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KHARKIV CYCLING INFRASTRUCTURE DEVELOPMENT FEATURES

The article focuses on cycling infrastructure development features in a number of European cities. The article outlines the main problems of a big city's transport infrastructure and points out the advantages of a network of cycle paths and bike racks introduction to an urban space. Approach, based on the relevant researches analysis and successful experience of some western countries, substantiates creation of a full-fledged bicycle infrastructure in Kharkiv. By means of Delfi questionnaire citizen's opinion concerning the question of creation and use of bicycle infrastructure is revealed; potential target audience is defined.

Key words: bicycle, cycling infrastructure, bike path, cycle track, bike rack.

Анна Соколенко. ОСОБЛИВОСТІ РОЗВИТКУ ВЕЛОСИПЕДНОЇ ІНФРАСТРУКТУРИ У ХАРКОВІ. У статті представлена характеристика рівня розвитку велосипедної інфраструктури у ряді міст Європи. Визначено основні проблеми функціонування транспортної інфраструктури великого міста та переваги впровадження мережі велосипедних доріжок та паркінгів у міському просторі. Базуючись на проведених у даній сфері дослідженнях та вдалому досвіді західних міст обґрунтована доцільність створення повноцінної велосипедної інфраструктури у місті Харкові. Шляхом проведення анкетного опитування виявлено ставлення населення до питання створення та використання велосипедної інфраструктури; визначено потенційну цільову аудиторію.

Ключові слова: велосипед, велосипедна інфраструктура, велосипедна доріжка, велосипедна смуга, велопарковка.

Анна Соколенко. ОСОБЕННОСТИ РАЗВИТИЯ ВЕЛОСИПЕДНОЙ ИНФРАСТРУКТУРЫ В ХАРЬКОВЕ. В статье представлена характеристика особенностей развития велосипедной инфраструктуры в ряде городов Европы. Определены основные проблемы функционирования транспортной инфраструктуры большого города и преимущества внедрения сети велосипедных дорожек и паркингов в городском пространстве. Основываясь на проведенных в данной сфере исследованиях и удачном опыте западных городов, обоснована целесообразность создания полноценной велосипедной инфраструктуры в городе Харькове. Путем проведения анкетного опроса выявлено отношение населения к вопросу создания и использования велосипедной инфраструктуры; определена потенциальная целевая аудитория.

Ключевые слова: велосипед, велосипедная инфраструктура, велосипедная дорожка, велосипедная полоса, велопарковка.

Introduction. Availability of bike paths networks and usage of bicycles for commuting, of course, can't testify to technological backwardness of one or other country. Nevertheless, in the developed countries, for the last 30 years an accurate tendency to development of cycling infrastructure, promoting and advertising of cycle as a healthy means of life. The case is that strongly growing urbanization in the modern world may lead to deterioration of ecological situation, medical injuries and unjustified fuel consumption. Therefore governments of the different countries give the "green" street to the majority of projects connected with replacement of cars with bicycles. In Ukraine we face the same problems, but one should consider that European cities have narrower streets (especially in historical centers) and more cars per capita. We can successfully use experience of foreign projects with benefit for the city and without unjustified expenses.

Literature review. Cycling infrastructure as subject was already analyzed by various authors in periodicals and in the Internet. A number of experts and enthusiasts in various areas, in particular Gorbachev P. [4], Sinyuta A [11], Kizlevich A., Tkachenko N. [13], Tokmilenko A. [14], Sulima Y. dealt with issues of cycling infrastructure development in Kharkov. Besides, certain steps towards this issue were taken by cycle activists and businessmen [10].

Significance of the study is defined by the fact that Kharkov has all prerequisites for creation of cycling infrastructure and conversion to a cycle tourism center. However, not all factors are developed sufficiently for this purpose, that is Kharkov municipal authority in cooperation with private investors should come to european level and pay maximum attention to further

development of this question.

The purpose of the study is to explore the cycling infrastructure in the European countries, to justify its development importance in Kharkov and region, provide guidelines for further development of cycling infrastructure in the city, to give bigger number of citizens and city visitors better understanding on advantages and prospects of cycling infrastructure; to involve investors and tourists to the region.

Main Body. According to Wikipedia, "cycling infrastructure refers to all infrastructures which may be used by cyclists. This includes the same network of roads and streets used by motorists, except those roads from which cyclists have been banned (e.g., many freeways/motorways), plus additional bikeways that are not available to motor vehicles, such as bike paths, segregated cycle facilities and, where permitted, sidewalks, plus amenities like bike racks for parking and specialized traffic signs and signals" [15]. In Ukraine solitary cycle tracks appear in Kyiv, Lviv, Vinnytsia, Odessa and Mariupol, but do not form a transport network, and sometimes have no systemacity and logic. Also, a part of the bike way "Roscoff-Kyiv" of the EuroVelo European cycling routes network connects Kyiv and Lviv [5].

