

**ARCHDESIGN '19**  
**CONFERENCE PROCEEDINGS**

Özgür Öztürk DAKAM YAYINLARI

March 2019, İstanbul.

[www.dakam.org](http://www.dakam.org)

Firuzğa Mah. Boğazkesen Cad., No:76/8, 34425, Beyoğlu, İstanbul

ARCHDESIGN '19 / VI. INTERNATIONAL ARCHITECTURAL DESIGN CONFERENCE  
PROCEEDINGS

Cover Design: D/GD (DAKAM Graphic Design)

Print: Metin Copy Plus, Mollafenari Mah., Türkocağı Cad. 3/1, Mahmutpaşa/  
İstanbul, Turkey

ISBN: 978-605-81019-2-0

**VI. INTERNATIONAL ARCHITECTURAL  
DESIGN CONFERENCE**

**ARCHDESIGN '19  
CONFERENCE PROCEEDINGS**

**Özgür Öztürk DAKAM YAYINLARI**

# CONTENTS

- 9     **ARCHITECTURE AS A DIALOGUE BETWEEN BODY-BRAIN-SPACE**  
          **SARA MOLARINHO MARQUES**
- 33    **IDEAL TYPES OF RELATIONS BETWEEN LITERARY NARRATIVE AND ARCHITECTURAL**  
**SPACE: THREE EPISTEMOLOGICAL MODELS**  
          **NIKOLAOS-ION TERZOGLU**
- 51    **THE CONTEMPORARY LIBRARY AS A THIRD PLACE**  
          **LARISSA FALAVIGNA, ANA LUISA ROLIM**
- 69    **THE RETURN OF THE GESAMTKUNSTWERK – “SET THE TABLE”, A PROJECT WITHIN**  
**THE TOTALITY OF SPACE, PLACE AND SPECTACLE**  
          **ANNA MARIE FISKER, ANNA EVA UTKE HEILMANN, NINI CAMILLA BAGGER**
- 75    **R/EVOLUTION OF SUPER DIVERSITY: HISTORICAL YELDEĞİRMENİ NEIGHBORHOOD**  
          **ÇİSEM DEMİREL, İZEL BEŞİKÇİ**
- 91    **THE URBAN PERCEPTION: A STUDY OF USERS’ ATTITUDES AND REQUIREMENTS**  
**TOWARD THE REDESIGN OF THE PEDESTRIAN WAY**  
          **THIRAYU JUMSAI NA AYUDHYA**
- 103   **URBAN REGENERATION APPROACHES IN HISTORIC URBAN FABRIC IN**  
**ARCHITECTURAL STUDENTS’ PROPOSALS: A CASE STUDY IN YUKARI MAHALLE,**  
**AKÇAKOCA**  
          **DUYGU GOKCE, AYSEGUL TANRIVERDI KAYA**
- 119   **URBAN TRANSFORMATIONS IN ISTANBUL: THE FENER-BALAT GRAMMAR**  
          **ELENI STYLIANI OIKONOMAKI**
- 121   **ARCHITECTURE AS A MEANS FOR SOCIAL INCLUSION FOR PEOPLE WITH DEMENTIA**  
          **KONSTANTINA VASILIKI IAKOVOU, KYRIAKI TSOUKALA, MAGDA TSOLAKI**
- 135   **GLOBALISATION’S IMPACT ON URBAN IDENTITY**  
          **MIRELA SVETOSLAVOVA**
- 143   **THE AESTHETICIZATION OF YUGOSLAV ARCHITECTURE THROUGH STRUCTURALIST**  
**ANALYSIS OF FORM-MEANING RELATIONSHIP**  
          **DANICA STOJILJKOVIC, JELENA RISTIC TRAJKOVIC**
- 155   **ARCHITECTURE AS AN ARTILGET OF GENTRIFICATION, TOURISM, TERTIZERING AND**  
**DISPLACEMENT IN CITIES OF LATIN AMERICA**  
          **DRA. ESKA ELENA SOLANO MENESES, MTR. MARCO ANTONIO LUNA**  
          **PICHARDO, MTR. JUAN MIGUEL REYES VIURQUEZ**

