road traffic; city Zagreb; mobility harmful emissions;
sustainability modelling; urban public transport

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ANALYSIS OF HARMFUL EMISSIONS GENERATED BY ROAD TRAFFIC IN THE CITY OF ZAGREB AND PROPOSALS OF MEASURES

Summary. The total number of registered road motor vehicles in Croatia in 2008 was 2,021,936 out of which 20.5% were registered in the city of Zagreb. Due to improper engine operating conditions, relatively low speeds (below 80km/h), large number of vehicles, high percentage of defective vehicles, poor fuel quality, the highest effect on air pollution in the city of Zagreb is generated by road motor vehicles. If air pollution in the city is analyzed from 2001 to 2009, it may be concluded that the biggest problem lies in the pollution by nitrogen oxides, airborne particles and ground-level ozone, which means that taking these pollution parameters in consideration the air was of Category II, i.e. moderately polluted. The most endangered city areas are the industrial zones and traffic nodes. Numerous European cities have been undertaking activities in order to reduce air pollution, which include also the introduction of new standards for new vehicles, improvement of fuel quality, fuel and vehicle taxing, usage of alternative fuels, etc. The city of Zagreb is no exception and since the current traffic system has not been solved in an optimal manner and since there is a lot of room for improvements in technical, technological and ecological sense, this paper will analyze the impact of road traffic on air pollution and offer proposals of measures to establish a sustainable traffic system of the City of Zagreb. Some of the proposals for reducing the harmful emissions from road traffic in the city of Zagreb include: reconstruction of the road network (emphasis on intersections), introduction of the traffic-dependent control of light signalized intersections, usage of intelligent transport systems for guiding and better organization of traffic, "Park-and-ride" system, etc. The traffic system of the city of Zagreb can be optimized without the construction of new roads by introducing intelligent traffic control with possible organizational changes and introduction of an accompanying system for control and management, thus significantly contributing to the reduction of the pollutants. The best practice, e.g., of the implemented measures of the transport policy on the CIVITAS[1] pattern of 36 European cities, however, clearly suggest development guidelines for urban transport and can be entirely implemented in modelling the development of urban public transport in Croatia.

ANALIZA SZKODLIWYCH EMISJI GENEROWANYCH PRZEZ RUCH ULICZNY W MIEŚCIE ZAGRZEB I PROPOZYCJE POMIARÓW

Streszczenie. Całkowita liczba zarejestrowanych drogowych pojazdów silnikowych w 2008 roku w Chorwacji wyniosła 2,021,936, z których 20,5% zostało zarejestrowanych w mieście Zagrzeb. Równocześnie niepoprawny stan działania silników, relatywnie mała

[1] City VITAlity Suistainability Initiative – eight demonstration projects within the shemes of 5th and 6th Framework Programmes.

prędkość (poniżej 80 km/h), ogromna liczba pojazdów, wysoki procent uszkodzonych pojazdów, słaba jakość paliwa, najwyższy wskaźnik zanieczyszczenia powietrza w mieście Zagrzeb są generowane przez silnikowe pojazdy drogowe. Jeśli zanieczyszczenie powietrza w mieście jest analizowane od 2001 do 2009 roku, to można stwierdzić, że największy problem jest w zanieczyszczeniu tlenkiem azotu, cząsteczkami powietrza oraz gruntowym poziomem ozonu, co oznacza, zestawiając te parametry zanieczyszczeń, powietrze było w II kategorii, co oznacza umiarkowane zanieczyszczenie. Najbardziej zagrożonymi obszarami miasta są strefy przemysłowe oraz węzły komunikacyjne. Wiele europejskich miast zobowiązało się do podjęcia działań w celu zredukowania zanieczyszczeń powietrza, włączając w to także wprowadzenie nowych standardów dla nowych pojazdów, polepszenie jakości paliwa, opodatkowanie paliwa oraz pojazdów, użycie alternatywnych paliw itd. Miasto Zagrzeb nie jest wyjątkiem, ponieważ obecny system ruchu nie został rozwiązany w optymalny sposób oraz dlatego, że jest jeszcze wiele do poprawienia w sensie technicznym, technologicznym i ekologicznym. W tym artykule zostanie przeanalizowany wpływ ruchu ulicznego na zanieczyszczenie powietrza oraz zostaną przedstawione propozycje pomiarów, by ustanowić zrównoważony system ruchu w mieście Zagrzeb. Niektóre propozycje dotyczące zredukowania szkodliwych emisji z ruchu ulicznego w mieście Zagrzeb zawierają: rekonstrukcję sieci dróg (z naciskiem na skrzyżowania), wprowadzenie do systemu sygnalizacji świetlnej na skrzyżowaniach sterowanej w zależności od natężenia ruchu, użycie inteligentnego systemu transportowego dla przewodzenia oraz lepszej organizacji ruchu, system „parkuj i jedź" itd. System ruchu w Zagrzebiu może zostać zoptymalizowany bez konieczności budowy nowych dróg przez wprowadzenie inteligentnego systemu kontroli z możliwościami zmian organizacyjnych i wprowadzenie towarzyszącego systemu dla kontroli i zarządzania, co znacząco przyczyni się do redukcji substancji zanieczyszczających. Najlepsze praktyki, na przykład wdrażania środków taktyki transportu na wzorach CIVITAS[2] w 36 europejskich miastach, oraz jasno zasugerowane wytyczne rozwoju transportu miejskiego mogą być całkowicie wdrożone w modelowanie rozwoju publicznego miejskiego transportu w Chorwacji.

