



## EDITOR-IN-CHIEF'S WORD

Engineering Power is a bulletin regularly published four times a year in which the Croatian Academy of Engineering ([www.hatz.hr](http://www.hatz.hr)) promotes the visibility of the state of the art of technical sciences in Croatia, especially of its distinguished scientist members. In this fourth issue of this year I am particularly pleased that our respected regular member, architect Tihomir Jukić, has joined our efforts and with his artistic and engineering approach he gave a view into the development urban planning of a new part of our capital with specific contents in which he significantly participated with his associates. I expect that this content will be interesting and instructive for every reader.

Editor-in-Chief

Vladimir Androžec, President of the Croatian Academy of Engineering



## EDITOR'S WORD

Dear readers,

Development and urban transformation of a city, especially when it has such a great significance for the region as the city of Zagreb (or it is a capital of a state that itself goes through significant historical and social changes), is influenced by many demographical, economic, political and socio-cultural factors.

It is therefore a challenge to shed light on this process, and I am especially glad to present this edition of Academy's Bulletin Engineering Power that focuses on the genesis of Novi Zagreb (New Zagreb) in turbulent times of the city's recent history. The Guest-Editor of the issue is Tihomir Jukić, Member of the Academy

in the Department of Architecture and Urban Planning and Professor at the Faculty of Architecture, University of Zagreb.

Editor

Zdravko Terze, Vice-President of the Croatian Academy of Engineering



## FOREWORD

The theme of urban transformation has been dominant in the process of urban planning during the past decades. Demographic and economic indicators no longer support the concept of city expansion or usurpation of new surfaces. Furthermore, urban planning trends stem from sustainable development and circular economy. In practice, this implies the completion of a city and reuse of space partially or wholly abandoned. The economic transition has led to abandoning former large halls right in the city centre of Zagreb (Janko Gredelj wagon factory or former slaughterhouse Zagrepčanka). These are so-called brownfields or areas anticipating its structural and functional transformation. The space of the Zagreb Fair can be included in this category as one of the most interesting areas in Zagreb still in its primary use, even though to a lesser extent. The remaining unconstructed and technologically obsolete part is used for different purposes. Certain parts were used as warehouses. However, they have started to be used recently for sporting and recreational activities. It is crucial to implement the economic and structural transformation of the entire complex. A transformation that would consider its location and become a new and buzzing city centre, as well as the centre of Novi Zagreb. Due to its importance in the General Urban Plan (GUP) of Zagreb, it has been categorised as a "city project" – actually a space of immense interest for urban development. In compliance with the GUP of Zagreb, the theme of this city project has been set out in Article 101, item 3 as "... public amenities, a place for promoting, primarily, the Zagreb School of urbanism and architecture, Croatian culture and its belonging to the Central European cultural circle,..."

A selection of new and already published texts has already been made and they should shed some light onto the genesis of Novi Zagreb and its relation with the Zagreb Fair as well as its continuous modifications through time. Finally, an excerpt from the Programme of the strategic-city project of the Zagreb Fair 2017/2018 has been presented by the Institute for Urbanism, Physical Planning and Landscape Architecture with the University of Zagreb and the City Office for Strategic Planning in cooperation with professionals and consultants from various city offices and institutes as well as utility services. The new amendments to the GUP of the City of Zagreb (2019) removed the Zagreb Fair from the list of "city projects".

Guest-Editor

Tihomir Jukić, University of Zagreb, Faculty of Architecture

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### Novi Zagreb – new city next to the city

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#### Abstract

*Throughout history, every new society has tried to present itself with great construction ventures, and this was the case in the post-war new Yugoslavia. Novi Zagreb is an example in these areas. It is evident that certain factors overlapped, and only this kind of social and historical as well as economic conditions could give birth to an entirely new city south of Sava.*

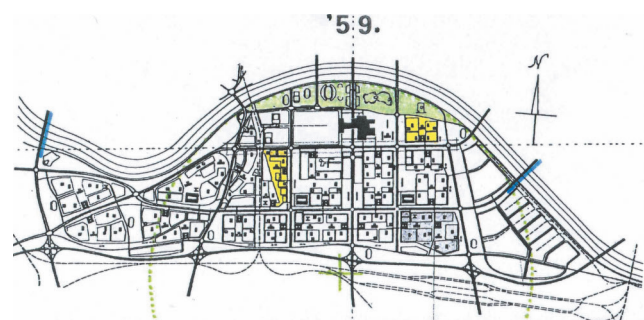
**Keywords:** Novi Zagreb, South Zagreb, Zagreb, Zagreb trade fair, new city

#### 1. Introduction

The genesis of Novi Zagreb (New Zagreb) was characterised by turbulent political events in the world and Yugoslavia as well as social and economic changes. The cultural atmosphere, of which Zagreb of the ex-Yugoslavia was the leader on an international level, was extremely important. Compared to other cities within the region, the City of Zagreb ranked high on the list of cultural events in the late '50s and early '60s of the 20th century. Groups like – Exat 51, Gorgona, Nove tendencije – five international exhibitions, which, in the midst of the Cold War gathered artists, gallerists and theoreticians from East and West Europe; Music Biennale visited by the leading figures of classical and experimental music by Stravinski, J. Cage; Geff Avant-garde Film Festival, etc.). The expansion of the city to a large free area and poor villages was a reflection of the present social and several political circumstances that resulted in the decision made by the city heads and its mayor Većeslav Holjevac (1952-1963). They made a radical decision on the construction of a Novi Zagreb Fair in the area “on the other side of Sava” to preserve the tradition of fairs and the dominant role of this Fair in Yugoslavia and the region. This political decision resulted in the construction of a new bridge (Most Slobode – Liberty Bridge), traffic, and infrastructural network, which became the framework for urban development on the other side of Sava – South Zagreb. During the times this decision was made, this area had already included the complex of the Shipping Institute (Brodarski Institute, 1952) and the Fair (1956) [1].

#### 2. Conquering the new site-concept of a city next to the city

Since there was no time or money to reconstruct the illegally built areas of Trešnjevka, Trnje and Peščenica, it was decided to venture into intensive construction works on the other side of Sava. During the post-WWII period, the name Novi Zagreb was used for the newly planned and transformed area between the railway and Sava (today's Trnje) as opposed to the old Zagreb (Donji grad). The freshly conquered area on the “other side of Sava” or the area south of Sava is called South Zagreb in all plans and records of this period. However, there is another, less formal reason – the planners of that period wanted Zagreb to be different from Belgrade in this aspect. However, the name Novi Zagreb prevailed later on [1].



**Fig. 1.** The plan of South Zagreb for 250,000 people; spatial organisation was realised strictly in line with the principle of residential communities



The need for fast construction of a significant number of flats, due to mass movement of people to the City, resulted in different expansion models of the City. In the case of Zagreb, the model “city next to the city” was chosen to avoid the restoration of vast illegally constructed areas on the outskirts of the City (Trešnjevka, Trnje, Peščenica, etc.). This model was legitimate and already known in the theory of urban planning. Many European cities solved their expansion in the same way in different periods, i.e., New Amsterdam in the Netherlands or Toulouse-le-Mirail in France as the “new Toulouse” for 50,000 people – a new part of the City right next to the old one. The project of South Zagreb was much more significant – the new part of the City was planned to accommodate 250,000 people. The area on the “other side of Sava” became both in architectural and urban planning sense, a polygon for verifying new contemporary ideas of urban planning. The international congress of modern architecture – Congrès Internationaux d’Architecture Moderne (CIAM) and the Athens Charter from 1933 played a vital role in the sense of planning a new city concept [2]. The Charter proclaimed the principles of a functional city and the principle for realising dignified hygiene living conditions (sun, light, air, green surfaces) [3].

All of the above mentioned supports the fact that the City and the society must be ready for such a grand venture as South Zagreb had been, and that it would take not only an idea, funds or organised residential policy, but also a major with progressive views and visionaries as Većeslav Holjevac was. Also, a cultural background was

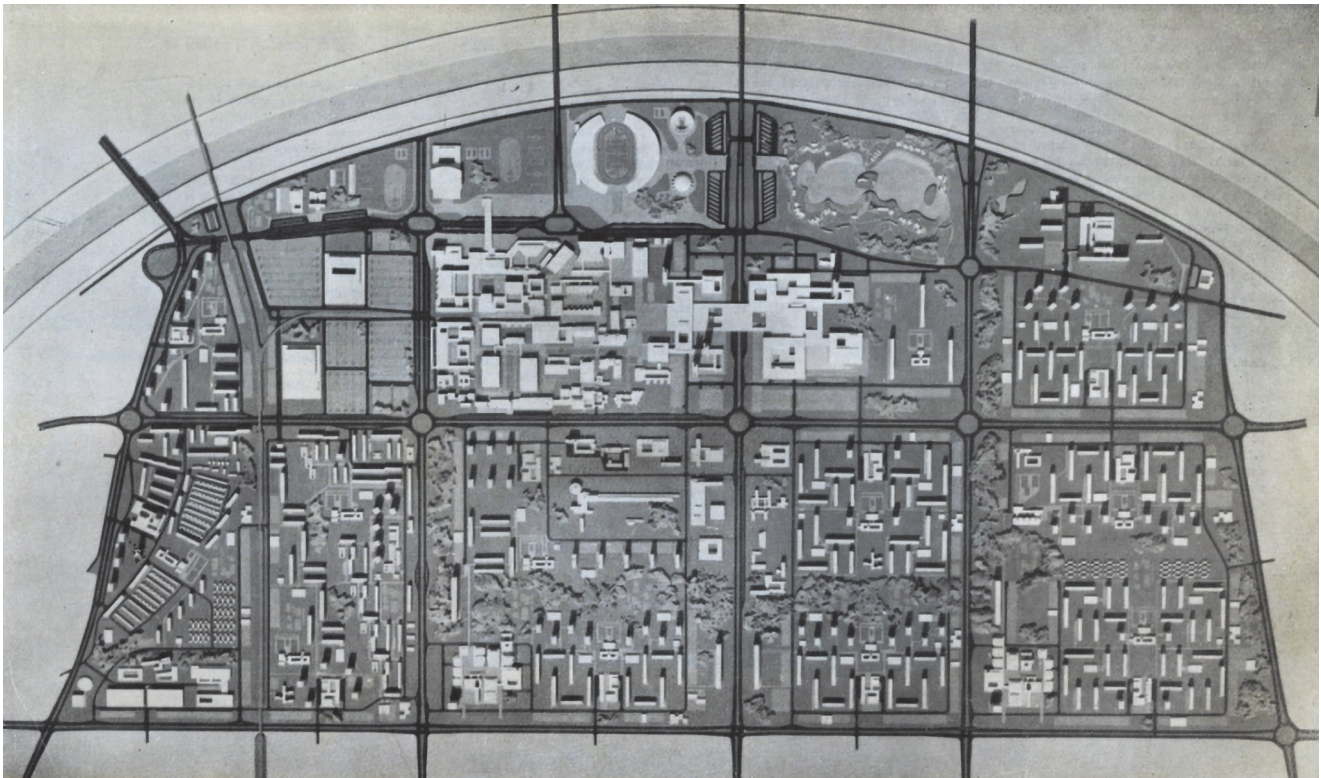
present in Zagreb at those times and the degree of social development that could realise a project like the Plan of South Zagreb for 250,000 people.

### 3. Urban planning of South Zagreb

The City of Zagreb Regulatory Plan (1953) is a plan drafted by an architect – Vladimir Antolić preceded the Zagreb South Urban plan. The councilmen of the City Assembly denied adopting the plan in its entirety since they felt that the City’s railway system required more work; also, the concept of the City across the River Sava had not been elaborated enough [4].

This fact motivated the mayor who wanted to direct the City’s development on the other side of Sava as quickly as possible. He met with the director of the Institute for Physical Planning of the City of Zagreb, architect Zdenko Kolacio, and put him in charge of forming a team of experts. These ideas marked the beginning of the South Zagreb project. Mayor Holjevac left a significant mark in Zagreb’s development and growth in the period of its transformation and the most significant progress. He was a visionary politician and writer, and open-minded enough to introduce innovations and make brave decisions.

He successfully fought off the attempts to direct the Zagreb Fair to Belgrade. With his independent and energetic politics, Holjevac confronted the Yugoslavian political leaders. After the Declaration over the name and status



**Fig. 2.** Photo of the model of South Zagreb for roughly 100,000 people, from the publications of Južni Zagreb, the Zagreb Urban Planning Institute (1962)

of Croatian literary language was published, Holjevac was expelled from the Croatian Communist Central Committee [5]. The legacies of his mandate (1952-1963) were the Zagreb Fair, Novi Zagreb, Pleso Airport, Technical Museum, Student Centre in Savska Street, Zagreb Television, Sljeme cable car.

At the beginning of his mandate in 1952 around 350,000 people lived in Zagreb. This number climbed up to 430,000 after his mandate (1961). The rise in the number of people acted as an incentive to develop a new city next to the city (South Zagreb). Two facts were in favour of this idea.

