

CETRA 2016

4th International Conference on Road and Rail Infrastructure
23-25 May 2016, Šibenik, Croatia

Road and Rail Infrastructure IV

Stjepan Lakušić – EDITOR



Organizer
University of Zagreb
Faculty of Civil Engineering
Department of Transportation



CETRA²⁰¹⁶

4th International Conference on Road and Rail Infrastructure
23–25 May 2016, Šibenik, Croatia

TITLE

Road and Rail Infrastructure IV, Proceedings of the Conference CETRA 2016

EDITED BY

Stjepan Lakušić

ISSN

1848-9850

PUBLISHED BY

Department of Transportation
Faculty of Civil Engineering
University of Zagreb
Kačićeva 26, 10000 Zagreb, Croatia

DESIGN, LAYOUT & COVER PAGE

minimum d.o.o.
Marko Uremović · Matej Korlaet

PRINTED IN ZAGREB, CROATIA BY

“Tiskara Zelina”, May 2016

COPIES

400

Zagreb, May 2016.

Although all care was taken to ensure the integrity and quality of the publication and the information herein, no responsibility is assumed by the publisher, the editor and authors for any damages to property or persons as a result of operation or use of this publication or use the information's, instructions or ideas contained in the material herein.

The papers published in the Proceedings express the opinion of the authors, who also are responsible for their content. Reproduction or transmission of full papers is allowed only with written permission of the Publisher. Short parts may be reproduced only with proper quotation of the source.

Proceedings of the
4th International Conference on Road and Rail Infrastructures – CETRA 2016
23–25 May 2016, Šibenik, Croatia

Road and Rail Infrastructure IV

EDITOR

Stjepan Lakušić
Department of Transportation
Faculty of Civil Engineering
University of Zagreb
Zagreb, Croatia

CETRA²⁰¹⁶

4th International Conference on Road and Rail Infrastructure

23–25 May 2016, Šibenik, Croatia

ORGANISATION

CHAIRMEN

Prof. Stjepan Lakušić, University of Zagreb, Faculty of Civil Engineering
Prof. emer. Željko Korlaet, University of Zagreb, Faculty of Civil Engineering

ORGANIZING COMMITTEE

Prof. Stjepan Lakušić	Assist. Prof. Maja Ahac	All members of CETRA 2016 Conference Organizing Committee are professors and assistants of the Department of Transportation, Faculty of Civil Engineering at University of Zagreb.
Prof. emer. Željko Korlaet	Ivo Haladin, PhD	
Prof. Vesna Dragčević	Josipa Domitrović, PhD	
Prof. Tatjana Rukavina	Tamara Džambas	
Assist. Prof. Ivica Stančerić	Viktorija Grgić	
Assist. Prof. Saša Ahac	Šime Bezina	

INTERNATIONAL ACADEMIC SCIENTIFIC COMMITTEE

Davor Brčić, University of Zagreb
Dražen Cvitanić, University of Split
Sanja Dimter, Josip Juraj Strossmayer University of Osijek
Aleksandra Deluka Tibljaš, University of Rijeka
Vesna Dragčević, University of Zagreb
Rudolf Eger, RheinMain University
Makoto Fujii, Kanazawa University
Laszlo Gaspar, Institute for Transport Sciences (KTI)
Kenneth Gavin, University College Dublin
Nenad Gucunski, Rutgers University
Libor Izvolt, University of Zilina
Lajos Kisgyörgy, Budapest University of Technology and Economics
Stasa Jovanovic, University of Novi Sad
Željko Korlaet, University of Zagreb
Meho Saša Kovačević, University of Zagreb
Zoran Krakutovski, Ss. Cyril and Methodius University in Skopje
Stjepan Lakušić, University of Zagreb
Dirk Lauwers, Ghent University
Dragana Macura, University of Belgrade
Janusz Madejski, Silesian University of Technology
Goran Mladenović, University of Belgrade
Tomislav Josip Mlinarić, University of Zagreb
Nencho Nenov, University of Transport in Sofia
Mladen Nikšić, University of Zagreb
Dunja Perić, Kansas State University
Otto Plašek, Brno University of Technology
Carmen Racanel, Technological University of Civil Engineering Bucharest
Tatjana Rukavina, University of Zagreb
Andreas Schoebel, Vienna University of Technology
Adam Szelaż, Warsaw University of Technology
Francesca La Torre, University of Florence
Audrius Vaitkus, Vilnius Gediminas Technical University



