

public transport, vehicles, bus-lane

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SOME IMPLEMENTATION OF QUALITY OF PUBLIC TRANSPORT

Summary. This work gives an overview of several methods for improving the quality of public passenger transport by separate lane and priority at traffic signals.

PEWNE ZASTOSOWANIA DOTYCZĄCE JAKOŚCI TRANSPORTU PUBLICZNEGO

Streszczenie. Niniejsza praca prezentuje przekrój kilku metod polepszania jakości publicznego transportu pasażerskiego przez wprowadzenie osobnych pasów ruchu i osobnej sygnalizacji świetlnej.

1. INTRODUCTION

With the public transport related to the vital needs of the majority of the population. Unproductive waste of time travel, their excessive length, the harmful effects of transport on the environment (air pollution, noise, vibration) and the direct threat of the creation of road accidents put the transport problem of the cities one of the most important problems of modern times. Intensive saturation of the cities with individual means of transport and difficulties in organizing the movement of traffic flows necessitate a search for reserves to increase the speed of communication (route speed) on urban routes. Reduction of losses requires the organization of speed and express routes in urban passenger transport, whose effectiveness depends on the conditions of traffic organization of the planning structure of cities and traffic loads.

2. EXPOSITION

Raising the quality of passenger public transport is a task of primary importance. It is therefore necessary to ensure above all reliable and safe service to passengers, reducing their travel time, high regularity in the movement of vehicles and safety of the movement.

Improving the quality of public transport which is regarded in this paper, namely:

- reduce the time for movement of passengers;
- regularity of movement of vehicles along the routes;

Vehicles for urban passenger transport, when moving through the streets passing through intersections (nodes) and stretches between them. This leads to transport restraint, resulting in increased travel time and violates the regularity of movement of vehicles. In this regard, if you give priority to movement of vehicles on urban passenger transport can significantly reduce these restraint and increase quality of service. In view of the types of urban passenger transport in cities in our

studies, our priority concern movement of buses, trolleybuses and trams. The construction of separate lanes for vehicles (bus-lane) in the streets in the settlements is one way to give priority to movement of vehicles on urban passenger transport in areas of the street network between junctions (Fig. 1).



Fig. 1. A view of “bus-lane”
Rys. 1. Widok na “bus-lane”

The use of existing reserves, increasing the speed of buses and trolleys on city routes is carried out by a complex of engineering and planning (urban) and logistic activities. To engineering and planning activities include: creating speed roads; special roads for movement of traffic flows; Isolation of transport of pedestrian flow; organizing crossing traffic flows at different levels; rational location in the city on bus stops and bus stations for long distance communications; creating of special zones in the city where traffic is allowed only for public transport. Implementation of urban activities requires substantial capital investment and is accompanied by significant deadlines for their implementation. To organizational and technical measures to increase the speed of urban passenger transport include: rational use of stand-street to divert trucks and the flow of cars; processing procedure for the organization of speed and express bus lines; creation of priority of movement for urban passenger transport. As a result, a summary of the projected data of complex materials, transport routes and express movement speed, are often designed without taking into account the increase in the intensity of the movement of vehicles on the estimated time and the limited bandwidth of the road network. In this volume of traffic exceeds the critical value of the density of traffic, allowing free circumvention of vehicles stopping at bus stops. In terms of insufficient density of the network with increasing intensity of the movement many organizational and technical measures do not allow to obtain the effect of increasing the rate of release vehicles [1]. In other countries, to increase speed considerable distribution received by such events, separation of sections and whole streets for the movement of urban passenger transport; advantage in transmittance the bus through intersections with use of modern technical means; organization of special zones prohibiting the movement of freight and light cars. The relationship between the traffic capacity of the highways with different parameters and the organization of movement, the duration of inhibitions, the rate of message traffic volume and density of traffic flows, which are the basis for determining the appropriate fields of use and choice of conditions to establish priority traffic urban passenger transport are examined using queuing theory.

Another method to reduce the inhibitions of vehicles from urban passenger transport is giving priority junction with traffic lights signaling. Thus, by periodically giving priority to vehicles from urban passenger transport through the junctions, allows you to maintain and stabilize the schedule time of travel sections and the entire route. Summarizing studies of [3, 7] that can be expected positive effect of priority release of vehicles from urban passenger transport, if there is one of the following factors or combination of them - longer routes and higher frequency of movement of vehicles from

urban passenger transport, low speed, poor distribution of the duration of green signals on the separate phases in intersections, difficult conditions for the lanes in intersections, position the bus stop to the intersection and others. Popular are the three main concepts priority to traffic from urban passenger transport [5, 9], most often used in practice: a passive priority, priority active and adaptive. In passive priority, there is no interaction between traffic lights and signaling traffic from urban passenger transport. Drivers of vehicles built themselves a certain behavior in traffic areas before intersections with traffic lights signaling. This concept is illustrated in Fig. 2 where the solid line with arrow shows the possible cases of vehicle traffic from urban passenger transport in the junction. In this strategy, the effectiveness of priority depends on the routine experience of the driver of vehicles from urban passenger transport, as it selects the rate of movement in the approach of the intersection. In this strategy, the effectiveness of priority depends on the routine experience of the driver of vehicles from urban passenger transport, as it selects the rate of movement in the approach of the intersection. Most often these conditions can rarely be met in practice and so this strategy is less effective.

