

Problems and urban infrastructure development in Russia

(For example, the city of NaberezhnyeChelny)

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Abstract

Over the last few years the number of cars owned by Russian citizens, has dramatically increased, but to levels of Europe and the United States still need to "grow". Some regions in motorization have already caught up with the European countries, and the capital of Russia is not on the leading places for this indicator. At

the moment the country is at the level of European countries in the 70-ies of the last century. But there is another important problem of insufficient road areas and parking lots in the infrastructure of cities of Russia.

In NaberezhnyeChelny. The city's population is 522 thousand people, city area is 17103 ha. Ratio of "metropolis" in NaberezhnyeChelny is 3.9. For comparison, this ratio in Moscow (within MKAD) - 35, Paris – 28, Sydney – 4, Kazan - 5,9. The coefficient of NaberezhnyeChelny in the density of the metropolis is about on par with Sydney, it is better to Kazan. This speaks to the amazing possibilities of NaberezhnyeChelny for the harmonious development (extension) adjoining roads and construction (extension) of the commercial parking lots within walking distance, parks and green spaces. Taking into account the ratio of the reserve for the development of road infrastructure exists.

The observed infrastructural problems of the city of NaberezhnyeChelny: the lack of local parking lots; a huge amount of garbage in the form of leaves in the spring and autumn, mainly from not presentable, dangerous and large trees (poplar, birch); parking on lawns, the result of which is pollution of roads.

We cannot quickly catch up with Europe but we can develop the infrastructure in this direction.

Keywords: road area, metropolis ratio, infrastructure, vehicles, population.

Introduction

Effective vision has some fundamental and distinctive properties. So, it must be not static but evolutionary. The system of values which it reflects, should have both implicit and explicit components. It can never be fully achieved, that is, there are always some areas of tension between what is implemented and what can be achieved. And most importantly, it possesses high energy, clear, consistent, instills energy and inspiration. [1].

Russian cities are growing and we need to think about the harmonious development concept that future generations will be grateful. Consider what might be the concept of urban infrastructure development on the example of the city NaberezhnyeChelny, Tatarstan, Russia.

Over the last few years the number of cars owned by Russian citizens, has dramatically increased, but to levels of Europe and the United States still need to "grow". Some regions in motorization have already caught up with the European countries, and the capital of Russia is not on the leading places for this indicator. At the moment the country is at the level of European countries in the 70-ies of the last century. But there is another important problem of insufficient road areas and parking lots in the infrastructure of cities of Russia.

According to common world standards in the roads area shall be not less than 20% of the city territory [2]. In large cities of developed countries, the percentage of area occupied by roads is usually 20-35%, and in Moscow 6-10%. In NaberezhnyeChelny the roads area is approximately 5-6 %. With a population of 522 thousand people [3], the area of the city is 17103 ha, including the area of green space 5191 ha, it is 30,4% of the total area of urban land [4].

Methods

In the program of strategic development of Tatarstantill 2030 all comparisons are with the developed countries of Europe and Asia. Benchmarking in this case also involves the developed cities in the world. To be objective, compare the ratio of "metropolis" cities [2]:

Table 1. The "metropolis" ratio

City	k	City	k
Moscow (MKAD)	35	Kazan	5,8
Paris	28	Sydney	4
London	18	NaberezhnyeChelny	3,9
Los Angeles	11	Nizhnekamsk	3

This means that in order to ensure, in Moscow the level of car use equal to London, the percentage of road surface area should be increased in 2 times. But then square roads of Moscow should occupy 40% of the city area. It is impossible to do due to the dense development of the city [2].

In NaberezhnyeChelny. The population members for 2014 is to 522,048 [3] people, city area 17103 ha. [4], k= 3,9.

The derived "metropolis" ratio [2]:

$$k = \sqrt{QP}$$

where:

Q – population of the city, people.

P - population density (population/city area) people / sq. km. (ha)

Based on the ratio, NaberezhnyeChelny on the density of the metropolis is about on par with Sydney, it is better to Kazan. This speaks to the amazing possibilities of NaberezhnyeChelny for the harmonious development (extension) adjoining roads and construction (extension) of the commercial Parking lots within walking distance, parks and green spaces.

As noted the area of green space in NaberezhnyeChelny is 5197 ha.

According to building rules II-60-75 green spaces. Area of public green spaces in residential areas are calculated according to table 2.

