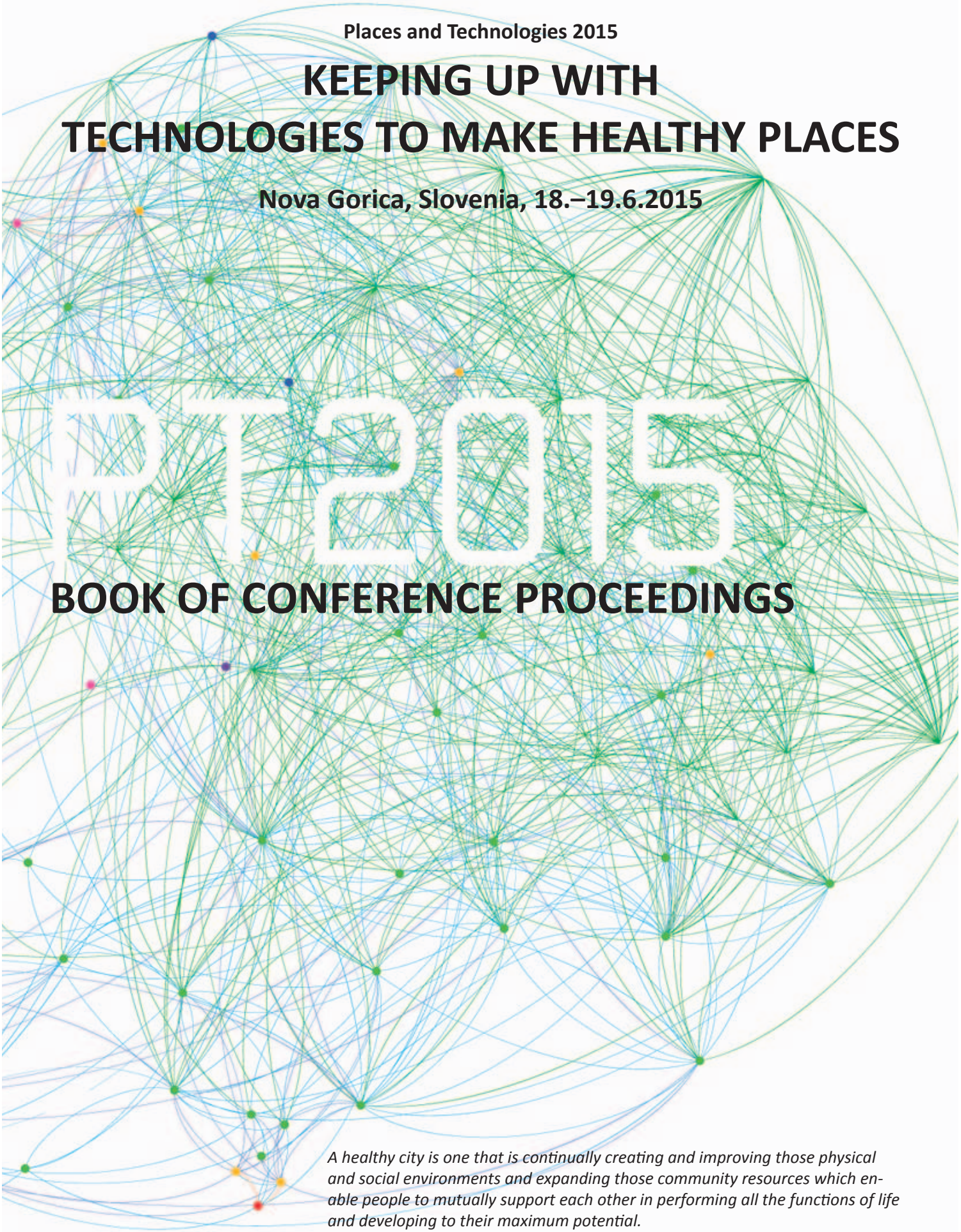
Places and Technologies 2015

KEEPING UP WITH TECHNOLOGIES TO MAKE HEALTHY PLACES

Nova Gorica, Slovenia, 18.–19.6.2015



BOOK OF CONFERENCE PROCEEDINGS

A healthy city is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and developing to their maximum potential.
Health Promotion Glossary (1998)

ORGANIZERS:

Универзитет у Београду - Архитектонски факултет
University of Belgrade - Faculty of Architecture
www.arh.bg.ac.rs

University of Belgrade,
Faculty of Architecture, Serbia

URBANLAB
PROFESSIONAL ASSOCIATION URBAN LABORATORY

Professional Association,
Urban Laboratory, Serbia

University of Ljubljana
Faculty of Architecture

University of Ljubljana,
Faculty of Architecture, Slovenia

SPLOŠNA BOLNIŠNICA "DR.FRANCA DERGANCA" NOVA GORICA

General Hospital, »Dr Franca
Derganca« Nova Gorica, Slovenia

SPONZORS:

kreal
Creative together

KREAL, Creative Aluminium, Kidričevo, Slovenia

SUPPORTERS:

MESTNA OBČINA
NOVA GORICA

ISOCARP
Knowledge for better Cities

Skgz
SLOVENSKA KULTURNO-GOSPODARSKA ZVEZA
UNIONE CULTURALE ECONOMICA SLOVENA

DUPPS TSPAS
DRUŠTVO URBANISTOV IN PROSTORSKIH PLANERJEV SLOVENIJE
TOWN AND SPATIAL PLANNING ASSOCIATION OF SLOVENIA

Tempus

RESARCH
Restrukturiranje studijskog programa Arhitekture u program sa integrisanim Masterom, usklađen sa standardima Evropske Unije

GO
European Grouping of Territorial Cooperation
Gruppo europeo di cooperazione territoriale
Evropsko združenje za teritorialno sodelovanje

CIP - Kataložni zapis o publikaciji
Narodna in univerzitetna knjižnica, Ljubljana

614:711.4(082)(0.034.2)

INTERNATIONAL Academic Conference Places and Technologies (2 ; 2015 ; Nova Gorica)

Keeping up with technologies to make healthy places [Elektronski vir] : book of conference proceedings / [2nd International Academic Conference] Places and Technologies 2015, Nova Gorica, 18.-19. 6. 2015 ; editors Alenka Fikfak ... [et al.]. - Ljubljana : Faculty of Architecture, 2015

ISBN 978-961-6823-68-5

1. Gl. stv. nasl. 2. Dodat. nasl. 3. Fikfak, Alenka
279986432

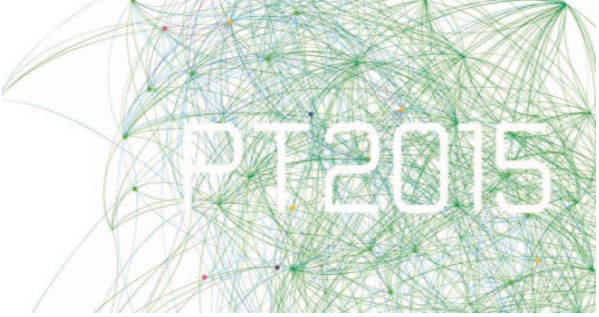
Places and Technologies 2015

KEEPING UP WITH TECHNOLOGIES TO MAKE HEALTHY PLACES

BOOK OF CONFERENCE PROCEEDINGS

Editors:
Alenka Fikfak, Eva Vaništa Lazarević,
Nataša Fikfak, Milena Vukmirović, Peter Gabrijelčič

Nova Gorica, Slovenia



Contents

INTRODUCTION 10

HEALTHY CITY - TECHNOLOGY AND URBAN RESILIENCE 11
Eva Vaništa Lazarević

A PLACE FOR PLACES: LIVE AND STAY 13
Nataša Fikfak

NOVA GORICA 14
Matej Arčon

HEALTHY CITY - TECHNOLOGY AND URBAN RESILIENCE 17
Ružica Božović Stamenović

INNOVATING AT LISBON'S WATERFRONT PLACE, THE "TAGUS PLATFORM" PROJECT 19
Pedro Ressano Garcia

TOPIC I: Architecture and Health 19

HEALTHY BUILDINGS: THE ICF CLASSIFICATION AS A DESIGNING TOOL 20
Alberto Arenghi, Daniele Malgrati, Michele Scarazzato

