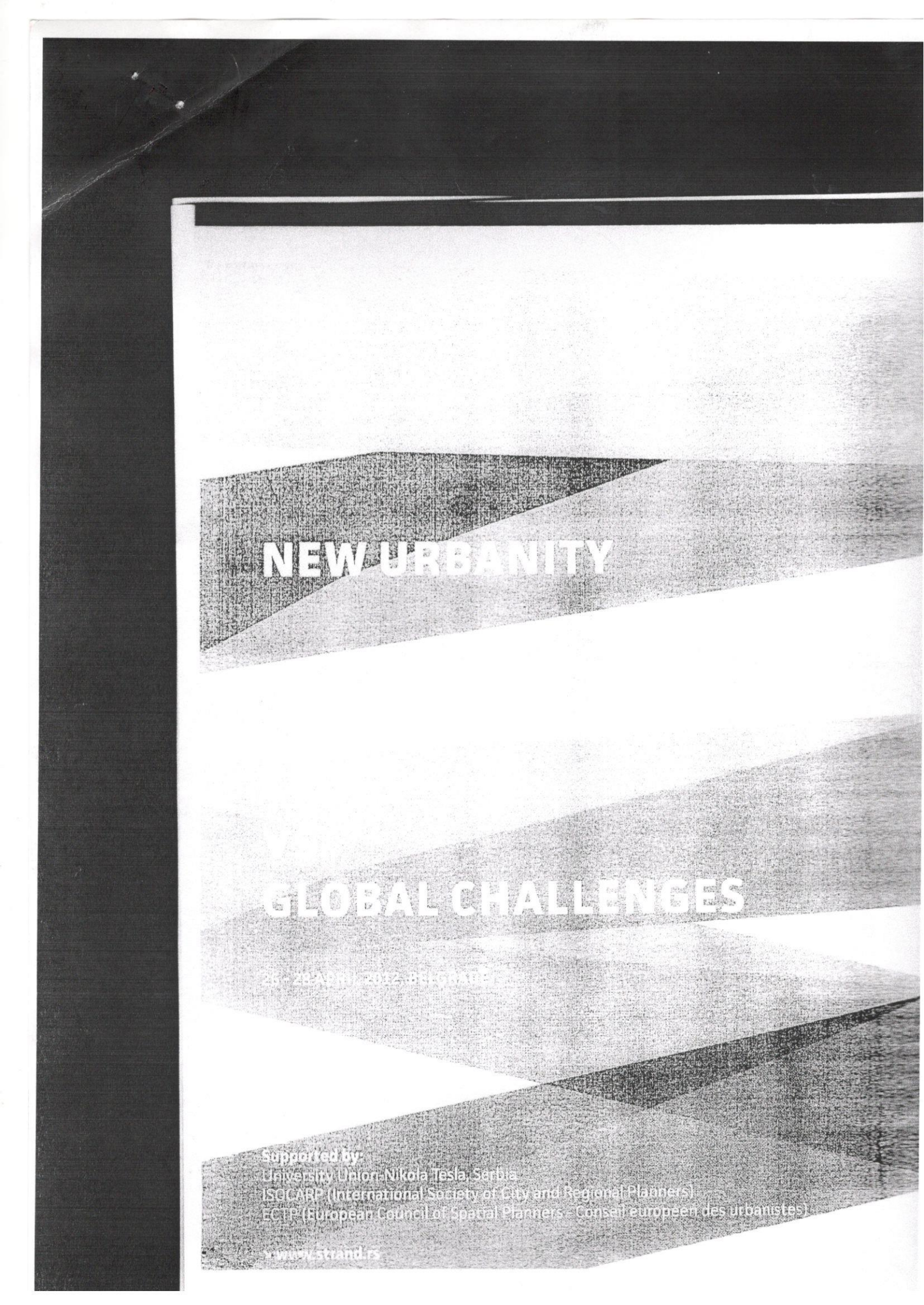
NEW URBANITY
GLOBAL CHALLENGES
Supported by:
University Union-Nikola Tesla, Serbia
ISOCARP (International Society of City and Regional Planners)
ECTP (European Council of Spatial Planners - Conseil européen des urbanistes)
www.strand.rs

