

BASIC FEATURES OF MODERN FUNCTIONAL-SPATIAL STRUCTURES OF TUZLA CITY

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Cities are created and developed thanks to the resources in its base or hinterland, and are strongly influenced by changes in its narrower and wider surroundings. Regarding, the spatial and functional structure of the city are highly conditioned. Apart from the geographical basis (spatial context), the historical aspect of the city's development has played an important role in these cause-and-effect relationships, which influenced both the deployment of urban services and the development of city functions. Thus, the modern functional-spatial structure of the city is a process of adapting of environment to human needs, which has become increasingly complex over time.

This paper analyzes the contemporary functional - spatial structure of the city of Tuzla, which means the analyze of the spatial distribution and establishment the interdependence of the geographical elements and factors in aspects of business, industrial, residential, traffic, sports, recreational zones, greenery zones and special purpose zone locations. Scientific methods (field, statistical, analytical, synthetic, etc.), were used. The different purpose zones and different ways of land use in the territory of the city of Tuzla have been identified and cartographically represented.

Key words: city, Tuzla, regional center, functional-spatial structure, spatial purpose zones.

INTRODUCTION

The spatial structure of a city is influenced by natural, social, economic and other factors and is therefore subject to constant change (Vresk, 1990). The city area has a complex spatial structure defined by functional, social and morphological elements. The functional structure of the city is complex and refers to the urban land use that uses institutionalized urban activities as separate spatial systems within the city, such as activities related to business, production, housing, recreation and vacation. The spatial structure of the modern city is also greatly influenced by traffic development and according to the definition, the modern city spatial structure is linked to the development of economic activities and housing along the existing transport network (Njegač, Gašparović, Stipešević, 2010). Tuzla is a first order regional center in northeastern Bosnia and it is also the center of the Tuzla Canton as well as the municipalities in the Canton. It is located in the valley of the Jala River at an average altitude of 230 meters, between the ridge of Majevisa in the north and the Spreča valley in the south in the so-called Tuzla Basin. The city has an area of 81.6 km² and according to the latest census (2013), there were 110,979 inhabitants (in the narrower urban area 74,457 inhabitants and in the wider urban area 36,522 inhabitants),

which means that Tuzla is the third largest city in Bosnia and Herzegovina (behind Sarajevo and Banja Luka) (Kudumovic Dostovic, 2017). With a population density of over 1000 inhabitants / km², Tuzla is also one of the most populated urban areas in Bosnia and Herzegovina. For centuries, the functions that have secured the epithet of political, administrative, educational, health and cultural-sports center of the Northeast Bosnia region were built. Also, over the last fifteen years, Tuzla has become an important tourist city / destination in Bosnia and Herzegovina, which has attracted a large number of tourists through the reconstruction of the old city center and the construction of the "Pannonian Lakes" complex, the adaptation of industrial districts and the construction of reception facilities and catering development. However, contemporary urban identity (Prelogić, Lukić, 2011) of Tuzla is determined by the morphology of the terrain (Tuzla basin) and the mining, industrial and economic heritage, which still represents a significant orientation of the development of this city and largely determines its functional and spatial structure. The diversity of urban functions imposed the need to divide the city territory into individual parts, each intended for one dominant function. This means that over 50% of the surface of a certain part of a city is made up of an activity or function by which that part of the city is called residential, commercial, sports, etc. This subdivision of the city into functional zones is called " zoning " and represents the initial stage in solving urban structures of the city (Mujagić, N., 2010). The paper was created as a result of research conducted for the purpose of writing an approach thesis, in the first year of the doctoral study, on the subject "Methodology of scientific research work in geography". The methodological work is based on the assumption that in the city of Tuzla, due to its long historical development and due to different geographical and economic and political circumstances, a complex functional-spatial structure has developed. The aim of the paper is to examine and analyze the functional and spatial structure of the city of Tuzla, ie to determine the existence of different zones of the urban terrain exploitation and to determine the proportions of individual zones in the total area of the city. Various research methods (analysis, synthesis, comparison, mapping, etc.) gave results, showing that in addition to numerous residential areas the industrial, recreational, business, traffic, sports, greenery zones and special purpose zones are present in the structure of the city. The survey was carried out on an area covering 4,745 ha (47.45 km²) or 15.68% of the total area of Tuzla municipality (296.86 km²). The mapping determined the size, layout and interrelation of the surfaces for individual purposes and the analysis of various cartographic insets (geographical maps and plans) revealed important knowledge about the territorial expansion of the city at different stages of its development, as well as other functional and spatial elements. The field survey supplemented the data on the area of the city of Tuzla, which is the subject of urban-geographical research.