- 171 **BIOPHILIC ARCHITECTURE: NATURE-BASED DESIGN SOLUTIONS FOR HEALTH AND WELL-BEING IN LIVING SPACES**  
VLADAN DJOKIC, JELENA RISTIC TRAJKOVIC, ANA NIKEZIC, MILENA KORDIC
- 189 **FLEXIBILITY AS A TOOL TOWARDS IMPROVEMENT OF EXISTING HOUSING DESIGN IN TIRANA**  
SILVIA AZIZAJ, ANNA YUNITSYNA
- 205 **OPPORTUNITIES FOR TRANSFORMATION THROUGH ADAPTIVE DESIGN: EMERGENT STUDENT WORK**  
STELLA SOFIA PAPANICOLAOU, MICHAEL LOUW
- 223 **A BIOMIMETICS-BASED DESIGN METHODOLOGY**  
ANA LUISA ROLIM, LARISSA FALAVIGNA.
- 239 **A NEW FUTURE FOR ARCHITECTURAL PRAXIS: CONTEMPORARY ARCHITECTURE AMONG CONCEPT, THOUGHT AND RHETORIC**  
ZAFER SAGDIC, SEZGIN BILGIN, NUR URFALIOGLU
- 253 **EXPERIMENTS WITH DIFFERENCE: SIMULATING BODIES IN ARCHITECTURE**  
KIM KULLMAN
- 255 **FOLDED ASSEMBLIES: A METHODOLOGY OF ASSEMBLING MULTIPLICITIES OUT OF PAPER FOLDING**  
ELINA PAVLEA
- 269 **A PASSIVE SOLAR HEATING EXPERIMENT UTILIZING PLASTIC WATER BOTTLES AS THERMAL MASS**  
MAGED MIKHAEL, MOSTAFA METWALY, MIRAME EL-SAYED
- 283 **GRAPH CHARACTERISTICS OF DOME STRUCTURES**  
REKA SARKOZI, PETER IVANYI, ATTILA BELA SZELL
- 285 **LIGHTING METHODS AND PROPOSALS FOR THE MODERN HOUSE**  
EIRINI SKAFIDA
- 301 **THE EFFECT OF THE PARAMETERS OF TEMPORAL CHANGE IN URBAN AREAS ON AIR POLLUTION: THE CASE OF DIYARBAKIR CITY**  
CANAN KOÇ, AHMET KOÇ
- 309 **EVALUATION OF URBAN PRESERVATION IN HISTORICAL ENVIRONMENT BY VISUAL PERCEPTION: MIDYAT AND SURICI CASES**  
CANAN KOÇ, D. TÜRKAN KEJANLI

- 329 THE CONCEPT OF LEGACY AND ITS MANIFESTATIONS IN ARCHITECTURE AND BUILT ENVIRONMENT  
MARGO SOCHA, ARDAVAN KHOSHFEKARI, AMANY HENDY
- 331 STRUCTURAL VULNERABILITY ASSESSMENT OF JAMEH MOSQUE OF ISFAHAN IN IRAN  
ARDAVAN KHOSHFEKARI
- 333 INTERIOR DESIGN BETWEEN BEAUTY AND UGLINESS  
AMANY HENDY, AYA HABBAK
- 349 THE INTERIOR SPACE AS AN ECOSYSTEM  
YOSRA EL HARAIRY
- 367 ART- ARCHITECTURE OF LE CORBUSIER: A POSSIBLE CUBISM IN ARCHITECTURE  
SRIVALLI PRADEEPTHI IKKURTHY
- 377 CULTURE AS AN INDISPENSABLE FACTOR IN MODERN DESIGN IDENTITY: THE CASE OF JAPAN  
DR. JOHANNIS TSOUMAS
- 387 DESIGN STUDIO'S PLACE IN ARCHITECTURAL EDUCATION: CONCEPTUAL STUDY EVALUATION IN DICLE UNIVERSITY ARCHITECTURE DEPARTMENT AS A STUDIO EXPERIENCE  
BAHAR ARAS BAYLAN, BERIVAN ÖZBUDAK AKÇA
- 399 FUTURE SPACES: AN EXPERIMENTAL DESIGN STUDY  
AYSUN AYDIN ÖKSÜZ, BAHAR KÜÇÜK KARAKAŞ, GİZEM SEYMEN.
- 409 CULTURE, CONTEXT & IDENTITY IN CONTEMPORARY ARCHITECTURE: CASE STUDY OF 2 BUILDINGS FROM PORTUGAL  
ABRAR, NAEEM
- 427 HARMONOGRAPHY RECONSIDERED: MATHEMATICS IN ARCHITECTURAL EDUCATION  
LEVENT ŞENTÜRK
- 439 PUBLIC WASH-HOUSES IN PORTUGAL: SPACES OF AGGREGATION AND SANITARY AID. THE CASE OF STUDY OF THE CITY OF AVEIRO  
TIZIANA CAMPISI, MANFREDI SAELE §
- 455 REVIEWING THE EXPERIENCE OF APPLYING PEER FEEDBACK IN DESIGN EDUCATION  
NEHAD EWEDA
- 475 SPATIAL ADAPTABILITY AS A NEW APPROACH FOR SUSTAINABLE ARCHITECTURAL DESIGN: CASE STUDY OF (BATTERSEA POWER STATION IN LONDON & MINSHENG ART MUSEUM IN CHINA)  
SHERIF KHASHABA, GHADA REHAN

# THE AESTHETICIZATION OF YUGOSLAV ARCHITECTURE THROUGH STRUCTURALIST ANALYSIS OF FORM-MEANING RELATIONSHIP

**DANICA STOJILJKOVIC**

PhD, Institute for Multidisciplinary Research (Belgrade, Serbia)

**JELENA RISTIC TRAJKOVIC**

PhD, University of Belgrade – Faculty of Architecture (Belgrade, Serbia)