1. INTRODUCTION

Road traffic is the largest source of pollutant emissions that apart from affecting health of humans and animals, vegetation and citizens have large influence on the global climatic changes. Since in Zagreb 37% of trips are made by passenger cars, as well as due to the average ECO-test irregularities of 4.25%, high percentage of defect vehicles, large numbers of motor vehicles (in 2008 – 414,353), the largest influence on air pollution in the city of Zagreb is precisely by road motor vehicles.

For air quality monitoring, the cities with over 40,000 citizens, including the city of Zagreb, have to follow the concentration of the pollutants and compare the measured concentrations with the values used to assess air quality. In Zagreb this is carried out by the Institute for Medical Research (Institut za medicinska istraživanja - IMI) that performs measurements at 13 monitoring stations in the wider area of the city, out of which 6 urban ones and 3 state monitoring stations, and 4 monitoring stations for special purposes.

The analysis of air pollution in Zagreb from 2001 to 2009 showed that the biggest problem in the city was the pollution by nitrogen oxides, suspended particulates and ozone (ground-level ozone), which means that the air was category II, i.e. moderately polluted, whereas the value was exceeded for parameter PM_{10}, so that in the western part of the city the air was of category III, i.e. excessively polluted.

[2] City VITAlity Sustainability Initiative (Miejska Inicjatywa Żywotność i Zrównoważony Rozwój) – osiem projektów pokazowych ze schematami 5 i 6 Programów Ramowych.

The most threatened parts of the city are the industrial zones and traffic junctions. The reduction of pollutant emissions generated by road vehicles includes control of the emission quantity from the vehicles and traffic management measures, which requires unification of the action policies at the local and national level.

Along with the analysis of harmful emissions due to road traffic, the paper places emphasis on the measures to establish sustainable traffic of the city of Zagreb such as: better control of air quality, activities regarding improvement of public urban and suburban traffic, establishing of automated traffic management system, measures related to parking and public garages, etc.

The mentioned measures of traffic organization in the City of Zagreb are meant to achieve not only safety improvement but also reduction in the traffic impact on environmental pollution. Large influence on the reduction of air pollution caused by road motor vehicles exhaust gases is due to the ECO-test which started to be implemented on 18 April 2001 for petrol vehicles, and on 18 April 2002 for Diesel vehicles.

2. ROAD TRAFFIC AS SOURCE OF AIR POLLUTION IN THE CITY OF ZAGREB

In the city of Zagreb the largest influence on air pollution is by road motor vehicles that in the total air pollution account for large percentages NO_x – 35%, CO – 44%, SO_x – 7%, Pb – 38%, NMVOC – 16%, suspended particulates – 30%, according to the data of the State Bureau of Statistics for the year 2007 [3].

