THE NEED OF DEVELOPING THE PARKING SYSTEM IN THE BUCHAREST MUNICIPALITY

Ph.D. Candidate Student Carmen Elisabeta RADU, University POLITEHNICA of Bucharest, ROMANIA carmenradu23@gmail.com
Ph.D. Candidate Student Edward RĂŞCHITOR, University POLITEHNICA of Bucharest, ROMANIA edwardraschi@gmail.com
Ph.D Emeritus Prof. Eng. Iosif TEMPEA,
University POLITEHNICA of Bucharest, ROMANIA iosiftempea@yahoo.com

Abstract: This work deals with the need and possibility of building car parks in Bucharest above Dâmboviţa river. They included analyses referring to the evolution of the number of existing vehicles in Bucharest, an analysis of the number of vehicles in Bucharest, as compared to other European capitals, and also certain elements leading to the possibility and profitability of building a car park above Dâmboviţa River.

Keywords: Traffic, parking, accesibility, slab, investments

1. Introduction

As for the road traffic, the problems affecting Bucharest are related to pollution, large number of vehicles in the city, small number of car parks and their location in areas which are difficult to access as compared to the large boulevards, the services and dwellings of the citizens, elements which have also been highlighted in the work ”Multi-storey car parks above Dâmboviţa river” [1].

In relation to this last very important element, this work has been prepared that highlights the possibility of building a car park above Dâmboviţa river. It is considered that the respective car park would solve a part of the mentioned problem, considering the existing area, the execution technology and current financial possibilities. Also, in the case of a multi-storey car park above Dâmboviţa river, one can plant energetic willow, considered to be a renewable energy resource and oxygen source (diagram 9).

2. The number of existing vehicles in bucharest

One of the very important problems affecting the contemporary world is the transportation systems used in economy. Within the defining elements of the economic system of a country, transportation is an important component besides industry, agriculture and trade.

In the case of the urban system, the transportation branch greatly influencing the current world is the road transport, whose correct evolution leads to normal developments of the daily activities.

According to the data provided by Eurostat[2], in 2017, the monitoring rate of certain European capitals was the one presented by the chart in diagram 1. One can note an average monitoring rate of Bucharest as compared to the other evaluated capitals.

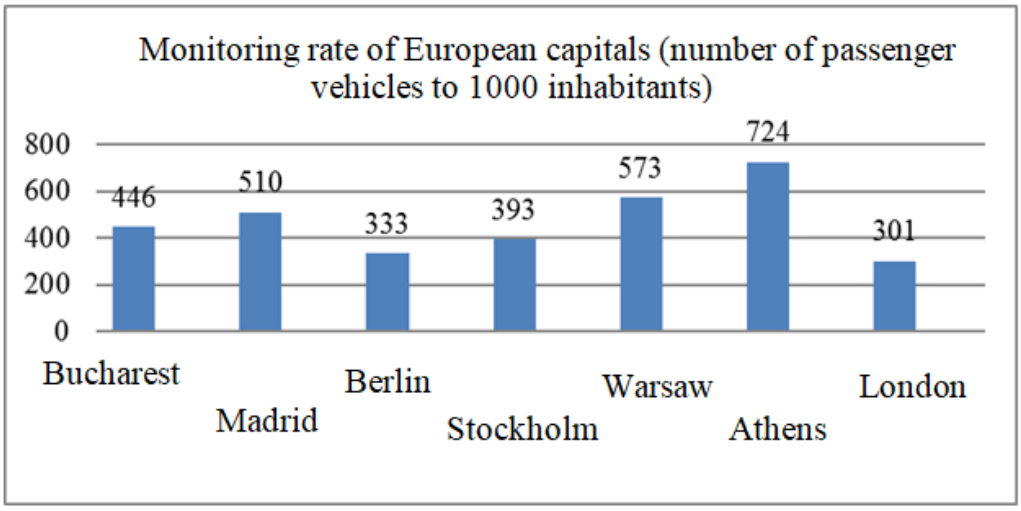

Diagram 1. Monitoring rate of certain European capitals

A side of these urban road transports that are referred to is represented by the car parks that must cover a very large number of vehicles that daily cross Bucharest.