## **Abstract**

This paper addresses the aestheticization of Yugoslav architecture through the implementation of structuralist form that took place between the early 1950s and the late 1970s, and calls attention to the need for contemplating the relationship between formal and intrinsic elements in architecture. An important component of the interest for the formal issues of architecture was to make a distance from functionalistic philosophy, which led to novel understanding of form and to the aestheticization of architecture. Structuralist aesthetics, which was accepted in the 1950s, changed the concept of form for the concept of structure, and focused on the elucidation of internal construction and organization. With reference to structuralist theoretic-methodological approach, an aspiration of Yugoslav architects for achieving inter-relationship between physical and semiotic structure via invisible laws that define and form elements of structure is pointed out. Different aspects of aesthetics of Yugoslav architecture reflected in various approaches for accepting the formal principles: the recognition of constructive aesthetics and importance of integration of constructive and formal elements of an organic entity, the interest in relations between the elements of architectural system, the idea of fluid space, and the evolutionary growth, development and transformation. This paper starts from the premise that the aspiration for aestheticization of architectural form through articulation of the unity of elements promoted Yugoslav architecture to build a connection between formal structure of an object and the meaning of its structural elements.

## **Introduction**

The theme of aestheticization emerged in Yugoslav architecture in mid-1950s through the critics of functionalism, which questioned the value of function over aesthetic form. In the early 1950s, a tendency to oppose modernistic functionalism

and to promote a more formal and semiotic approach in architectural theory and practice, promoting. Structuralist concepts spread all over the world under the influence of Aldo van Eyck and Team X, which rejected functionalism doctrine in urbanism. Structuralism represents the most important avant-garde movement in the 1950s and developed as a reaction to CIAM's functionalism. The development of new approaches in architecture in that period was aimed at abandoning functionalist paradigm and turning to formal aspects and physical interrelations between architectural elements, which found theoretical background in structuralism. Michael Hays pointed out that architecture 'tried' to resolve the search for meaning by applying structuralist projections of the system of formal elements and rules of combinations and transformations that were analogous to rhetorical formations in the language (Hays, 2010). The central issue of structuralist approach is related to the connection between physical and semiotic (meaning-related) structure, i.e. to invisible laws that define and form the elements of structure. In contrast to the common formalistic approach, the form in structuralism is interrelated with the content. Lévi-Strauss noted that structuralism does not oppose the abstract and the structure is not separated from the content which is realized through the logical organization as the quality of reality (Levi-Stros, 2012). Pertinent to this, the initial concepts of structuralist form in Yugoslav architecture have been developed by pointing out the importance of integration of constructive and formal elements and by creating the organic whole. Different approaches in the application of formal aspects could be observed in the anesthetization of architecture in Yugoslavia in the early 1950s: application of constructive aesthetics, exploration of relations between elements in architectural compositions, the idea of articulation of architectural form through smaller structures, the idea of evolutionary growth, development and transformation, and the concept of brutalist form.

### **The constructive aesthetics**

In the early 1950s, the progress in construction engineering facilitated an aesthetic approach in architecture. The breakthrough of new constructions in architecture enabled the incorporation of both, an improved technical component and 'emotional' need for aesthetical shaping. Pier Luigi Nervi, an engineer and architect, noted that without the interconnection between aesthetics, statics and techniques that were present in the past, there could be no architectural achievements and that 'only together those three spirits can create the true architecture' (Nervi, P.L., 1962). Pertinent to this, the first concepts addressing structuralist form emerged in Yugoslav architecture through the recognition of the importance of integration of constructive and formal elements and creation of the organic whole. In the article entitled 'Structuralism' that was published in 1960, Nikola Dobrović expressed enthusiasm for the aesthetics of constructivism as an integration of constructivist concepts and aesthetic and shaped forms. He pointed out that, in comparison to structuralism, previous constructivism was of relevance only as a program with defined aim to equalize architecture with construction, even if the latter is of poor value (Dobrović, 1960, pp.20-21). In regard to this, the artistic approach to constructivist aesthetics represents a synthesis that should deliver new forms and constructions – 'Because of close relationships between technical and aesthetic qualities of an artwork, only impeccable structure can deliver architecture



with character' (Dobrović, 1960, pp.21).

Belgrade Fair was one of the first works that were based on the principles of constructive aesthetics (1953-1957). Milorad Pantović applied original domal shape structures to construct fair halls and bring off an organic balance of form through a coherent composition of different elements of structure. In the Belgrade Fair project, Pantović renounced stiff orthogonal shapes and created round forms that are incorporated into the surroundings. The largest hall in Belgrade Fair complex – Hall I, was a constructive and technological experiment of engineer Branko Žeželj. The construction was made of pre-stressed concrete ribbed arches that were connected into a monolithic structure, with a 106 meters span, which was the largest in the world at that time. Two smaller halls – Hall II and Hall III were designed as thin shell pre-stressed concrete structures (only 9 cm thick). Uroš Martinović noted that the halls of Belgrade Fair represent the first urban super-structure in Yugoslavia (Martinović, 1978, p. 122). An articulation of structural elements in the framework of round forms is also present in the project of Ivan Štraus - Aeronautical Museum in Belgrade (1969). Štraus creates a new aesthetics through the sculptural treatment of the object, which is based on the unity of technical and aesthetic postulates: 'Rational and sensible at the same time, he proves the existence of new contemporary aesthetics, the aesthetics of mechanical design, through forthright materials, clear constructive ideas, and visual beauty of form that is both, functional and rhetorical (Kurto, 1986).



