BICYCLE TRANSPORT AND MOBILITY MANAGEMENT IN RELATION TO ALTERNATIVE TRANSPORTATION TYPES

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Summary: The article deals with cycling as one of the options of transportation services. This article also describes the management of mobility in relation to non-traditional means of transport.

Key words: Bicycle transport, traffic safety, the Environment.

INTRODUCTION

Almost every European city has a problem with an overabundance of cars, one way to solve this problem is to establish tangible incentives for public transport and car pooling but also more in favor of cycling. In Amsterdam, Barcelona, Bremen, Edinburgh, Copenhagen, Ferrara, Graz and Strasbourg this system is already underway and while there are restrictions that apply to the use of cars in urban centers (7). The thought was that these actions would impede economic growth or limit the accessibility of shopping centers. But to the contrary support it, because they are based on the knowledge that the unlimited use of cars for travel by individuals are now in conflict with the mobility of citizens.

1. BICYCLE TRANSPORT

Particularly important are measures to better integrate the use of bicycles and public transport, which considerably extends the distance that you can "tour"(3). Bikes also offer an alternative to a personal car for short distances (ie within 8 km). Bicycles are compact and relatively fast, with average speeds in towns of 15-25 km/h. Bicycles could achieve significant environmental effects if it were possible to replace car trips with riding the bike. European Cyclists' Federation has proposed a plan to encourage cycling in urban areas, based on favorable conditions created for cyclists both in terms of infrastructure, thus sharing the use of roads (7).

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According to many polls, almost three-quarters of Europeans believe that the use of bicycles is more beneficial than cars in cities. People look at the bicycle at least as favorable as other forms of individual transport.

Tab. 1 - The average volume of pollutants (m/m^3)

Air pollutant	Cyclist (m/m^3)	Motorists (m/m^3)
Carbon monoxide (CO)	2670	6730
Nitrogen dioxide (NO_2)	156	277
Benzene	23	138
Toluene	72	373
Xylene	46	193

Source: (14)

1.1 Factors influencing the choice of cycling as an alternative mode of transport

- socially acceptable,
- the sense of safety,
- recognition of bicycles as a form transport for adults, etc.

But equally applied by objective factors:

- topography of the terrain,
- climate,
- speed and safety and practical aspects.

The objective of negative factors has a deterrent effect only:

- more steep climb,
- frequent strong winds,
- intense rainfall and high temperatures.

Low intensity cycling is achievable in most European cities. In cities with 50-500 thousand inhabitants, which are in favorable geographic and climatic conditions. Where they can apply the general concept of urban mobility could be quite realistic and count on reaching 25% bicycle use.

Over the last decade, CO2 emissions have decreases in all sectors except transportation, where there are still growing, mainly thanks to the work car. Cars are used increasingly. The European Union focuses on the labeling of private cars by CO2, which that particular car produces. At the same time the Union is preparing a tax policy to further promote deeper cuts in emissions. The European Union has concluded agreements with car manufacturers on reducing the number of vehicles sold in Europe. But even in the most favorable scenario the reduction, which the EU committed in the Kyoto Protocol, will constitute only 15% in fuel consumption, average consumption in cities doubles).

Tab. 2 - Emissions of carbon dioxide (CO2) emissions by mode of transport (thousand tons)

	2000	2005	2006	2007	2008	2009
Total Transportation	***12 252***	***18 191***	***18 514***	***19 629***	***19 033***	***19 093***
Private car	7 215	9 791	9 697	10 165	9 809	9 868
Public road passenger transport including public transport buses	1 121	1 868	2 009	2 149	2 054	2 079
Road Freight Transport	2 937	5 132	5 489	5 819	5 655	5 724
Railway transport - motor traction	326	270	260	298	329	339
Water transport	16	15	19	15	16	13
Air transport	637	1 115	1 040	1 183	1 170	1 070

Source: Ministry of Transport

For air quality and health of the population has the European Union has adopted a directive on emissions of various pollutants. According to these directives cities with more than 250,000 inhabitants are required to inform residents about air quality and to adopt plans to improve the situation in terms of reduction of a total of 13 pollutants.

Tab. 3 - Total transport emissions (thousand tons)

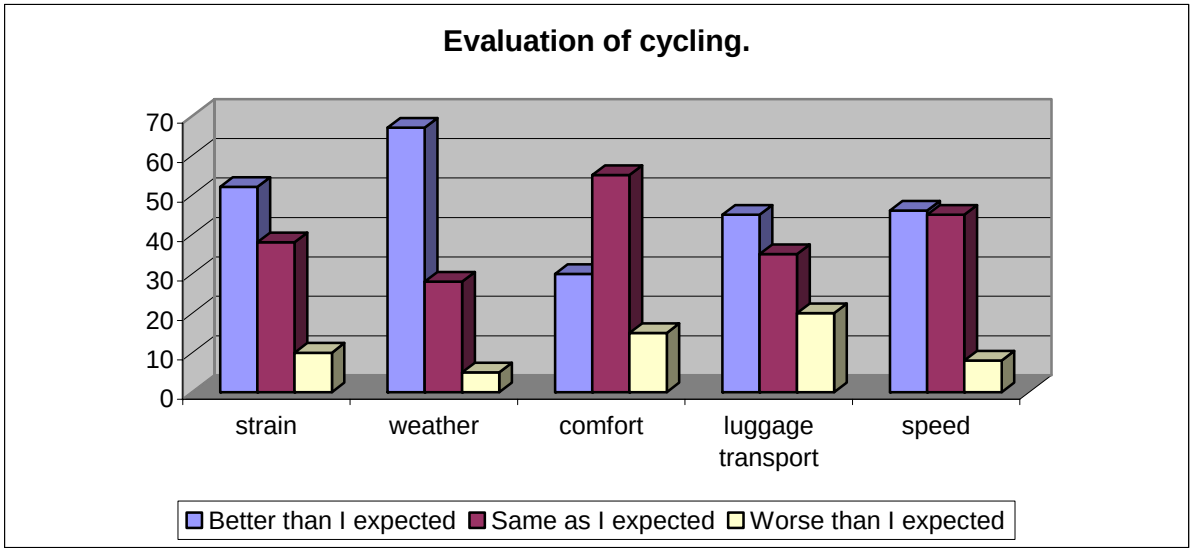
	2000	2005	2006	2007	2008	2009
CO_2	12 252,0	18 191,0	18 514,0	19 629,0	19 033,0	19 093,0
CO	278,4	232,8	213,1	204,2	188,1	179,9
No_x	96,8	101,6	97,1	94,2	90,5	87,7
N_2O	1,4	2,4	2,5	2,5	2,4	2,4
Volatile organic compounds	60,0	47,3	42,3	40,5	35,6	33,9
CH_4	1,8	1,9	1,8	1,7	1,7	1,6
SO_2	1,7	0,6	0,6	0,7	0,6	0,6
Particles	4,9	6,3	6,4	6,6	6,4	6,4
Pb	0,1	0,0	0,0	0,0	0,0	0,0