The number of vehicles registered in Bucharest was, according to the Bucharest Statistics Directory 2007 [3], and Bucharest Statistics Directory 2016 [4], respectively, the following:

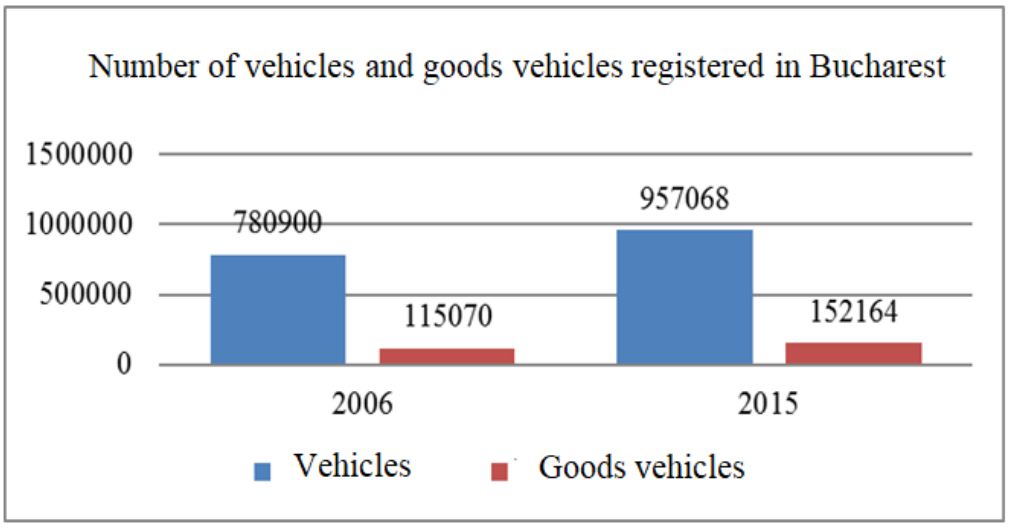

Diagram 2. Number of vehicles and goods vehicles registered in Bucharest in 2006 and 2015

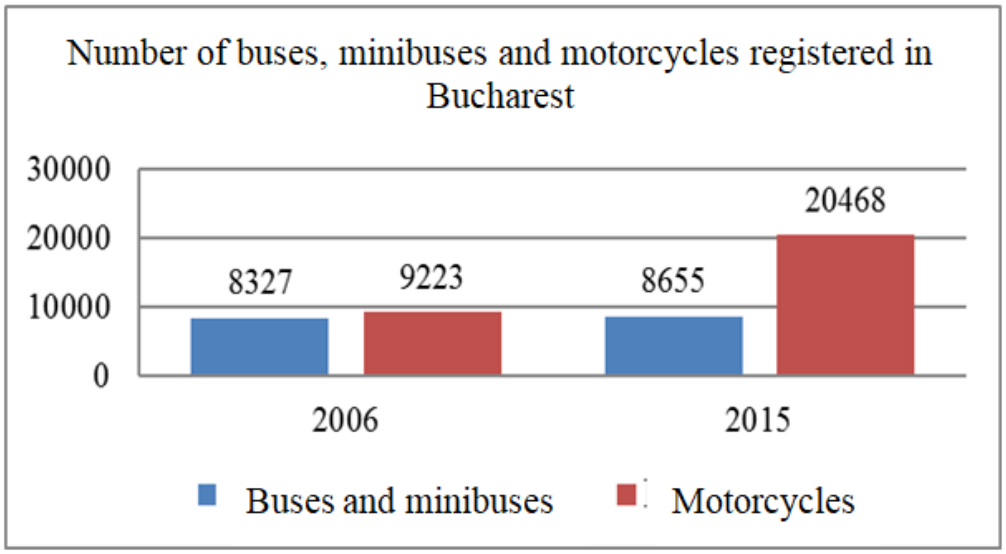

Diagram 3. Number of busses, minibuses and motorcycles registered in Bucharest in 2006 and 2015

3. The need of building car parks. Types of car parks that can be built in bucharest

Regarding the elements mentioned in the previous chapter, one must highlight a few elements related to the needs and possibilities of building car parks in Bucharest.