SUSTAINABLE URBAN MOBILITY PLANS

Davor Brčić, Marko Šoštarić, Dino Šojat

University of Zagreb, Faculty of Transport and Traffic Sciences, Croatia

Abstract

Urban areas globally, and especially the ones of the European environment, face a great amount of challenges today: the economic crisis, climate change, transport system relying on fossil fuels, and the health risks caused, directly or indirectly, by transport. Increasing transport demand produced by several factors burden the existing urban transport system with more demanding solutions. The existence of a need for increasing mobility to satisfy traffic demand, along with space, energy, environment and financial issues requires a new approach in resolving urban transport problems of the world. Therefore, a new transport policy vision requires redefining the existing urban transport strategy in a way that traditional strategic approach in transport planning shifts to the integrated traffic planning. The European Commission adopted transport strategy, “Action Plan on Urban Mobility” in 2009. As a consequence, sustainable urban mobility plans (SUMP – Sustainable Urban Mobility Plan) have been implemented in several European cities. Croatia is at its beginnings in developing sustainable urban mobility plans. The paper will present the European planning documents related to urban mobility, the purpose and objective of planning and the development of sustainable urban mobility plans in the European cities.

Keywords: transport policy, sustainable urban mobility plan, European Union, transport strategy, sustainable urban transport system

1 Urban traffic

The global urbanization trend and the economy prosperity of cities generate the induced transport demand in daily migrations. The questionable urban mobility is becoming a fundamental issue in the cities worldwide, especially the developing cities. The existing liability models in cities (in terms of economy, environment, space, energy and society) are becoming unsustainable, especially in long-term periods. The urban areas are especially burdened due to the excessive private car usage. The significance of public spaces for the citizens (in terms of pedestrian and cycling infrastructure, green urban areas, recreational areas, etc.) becomes essential for the future city prosperity. The private car usage generates transport demand, which produces the ever-increasing external costs in urban communities. The rational traffic demand reduction of private car arises as an imperative, since the external costs of the local community are a result of the increased private car usage, in form of increased traffic congestion, noise, air pollution, health issues, road accidents, decreased population density and uncontrolled suburban sprawl. When considering city development, the excessive private car usage in daily migrations causes a regressive investment policy, which consumes significant financial assets for the investment in construction and maintenance of road infrastructure. The examples of the developed cities, which tried to resolve the problems by building additional road infrastructure, suggest that the described problem could not be solved in this manner. The additional roads actually induced additional road traffic, which created even higher deficit in terms of capacity in the near future.

The experts concluded that the change in the current traffic doctrine is essential for the change in modal split of city trips, especially the motorized modes of transport. The solution for the urban traffic system had more relations to politics instead of traffic engineering. Therefore, considering a new traffic doctrine, the urban traffic system is seeking new goals such as sustainable traffic system, better quality of life, social equity and social integration [1].

The challenges of the existing urban traffic system are big because, in addition to daily migrations caused by mobility by gravity, the most interurban transport ends in urban areas [3]. The cities in the European environment consist of 70 % of total population, and contribute by 85 % of GDP in the European Union. In addition, the cities are responsible for 70 % of the greenhouse gas emissions (GHE: 40% CO₂ and 70% of other pollutants) on global scale [2, 3]. In this manner, the responsibility of politicians on national, regional and local level and the local administration in solving transport problems is even higher and more significant [3], since without an efficient and sustainable transport system in urban environment and its gravitational areas, there is no prosperity – neither in economy, nor in environment, space, energy consumption and society.

2 Transport strategy of the European Union

The adoption and the and the conduction of traffic policy on the European level (European Union Traffic Policy) is a demanding task. The European Union recognized that the cities, i.e. urban communities have to be a fundamental priority when solving transport problems in terms of number of residents, population density, economy and traffic.

Therefore, based on the first transport strategy of the EU (WHITE PAPER 2001; European transport policy for 2010: Time to decide), the European Commission adopted the following documents (by recognizing and taking into account and the extent of problems caused by traffic in urban areas): GREEN PAPER 2007; “Towards a new culture for urban mobility” [2], and eventually, the “Action Plan on Urban Mobility 2009.” [3]. The stated documents put the focus on traffic issues in the urban environments of the EU.

Following the transport strategy of the 2001 White Paper, the EU Commission introduced the WHITE PAPER 2011; “Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system” in 2011 [4]. In accordance with the previous determination on solving the urban traffic issues as a priority, and based on the already introduced “GREEN PAPER” from 2007. and “Action Plan on Urban Mobility” [3] from 2009., the European Union introduced several documents in 2013: “Together towards competitive and resource-efficient urban mobility” [8], “A Concept for Sustainable Urban Mobility Plans” [9], “A call to action on urban logistics”[10], and “Targeted action on urban road safety”[11]. All these documents offer concepts for solving urban transport problems.