Mladen Pešić, Iva Marković: POSSIBILITIES OF (RE) ACTIVATION OF ABANDONED INDUSTRIAL BUILD
A NEW CONCEPTUAL MODEL OF THE BELGRADE BROWNFIELD AND ITS APPLICATION
TO THE LOCAL INDUSTRIAL HERITAGE
Jasmina Bunevska Talevska: MICROSCOPIC SIMULATION MODEL SFStreetSIModel, v1.1 AS AN ASSIST DEC
INSTRUMENT FOR SUSTAINABLE DEVELOPMENT OF CITIES IN FYROMACEDONIA: CASE STUDY

Open discussion & Closing remarks – Chair of Sessions 1 and 2

20.00 Conference Dinner

DAY 2 Friday, 27 April 2012

09.30 - 10.00 Registration
10.00 -11.00 Keynote Adresses
João Pereira Teixeria: NEW PARADIGMS OR THE SAME PROBLEMS WITH OTHER CONTEXTS?
Vladan Djokić: IMPACT OF URBAN DESIGN ON THE CITY MORPHOLOGY

11.00 - 18.00 Paper and Discussion Sessions 3,4
11.00 Session 3. URBAN PLANNING AS AN INSTRUMENT FOR SUSTAINABILITY
Chair: Tom Kauko & Bojan Boric

Nada Lazarevic Bajec: STRATEGIC AND AUTONOMOUS CLIMATE CHANGE ADAPTATION ACTIONS
AND IMPLICATIONS FOR TRANSFORMATION OF URBAN PLANNING MODEL IN SERBIA
Tom Kauko: PROPERTY DEVELOPMENT, VALUE AND PRICE AMID URBAN SUSTAINABILITY AGENDA
– SOME RECENT EVIDENCE FROM HUNGARY
Bojan Boric: URBAN TRANSFORM-ABILITIES CHISINAU, MOLDOVA – SELF-REGULATION
AS AN ALTERNATIVE TO INSTITUTIONALIZED PLANNING PROCESSES
Danijela Milojkić, Ivan Simić: PRINCIPLES OF SUSTAINABILITY IN STRATEGIC PLANS IN SERBIA
Snežana Pejčić Tarle, Nataša Bojković, Marijana Petrović: THE ROLE OF SUSTAINABLE MOBILITY
PUBLICITY CAMPAIGNS IN MODERN CITY PLANNING

12.15 Coffe break

Zoran Cekić, Nebojša Šurlan: WHOLE LIFE VALUE OF CONSTRUCTION PROJECTS IN WESTERN BA
WHOLE LIFE VALUE OF CONSTRUCTION PROJECTS IN WESTERN BALKANS
Ile Cvetanovski, Vaska Atanasova: NEW MATHEMATICAL MODELS
FOR URBAN DISTRIBUTION CENTER PLANNING
Zvjezdana Milašinović-Popović: MULTIFUNCTIONAL RURAL DEVELOPMENT
FOR THE PURPOSE OF SUSTAINABLE URBAN DEVELOPMENT
Ivo Županović: THE CONCEPTUALIZATION OF SUSTAINABLE TOURISM DEVELOPMENT BASED ON
BALANCE OF CONSTRUCTION OF TOURISM INFRASTRUCTURE AND PRESERVING CUL
AND NATURAL CHARACTERISTICS OF DESTINATION

13.30 - 14.30 Lunch Break

14.30 Session 4. INFLUENCE OF SPATIAL PLANNING, URBAN DESIGN AND BUILT F
ON URBAN SUSTAINABILITY, Chair: Bob Giddings (to be confirmed)

Sabina Uffer and Juliet Davies: WHAT AND WHO MAKES URBAN FORM RESILIENT?
AN ANALYSIS OF HISTORIC DEVELOPMENTS IN BERLIN AND LONDON
Miloš Kopić, Nadja Kurtović-Folić: DESIGN OF URBAN SPACE THAT SUPPORT RAIL SYSTEMS
LEARNING FROM THE PAST

MICROSCOPIC SIMULATION MODEL SFStreetSIModel, VERSION 1.1 AS AN ASSIST DECISION INSTRUMENT FOR SUSTAINABLE DEVELOPMENT OF CITIES IN FYROMACEDONIA: CASE STUDY