Source: Ministry of Transport

They have tightened the regulations on noise restrictions. Transportation is by private cars in cities is a major source of noise, which damages mental and physical health.

1.2 An evaluation of cycling

The following graph is provided to users of motor vehicles, cycling evaluated in terms of exertion, weather, comfort, baggage service and speed (7).



Source: adjustments of the authors

Fig. 1 - Evaluation of cycling

2. MOBILITY MANAGEMENT IN RELATION TO NON-TRADITIONAL MODES OF TRANSPORT

Transport is an important condition for achieving a qualitative change in the development area, which is reflected in higher living standards of citizens. Interaction between the development of transport system and social change are negatively influenced by changes in the mobility of citizens. Areas with a high degree of urbanization and traffic congestion are problematic because the transport network had been proposed for the past traffic flow. All these aspects will ultimately lead to "unsustainable" mobility (8).

2.1 Causes of non-sustainable mobility

- lagging development of public transport, which occurs because of an imbalance between the development public transport and individual transport,
- underdeveloped system of capacity at the edges of parking lots in large cities and their links with the public transport network in application integration of a parking receipt with a ticket to travel on public transport (8),
- low quality of public services, public transport and lack of clarity in the concept of regional travel guide,
- Low level of control of private car use for journeys to work and schools (8),
- lack of transport links between the participants and the transport process, ie the Company as the organizer of the service, operators and passengers,
- Not making the integration of comprehensive transport services.

To use non-traditional modes of transport it is necessary to use a demand-oriented approach to passenger transport, which requires new partnerships and a set of tools to support and encourage a change in attitude and behavior towards sustainable modes of transport.

These tools usually are based on information, organization and coordination and require promotion. Transportation information and publicity campaigns can influence awareness, attitudes and behavior of passengers - and to encourage bicycle and pedestrian traffic and use of public transport.

The goal is achieving change in travel behavior from driving cars in favor of public transport and other vehicles that are environmentally friendly. Pedestrians, cyclists and a higher number of individuals traveling in a car is necessary to apply appropriate effective tools for supporting this change. These instruments have an impact on the following objectives:

- increase the occupancy of cars,
- proportionate reduction in the length of passenger journeys,
- redistribution of personal automobile travel to alternative modes of transport. (8)

That implies a shift of trips from cars to other modes of relocation. This trend is to be achieved without special transport system improvements, not changes in transport infrastructure, without the large financial costs, strict measures or bans. To meet these objectives, it is first necessary to analyze and understand the model behavior. Each individual has his lifestyle and is adjusting their transport needs, these needs are influenced by transport such as transport infrastructure and transport services provided, the limited capabilities of individuals and households based on socio-demographic conditions and their social values, practices and opportunities related travel.

Proper implementation of mobility management of all elements can be achieved by a change in the behavior of passengers and achieve a lasting state of sustainable transport. Mobility Management is a very flexible approach and its tools are very complex.

2.2 Levels of implementation of mobility management

- Conceptual level: Mobility Management is initiated and then supported.
- Management level: At this level, the Mobility Management is organized.
- User level: Mobility Management comes into direct contact with the user. This level includes the implementation of mobility services that are provided on an urban / regional level (8).

3. CONCLUSION

If the municipal or regional level was to apply the concept for the entire city or region, while it may be a large enough area, they could not cover all target groups and trip purposes. In this case, we would recommend measures for the general public - a simple and readily available information on alternative modes of transport, or specific services for specific target groups (např.koordinovanou delivery service for customers shopping centers) are more likely for short-term changes. Managemet mobility and the integration of different modes of transport, therefore it is necessary that the different partners work together. Potential partners may have different motivations, but the same goal. Current experience shows that the success

of the project is important from the very beginning of the interaction of all concerned stakeholders. Otherwise, there will be delays or an unsuitable atmosphere, which can impede a smooth implementation before and during the implementation process. That would make it difficult to correct any errors.

Achieving change in the behavior of road users and the creation of structures needed to achieve sustainable mobility of citizens is a very severe problem. It is a systematic bi-annual activity.

Mobility Management is influencing attitudes towards more sustainable modes of transport, while the center of the approach is primarily to provide services. These services are for new and voluntary users, and an important prerequisite for effective marketing. The traveling public will appreciate the complexity and the integration of transport and transport services, thereby making it considerably influenced in the choice of method of transport.

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