Right after WWII, the state was in charge of housing construction. The state's monopoly weakened between 1955 and 1959, and building funds were formed with contributions made by workers and work organisations. New possibilities for financing housing construction (in public or private ownership) opened up, and first housing cooperatives were founded.

In 1958 the nationalisation of tenement buildings and construction sites was implemented. The elimination of the ownership category in urban space allowed a freer approach to urban planning.

Concerning the post-war urbanism, it would be inappropriate not to mention and highlight the significant contribution to urban planning made by Vlado Antolić, great urban planner and visionary. His partially adopted City of Zagreb Regulatory Plan (1953) became the main planning development document in the '50s and the '60s of the 20th century [6]. Architect Antolić embedded in this Directive (1949/1953) new planning paradigms of a functional city, and the plan stimulated the city's expansion to the south towards the Sava and promoted modern settings of organising districts with buildings surrounded by green vegetation [7].

#### 4. The importance of Family and Household didactic exhibition

In 1956 national committees steered the direction towards rationalisation and funds for housing loans. Some cities even established loan policy and managed to increase their funds. This is specially referred to as engaging additional funds of work organisations for their workers. The structure of housing construction completely changed. National committees, urban planners, architects, builders and the industry had to find their place in the implementation of this plan, continually managing the rationalisation of housing construction. This rationalisation meant switching from building flats to producing them. The industrial production and pre-fabrication resulted in housing construction rationalisation.

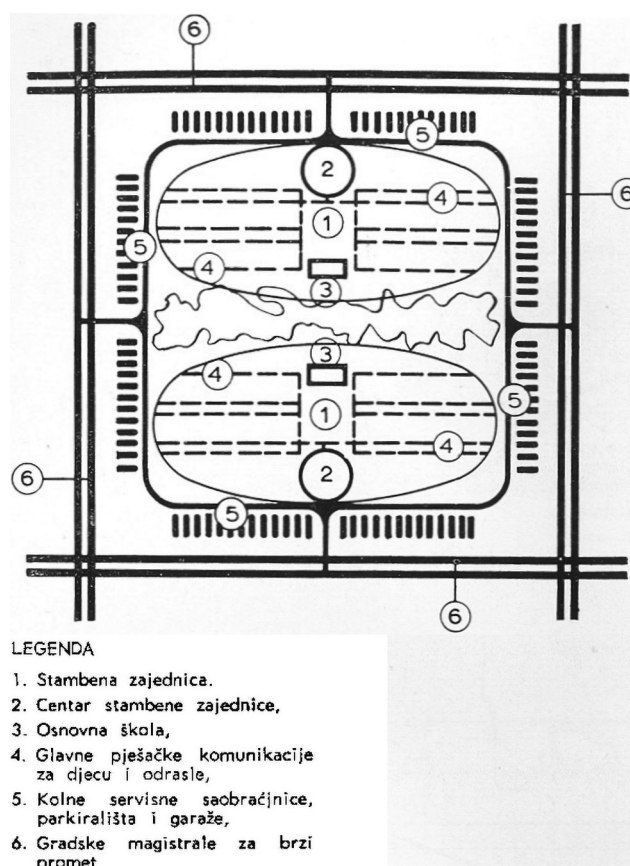


Fig. 3. Residential community organisation – the relation between pedestrian and road surfaces, Urban Plan Programme of Zagreb, the Zagreb Urban Planning Institute (1965)

The change in ownership played an important role, and a new law was adopted, which allowed the nationalisation of construction sites [8]. Without taking into account technical, architectural, urbanistic, economic, social and political criteria, housing issues could not have been resolved in its entirety. The Zagreb Fair played a direct and crucial role in the process of planning Novi Zagreb.

The exhibitions held by organisations Family and Household played an essential role in informing the public and searching for new housing models. They consolidated all aspects of the life of a “new human” in a new society. Educational Exhibition of Social Standard dealt indirectly with this issue as well as possible city housing models. Educational exhibitions organised by Family and Household [9] were held at the Zagreb Fair from 1957 until 1960. There was an obvious link between the promoted models of housing communities of the educational exhibitions organised by Family and Household and the executed Urban plan for South Zagreb since 1962 [10].

A “model of flat for the near future” was promoted at the Zagreb Fair through exhibitions and architectural tenders [11]. To create mutual principles and opinions to define a prototype of the flat, which would suit the conditions of the time and the needs of working people, an exhibition of the same name was held. All of this contributed to forming a model of community living after WWII [12].



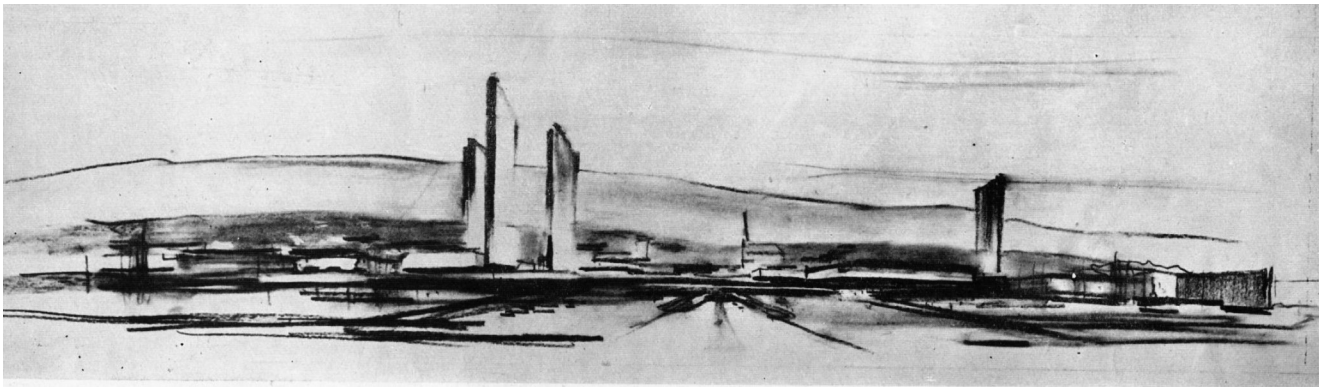


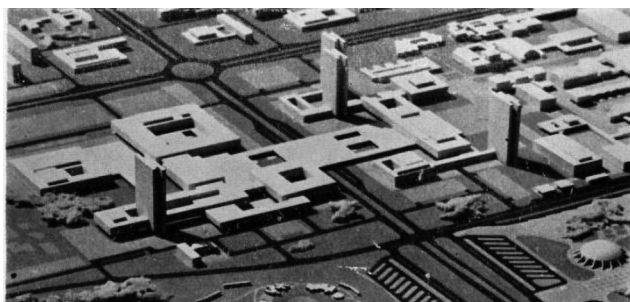
Fig. 4. View to South Zagreb facing Sljeme, Južni Zagreb publication

## 5. Housing community concept

In the late '50s and early '60s, the first plans of South Zagreb appeared. The concept of urban design of South Zagreb since 1962 included a new city for 250,000 people organised in housing communities [13] with 8,000-12,000 residents and an average density of 264 residents per hectare. Based on the principles of modular urbanism, a new city was planned right next to the existing one with four residential districts and 24 residential communities with 76 neighbourhoods, three districts, and one city centre as well as seven sporting and recreational centres and 24 playgrounds [10].

Each block of Novi Zagreb, defined by intense side traffic, carried urban and architectural features of the period. The novelties concerning planning included separate housing districts or "residential communities" whose size was determined by the capacities of schools, i.e. the number of children in the district who could attend their elementary school without having to cross wide city roads [14]. A new city centre of South Zagreb was also planned in addition to the central city axis.

Jakob Bakema, famous Dutch architect, was one of the authors who questioned the organisation system of the centre of South Zagreb and offered a solution [15]. Just as the new city centre, the centres of residential districts



Pogled na dio makete ukazuje na koncepciju centra. Promet prolazi ispod bujnog života na trgu. Poslovni dio povezuje se sa Velesajmom i na taj se način uključuje veliki međunarodni objekt u događaje i manifestacije centra, sa druge strane trgovačke i ugostiteljske velike radnje, društveni donovi, kazališta i kina u neposrednom su kontaktu sa bogatim zelenilom.

Fig. 5. Central area of South Zagreb, linking with the Zagreb Fair – part of the model, published in Južni Zagreb, the Zagreb Urban Planning Institute (1962)

were also planned for various cultural, recreational, trade-hospitality, and business amenities.

Special attention was focused on employment. In strictly industrial zones like Leskovac and Jakuševac, it was presumed that up to 50,000 people would work in larger service, industrial and other work zones of South Zagreb on the surface of 700 ha. After his international success and the first award from Sao Paolo in 1954 as well as realised bathing resorts along the Adriatic coast, in 1958, architect Zvonimir Požgaj developed a project of a Novi Zagreb bathing resort called Jezero (eng. Lake or today's Bundek) [16]. It was equipped with 2162 changing cabins and 860 lockers for 12,750 swimmers (15,000 max.).

Construction companies included in the South Zagreb project played a big role. They focused on prefabricating parts of buildings. They were the so-called flat factories Jugomont and Jugobeton, and they used the industrial YU-61 prefabrication system (author: Bogdan Budimirov, co-authors Željko Solar, Dragutin Stilinović) [17]. All of these changes resulted in the residential reform between 1960 and 1965 with housing funds as the primary source of financing. During that period (early 60's), the construction of the first generation of residential districts (Savski gaj, Trnsko under its work name Novi Zagreb 1, Zapruđe...) did not only start, but it was completed. Research showed that their maintenance and modernisation was not invested in enough, or it was not invested in at all, with serious indications pointing to their restoration and reconstruction [18]. In that time, Zagreb had a population of 560,000. The main documents for future development were the Urban Programme of Zagreb (1961/1965) and the General Urban Plan of Zagreb (1971) in which Novi Zagreb gained its form, detailed elaboration, and strict realisation rules.

## 6. Socially oriented residential construction

The best parts of Novi Zagreb were built in the '70s and the '80s of the 20th century based on the model socially oriented residential construction (DUSI). This model [19] was an integral part of the plans for future spatial development over the next five to 15 years. In 1979

Technical conditions for planning and constructing residential facilities on 20 locations were drafted for the purpose of socially oriented residential construction in Zagreb 1979-1980. In 1983 the DUSI study Standard of districts, buildings, and flats in Zagreb was drafted. The standards referred not only to the planning of buildings but also to district planning. Dugave (1977) was an example of a residential district of the period [20] with high housing standards from the aspect of the district and the aspect of buildings and flats. The '70s were marked by questioning the existing settings of urbanism and architecture. The main idea of the '80s was the city completion, with a focus on city areas that have been ignored ever since.

## 7. Conclusion

The area of Novi Zagreb was revalorised and affirmed once again by society and experts. This area was built in compliance with all the rules of urban planning of the time, achieving high quality in terms of its architectural expression. The contemporary transformation processes of the City, the affirmation and revitalisation of *Zagreb Fair* site, as well as the compression of this once main economic activity should turn this site into the centre of Novi Zagreb and transform it into a city inside a city with all of the missing amenities included. The final result should be a so-called living room for the residents of Novi Zagreb. The dissolution and transformation of the Zagreb Fair, its opening-up and merging with the future Sava Park (the area of the hippodrome and Bunde) will give Zagreb an attractive and recognisable park of the 21st century. This would in return improve the quality of life not only in Novi Zagreb but also in the entire City.

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**Note:** Novi Zagreb – the concept of a new city is an excerpt from the text prepared for *Prostor*, a scientific journal for architecture and urbanism in which the genesis of Novi Zagreb will be prepared and presented in full.



Borka Bobovec<sup>1</sup>, Ivan Mlinar<sup>2</sup>, Domagoj Sentić

## Zagreb Trade Fair as an Impetus for the Novi Zagreb Centre Development

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### Abstract

*The construction of the Zagreb Trade Fair started in the late 1950s with the intensive building of its pavilions. An incomplete urban-planning concept was a common feature of both the Zagreb Trade Fair and Novi Zagreb ("New Zagreb") itself. Zagreb Trade Fair has significant spatial potential that allows for a functional and partly a structural transformation of its areas and buildings.*

**Keywords:** Center of Novi Zagreb, Novi Zagreb, South Zagreb, Zagreb, Zagreb trade fair.

### 1. Novi Zagreb Historic and Spatial-urban Context

Spatial development of Zagreb in the late 19th and the early 20th century was prompted by accelerated industrialisation and commerce, along with a consequent increase of population. It was characterised by longitudinal expansion of the town eastward and westward from the city centre. The development was defined on the

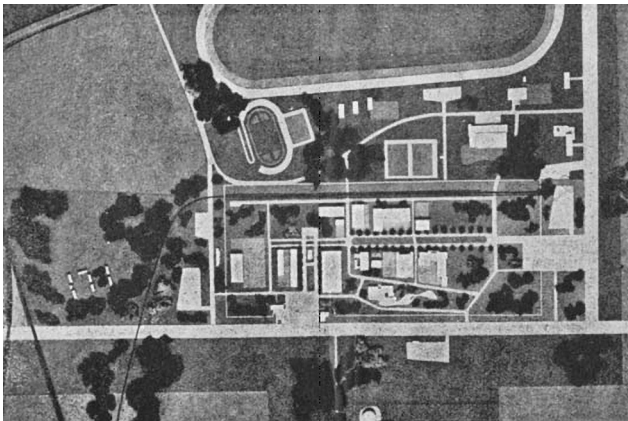
southern slopes of Zagreb Hill, and south of the railway built-in 1862. The area south of the railway and north of Sava River was mainly used for agriculture.