Mr.Sc. Jasmina Bunevska Talevska
Assistent in Traffic and Transport Engineering
Department of Traffic and Transport, Technical Faculty of Bitola
jasmina.bunevska@tfb.uklo.edu.mk
Dr.Sc. Marija Malenkovska Todorova
Professor in Traffic and Transport Engineering
Department of Traffic and Transport, Technical Faculty of Bitola
marija.malenkovska@tfb.uklo.edu.mk

ABSTRACT

The accelerate process of urban growth of little cities in the FYROMacedonia produced important levels of environmental degradation and social segregation. Further, local government lack technical instrument to generate a sustainable development. In the first part, this paper emphasize the development of an integrated urban-ecological object oriented microscopic simulation model in order to assist municipal institutions and leaders in deciding the future planning policy for the cities. The second part of the paper shows the application of the SFStreetSIModel, version 1.1 in the procedures for introducing the "shared space" concept in the city centre of Bitola, FYROMacedonia.

Keywords: Microscopic simulation model, Sustainable development, Urban planning, "shared space" concept

MICROSCOPIC SIMULATION MODEL SFStreetSIModel, VERSION 1.1 AS AN ASSIST DECISION INSTRUMENT FOR SUSTAINABLE DEVELOPMENT OF CITIES IN FYROMACEDONIA: CASE STUDY

Mr.Sc. Jasmina Bunevska Talevska
Assistent in Traffic and Transport Engineering
Department of Traffic and Transport, Technical Faculty of Bitola
Dr.Sc. Marija Malenkovska Todorova
Professor in Traffic and Transport Engineering
Department of Traffic and Transport, Technical Faculty of Bitola

INTRODUCTION

Urbanization has been the dominant demographic trend in the entire world, during the last half century. With the high pace of social and economic development in FYROMacedonia and the resulting growth of city population, lack of infrastructure, and congested traffic, an environmental degradation became the major issues faced by cities in their sustainable development. Urban areas have become more focused on the transportation of vehicles through the public space, as use of cars has increased, than on the ability of people to enjoy the space. This has led to city streets that function poorly in their ability to move traffic. At the city level, local governments have been encouraged to carry out an integrated land-use planning to comprehensively address adverse impacts of urbanization, including environmental problems. Cities and urban settlements seeking funding support for their planning and management strategies should incorporate traffic and environmental issues in their proposals. They should be able to demonstrate why this integration is important in the context of their city, and to suggest how it can be achieved. A new idea has been developed to combat this social disorder, named as "Shared Space" concept, which is an approach to street design that incorporates non-conventional methods of traffic management in order to improve the quality of life in urban areas.

Since the primary focus of the National Strategy on the Sustainable Development in the FYROMacedonia, is placed on systematic and better management of urbanization through sustainable land use policies and tools, the idea to analyze the need and possibilities for introducing the concept by using new simulation tool seems logical and necessary.

Thus, the vision of local public authorities, specifically those in the field of traffic and urban planning is highly important for generating sustainable urban development strategies, the main aim of this paper is transfer the scientific knowledge to the local level through the use of 2D simulation of urban streetscape and traffic flow. Namely, the City of Bitola case study illustrates how a city can address a nationwide problem at the local level.

URBAN CONTEXT: CITY OF BITOLA

Bitola is the economic and industrial center of southwestern FYROMacedonia. The Pelagonia agricultural combine is the largest producer of food in the country. The Strezevo water system is the largest in the FYROMacedonia and has the best technological facilities. The three thermoelectric power stations of REK Bitola produce nearly 80% of electricity in the state. The Frinko refrigerate factory was a leading electrical and metal company. Bitola also has significant capacity in the textile and food industries. Bitola is also home to twelve consulates, which gives the city the nickname "the city of consuls." Covering an area of 1,798 km² and with a population of 122,173 (1991), Bitola is an important industrial, agricultural, commercial, educational, and cultural center. It represents an important junction that connects the Adriatic Sea to the south with the Aegean Sea and Central Europe.