Due to the very large number of vehicles registered in Bucharest, which daily cross it, it is absolutely necessary to build car parks with as large as possible capacities, as soon as possible. One can build the following types of car parks:

a) Simple car park - which can be built making relatively small investments - is the platform type car park above Dâmboviţa river, considering the large area of river train (from Lacul Morii-Ciurel to Vitan area). Such a car park exists in Eroilor area, opposite the Romanian Opera House.

b) P+1 type two-level car park, which can be built above Dâmboviţa river, thus doubling the number of parking spaces as compared to the variant presented at item a). For the movement of the vehicles in the car park floor area, one may use either an inclined plane cast in reinforced concrete, or a conveyor belt as an inclined plane, on which the vehicle stays while moving uphill (according to diagrams 7 and 8)

c) multi-storey car park on a round platform with a smart parking system, equipped with an automation package system, where cars are stored vertically. The multi-storey car park is built on metal structures.

The elements leading to the need, possibility and profitability of building a car park above Dâmboviţa river are:

- Accessibility. The area is accessible in the city center as compared to other car parks, and the employees working in the central area have easy access to their work places
- Large useable area. One may build several similar or identical car parks, in terms of area, considering the availability of straight portions of Splai area

- Fluidization of public transportation. A fluidization of the surface public transportation is achieved in the respective area
- Easy access to subway. There is immediate access to the subway stations, thus achieving easier movement to several areas of Bucharest
- Obtaining funds. Funds are obtained for the maintenance of these car parks and for other investments by selling passes for using the respective car parks.

Dâmboviţa river is channelled along its entire length to be found in Bucharest, i.e. approx. 12 km. The width of the arranged river bed varies between 20.00 – 50.00 m. That is why I once again take into account the possibility of building several car parks above the river. In order to prove those mentioned above, please find below two photos showing Splaiului Independenţei areas, where I consider that such car parks can be built. In diagram 4, the area between Grozăveşti Bridge and Lacul Morii – Ciurel is presented, and in diagram 5, the area in the immediate proximity of the Palace of Justice.

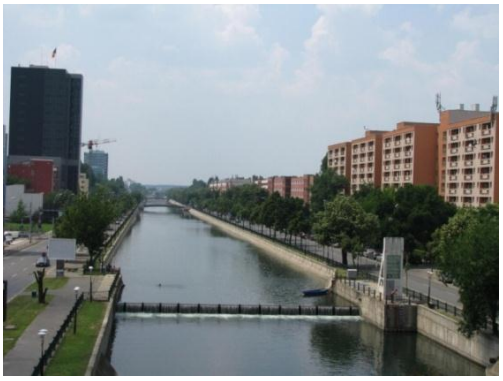

Diagram 4. Dâmboviţa in the Grozăveşti area

Diagram 5. Dâmboviţa in the Palace of Justice area

In diagram 4, one can note the area of the river train which does not imply significantly large investments for the execution of a car park above the river, and we also note the possibility of creating a very large number of parking spaces, even in the situation of building a simple car park, without considering the execution of the P+1 type two level car park. The two photos are presented as examples, but we estimate that there is the possibility of building such car parks for more than 60 % of the length of the river crossing Bucharest.

One may consider the manner of laying the concrete slab in 1938 between the Senate Square (the current United Nations Square) and Unirii Square (diagram 6).

Diagram 6. Building the bridge in the Palace of Justice area in 1938

One considers several possibilities of executing the car park (diagrams 7, 8, 9). The optimal variant may result further to a discussion with specialized architects, civil engineers and further to an impact study which we consider to be absolutely necessary. In this study, a questionnaire is included which would be filled in by the road users and specialists. The answers shall subsequently be summarised, and important conclusions shall be drawn.