The railway became an obstacle and the divider between the southern part of Zagreb's residential areas (built between the late 19th and the early 20th century) and Trešnjevka, Trnje, and Peščenica areas that were planned for the expansion of the town [1]. In the same area,



Fig. 1. Aerial photography of the Zagreb Fair from the late 1950s [47]





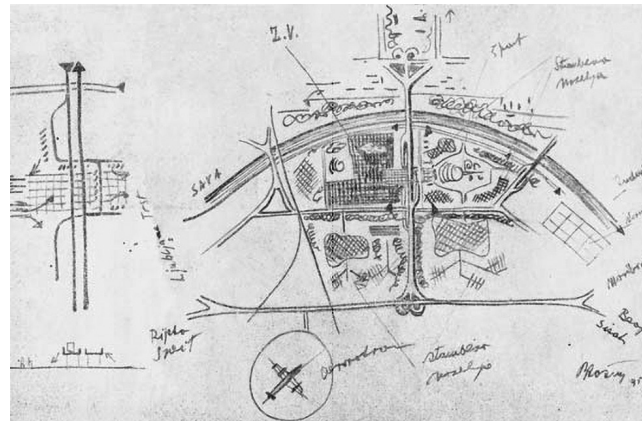
**Fig. 2.** Marijan Haberle: Scale model of the urban-planning concept of Zagreb Trade Fair from 1955 [20]

mostly alongside existing suburban roads, unplanned substandard construction of family housing was gradually developing, which soon became an obstacle to the urban planning of the southern part of the town's periphery [2, 3].

For the areas of Trešnjevka, Trnje, and Peščenica, the General Regulatory Plan for the Town of Zagreb from 1936 planned the incorporation of older constructions and infrastructure, as well as partial new development into the continuously built-up urban tissue. The same plan from 1936 also encompassed Sava River and the area south of the River, wherein sports facilities were planned. The WWII halted the implementation of the 1936 plan. The change in the socio-politic system, following WWII, prompted the development of the Directive Regulatory Basis of Zagreb in 1953, which encompassed a substantially wider area than that of the General Regulatory Plan for the Town of Zagreb from 1936, including a larger area south of Sava River, which thus also became the town's divider. A significant boost to the expansion of Zagreb to the right bank of Sava River was also the visionary decision of then-Mayor Većeslav Holjevac [4] to construct the Liberty Bridge (Most slobode) over Sava River, which was opened to traffic in 1959 [5]. Up to that point in the mid '50s, the construction of the Naval Institute, the first housing development of Novi Zagreb [6, 7] and Zagreb Trade Fair [8, 9, 10] had already started as a significant impetus to the development of the area south of Sava River [11, 12]. The construction of Zagreb Trade Fair prompted more rapid urbanisation in a way that it accelerated the development of overall infrastructure – from electricity, water supply, and sewage systems, to corresponding roads required for the access to Zagreb Trade Fair, which was utilised in the development of the entire area.

## 2. Zagreb's fairs area through history

Trade fair exhibitions in Zagreb have a tradition dating back to the first royal fairs in the late 11th century [13],



**Fig. 3.** Božidar Rašica: Sketch of the urban-planning concept of Zagreb Trade Fair from 1957 [19]

followed by the first fairs on St Mark's Square in the 13th century. Fairs were held on main squares of Gradec and Kaptol until the mid-17th century; when the attacks of the Turks no longer presented a threat, as they moved to the area of Harmica (today's Ban Josip Jelačić Square). The fair was subsequently relocated to the New Square (today's Nikola Šubić Zrinski Square), then to the Fair-ground Square (today's Republic of Croatia Square) in the mid-19th century, to the area of present-day Martićeva Street in 1895, and Heinzelova Street behind the Town Pound in the 1930s.

A significant event in the context of trade fair exhibitions in Zagreb is the Great Croatian-Slavonic Economic Fair, which took place in 1964 by the Market Square, on which the Croatian National Theatre was built later [14]. Zagreb Assembly was the name of the international economic exhibition and holding company that operated in Zagreb from 1909 until 1946 as a predecessor to the Zagreb Trade Fair. The first exhibition (trade fair) at Zagreb Assembly was organised in 2011 by the Fair-ground area in Martićeva Street. The WWI halted the holding of Zagreb Assemblies, which resumed in 1922 as the First Great Fair of Zagreb; from 1936 onwards, the exhibitions of Zagreb Assembly took place at the new exhibition space on Savska Road, at which the of Zagreb University Student Centre is located today [15]. Zagreb Assembly was renamed to Zagreb Trade Fair in 1946 and relocated in 1956 from Savska Road to the area south of Sava River [16] – the present-day Novi Zagreb.

The fairs were being relocated to new sites that were typically placed peripherally in relation to the city, thereby stimulating the development and emergence of new urban areas. Based on the example of Zagreb, we can follow the relocation of fairs mainly towards the south and Sava River. The construction of the Zagreb Trade Fair south of Sava River prompted a significant expansion of the town to the hitherto practically non-constructed southern area of Zagreb, which will soon become Novi Zagreb.

### 3. Zagreb Trade Fair in Novi Zagreb

With the beginning of the construction of the new Trade Fair, the political leadership saw the possibility to also demonstrate the stable development of the economy beyond the state's borders and to initiate a significant international fair in the south-eastern part of Europe. The management of the Zagreb Trade Fair and the City of Zagreb as the state's leading industrial centre recognised the relevance and potential of organising a large-scale international fair and enabled its implementation in the area of Novi Zagreb within a short period. The Zagreb Trade Fair was the only international fair that was equally visited by exhibitors from all countries (capitalistic and socialistic states), with particular emphasis on Non-Aligned countries, which were becoming a relevant market at the time. The inadequate number and size of the Fair's exhibition spaces very quickly presented a limitation to the exhibitors, who sought to display their products in the best way possible [17]. The construction of the pavilions of the new Fair began in 1956 [18] upon the decree of then-Mayor Većeslav Holjevac, in the non-constructed area south of Sava River according to the urban-planning concept of Marijan Haberle [19, 20] from 1955 [21, 22]. The Fair's spatial matrix is characterised by a sequence of pavilions alongside three longitudinal lines from east to west, while the urban-planning design was pushed into the background concerning projects of individual exhibition Halls due to short deadlines for deliberation and construction. Such an approach has resulted in inconsistent spatial relations as a whole and between the individual Halls [23]. The urban-planning concept of Zagreb Trade Fair by Božidar Rašica [24] from 1957 sought to integrate the Trade Fair with the entire area of Novi Zagreb, and highlight the central axis from north to south, with Zrinjevac (Nikola Šubić Zrinski Square) as the starting point.

As part of Zagreb Trade Fair, a significant number of architecturally valuable pavilions were constructed,

from the "West Germany" pavilion by Ivan Vitić (today's Pavilion No. 40) [24, 25] and "Machinery" by Božidar Rašica [26, 27] (today's Pavilion No. 36) [25, 28], to the "Tourism" pavilion by Zdravko Bregovac [29] and "Đuro Đaković Pavillion" by Miroslav Begović (today's Pavilion No. 28) [25, 28].

One of the first exhibition halls, "named" as the Hall Number 40, was built according to the design prepared by an architect Ivan Vitić and civil engineer Kruno Tonković. They, within an incredibly short time, devised the original concept that was on par with the most celebrated architectural creations of the mid-20th century [30]. Most of the pavilions were built in the second half of the 1950s and early 1960s, whereby the financial resources were merged with the ones of the exhibitors, who constructed the pavilions and exhibited in them for a certain period, after which they entrusted them to Zagreb Trade Fair. This period saw exceptional expertise, organisation and collaboration between architects and civil constructors [31] who, in spite of numerous limitations and short deadlines, successfully developed projects and constructed pavilions that are comparable with the most significant works of architecture at the time.

During the 1970s, a few more pavilions were built with no significant architectural value, while the overall construction was completed in the late 1980s, including the southern entrance to Zagreb Trade Fair in 1987 according to the project by Đivo Dražić and Edvin Šmit [32]. The spatial concept of Zagreb Trade Fair has been developing from its beginnings until the present day [33], starting from simple linear sequencing of pavilions along the axis extending from east to west, to intended northward expansion of exhibition Halls and roads towards Sava River, with the purpose of highlighting the central urban axis from north to south with Zrinjevac as the starting point. From today's perspective and compared to other projects, Zagreb Trade Fair was a platform that reflected the state of the architectural scene at the time,

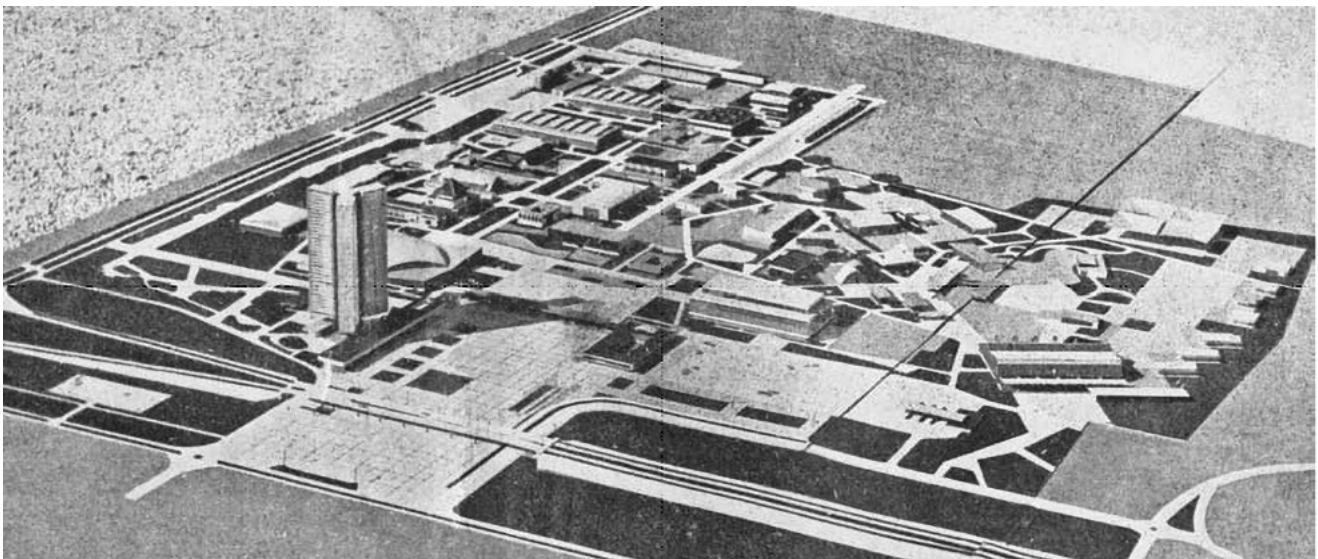


Fig. 4. Božidar Rašica: Sketch of the urban-planning concept of Zagreb Trade Fair from 1957 [19]



i.e., it can also be regarded as a laboratory for new architectural forms and viewpoints [34].

The space of the Zagreb Trade Fair has been protected by the Institute for Protection of Cultural Monuments as a cultural asset and entered in the Register of Protected Cultural Assets, while some pavilions are under special protection as constituent parts of the building fund of monumental value: 1. “Machinery” by Božidar Rašica, 1957 (today No. 36); 2. Hyperbolic Paraboloid by Božidar Rašica, 1964 (today designated as K 3. Chinese Pavilion by Cheng Sung Mao, 1957 (today No. 11); 4. “Vitić’s Pavilion” by Ivo Vitić, 1956 (today No. 40); 5. The German Democratic Republic by Božidar Rašica, 1964 (today No. 35); 6. USSR by J. Abramov, 1956 (today No. 9); 7. The Czechoslovak Socialist Republic by Josef Hruby (today No. 20), 1956; 8. Italy, by R. Contigiani, G. Sambito, 1962 (today No. 15) [35].

Since then, for nearly twenty years, Zagreb Trade Fair has seen investment only in the maintenance of existing edifices and infrastructure. While taking into account, the necessity of creating needed spatial and infrastructural conditions for contemporary trade fair exhibitions, the City of Zagreb has opted for the construction of a new Trade Fair Centre, which in 2007 prompted the preparation of the Programme for Urban and Architectural Development of the Zagreb Trade Fair. The program initiated the construction of the new part of the Zagreb Trade Fair is planned east of the current location [36]. New exhibition Halls were planned with the approximate total area of 60,000 square meters of gross exhibition space with underground parking structures, while the pavilions would be connected by the fair’s enclosed avenue, with which the revitalisation of Zagreb Trade Fair would be implemented in its entirety [37].