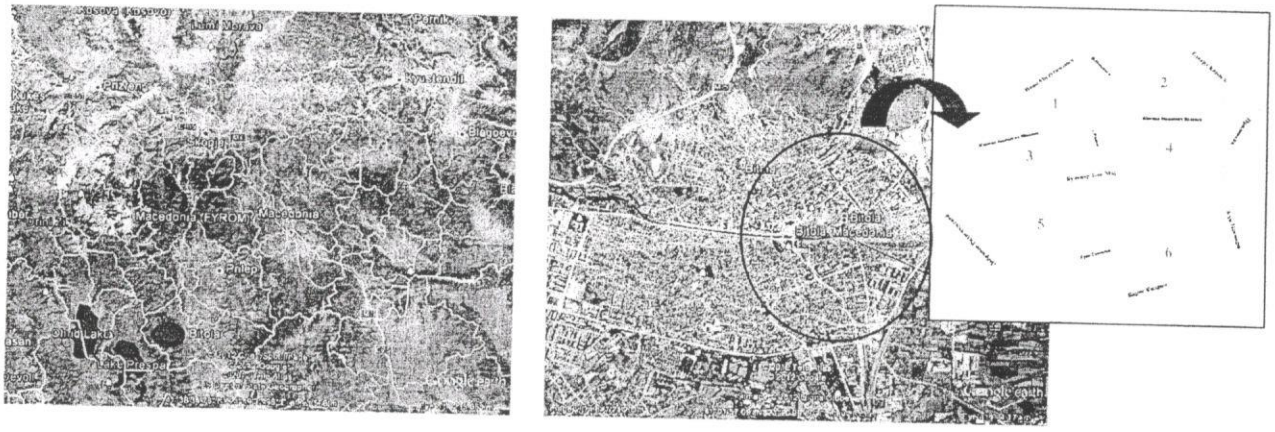

Photo 1. Localization of the study area

City of Bitola and the Local Mobility

"Local mobility" also known as short-distance mobility of individuals and non-motorised transport as walking and cycling within the Bitola is impared. City has become more focused on the transportation of vehicles, as use of cars has increased, than on the ability of people to enjoy the space. This has led to city streets that function poorly in their ability to move traffic. Drivers are focused on traffic signals and signage and rarely communicate either visually or verbally with pedestrians along the road. When drivers are not at stoplights, they are often going as fast as the posted limit will allow, which further distances the drivers from pedestrians who are looking to cross the road safely.

For the support of "Local mobility", key elements are the pedestrian and bicycle friendly site and street design and a mixture of land uses combined with parks and green spaces. Having in mind that nearly every trip, for example by public transport or by car, starts and ends with a walking distance, the significance of "Local mobility" is even higher as said yet. And at last but not least, we need to keep in mind that the dependence of children or elderly people on non-motorised traffic, increases the significance of "Local mobility".

City of Bitola and a possibility for introducing "shared space" concept

The concept of shared spaces is gaining popularity around the world as an innovative approach to streetscape design. Shared spaces are streets which have very little separation between road users: meaning pedestrians, cyclists, and vehicles literally share the road space. Traffic control infrastructure is often removed from shared spaces to introduce a degree of uncertainty to urban streets, necessitating a more careful and courteous style of driving with the aim of increasing safety for all road users.

The idea of shared spaces is beginning to appear in FYROMacedonian cities. But, the advantages and disadvantages of shared spaces are need to be investigated in a FYROMacedonia-specific context to gauge the appropriateness of the concept.

Traffic flow and speed in the context of sharing the street space

Sharing is also a function of reduced traffic flow and speed. In general, shared space schemes achieve their maximum benefits when pedestrians use the space in the street that would be dedicated primarily to vehicular use in a conventional setting, (Local Transport Note 1/11, 2011). For pedestrians to fully

share the space, relatively low traffic flows and speeds are usually necessary. Vehicle speed has a significant influence on pedestrians' willingness to share the space and drivers' willingness to give way to pedestrians (and others). As vehicle speeds decrease, the proportion of drivers giving way increases, so the street becomes more shared. This is where the design speed becomes important. The design speed is a target speed that designers intend most vehicles not to exceed and is dictated primarily by the geometry within the street.