In an effort to make the conduction of the transport policy in EU cities operational, the Commission conducts a series of activities by projects supported by the EU funds. Some of these projects are: “CIVITAS”, program “7th RTD Framework Programme”, “European Innovation Partnership (EIP) Smart Cities and Communities”, “Intelligent Energy Europe programme (STEER)”, “The urban dimension in Community policies”, “CLARS” platform, project “Do the Right Mix”, project “European Mobility Week”, and, following the “7th RTD Framework Programme”, the “HORIZON 2020” program. With the activities, projects and funds stated, the Commission conducts the transport policy in the urban areas of the EU state members strongly, efficiently and vigorously.

3 Analysis of concepts for creating urban transport plans and their goals

When considering the concept for creating sustainable urban mobility plans, the first action is to refer to the framework determined by the Urban Mobility Package [6], which consists of the actions stated below:

- Definition of the purpose and the goal – SUMP has to enable the accessibility of the urban space while ensuring a high-quality transport system with the “functional city” as a goal.
- Definition of a long-term vision and a clear implementation plan which has to define the future development of mobility, infrastructure and services, with short-term implementation plans, implementation period, clear responsibility delegation and the identification of the financial and other resources necessary.
- Estimation of the existing and future needs, with clearly determined goals related to the SMART goals. (S – specific, M- measurable, A – achievable, R – relevant, T- time-limited)
- Well-balanced integrated development of every transport mode: public transport, cycling, walking, intermodal journeys, road safety, road transport, mobility management and the ITS implementation.
- A good horizontal and vertical integration in terms of cooperation on the national, regional and local level, and the cooperation on the local level with every urban mobility stakeholder.
- A participation approach within the development and the implementation of the plan with the users – citizens.
- Continuous monitoring of plan conduction, with audits and reporting if necessary.
- Quality ensuring by creating mechanisms for a high-quality and properly-evaluated plan.

Therefore, the stated framework certainly has to be taken into account when analysing local urban problems, and the guidelines also have to be included during the determination of the purpose and the goals of the Sustainable urban mobility plans. It is clear that the purpose and the goals will be specific and related to the local conditions; however, the determination of goals also needs to consider the following 10 basic principles of SUMP development:

- The planning of a “humane city”, which has a proper population density,
- Optimization of the road infrastructure by using ITS,
- The development of a city oriented on public transport,
- The development of non-motorized modes of transport – walking and cycling,
- The implementation of improvements for integrating public transport,
- Monitoring vehicle usage,
- Parking supply management,
- The promotion of clean vehicles,
- The implementation of communication solutions,
- A comprehensive approach to the challenges and problems.

4 The indicators of a sustainable urban transport system

The definition of the indicators related to the strategies and measures of a sustainable transport system in the urban environment is neither simple nor easy task. There are a series of indicators which are related to the sustainable transport system, but the crucial are the dominant ones. When considering the indicators, the important is not to repeat them, and that they are relevant, measurable, and available. In terms of urban mobility, the expectedly relevant are the following indicators:

- Availability of mobility and space supported by a high-quality infrastructure,
- Quality of infrastructure: safety, comfort, and security (in terms of user experience)
- Costs and the cost availability
- The impact on the environment and health
- The impact on the economy in general (through investments and tax policy)

The availability of mobility for users is the availability of several modes of transport for different social categories of residents in the total mobility. There is a series of indicators which closely determine the indicators of availability of mobility and space: modal split, travel time

(by purpose), trip length (by purpose), and land-use indicators. The quality of infrastructure and safety, comfort, and costs are divided into following indicators: quality of infrastructure, easiness and comfort while using a mode, safety, security, cost availability, etc. The indicators related to economy are investments, operating costs, pricing policy, etc. The indicators related to the environment and health are divided into: air pollution indicators, resource expenditure indicators, health risk indicators and others. Indicators related to the economy policy in general are: finance potential for funding the Plans and the allocation of funds by tax policy and financial measures on the national, regional and local level.

5 Strategies and measures for a sustainable urban transport system

According to Böhler; Hüging: Urban Transport Energy Efficient, GIZ GmbH, Berlin 2012 [5], the strategies which are implemented by traffic and other experts when developing a concept of sustainable urban transport system (i.e. conditionally sustainable transport system in terms of energy) can be categorized as one of three global strategy groups: Avoid/Reduce, Shift/Maintain, and Improve. Fig. 1 shows the concept of a sustainable urban transport system as an A-S-I approach.