Figure 1. Belgrade Fair (1953-1957), Milorad Pantović. Taken from [http://beogradskonasledje.rs/kd/zavod/savski\\_venac/hala\\_1\\_beogradskog\\_sajma.html](http://beogradskonasledje.rs/kd/zavod/savski_venac/hala_1_beogradskog_sajma.html)

One lineage of experiments in the 1960s introduced umbrella-like structures into the Yugoslav architecture. The first structures in that form have been projected by Feliks Kandela in 1952. Kandela criticized functionalistic views that 'function makes an organ' and that 'form follows the function', and emphasized that the

creation of new forms can be achieved only through structure and structuralist solutions. Dobrović noted that 'the new constructive possibilities of reinforced concrete promote gradual metamorphosis of new aesthetics' (Dobrović, 1960, p.11). In Station House Kosovo Polje project (1964), Nikola Dobrović developed the structure by implementing the basic constructive element that resembles an upside-down umbrella (Mitrović, 1967, pp.34-35). Within the research project entitled 'The development of standardized design and prototypes of family house, with the full application of synthetic materials from domestic production', Jurij Neidhardt worked on the development of serial residences from prefabricated elements made from synthetic materials (Neidhardt, 1966, p.7). Neidhardt stressed out that such approach in architecture brings a brand-new type of form that resembles the modelling of car body. Neidhardt developed 'modular architecture' by assembling several units under one roof and by further organization of such structures within the residential area.

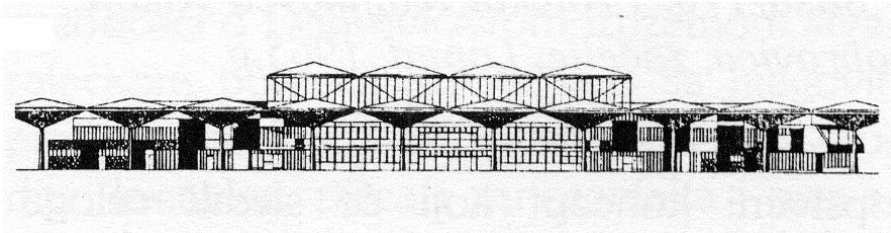


Figure 2. Project Station House Kosovo Polje (1964), Nikola Dobrović. Taken from (Vukotić Lazar, M. 2002, p. 123)

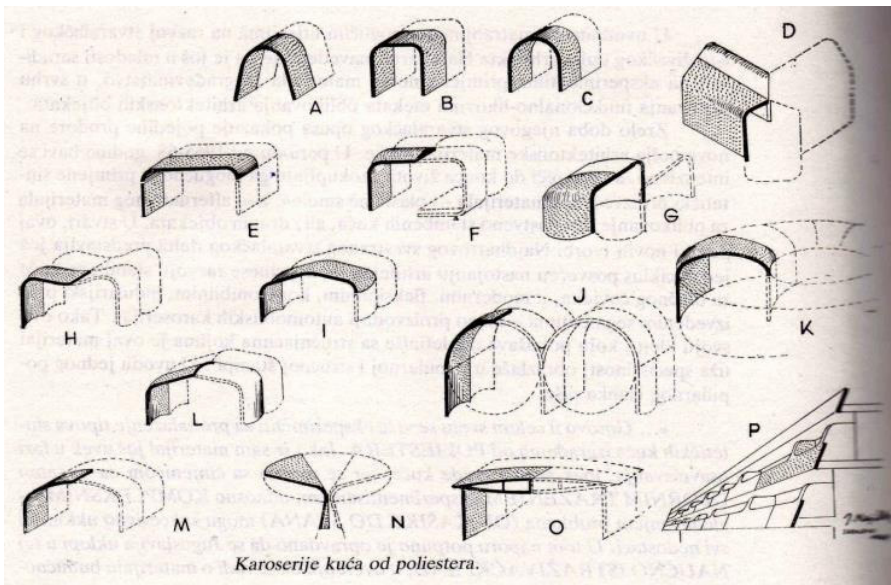


Figure 3. 'The development of standardized design and prototypes of family house, with the full application of synthetic materials from domestic production' (1966), Jurij Neidhardt. Taken from (Karlić – Kapetnović, J. 1990, p. 238)