APPLICATION OF SFStreetSIModel, version 1.1 IN THE PROCEDURE FOR ANALYZING THE POSSIBILITIES OF INTRODUCING THE CONCEPT SHARED SPACE: case study

Recently developed, second improved version of microscopic simulation model Side Friction Street Simulation Model - SFStreetSIModel, version 1.1 simulates movement of heterogeneous flow (passenger cars and light duty vehicles), as well as pedestrians moving along the pavement on two lane two way city street on secondary network.

SFStreetSIModel, version 1.1, is objective-oriented model, written in the program language Action Script 3, implemented in Adobe Flash and Adobe Flex technology. Here will be described in details, the application of the model and the results received with ten-hour simulation of traffic movement on the streets (locations) which belongs to the stady area (Photo 1), in the city of Bitola, FYROMacedonia.

Simulation and visualization of the traffic and the environment on the analyzed locations in SFStreetSIModel, version 1.1

Since changing the way a street operates to bring about an increase in the level of sharing requires an understanding of how people currently use the space, we collect a certain amount of baseline data, (Bunevska 2011), (Table 1). For data asquising period the month of May was chosen because it had the largest number of accidents, three days of the week (Thursday, Friday and Saturday) and three time periods or mornings from 8:00 a.m. to 9:00 a.m., afternoon 2:00 p.m. to 3:00 p.m., as well as the period of the day in which 31,21% of the accidents happened and evening from 7:00 p.m. to 8:00 p.m.

Table 1. This is an example of a table

Useful baseline data	Method used for data asquising
Traffic speed	GPS device in the vehicles (GARMIN nuvi 1390t)
Classified vehicle counts	Manually - filling forms ready before hand
Pedestrian flows along the street	Manually - filling forms ready before hand
Assessment of land use and frontage activity	Manually - filling Open-space forms
Records of existing street furniture	Manually - filling Open – space forms
Observation of how people use the space	Manually - filling Open – space forms
Traffic accidents	so called "Safety method"

Collected and analyzed data were used within the simulation model as it is shown in the dialogue window (Input), (Photo 2).

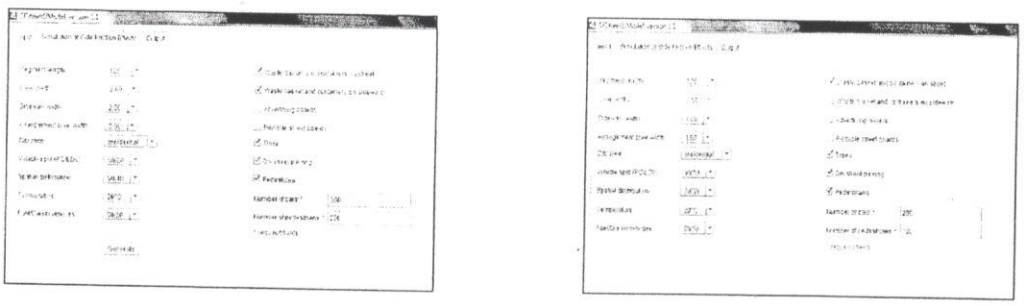

Photo 2. Geometrical, Functional and Design Characteristics of the locations under study, as input parameters into the SFStreetSIModel, version 1.1

SFStreetSIModel, version 1.1, output parameters (Photo 3 - Photo 6), enable analysis of effectiveness, safety and environmental conditions at the studied locations.

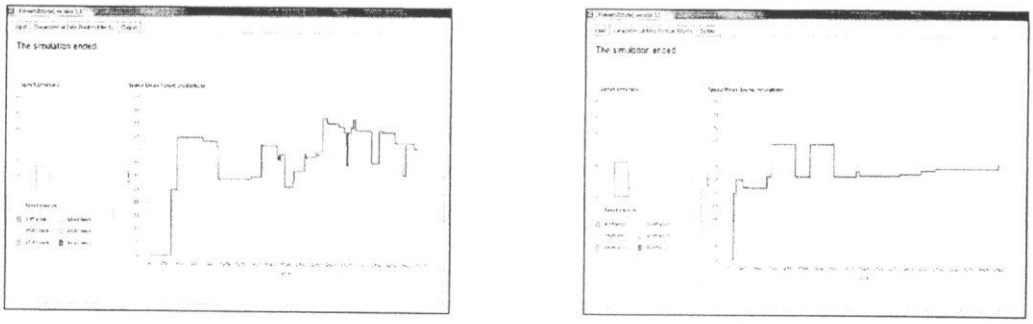

Photo 3: An example of simulated Space Mean Speed Oscillations in every moment (t=1,...,3600s) and the magnitude of drivers Speed Pressure of the studied locations

