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SAFETY AND SUSTAINABILITY OF ACTIVE TRANSPORT MODES - OVERVIEW

Key Words

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Abstract

When it comes to active transport modes special emphasis is placed on walking and cycling as transport modes. However, modern society is facing new forms of active transport modes where a human is the main or auxiliary trigger. What is common to all forms of active transport modes is to contribute to the improvement of urban road safety and thus the protection of the environment and psycho-physical health. Previous studies have shown a high percentage of walking in distributions (in Belgrade and Novi Sad), but the culture of cycling is still at a very low level (approximately 1% for the city of Belgrade (2020) and 9% for Novi Sad (2019)). However, these transport modes are recognized as very dangerous but the improvement of their safety is associated with the improvement of the overall level of road safety. In addition, these are economically acceptable transport modes with a high environmental contribution and health benefits to humans and urban life. However, active transport modes are still marginalized due to the very nature of road traffic development so far. The aim of this paper is to review the professional literature in order to contribute to the understanding of the importance of these transport modes in the formation of sustainable cities but also in achieving the goals of sustainable development.

1. INTRODUCTION

Active transport modes are recognized as an alternative to the use of passenger automobiles around the world, but also a means that can contribute to achieving the goals of sustainable development. Namely, the goals of sustainable development, which recognize the importance of urban road traffic safety, and thus active transport modes, are **good health** and **sustainable cities and communities**.

When we talk about active transport modes, we primarily mean cycling and walking. In addition, in practice, there are other forms that can be classified in the domain of micro-mobility vehicles, such as scooters, skates, and other vehicles that can be electric or human-powered [21, 6, 7]. However, cycling and walking stand out as the most common forms of active transport modes, accounting for 20-40% of all travel in the EU [7]. While, on the other hand, in the US 11% of travel is done by walking, and only 1% by cycling [17]. When it comes to the culture of choosing active transport modes in Belgrade, as the capital of the Republic of Serbia, 68% of citizens choose walking every day, while only 1.5% of citizens choose cycling [19].

Increasing the share of active transport modes can lead to a number of societal benefits, including health benefits, environmental protection, and improving the sustainability of cities [19, 20, 7]. Based on the above, it can be seen that the benefits of active transport modes alone exceed mobility targets [6], as increasing the share of active modes of transport leads to a reduction in road traffic congestion, noise, air pollution and travel costs. However, the use of active transport modes in certain parts of the world is not a choice but a necessary thing based on the economic, cultural and spatial characteristics of each country [6]. This has led to a significant share of active transport modes in low - income countries (around 30-45%; [6]).

However, vulnerable road users, i.e. users of active transport modes, are a particularly vulnerable category, especially in the EU. According to the ETSC report, approximately 9,500 people died in the EU in 2017 (i.e., approximately 26 people per million inhabitants), where 70% of them were involved in accidents as vulnerable road users (pedestrians, cyclists, drivers of small vehicles; [2]). In addition, the number of dead pedestrians and cyclists in the EU increased in 2018, compared to 2010 (pedestrians - an increase from 20% to 21%; cyclists - an increase from 7% to 8%) [3]. In addition, accidents with active road users very often go unreported to the police, where data on such accidents are often found from special sources, such as hospital reports [3].

The recognized reason for such data is the car-centric planning system established much earlier, which made the automobile recognized as a cheap and reliable means of transport. This is especially due to the lack of areas intended for vulnerable road users, the lack of good connectivity of existing areas and the subjective and objective sense of road traffic safety.

Recognizing the risks of active transport modes, but also the advantages of the same, the question arises whether the promotion of the same is safe from the point of view of human and at the same time sustainable from the point of view of the city. In this regard, the subject of this paper is the analysis of available literature dealing

with the impact of active transport modes on safety and sustainability, all in order to define a starting point that will be important in favoring these modes of transport.

2. SAFETY OF ACTIVE TRANSPORT MODES

Research has shown a high level of safety of users of active modes of transport in countries where there is a culture of choice of such transport modes, i.e. in countries with a high proportion of cyclists and pedestrians [14, 1, 8]. In other words, the increase in active road users leads to a decrease in the accident rate and the consequences of accidents with this group of road users. However, in order to increase the number of road users who use active transport modes, and thus greater road traffic safety, it is necessary to work on infrastructure, policies and programs aimed at this group of road users [9].

However, the development of infrastructure for active transport modes can also contribute to increasing the overall level of road traffic safety. Namely, the design and construction of areas that are safer for users of active transport modes, leads to a reduction in the number of fatalities in road traffic accidents and better road traffic safety outcomes for all road users [11].