### The articulation of architectural form through smaller units

Yugoslav architecture implemented a formal structuralist approach which promoted the articulation of smaller units within architectural composition. This had an impact on the perception of anesthetization of architectural forms and promoted the development of more humane living environments, which was in contrast to the previous functionalistic approach. Arnulf Lüchinger acknowledged the time as an important formative factor (the fourth factor), and pointed out that growth, coherence and transformation represent the main principles of structuralism in architecture (Lüchinger, 1981, p.43). The articulation of architectural form through smaller units was aimed to make architecture more comprehensible to people. According to Hertzberg, the structures may become large only through a multitude of smaller units, because any excess provokes repulsion (Hetzberg, 1977, p. 27). The project for Museum of Contemporary Art in Belgrade (1961) by Ivan Antić and Ivanka Raspopović was conceived as a series of crystal forms that can be multiplied if needed. Through aesthetic constructive forms, the object gained a complex crystalloid structure which is composed of orthogonal, clear-cut, cubic bodies. The spatial coordination is generated by the shearing of two rectangular planes, the intersection of vertical slopes, and cascade organization of horizontal planes in the interior groups of exhibition units. The main value of Museum of Contemporary Art lays in 'the crystal forms that can be functionally multiplied' (Manević, 2008, p. 9). Ivan Antić and Ivanka Raspopović implemented the concept of growth also in the project Museum '21st October' in Kragujevac (1968-1975). The project is based on a three-dimensional module 3×3×3 m, which is multiplied to generate all elements of Museum. The form of the object abides to the principle of three-dimensional grid, which is developed as irregular series of vertical cubic forms of different heights from 4.5 m to 21.5 m. The object is placed into geometrically organized space, which is put, together with the abstract memorial content, into an abstract context of realistic continuum (Anonym, 1965, p. 39).



Figure 4. Project Museum '21st October' in Kragujevac (1968-1975), Ivan Antić and Ivanka Raspopović. Taken from: [https://sr.wikipedia.org/wiki/Спомен-музеј\\_“21.\\_октобар”\\_Крагујевац](https://sr.wikipedia.org/wiki/Спомен-музеј_“21._октобар”_Крагујевац)

In the design concept for Youth Centre 'Sedam Sekretara SKOJ-a' (1966), Andrija Mutnjaković explored experimental and avant-garde features of architecture that could properly represent the memorial for the fallen young communist leaders. The synthesis in Mutnjaković's project relied on contemporary exploration of the phenomenon of shaping the volume, pointing out the problem of formalism and artificiality (Mutnjaković, 1982, p.89). Mutnjaković projected structural shape by adding volume and created dynamics through wavy growth of forms. The object contains 500 units, and the construction could begin with any of these units and may encompass any number of units: 'Structural agglomeration does not have composition elements. It represents a complete structure in any stage of construction, which means that the object can be built in many phases, in accordance with economic capacities of the society' (Mutnjaković, 1982, p.89).

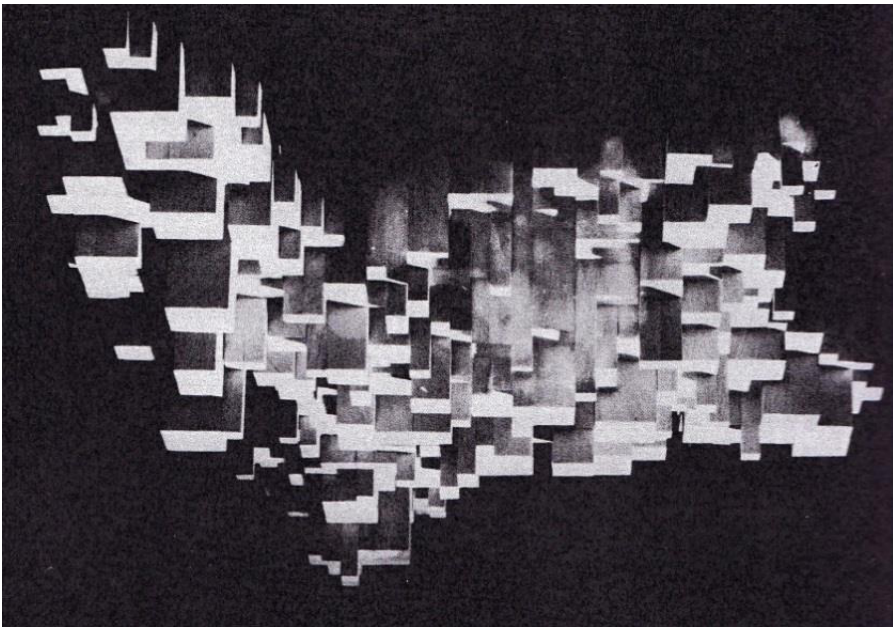


Figure 5. Design concept for Youth Centre 'Sedam Sekretara SKOJ-a' (1966), Andrija Mutnjaković. Taken from (Mutnjaković, 1982, p. 94)

#### **The exploration of interrelations between elements in architectural structure**

Structuralist experiments focused on interrelations between elements of the whole that function and are organized and formed by invisible laws. Architect Vjenceslav Richter addressed the theme of such interrelations: 'Contemporary spatial expression represents materialization of the most eminent spiritual ideals, which are reflected in new order and relations that are recognized here as well abroad' (Richter, 1964, p. 16). Richter explored the laws of organization of sculptural elements in architecture and introduced aesthetical and logical visual experiment in the field of spatial geometry. Richter pointed out that large complex forms can be conceived in a way so that spatial and formal relations result in a harmonic synthesis of all nominal units. The starting point of Richter's formal explorations were models of systematic forms that used sphere and cube, curved and flat surfaces, circle and