#### 4. Centre of Novi Zagreb

The area of Novi Zagreb was also interesting for foreign architects. Jakob Bakema, one of the most significant Dutch architects in the 20th century [38, 39], believed that the future ‘heart’ of the city should be created around the wide-open space next to the Sava River [40]. In 1965 he proposed a concept for the centre of Novi Zagreb based on the European architectural theory and practice at the time. The centre was designed and organised as a junction point from which everything is further distributed and grouped. The traffic and access of vehicles to parking lots are clearly defined and enable a quick and efficient separation of pedestrian and vehicular traffic, which, together with parking lots, becomes invisible to the centre’s users. Sites intended for gatherings of residents are located in several places, which enables the division into cultural, public, and commercial contents. Another feature of this simple concept is the possibility of connecting the Sava River to the city. The concept’s simplicity also opened up an array of options for further

extensions without having to intervene in the concept’s basic idea, substantially.

In 1982, six teams of Zagreb’s urban planners developed Studies of Central Urban Space of Trnje, Novi Zagreb, and Banks of the Sava from the Railway Bridge to Youth Bridge, which also encompassed the centre of Novi Zagreb [41, 42]. These studies were ambitious, albeit theoretical concepts that gave incentive to new deliberations and postulates for the development and design of the town. Then, in 1985, a Call for Tenders was issued for a concept of a commercial and conference center with a hotel on the east side of the Zagreb Trade Fair, and office buildings of INA Commerce and Exportdvo. The result is the construction of the INA Commerce building, designed by Velimir Neidhardt on the east side of the Zagreb Trade Fair, northwest of Većeslav Holjevac, and Dubrovnik Avenues intersection [43]. The area east of the Zagreb Trade Fair, alongside the central city axis, was ideal for the reassessment of connections between old and new parts of the city along the line that was of exceptional importance for growth and definition of the city. The significance of the building of INA Commerce lies in the fact that this was the first large-scale business edifice built in Novi Zagreb [43] outside of the enclosed area of Zagreb Trade Fair.

Following the Call for Tenders issued in 1991 for the East Entrance to Zagreb Trade Fair and World Trade Centre with a hotel, the two top-ranked bidders were projects by authorial groups comprised of Velimir Neidhardt, Zvonimir Krznarić, and Davor Mance [43], and Marijan Hrzić, Tomislav Odak, and Branko Siladin. The submitted projects planned the centre of Novi Zagreb with two lines divided by an access road parallel to Većeslav Holjevac Avenue. A sports centre with a garage, followed by World Trade Centre, East Entrance to Zagreb Trade Fair with an entrance square, and an office building connected to the Trade Centre, and the garage was planned on the line alongside Zagreb Trade Fair, from north to south. The line alongside Većeslav Holjevac Avenue was defined by the proposed hotel on the north, and by the existing building of INA Commerce on the south. Furthermore, a park with a large square, south of the hotel and

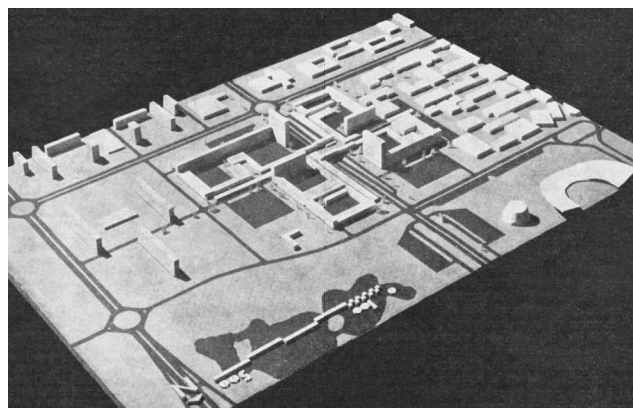
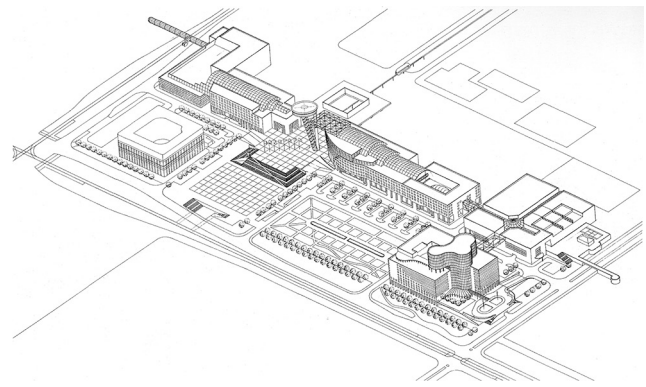


Fig. 5. Jakob Bakema: Third stage of the construction of the centre of South Zagreb from 1965 [40]



west of the WTC, was planned, too. The Call never saw its implementation, as was also the case with the study by architects Bach and Stoecker from 1997.

In the first decade of the 21st-century, construction of the Museum of Contemporary Art (designed by Igor Franić) was opened (2009) by the northeast corner of Većeslav Holjevac and Dubrovnik Avenues intersection. The Avenue Mall, a commercial centre on the southwest portion of the intersection of Većeslav Holjevac and Dubrovnik Avenues, designed by the architectural office Plan d.d., and opened in 2007 [44]. The business and residential complex Bundek Centre, authored by Branimir Medić and Pero Puljiz, has been built since 2008 southeast of the intersection of Većeslav Holjevac Avenue and Bundek Street. The edifices built and initiated in the centre of Novi Zagreb reflect the fifty-year



**Fig. 6.** Velimir Neidhardt, Zvonimir Krznarić and Davor Mance: Submitted concept for the East Entrance to Zagreb Trade Fair and World Trade Centre with a hotel from 1991 [43]

planning of the area of Novi Zagreb and the potential new centre of the city.



**Fig. 7.** Zagreb Trade Fair on the orthophoto map of Zagreb [35, 48]: 1 Pavilion 1, Božidar Rašica, 1976; 2 Pavilion 2, Božidar Rašica, 1976; 5 Light Industry I, Marijan Haberle, 1956; 6 Light Industry II, Marijan Haberle, 1957; 7 Austria, Božidar Kolonić, 1969; 7a Pavilion 7a – extension, Đivo Dražić, 1987; 8 Federal Republic of Germany, Peter Pixis, 1960; 8a Pavilion 8a – extension, Božidar Rašica, 1969; 8b Pavilion 8b – extension; 9 USSR, J. Abramov, 1956; 10 Federal Republic of Germany, Buderich, 1968; 10a Pavilion 10a – extension, Đivo Dražić, 1990; 11 Chinese Pavilion, Cheng Sung Mao, 1957; 11a Pavilion 11a – extension, Božidar Kolonić, 1971; 12 Wood Industry, Dubravko Radošević, 1970; 13 USA, F. Bornemann, 1967; 14 Pavilion 14, Ivan Vitić, 1957; 14a Marles, Ludvik Sedonja, 1976; 15 Italy, Contigiani and Sambito (construction), 1961; 16 Slovenijales, Božidar Rašica, 1964; 18 German Democratic Republic, Richard Paulick, 1957; 19 Romania, Ressu, 1956; 20 Czechoslovak Socialist Republic, Josef Hruby, 1956; 22 Pavilion 22, Marijan Haberle, 1956; 23 Lesnina, Pavel Göstl, 1970; 24 Vaso Miškin Crni, Lujo Schwerer, 1961; 25 Light Industry III, Marijan Haberle, 1961; 28 Đuro Đaković, Miroslav Begović, 1961; 29 Craftsmanship Pavilion, Drago Korbar, 1958; 31 Rade Končar, Zvonimir Marohnić and Drago Korbar, 1957; 32 Energoinvest, Zdravko Gmajner, 1960; 33 Greece, Vlasta Jakovac, 1959; 34 USA, Ivo Geršić, 1958; 35 German Democratic Republic, Božidar Rašica, 1964; 36 Machinery Hall, Božidar Rašica, 1957; 36a Machinery – extension, Božidar Rašica, 1958; 39 USSR, B. S. Vilensky, 1967; 40 Vitić's Pavilion, Ivan Vitić, 1957; A Administration Building – extension, Marijan Haberle, 1956 / Zrinka Andrijević, 1965; C Customs – Intereuropa, Edvin Šmit and Đivo Dražić, 1990; H Hyperbolic Paraboloid, Božidar Rašica, 1964; K Conference Centre, Božidar Rašica, 1969; S Customs Storehouse and Workshops, Marijan Haberle, 1956; U Southern Entrance, Edvin Šmit, Đivo Dražić, 1990; W Public Washrooms and Toilets, Marijan Haberle, 1956

## 5. Conclusion

By analysing the development of the city of Zagreb, sites can be traced at which fairs were located – starting from St. Mark's Square, Ban Josip Jelačić Square, Republic of Croatia Square and the Student Centre to Zagreb Trade Fair – which prompted urbanisation and modernisation of town areas. The fairs changed locations in town at which they were held, and ultimately developed from local markets to an international trade fair. With the construction of Zagreb Trade Fair, all necessary infrastructure that enabled the development of this part of the town were brought to the area of Novi Zagreb; hence, the latter once again played an important role in the development of the new part of Zagreb in the late 1950s [45], which can be considered a strong stimulating element to the city's expansion to non-constructed, free areas.

The basic function of Zagreb Trade Fair is contemporary trade fair exhibitions, which is not fully possible due to the urban-planning and architectural concept that is more suitable for the period in which it was built than for the present time and needs. The system of individual fair pavilions and open surfaces is being increasingly replaced by large, enclosed, flexible spaces that enable quick transformation according to the fair's programmes.

The existing spatial, functional and structural potential of Zagreb Trade Fair is today an appropriate location for a new transformation of the city. The contemporary spatial and traffic requirements for trade fair exhibitions direct Zagreb Trade Fair to a new location that will stimulate further urbanisation and modernisation of the city's marginal area.

The threat to the area of Zagreb Trade Fair is posed by the lack of a clear vision regarding the development of this urban area and the city as a whole, but also by partial interests that also increasingly stimulate the design or modification of plans, as well as implementations that permanently restrain the development of the city, which results in a certain level of chaos and disharmony in the urban-planning, architectural and sociological sense [46].

The common feature of Zagreb Trade Fair and Novi Zagreb is the disconnected and incomplete urban-planning concept that was adapted to contemporary needs over time and to a certain extent. Today, the area of Zagreb Trade Fair is a spatial divider of Novi Zagreb, for which it is increasingly difficult to keep track of the contemporary needs of the city, but also of contemporary trade fair exhibitions. Zagreb Trade Fair represents a great urban potential for a functional and partly a structural transformation that began with the construction of the Museum of Contemporary Art alongside this exceptionally attractive and valuable urban space.

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## The Fairground as a Geopolitical Playground: the Zagreb International Trade Fair and Cold War Circumstances

### Abstract

*Zagreb is a city with centuries-old tradition of annual fairs where the first modern international trade fair was organized as early as 1864. The history of Zagreb International Trade Fair begins back in 1909, when its predecessor, trade show named Zagreb Convention was founded and its first exhibition was held next year. Over the years the Fair changed its locations several times, due to physical limitations of the place available and lack of space needed. With the last relocation to its current location on the right bank of the Sava River, close to the cardinal city axis, Zagreb Fair gained far greater importance, propelling also further development of the city and giving decisive impulse to immediate construction of emerging Novi Zagreb. The construction of the first stage of new Trade Fair started in summer 1956 according to the spatial concept by architect Marijan Haberle. In only 115 days till the vernissage a number of 13 pavilions were built, there of 7 made for foreign countries by selected national architects. For the following event in 1957 the new Fair was completed, i.e. substantially enlarged to the extension plan by Božidar Rašica to comprise a total of 21 exhibition pavilions: nine for domestic exhibitors designed by renowned Croatian architects, and ten other ones for foreign exhibitors (USA, Austrian, BRD and DDR) in addition to the already existing one and also one more for collective foreign shows as well as one for domestic representatives of foreign industries. In the upcoming decade or so several new pavilions were built, the others changed owners or users. Above all, however (new) Zagreb Trade Fair, generously arranged, embellished in time with fine landscaping and a number of open-air sculptural accents, was not only a prestigious international commercial event. Its premises became an unrivaled arena for most direct head-to-head competition of radically opposed Western and Eastern worlds, involving (following the establishment of Non-Aligned Movement 1961), also 3rd World countries in the famous AYA – Africa-Yugoslavia-Asia exhibition hall.*

**Keywords:** Zagreb International Trade Fair; pavilions, New Zagreb

Zagreb is a city with a centuries-old tradition of annual fairs, where the first modern international trade fair was organized as early as 1864. As in many other cities, the fairs developed from markets. Until the mid-seventeenth century, markets in Zagreb were organized on the traditional central squares of the upper town, Gradec and Kaptol. The idea of hosting a major trade exhibition emerged in the mid-nineteenth century, and in 1864, on the Fairground (Sajmište) Square and in today's Rectorate Building, the first in a series of internationally important commercial exhibitions was held (the Triune Kingdom National Exposition). The National Economy and Forestry Exhibition followed in 1891. Over the years, the Fair changed its location several times due to the need to expand and the physical limitations on the space available. The following exhibition was relocated to the eastern part of the city, where the Croatian-Slavonian Economy Exposition was held in 1906.