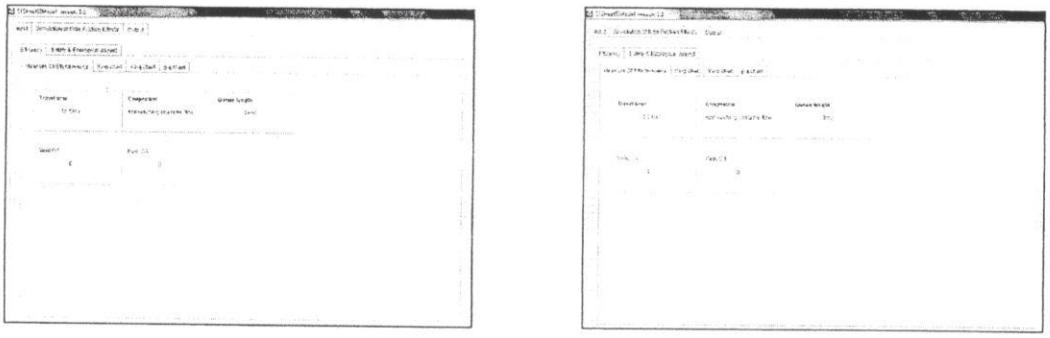

Photo 4: An example of simulated measures of effectiveness for studied locations

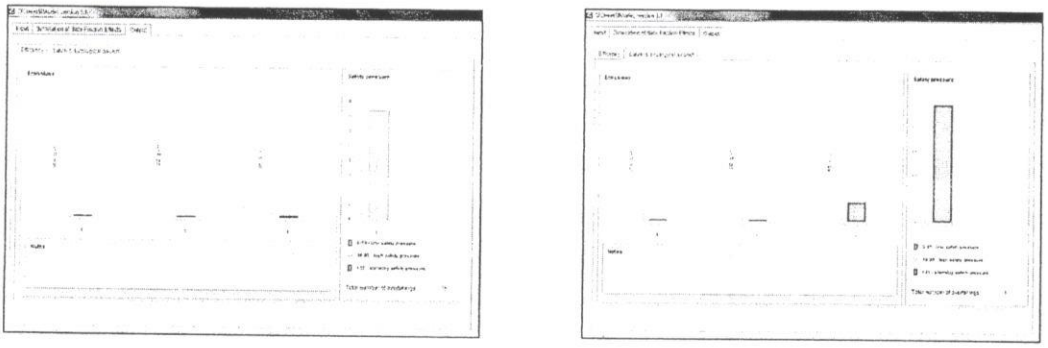

Photo 5: An example of simulated Safety and Ecological Measures (Safety Pressure, CO and NO_x Emissions and Fuel Consumption) for studied locations

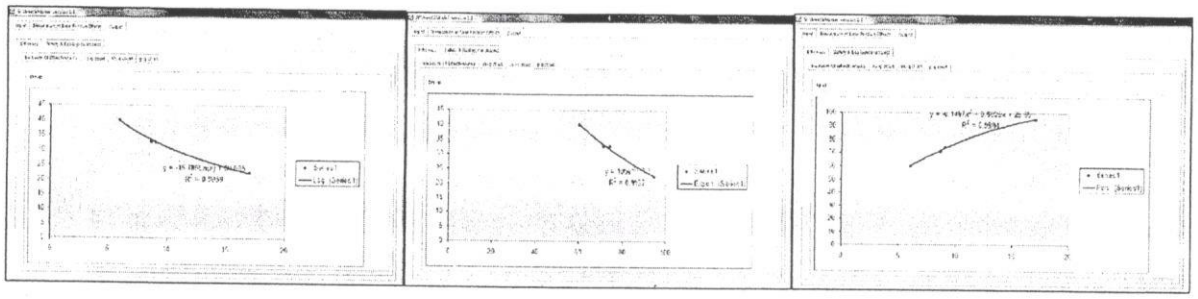

Photo 6: An example of calculated and visually presented Traffic Flow Diagram (Speed-Density, Density-Flow, Speed-Flow) for studied locations