square, and observation and postulation of relations between these elements to produce new spatial structures. One example of Richter's work is an experimental model named *Reljefometar* (1964), which is based on the design of mobile prefabricated orthogonal units. Since the number of formal relations between mobile elements is unlimited, *Reljefometar* represents an open system with unpredictable and immense combinatory potential (Horvat-Pintarić, 1970, p. 15). System theory, which explored the relations between units and the whole, and the derivation of meaning, i.e. the manifestation of creative imagination through the interactions of elements and principles, enabled Richter to develop projects with solutions for the synthesis of human environment - *sinturbanism* (1964). Sinturbanistic city is composed of variations and multiplications of same elements, whereas a diversity is accomplished by the presence and composition of the system. This approach overcame the absence of system in contemporary heterogeneous agglomerations and urbanistic monotony, achieving urban intimacy of Mediterranean cities. In the project 'Catering School' in Dubrovnik (1962), Richter applied the style of ancient builders, who established objects on slopes (Anonym, 1961, p. 5). By disintegration of spatial mass, Richter showed that visual surroundings can be shaped by simple means and dynamic change of spatial intervals, which forms a synthesis of ambient.



Figure 6. Project 'Catering School' in Dubrovnik (1962), Vjenceslav Richter. Taken from (Horvat-Pintarić, 1970)

Djordje Petrović presented visual explorations of structuralist form and the experiments of interior of structures through perception of relations between units of space in monograph 'Visual Research of Human Environment and Urban Design' (1972). Petrović brought together visual exploration and different optical structures that facilitate the development of creative capacities in the organization of visual experience, the originality of individual expression, and three-dimensional experience which enables the perception of environment, analysis, organization, and synthesis of architectural space. Petrović conducted visual experiments in the courses at the Faculty of Architecture in Belgrade, exploring interrelations between elements – 'cells' of the model, convergence, support, contact, overlap,

and structural aspects of the system. He started the organization of the system with transparent or non-transparent material elements and further explored new spatial qualities of dimensions, relations and optical experiences through confrontations of surfaces of the elements. Alterations of visual impressions were developed by light and shadow, the illusion of vibration of space. New forms are built by 'cell' moving, whereas rotation is used to transform initial composition of 'cells' into new systems. This opened new unpredictable possibilities for combining the cells of the system into groups.

By accepting structuralist concept, the perception of architecture is placed into a context of the structure that provides an insight of interrelations between elements (Lüchinger, 1981, p. 16). The elements are constant, whereas the changeability of structure is enabled by interrelations between elements. According to Hertzberg, the structure represents harmony and unity: 'It is the way the elements function or connect' (Hertzberger, 2015, p. 32). Aleksej Brkić (1978, 1979) examined the theme of architectural form as logical system in the series of texts 'The Inversion of Dialectics of Form' in *Izgradnja journal* (1978-1979). He pointed out that 'the architecture is real as much as it represents a logical framework or system' (Brkić, 1978). According to Brkić, the form as presentation and architecture does not contain absolute norms or ideals. It is a product of specific logic or social reflection of a certain truth that is derived from previous, inter-dependant truths (Brkić, 1978). The design has dual role in human survival – real, as an object of physical relevance, and abstract as an object with specific statement. In the project of business building 'Invest-Import' (also known as Hempro building; 1953), Brkić diverged from functionalistic schemes and opted for 'actual' multi-layered architecture to promote the frequency of events in the system. He was one of the protagonists of intellectual avant-garde that showed a resistance to traditional construction and orthodox functionalism (Manević, 2008, p. 58). His inspiration was the rhythm of streets in faraway lands, 'where the architecture was born'. He wrote: 'Closely packed buildings, intersections of walls, sudden breaches, sun in the zenith, sun on the horizon, playful colours, and bottomless infernal shadows, all kinds of movements and crossings, created a magnificent theatre from events in the streets. (Brkić, 1992, p. 147)'