Purpose and use of the urban topography of Tuzla

The physical and geographical position of Tuzla is determined by the tectonically predisposed basin, which primarily determines the urban directions of origin and development, and therefore makes it a limiting factor for the development of the city to the east and west directions. In socio-political terms, like the whole of Bosnia and Herzegovina, in the last 30 years, Tuzla has gone through a difficult war and then post-war transition period marked by the transition from a predominantly socialist plan to a capitalist market economy. This resulted in the "shutdown" of numerous pre-war industrial capacities and the opening of new, mainly service facilities in the urban area. The slow development of Tuzla

as a regional center was particularly influenced by the "division" of the state into ethnically homogenized entities, which further impeded regional functioning and changed the position of this city in relation to its former gravitational area. Specifically, in the 1980s, Tuzla attracted around 40,000 daily migrants from all parts of northeastern Bosnia, and since 1995. the area of Tuzla has been reduced by parts of this region in the entity Republic of Srpska (Kudumović Dostović, 2017). Today, the functional and spatial structure of the city of Tuzla is very complex and under the influence of these factors, is a subject to constant changes with the outskirts of the city being expanded and the central parts, due to numerous and long pressures, being rehabilitated, renovated or reconstructed.

Table 1. Structure of basic aspects of purpose / use of urban topography of Tuzla

Purpose	ares (ha)	percentage (%)
Farmland	1038,7	21,9
Forest land	909,9	19,2
Residential area	1689,5	35,6
Residential-business zone	170,7	3,6
Business zone	61,5	1,3
Economic zone	281,6	5,9
Recreational zone	289,9	6,1
Sport-recreational-memory complex zone	53,5	1,1
Graveyard	24,7	0,5
Reclaimed land	57,9	1,2
Special purpose	53,1	1,1
Water surfaces	1,5	0,0
Ash and slag landfill	10,1	0,2
Main roads	25,3	0,5
Regional roads	5,3	0,1
Local roads	71,9	1,5
IN TOTAL:	4745	100

Source: Tuzla Municipality's Energy Sustainable Development Action Plan (SEAP), Tuzla, 2011, p. 14

Topographic mapping in the city of Tuzla distinguishes business, residential, industrial, traffic, sports and recreation zones and special purpose zones. Based on the data presented in Table 1 in the structure of land use by purpose, the largest areas in the urban system are the inhabitation ones, with 35.6%. The next category of urban topographic units is agricultural land (21.9%), followed by forest land (19.2%). The economic zone covers 5.9% and the business zone covers only 1.3% of the total city area. Recreation zones are represented by 6.1%, while sports and recreation-memorial complex zones account for 1.1%. The road transport network, comprised of main, regional and local roads, occupies 2.1%, land intended for cemeteries belongs to 0.5%, reclaimed land 1.2%, and special purpose land 1.1%. Ash and slag landfill occupy a relatively large area (0.2%) within the industrial zone of the city. It should also be noted that as many as 26 different soil types are represented in the territory of the city of Tuzla, some of which are characterized by a high fertility (especially along the stream of the Jala River), but are inaccessible due to urban infrastructure (Stjepić Srkalović, 2015).

Table 2. Tuzla city zones according to CIAM

No.	Urban zones	Area (ha)	(%)	Limiting values according to CIAM (%)
1.	Residential zones	1689,50	60,67	30-70
2.	Industrial zones	281,60	10,11	10-30
3.	Central City Zones	231,20	8,34	2-10
4.	Green areas	135,70	4,87	2-25
5.	Zones of sports and recreation	343,40	12,33	5
6.	Traffic zones	102,50	3,68	15
IN TOTAL:			100,00	-

Source: Tuzla Municipality's Energy Sustainable Development Action Plan (SEAP), Tuzla, 2011, p. 14 .; Mujagić, N., *Spatial Planning and Physical Planning, Faculty of Public Administration in Sarajevo, Sarajevo, 2010, p. 284*