The history of the Zagreb International Trade Fair begins in 1909, when its predecessor, the Zagreb Convention, was founded, while its first exhibition was held the following year. The initial impetus for the Trade Fair came from the mayor, Milan Amruš, who realized how important it would be for the future development of the city. The Zagreb Fair had five large permanent exhibition buildings, as well as thirty companies with their own pavilions, and national pavilions for, initially, the United Kingdom, Sweden, Czechoslovakia and France, and later also for Italy and Spain. One of the permanent struc-

tures was a former riding house converted into an "Industrial Palace".

Exhibitions were also organized in 1911 and 1913. The end of the First World War saw the formation of a new state, The Kingdom of Serbs, Croats and Slovenes. In the new state, Zagreb was the center of industry, trade, commerce and finance. The need to reinforce the links between the newly established state and the market led to the revival of the Zagreb Convention and the first post-war trade fair was organized in the summer of 1922. It was conceived as a Kingdom trade fair with an international focus [1]. After the revival two events took place each year – a special spring show in April (cars and other motor vehicles and individual branches of the economy) and a major annual international trade fair in September with numerous specialized exhibitions. The fair of 1922 covered an area of over 31,000 m<sup>2</sup>, including 13,000 m<sup>2</sup> in the pavilions, and there was a total of 650 exhibitors, including over five hundred from the host nation. International participants included companies from France, Germany, Hungary, Czechoslovakia, Austria, Poland, Switzerland and Italy.

Due to the growth of the Zagreb Convention, its location soon became unsuitable. In 1930 a call for proposals was made to reorganize the venue, but this idea was dropped. Instead, the decision was taken to relocate, and in 1934, after years of searching, the Convention was moved to the large site of a former furniture factory – "Bothe &

Ehrmann” – on the Savska Road. This move represented the final acceptance of the Zagreb Convention’s development as an urban institution with significance reaching beyond the city limits. The new location eliminated the basic spatial restrictions of the Zagreb trade fair and provided the necessary conditions for its continued evolution.

At the end of the 1935, a contest to redesign and reinvigorate the Zagreb Convention was announced. The architects Hinko Bauer and Marijan Haberle won the first prize. The design of the complex by Bauer & Haberle implemented in 1936–1938, reflects the high quality of the ensemble as a whole and of national pavilions individually [2]. It is appropriate to evaluate the Zagreb Convention using the criteria for constructing complexes used for the international fairs of the era, particularly the 1937 Paris Exposition. Individual pavilions can be compared with the structures built for international exhibitions, such as the Venice Biennale. This was a kind of global competition in architecture, similar to the international section of the Paris exhibition in front of the Trocadero with the Finnish pavilion of Alvar Aalto, and the Yugoslav one designed by Josip Seissel. The permanent national exhibition pavilions of France, Italy, Germany and Czechoslovakia were designed by foreign architects – architects Robert Camelot and Jacques Paul & Herb with the constructor Bernard Lafaille in 1937, Dante Petroni in 1937, Otto Roemer in 1937, and Ferdinand Fencel 1938, respectively. The French exhibition pavilion was built in the center of the new trade fair complex. Its position and circular plan were taken from the first-prize-winning design. The pavilion was cylindrical with an irregular perimeter, covered with a thin-shell steel structure (“la voile mince”), and had an inverted conical shape with a diameter of 33 meters. The cone was built of 2 mm-thick steel plates positioned 15 meters above the ground on a ring of 12 tubular posts with a diameter of 80 cm each. The posts stood on short reinforced-concrete base columns rising from the foundation ring. The lower part of the perimeter had masonry walls, while the upper part was built of wooden frames and boards with narrow vertical windows. Additional natural lighting was provided through the central roof glazing. The pavilion was heated by an electric heating system. The structure was built by the “Braća Faltus” construction company, while the “Braća Ševčik” iron and metal foundry produced the metal construction. In the Zagreb fair complex the French pavilion represents a unique engineering innovation, because it was the first time a thin-shell construction had been applied to a load-bearing structure. The pavilion has exceptional cultural, historical, technical and technological value, far exceeding its local significance, and was therefore repeatedly published and appraised in the international professional press. The Italian pavilion, a worthy achievement of interwar rationalism, was also immediately published in the periodical *Heraklith-Rundschau*. The Czechoslovak pavilion, a significant building in the spirit of what was known as scientific functionalism, was

highly appreciated within the œuvre of its author. Interestingly, the pavilion of the Third Reich in Zagreb was designed as an elegant, atrial, skeletal structure in the Bauhaus style. It was completely different from the German pavilion designed with totalitarian architecture by Albert Speer, which was built almost simultaneously for the 1937 Paris Exposition. The architects of the French and Czechoslovakian pavilions in Zagreb occupy highly valued positions in the international history of modern architecture, while the designers of the Italian and German pavilions have fallen into complete oblivion [2].

The dynamic development of the Zagreb Convention was unfortunately short lived: the big autumn show in 1939, where the Philips Company presented a television exhibition with a movable TV studio, coincided with the German invasion of Poland and the outbreak of the Second World War. Soon the activity of the Convention began to fade and in autumn 1942, instead of the international fair of samples, only a Croatian-German agricultural festival was held. The exhibition activity on the Savska Road site was reignited in 1947 under the new name “Zagreb Fair”. Post-war changes, both social and political, demanded a reorganization of the Zagreb Fair in a way that suited to the government of the newly established Socialist Federal Republic of Yugoslavia. The composition of foreign exhibitors changed significantly with the leading role now taken by the Soviet Union. The affiliation of Yugoslavia to the socialist bloc and the beginning of the Cold War, were both important factors in how individual states presented themselves at the Zagreb Fair [1]. The International Sample Fair was organized with the purpose of promoting the first Yugoslav five-year plan for boosting the national economy. At the fairground, the former French pavilion, located in the middle, now became the Central Pavilion, while the Czechoslovak pavilion was retained for use by Czechoslovakia; the Concert shell between the main entrance and the French Pavilion (which became the national pavilion of independent Croatia in 1941) was demolished, and the picturesque Banovina pavilion was replaced with an unsightly addition to the former German pavilion. The new era was marked with a sgraffito mural titled *Work, industry, construction* by Ernest Tomašević [2].

In June 1948 an attempt was made to sabotage the Zagreb Fair: “...the countries of the Cominform bloc wished to obstruct the fair by first hiring pavilions and then cancelling their participation at the last moment. Thanks to the resourcefulness of the Zagreb Fair management, this scheme was not only prevented – quickly filling the entire exhibition space previously hired by the USSR – but was also turned into our advantage, the western side of the fairgrounds being expanded by three new pavilions” [3]. As the Yugoslav League of Communists under Comrade Tito had been expelled from Cominform that same month for having refused to accept limits on its independence of action, sabotage of the Zagreb Fair was not entirely unexpected.

From the early 1950s the Zagreb Fair yet again showed a need for expansion. At the same time, Većeslav Holjevac, mayor of Zagreb, recognized the city's need to cross the Sava River and to continue its logical progression to the south. Out of this came the idea of making a new venue for the Zagreb Fair on the right bank of the Sava River. In the spring of 1953, experts from various city institutions came together to evaluate the possible expansion of the city, and the Zagreb Fair, beyond the Sava" [3]. A location was conditionally approved, along with plans to expand the city south of the river.

The construction of the first stage of the new Zagreb Fair started in summer 1956, along the lines of a spatial concept by the architect Marijan Haberle. In record time, with only 115 days till the vernissage, the first 41,000 m<sup>2</sup> of the exhibition space, complete with all utilities and facilities, was completed on a plot measuring 325 x 900 m. Thirteen pavilions were built, seven of which were designed for foreign countries by selected national architects. Italy, the USSR, Romania, Czechoslovakia, China, Hungary and Poland took the opportunity to build new structures with a total exhibition area of 19,432 m<sup>2</sup>. For Yugoslav exhibitors, the Zagreb Fair authorities built five pavilions totaling 20,464 m<sup>2</sup> in area. Due to the unexpectedly high interest from exhibitors and the lack of space, two other pavilions originally earmarked for Yugoslavia were ceded to India, Austria and West Germany. In addition, some foreign countries, including the USA, Great Britain, Liechtenstein, Israel and Pakistan, stayed at the old fairground, occupying some 20,000 m<sup>2</sup> of exhibition space in the city center (Savska Road), making a total of twenty-five participating countries from three continents.

In September 1956, Marshal Tito opened the 51st International Fair in Zagreb, which was in that year held in two locations: on the completed part of the new grounds, and on the old fairground in Savska Road. During the opening it was pointed out that "the Zagreb Fair 'is becoming a manifestation of two permanent policy aspirations of Yugoslavia: aspirations for economic progress and aspiration for a wider and broader cooperation between Yugoslavia and other countries'" [4]. "With the 51st International Fair, Yugoslavia was affirmed as an industrial land and at the same time had become a manifestation of Europe's economic scale. That, business people of many countries did not hide" [5].

As part of US President Eisenhower's foreign economic policy, which started in 1954, United States participation in international trade fairs included exhibitions behind the Iron Curtain. The first such appearance was at the International Trade Fair in Zagreb in Communist Yugoslavia 1956. While little was expected in immediate trade, the fair offered a chance to counter Soviet propaganda and present an approach to American life and resources [6]. The theme was "America at home", where Yugoslav workers were invited to compare their daily lives with those of their American counterparts. The display model was a completely furnished "pumpkin" – a shaped dwell-



**Fig. 1.** Zagreb International Trade Fair, aerial view 1957 in front line – Hungarian, Soviet and Chinese pavilions; behind – Czechoslovak, Romanian and GDR pavilions; far behind – USA and Engineering pavilions

ing of sprayed concrete designed by the architect John Johansen especially for the Zagreb Fair. [Fig. 1.] "It is the first building of its kind in the world ... The structure of the building is made of a concrete shell covering over the pipe framework. A concrete circular dome covers a floor of about 15 m in diameter. The frame, coated with concrete (concrete can be also sprayed), is mounted on the edge of the circular foundation and connected at the top to a tubular joint. The most interesting thing is that the roof of this building does not require any central pillar, so the entire surface of the building is completely free for decoration" [7]. Despite its interesting project, the United States exhibit was at a disadvantage, being housed at the old fairground in downtown Zagreb, while the Russians and Chinese had permanent buildings of their own at the new grounds outside the city [8].

For the following event in 1957, the new Fair was complete, having been substantially enlarged in line with designs by Božidar Rašica, to comprise a total of 21 pavilions: nine for domestic exhibitors, designed by renowned Croatian architects, ten others for foreign countries (the existing pavilions were joined by those for the USA, Austria and the two Germanys), one more for collective foreign shows, and the last one for domestic representatives of foreign industries. [Fig. 2.]

The first US pavilion at the Zagreb Trade Fair was designed by the Walter Dorwin Teague Association. It contained 4,250 m<sup>2</sup> of space. Most of the construction materials were made in Yugoslavia, including ten Y-shaped steel posts supporting the building, each stretching its arms 29 meters across the width of the building. Aluminum louvers, each almost one meter wide and 4.8 meters long, covered the façade [9]. [Fig. 3.] These were fabricated in the US and shipped across the ocean with "do-





Fig. 2. Shaped dwelling of sprayed concrete designed by John Johansen – US display model at Zagreb International Trade Fair

it-yourself” instructions for the construction crew. The pavilion included an appliance store, a model apartment, an area for farm machinery and a fully equipped laundromat, creating a sensational picture of the American way of life. By creating consumer demands that the Soviets could not yet fulfill, Americans wanted to push the independent-minded President Tito closer to the West [10]. Many years later Walter Dorwin Teague explained the situation:

*“In 1957, I designed and built the permanent United States pavilion in Zagreb, Yugoslavia, for the Department of Commerce. With some misgivings, Paul Medalie, the Commerce man, and I gave in to the pleadings of the Yugoslav fair management and agreed to let them do the construction. The schedule was almost impossible; because of delays in the contract we couldn’t break ground until June, and the 350-foot-long building was supposed to open, with exhibits, Sept. 10.”*



Fig. 3. USA pavilion at Zagreb International Trade Fair 1957

*The Yugoslavs wanted to show what they could do. The steel mill in Maribor worked 24 hours a day, and 13 machine shops in Zagreb cranked out the huge louvers that made up the facade, using the material we shipped over. Our people and the Yugoslavs worked side by side, communicating in sign language.*

*The main exhibit was a complete duplication of a large U.S. supermarket, and the U.S. Food Chain Association did a masterly job of bringing over everything and setting it up. On Sept. 10, Marshal Tito walked down the aisle and cut the ribbon to open the show. The supermarket was a huge success, and the Zagreb officials went on radio with glowing praise of the building, the exhibits and the cooperation that had overcome all obstacles.*

*Almost 30 years have passed since then, and I haven’t been back, but I know that at that time there were very few people in Zagreb who didn’t admire and want to emulate the United States, and that includes Communist Party members. We weren’t trying to tell them to give up Communism; we were saying: ‘This is how we do it. Judge for yourselves.’ ” [11].*

The permanent American pavilion was the largest exhibition building constructed by the United States in any foreign country at the time of construction, and it was supervised by the designer’s son, Walter Dorwin Teague, Jr [12]. The first American supermarket in a communist country, Supermarket USA, as a joint project of the National Association of Food Chains and the US, was housed in one third of the pavilion [13]. Six hundred manufacturers contributed equipment and merchandise for the exhibit, including packed and perishable items.