On the other hand, the emergence of an increasing number of users of active transport modes in urban areas, forces motorists to become aware of this group of road users [7]. It is for this reason that it is necessary to work on the development of strategic documents that will give a motive for a large percentage of motorists to change their daily way of traveling. However, the conducted research shows a low subjective feeling of road traffic safety of users of active transport modes [19, 21], in which additional efforts are needed.

3. THE IMPACT OF ACTIVE TRANSPORT MODES ON HUMAN HEALTH

Physical inactivity of children and adolescents is a significant health problem of modern times (the fourth leading cause of death in the world [18]). However, active travel offers immediate health benefits and forms future sustainability and healthier habits [10]. However, 8 out of 10 studies have shown that car-centric planning leads to the so-called dependence on the use of private automobiles, which is significantly associated with the risk of being overweight [13].

Physical activity, as a result of active transport modes, is associated with a reduced risk of premature death and a number of chronic diseases [16]. Physical activity has been estimated to reduce the likelihood of death by 30%, cardiovascular disease by 20-35%, type 2 diabetes by 30-40%, and by approximately 20% reduction in cancer cell development. Two related studies conducted in 2008 showed that the risk of developing cardiovascular disease is reduced by 16% if people walk approximately three hours a week [4], 11% if they choose active transport modes to perform their daily routines [5].

A study conducted in San Francisco in 2013 showed that changing the mode of transport from a private passenger automobile to active transport modes has

significant health benefits in terms of reducing injuries and deaths in road traffic accidents [12]. In this way, it is estimated that it is possible to avoid more than one thousand five hundred deaths of users of active transport modes per year. In addition, just following the concept of a 15-minute walk a day can prevent more than a hundred thousand premature deaths a year [7].

4. THE IMPACT OF ACTIVE TRANSPORT MODES ON ENVIRONMENTAL PROTECTION

Active transport modes have zero emissions of pollutants and noise when moving in urban areas. In this regard, the transition from private passenger automobiles to active transport modes can lead to a reduction in CO₂ levels and the greenhouse effect at EU level by approximately 20% [7].

If air pollution were measured in deaths, it is estimated that approximately half a million EU residents die each year from air pollution, where health costs can be estimated at €67 billion [7]. Switching to active transport modes of transport can significantly reduce the number of premature deaths, but also lead to the improvement of the overall image of the city, reduction of exhaust gases and noise resulting from road traffic.

Road traffic congestion is a major part of the traffic situation in cities, where it is estimated that at the EU level they cause costs of 1% of GDP (approximately one hundred billion euros) [7]. Switching to active transport modes can lead to a reduction of road traffic congestion, but also to the formation of spaces that will be intended for users of active transport modes, if the parking space is removed.

5. DISCUSSION AND CONCLUSION

Active transport modes that literature and practice most often encounter are cycling and walking. Today, however, various forms of micro-vehicles are used around the world as an alternative to the use of private passenger automobiles. By using active transport modes, a number of social benefits can be achieved, such as health benefits, environmental protection and improving the sustainability of the city.

In order to work on the promotion of active transport modes as an alternative to private passenger automobiles, it is necessary to work on improving the infrastructure intended for this group of road users. In this way, a subjective sense of road traffic safety will be provided, which attracts a larger number of users of active transport modes. On the other hand, quality infrastructure intended for active transport modes can lead to an increase in the overall level of road traffic safety in cities, as drivers are aware of the presence of vulnerable road users; respect the implementation of new measures and strategies.

Active transport modes are of great importance in terms of health, as physical inactivity is recognized as the fourth leading cause of death in the world. Namely, the promotion of active transport modes leads to an increase in walking and cycling,

which leads to a decrease in the likelihood of premature deaths and chronic diseases.

In terms of environmental protection, reduction of air pollution and noise resulting from road traffic, active transport modes have a significant advantage, since they are zero-emission vehicles, the so-called environmentally friendly vehicles. In addition, the transition to active transport modes can enable a significant reduction in private passenger automobiles, road traffic congestion and parking spaces that can be redesigned and intended for this group of road users.

This paper presents the basic advantages that the use of active transport modes has on living in cities. However, the culture of using active transport modes is very low and their advantages in practice are not sufficiently recognized. In this regard, future work must be based on promotional work that will show citizens through educational campaigns the importance of choosing active transport modes for everyday movements around the city. In addition, it is necessary to conduct more extensive research on the attitudes of citizens who already use and who do not use these means of transport (survey research), based on which the motives of use, subjective sense of road traffic safety will be seen, but also define future research and campaigns on this topic.

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