THE HEALTH ASPECTS OF SUSTAINABLE ARCHITECTURE 26
Kosara Kujundžić

UNIVERSITY AND DWELLERS' ASSOCIATIONS TOGETHER FOR CREATING SUSTAINABLE AND HEALTHY URBAN ENVIRONMENTS 32
Lucia Martincigh, Francesco Bianchi, Cecilia De Marinis, Marina Di Guida, Giovanni Perrucci

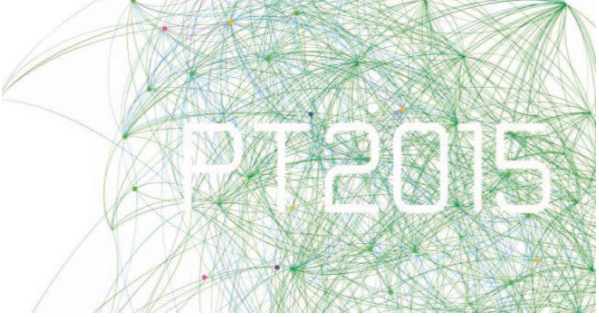
"VERTICAL" CITY 39
Damjana Lojaničić

HEALTHY WORKPLACE: UTOPIA OR REALITY OF MODERN ARCHITECTURAL DESIGN IN BOSNIA AND HERZEGOVINA 45
Tijana Vujičić, Tanja Trkulja

SUSTAINABLE DESIGN FOR IMPROVEMENT OF HEALTHY BUILT ENVIRONMENT 52
Aleksandar Petrovski, Ognen Marina, Georgi Dimkov, Dimitar Papasterevski

HEALTHCARE DESIGN REVISITED – NEW APPROACHES TO USER – CENTRIC, EFFICIENT AN EFFECTIVE DESIGN 59
Eva Vaništa Lazarević, Jelena Marić, Milena Vukmirović, Goran Radović

BUILDING MATERIALS AND HUMAN HEALTH: DESIGNERS' PERSPECTIVE 74
Saja Kosanović, Alenka Fikfak, Mirko Grbić



TOWARDS A NEW UNDERSTANDING OF HEALTHY PLACE 80
Saja Kosanović, Eva Vaništa Lazarević, Slađan Timotijević

ENVIRONMENTAL FEATURES OF BUILDING MATERIALS OF TRADITIONAL OHRID HOUSE AND THEIR CONTRIBUTION TO ITS HUMAN DESIGN 86
Radmila Tomovska, Ana Radivojević

HEALTHY ARCHITECTURE AS A RESULT OF BALANCED INTEGRATION OF ARTIFICIAL AND NATURAL RULES 93
Dženana Bijedić, Rada Čahtarević, Senaida Halilović

HEALTHY ARCHITECTURE FOR CHILDREN 101
Julija Aleksić

MEDICINE AND ARCHITECTURE IN THE CONTEMPORARY SOCIETY 107
Ilka Čerpes

MARGINALISATION OF LOCAL COMMUNITIES ALONG THE STRAIT OF SINGAPORE 115
Magnus Nickl, Verena Stecher

THE SCALE OF ACUTE CARE HOSPITALS IN SERBIA - THE NEED FOR RETHINKING 121
Marko Matejić

ARCHITECTURE AND HEALTHY LIVING SPACE 127
Goran Radović

TOPIC II: Physical Planning and Quality of Place 140

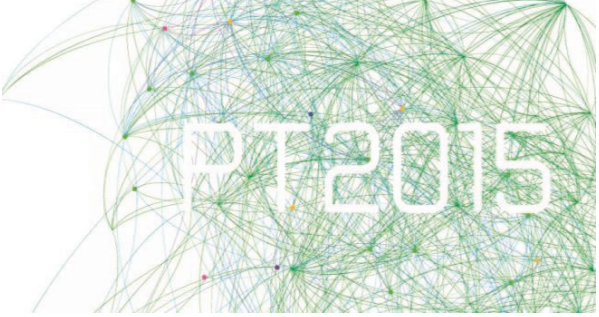
DEVELOPMENT DIRECTIONS OF URBAN STRUCTURE THROUGH REGISTRATION OF CHANGES OF SEGMENTS OF URBAN COMPLEX 141
Velimir Stojanović

THE TRANSFORMATION OF THE SQUARE CARICA MILICA IN NOVI SAD (SERBIA) 147
Ivana Sentić, Ksenija Hiel

VARESE LIGURE: AN ITALIAN RURAL MUNICIPALITY WHICH HAS IMPLEMENTED AN EXEMPLARY MODEL OF SUSTAINABLE DEVELOPMENT 154
Giovanni Sergi, Carlo Berio, Giulia Canton, Giacomo Crovo

CYBERPARKS CHALLENGES - NEW DIGITAL MEDIA FOR ATTRACTIVE URBAN OPEN SPACES 163
Ina Šuklje Erjavec, Carlos Smaniotto Costa

MEDIA ARCHITECTURE AND SUSTAINABLE ENVIRONMENT 171
Jasna Čikić-Tovarović, Jelena Ivanović-Šekularac, Nenad Šekularac



IMPLEMENTATION OF NORWEGIAN EXPERIENCE TO SLOVENIAN HOSPITAL SECTOR 179
ALENKA TEMELJOTOV-SALAJ, SVEIN BJOERBERG, SIMON VRHUNEC, ANDREJ BARIČIČ

TOWARDS OPEN, THERMODYNAMIC CITY P&T 2015 186
MARIJA BOJOVIĆ, IRENA RAJKOVIĆ, SANJA PAUNOVIĆ ŽARIĆ

INTERWEAVING OF BANJALUKA'S URBAN AND RURAL LANDSCAPES 194
DIJANA SIMONOVIĆ

AN APPLICATION OF THE "ENVIRONMENTAL ISLAND": A PRESCRIPTIVE TOOL TO CREATE HEALTHIER URBAN ENVIRONMENTS 201
LUCIA MARTINCIGH, CECILIA DE MARINIS, JANET HETMAN

DEVELOPMENT OF PUBLIC SQUARES IN NORTH WESTERN EUROPEAN CITY CENTRES 209
BOB GIDDINGS, JAMES CHARLTON

MUSIC AND SOUND AS A TOOL INTO DESIGNING HEALTHIER ENVIRONMENT 216
ANJA KOSTANJŠAK, MORANA PAP, TENA LAZAREVIĆ

DESIGNING PARKING STRUCTURES IN SERVICE OF PUBLIC HEALTH 225
TANJA TRKULJA, TIJANA VUJIČIĆ

DESIGNING THE WORKING ENVIRONMENT WHEN PLANNING BUSINESS ZONES 232
GREGOR ČOK

FOUR PARADIGMS FOR THE VENETO REGION'S CENTRAL AREA 240
ENRICO ANGUILLARI

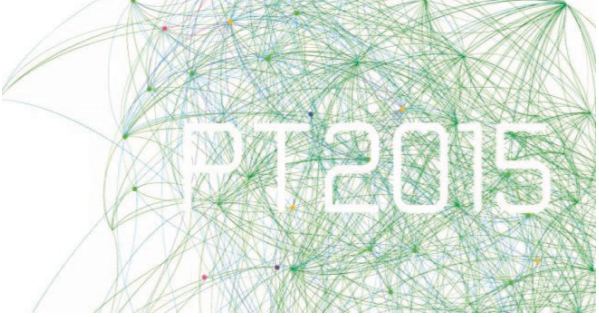
MUNICIPALITY POLICY AS KEY FACTOR FOR THE ROLE OF ARCHITECTURE AND TECHNOLOGY IN PUBLIC HEALTH 248
DEJAN VASOVIĆ, NATAŠA ĆUKOVIĆ IGNJATOVIĆ, DUŠAN IGNJATOVIĆ

INDUSTRIAL HERITAGE IN ALBANIA AND THE OPPORTUNITIES FOR REGENERATION AND ADAPTIVE RE-USE 255
FLORIAN NEPRAVISHTA

THE POSSIBILITIES OF THE APPLICATION OF THE CONCEPT OF HEALTHY CITY IN ILLEGAL SETTLEMENTS IN SERBIA 266
BRANISLAV ANTONIĆ, BISERKA MITROVIĆ

