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CHANGING THE PARKING REGIME IN NOVI SAD BY INTRODUCING AN EXTRA ZONE IN THE CITY CENTER

Keywords

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characteristics,
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Abstract

With the increase in the number of registered vehicles and the degree of motorization in Novi Sad, the requirements for parking have increased significantly. Research conducted in 2017 determined the basic characteristics of parking in the central zone of the city of Novi Sad, and in 2019 certain measures were proposed to improve the parking system. Since the demands for parking in the central city zone exceed the parking capacity and in some parts of the day they reach up to 140% of the capacity, a measure was proposed in the form of a change in the parking regime and the introduction of an "extra" zone in the parking system. This paper shows the impact of this measure on the parking system in Novi Sad.

1. INTRODUCTION

With the increase of motorization and individual motor traffic, Novi Sad has faced increasing traffic problems. Problems related to vehicle parking are among the most significant, since they have a number of negative effects, such as reduction in the capacity of city roads conditioned by the slow movement of the vehicle and maneuvering in the process of parking, occupation of areas intended for pedestrians

and cyclists, irrational use of available areas, noise and exhaust emissions, dissatisfaction of citizens and users of parking lots, etc. The need to park vehicles in central city zones arises as a consequence of numerous factors, whereas parking requirements have random value. Constant increase of demands for parking is a direct consequence of:

- concentration of numerous activities in central urban areas;
- lifestyle changes;
- an increased mobility of the population;
- high representation of individual car traffic in the total traffic structure of mechanized modes of movement [1].

Over time, it has been established that the capacities of city parking lots cannot meet the growing demands for parking. On the other hand, in the interest of the development of the city, new capacities cannot be created indefinitely, but the existing parking areas must be used optimally. In order to improve the functioning of the parking system and harmonize the needs for parking with the needs and general tendencies of the development of urban areas, it is necessary to periodically analyze the existing parking system. One of those studies was carried out in 2017 for the purposes of the SMART PLAN study - data collection [2]. Within the framework of the SMART PLAN study - the second phase, a correction of the existing parking regime in the narrower central city zone was proposed, which introduces an "extra" zone. In relation to the existing parking regime, a time-limited parking of up to 60 minutes was proposed for the "extra" zone, as well as a higher fee for the parking service in this area [3].

Within this paper, the characteristics of parking in parking lots in the inner city zone will be analyzed, before and after the proposed change in the parking regime in the central city zone.

2. FIELD OF RESEARCH

Within the framework of the SMART PLAN - the second phase, the introduction of an "extra" parking zone was proposed. The parking lots that are proposed to be redistributed to the new zone are as follows:

- Mihajlo Pupin Boulevard (section between the intersection with Narodnih heroja Street and Žarko Zrenjanin Street) - on both sides of the road,
- Modena Street,
- Ilija Ognjanovića Street,
- Narodnih heroja Street.

However, as the construction of the parking garage in Modene Street has started in the meantime, the entire street is closed to traffic, and the parking spaces on this street are temporarily usurped. In addition to this street, the dead end of Ilija Ognjanovića Street is also closed to traffic, so the parking capacity in this street is reduced. In addition to the proposed streets, to the "extra" zone were also reassigned the streets Isa Bajić, Ignjat Pavlas, Konstantina Danila and the continuation of

Mihajla Pupina Boulevard (from the intersection with Modena St. to Pionirska St.). The capacity of the parking lot in Mihajla Pupina Boulevard (the section between the intersection with Narodnih Heroja Street and Žarka Zrenjanin Street) has been reduced because part of the parking lot has been repurposed as a taxi stand. The display of the "extra" zone in the parking system in Novi Sad is shown in Figure 1.