Although the share of passenger cars in the total number of vehicles is decreasing, it is still at high 76%, representing therefore the main problem from the aspect of air pollution by exhaust gases. In the situation of such a big increase in the number of motor vehicles as in Zagreb, large difficulties in the traffic system flows are inevitable, particularly in the historical centre where the streets, originally built for pedestrians, do not manage to withstand this load. Traffic flow regulation and organization in the City road network, which apart from a minor railway system accepts all transport means, is extremely unfavourable. Due to restrictive regulation, a multitude of unnecessary prohibitions and obligations, i.e. unfavourable directions of street network, the intersection capacities have been reduced by more than 20%. This is unfavourably reflected on the costs and on the environmental pollution. On the tram network the traffic flows mainly along streets so that passenger cars, heavy-duty cars, trams, buses, and taxis compete for a restricted space on the roads which in many areas leads to significant levels of traffic congestions, especially at the main intersections and around the central area. As consequence of the way in which the city is developing, there is a network system with a number of streets with one-way traffic and a large number of intersections. The conflict is inevitable between trams and road vehicles on the sections where trams operate together with other traffic, especially at intersections and tram stations in the city centre. In Zagreb, the air quality, regardless of formal changes over the years has been changing, so that, as in the cities of the similar size in EU, there has been reduction of the levels of mass concentrations of sulphur compounds and smoke. If air pollution in Zagreb from 2001 to 2009 is analyzed, it may be concluded that the problem lies in the pollution by nitrogen oxides, suspended particulates and ozone (ground-level ozone), which means that the air in relation to these pollution parameters would be of category II, that is, moderately polluted. The tolerant value that has been exceeded for the third year in a row, is the PM_{10} parameter, so that the air in the western part of the city was of category III, i.e. excessively polluted Table 1 presents the values of pollutants in the air in relation to the traffic density, in the 1990s. Although the values of pollutants have been significantly decreasing, the relations have not significantly changed. With the increase in the traffic density the street pollutant emissions in the air have been increasing linearly.

The increasing use of passenger vehicles is becoming a dominant problem regarding air quality in the urban area. In the last decade, in Zagreb, there has been significant increase in the number of vehicles, by more than 60%. Regardless of the fact that it is a newer generation of vehicles, with reduced specific emissions and vehicles that use higher quality fuels, such a big increase in their number causes an increase in the total emissions of pollutants in the air, especially during peak periods

and on the roads the capacity of which cannot provide the necessary throughputs. Especially high is the level of nitrogen oxides and NMVOC compounds that in their interaction cause the formation of ground-level ozone, which is especially emphasised during the summer period.

Table 1
Value of pollutants in the air in relation to traffic density

Concentration (mg/m3)				
Streets with dense traffic			Low traffic streets	
Pollutant	Mean values	Maximal values	Mean values	Maximal values
CO	28	70	1	5
Pb	0.008	0.037	0.0005	0.0015
NO2	0.1	0.23	0.25	0.032
SO2	0.16	0.7	0.018	0.032
Smoke	0.644	1.235	0.245	0.251

The assessment of emissions of the main pollutants generated by the traffic sector of the City of Zagreb is presented in Table 2. This refers to the orientation assessment derived on the basis of the number of registered vehicles. The assumption has been used that an average vehicle in the urban area travels about 5,000km a year. With the data on the emission factors of vehicles, the final assessment of pollution from the mobile emission sources has been obtained.

Table 2
Orientational estimate of traffic sector emissions of the City of Zagreb

Pollution parameter	Quantity of emissions (t)
CO	7,890
NOX	2,474
NMVOC	2,217
PM	276.2
CO2	641,193
SO2	426

As seen in Table 2 in the area of the city of Zagreb, the largest emissions are from carbon (IV) oxide, with the traffic accounting for almost 30%, followed by the emissions of carbon (II) oxide, and the emissions of nitrogen oxides, which account for about 46%.

As a metropolis, the City of Zagreb is spreading, developing and therefore has the need for modern and well organized transport. Starting from the fact that the future development of Zagreb cannot be based on the concept of the “automobile city”, and that the existing form of urban transport cannot ensure fast travelling of larger distances, it is necessary to define the most favourable form which will enable as part of the future unique system, fast and rational urban and suburban public transport.