URBAN REGENERATION AS A TOOL FOR POPULATION HEALTH IMPROVEMENT 272
FILIP PETROVIĆ

URBANIZATION OF METROPOLITAN AREAS – THE IMPORTANCE OF NEW SPATIAL DATA ANALYSIS TOOLS 281
HANNA OBRACHT-PRONDZYNSKA



AQUAPONICS BASED ARTIFICIAL BIOSPHERE INCLUDED IN ARCHITECTURE: FROM MITIGATION OF NEGATIVE IMPACTS TO POSITIVE ADDED VALUES OF URBAN SPATIAL STRUCTURES ON LOCAL, REGIONAL AND GLOBAL SCALE 288
Piotr Marek Smolnicki

INSTITUTIONAL CHALLENGES IN THE URBAN PLANNING WATER SENSITIVE PLACES 297
Višnja Sretović Brković, Matija Brković

TOPIC III: Lifetime Communities and Participation 308

COHOUSING FOR BUILDING REUSE 309
Adolfo Baratta, Fabrizio Finucci, Annalisa Metta, Luca Montuori

HOW TO DESIGN HEALTHY BUILDING FOR HEALTHY LIVING? 315
Anja Jutraž, Sanja Štimac

PARTICIPATORY URBAN PLANNING AND PUBLIC POLICY 326
Višnja Kukoč

TOPIC IV: Cultural Patterns and Sensitivity 332

SENSE OF PLACE IN ARCHITECTURAL DESIGN: TOWARDS HEALTHY PLACES P&T 2015 333
Eglė Navickienė

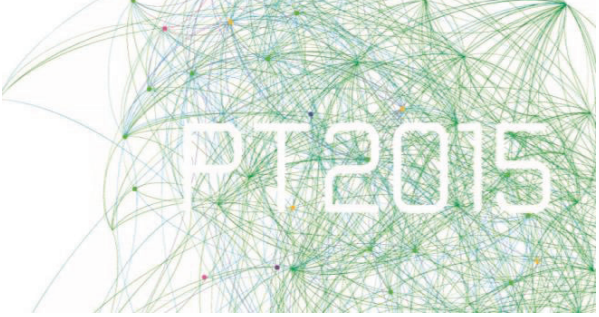
HOLIDAY HOMES IN THE VICINITY OF SPLIT, CROATIA, DESIGNED BY FRANO GOTOVAC – CONTINUITY OF ARCHITECTURAL HERITAGE 341
Vesna Perković Jović

ARCHITECTURE AND ITS AFTERLIFE; GREEN URBANITY 347
Gabriella Medvegy, Gábor Veres

INVESTIGATION OF RELATIONSHIP BETWEEN CULTURE OF THE INHABITANTS AND QUALITY OF HOUSING 353
Ana Špirić, Sanja Trivić

UTOPIAN PROJECTS DRAWINGS AS INDICATORS OF MODERN SOCIETY NEEDS 361
Vladimir Kovač

YOUTH AND THE FEELING OF SAFETY IN PUBLIC SPACES 368
Svetlana Stanarević, Stevan Tatalović



TOPIC V: Health Intensive Care 375

OPTICAL COHERENCE TOMOGRAPHY - GUIDED PRIMARY PERCUTANEOUS CORONARY INTERVENTION IN ACUTE MYOCARDIAL INFARCTION 375
IGOR KRANJEC

FRACTAL ARCHITECTURE OF THE CORONARY ARTERY TREE 386
MATJAŽ KLEMENC

HUMANIZATION OF DIALYSIS: GREEN AND COZY 392
JADRANKA BUTUROVIĆ-PONIKVAR

CONTEMPORARY CHALLENGES OF PUBLIC HEALTH AND AN ACTIVE APPROACH TO OVERCOME THEM 397
MARKO VUDRAG

ANALYSIS AND CONTEMPORARY APPROACH OF SPACE DESIGN OF INTESIVE PSYCHIATRIC CARE UNIT 406
NEVENA DUTINA, ALEKSANDRA DUTINA

TOPIC VI: Inclusive and Accessible Environment 413

TOWARDS INCLUSIVE FIRE SAFETY DESIGN 414
VALERIA TATANO, ELISABETTA CARATTIN

INCLUSIVE AND THERAPEUTIC URBAN ENVIRONMENT: INVOLVING USERS IN THE DESIGN PROCESS 422
ILARIA GAROFOLO, BARBARA CHIARELLI

DEVELOPING INNOVATIVE SOCIAL HOUSING TO FOSTER INCLUSIVE COMMUNITIES 429
SILVIA GRION, PAOLA COLONI

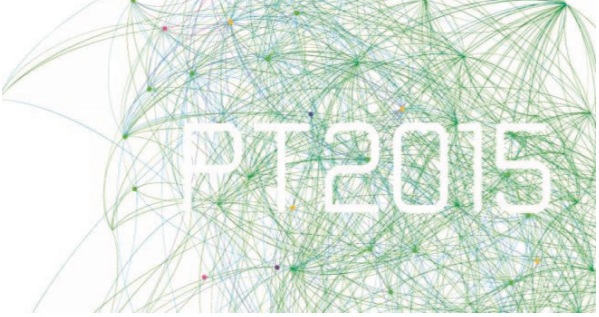
URBAN PUBLIC SPACES ACCESSIBLE FOR ALL: A CASE STUDY IN A HISTORICAL DISTRICT OF ROME 436
LUCIA MARTINCIGH, CECILIA DE MARINIS

ECOLOGICAL LANDSCAPE, PHYTODEPURATION AND MANMADE WETLANDS IN MAGOK LAKE PARK, SEOUL 445
CRISTIAN SUAU, CARMELO ZAPPULLA

ADVANCED SYSTEMS FOR IMPROVING COMMON HEALTH 458
URŠKA KALČIČ, JANEZ PETER GROM

INCLUSIVE AND ACCESSIBLE ENVIRONMENT: PLANNING FOR THE FUTURE 466
SANKALP SHUKLA, APOORVA GANGRADE, ANSHULA GUMBER

FACTS4STOPS – USER NEEDS REGARDING PUBLIC TRANSPORT STATIONS AND ENVIRONMENT 472
CHRISTINE CHALOUPKA-RISSER, DANIEL BELL



TOPIC VII: Environmentally Friendly Transport 478

SHIFTING TO MORE ENVIRONMENTALLY FRIENDLY MODES IN LONG-DISTANCE TRANSPORT 479
Aleksandra Nešić, Ivana Čavka, Olja Čokorilo

ASSESSING PUBLIC TRANSPORT EFFICIENCY IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT 485
Evgenia Yosifova

THE ROLE OF PUBLIC TRANSPORT PRIORITY IN SUSTAINABLE URBAN MOBILITY 492
Dino Šojat, Davor Brčić, Marko Slavulj

APPLICATION OF PV MODULES ON NOISE BARRIERS 498
Budimir Sudimac, Andjela Dubljević

PLANNING OF ELECTRIC TRANSPORTATION IN THE KRŠKO REGION 505
Ana Tivadar, Stanko Manojlović, Simon Podkoritnik

INTELLIGENT TRANSPORT SYSTEMS FOR SMART CITIES 511
Bia Mandžuka, Ljupko Šimunović, Mario Ćosić

TOPIC VIII: Building Technologies 518

RETROFITTING OF MULTI-FAMILY BUILDINGS TOWARDS HEALTHIER SETTLEMENTS 519
Aleksandra Krstić-Furundžić, Aleksandra Đukić

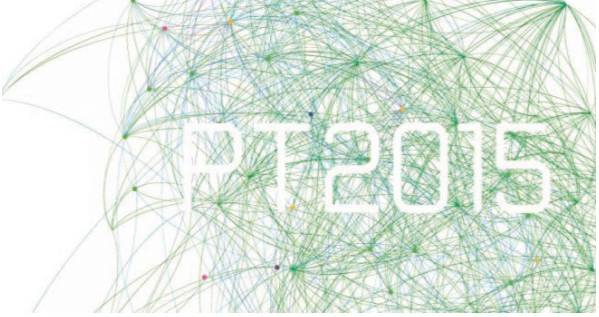
FERROCEMENT ARCHITECTURAL STRUCTURES FROM THE ASPECT OF SOCIAL WELL-BEING 526
Aleksandra Nenadović