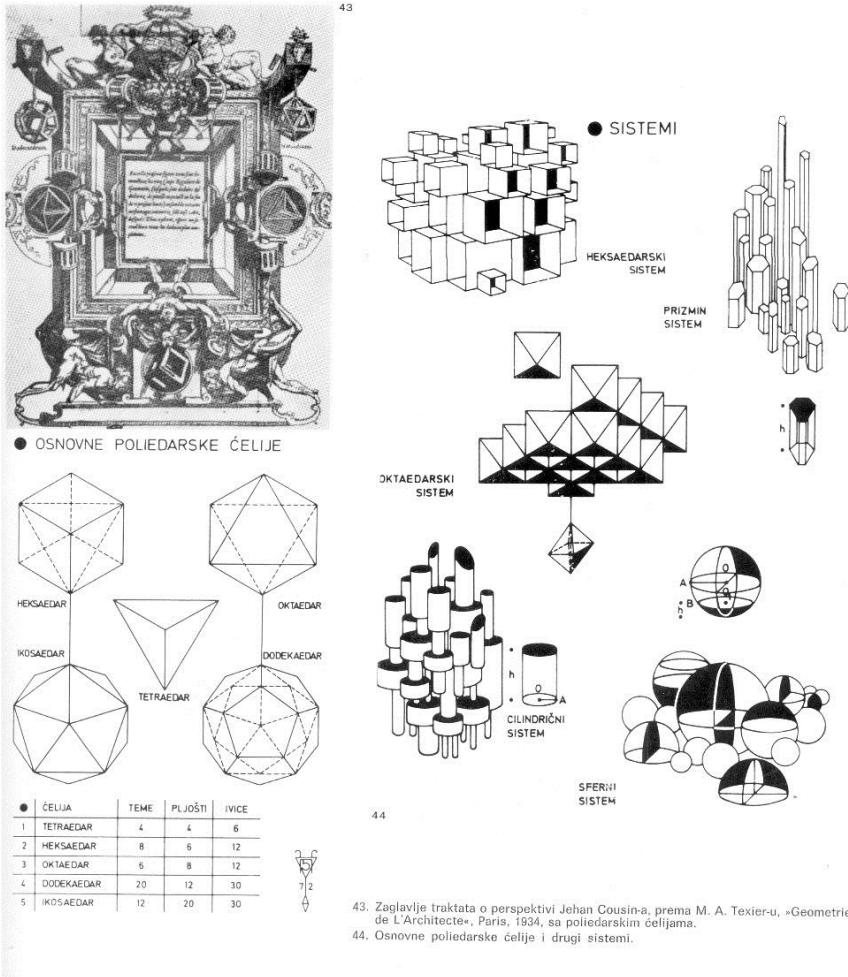


Figure 7. Basics of Polyhedron cells and other systems of Đorđe Petrović. Taken from (Petrović, 1972, p. 41)

**Brutalist form**

Brutalism was developed in the late 1950s. It was characterized by the use of 'raw' concrete ('beton brut' in French), which emphasized the aesthetics of form of the object. Team X generated two different movements – new brutalism, which was developed by English members with Alison and Peter Smithson being the most prominent figures, and structuralism, which was developed by Dutch members with Aldo van Eyck and Jacob Bakema as leaders. Although both movements originate from Team X and the critique of functionalism, they differ in material processing and the organization of function. New brutalism emphasized the authentic aesthetics of raw materials with their overt natural structure. With the unveiling of 'the truth of materials', concrete, which was previously a constructive material with no aesthetic effects, became an element of decorative and visual expression. Concrete was casted using a rough wooden formwork with the aim to produce

an effective and interesting appearance. Rich plastic and sculptural expression of monolithic brutalist buildings accentuate content and function as well as the form of the object. Brutalist structures are formed by the repetition of modular elements that are grouped in specific functional zones making one complex, which makes the concept of the object comprehensible.

Many projects of Yugoslav architects in the late 1960s and early 1970s showed elements of brutalism. The works of Mihajlo Mitrović from that period contain two architectural concepts – new brutalism and critical aesthetics (Perović, 2003, p. 183). In the project of Hotel 'Putnik' in New Belgrade (1970-1971), Mitrović applied raw, unfurnished concrete, cylindrical and cubic forms, and a combination of horizontal and vertical fragments of facade, to generate structural composition of 'megalithic contours' (Kadijjević and Mitrović, 1999, p. 68). He also used the sculptural approach, rough materials, and brutalist principles for the project 'Geneks Towers' in New Belgrade (1980). Inspired by contemporary Japanese architecture, Mitrović designed residential and business towers that are connected via attic stories. This project was presented at the exhibition of brutalism in Wien in 2008 (Mitrović, 2012, p. 128).



Figure 8. project 'Geneks Towers' in New Belgrade (1980), Mihajlo Mitrović. Taken from (Kadijjević and Mitrović, 1999, p. 73)



Institute of Urbanism that was designed by Branslav Jovin and built in the centre of Belgrade in 1970, represented 'a reflection of recent brutalist experiments in the world' (Ignjatović, 2012, p. 701). In the project 'Residential Block in Red Army Boulevard' (1971-1974), Stojan Maksimović developed a scattered structure of the object. According to Manević: 'The combination of concrete, as the constructive element, and bricks, as facade panel, reflects Maksimović's style, adopted credo, the principle of organic synthesis of different constructive methods, function and elements of visual art (Manević, 2008, p. 247). In the project Electric Substation 'Filmski grad' (1977-1979), Aleksandar Djokić formed a composition of elements of circle, cylinder and arch, merging them into playful scattered brutalist form (Kadijević, 2013, p. 110).

### Conclusions

Structuralist approach performed a radical critique of functionalism through explorations of relations between elements and of universal laws of social and cultural structures. Structuralism also criticized formalism which emphasized a structural approach to architectural form but was limited to the manifestation of form not going into deeper comprehension of relations between elements. Structuralist approach insisted on the liberation of architecture from the elements of formalism, and promoted new freedom of interrelations through temporal transformation of architectural form and adaptation and flexibility through the addition, subtraction and alteration of shapes. The critical approach of the members of structuralism movement promoted the change of functionalistic principles and values in Yugoslav culture of high modernism. In that context, a new contemplative system, which was oriented to formal and semiotic approach, was established. In the early 1950s, Yugoslav architecture showed a progress in engineering construction, which enabled the creation of balance between aesthetic forms and constructive foundations of objects. At the same time, regarding the development of concept of time/duration as a generic factor, themes of growth, development and evolution, as well as semiotic approach that reflected in the importance of interrelations between elements of the system, were introduced into architecture. The aspiration for anesthetization of architectural forms through articulation of harmony of elements influenced the development of connections between formal structure and the meaning of structural elements in Yugoslav architecture.