3. PROPOSALS OF MEASURES FOR ESTABLISHING THE SUSTAINABLE TRAFFIC OF THE CITY OF ZAGREB

3.1. Increase of capacity by using ITS

The biggest need to find and implement the traffic organization model that will significantly increase the throughput capacity, safety and the quality of traffic, i.e. reduce the

pollution is precisely in the cities where the traffic flow is the slowest and the traffic-generated pollution the greatest. The experiences of the European cities tells us that the answer to the observed problems lies in using ITS, thus realizing gains of up to 30%.

The introduction of ITS in the city of Zagreb can be observed through five basic criteria:

1. increase of throughput capacity,
2. increase of the efficiency of public urban transport,
3. increase of traffic safety level,
4. increase of environmental protection,
5. increase of economic efficiency.

Since the public urban traffic in Zagreb mostly shares the traffic area with the motorized traffic, it has been estimated that the starting criterion, the criterion which should be given priority, is the increase of the efficiency of public urban traffic, which inevitably includes also the increase of all the other parameters. The ratios of the criteria weights and priorities of the ITS subsystem are presented in Figure 1. The weights of the criteria shows possible and necessary development of the Zagreb traffic in accordance with the sustainable development principles.

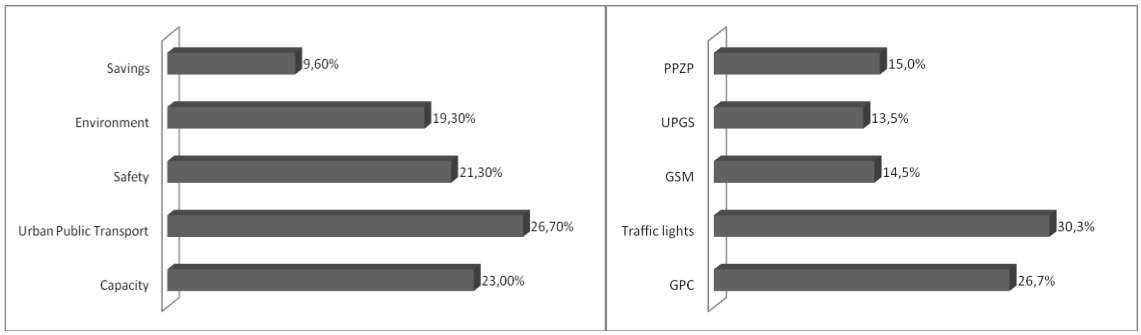

Fig. 1. Criteria weights and overall priority of ITS subsystems
Rys. 1. Kryteria nadrzędne i wagowe podsystemów ITS

GPC – the central traffic centre would be the centre where professional opinions and ideas would be realized, the traffic lights would be controlled and managed, thus achieving all the mentioned advantages;

The traffic lights – with the modernization of the traffic lights and by installing sensors the traffic would be optimized (mainly the public urban transport), and the traffic centre would achieve full usage;

GSM – services achieve better information level of the users, primarily for the usage of public urban transport and increase in the throughput capacity by informing about the emergencies;

UPGS – guidance – parking – garage system would significantly reduce the load on the traffic network in the downtown area, and on the periphery it would stimulate the usage of park-and-ride systems;

PPZP – variable traffic signs and messages restrict and direct the traffic, warn about emergencies and offer alternative routes.

Modernization of the traffic lights (new devices, sensors, special sensors for public traffic, etc.) and the construction of the main traffic centre represent the base for the development of the system for automatic traffic management in the City of Zagreb, and should therefore be given priority in relation to other ITS subsystems.

Computer simulations have also shown that significant reduction of environmental pollution caused by road traffic can be achieved by the usage of telematic systems for traffic management, as well as better throughput of the traffic flows even without reconstruction. To reduce the exhaust emissions at intersections the main thing is to increase the throughput capacity thus avoiding the stay of vehicles and increasing the speed of passing through the intersection, and this can be done on the example of an intersection in the city of Zagreb in two ways: by reconstruction and by adaptive management of the traffic lights.

Having in mind the benefits of ITS confirmed in practice in the cities of Europe, for the city of Zagreb, the following results can be expected [1]:
- shorter travel time up to 25%,
- lower exhaust emissions up to 22%,
- lower fuel consumption up to 10%,
- lower losses by 15-20%.