DAYLIGHT ANALYSES OF "READY-MADE" FAÇADES WITH MODULAR OPENINGS - CASE STUDY LOCATION IN PODGORICA 532
Sanja Paunović Žarić, Irena Rajković, Marija Bojović

ACTIVE SOLAR SYSTEMS – STUDY OF POTENTIAL FOR APPLICATION IN THE MATERIALIZATION OF TOURIST FACILITIES IN MONTENEGRO 539
Irena Rajković, Sanja Paunović Žarić, Marija Bojović

PREFABRICATED PASSIVE HOUSE VENTILATED FAÇADE PANEL SYSTEM WITH RECYCLED CONCRETE 548
Ljubomir Miščević , Ivana Banjad Pečur, Bojan Milovanović

POTENTIAL ANALYSIS OF DYNAMIC, THERMAL BUILDING SIMULATIONS AND DEVELOPMENT OF MEASUREMENT AIDED SIMULATION TECHNIQUE 556
István Kistelegdi, Bálint Baranyai, Bálint Bachmann



TOPIC IX: Adaptive Reuse and Urban Renewal 561

COMPARISON OF THE SUSTAINABILITY OF DIFFERENT TECHNIQUES FOR THE STRENGTHENING OF REINFORCED CONCRETE SLABS 562
TANYA CHARDAKOVA, MARINA TRAYKOVA

SYSTEMS FOR THE REQUALIFICATION OF NON-LISTED ARCHITECTURE: THE "*ADAPTIVE EXOSKELETON*" 569
FRANCESCA GUIDOLIN

RECONSTRUCTION AND REVITALIZATION OF THE COMPLEX SENARA, WITHIN THE MONASTERY HILANDAR, IN ORDER TO ADAPT TO MODERN TRENDS AND SOCIAL CHANGES 575
JELENA IVANOVIĆ-ŠEKULARAC, JASNA ČIKIĆ-TOVAROVIĆ, NENAD ŠEKULARAC

RENEWAL OF JUGOMONT PREFABRICATED RESIDENTIAL BUILDINGS JU-61 582
IVAN MLINAR, LEA PETROVIĆ KRAJNIK, TAMARA MARIĆ

BROWNFIELDS AS PLACES AND RENEWABLE ENERGY SYSTEMS AS TECHNOLOGIES: POTENTIALS AND RISKS IN CASE OF SERBIA 588
ANITA STOILKOV-KONESKI, ZORAN KONESKI

LANDFILL JAKUŠEVEC IN ZAGREB – POTENTIAL FOR NEW SPACE IDENTITY AND ENHANCEMENT OF QUALITY OF LIFE 595
LEA PETROVIĆ KRAJNIK, DAMIR KRAJNIK, IVAN MLINAR

TOPIC X: Active Living and Health 601

OPEN PUBLIC SPACES FOR HEALTHIER CITIES 602
ALEKSANDRA STUPAR, ALEKSANDRA ĐUKIĆ

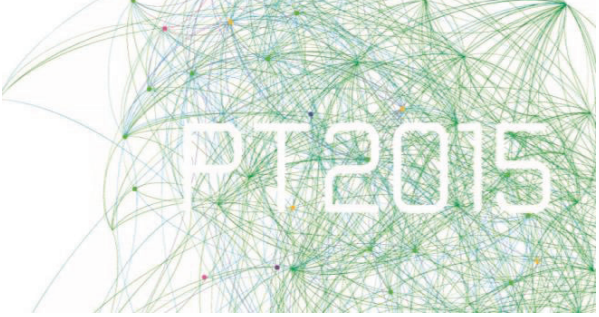
RESPONSIBILITY TO THE EMPLOYEES' HEALTH UNAVOIDABLE IN THE CREATIVE AND INNOVATIVE DESIGN OF OFFICE SPACES 610
NIKOLA Z. FURUNDŽIĆ, DIJANA P. FURUNDŽIĆ, ALEKSANDRA KRSTIĆ- FURUNDŽIĆ

HEALTHY PLACES, ACTIVE PEOPLE 617
KATARINA ANA LESTAN, IVAN ERŽEN, MOJCA GOLOBIČ

THE IMPACT OF QUALITY OF PEDESTRIAN SPACES ON WALKING AS A MODERATE PHYSICAL ACTIVITY 623
MILENA VUKMIROVIĆ, EVA VANIŠTA LAZAREVIĆ

TOPIC XI: Health Promotion, Protection and Prevention 638

OUTDOOR GYMS: "NO MORE EXCUSES FOR PEOPLE WHO CANNOT AFFORD MEMBERSHIPS. GET OUT AND GET IN SHAPE!" 639
ANNE-KATHRIN WILL



STUDENT PHYSICAL EDUCATION FOR HEALTHY LIFESTYLE 646
ALEŠ GOLJA

KEY POINTS OF HUMAN AWARENESS AND EMERGENCY PLANNING. SCHOOLS AS A CASE STUDY 655
MADDALENA COCCAGNA

ANOTHER SIDE OF THE COMFORT OF LIVING – ELECTROMAGNETIC POLLUTION 661
NEBOJŠA ARSIĆ, JORDAN RADOSAVLJEVIĆ, NATAŠA FIKFAK, SAŠA ŠTATKIĆ

RECOMMENDATIONS FOR UNIVERSAL DESIGN OF OUTDOOR LEISURE AND RECREATIONAL AREAS 667
LARA SLIVNIK

TOPIC XII: Social Networks and Human Basic Needs 673

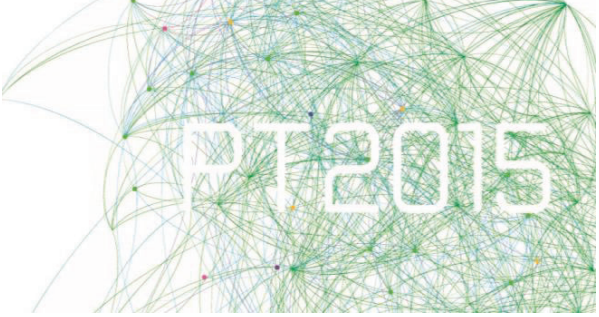
VISUAL REPRESENTATION AND EXPERIENCE OF PLACE: CASE STUDY ALHAMBRA IN GRANADA 674
ISIDORA KARAN, VEDRANA IKALOVIĆ

BEYOND THE QUANTIFIED SELF: A LOOK AT THE SOCIAL DIMENSION OF HEALTH 680
SVEA HEINEMANN

SKYSCRAPER'S PUBLIC AREAS: THE IMPACT ON SPACE AND SOCIAL LIFE 686
ALICJA STEFAŃSKA

THE IMPACT OF SOCIAL NETWORKS USE ON REDUCTION OF DEPRESSION IN CANCER PATIENTS 691
LEILA HABIBI, HAMID REZA FARPOUR

2ND INTERNATIONAL ACADEMIC CONFERENCE
PLACES AND TECHNOLOGIES 2015
KEEPING UP WITH TECHNOLOGIES TO MAKE HEALTHY PLACES
18 & 19 JUNE 2015 | NOVA GORICA | SLOVENIA



THE IMPACT OF QUALITY OF PEDESTRIAN SPACES ON WALKING AS A MODERATE PHYSICAL ACTIVITY

Milena Vukmirović[1]
PhD, Research Associate, University of Belgrade - Faculty of Architecture, Blvd. Kralja Aleksandra 73/II, milena.vukmirovic@urbanlab.org.rs

Eva Vaništa Lazarević
PhD, Professor, University of Belgrade - Faculty of Architecture, Blvd. Kralja Aleksandra 73/II, eva.vanistalazarevic@gmail.com

ABSTRACT

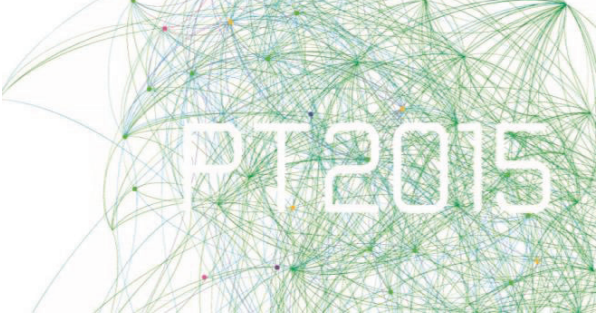
One of the objectives of quality of pedestrian spaces improvement is to encourage walking in the way to become a natural part of everyday patterns in urban activity. This would also have implications on the reduction of public health issues since the majority of urban population has become sedentary. The stated objectives and relationships were analysed through the interpretation of the results obtained in the direct survey of citizens in the central part of the City of Belgrade. Citizens were asked to assess the quality of the pedestrian environment of the research territory by using a specific questionnaire designed on the basis of the professional tool for the evaluation of the quality of pedestrian spaces. The results have shown that citizens of Belgrade still consider walking mainly as a recreational activity, but that they would walk more if the quality of pedestrian environment were improved.