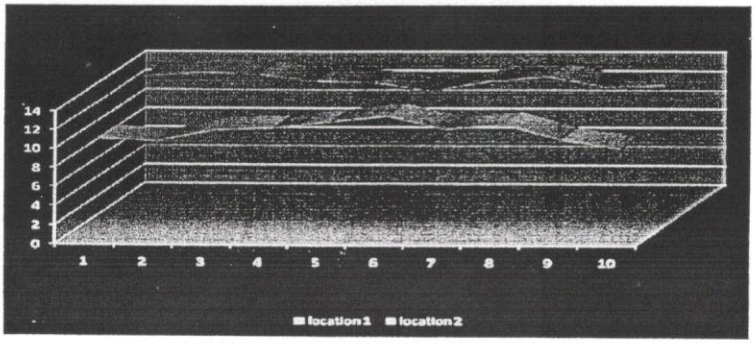

Photo 7: Simulated Travel Time for the studied locations

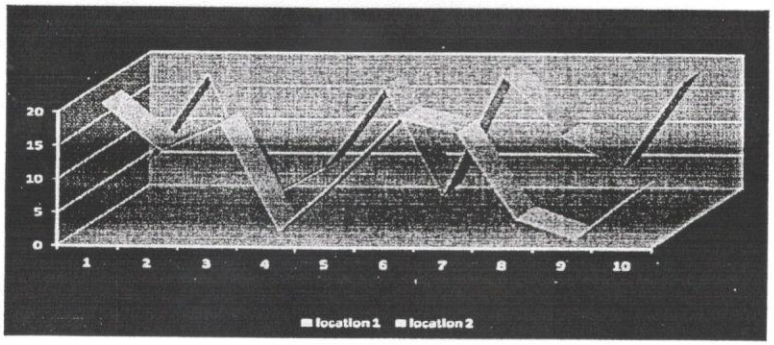

Photo 8: Simulated number of overtakings for the studied locations

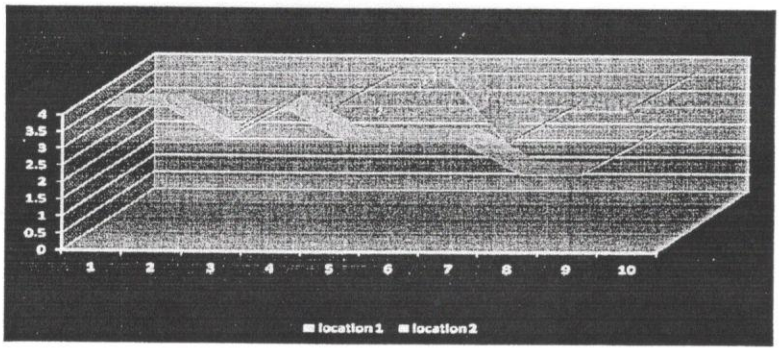

Photo 9: Simulated Vehicle Level Of Service*) for the studied locations
*) 1-LOS F; 2-LOS E; 3-LOS D; 4-LOS C;
5-LOS B; 6-LOS A

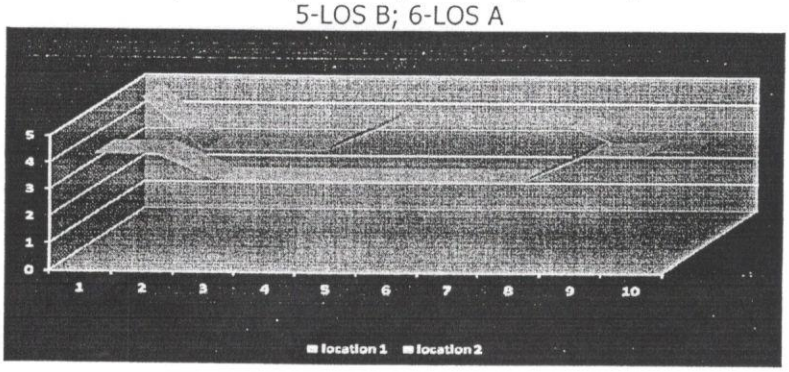

Photo 10: Simulated Pedestrians Level Of Service*) for the studied locations
*) 1-LOS F; 2-LOS E; 3-LOS D; 4-LOS C;
5-LOS B; 6-LOS A