Comparing the values and the city zones structures with CIAM¹ and the analysis of Tuzla city zoning based on these values, the following were concluded: 1. Tuzla city residential zones with a value of 60.67% enter the CIAM limit values for average cities in the world (30-70%); 2. The Tuzla industrial zone with 10.11% is at the lower limit of the average limit value; 3. Central city zones (2-10%) and greenery zones (2-25%) also enter the limit values; 4. The Tuzla City Sports and Recreation Zones by 12.33% significantly exceed the average CIAM value; 5. The traffic zones of the city of Tuzla are far below the average value (Table 2).

Tuzla city business zones

Business activities are a group of service activities that are functionally interconnected and exhibit similar location tendencies and are most often concentrated in the same locations. The business activities of the city are most often divided into: trade, finance, personal and professional services and administration (Vresk, M., 2002). In the functional - spatial structure of Tuzla, business occupies a very small area. This type of urban land use accounts for only 61.5 ha or 1.3% of the total city area. The main business activity is retail trade with specialized stores selling goods for short-term needs (supermarkets and specialized food stores) in which the population, living within the gravity area of the urban area, is most often supplied. Other activities that contribute to the importance of the centers include hospitality and services (personal and professional), while other types of activities are minimized. Tuzla is the largest business center in terms of size of the area and the number of inhabitants it supplies. It is located in the central part of the city, and represents the historic city center, which has functioned as a city center since its inception until today. It was formed during the Ottoman empire and during the Austro-Hungarian period it was greatly expanded in the east direction and enriched with new urban amenities, the most

¹ The foundations of functional city zoning in 1930. were defined by CIAM (International Congress of Modern Architecture) and functional zoning and traffic were identified as the basic problems of the modern city. According to CIAM, the city contains six basic zones: residential, work or industrial, central, green, sports and recreation zones and the city's traffic zones (Mujagić, N., 2010). CIAM's urban matrix is a syntagm that implies a strategy of maximizing green spaces and eliminating the traditional street, planning principles that have been overwhelmingly advocated at CIAM's Third and Fourth Congresses (Congres International d'Architecture Moderne). (Grgić, Matijević Barčot, 2013).

important of which are: hotels (Maks and Bristol), banks (Schuster's Palace), cinema (Colosseum), Baroque Shopping Center, crafts and shops, cafes, and private residential buildings. (Buljugić, S.i N., 2010) The central business center is about 2000 m long with an average width of about 400 m. It covers an area of about 52.38 ha. It is well-connected to other parts of the city, as well as to the wider environment via two main roads that limit it almost parallel along its entire length. In addition to its connection with the wider surrounding, this area is connected by an orthogonal type of road network to the housing and labor zones in the east and west of the city. The central business center is one main street, intersected by numerous side streets. This is also the largest business zone in the city. There are various cultural institutions, educational, financial institutions, travel agencies, insurance institutes, administrations of numerous companies and other services. In addition to business activities, there are also sacral objects concentrated. The central business center also houses the pedestrianized zone of the Tuzla Korzo, as well as four city squares: Sloboda Square, Solni Square, Trg Mladost and Srebrenica Genocide Victims Square, which further contribute to the humanization and functional specificity of this area (Bećirović, Djedović, 2013). Increased concentration of business activities also led to other accompanying functional changes in the central part of the city, such as a decline in the function of housing, i.e. a decrease in the number of residents, households and apartments. Since the area of the central business center is located in the zone of intensive subsidence caused by long-term exploitation of salt water from the Trnovac and Hukalo districts, in the period from 1955. to 1985. about 2700 residential, public, cultural, educational and other objects were demolished and the population was relocated to other parts of the city. This makes the city of Tuzla practically divided into two parts east and west (Igić-Munitić, 1985). Since the mid-1980's, the process of revitalizing the city center has begun. Since then, this area has started to regain its former functions. Due to its position throughout the city, the central business center is also the largest concentration of city functions, i.e. retail, catering, financial business, business premises (offices), travel agencies, as well as service institutions (Maretić, M., 1996).