Today, considering congestion of city roads and country highways network, cyclist gets main advantage in speed. The cyclist can commute around the city with an average speed of 17 km/h and bypass traffic jams, or reduce a route through travel yards and squares. Average car makes 25-30 km/h in the city speed, and doesn't exceed 13 km/h in rush hours. Developing the bicycle movement makes possible to reduce pressure on the city transport infrastructure.

Bicycle is interesting in the context of unloading roads which can't be broadened near the downtown that

can reduce quantity of necessary transport more than twice. The following argument in favor of a bicycle is that fact that the necessary area for bike parking is 8 times less than for car. To install a bike rack at a limited territory is more simple and economical choice.

From the ecological point of view, cycle transport is a rescue of an urban environment from exhaust gases which negatively influence all of us, irrespective of the social status and age day and night.

From the medical point of view bicycle is the

strongest means in prevention of diseases of cardiovascular and respiratory system and good trainings of muscles.

There are plenty of facts, figures and examples of international experience, proving the feasibility of implementing cycling in cities. For example, in the context of one of the European surveys, 1,000 people in each country were asked: “What is your main mode of transport for daily activities?” (Fig. 1).

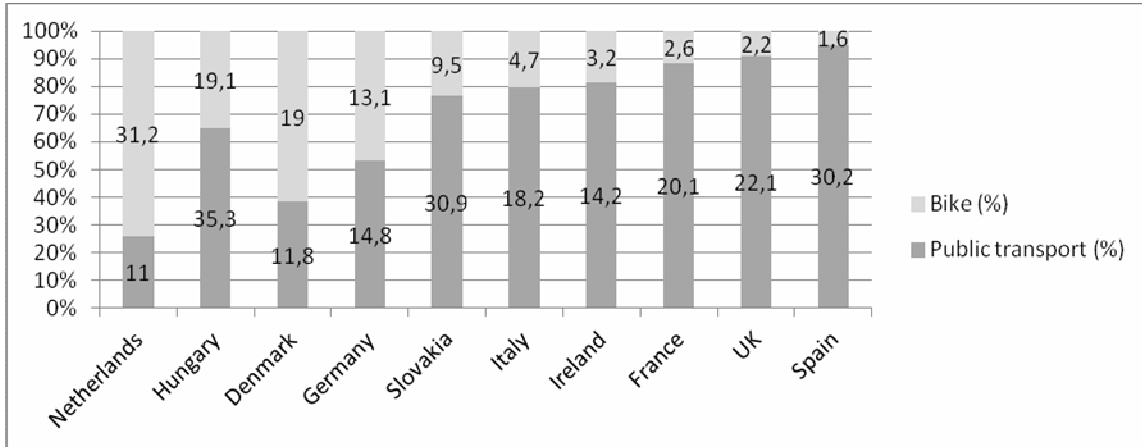


Fig. 1. Illustrative chart to a question “What is your main mode of transport?” (built by author based on [2])

In 1983 European Cyclists Federation (ECF) was created, the vast majority of the European countries are members of Federation. It promotes cycling as a sustainable and healthy means of transportation and recreation (Fig. 2).

One of the most bicycle-friendly countries is the Netherlands, with only 16.6 million population, and more than 16 million bicycles. Dutch companies encourage workers to use bicycle for commuting. In the capital and largest city Amsterdam 40% of trips are made by bike. Total length of cycle paths in the Netherlands — 15 000 km, and the well-known parking of Fietsflat at the Central station is able to store 2500 bicycles.

Germany also shows dynamic progress in cycling

promotion. In the capital Berlin in the last 10 years number of cyclists has doubled, and 130 km of bikeways have appeared. 40 thousand berliners ride on bicycles at any time of the year, accounting for 12% of total traffic. A distinguishing feature of German bike infrastructure is high level of discipline of both drivers and cyclists.

In the Austrian capital Vienna functions a municipal network of bike rental stations Citybike-Wien. Total length of bikee paths now exceeds 1,000 km, although in the early 1990’s it did not reach 190 km.

By 2012, the capital of Finland Helsinki offers about 750 km of bicycle paths for cyclists. Special cycling routes were worked out city allowing take pleasure in the most picturesque corners of the city.