Keywords*: quality of pedestrian spaces, walking, moderate physical activity, Belgrade.*

INTRODUCTION

The creation of liveable, safe, sustainable and healthy cities is possible by increasing the concern for pedestrians, cyclists and city life in general (Gehl 2010). Liveable city potential is getting stronger when a large number of people are attracted to walk, ride a bike and spend time in open public spaces. Safety of the city could be generally increased when a large number of people move in and stay in the outdoors, because a city that invites people to walk has cohesive structure that offers short distances, attractive open spaces and various urban facilities. Sustainable city is established when the most of the urban traffic system belongs

[1] Corresponding author



to the green mobility, which is related to walking, cycling or using public transport as the primary forms of movement in cities.

The current demographic and economic trends have resulted in an increase of interest to determine the effects of responsible traffic and transport planning in public health improvement. Research shows (Litman 2010, Lee and Buchanner 2008) that investing in the improvement of public transport is one of the most cost-effective ways to generate positive objectives in the field of public health, i.e. public health improvement is among the biggest advantages offered by high quality public transport and traffic oriented development (TOD). Given that, the healthy city is achieved when walking and cycling become a natural part of everyday urban activity patterns (Vukmirovic and Vukmirovic 2014). In this way it can impact on the public health problem solving by reducing the proportion of sedentary population, which is caused by the large use of cars for urban mobility.

Physical inactivity is seen as a significant problem in the domain of public health[2] that can't be solved by a simple promotion of a healthy lifestyle (Kahlmeier et all. 2011). Considering this it was observed that the promotion of active transportation - pedestrian and bicycle movement – as an appropriate approach, not only promotes a healthy way of movement in cities, but also brings positive effects on the urban environment. Researches (Lee and Buchner) provide clear evidence that physical activity, including walking, significantly influence the improvement of health. Walking as a healthy form of physical activity gained importance in early 90s due to new recommendations that emphasized the benefits of moderate physical activity. Walking at the speed of 5km/h[3] (Centres for Disease Control and Prevention 2003) is seen as a key example of moderate physical activity since 1995. An easy walk can lead to certain effects for example person of 91 kg weight could burn 114 calories when walk 1500 m (C3 Collaborating for Health 2012). Physical activity is every movement of the body that leads to the waste of energy. On the other hand, physically inactive persons are those who lead sedentary lifestyle, or those that do not have any form of physical activity in their leisure time. Physical inactivity is considered to be fourth identified risk factor affecting the mortality of the world population (WHO 2009).

Given the high proportion of diseases attributable to the risk factors that can be avoided, it is necessary to insist on the implementation of the strategies and programs both at the individual and societal levels that would have goals of reducing these risks. From the standpoint of urban design and planning, it is necessary to establish and implement positive measures that would aim to increase the intensity of pedestrian movement, and thus improve public health and quality of life in cities.

[2] The World Health Organization (WHO).
[3] That could be reached by the most adults.

FACTORS OF URBAN ENVIRONMENT THAT AFFECTS WALKING

Pikora at all (2003) offered a framework that includes four groups of factors that affect the intensity of walking in the local environment: functional, safety, aesthetic and destination. Functional factors cover physical attributes of streets and paths (type and width of the street, intensity, speed and type of traffic and path directness related to specific destination) that define the fundamental structural elements of the local environment. Safety of the urban environment includes two features: safety of an individual (such as the presence of adequate lighting and level of passive surveillance) and road safety (such as the existence of appropriate crossing). Factor of aesthetic represents an urban environment that affects walking through entering in interesting and pleasant outdoors. Destination, as a characteristic of the physical environment refers to the availability of public and commercial facilities in the local area.

Sallis at all (1997) conducted a study of individual perceptions of the local environment. The study included the occurrence of the local environment like pleasantness of the scene and pedestrian flows, safety, characteristics of the neighbourhood such as predominant presence of housing, predominant presence of commercial contents or combination of commercial facilities and housing. Their colleague Bauman has concluded that the most important environmental factors are spaces that are safe during the day, an attractive local environment that is comfortable for walking, presence of other facilities including shops, parks and beaches and reduced noise level from other forms of transport.

NAPRAVI KORAK
UNAPREDI OKRUŽENJE

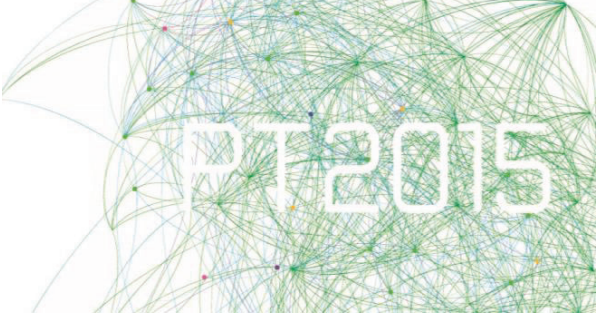
QUESTIONNAIRE

GENERAL DATA

Gender	☐Male	☐Female					
Age	☐0-14	☐15-19	☐20-29	☐30-39	☐40-55	☐56-64	☐over 65
Profession	☐Pupil	☐Student	☐Employed	☐Employed with high education		☐Pensioner	
Do you live in Vracar?	☐Yes	☐No	Where you live (which municipality)?				
Character of road users							
Do you have a private car?			☐Yes	☐No			
How often do you use your private car?			☐Always	☐When I go to work	☐Few times a week	☐When I travel out of town	
What distances do you cross by car?			☐I don't pay attention, I always use car		☐over 500m	☐over 1000m	
How much time you spend in searching for a parking place?			☐I have my own	☐less than 10min	☐10-20min	☐over 20min	
Could you give up driving a private car in favor of walking for crossing a distances of less than 500m?			☐No	☐Depends on the situation. Specify?	☐Yes	☐Didn't think about it	
Do you walk?			☐Yes	☐Sometimes	☐No		
On what occasion do you walk?			1. When doing bussines near my place of residence 2. When going to work, which is near my place of residence 3. When I take children/grandchildren to school 4. When I recreate/go for a walk 5. When I go shopping				
Do you consider walking as a mode of transport or recreation?			☐Transport	☐Transport and recreation	☐Recreation		

Figure 1: Example of the questionnaire (this table was done in accordance with Gerlach 2010).

Gerlach (2010), member of the Management Committee of the COST Action *Pedestrian Quality Needs*, has proposed three sets of criteria that correspond to different categories of pedestrian requirements (first, second and third). The structure and hierarchy of established demands has resulted in identifying the



criteria for the evaluation of walking and pedestrian environment. Featured evaluative criteria include the following aspects design of the pedestrian environment that belongs to the first order requirements, traffic rules and flows that belong to the second order requirements and the aspect of traffic participants' behaviour that belong to the third order requirements. In addition, for each of the selected values is determined the relevance that corresponds to one of three aspects of the quality of immediate pedestrian environment - safety, comfort and attractiveness, as well as an interest group to which it relates. By overlapping pedestrian needs, pedestrian environment quality criteria and identified groups of stakeholders, the framework for evaluation of the quality of pedestrian environment has been created. Named "Walkability checklist", it was defined as a professional tool.