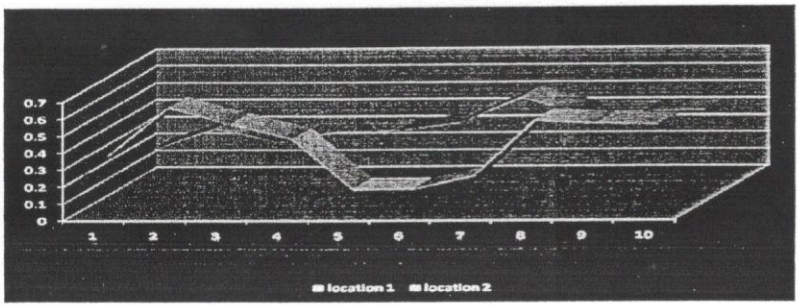

Photo 11: Simulated Average CO and NO_x emissions (g/km), for the studied locations

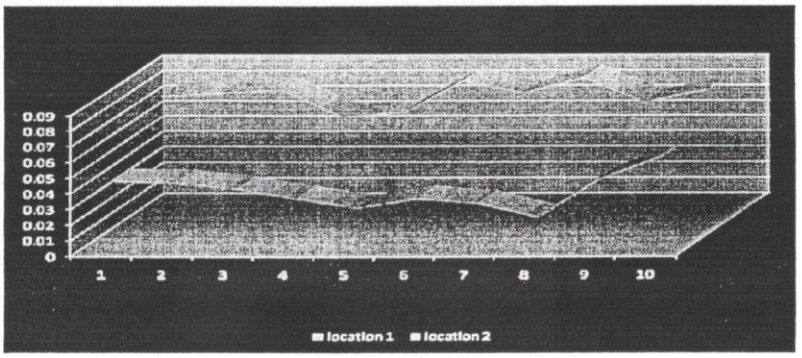

Photo 12: Simulated Fuel Consumption (l/km), for the studied locations

According to the simulation results, it was found that the space mean speed at the studied locations is high, and that the drivers are under low safety pressure. Unfortunately, that is why the level of service for vehicles is reasonably high and low LOS for the pedestrians. Simulated output parameters shows high level of carbon monoxide and oxides of nitrogen as well as high fuel consumption at the locations.

CONCLUSION

Our main aim with this analyses is to contribute towards the local government of the city of Bitola to create local road safety strategies, which set out how authorities plan to tackle road traffic casualties in their area and why they believe their approach will be effective. The application on microscopic simulation model SFStreetSIModel, version 1.1., showed endangered level of safety, security and ecological environment for the pedestrians. That is, we have shown that SFStreetSIModel, version 1.1., can be used as an assist decision instrument for sustainable development of Bitola, and we believe that well designed shared spaces could bring a balance of the needs of all road users as well as to create more pedestrian friendly public spaces. However, more research needs to be undertaken to investigate the effect that shared spaces will have in our cities.

References

1. Bunevska T.J., Malenkovska T.M. (2011). *Development of low speed urban street "side friction" models: case study*, Suvremeni promet, Vol.31, No1-2, pp.75-80, ISSN 0351-1898.
2. Bunevska T.J., Malenkovska T.M. (2011). *Contribution to sidewalk pedestrian level of service analysis*, Transport Problems ISSN 1896-0596, The Silesian University Of Technology, Faculty of Transport.
3. The Cities Alliance, (2007). *LIVEABLE CITIES - THE BENEFITS OF URBAN ENVIRONMENTAL PLANNING*. Washington, D.C. 20433, U.S.A.
4. Local Transport Note 1/11, (October 2011). *Shared Space*, TSO@Blackwell and other Accredited Agents.