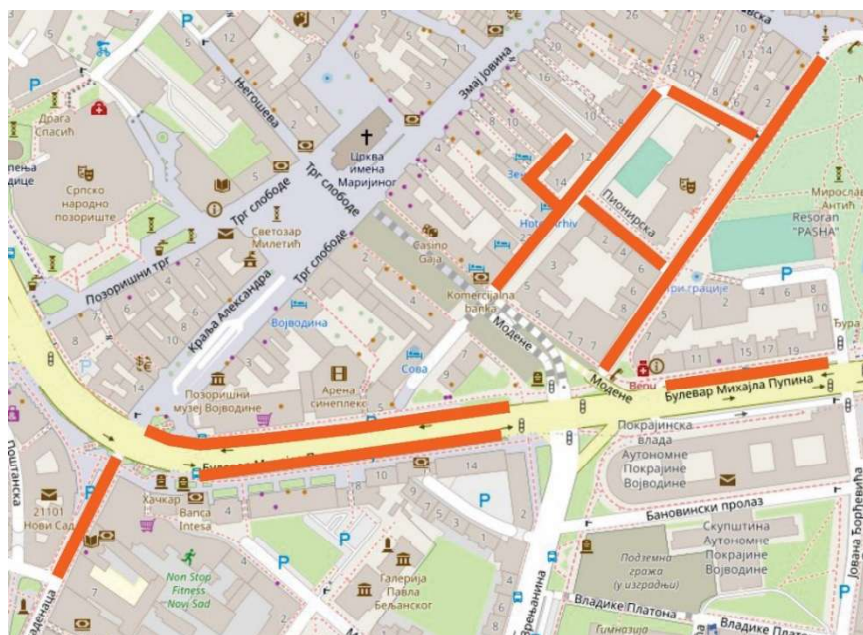


Figure1. Overview of the research area

The initial research was carried out in 2017, as part of the Smart Plan project - data collection, commissioned by the City of Novi Sad. During the research, a full-day count of vehicles in parking lots was carried out, from 7:00 a.m. to 9:00 p.m., that is, during the period when parking fees are charged in Novi Sad.

The second survey was carried out in May 2023, as a control count and verification of requests, in order to determine the requests for parking in the period when the measure was applied in the parking regime. Control counting determined the average hourly parking requirements in all parking lots.

3. COMPARATIVE ANALYSIS OF ACCUMULATION BEFORE AND AFTER THE INTRODUCTION OF THE EXTRA ZONE IN THE PARKING SYSTEM

Since the licence plate numbers of the vehicles parked in the observed parking lots were not recorded by the control counting, of all parking characteristics only a comparative analysis of the accumulation can be performed.

Figure 2 shows a comparison of the occupancy of parking spaces in parking lots located in the extra zone, obtained from the research in 2017 and 2023. It is observed that the accumulation of vehicles during the survey in 2023 decreases throughout the day. Also, it can be seen that the occupancy of parking spaces does not exceed 100% in any part of the day. It is also necessary to take into account the fact that the capacities of certain parking lots have been reduced due to the construction of a parking garage in Modena Street and by relocating taxi stands (the capacity in the observed area was reduced by over 10%). As the total accumulation in all parking lots is less than 100% throughout the day, it can be concluded that users can find a free parking space at any time of the day in the observed area.

