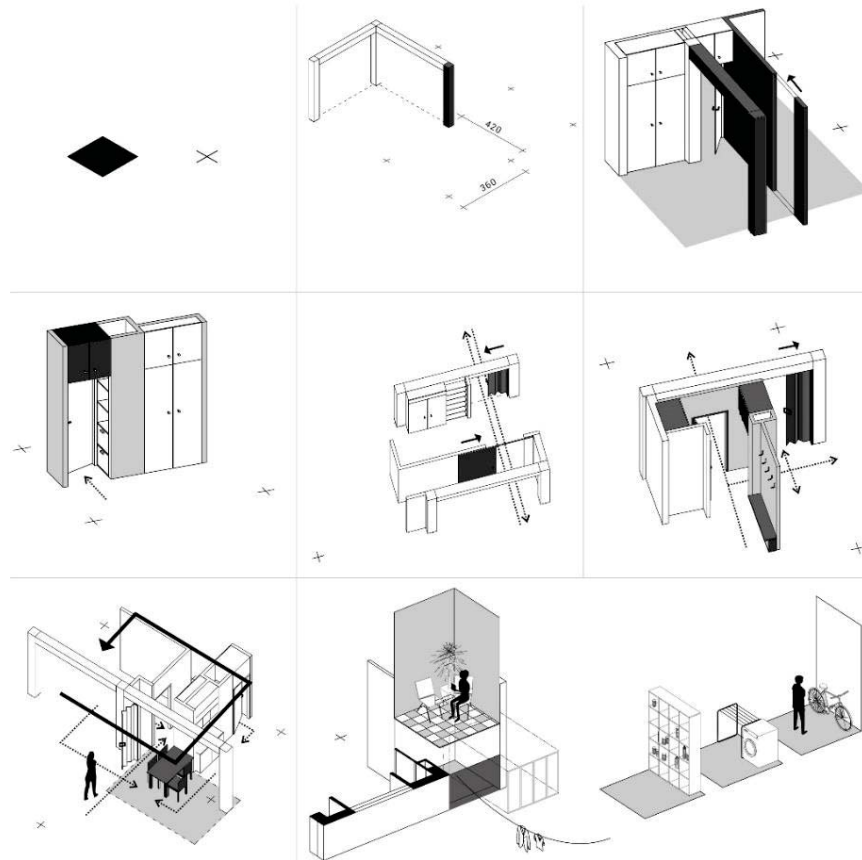


Figure 1. Diagram of data collection

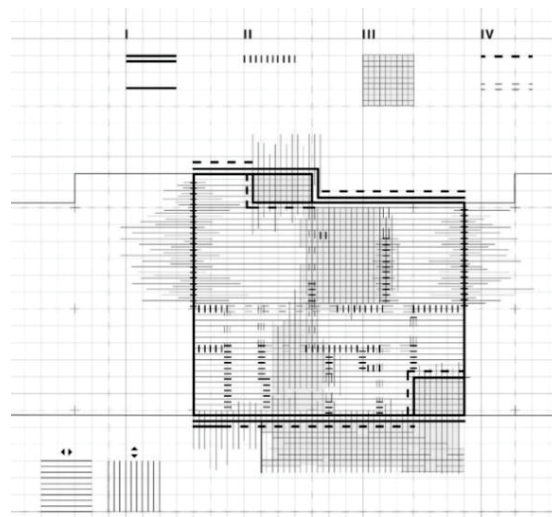


Figure 2. Apartment level mapping

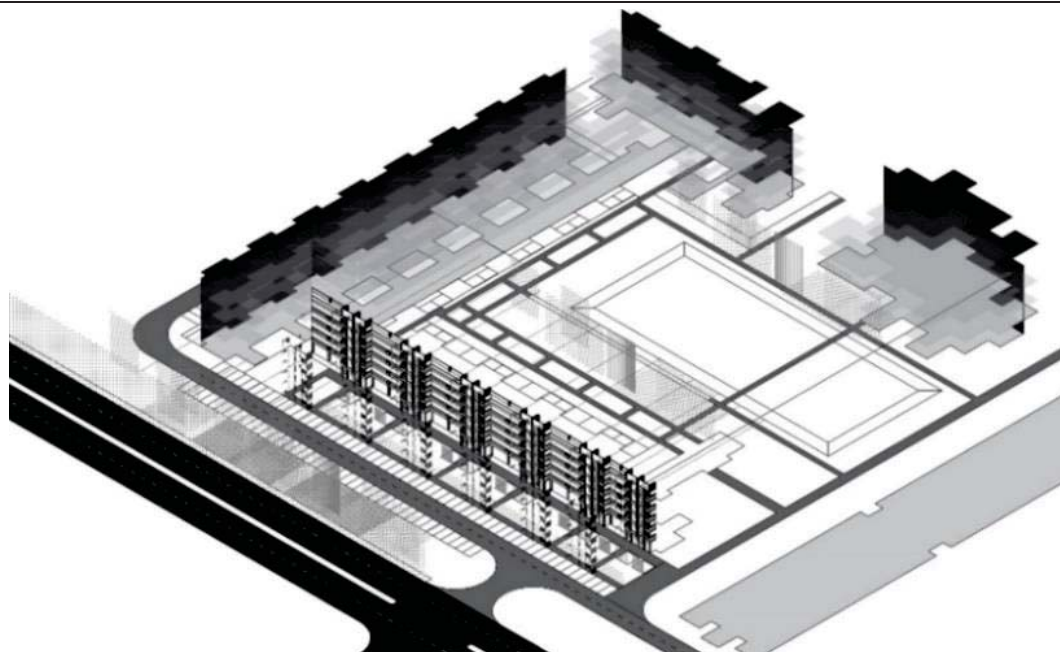


Figure 3. Block level mapping

4. RESULTS OF GRAPHIC ANALYSIS

4.1. Elements of the essential border

External facade wall: The street facade stands out as a perceptually important essential boundary. Its dominant participation in the perception and recognition of the spatial unit from the street, as well as the contact with residential units from its opposite side, causes the fixed border element to dissipate and stratify due to its importance, forming within itself more border phenomena of another categorization (e.g. windows, loggias, flower pots, air conditioning units – striving for personalization of the public area); in this way, the facade as a border is additionally layered.

Street: The main road that connects block 23 with the rest of New Belgrade, the city center, as well as the highway, is the street Antifašističke borbe. During the 1960s, Kevin Lynch emphasized the importance of perceiving paths (streets) as an important element of building place identity. He claimed that the specific character of the street facade gives a clear identity to the street itself, and, additionally, that paths leading to recognizable landscapes and important strategic points become crucial for defining place identity [16].

The kindergarten: The kindergarten within the block does not form a pronounced physical boundary like the previously mentioned examples, but in mutual relation with the meander, it builds an essential boundary, which is recognized in the perceptual continuity achieved together with the meander object. Without the kindergarten, the meander would not be compositionally complete; the existence of an additional free-standing building at the top of the imaginary square formed together with the meander enables the definition of a perceptible essential boundary, which further produces new boundary conditions in the zone it surrounds.