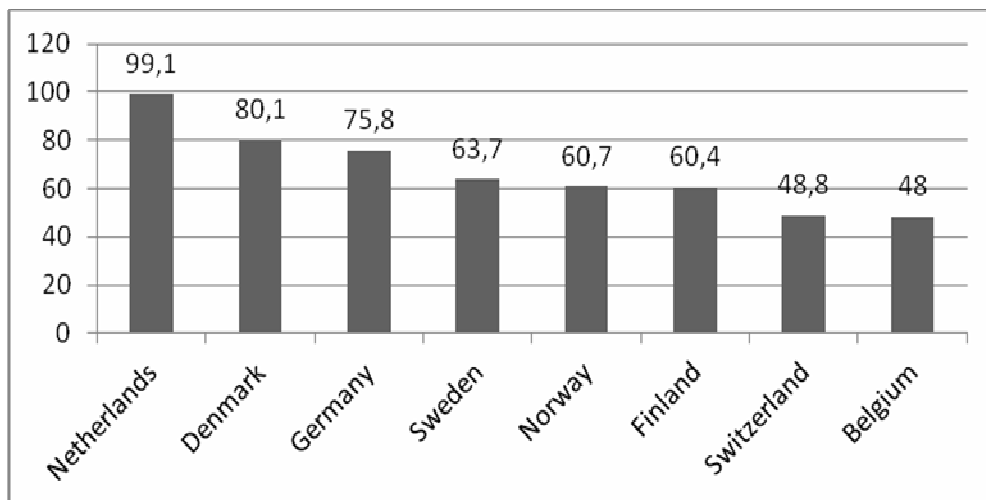


Fig. 2. Percentage of cyclists in some European countries (built by author based on [3])

French bicycle network was improved by Jean-Claude Decaux, who patented Cyclocity system and developed the whole infrastructure, from special rental stations to lease calculation algorithms. The first in France bike rental system appeared in Lyon in 2006. In Paris today functions 750 bike stations and 400 km of bike tracks with 10,6 thousand cyclers [8].

Among other European cities, where administration creates all conditions for comfortable movement, it should be noted: London, a cycling capital of Britain; Austrian Vienna, which is due to the compact size of the tourists prefer to conquer on two wheels; Dublin, Ireland with slogan 'burn fat, not gasoline'; Czech Prague and Hungarian Budapest; neighboring Minsk creating a cycle paths network beginning with 2007 [15].

Along with that, in Ukraine in recent years also appeared a market for bicycle infrastructure and megacity Kharkiv is not exclusion.

Kharkiv's transport system is associated with the following shortcomings: poor covering quality, high power consumption, the extremely environmental unfriendliness, nervousness and instability, low efficiency and movement speed, promptly growing fuel prices, the general congestion problems. Besides, the huge number of people spends the most part of time behind computers and laptops and suffers from a hypodynamia. Public transport somewhere even limits mobility, adding stress as well.

Despite the lack of infrastructure, more and more adherents of this type of transport appear in Kharkiv every year and cyclist can be met even in winter. In summertime practically all categories of population cycle. So an important issue concerning movement safety appears. Movement of cyclists is regulated by Rule of the Road of Ukraine. Cycling along sidewalks and foot paths is forbidden for people aging over 7. At the same time, cycling along the carriageway is allowed for people aging over 14 [9]. Considering prompt increase in bikes on the roads, a logical question arises: "How can an 8 years old child cycle at a carriageway?"

Speaking about actions connected with bicycle it is important to note the Cycling day which is carried annually in the spring. In the first bicycle race which took place in 2006, 130 people took part, but from year to year participants quantity rates. So, in the 2012 cyclists number accounted for more than 5 thousand, and in the 2013 6,5 thousand bikes gathered on the square. In 2014, except traditional spring, an autumn Cycling day was carried out.

Such competitions as Flashcross, VeloQuest are arranged in the city, kayak campaigns (for example by KAVA) are conducted, and at thematic Internet forums often one can find invitations to a "city cycle ride" [6]. In autumn 2014 a workshop "Re-cycle Kharkiv" was held, where under the direction of experts from Kharkov, Kiev and Lviv projects on development of cycle infrastructure were developed [10].

According to researchers, there are two ways of development of cycling infrastructure: the allocated bicycle paths and cycle tracks on highways [8].

Bicycle path is an independent road with a covering or part of a road marked off or separated for the use of bicyclists. Cycle track is a roadspace officially in-

tended for use exclusively by cyclists, which visually separates cyclists from an automobile stream [15].