The American pavilion drew visitors with a series of interesting exhibits (agricultural and household appliances, the typical American home) and a supermarket that had never before been seen in Yugoslavia [10], while the pavilion of the USSR, dominated by huge machinery, special vehicles, also presented “a ‘new model of the Volga passenger wagons’, trucks, and a self-propelled combined harvester SK-3.” Only the free sightseeing flight by Aeroflot helicopter, brought along with the Soviet exhibition, went some way toward matching the delights of American abundance [14].

The following year, the struggle for supremacy between the Soviets and the Americans was once again expressed at the Zagreb Fair with demonstrations of the competing achievements of their nations. The idea behind the US exhibit was to “show the Yugoslavs that American ideas and methods can help them solve some of their problems... The food packaging machinery, for instance, is a follow up of last year’s highly successful exhibit of a typical American neighborhood supermarket. The supermarket idea has caught on here since then – about fourteen are said to have been built or are being built in Zagreb and Belgrade.” [15] Tito, having inspected the US units on display, commented: “Just the thing for Yugoslavia.” Reporting from the Fair, the Russian press *Moskovskaia pravda* obviously criticized Tito’s short

visits to the pavilions of the socialist countries (three to seven minutes), as opposed to the US pavilion, where he stayed for over 30 minutes. They concluded that Tito's attitude to the Fair was just as questionable as his views on Marxist doctrine [16].

Throughout the years "rival suitors – the United States and the Soviet Union – woo Yugoslavia with technological triumphs" [17] developing competition that intended to maintain economic, military and political interests in this part of the globe. In 1959, for instance, the main Soviet exhibit was Sputnik 3, an automatic scientific laboratory spacecraft. The same year, the United States countered with a North American X-15 rocket-powered aircraft, along with the Transland Ag-2, and cars such as the Chevrolet Impala and Studebaker Lark VI. The most significant achievements from the Space Race were exhibited at the Zagreb Fair shortly after their use [Fig. 4.].



**Fig. 4.** Soviet exhibit Sputnik 3 and United States exhibit North American X-15 rocket-powered aircraft at Zagreb International Trade Fair 1959

Competing for position, even at the Fair, led to several new pavilions being built in the following decade or so, while others changed owners or users. Italy constructed three new national pavilions in 1956, 1959 and 1962, selling their previous ones to Poland, the Netherlands and Switzerland respectively, while the original Hungarian pavilion of 1956, having a light and easy-to-disassemble metal structure, made way for the new West German pavilion and moved nearby; it was later moved to a more distant point in order to accommodate domestic wooden industries, while Hungary shared a new pavilion with Spain. The largest pavilion built for a foreign country was the second USSR pavilion, designed by Boris S. Vilenskiy in 1967. That same year, the second American pavilion was also built, designed by Fritz Bornemann using the innovative Mero system of nodes and beams, positioned closer to the main city axis.

In the chronology of the Zagreb Fair, the 1960s were the years of the greatest developments with a fast-growing economy in general and particularly rapid industrial advances. This enabled further strengthening of international trade and politics. The expansion of the fair in 1963 was mainly due to developing countries in Africa and Asia using international trade exhibitions to promote themselves as part of the world economy [3]. Within the

Non-Aligned movement, the AYA – Africa-Yugoslavia-Asia – exhibition center played an important role in world relations. The Round Table of Developing Countries, a permanent forum for stimulating cooperation among developing countries, used especially for the transfer of knowledge and technology, also took place at the Zagreb Fair, along with its pioneering role in presenting developing countries to the rest of the world [18].

In the 1970s, the trend in fairs tended towards specialized events, and the Zagreb Fair management also adopted such a business policy. In parallel with the founding of specialized fairs, the tradition of the Zagreb International Autumn Fair was maintained. In the late 1980s, the history of the fair reached another turning point with the break-up of Yugoslavia. A period of transition ensued, and a significant part of the market was lost. With a view to establishing closer links between the economies of particular countries and the domestic market, the Partner Country project was initiated in 1987 at the Zagreb Fair. Despite the turbulent social and political events in the 1990s, the Zagreb Fair continued to be held [3]. The last twenty years have been characterized by a slowdown in activities.

Since 2003 the entire complex of the Zagreb Fair has been registered cultural property with 8 individually protected pavilions: the USSR pavilion, designed by J. Abramov in 1956 – a distinctive exhibition hall, 14.2 m in height with a 27.5 m arch span, consisting of prefabricated mounting elements resting on two monolithic reinforced-concrete frames; the Chinese pavilion designed by Cheng Sung Mao in 1956 the Czechoslovakian pavilion from 1956, designed by the Czechoslovak architect Josef Hrubý as the only major building at the Zagreb Fair whose load-bearing structure is made of wood, making it a rarity among the mostly concrete and steel buildings typical of fairs; the International 'collective' pavilion by architect Ivo Vitić, from 1957 – a reinforced concrete structure of the original system, with cables on the roof, whose elegant silhouette and mesh-ribbed-surface gable walls make it truly stand out [Fig. 5.]; the Engineering pavilion from 1957 by architect Božidar Rašica – a simple object with large dimensions and an airy construction (steel and glass) that allows variable spatial solutions and multipurpose use, located on



**Fig. 5.** International 'collective' pavilion, Zagreb International Trade Fair 1957





**Fig. 6.** Engineering pavilion, Zagreb International Trade Fair 1957

the very edge of the fair, in order to facilitate access and use, without the need of going deeper into the grounds of the fair [Fig. 6.]; the third Italian pavilion built in 1962 by Raffaele Contigiani and Giuseppe Sambito – this project aimed to create an architectural structure showing new technical possibilities (inverted pyramids made of

lightweight ribs covered with sheet metal and glass. The design allows flexible shifts that may be caused by the wind or the stretching of the steel acting on the pyramids themselves, on their covers and on the glass wall membrane) [Fig. 7.]; the Hypar of 1964, again by Božidar Rašica – a reinforced concrete shell designed as an information point; and the DDR, also designed by Božidar Rašica in 1964 – the design is based on a modular spatial system, where six major load-bearing concrete piers carry inverted pyramids. The mantle object is derived from what was at the time an entirely new building material: molded glass elements [19]. The existing urban matrix of the Zagreb Fair in its present situation is the guiding commitment for future constructors.

The principles, on which the pavilions for trade fairs were built, were not rigidly determined, because the role and



**Fig. 7.** Third Italian pavilion, Zagreb International Trade Fair 1962

character of the fair, in conveying the latest ideas and products to an immediate audience, changed in accordance with social, economic, political and other factors. By a tradition, European nations tended to build their own pavilions for the Zagreb trade shows: France and Czechoslovakia had their own pavilions here in 1922, and then there was, of course, a great architectural contest between the German, French, Italian and Czechoslovak pavilions at new Zagreb Convention in 1936/1937.

The last relocation of the Zagreb Fair, in 1956, to its current location on the right bank of the Sava River, close to the main city axis, was a step of far greater importance than simply moving the fair. It was a decisive moment in the expansion of the city, which propelled further development and gave added impulse to the immediate construction of the emerging New Zagreb. The Zagreb Fair was always a place of innovation, in terms of both architecture and the exhibits themselves. The innovative techniques used in the design and construction of the pavilions (the thin shell of the French pavilion, the sprayed concrete house and the Mero system used in the US pavilions), combined with the way the latest achievements in science and culture were presented, ensured that the Zagreb Fair played a significant and inescapable role in the history of trade fairs.

Above all, however, the (new) Zagreb Trade Fair, generously arranged and embellished over time with some fine landscaping and a number of open-air sculptural accents was not only a prestigious international commercial event: its premises became an unrivaled arena for the most direct head-to-head competitions between the diametrically opposed Western and Eastern worlds, eventually augmented (following the establishment of the Non-Aligned Movement in 1961) by the addition of third-world countries in the famous AYA – Africa-Yugoslavia-Asia – exhibition hall.

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## Zagreb Fair Transformation model and its inclusion in the area of Novi Zagreb

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### Abstract

*Through different thematic units, the presented research relates to Zagreb's urban development and planning with reference to the Zagreb Fair and a potential model of its transformation as well as its inclusion in the area of Novi Zagreb. The implemented research should offer answers to the following questions: What is a city project?; How is it defined in the urban and planning records of the City of Zagreb?; How is it implemented in practice? – And all of this based on the example of the Zagreb Fair as a protected site. In line with positively assessed urban practices in other European cities, a potential transformation model has been proposed regarding the area important for the City and its future development. Using new technological achievements, a smaller portion of the site has been intended for the main fair, exhibition and congress activities (roughly 1/3 of the surface). The amenities and the structure would be transformed into the remaining two-thirds of the surface. It is precisely the vision of this new space, organisation concept and the programme of amenities which are the subject of this article.*

**Keywords:** Zagreb Fair, transformation, Novi Zagreb, city project

### 1. Introduction

Urban planning trends have stemmed from sustainable development and circular economy since the beginning of the new century. In practice, this implies the city's

completion and reuse of partially or wholly abandoned sites, with *the Zagreb Fair* as one of the most important ones. This area is a brownfield, one awaiting its structural and functional transformation [1]. This site has been neglected for decades. It is technologically obsolete

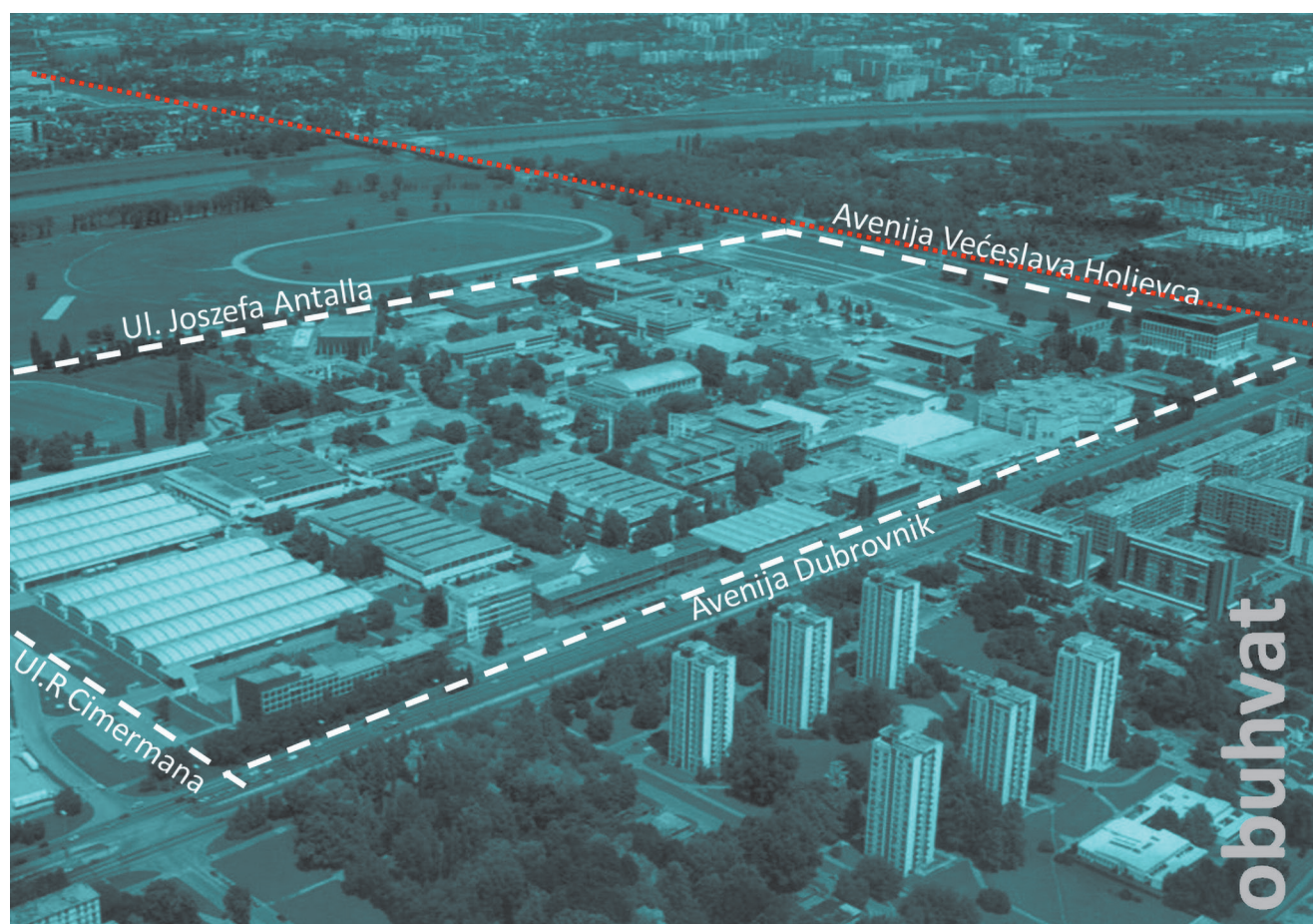
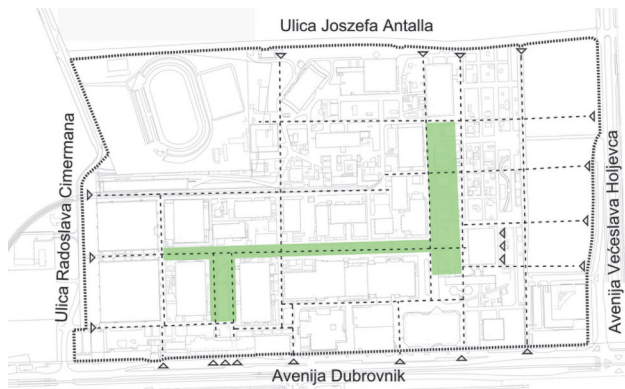