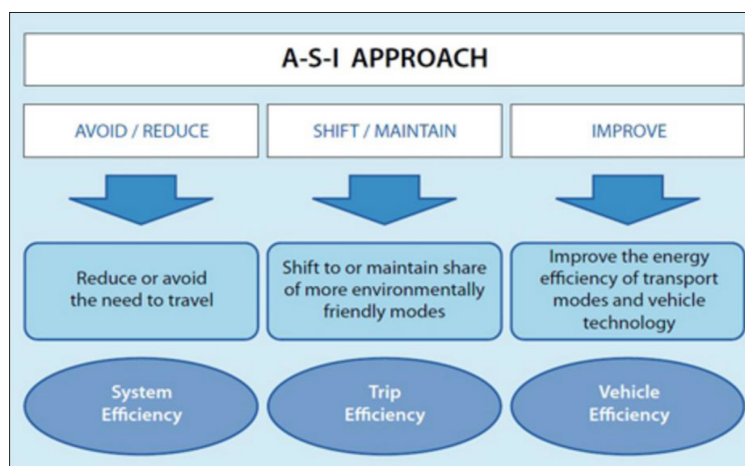


Figure 1 The concept of a sustainable urban transport system – the A-S-I approach [5]

Avoid/Reduce is the avoiding or reducing the need for travel, in which the purpose and the objectives are achieved with the help of various instruments (by using planning, regulations, economy, information technology). Shift/Maintain is the achievement of a shift to the energy efficient modes of transport by using public transport and non-motorized modes of transport, which cost less per passenger transported while being rational in terms of space consumption. The goals can be achieved by using various instruments (by using planning, regulations, economy, information technology, and urban transport technology). Improve is the improvement of the vehicle energy efficiency by applying technology achievements, in form of less fuel consumption per kilometre crossed, the implementation of technology improvements, reduction of GHE per kilometre crossed, and the improvements in vehicle fleet management. This can be done by using information and technology instruments. According to the strategies stated above, there is a series of measures implemented in order to achieve the purpose and the goals set. The measures are grouped into five fundamental instruments:

- Planning instruments (urban space management – space and traffic planning)
- Regulation instruments (pollutant emission standards, safety, speed limitations, parking policy, space reallocation, etc.)

- Financial instruments (fuel tax, zonal charging, car park charging, green zone charging, public transport subsidizing, etc.)
- Information instruments (public mobility management campaigns, marketing, and the promotion of the sustainable modes of transport)
- Technology instruments (fuel efficiency improvement, implementation of clean vehicle technologies, implementation of ITS for the transport system optimization, etc.)

6 Instead of conclusion

The goal of the paper was to point out the need to change the approach in space and traffic planning of urban areas to the professional community, based on the concise analysis of the regulation framework, the concept of a sustainable transport system, its indicators and the analysis of strategies and measures for a sustainable urban transport system. It has become obvious that the countries in the European environment can be divided into three groups [5]:

- Countries that conduct activities on introduction and implementation of Sustainable Urban Mobility Plans based on their national transport policy (Italy, France, Germany, Belgium, The Netherlands, United Kingdom, Norway),
- Countries that are making efforts and conducting activities for the adoption of the Sustainable Urban Mobility Plans (Spain, Portugal, Austria, Slovenia, Hungary, Poland, Sweden, Finland, Estonia)
- Countries that have not adopted the sustainable mobility approach on their national level (Croatia, Czech Republic, Slovakia, Romania, Bulgaria, Greece, Latvia, and Lithuania)

Instead of a conclusion, the paper presents a statement – it is necessary to make efforts in developing a Sustainable Urban Mobility Plan for the Republic of Croatia as soon as possible, because, besides the systematic approach in solving urban transport problems, a Plan will be a condition for granting EU funds intended for the development of sustainable urban transport systems.

References

- [1] Penalosa, E.: The Role of Transport in Urban Development Policy, GTZ GmbH, Germany, Eschbom 2002., revised July 2005.
- [2] EU Commission: GREEN PAPER; Towards a new culture for urban mobility, Brussels, 25.09. 2007.
- [3] COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, “Action Plan on Urban Mobility”, Brussels, 30.09.2009.
- [4] EU Commission: WHITE PAPER: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, Brussels, 2011.
- [5] Böhler, S., Hüging, H.: Urban Transport Energy Efficient, GIZ GmbH, Berlin 2012.
- [6] EU Commission: Annex; A Concept for sustainable Urban Mobility Plans, Brussels 17.12.2013.
- [7] Bohler-Beadeker, S., Kost, K., Merforth, M.: Urban Mobility Plans, National Approaches and Local Practice, GIZ Bonn, Germany, November 2014.
- [8] EU Commission: “Together towards competitive and resource-efficient urban mobility”, Brussels, 17.12.2013.
- [9] EU Commission: A Concept for Sustainable Urban Mobility Plans, Brussels 17. 12. 2013.
- [10] EU Commission: “A call to action on urban logistics”, Brussels 17.12. 2013.
- [11] EU Commission: “Targeted action on urban road safety”, Brussels 17.12. 2013.