In recent times, smaller business centers have been developed in some parts of the city due to intensive residential construction. They differ from the central business center by the size of the area and the number of residents which are supplied. They appear in the form of shopping malls that are more recent or one street where the retail trade is located, as well as service and service facilities. Such smaller business centers are located in Slavinovići, Sjenjak, Slatina, Irac, etc. (Figure 5).

Location of industry in the city

Industry occupies a very small share in the total area of Tuzla. Industrial areas in the urban part of the city cover about 281.60 ha or 5.9% of construction land. In the existing distribution of industrial capacities in the area of the city of Tuzla, two specific types of spatial organization of industry are distinguished, the industrial zone „West“ and individual locations around the city, which do not cover large areas (Map 1). Almost the entire Tuzla industry is located in the western part of the city, i.e. at the entrance to the city, on the stretch from Irac in the east to Šićki Brod in the west and Husino in the southwest. In the north, the northbound road is adjacent to the residential area of Solana, and to the south is the southern main road (Tuzla City Plan, 2011). The industrial zone “West“ developed around the Kreka Mine, the Salt Factory and the Distillery, which are around the industrial

plants that were opened at the site in the Austro-Hungarian period. The industrial zone „West“ covers an area of approximately 1.91 km² or 191.64 ha. The following production units are located in this industrial zone: Tuzla Thermal Power Plant, Polihem (HAK I and II), Tuzla Gas Concrete Factory (Siporex), Guming, AIDA Footwear Factory, Tuzla Salt Factory, DITA Detergent Factory, TTU, Printkom (graphic industry) and Spirit Factory. Within the industrial zone „West“ the Tuzla thermal power plant occupies an area of about 500,000 m², HAK I and II about 352,063 m², Gas concrete plant (Siporex) about 120,000 m², TTU 57,000 m², DITA detergent factory 838,300 m², AIDA footwear factory 13,489 m², Guming 10.125 m², Printkom 2.000 m² and Spirit Factory 23.445 m² (Documentation of surveyed companies). The land in and around the industrial zone „West“ is intended for industrial enterprises. It is equipped with roads and communal infrastructure (water supply and sewerage network), energy connections (heat network and electricity). It is very well connected with the city center and with neighboring towns, as two main roads pass by - the northern and southern city main roads, while the central part passes the railway, linking the city of Tuzla with the surrounding regions. In the transition period, the introduction of a market economy followed the process of privatization of former state-owned industrial enterprises. However, some industrial enterprises that have not been restructured in the city have failed, such as Polihem (Hak I and II), the Distillery and Guming, or are still present, such as the AIDA footwear factory, but on a much smaller scale. The collapse and restructuring of the industry in Tuzla result in changes in the way the land was used by former companies. The beginning of the trend of changing the use of industrial buildings and land in shopping centers is the space of the former Distillery, where a modern shopping center was built, modeled after the European ones.

Outside this zone, in the territory of Tuzla, there are industrial plants of food industry, metal industry, electrical industry, and a salt mine. These industrial facilities occupy smaller areas in the city: The brewery covers an area of approximately 14,481 m², the Foundry approximately 49,000 m², the processing and marketing of milk about 11,000 m², Elir about 15,000 m², Tušanj Salt Mine about 92,000 m² and Tuzko Garment Factory about 17,500 m². They are located within residential areas, which nowadays face major restrictions on their expansion and development, and represent potential or actual environmental pollutants. They are equipped with communal infrastructure (water supply and sewerage network), energy connections (heat and electricity), and roads.



Fig. 1. Aerial view on the industrial zone „West“
Source: tuzlarije.net



Fig. 2. Brewery Tuzla (Foto: A. Bećirović)