According to building rules II-60-75? in the design of urban green spaces should be given area of at least in the design of urban green spaces should be given area of at least: 15 ha — for citywide parks, 10 ha —for planning areas, 3 ha — for gardens of residential areas, 5 ha — for squares. Area of general village garden should be not less than 2 ha.

Table 2. The area of common green spaces

Green spaces	Area of green spaces, sq. m. per person					
	in the largest, large and big cities		in medium-sized cities		in small cities and towns	
	in the first place	on the settlement date	in the first place	on the settlement date	in the first place	on the settlement date
Citywide or general village	5	10	4	6	7	7
In residential areas	7	11	5	8	-	-

Based on the table of population for the city of NaberezhnyeChelny it is enough 1096,3 hectares of green spaces and parks, squares 50 hectares. According to the norms of 1,200 hectares for green space would suffice, and in the presence of NaberezhnyeChelny 5197 hectares, i.e. more than 4 times.

Results

The reserve exists. If you look at the existing problem of the city at the time observed:

a) lack of local parking spaces;

b) a huge amount of garbage in the form of leaves in the spring and autumn, mainly from not presentable, dangerous and large trees (poplar, birch)[5];

c) the parking of cars on lawns due to the obvious lack of parking lots, the result of which is pollution of roads.

Over the last few years the number of cars that are owned by Russian citizens has increased dramatically, but despite this, to levels of Europe and the US still need to grow. Some regions in motorization have already caught up with the European countries, and the capital of Russia is not on the leading places for this indicator. At the moment the country is at the level of European countries in the 70-ies of the last century.

At the beginning of 2012 on one thousand inhabitants of Russia is 250 cars, which is approximately one car for four people. According to these indicators, the country lags behind the United States three times, and from Europe almost doubled. In Europe per 1000 inhabitants the leading countries account for approximately 480 cars, and in more developed countries the number of cars reaches 600 copies. A leader in the motorization is the United States with a rate of 760 vehicles per thousand people, in second place is Luxembourg (680 auto/1000 inhabitants), and the third settled Malaysia (640 cars/1000 inhabitants). Completing the top five Australia and Malta. It is also interesting that the top ten does not include the leading countries in car manufacturing, such as Japan and Germany occupy only the eleventh and fifteenth place respectively. It can be noted that Russia is the only leader among the CIS countries, but to European countries is certainly far [6].

Further we will present the results of the study and the trend of NaberezhnyeChelny.

Table 3. - Statistics on the number of cars in NaberezhnyeChelny [7]

	2010	2011	2012	2013	2014	2015
Lights(natural persons)	99431	108875	118598	128837	135886	144900

Lights (legal entities)	2792	3021	3231	3467	3862	4130
Total	102223	111896	121829	132304	139748	149030

Over the period 2010-2015, respectively, the number of cars steadily grows linearly.

Analyze the specific number of cars per 1000 inhabitants of NaberezhnyeChelny.

Table 4. Statistics population and total number of passenger cars

	2010	2011	2012	2013	2014	2015
Light vehicles	102223	111896	121829	132304	139748	149030
City population	510301	513200	516637	519025	522048	524444

Table 5. Statistics of passenger cars per 1000 people.

	2010	2011	2012	2013	2014	2015
Specific per 1000 of population	200,3	218,04	235,8	254,9	267,7	283

As can be seen from the tables, while the number of cars per 1000 inhabitants NaberezhnyeChelny behind the cities of Europe, not to mention the US. But the trend is increasing. Forecast figure 2030.

Table 6. The forecast increase in the number of people and number of cars until 2030.

	2010	2015	2020	2025	2030
Light vehicles	102223	149030	196000	243000	290000
City population	510301	524444	537555	550990	564700

Table 7. Forecast growth in the number of passenger cars per 1000 people.

	2010	2015	2020	2025	2030
Specific per 1000 of population	200,3	284,2	365	441	513
City population	510301	524444	537555	550990	564700