Depending on the width of the traffic areas and sidewalks, and also movement intensity, in Kharkov is possible to use both ways. According to researchers [8], Moskovskiy, Traktoroströiteley, Geroyev Stalingrada, Gagarina, 50 let VLKSM, Gvardeytshev Shironintsev, Geroyev Truda avenues and Klochkovskaya, Akademika Pavlova streets are suitable for these purposes. The author counted out parameters for cycle tracks which won't constrain traffic even on the central streets (Sumskaya st., Lenina ave.) on the assumption of high-quality parking mode. Besides, it was offered to use spatial resources of private sector and industrial zone. On separate sites of highways with heavy traffic the construction of easy metal cycling and pedestrian bridges can be an effective solution of the problem.

In recent years media has been talking a lot about cycling infrastructure projects implementation. In particular, in 2012 a bike path along Gagarin Avenue was promised [7], however it wasn't built to present day. But at the intersection of Pushkinskaya and Vesnina st., and further from Vesnina to Artem st. a test marking for a bicycle path was made.

In the same 2012 within the "Cycle to forest" drive, Rozetka online store presented our city a cycle route through the forest park [14]. This action caused a resonance among the public. The author of article is supporter of the forest park as a part of wild nature and believes that to solving transport problems at the expense of forest park is a wrong tactics.

In the Kharkov city council report concerning distribution of funds for development and construction of cycling facilities in Kharkiv in 2013, no funds allocated. In 2014 Kharkov city council budgeted 5 mln uah on a cycle path along Belgorodskoye highway (from Derovyanko st. to the Pyatikhatkii settlement). As of 28.07.2014, according to the expenditure item, a topographic shooting for the sum of 208005,6 uah is executed [1], but as we can observe in the February, 2015, further works in this direction wasn't carried out.

In order to identify residents' attitude to a cycling infrastructure creation issue in Kharkiv, in autumn 2014 a socio-geographical research was carried out by the author. In questioning took part young people aged 18 - 30 years. 208 respondents were interviewed on the whole. Gender ratio (m/): 70% / 30%; social status: 41% - students, 59% - employees of organizations with different forms of ownership.

To a question "Does Kharkiv need bike racks?" the majority considers that it is necessary to create a network of bicycle paths and tracks in Kharkov (73,1%).

Thus to a question "Do you cycle?" only 26,4% answered they cycle constantly in the city, 45,2% use bicycle only out-of-town where there are no cars, and 28,4% don't ride a bicycle at all. In author's opinion, the main reason for that is fear of roads where cars create serious problems for cyclists (Fig. 3, 4).

Among obstacles which exist on the way of use of cycle transport, and disturb citizens mostly, we should point (fig. 5): lack of bike racks (28,26%); absence of driving culture at drivers (26,59%); lack of bicycle paths (18,56%); ignorance of road laws (9,48%); lack of funds

for acquisition of the bicycle (9,08%); lack of cycling skill (8,03%) (Fig. 5).

To a question “Are you personally ready to change transport for cycle?” 42,8% of citizens will be ready to use bicycles if appropriate conditions are created. At the same time, 26,4% of respondents already cycle actively and 30,8% of respondents are not ready to change transportation means so far (Fig. 6).

The ambiguous point of view developed concerning “Whether cycle paths network will make Kharkiv

more attractive for tourists?” question. 55% of respondents consider there will be no essential improvements (Fig. 7). It is connected with low prevalence of a similar type of transport among the population and testifies to need of promoting of bicycle transport and cycle tourism.

It is interesting that at the same time, by results of another survey, about 87% of respondents answered that would use bicycle as intermediate transport from the house to the subway [13].

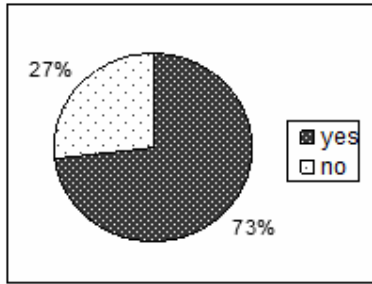


Fig. 3. The illustrative chart to a question “Does Kharkiv need bike racks?”

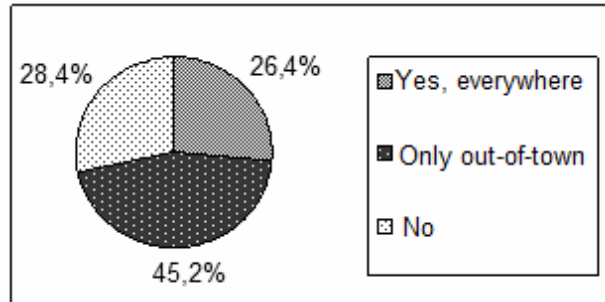


Fig. 4. The illustrative chart to a question “Do you cycle?”