Residential zones in the city

In addition to work and recreation, housing is one of the most important functions of the city of Tuzla. The spatial arrangement of residential zones is very complex, since the areas with built-up buildings intended for residential purposes are present in all parts of the city. Residential areas cover 1689.5 ha of urban land. In a large part of the city, residential areas are mixed with business and other areas, while in some, especially the outskirts of the city, are exclusively residential. There are considerable differences between the residential areas of the city of Tuzla, both in terms of time of appearance and construction material, height, equipment, and social structure of the population. The intense industrialization, as well as the increased migration of the population into the city since the 1950's, has caused the massive construction of residential buildings, which continues today. Since then, the city has expanded linearly from the center, which represented the nucleus of the city of Tuzla in the west and east directions. Due to intensive housing construction, Tuzla gradually changed its physiognomy. According to the prevailing morphological characteristics, the city of Tuzla is characterized by mixed residential zones with two characteristic ways of housing construction - collective and private housing. The following residential areas are distinguished in Tuzla: Slavinovići, Sjenjak, Brčanska Malta, Solina, Novi Grad I, Novi Grad II, Ši selo, Stari Grad, Kula, Centar, Jala, Slatina, Mejdan, Tušanj, Batva, Mosnik, Solana and Kreka (Picture 5). According to the estimation, the city of Tuzla had about 38,511 apartments in 2010., of which are 19,104 in collective housing units and 19,407 in individual housing with about 108,673 residents. When we compare the ratio of individual and collective housing in Tuzla, it ranges around 51%: 49% (Table 3).

Table 3. Tuzla Housing Fund by Local Communities in 2010

No	Local community	Number of residents in 2010.	Residents per flat/house	Number of housings		
				Collective housing	Individual housing	Total
1.	Batva	8052	2,01	2343	1662	4005
2.	Brčanska Malta	8032	2,87	2202	598	2800
3.	Centar	2547	2,25	334	797	1131
4.	Jala	1495	2,41	71	550	621
5.	Kreka	12438	4,5	323	2444	2767
6.	Kula	1452	2,9	50	450	500
7.	Mejdan	1432	2,51	88	482	570
8.	Mosnik	6866	2,32	650	2313	2963
9.	Novi Grad I	4723	3,42	1370	9	1379
10.	Novi Grad II	3330	5,72	582	-	582
11.	Sjenjak	9742	3,63	2092	589	2681
12.	Slatina	6444	2,55	1780	750	2530
13.	Slavinovići	11765	2,4	1400	3500	4900
14.	Solana	4635	3,39	216	1153	1369
15.	Solina	5694	2,88	576	1404	1980
16.	Stari Grad	11937	4,9	1229	85	1314
17.	Ši Selo	7605	1,74	3098	1281	4379
18.	Tušanj	5921	2,9	700	1340	2040
Total	City of Tuzla	108.673	2,95	19104	19407	38511

Source of data: Field survey conducted from October 2010 to March 2011 in the territory of the City of Tuzla, documentation available to local communities.

Collective housing is predominantly represented in the narrow urban area, i.e. in the alluvial plain of the Jala River and its tributary Solina, at an average altitude of up to 250 m (Topographic Map, Sheet Tuzla, 1977).

Housing was mostly done in blocks, and apart from the apartments, other urban facilities were built, such as schools, kindergartens, shopping and service facilities, health institutions, parking spaces, etc. Collective housing facilities were built in different periods. The first residential buildings in Tuzla were built during the Austro-Hungarian empire, in 1880. and are located in the residential zones Centar (in today's Džafer mahala street, number 8.) and Solana (18th Hrvatske brigade street, numbers 40 and 42), then in the Old Town from 1885. in Turalibegova Street no. 65. Three buildings were built in Kreka in 1890. (in today's M. Trifunović Uče Street 34, 36 and 38). In Slavinovići, in the Ž. Vukovića street no. 8, the building was built in 1902., and in Mosnik (Gornji Mosnik No. 2) in 1910.

The period of the most intensive housing construction in Tuzla was after the Second World War, when completely new housing estates were built in the area of the Tuzla periphery. By the end of the 1960's, collective housing estates were built in Kula (until 1958.), on Mejdan (1948-1962), in Novi Grad I (1958-1964), in Novi Grad II (1960-1968), Jala (until 1961.), Kreka (until 1967.), Solana (until 1959.), Centar (until 1967.) and Slatina and Tušanj (1952-1969). In the mid-1970's, collective housing units were built in Mosnik (until 1977.), and by the end of the 1980's residential buildings were built on Irac (until 1980.), Brčanska Malta (1967-1981), Sjenjak (1983 -1986), Slatina (until 1985.), Solina (1986.), Slavinovići (until 1988.) and Stupine (1987-1989) (Document No. 06-2 / 3-JI-23 - 10030/10, 2010).