All of the above examples indicate that the achievement of expected level of walking in urban environment is necessary to attain accomplish three criteria of quality pedestrian space as follows: 1) safety, 2) comfort, and 3) attractiveness. The first criterion is considered as a prerequisite for occurrence of any activity in a given area, while the other two can be seen as a precondition for motivating more people to walk or spend time in the outdoors.

Bearing in mind the necessity of introducing an anthropo-social factor (Neidhart 1997), i.e. inclusion of direct space users in planning and designing process, this evaluating apparatus was used as the basis for the creation of a questionnaire (see Figure 1). In this way, citizens would be placed in the position of "expert". Such treatment of a professional tool and its immediate application in the form of questionnaire aimed at forming the relevant framework information, based on who could be identified specific deficiencies and proposals for improving pedestrian movement and environment in the selected polygon - territory.

METHODOLOGY AND MATERIAL

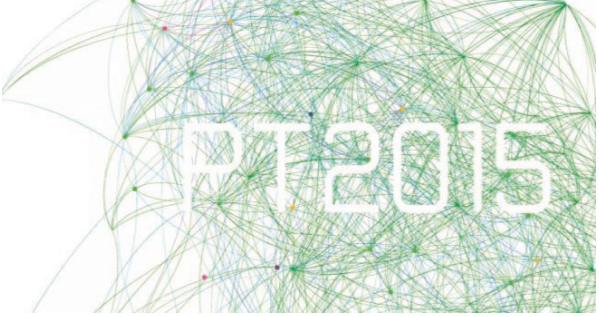
As previously stated, a professional tool for evaluation of the quality of pedestrian movement and direct pedestrian environment is used as a basis for defining the questionnaire (Vukmirovic 2010). Following six groups of issues were established: General information on the respondent (4 issues) - used to determine the characteristics of pedestrians on the observed territory; Character of traffic participants (7 issues) - to determine the obtuseness of using private cars; Design in relation to the function/ rank of the road (3 issues) – to determine the intensity of pedestrian movement in relation to the main and secondary flows on the study territory and evaluating the quality of these flows; Sidewalks / walkways / paths (14 issues) - to determine the quality of direct pedestrian environment; Traffic flows (6 issues) - to determine the possibility of overlap with other modes of transport and The walking quality and climate (6 issues) - to determine the attitude of citizens in terms of pedestrian movement, its improvement and intensity incensement.

The survey was conducted during the March 2015 under the academic elected course "Network of pedestrian flows in the function of urban redesign"[4] on Bachelor and Master Academic Studies at University of Belgrade – Faculty of Architecture. The aim of research is to examine the quality of pedestrian movement and its environment at the territory that belongs to the Central part of the City of Belgrade.

Figure 2: Central part of the City of Belgrade. Research territory.

Figure 3: Concept for spreading the pedestrian zone in the Centre of the City of Belgrade developed by the Office of the Director for Urban Planning of the City of Belgrade, 2014.

[4] Lead by Associate Professor Dr Aleksandra Djukić.



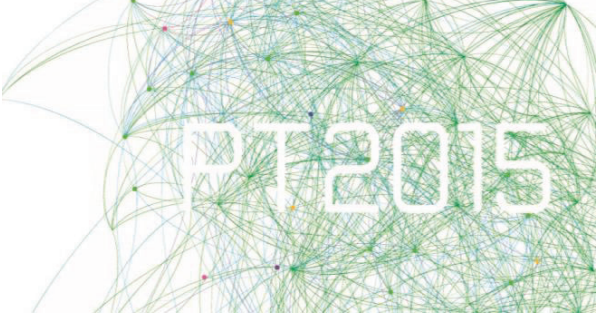
Territorial framework in which research was conducted includes the territory that belongs to the central part of The City of Belgrade and encompasses the site that starches from Vasina Street to the Danube's waterfront, known as Upper and Lower Dorcol (see Figure 2). The importance of this territory can be viewed through the framework defined by the "Project for spreading the pedestrian zone in the Centre of the City of Belgrade"[5] (Knez Mihajlova Street, see Figure 3) and the concept of connecting the central core of the City with Sava's and Danube's waterfronts seen as the areas of the strategic importance for the City of Belgrade. The size of the subject territory corresponds to the surface of the circle of diameter 1.5 km that could generally be accepted as pedestrian manageable site. Lack of perceived territory is in the terrain topography, i.e. major ups and downs in certain locations.

The research was conducted in the form of direct questioning of citizens in the most important areas that belongs to the research territory: Republic Square, Students' Square, entrance to the Kalemegdan's park in Uzun Mirkova Street, along the Francuska Street, along the Cara Dusana Street, along the Strahinjca Bana Street and at Bajlonijeva Market.

The survey was conducted on the sample of 251 people and the study included five groups of respondents by age, as follows: 117 people aged 20 to 29 years, 30 people aged 30 to 39 years, 35 people aged 40 to 55 years, 12 people aged 55 to 64 and 16 people aged over 65 years. The sample population has a random character and does not correspond to the actual representation of age groups in relation to the total population. Practically, this sample is representation of people in the streets of the research territory. In relation to the employment status of respondents five groups are included. In accordance with this the structure of the respondents is as follows 11 high school pupils, 108 students, 40 employed people, 47 unemployed people and 22 retired persons. Similar to the age of the population, this is a sample that represents the number of people seen on the streets of the study area. In relation to the place of living, the sample comprised those 98 correspondents who live in the research area and 133 who live in other parts of Belgrade.

The following paper will present the research results, with special emphasis on those related to individual aspects of safety, comfort and attractiveness of the pedestrian environment, because of their property as a prerequisite for walking.

[5] "Project for spreading the pedestrian zone in the Centre of the City of Belgrade" is defined as a subproject of the Project IME: Identity _ Mobility _ Environment of the City of Belgrade initiated by the Office of the Director for Urban Planning of the City of Belgrade, Mr Milutin Folic and adopted by the Belgrade City Council in April 2015. Project IME consists of 18 subproject that aimed to improve the identity of the City and the quality of life of its citizens, following the main goals of the City of Belgrade Development Strategy.



RESULTS

The results of this research are presented in accordance with the structure determined by establishing a different set of questions.

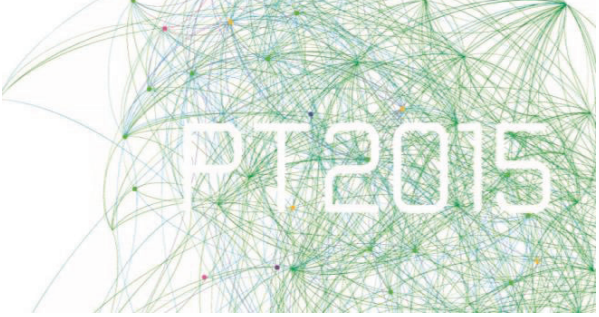
Character of road users

This group of questions aimed to determine the representation of the private cars' usage on the observed territory. This information could be used as a base and comparative sample for the results, which would be obtained by evaluating the situation after conducted promotional campaigns and other activities related to improving pedestrian movement and its environment.

Table 1: Character of road users of the study territory.

Questions' group	Question	Answers	No.	Positive/ negative trend
Character of road users	Representation of the respondents who own a private car	Yes	112	○
		No	118	
	The intensity of private cars' usage	Always	50	⊗
		When I go to work	15	
		Few times a week	25	
		When I travel out of town	22	
	Path length that exceeds with the private car	Do not pay attention	58	⊗
		Over 500m	41	
		Over 1000m	13	
	Duration of the search for a parking lot	I have my own parking space	25	⊗
		Up to 10 min.	39	
		10-20 min.	29	
		Over 20 min.	19	
	Driving by private car *versus* pedestrian movement at distances less than 500m	No	9	⊕
		Depends on the situation	20	
		Yes	80	
		Didn't thought about that	13	
	Walking or not	Yes	176	⊕
		Sometimes	38	
		No	8	
	Pedestrian movement: transport or recreation	Transport and recreation	172	⊕
		Recreation	46	
		Transport	13	

Considering the obtained results we could conclude that the most of the correspondents belongs to the population from 20 to 29 years old, i.e. students. On the other side the number of those who have its own car and who have not is approximately equal. Although these results can be positively characterized, the



high level of those who always use their car (one-fifth of the respondents), regardless of the reason for that, indicates a significant negative trend. In relation to the path length that citizens exceed by car, the majorities of respondents use their cars at distances that are pedestrian characterized, i.e. distances maximum between 500 and 1000 meters. Additional argument for promotion and improvement of walking and pedestrian environment can be searched in the fact that this is the central area of the City of Belgrade and, as consequence, has a problem with parking. This is supported with these results, which show that drivers spend some time (from 10 to 20 minutes) in search for parking, although pedestrian cross 500 meters for 6 minutes. This is further supported by the positive responses to the quaestions that could influence a change in habits of the population like choice between driving and walking at a distance of 500 m, walking or not and treatment of walking as transportation and as recreation, not only as leisure activitiy.