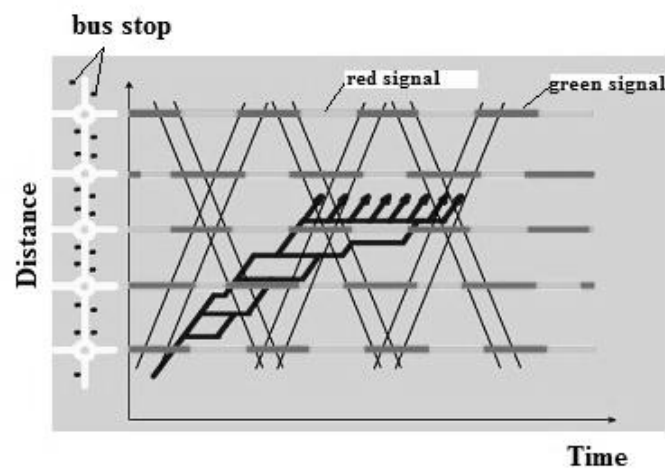


Fig. 2. Passive priority to vehicles from urban passenger transport
Rys. 2. Pasywny priorytet dla pojazdów miejskiego transportu pasażerskiego

When the active priority signals traffic lights signaling a change "order" by vehicles from urban passenger transport. This "order" leads to an extension of the current phase (green signal), the earlier and the inclusion (Fig. 3) or calling a special stage (Fig. 4).

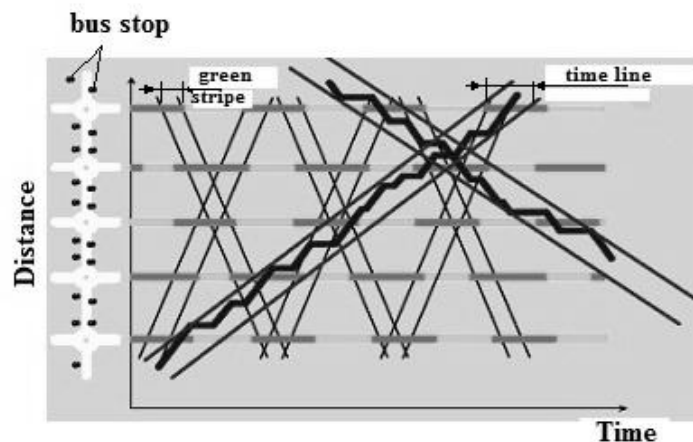


Fig. 3. Adaptive priority with early involvement or extension of the phase for vehicles from urban passenger transport
Rys. 3. Adaptacyjny priorytet z wczesnym włączeniem lub rozszerzeniem fazy dla pojazdów miejskiego transportu pasażerskiego

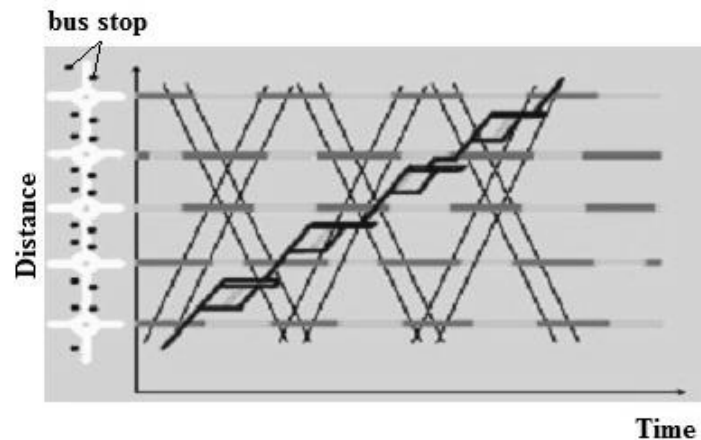


Fig. 4. Adaptive priority by calling the procedure for vehicles from urban passenger transport
 Rys. 4. Adaptacyjny priorytet wywołujący tryb dla pojazdów miejskiego transportu pasażerskiego

Adaptive priority is similar to active with the difference that using more information on the status of vehicles from urban passenger transport in its tail movements in the intersection approach, the current status of implementation of the schedule, the type of schedule and magnitude of the relative priority.

3. CONCLUSION

Although priority release of vehicles from urban passenger traffic lights at intersections with signals has been investigated enough [3, 6, 7] and practice shows that it is an appropriate tool to reduce the inhibitions of vehicles from urban passenger transport, this approach does not always lead to positive results. It is therefore recommended [9, 10] to be always performed by prior experimental studies, which provide the basis for detailed studies with simulation models and then check again to confirm the effect in real situations of the practice.

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