Since the Austro-Hungarian period, and especially after the Second World War, in parallel with the intensive construction of collective housing buildings (buildings and skyscrapers), intensive construction of individual residential buildings has taken place in Tuzla. Individual dwellings occupy larger areas, with a much smaller population than collective dwellings. They continue directly to settlements with collective housing facilities and are located on the slopes of an urban area, and in most of these settlements, other amenities forming an urban structure are omitted. Nowadays, individual residential buildings have undergone significant changes, which are first of all noticed by the material from which they were built, floors, interior design, roof shape, etc. Unlike in the past one floor above the ground floor, two are usually built recently, and often three floors with a slightly lower floor, the so-called low or high attic. Today, there are numerous urban-geographical problems in parts of the city dominated by individual residential buildings, which are reflected primarily through the unresolved wastewater system, district heating is partial, streets are not paved, and in some landslides are present, which is a limiting factor in the use of construction.

City traffic zones

Traffic is one of the main factors influencing the spatial expansion of the city of Tuzla. Although traffic is the „skeleton“ of each city, the surface area for traffic in the city of Tuzla occupies a very small share in the total compared to all other city functions. Traffic in Tuzla is performed by city roads (streets and railways), with city streets being of the utmost importance. In addition to serving road and pedestrian traffic, various conduits also pass through the city streets, such as for electricity, water, heating, telephone, etc. Punctual points

(squares and promenades, parking spaces, railway and bus lines stand out in the Tuzla city area) and linear traffic zones (city streets and railways). Town squares and promenades (pedestrian zones) are an integral element of the functional-spatial structure and are known gathering places for the population. There are four town squares in the central business center (Sloboda Square, Slani Square, Kapija Square and Srebrenica Genocide Victims Square), as well as the famous Čaršija promenade, the popular Tuzla Korzo, which are connected by pedestrian streets and today represent a pedestrian zone in the city center. Also, in the eastern part of the town is a smaller promenade, more recently along the river bed of the Jala (Picture 5).



Fig. 3. Trg Slobode (Freedom Square)
(Foto: A. Bećirović)



Fig. 4. Pedestrian zone „Korzo“ (Foto: A. Bećirović)

The squares and pedestrian areas are free of car traffic, paved and equipped with urban infrastructure and adapted to pedestrian traffic, which is very intense and gives great liveliness to this part of the city (especially in the summer days). For the purpose of stationary vehicles in the city there are landscapes in the form of open or closed parking spaces. Tuzla has 36 landscaped parking spaces divided into three toll zones, and their current capacity is 1621 parking spaces (PUC „Transport and Communications“ Tuzla, 2012). Due to the mismatch between the degree of motorization and spatial - urban development, the lack of parking space in the city is one of the leading problems today. This problem is most pronounced in the previously built residential areas of the inner part of the city (Centar, Stari Grad, Mejdan, Novi Grad I and Novi Grad II), which have very limited conditions of expansion. Newer residential settlements in the eastern part of the city (Slavinovići, Sjenjak, Stupine, Brčanska Malta) are characterized by a balanced relationship between parking space and the number of users. The parking space lack problem could be solved by constructing underground or above ground garages on several floors. Buses and taxi services are used for public transport in the city. Tuzla has international, inter-entity, federal, cantonal and city bus lines. 64 bus stops (niches) have been built within the city bus network. In order to relieve traffic in the city, bus terminals have been moved from the center to the eastern (Simin Han) and west (Siporex) parts of the city, while the intercity bus station is located in the area of the Mosnik residential area. The East and West bus terminals in Tuzla are the busiest in the area of Tuzla Canton, as they serve 19 carriers daily with a total of 354 departures or returns (GPS, 2011). Increased traffic intensity and traffic congestion in Tuzla are also affected by the increase in the number of passenger cars. According to the information of the Ministry of Internal Affairs of Tuzla, 30,865 vehicles were registered, of which 27,241 passenger motor vehicles, 204 buses, 2,348 trucks, 287 motorcycles and mopeds and 785 others (special vehicles, tanks, cargo trailers, etc.) (MIA).