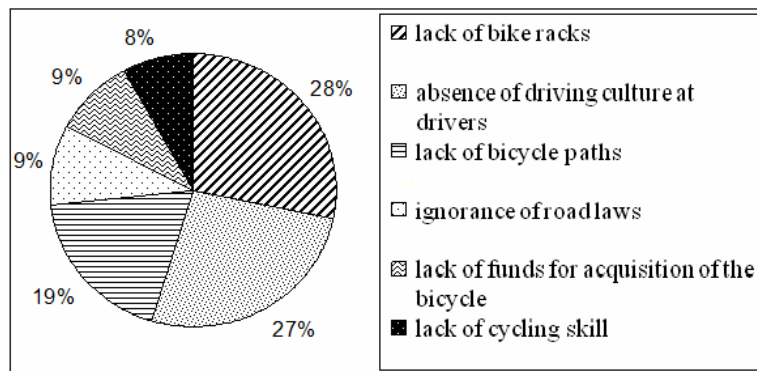


Fig. 5. Illustrative chart to the question “Obstacles existing on the way of use of cycle transport”

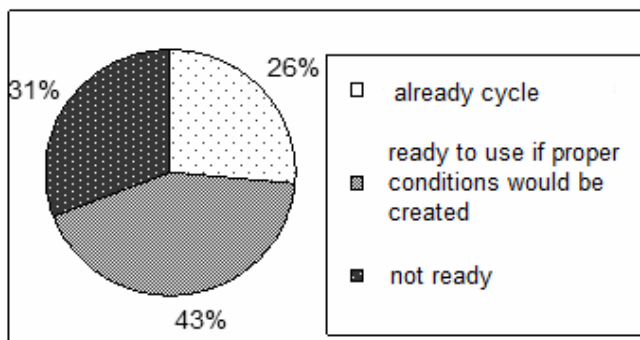


Fig. 6. Illustrative chart to a question “Are you personally ready to change transport for cycle?”

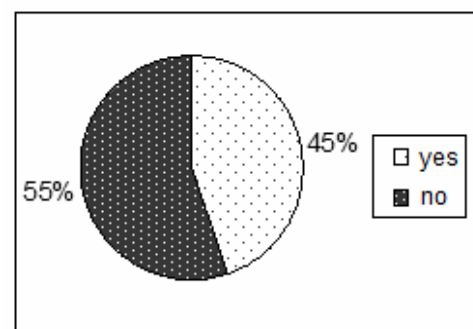


Fig. 7. Illustrative chart to a question “Whether cycle paths network will make Kharkiv more attractive for tourists?”

Conclusion. To sum up, introduction of cycle transport in infrastructure of the city quite necessary measure, both for traffic unload, and physical and psychological states of citizens increase. Target audience in Kharkov is active youth which seeks to develop cycle infrastructure. Support and development of this movement has to be the priority direction not only for youth

public organizations, but also for the city authorities as it promotes youth invigoration and installs healthy and active lifestyle among citizens. With the experience of developed European countries, such as Finland, Sweden and France, all prerequisites for construction of bicycle infrastructure are given.

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Summary**Anna Sokolenko. KHARKIV CYCLING INFRASTRUCTURE DEVELOPMENT FEATURES.**

The article presents some facts about prospects of cycling infrastructure. Kharkiv transport system has a number of essential shortcomings one of which is lack of infrastructure which would give the chance to Kharkov citizens and city visitors cycle freely. Now independent non-governmental organizations are engaged in development of the bicycle movement. They organize competitions, championships and races, cycling trips and walks, arrange Cycling day annually. The growing number of cyclists on roads of Kharkov testifies to expediency of creation of bicycle infrastructure. In order to identify residents' attitude to a cycling infrastructure in Kharkov, in autumn 2014 a socio-geographical research was conducted. According to results, 42,8% of citizens are ready to get on bicycles if appropriate conditions are for this purpose created. At the same time, 26,4% of respondents already actively use the bicycle as a vehicle. Among obstacles which exist at citizens on the way of use of cycle transport, it is possible to allocate: lack of parking lots of bicycles, absence of culture of driving at drivers, lack of bicycle paths. Governments of european countries support all projects connected with bicycles and cycling infrastructure, so we can use experience of foreign projects with benefit for the city and without unjustified expenses.

Key words: bicycle, cycling infrastructure, bike path, cycle track, bike rack.