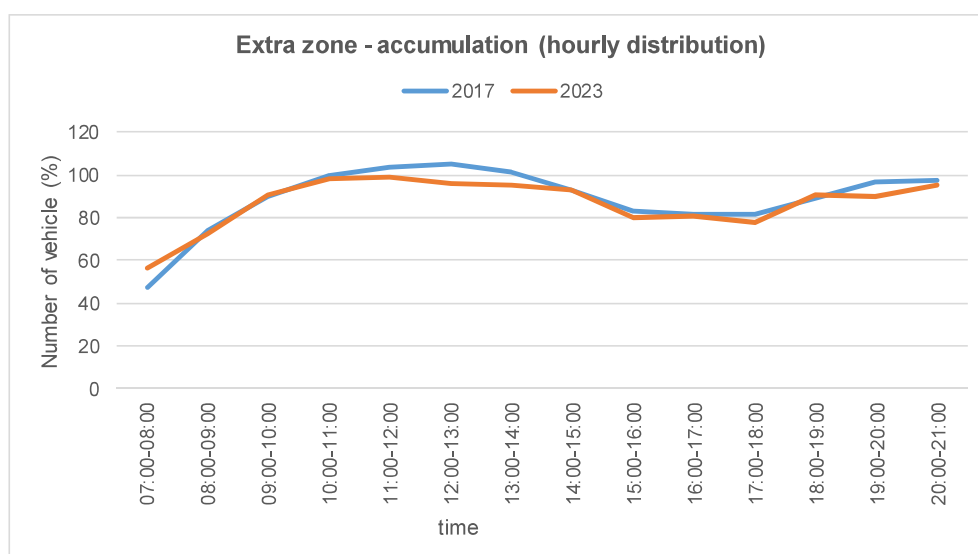


Figure 2. Hourly distribution of accumulation

The following table shows separate parking accumulations in parking lots located within the "extra" zone, with a comparative analysis of the results of the research conducted in 2017 and 2023. Parts of the day when parking capacity occupancy was lower in 2023 compared to 2017 are shown in green, while parts of the day when parking lot utilization was higher in 2023 compared to 2017 are marked in red. Differences in parking lot occupancy up to 10 % are not marked. The results of the research for the parking lot in Isa Bajića Street differ from other parking lots, given that during most of the day the occupancy of the parking lot is higher in 2023 compared to 2017, and the reason for this is that at certain moments some vehicles were improperly parked in the observed area. In other parking lots, during a longer period of the day, the parking accumulation determined by the 2023 survey is less than or equal to the accumulation determined by the 2017 survey.

Table 1. Occupancy of parking spaces in parking lots, within the "extra" zone

Name of the street	Year	07:00-08:00 h	08:00-09:00 h	09:00-10:00 h	10:00-11:00 h	11:00-12:00 h	12:00-13:00 h	13:00-14:00 h	14:00-15:00 h	15:00-16:00 h	16:00-17:00 h	17:00-18:00 h	18:00-19:00 h	19:00-20:00 h	20:00-21:00 h
Narodnih heroja	2017	61	96	93	96	93	93	89	93	86	86	64	89	86	89
	2023	50	84	92	92	97	92	89	92	84	87	87	74	79	87
Bulevar Mihajla Pupina (Bazar)	2017	23	63	89	95	95	93	88	91	82	81	91	93	93	93
	2023	21	46	97	110	100	95	95	100	74	74	67	97	87	100
Bulevar Mihajla Pupina (DDOR)	2017	29	85	98	95	98	97	93	97	93	80	85	92	97	100
	2023	15	43	92	98	96	92	92	89	75	89	70	96	91	94
Bulevar Mihajla Pupina (režijska)	2017	100	100	97	97	100	100	97	97	83	83	76	76	97	97
	2023	54	71	80	97	103	100	97	94	83	86	77	77	89	97
Ilije Ognjanovića	2017	65	86	103	111	116	123	114	98	88	89	93	97	103	102
	2023	96	102	109	115	115	110	108	109	100	90	94	100	100	106
Ise Bajića	2017	62	69	92	100	100	108	115	100	92	92	100	85	100	108
	2023	109	82	136	118	136	127	127	118	82	100	64	73	82	118
Konstantina Danila	2017	64	73	91	100	100	100	100	91	64	100	82	91	73	100
	2023	55	91	100	100	100	100	100	82	100	82	100	100	64	100
Ignjata Pavlasa	2017	27	46	67	94	103	101	98	84	68	68	69	81	96	95
	2023	54	65	66	80	82	82	83	74	61	63	66	88	89	85

4. CONCLUSION

Problems related to vehicle parking are among the most significant problems in the field of traffic, which have arisen due to the increase in the degree of motorization and individual motorized traffic. Demands for parking in the central area of the city are increasing due to its attractiveness, and the space for expanding parking capacities is decreasing. That is why it was necessary to change the parking regime and introduce an "extra" zone, where parking will be limited to a maximum of one hour. This provides an opportunity for a greater number of users to use the services of the parking lot.

The results of the research, which was conducted in 2017 as part of the Smart Plan study - data collection, and in 2023, after the implementation of the proposed measure of changes to the parking regime, were compared. Since in 2023 only a control count was carried out, only a comparative analysis of the occupancy of parking spaces, i.e., the accumulation, could be carried out.

The comparative analysis concluded that the accumulation of vehicles during the research in 2023 was less throughout the day. Also, it can be seen that the occupancy of parking spaces does not exceed 100% in any part of the day. It is also necessary to take into account the fact that the capacities of certain parking lots have been reduced due to the construction of a parking garage in Modena Street and by relocating taxi stands (the capacity of these parking lots has been reduced by over 10%). As the total accumulation in all parking lots is less than 100% throughout the day, it can be concluded that users can find a free parking space at any time of the day in the observed area.

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