4.2. Elements of the collective border

Secondary streets and pedestrian communications: The existence of clearly fixed boundaries allows additional marginal states to appear between them. Two dominant borders – the building facade and the street – form a series of access to vehicular and pedestrian communications, in order to enable the movement of space users. The meeting zones between access roads, designed parking areas, green barriers, and pedestrian access to the meander illustrate the collective character of these border areas. *Internal building walls (partition wall between two apartments):* By lining up the apartments with the support of a modular grid and standardized measures, the mentioned border element can horizontally and vertically translate, while maintaining the utility values of both apartments. Mate Baylon wrote that the partition walls offer the possibility of increasing the area of one apartment by addition of the room originally belonging to the neighboring unit, caused by the need to increase the standard of the unit itself, or by increasing the number of household members [17]. In the case of the analyzed building, two apartments also form a unique segment defined as a field between two vertical hubs (cores), which further affirms the collective value of this boundary typology. Translation of the mentioned border is partially possible with another neighboring apartment, so that two apartments sharing a common core can be seen as one grouping. *Interior apartment walls (partition walls within a residential unit):* As there was an effort to create open flowing spaces, the apartment interior is characterized by a fluid division, which is one of the essential changes with the advances of modernity [1]. Hollow walls enable the creation of circular connections, which achieves not only the continuity of communications as a feature of the collective boundary, but also the continuity of use while improving the flexibility of the entire apartment. *Vertical and horizontal communication of the object (core):* Like Heidegger's "bridge", this boundary element does not separate, but gathers and unites its environment into a single whole [5]. The core, as a carrier of vertical and horizontal communications, networks spatial elements into a unique structure of the object; with a constant circulation of users, it also becomes a meeting place.

4.3. Elements of the production border

Commercial zone in meander ground floor: The existence of a large number of communication boundary conditions on the ground floor of the building (access roads, pedestrian paths, and their intertwining) creates the need for additional function in public areas of residence and retention. The need for a new boundary condition in this case arises from a large number of encounters that collectively create new boundary typology. *Terrain dynamics:* The zone of the inner yard is bounded by the previously mentioned essential boundary, which is formed by the meander and the kindergarten. This perceptual essential border creates new liminal states, which are also characterized through perceptual potential. In this case, the dynamic is produced due to the monotony of the existing terrain, which allows for the introduction of additional dynamics in order to adequately refine the perceptual impression and prevent perceptual fatigue. *Inner courtyard – atrium:* The atrium can be read in two ways because it is at the same time an open space inside the building and an integral part of the two-track building

typology. Therefore, the atrium leads to blurring of the boundaries both in the inside-outside relationship and in terms of use, networking the private and semi-private components. As a production boundary, it creates new socio-spatial qualities among the tenants of one building segment with the shared use of the premises adapted to personal and collective needs (such as storage areas, laundry room, etc.). *Loggia (balcony-loggia)*: As one of the constitutive motifs of the "Belgrade apartment", the loggia reconsiders the boundary between inside and outside. It enables moving of the apartment border, the simultaneous presence of closed and open space (with the application of an adequate portable border) and the production of new spatial phenomena. *Dining room on the extended communication*: This border typology creates a unique overlapping area by combining the economic, living, and communication zones. Immediate space does not only erase the border frames of its permanence in physical and functional terms, since it has no clear spatial determinants and purpose, but it also imposes itself as a boundary element by producing simultaneous flows in the apartment. In fact, the dining room with extended communication allows uninterrupted use of the living room intended for younger users, while it itself becomes a secondary center for the gathering of older members of the household (regulates the generational division). *Transient living room*: Manipulates the border between the quiet and noisy part of the apartment. It can also be said that it regulates the "wrong programming of the living room space", where the sleeping bed was planned [17]. Formed on the overlap of the day and night zones, this half-room or room per square meter becomes a multi-purpose room that can reflect the personal affinities and needs of the user himself, even in the modern-day. In terms of use, the transient living room can be an additional bedroom, an extension of the living room, a study, a wardrobe in the adjacent room, and similar.