TK, 2011). In addition, about 50% of vehicles in transit as well as from the municipalities surrounding the city are moving along the Tuzla roads. The road transport network (main, regional and local roads) covers an area of 102.50 ha or 2.1% of urban space. Within that area, main roads are represented by 25.30 ha or 0.5%, regional roads by 5.30 ha or 0.1% and local roads by 71.90 ha or 1.5%. The city street network is a bottleneck in traffic due to the very low level of construction and equipment. The total length of the street network of the urban area of Tuzla is 72 km. Main roads, 7 meters wide, account for 12 km; regional roads, 6 meters wide counts 8 km; Local roads, 5 meters wide and unclassified roads, account for 52 km (Spatial Plan of the Municipality of Tuzla for the period 1986-2000 / 2005, 1986). The backbone of road traffic in the city consists of two main thoroughfares interconnected by transversal streets at a distance of about 500 m. The southern throughfare is parallel to the northern throughfare and stretches along the Jala river in an average distance of 500 meters from the northern throughfare. It disconnects from the Sarajevo - Županja main road near Husino, runs through the entire city and coincides with the M-4 main road in the area of Tuzla, at the Brčanska Malta intersection. The network of city streets in Tuzla is irregular (a mixture of deformed orthogonal and radial systems), which creates a lot of difficulties in terms of traffic flow.

Although Tuzla is an important railway hub, today this type of traffic is almost completely eliminated from the city traffic system. The length of the railway network in Tuzla is only 5.4 km, and this type of traffic is present only in the western part of the city, where freight traffic goes to the industrial zone „West“ and the transport of passengers to the main railway station located at the same location as the Interurban bus station, close to the BKC. Transport of passengers by rail is negligible, and freight traffic serves the needs of Solana, for which it transports about 10,000 tons of its products during the year (ŽFBIH, 2010) (Picture 5).

Zones of sports and recreation

Today, Tuzla has numerous and varied sports and recreational areas and facilities that make up the zones of sports and recreation. For the purposes of sports and recreation in this city, the most attractive is the complex „Panonika“, then the Mejdan Sports Center, the Stadium „Tušanj“, the Stadium „Slavinovići“, and tennis courts on Slana Banja and the shooting range „Paša bunar“. Of these recreational zones, the most important is the salt lake complex „Panonika“, which for several years has also been one of the most important tourist sites (in 2015, about 450,000 visitors) in the wider Tuzla and regional area. It was created on the part of the old city center which, due to the uncontrolled exploitation of salt and intensive subsidence of the soil, turned into an unregulated wetland without any content and purpose. The complex was built from 2003 to 2012 and resulted in the construction of four salt lakes, Salt Waterfalls as an inhalation open air health center, the Archeological Park - Neolithic pile dwelling settlement, and museum exhibits. The Pannonian Lakes Complex has a total surface area of 75,000 m (Kudumović Dostović, 2017). In addition to the above mentioned sports and recreational facilities and facilities in the town of Tuzla, there are numerous sports fields, which are mostly located within school playgrounds and planned residential settlements (Picture 5).

Greenery and special purpose zones

In urban zoning, greenery zones play a specific and important role. They have the function of recreation and rest of the inhabitants of the city and should occupy significant urban and suburban areas. They can be point, line and surface type greenery zones. Point type greenery is represented by various types of single trees and geraniums. An example of point type greenery in Tuzla is the oak tree (*Quercus robur*), which is located in front of the elementary school „Kreka“, whose age is estimated at more than 300 years. In addition to the oak, the most common tree of the city greenery is the wild chestnut (*Aesculus hippocastanum*), and there are also linden trees (*Tilia*), sycamore trees (*Platanus*) and numerous species of ornamental woody plants. Line type greenery in cities is made up of alleys or aisles along streets and rivers. Tuzla has more aisles, the most famous in the city being the „Oktobarska“ alley in the street that connects the residential zones Novi Grad I and Novi Grad II. It is a combination of linden and sycamore, planted in the early 1960's.