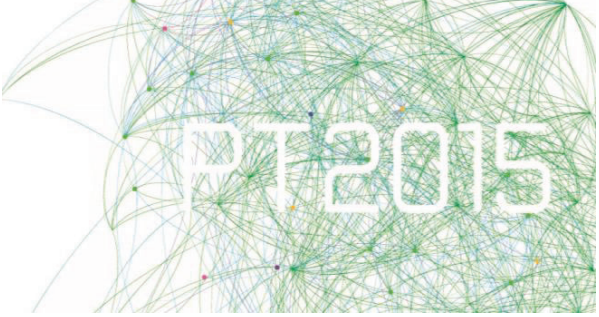
Design in relation to the function / rank of the road

The third part of the research was aimed to determine citizens' attitude towards the quality of pedestrian flows in the central part of the city. Having that in mind, we asked citizens whether they are satisfied with the size of pedestrian flows and sidewalks along the main and secondary routes (see Table 2). Besides their positive or negative expression about it, we asked respondents to tell us the reason why they negatively characterized certain routes.

Table 2: Design in relation to the function / rank of the road.

Group of questions	Question	Answers	%	Positive/ negative trend	Safety	Comfort	Attractiveness
Design in relation to the function / rank of the road	The citizens attitude related to the size of pedestrian paths on the main routes	Positive	70	⊕	⊕	⊕	⊕
		Negative	30				
	The citizens attitude in relation to the secondary streets	Positive	75	⊕	⊕	⊕	⊕
		Negative	25				

The first part of this research was related to the main routes – the main potential pedestrian flows in the study area. According to this, the results are presented as a comparative analysis of attitudes towards specific routes. Concrete recommendations/comments are presented in relation to each individual street covered by this research. These results showed that 70% of respondents are satisfied with the size of sidewalks and pedestrian flows along main routes. However, best-characterized main route, Vasina Street, has the following disadvantages: narrow sidewalks that are not consistent with a large capacity of pedesrtians. Dunavska Street, characterised as the worst main route, has the following disadvantages: narrow sidewalks, too exposed to the heavy traffic and unsafe



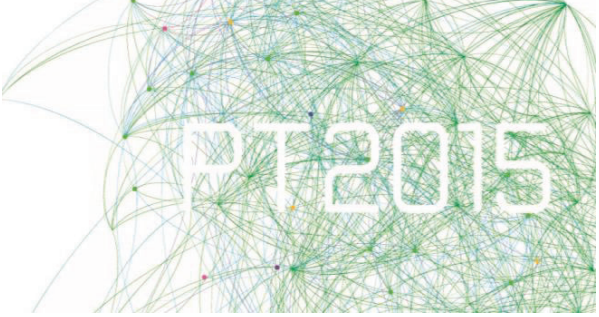
In relation to the secondary routes, the respondents (75%) expressed satisfaction with sidewalks/pedestrian flows, while 25% of them declared negative. However, it must be pointed out that secondary flows are also of great importance in terms of pedestrian movement, because through them one can reach the main routes. In terms of quality of these routes, respondents indicated the following deficiencies: parked cars on the sidewalks, some parts of the sidewalk is narrow which prevent pedestrian bypassing, as consequence - pedestrians are moving along the middle of the street – roadway, not maintained sidewalks, etc. Based on this, it can be concluded that these comments are mainly related to the criteria of safe movement, which is the primary quality that pedestrian environment should have.

Sidewalks/pedestrian routes/paths

In relation to the specified set of questions, tendency was to determine the citizens' attitudes regarding the quality of pedestrian flows in the research territory (Table 3).

Table 3: Sidewalks/pedestrian routes/paths.

Questions group	Question	Answers	%	Positive/ negative trend	Safety	Comfort	Attractiveness
Sidewalks/pedestrian routes/paths	Sidewalk width compared to the number of pedestrians	Corresponds	24	⊕	⊕	⊕	
		Partly corresponds	59				
		Do not correspond	17				
	Walking anywhere in the study area	Yes	51	⊕	⊕	⊕	⊕
		Mostly	45				
		No	4				
	Sufficient distance between the sidewalk and roadway	Yes	30	⊕	⊕	⊕	
		Mostly	50				
		No	20				
	Vulnerability of pedestrians in relation to motor vehicles	Yes	31	⊗	⊗	⊗	
		Mostly	18				
		No	51				
	The amount of pedestrian crossings in the study area	Yes	50	⊕	⊕		
		Mostly	42				
		No	8				
	Condition of pedestrian crossings	Good	11	○	○	○	○
		Satisfactory	69				
		Poor	20				
	Visibility of the sidewalks in the study area	Good	33	⊕	⊕		
		Satisfactory	52				
		Poor	15				
	The existence of barriers during pedestrian movement	Yes	42	⊕	⊕		
		No	58				
	The surface / sidewalk paving	Yes	25	⊕		⊕	⊕
		Mostly	52				
		No	13				
		Yes	20				



Equipment with street furniture	Mostly	46	⊗	⊗	⊗
	No	34			
The attractiveness of pedestrian flows	Not attractive	27	⊕		⊕
	Attractive	69			
	Very attractive	4			
Duration of staying outdoor	Up to 1h	30	⊕	⊕	⊕
	1-3h	45			
	More than 3h	25			
Quality of stay outdoor	Good	12	⊕	⊕	⊕
	Satisfactory	74			
	Poor	14			

These results lead to several concluding remarks. In terms of sidewalk width and its relation to the number of pedestrians in the study area, respondents considered that the width of sidewalks should be adjusted to the intensity of pedestrian movements along certain routes both on the main and secondary routes.

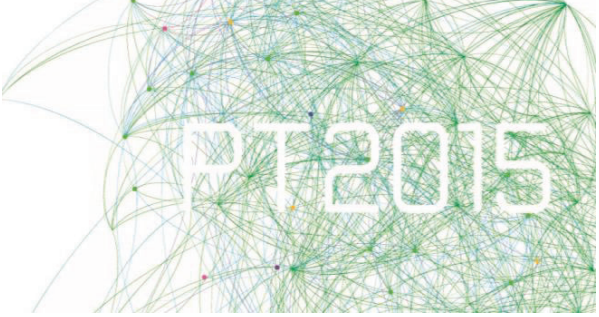
One of the positive results was citizens' attitude towards walking distances. Having in mind that 51% of them answered that the study areas is pedestrian manageable, this can be used as an additional argument for promotion and stimulation of pedestrian movement as sustainable mode of transport on this specific location.

The question about distances between sidewalks and roadways aimed at psychological sense of citizens. Results showed that the critical condition is mostly on secondary flows: respondents have noticed certain barriers on sidewalks that reduced the distance between cars and pedestrians. These barriers are parked cars on a sidewalk, narrow sidewalk, etc. Besides their psychological sense, this means that the actual safety is undermined. However, it can be used as a framework for future interventions, for example laws and plans to regulate parking in different way, sidewalk extension, etc.

As for the pedestrian crossings, the majority of respondents consider there is efficient number of them. Nevertheless, they are not well maintained, especially for people with disabilities. It can be a trigger for local government to start a project about maintaining and implementing principles of Access for All and Design for All in the study area.