Fig. 1. Border and surface catchment area – Zagreb Fair City Project

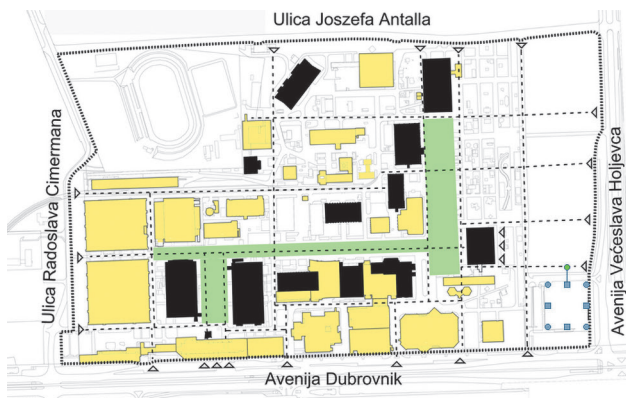


**Fig. 2.** Zagreb Fair City Project- protected urban matrix and possible entrances to the complex

and closed, which is contrary to the new concepts of fair and exhibition sites. The largest number of exhibition Halls is over 50 years old and in poor condition.

The main part of the existing public space is Aleja nacija (eng. the Boulevard of Nations), Velesajmska promenade (eng. Zagreb Fair Promenade), and ample central space of the square with the designed landscape.

On October 30th, 2006, the Ministry of Culture protected the Zagreb Fair site as a cultural and historic site, and it was enlisted in the Register of Cultural Goods of the Republic of Croatia. After a conservatory analysis of the existing state of a cultural good – cultural and historical site of the Zagreb Fair [2], elaborated protection measures were defined to preserve the urban matrix and the construction fund of monumental (8 pavilions) and ambience value (5 exhibition Halls) [3]. The text investigates the site's potential and significance, past research, implemented workshops, spatial and planning documentation (GUP), the theme of the city project implementation as well as activities based on the transformation model and programme for determining the amenities of the Zagreb Fair:



**Fig. 3.** Zagreb Fair City Project – protected exhibition Halls and protected matrix

## 2. Potential and significance of the Zagreb Fair space

The space of the Zagreb Fair has excellent potential considering its location in the City, good traffic connections,

public transport and the vicinity of the airport. Furthermore, the resolved property rights relations between Zagrebački Holding, the City of Zagreb and the Zagreb Fair contribute to a relatively speedy transformation. The potentials include traditional business exhibitions, fairs and congresses as well as quality public space with designed landscape, sculptures of famous artists and a developed utility infrastructure for the existing needs. Moreover, around 100,000 people live in its vicinity – all potential users of the future centre of *Novi Zagreb*. From an economic perspective, this is one of Zagreb's highest potentials in terms of promoting business competitiveness, completion procedure of the City and raising life quality. All interventions must be planned in compliance with its significance, and three requirement levels should be met during the planning process of the site and its amenities:

- *local* – particularly public and social facilities for the residents of *Novi Zagreb*
- *urban* – business, central and other facilities used by all citizens and the City's visitors
- *regional* – amenities vital for regional positioning of the Zagreb Fair site and the City.

## 3. Up-to-day research, workshops and studies

Besides the research published in scientific and professional journals related to the spatial genesis of the Zagreb Fair and *Novi Zagreb*, many workshops were held, and some researches were published in studies. The workshops (2005-2017) were conducted in order to develop the best possibilities and define the transformation concept of the Zagreb Fair, as well as to test the procedures and participants in the process of decision-making, planning and project financing:

- In 2005, the City of Zagreb Architects Association organised a workshop lead by architect Peter Wilson
- The City Office for Strategic Planning and Development held the Co-operative Urban Planning Approaches (CUPA) international workshop from July 3 to July 5, 2013. The workshop was led by the City of Vienna, Municipal Departments 21B and 27; Vienna Business Agency (VBA) EU team, TINA Vienna public planning institution and the Dutch International Intervention Institute.

Other studies, proposals and projects which should be highlighted include the ones specially developed for the Zagreb Fair transformation, and they are:

- Development of the Zagreb Fair for the Croatian economy (Zagreb Fair, 2011) – a programme developed by Zagreb Fair professionals; Zagrebačka mreža (2014) – project developed by a team of the Zagreb Fair experts, 2014 [4]



- Bearing Office developed a Pre-feasibility report for the development of the Zagreb Fair Site and Innovation Zagreb. The Bearing study proposes creating economically dynamic and environmentally friendly urbanization-developmental elements of the Third Generation of Innovative Environments [5].

It is necessary to highlight more relevant studies and presentations relating to innovation strategies and economic development, such as:

- Triple helix Innovation Partnerships (2013) – Private Sector Development – policy guidelines developed by OECD [6]
- Proposal for Innovation Strategy of the Republic of Croatia 2014 – 2020 [7]
- Development and Economic Competency in Zagreb (2014), Mreža znanja
- Programme guidelines and programme of the amenities of the Zagreb Fair strategic city project (2015) as the first part of the Zagreb Fair strategic city project. An expert team developed a study from the City Office for Strategic Planning and Development of the City of Zagreb [8].

#### 4. Zagreb Fair through Spatial-Planning records [9]

In the *General plan of the City of Zagreb (GUP)* from 2016, the Zagreb Fair site is categorised as two city projects with a note that it is required to implement a public architectural-urban tender. Their locations are determined, but their exact catchment area is not. According to this same plan, both sites – the site of the *Zagreb Fair* project and the *Zagreb Fair East* carry the same K1 mark – business purpose (business, administrative, office, trade, hospitality amenities, city shopping malls, eco-friendly production, utility sites, and the accompanying warehouses).

#### 5. Zagreb Fair City Project in legal documents

As in the case of many other European larger cities, the procedure or the GUP implementation model through the city project in Zagreb is a necessary planning tool enabling the City's interests to be realized in strictly controlled conditions with planning and commercial projects specially prepared in advance. The planning procedure of the Zagreb GUP, implemented in the City of Zagreb, dates from 2003.

“City project consists of the complex activities for developing a City special interest Site, or the City is the main actor in its realisation, whether acting as property



Fig. 4. Zagreb GUP – organisation and size of sites to be developed as city projects

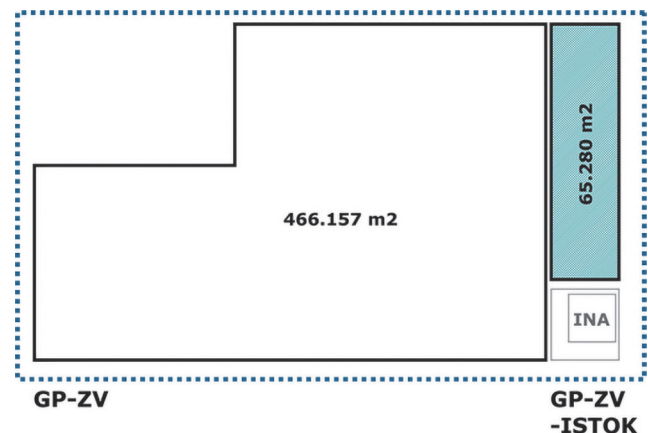


Fig. 5. The relation between the areas of the *Zagreb Fair* City Project and another city project – the *Zagreb Fair East*. Both for commercial use (K1)



Fig. 6. Programme guidelines and contents for the *Zagreb Fair* City Project (2015)

owner, former or future investor in the new city infrastructure or a new city quality (buildings of public or social use, parks, infrastructure, etc.)”. In various spatial strategies and urban plans, city projects are conceived in entirely different ways. The Croatian language uses expressions such as *gradski projekt*, *strateški projekt*, while in English the terms are: *city project*, *city devel-*



Fig. 7. Zagreb Fair City Project Programme developed in December 2017 and presented to the City Offices representatives in February 2018

opment project, city-controlled project, target area, etc. [10].

By adopting the Zagreb GUP, the Assembly of the City of Zagreb made a decision according to which the sites of highest importance for the city's development should be realised in accordance with the procedure called "city projects" [10]. In February 2015, the Institute for Urbanism, Physical Planning and Landscape Architecture with the Faculty of Architecture, University of Zagreb and the City Office for Strategic Planning of the City developed Programme guidelines and amenities of the strategic Zagreb Fair City Project (SGP ZV) as well as work material presented to the public (exhibition) city administrative entities. That was the first phase of the research, which assessed the possibilities of the Zagreb Fair site and which proposed the implementation procedure of the city project.

Based on the Programme guidelines, the same organisation developed the Zagreb Fair City Project (2017/18) [2].

The observed area encompasses two city projects defined by GUP:

1 Zagreb Fair and 2 Zagreb Fair – East (unbuilt area along the Većeslav Holjevac Avenue). For the comprehensive observation and planning it was proposed to merge the two projects and resolve the sites as a unique city project – the Zagreb Fair.

## 6. Activities for the transformation model and defining the Zagreb Fair programme

Upon observing and analysing the broader scope of Novi Zagreb, it can be concluded that Novi Zagreb, together with over 100,000 residents, does not have sufficient or diverse use or the capacities for cultural or sports amenities. It is precisely the planned transformation of the Zagreb Fair site as an innovative city area with mixed and different uses, which could include these amenities

either in the existing pavilions or newly built buildings. They represent one part of the realisation concept of an innovative district whose diversity and offer could raise the general quality of life in Novi Zagreb [2].

A monofunctional landuse of the Zagreb Fair site could not be replaced by another monofunctional landuse, except in case of the primal one (exhibitions, fairs, congresses). It should not exceed 15-20% of the total City Project site area, as to avoid creating large monofunctional zones. According to the research, the new Fair and its exhibition, fair and congress activities would take up roughly 1/3 of the present the Zagreb Fair area, and the remaining 2/3 could be envisaged for an "innovative city district".

- INNOVATIVE CITY DISTRICT, approximately 2/3 of the existing area with a technological park, innovation incubator, business centre and other economic amenities, trade and hospitality services, entertainment park, concert-media hall, cultural amenities, colleges and science institutes, hybrid polyvalent public facility, hospitality facilities with accommodation (hotel, hostel, student boarding or similar), hybrid public facilities, etc.
- FAIR EXHIBITION FACILITY WITH CONGRESS HALL, approximately 1/3 of the existing area.

The hi-tech Fair and exhibition facility on a smaller surface would contain the following amenities: fair-exhibition space, multifunctional halls, other accompanying services and hybrid public facilities.