3.2. Traffic redirection – "park-and-ride" system

The increase in the number of vehicles in the last few years has increased, the problem of the number of parking places that do not meet the demand, especially in downtown area. It is estimated that there is a shortage of about 25,000 parking spaces in the wider urban area. Therefore, urban streets, squares, green areas, and often also the pavements are occupied by irregularly parked vehicles. It is an indisputable fact that there is a shortage of parking spaces in Zagreb, and they need to be constructed best in the frame of public garages, at the City periphery, immediately next to the public transport stops. From the ecological aspect this is the only acceptable solution. Figure 2 shows that Zagreb has 14% more parking spaces in the garages in the city centre than Vienna.

In order to reduce the entry of passenger cars from the peripheral urban districts to the narrow city area, including the quantity of pollutants, it is necessary to introduce the park-and-ride system, i.e. construct parking lots (garages) along tram and bus terminals and bigger peripheral railway stops. Currently, there are only two parking lots for this purpose. It was as early as in 1999 that the General traffic plan of the City of Zagreb planned the construction of five such parking lots along tram terminals. It had been planned then that in 2005 their construction could eliminate 2,200 trips by automobiles into the city centre daily. /5/

The targeted reduction of parking spaces in the central parts of the city need to be continued, including the construction of garages, thus preventing the inflow of vehicles into the central parts of the City. The possibility of free parking at park-and-ride parking lots should also be introduced for all users, and if there is an excessive number of the interested parties, free parking for the users of public urban transport should be allowed or a single ticket introduced both for parking and for the usage of public urban transport. The public urban traffic users should have advantage in relation to parking for other purposes.

3.3. Public urban and non-motorized traffic improvement

Public urban traffic in Zagreb consists of the network of tram and bus lines, suburban trains (railway transport) and taxis. High-quality solutions in Zagreb and the region can be achieved by systemic investment into the synchronized development of the existing public transport systems – urban-suburban railways, and trams and buses, as well as gradual development of light rail as underground-surface track system.

Regardless of the planned improvements of railway, tram and bus transport it has been estimated that due to the size and spatial organization of the City this would be insufficient, so that it was concluded that the optimal choice for Zagreb is the construction of light rail. Since the 1970s in Zagreb the concepts of constructing a new system of fast rail transport have been present, different regarding the spatial span of such a system and its traffic and technological characteristics. The prognostic model has simulated the future traffic demand and several versions of the traffic system, from the existing one to the construction of a metro and light urban rail. Due to the too small traffic demand and big construction costs, it was not the classical metro that had been selected but rather the light urban rail. In the centre of the City the underground introduction of light urban rail routes has been planned, and in surface flow it is necessary to provide it with absolute priority at intersections. For the project of light urban rail construction to be realized it is necessary to continue with the valorisation of the basic and alternative route through New Zagreb, make a more detailed definition of

track levels in the central city area, way of spanning the River Sava, selecting the characteristics of the fleet, etc.

Since 2007 the city of Zagreb has introduced in case of buses biodiesel as fuel, and since 2009 also compressed gas has been used – currently some 60 buses run on compressed gas. According to the development plans, the buses will use exclusively bio-fuel, which is a significant contribution to the reduction of pollutants. The lower dependence on oil by using alternative fuels in public urban buses and favouring rail traffic (tram and rail) is an ecological necessity and the imperative of sustainable development.

3.4. Improved air quality control

In the last two decades the traffic sector has been taking over increasing shares in the emissions of the main pollutants in the air. This trend is influenced also by the structure and quality of the traffic network and the fact that in the total traffic of passengers the share of public urban transport has significantly changed in favour of individual road transport (45%:55%, Figure 3).

Due to excessive air pollution by the PM_{10} particulates in the western part of the city and the moderate pollution by ozone, nitrogen oxides and particulates on the majority of monitoring stations of local network, the introduction of pre-fabricated monitoring stations of small dimensions is recommended which would allow precise measurements of the traffic-generated pollutants. Taking into consideration the arrangement of the existing monitoring stations, both state and local ones, and the estimate about the busiest routes as well as intersections with frequent occurrence of traffic "jams", the introduction of subsystems of monitoring stations, including the city centre, are recommended.