### References

- Anonym. 1965. „Muzeji u Kragujevcu,“ *Arhitektura urbanizam* br. 33-34, p. 39.
- Anonym. 1961. „Ugostiteljska škola u Dubrovniku.“ *Arhitektura* br. 5-7, p. 5.
- Brkić, A. 1978. 'Inverzija dijalektike oblika', *Izgradnja*, 6 (1978), pp.1-8; 7 (1978), pp.1-8; 8(1978), pp.1-8;9 (1978), pp.1-8;11 (1978), pp.1-8.
- Brkić, A. 1979. 'Inverzija dijalektike oblika', 1 (1979), pp. 1-8; 2 (1979), pp.1-8; 3 (1979), pp.1-8.
- Brkić, A. 1992. *Znakovi u kamenu: srpska moderna arhitektura: 1930-1980*. Beograd: Savez arhitekata Srbije, p. 147.
- Dobrović, N. 1960. „Pokrenutost prostora – Bergsonove 'dinamičke sheme'-Nova likovnasredina.“ *Čovjek i prostor* br.100, p. 11.
- Dobrović, N. 1960. „Strukturalizam,“ *Arhitektura-urbanizam* br. 4, pp. 20-21.

- Hays, M. 2010. *Architecture's desire – Reading the late avant-garde*. Cambridge: MIT Press, pp. 23-50.
- Hetzberg, H. 1977. „Ideologija Strukturalizma.“ Čovjek i prostor br. 291, p. 27.
- Hertzberger, Herman. 2015. *Architecture and Structuralism. The Ordering of Space*. Rotterdam: nai10 publishers, p. 32.
- Horvat-Pintarić, V. 1970. *Vjenceslav Richter*. Zagreb: Grafički zavod Hrvatske, p. 15.
- Ignjatović, A. 2012. „Tranzicija i reforme: arhitektura u Srbiji 1952-1980“. In Šuvaković, M., Daković, N., Ignjatović, A., Mikić, V., Novak, J. and Vujanović, A. Eds. *Istorija umetnosti u Srbiji XX vek. Realizmi i modernizmi oko Hladnog rata*. Beograd: Orion Art i Katedra za muzikologiju Fakulteta muzičke umetnosti, p. 701.
- Kadiljević, A. and Mitrović, M. 1999. *Projekti, graditeljski život, ideje*. Beograd: S. Mašić: Muzej nauke i tehnike: Muzej arhitekture.
- Kadijević, A. 2013. „Expressionism and Serbian Industrial Architecture.“ *Zbornik Matice Srpske Za Likovne Umetnosti* 41, p. 110.
- Karlič – Kapetnović, J. 1990. *Juraj Najdhart život i delo*. Sarajevo: „Veselin Masleša“, p. 238. Kurto, N. 1986. *Ivan*
- Levi-Stros, K. 2012. „Struktura i forma: Razmišljanja o jednom delu Vladimira Propa“ in Prop, V. *Morfologija bajke*. Beograd: Biblioteka XX vek, pp. 217-255.
- Lüchinger, A. 1981. *Structuralism in Architecture and Urban Planning*. Stuttgart: Karl Kramer.
- Manević, Z. 2008. *Leksikon neimara*. Beograd: Gradjevinska knjiga.
- Martinović, Uroš. 1978. „Arhitektura, autori i ostvarenja.“ in Stojanović, B. and Martinović, U. *Beograd: 1945-1975: urbanizam: arhitektura*. Beograd: Tehnička knjiga, p. 122.
- Mitrović, M. 1967. „Stanična zgrada Kosovo Polje.“ *Arhitektura urbanizam* br. 43, pp. 34-35.
- Mitrović, M. 2012. *Arhitektura Beograda 1950-2012*. Beograd: Složbeni glasnik, p. 128.
- Mutnjaković, A. 1982. *Biurbanizam*. Rijeka: Izdavački centar Rijeka, p. 94. Neidhardt, J. 1966. „Sintetička kuća“. Čovjek i prostor br. 164, p.7.
- Nervi, P.L. 1962. „Odnos arhitekta, inženjera i konstruktora,“ Čovjek i prostor br. 108-109, p. 15.
- Perović, M. 2003. *Srpska arhitektura XX veka: od istoricizma do drugog modernizma*. Beograd: Arhitektonski fakultet Univerziteta u Beogradu, p. 183.
- Petrović, DJ. 1972. *Vizuelna istraživanja čovekove sredine i urbani dizajn*. Beograd: Beogradski izdavačko-grafički zavod, p. 41.
- Rihter, V. 1964. *Sinturbanizam*. Zagreb: Mladost, p. 16.
- Vukotić Lazar, M. 2002. *Beogradsko razdoblje arhitekta Nikole Dobrovića: (1945-1967)*. Beograd: Plato, p. 123.
- Štraus: *arhitektura : 1962-1986: Sarajevo - Banja Luka*. Sarajevo: Akademija nauka i umjetnosti Bosne i Hercegovine.