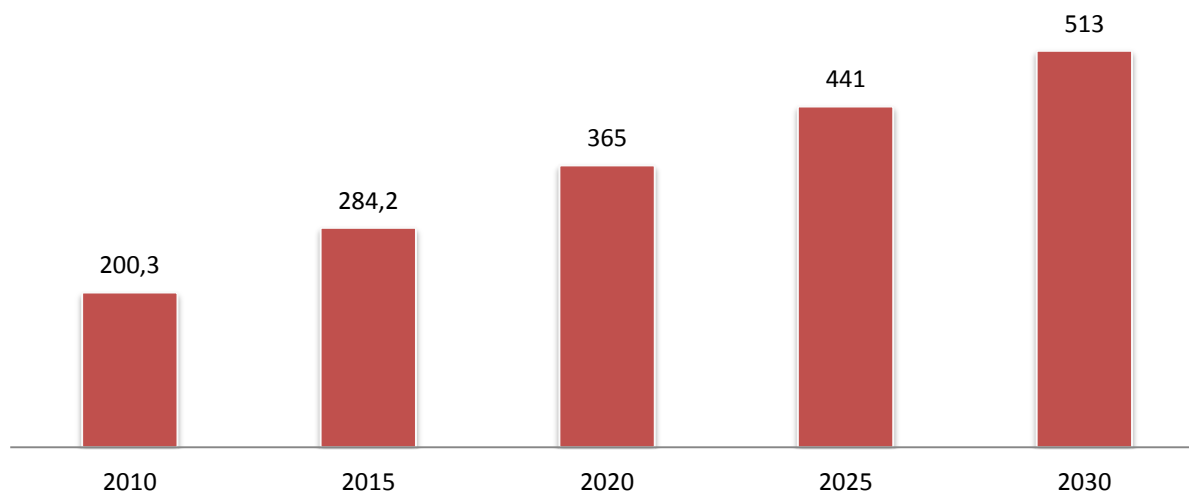


Рисунок 1. Прогноз количества легковых автомобилей на 1000 чел. населения г.Набережные Челны

Figure 1. Forecast growth in the number of passenger cars per 1000 people. NaberezhnyeChelny.

So, to the European cities, the number of passenger cars per 1,000 people, NaberezhnyeChelny will close in 2025, the question of harmonious development of city infrastructure in this trend.

Study on the parking lots.

In NaberezhnyeChelny the parking places business do 172 000 and IP [8]. The parking is a topical issue them to fill. Based on the official source of administration of NaberezhnyeChelny [9] the vacant seats on the parks the city is 12040 16% of the total capacity of parking of passenger cars number of 75680. The number of passenger cars 149030 149030 pieces of cars in the parking lot $75680 - 12040 = 63640$ cars in the yards and garage societies stored $149030 - 63640 = 85390$ cars in the city. According to BTI garages are 43574 units, but the residents of the garages are mostly used as workshops and storage rooms. The visual count and conversations with artists repair showed the occupancy rate of parking garages 35%, therefore, $43574 * 0,35 = 15250$ cars in garages. The rest $85390 - 15250 = 70140$ cars parked in yards and sometimes breaking the rules of parking due to the lack of parking spaces.

Summary. During observation of infrastructure problems in the city of NaberezhnyeChelny in terms of lack of parking spaces and roads area. It will be

difficult to provide level of car use in NaberezhnyeChelnyat the level of some cities in developed countries due to higher population density because of apartment buildings, but it is necessary to develop in this direction.

Conclusion.

The main proposals on development of infrastructure of NaberezhnyeChelny:

1. To build residential complex with the new (increased) by the standards of the squares of the adjacent roads and parking lots;
2. To increase the road area and adjoining parking spaces at the expense of a harmonious combination with the green areas.
3. To wisely choose the types of green spaces.
4. Now it is necessary to think of increase in the sites (areas), expansion of roadways within residential complexes, to think about multi-storey car park, to design and build multi-level interchanges.

We should provide a gradual transition to replacement boxes and open parking lots, occupying too large area and is unacceptable in the aesthetic attitude, in modern multi-storey garages and parking lots.

The main types of garages on the settlement date are multi-storey (4-5 floors) parking garages on 500 seats. In addition, districts are encouraged to place underground and semi-underground garages with a capacity of 50 seats [10].

Outdoor parking is to be placed to the first phase of construction on the site of multi-storey garages. On the settlement date for the implementation of the plan should be the construction of a multistory parking gated along the central avenues of the city, which should have a modern and original appearance to be able to look at the background architecture of the city's avenues. As well as to provide space for parking vehicles in the underground and ground floors when designing and construction of shopping centers and these rooms can be used as parking for customers and as a night parking. Include underground parking (in the design of houses to consider the draft storage space for cars in the basement) in the construction of new residential buildings [10].

In conclusion it can be noted that "all this was not to find errors, and to attempt to find a new "tremors"[11] for development.

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