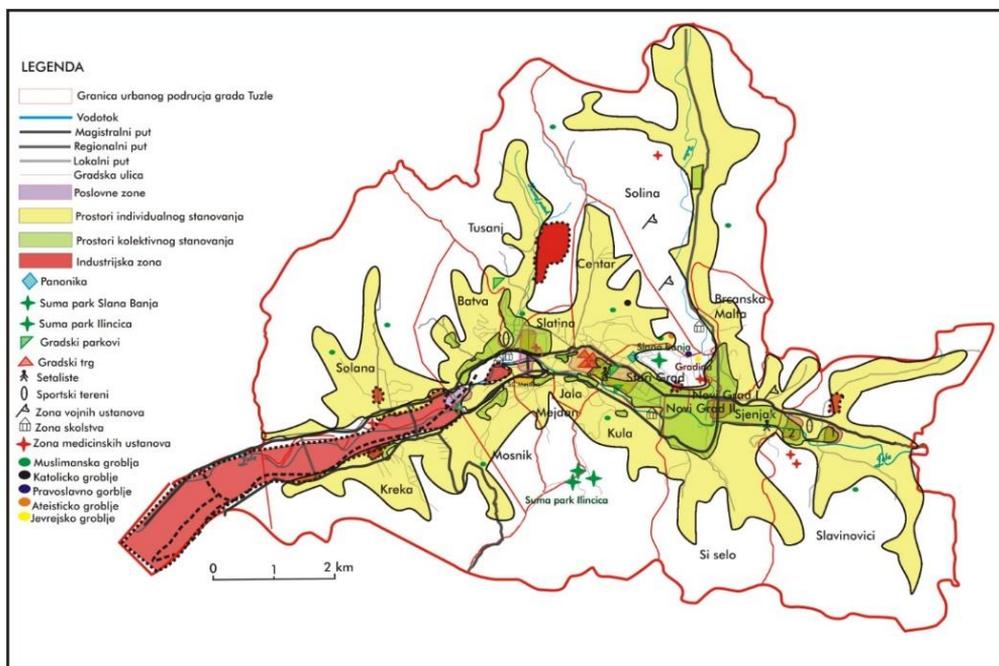


Fig. 5. Functional - spatial structure of the city Tuzla

Source: Topographic Map, Sheet Tuzla, 1977; Proposal of the Spatial Plan of the City of Tuzla 2010-2030, Institute for Urban Planning of the City of Tuzla, Tuzla, 2011; Field research conducted from October 2010 to March 2011 in the territory of the City of Tuzla, documentation available to local communities.

In addition to it, there are tree-lined avenues in the urban area and in the streets of Marshal Tito, Džemal Bijedić, Turalibegova, Rudarska, and along the banks of the Jala River along the Omladinsko pedestrian area. Surface type greenery covers larger areas, consisting mainly of city parks and park forests. On the territory of Tuzla, the larger park areas are the Central City Park, the „Musala“ Park, the Park near the BKC and the Park in Dragodol. City parks are enriched with facilities such as walking paths, benches, poles with

lighting, landscaped green areas, etc. In addition to city parks on the territory of the city and right next to it, there are parks - forests, the largest being „Slana Banja“ and „Ilinčica“ (Djedović, Bećirović, 2012). Compared to these zones, special purpose zones cover smaller areas and are located in different parts of the city. These zones include: schooling zones, zones of medical institutions, zones of military institutions and burial zones (Picture 5).

CONCLUSION

Tuzla is characterized by a relatively developed and complex functional-spatial structure of the city with clearly defined individual elements that are reflected primarily in a large number of built up economic, business and residential zones. However, from the aspect of share in the total urban area, agricultural and forest mostly undeveloped land have the largest share (41.1%). The second largest share in the total urban area (35.6%) is the residential area which has emerged as a result of one of the most important functions of the city since its inception. In the inner city area the residential area is mixed with other functions, mainly business, while in the outskirts of the city it is exclusively residential. The business zone occupies only about 1.3% of the city's surface and is mostly located in the historic city center. A special feature of the city is the developed industrial zone (5.9%), recognizable in Bosnia and Herzegovina and beyond, which includes a number of industrial, energy and mining facilities located mainly in the western part of the urban area. It is conditioned by specific terrain morphology and traffic structure (a zone that covers only 3% of the surface), mainly by road, which connected the border sections of the city with the central and regional roads of Tuzla with other parts of Bosnia and Herzegovina and the region. A significant area of the city are the recreational zones (6.1%), greenery, sports and recreation zones that gradually change the mining and industrial identity of Tuzla into a city of recreation, sports and tourism.

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