The plan is to move three such monitoring stations within certain time intervals (1-3 years) to extremely loaded traffic routes, and the planned measuring parameters are the particulates, benzene, nitrogen oxides, sulphur (IV) oxides and ozone. Also, at the existing monitoring stations of local network (where this is not the case) it is recommended to upgrade the measuring system by introducing PM2,5 particulates and BTX parameters in compliance with the Regulation on Emission Limit Values for Air Pollutants.

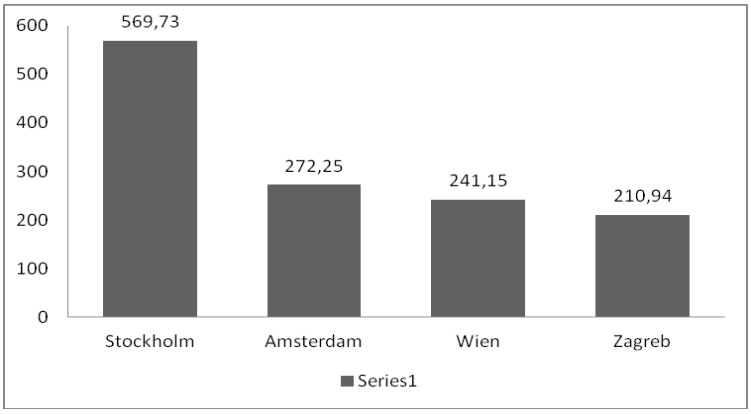

Fig. 2. Graphical presentation of the number of citizens per single place in public garages in the city centre
Rys. 2. Graficzna prezentacja liczby obywateli na pojedyncze miejsce w publicznym garażu w centrum miasta

One of the control mechanisms for filtering of exhaust gases is also the implementation of the Eco-test as part of regular technical inspections. The implementation of the Eco-test in Croatia has brought good experiences, since the data in the last five years show a trend of continuous reduction of NON-CATALYST vehicles with continuous increase in the total number of vehicles that take the test, reduction of the number of vehicles that fail the test and the replacement of the defect and harmful vehicles by the ecologically suitable ones, with emphasis that should be placed on the renewal of the fleet.

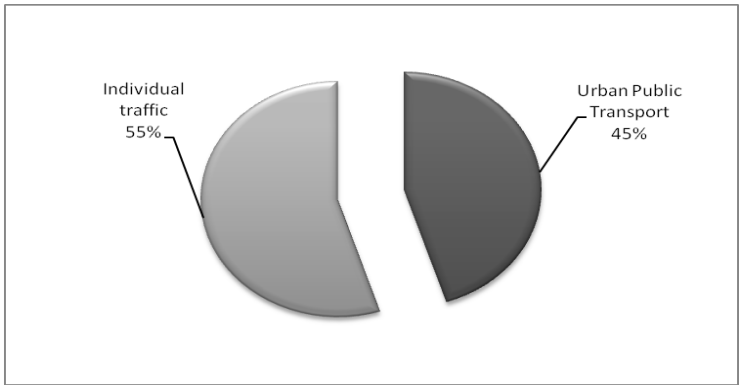

Fig. 3. Presentation of the distribution of motorized movements on urban public transport and individual traffic
Rys. 3. Prezentacja rozkładu przemieszczania się osób zmotoryzowanych w publicznym transporcie miejskim i ruchu indywidualnym

4. SCENARIOS FOR THE DEVELOPMENT OF URBAN TRAFFIC IN CROATIA

In compliance with the ECMT Strategy of sustainable transport development and the White Paper of the European Commission on the European transport policy, further development of transport system is based on the principles of integrity, inter-modality and sustainability, which mark to a great extent the development policy in the urban public transport as well.
Short-term plans often assume the form of rolling five-year program. Advanced management tool, such as planning, programming and budget system and the acceptance of a series of standards and guidelines for providing services, can help in converting good planning into well-guided implementation. An entire spectrum of strategic functions is usually developed for an agency at the level of a metropolitan region, included[3]

- an environmental protection strategy;
- a development strategy for urban planning;
- a road planning, including the supervision of the development of private concession;
- a transport management strategy;
- a parking and road charging strategy.