4.4. Portable border elements

Doors and windows: In his book *Human Space*, Otto Friedrich Bollnow points out the statements of Georg Simmel "that doors set a limit for themselves, but with freedom... in such way that they can remove that limit again" [18]. With technological development and the application of Le Corbusier's principles, along with their semi-permeable character, openings become an important implicative motif and a reflection of the weakening of boundaries in modernist architecture [19]. They allow places to be elongated outwards, but also for the exterior to penetrate over the interior, forming a transition zone. Therefore, the doors are numerous, mostly sliding, folding or in the form of a passage, and the windows are in a continuous row, with an emphasized horizontal character, thereby enhancing the visual connection with the environment. Today, with the replacement of dilapidated woodwork, as a semi-permeable portable border, the doors and windows in the external environment reflect the changes in the internal organization and division of the apartments. *Furniture*: Furniture takes on the function of a portable boundary element, whether it participates in the formation of zones or performs movable partitioning of a single space, instead of or in conjunction with partition walls. For the object in question and the period of construction in the sixties and seventies, "furniture composability" is an important standardization and adaptability feature [17]. As an element of equipment,

furniture is particularly important in auxiliary rooms and communication zones such as corridors, passages, storage rooms, etc., which are significant from the point of view of each user.

5. DISCUSSION

From both theoretical and practical standpoint, we are witnessing a gap between what New Belgrade should have been from an ideological aspect, what it was at the time of its creation as a 'big dormitory', to what New Belgrade is today – one of the most desirable city areas [12]. In the case of Block 23 and the meander building, the economic constraints also gave birth to some of the spatial characteristics, such as the upper limit of apartment size found in two-and-a-half-room or three-room apartments. On the other hand, with the careful design of the boundary space determinants, it is possible to change the mentioned 'human measure', and thus allow further modification of the mentioned dwelling units in the present. This primarily refers to the possibility of moving the dividing walls, but also to the flexibility offered by internal communication boundaries, such as light partition walls and portable borders of openings and equipment elements. It has been shown that, at the apartment level, the multiplication and development of border elements depend on the essential border as fixed and stable. Thus, the apparently weighted limit that determines the frame of one habitological component becomes the binding – connecting border of two apartments, while on the other axis it provides support for portable and creates production boundaries. Consequently, they enable temporal sustainability and the production of new spatial qualities according to personal and collective tendencies. Research contribution is the recognition of production border spaces as one of the greatest generators of human-scale continuity of modernist architecture. At the block level, there is a smaller scope for personalization of the analyzed spatial coverage, which is partly due to the collective character of the open public space. This claim can also be questioned through the concept of scale, because graphic analysis allows us to see the degree of boundary blurring in the interior and exterior space. Micro-environments in private residential zones have a greater manipulative range, which also leads to the complexity of border conditions, while in public zones it is more difficult to achieve layering in border areas. Graphic analysis at the block level represents a quality method for the research of continuity expressed through borders, because it allows us to see the cause-and-effect relationship between different typologies of borders. The research outcome defines the conditioning character of essential boundaries. The character of essential boundaries, which can be physical, perceptual, social, immaterial, or other phenomena, further determines the character of communication, production, and portable boundaries that arise within the originally located essential boundaries. Taking into account the previous statement, it can be concluded that the complex phenomenon of the border does not define the user-driven continuity exclusively by only its existence, but also through the uniqueness, value, and characteristics it carries.

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CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

624(082)
72(082)

INTERNATIONAL Conference Synergy of Architecture & Civil Engineering (2023 ; Niš)

Proceedings [of] The International Conference Synergy of Architecture & Civil Engineering, SINARG 2023, Niš (Serbia), September 14-15, 2023. Vol. 2 / [editors Slaviša Trajković, Vuk Milošević] ; [organized by University of Niš, Faculty of Civil Engineering and Architecture [and] Serbian Academy of Sciences and Arts - Branch in Niš [and] Serbian Academy of Sciences and Arts - Department of Technical Sciences]. - Niš : University, Faculty of Civil Engineering and Architecture : SASA, Branch in Niš, 2023 (Niš : Grafika Galeb). - [12] str., str. 597-1187 : ilustr. ; 24 cm

Tiraž 100. - Str. [9]: Preface / Editors. - Bibliografija uz svaki rad.

ISBN 978-86-88601-81-8
ISBN 978-86-88601-82-5 (niz)

а) Грађевинарство -- Зборници б) Архитектура – Зборници

COBISS.SR-ID 123837961