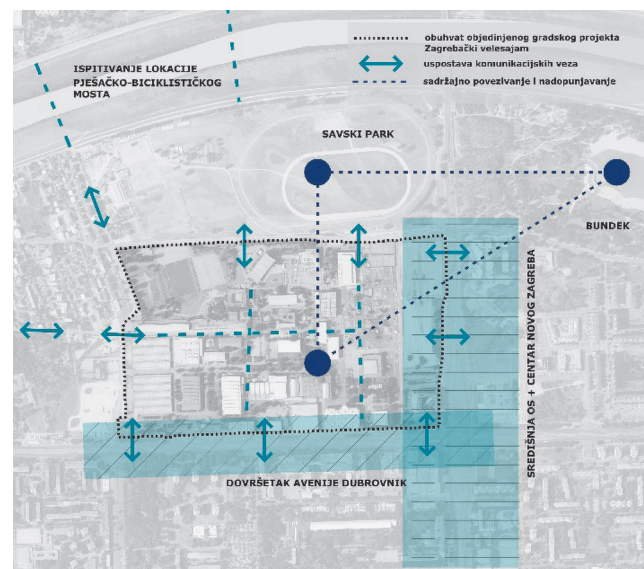


Fig. 8. Zagreb Fair -problem map / broader situation – transformation guidelines for the site

The new space could also have a congress centre, open-type hotels as well as offer business and hospitality services. It would be desirable if all these were accompanied by locations for hospitality facilities offering accommodation (hotel, hostel, student boarding, etc.) as well as education services, which would bring the site to



life. The pre-feasibility study for the congress centre was developed by the Tourism Institute (2018) [11].

Throughout history, the Zagreb Fair has always been a place for promoting and exchanging state-of-the-art technologies and new products. It has always been characterised as innovative. Therefore, the process of its planned transformation must include state-of-the-art technological solutions. That is why special attention is paid to low-carbon development [13] as well as production and rational use of eco-friendly energy resources.

## 7. Discussion and recommendations

The programme for *the Zagreb Fair* transformation should be clear and distinctive; that is, it should have a recognisable identity; it should be real and measurable, obtainable, and timely defined. It was developed in compliance with the Zagreb GUP [9] and the Development Strategy of the City of Zagreb\_Zagrebplan [12]. The transformation concept of the Zagreb Fair as an innovative district and new centre of Novi Zagreb should start from the following starting points [2]:

- The transparent and open process of site programming and planning must from the very start include in all of its phases total public and primarily the profession and the public
- The site should be approached as a whole, not in fragments and realisation phases should be determined
- New spatial preconditions should be created for implementing contemporary fair activities (up to 1/3 of the entire site), sustainability should be increased as well as the chances for business success of *Zagrebački velesajam* d.o.o.
- The existing fair and congress facilities of modern urban and architectural, functional, technical and technological features in compliance with world fair standards should be transformed, and new ones should be built
- The use of the site should correspond to the purpose of the Zagreb Fair, and good presentations of the protected cultural property – Cultural-Historic complex of *the Zagreb Fair* should be enabled
- Long-term economic and ecological sustainability, as well as site vitality, should be ensured

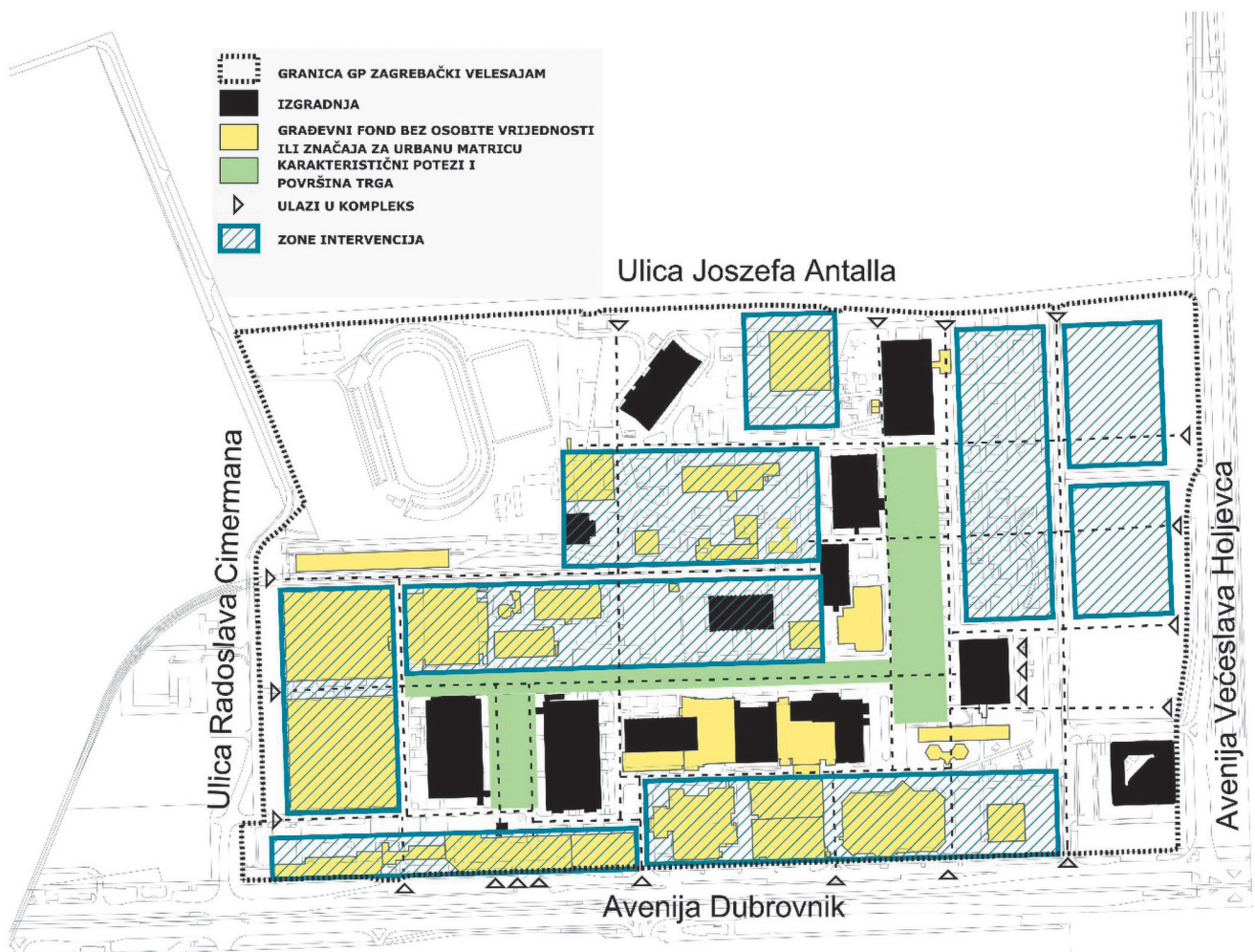


Fig. 9. Zagreb Fair – transformation guidelines of the site

- New vacancies should be created, and employment should be increased with new amenities and economic activities
- The site should be open to the surrounding sites and permeable in all directions
- The public and democratic character of the site should be created and realised.

## 8. Conclusion

In terms of content, economy, construction and infrastructure, the site requires urgent transformation, funds, and interventions. *The Zagreb Fair* site should be transformed into an innovative district. By opening this site and with new economic concepts, new amenities and structures, this site should become attractive to citizens as well as investors.

It is precisely the Programme of the City Project, published by the Faculty of Architecture in cooperation with the City Office for Strategic Planning and Development of the City, which is the starting point of its transformation to follow. The basis of the existing public space (landscape design with sculptures) is sound, and it should be accepted and included in the new comprehensive design concept. The system of traffic and parking is not organised or sufficient.

Upon observing and analysing the broader scope of Novi Zagreb, it can be concluded that *Novi Zagreb*, together with over 100,000 residents, does not have sufficient or diverse use or the capacities for cultural or sports amenities. The planned transformation of *the Zagreb Fair* site, as an innovative city district with mixed and different uses, could include these amenities either in the existing pavilions or new buildings. They represent one part of the realisation concept of an innovative district whose diversity and offer could raise the general quality of life in *Novi Zagreb*, which would be a significant contributor to the city's identity.

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**Note:** Novi Zagreb – concept of a new city is an excerpt from the text prepared for *Prostor*, scientific journal for architecture and urbanism in which the genesis of *Novi Zagreb* will be prepared in presented in full



## Activities of the Croatian Academy of Engineering (HATZ) in 2019

### *Auspices, Organization/Coorganization of Conferences*

#### Auspices

- Faculty of Textile Technology and Zagreb Innovation Centre, 12th TZG – Textile Science and Economy 2019 – French-Croatian Forum 12th Scientific and Professional Conference “Textile Science and Economy”, January, 23 to 24, 2019
- Faculty of Electrical Engineering and Computing, Round Table under the name “Croatian Central Sound Archives”, Gray Hall of the Faculty of Electrical Engineering and Computing, February 6, 2019
- Faculty of Architecture of Zagreb, Professional Conference “Buildings 2020+”, February 21, 2019
- Croatian Chamber of Mechanical Engineers, 6th International Conference Days of Mechanical Engineers, Vodice, March 20 to 23, 2019
- Croatian Color Societies and University of Zagreb (Faculty of Textile Technology, Faculty of Graphic Arts and Faculty of Architecture), International Color Day 2019 – “Color and Materials”, Technical Museum, Zagreb, March 21, 2019
- Faculty of Civil Engineering and Architecture, Osijek, 8th International Convention “WATER FOR EVERYONE 2019, March 21, 2019
- Croatian Microbiological Society, Symposium Power of Microbes in Industry and Environment, Sv. Martin na Muri, May 15-18, 2019
- Faculty of Electrical Engineering, Computing and Information Technology, Forum “ICT in Economy and at the University”, FERIT Osijek, May 16, 2019
- International Scientific Conference MOTSP (Management of Technology – Step to Sustainable Production), Marija Bistica, June 5-7, 2019
- Josip Juraj Strossmayer University of Osijek, Conference “26th International Conference on Systems, Signals and Image Processing IWSSIP 2019”, Osijek, June 5-7, 2019
- Faculty of Civil Engineering and Naval Architecture, Conference MOTSP 2019 “Industry 5.0 – Return to Humanity”, Marija Bistrica, June 5-7, 2019
- Faculty of Electrical Engineering and Computing, lecture and workshop “Computational Sport Science: Human Motion Modelling and Analysis”, FER, Zagreb, June 7, 2019
- Faculty of Food Technology and Biotechnology, Zagreb – Congress “10th International Congress “Flour-Bread ‘19” and “12th Croatian Congress of Cereal Technologists “Flour-Bread ‘19”, Faculty of Food Technology, University of Osijek, June 11-14, 2019
- Croatian Society of Mechanics, Conference “9th Meeting of the Croatian Society of Mechanics”, Sljeme, July 11-12, 2019
- Croatian Cartographic Society, “15th International Conference on Geoinformation and Cartography”, Zagreb, September 26-29, 2019
- Faculty of Mechanical Engineering and Naval Architecture, International Scientific Conference 14th SDEWES2019 “Conference on Sustainable Development of Energy, Water and Environment Systems“, Dubrovnik, October 01-10, 2019
- Faculty of Food Technology of the University of Osijek, 12th International Scientific-Professional Conference *With Food to Health*, PTFOS, Osijek, October 25-25, 2019
- HUNIG – Croatian Association of Petroleum Engineers and Geologists (HUNIG) “10th International Conference and Exhibition on Oil and Gas Economy and Primary Energy – Energy Sources that will ensure technological and economic development and energy independence”, Šibenik, October 2-3, 2019
- The Centre of Research Excellence for Data Science and Advanced Cooperative Systems, Workshop “4th Int’l Workshop on Data Science” Zagreb, October 15, 2019
- Center of Excellence for Computer Vision (CRV), Workshop “8th Croatian Computer Vision Workshop”, Zagreb, October 23, 2019
- Workshop “14th International scientific Symposium ‘Food to Health’”, PTFOS, Osijek, October 24-25, 2019
- 28th Forum: “Croatian energy day: How can we see energy transition until the year 2050”, MSU, Zagreb, November 15, 2019
- Lecture, PhD Anana Hajnala on the subject of *Measurement and Visual Perception of Ambient Optic Array*, FER, Zagreb, November 15, 2019
- Zagreb Textile days 2019, (HIST), Zagreb, December 6, 2019
- 30th International Scientific Conference ICWEST and Celebration of 70 Anniversary of scientific magazine “Wood”, Faculty of Forestry University of Zagreb, December 12-13, 2019

### Organization/Co-organization of Conferences

- Croatian Engineer's Day, Zagreb, Faculty of Chemical Engineering, Zagreb, February 22, 2019
- International Scientific Conference "Printing&Design", Školska knjiga Zagreb, March 14, 2019
- Workshop of the Economic Council of the Croatian Academy of Engineering "Needs of Croatian Economy for Lifelong Learning with Emphasis on Secondary Vocational Education", Croatian Academy of Engineering, Zagreb, March 29, 2019
- Workshop "Patents and Patent Application", Zagreb, April 3, 2019
- SED 2019/Energy Democracy Summit, Pula, April 20-22, 2019
- FSB, AMZH, HATZ, Lecture "Comanipulation for assistance to gesture with therapeutic applications", Croatian Medical Association, Zagreb, December 5 2019
- HGK, ICENT, HATZ, Round table discussion "Digital innovative solution in food and agriculture sector", FER, Zagreb, December 6, 2019



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