In considering the applicable models and scenarios for the development of urban public transport in Croatia, the starting basis lies in evaluating the status of the levels of its establishment regulation and organization.
About 70 per cent of the population and about 80 per cent of the traffic are concentrated in the urban areas of Croatia; the regulation of this transport segment at a government level does not exist, and the authority for managing urban transport has been delegated to the level of local authorities.

The municipal authorities have no autonomy of action in the regulation of transport; there is a lack of integration of the segments of the planning, monitoring, management and controlling of urban transport, and a large number of cities in Croatia have no organized urban public transport modes.

While in bigger towns, such as Zagreb, Split or Rijeka, the solving of urban transport issues, due to the negative impacts of uncontrolled growth in individual road transport on the quality of living, has become a question of the sustainability of further development; in smaller towns and urban settlements the failure to organize this transport mode has made the realization of the basic rights of citizens to mobility and freedom of movement questionable.

[3] Source: Strengthening Urban Transport Institutions Cities on the Move, World Bank Urban Transport Strategy Review.

The complexity of the problems regarding urban transport management is reflected in different, yet interdependent, factors of influence:

- ecological, regarding the provision of mobility which will not endanger environmental protection and the health of people,
- economic, regarding the efficiency and effectiveness of the public transport system expressed as the value of transport effects and economic benefits,
- social, regarding the provision of public services and the principles of accessibility for all the citizens in all areas.

Solving the problems of public transport, especially in urban areas, directly correlates with numerous non-transport disciplines. Therefore, the wider themes of area (physical) planning, sustainable development and environmental issues are noted within the context of this paper. Using the examples of the European cities included in CIVITAS initiative, the improvement of the public urban and suburban transport is proposed by combined measures of transport policy and innovative technological, operational and economic solutions.

Problems in the integration of the objectives of the physical planning, environmental protection and mobility in transport policy are real both in the cities of the European Union, as well as in the cities of the transition countries. The models for the improvement of urban transport in the pilot projects realised are analogously applicative at a regional level. This fact is of great importance for the regulatory harmonisation, strategic planning and policy of urban transport management in Croatia.

5. CONCLUSION

The results of air quality monitoring in the city of Zagreb undoubtedly indicate increased air pollution caused by traffic, i.e. mobile pollution sources. Therefore, there is the main objective of sustainable traffic policy, which is to reduce the current number of trips made by passenger cars by at least 40%. An entire series of specific targeted measures of traffic policy can contribute to the reduction of automobile traffic in the city and many cities have implemented these, such as e.g. lower prices of public urban transport, increased number of passengers in one vehicle (car-sharing), improvement of the park-and-ride system, eco driving, charging for the entry into the city centre, etc.

In the city of Zagreb two proposals of sustainable traffic can be highlighted as conclusion. The first proposal is of permanent character – final solution of traffic optimisation, and the other is of transitory character, which can be established within a short period of time, that can fit into the frames of current financial situation. The first proposal, that has not been considered within this paper, but rather mentioned, refers to the optimal choice for the city of Zagreb – construction of light urban rail, for which a decade is needed. However, the current situation in the city requires measures that will alleviate the load on the traffic routes, reduce the growing number of passenger cars, increase the usage of public urban transport, and thus also improve the air quality, within a very short period of time. Having in mind these facts, the proposed measures include:

- introduction of adaptive control of traffic lights and giving priority to the vehicles of public urban transport through active access model. In order to achieve this, it is necessary to change all the traffic lights since the existing ones are obsolete and cannot be managed intelligently. This project is estimated at 60 million kuna for the sake of comparison, the value of grade separation of the intersection Radnička cesta –Slavonska Avenue – Heinzelova Street amounted to 160 million kuna. The throughput capacity at intersections would be increased by up to 20%;
- to found the main traffic centre which would control and supervise the traffic lights;
- unify and time-coordinate all the forms of public urban traffic;
- stop the construction of parking spaces in the central parts of the city, and direct the money intended for these purposes to the construction of the park-and-ride parking lots;
- better air quality control.

In order to be able to implement the accepted policy of favouring public transport and restrictive relation to road traffic, it is necessary to continue with the activities regarding research, design and final realization of all the proven efficient measures to establish the sustainable traffic in the city of Zagreb.

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Received 12.10.2011; accepted in revised form 18.05.2013