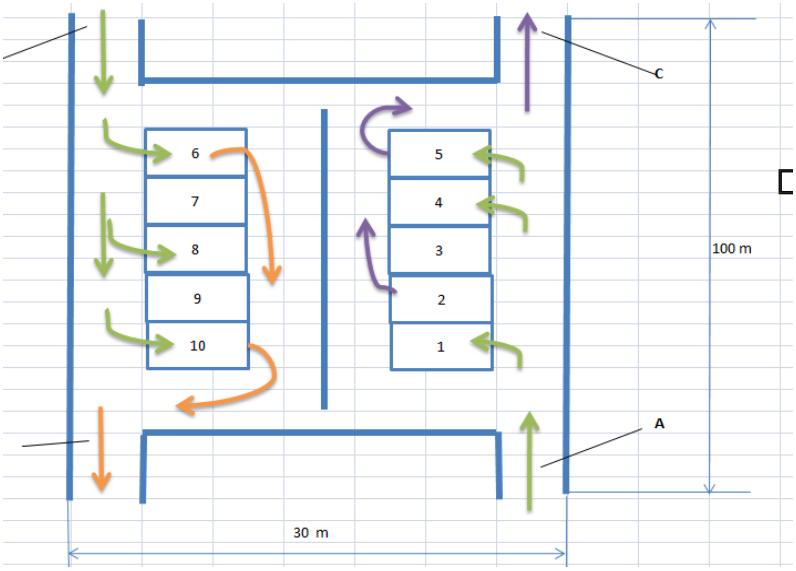

Diagram 7. Car park with an access option from both sides

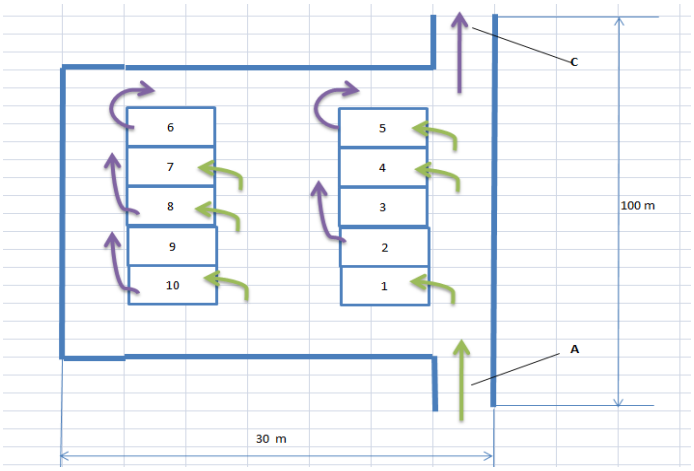

Diagram 8. Car park with an access option from one side

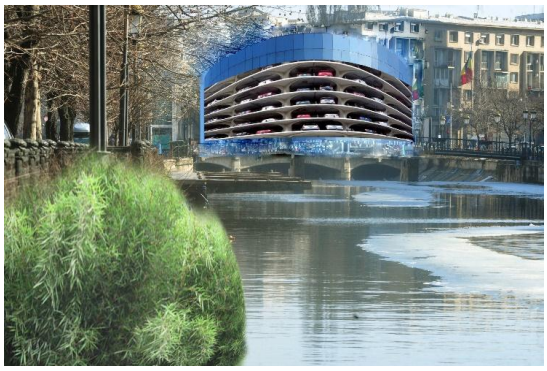

Diagram 9. Multi-storey car park on a round platform with an intelligent parking system

4. Conclusions

The number of vehicles involved in the Bucharest traffic is increasing by the year. The circulation of the surface means of public transportation is more or more difficult, while their commercial value is not higher than 10 km/h on certain moments of the day. The jams of junctions are frequent and certain problems occur even in the case of pedestrian traffic. In order to achieve a fluidization of traffic, numerous parking spaces are also necessary, which lead to a compliant parking of the vehicles. After studying the presented examples, one may conclude that a very useful car park can be built along Dâmboviţa River.

References

[1]**. Radu Carmen Elisabeta, Răşchitor Edward,** *Parcări supraetajate deasupra râului Dâmboviţa,* SMART START-UP EDIŢIA II, Polytechnic University of Bucharest, November 2017

[2] **https://monitorsocial.ro/data/transportul-in-comun-in-capitalele-europene/**

[3] *Bucharest Statistics Directory 2007*, Bucharest Statistics Regional Department

[4] *Bucharest Statistics Directory 2015,* Bucharest Statistics Regional Department