The majority of answers about sidewalks (in)visibility and existence of barriers during pedestrian movement are related to parked cars, outdoor cafes, construction sites, signs, fencing posts, misfits' ramp for baby carriage, staircases, all on the sidewalk surface. This means that walking in the study is rather difficult, although it has all physical preconditions to be pedestrian-friendly environment.

In terms of sidewalk paving and street furniture equipment, respondents are generally unsatisfied in the following: not accessible, parked cars, missing green, poor maintenance, damaged sidewalks, missing urban furniture, etc. Thus, in their point of view, it should be improved in terms of placing benches, trashcans, lighting, attractive design and more attractive contents along some routes.



The question about duration and quality of staying outdoors brings on the conclusion that the citizens are mostly satisfied as they consider it pleasant. However, negative trend goes on towards inadequate maintenance, missing and insufficient greenery, unconformity for pedestrians, and so on.

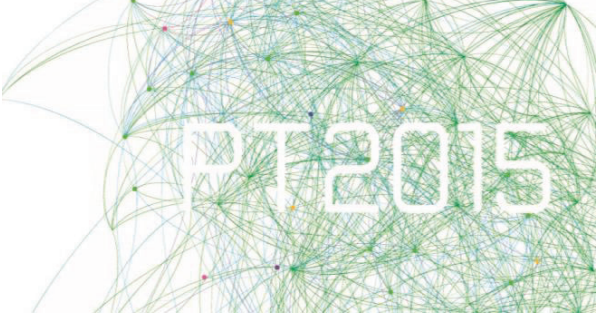
Traffic flows

This group of questions was aimed to determine the citizens' attitude towards other modes of transport, other road users and possibilities of establishing mutual relations. In relation to the traffic flows and based on these results (see Table 4), it can be concluded that the speed of the cars endanger pedestrians even traffic calming measures were applied in reconstructed streets. The study areas, as it belong to the central part of the city, is well connected by public transport to other parts of the city and its citizens are satisfied with the timetable. However, there is a need to introduce signalization on public transport stops, which would indicate the arrivals and other information about possible traffic jams, changes or temporary abolition of certain lines.

Table 4: Traffic flows.

Questions group	Question	Answers	%	Positive/ negative/ neutral trend	Safety	Comfort	Attractiveness
Traffic flows	Attitude towards car's speed	Fast	34	⊗	⊗	⊗	
		Moderate	30				
		Slow	36				
	The existence of measures for traffic calming	Yes	48	⊕	⊕		
		No	35				
		Don't know	17				
	Connections with public transport to other parts of the city	Yes	58	⊕		⊕	⊕
		Mostly	35				
		No	7				
	The existence of an appropriate timetable	Yes	44	⊕		⊕	
		Mostly	41				
		No	15				
	The existence of adequate pedestrian signalization	Yes	43	⊕	⊕	⊕	
		Mostly	43				
		No	14				
	Need for introduction of pedestrian operated signals	Yes	35	⊗	⊗	⊗	
		No	65				

Respondents are generally satisfied with existing pedestrian signalization and find that it should not be promoted in pedestrian-operated. However, those who believe that it should be improved in this way, state that it would contribute to increased flow, increased safety especially for children, reduced length of waiting at pedestrian crossings, especially at night, but some of them have stated that it could also contribute to the continually traffic flows when pedestrians are not on the crossings.



The quality and climate of walking

This group of questions was aimed at highlighting the current position, i.e. climate of walking in the research territory. Furthermore, it should point out possible improvements that would happen by increasing the intensity of pedestrian traffic. In order to increase the intensity and quality of pedestrian movement, citizens believe (see Table 5) that it is necessary to adopt a pedestrian development strategy (although most of them think this territory is pedestrian-friendly). The strategy would encompass all previously mentioned problems and contributed to improving the quality of life in this part of the city. It would result in renovation of pedestrian spaces, their staying outdoors, equipping dominant routes, giving preference to pedestrians, awareness, increased safety and comfort of citizens, speed reduction, availability, more elderly in the street, attractiveness, flow regulation, reducing the number of motor vehicles together with pollution and noise reduction, pedestrians and drivers would be better educated in traffic, the organisational quality of pedestrians in traffic would be improved and that would result in new hierarchy of the of road users, etc.

Table 5: The quality and climate of walking.

Questions group	Question	Answers	%	Positive/ negative/ neutral trend	Safety	Comfort	Attractiveness
The quality and climate of walking	Existence of pedestrian movement strategy	Yes	31	⊕			
		No	69				
	The need for pedestrian movement strategy	Yes	70	⊕			
		No	30				
	Study area in friendship with pedestrians	Yes	23	⊕		⊕	⊕
		Mostly	64				
		No	13				
	The level of noise in the streets	Low	6	⊗		⊗	
		Middle	35				
		High	41				
		Very high	18				
	The level of pollution in the streets	Low	5	⊗		⊗	
		Middle	26				
		High	40				
		Very high	29				

SUMMARY OF OVERALL RESULTS AND CONCLUSION

The obtained overall results are categorized and evaluated as positive, negative or neutral, in terms of general impression as well as in individual criteria on which specific issues were referred. An overview of these results is shown in Table 6.

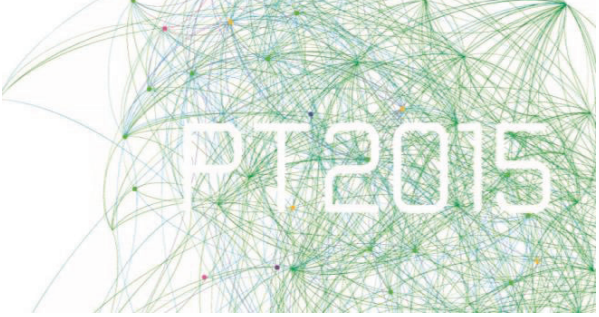


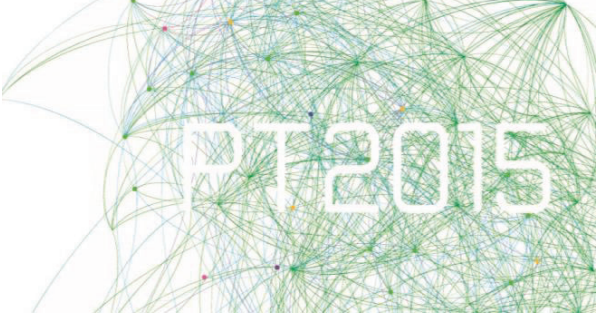
Table 6: Summary of overall results.

Negative, positive or neutral stand	**General impression**	Individual criteria		
		Safety	Comfort	Attractiveness
⊗	**9**	3	6	1
⊕	**22**	11	11	9
○	**2**	1	1	1

Based on the results of the survey, citizens have **positively** characterized the current situation of pedestrian movement in the study area that belong to the central part of the city. This has shown that citizens have a **high level of awareness related to the pedestrian movement as a sustainable form of transport**, but so far have not the opportunity to consider individual aspects of this type. In addition, by separating comments and their analysis related to specific problems may lead to **a number of concrete guidelines and recommendations** that would have resulted in improving the pedestrian environment. These guidelines should address the secondary flows of movement, which are necessary for establishing a complete pedestrian network and that could contribute in the formation of the direct pedestrian connection between the core of the city with Danube's waterfront.

By analysing the quality of the pedestrian environment, a specific stakeholders and users of information have been recognized: (a) organizations involved in the maintenance of facilities and open public spaces, (b) the police who is responsible for enforcement and monitoring of appropriate behaviour of traffic participants, (c) city planners and traffic engineers who influence the initiation of decisions (as elements of the wider planning process) related to improving pedestrian environment, (d) tourist organizations which defines the requirements for the existence of a pedestrian flows network (this applies particularly to the criteria of comfort and attractiveness of direct pedestrian environment), (e) association of persons with disabilities who are carriers and initiators of the decisions implementation related to the creation of pedestrian environment according to the principles Design for All, (f) schools that appeal to the existence of a secure movement flows, (g) organizations that are involved in business of providing adequate public transport and installation of stations.

In collaboration with these stakeholders, there should be a comprehensive approach in a form of Strategy of walking in the central part of the City as well on the whole City of Belgrade territory. However, individual criteria should be addressed as well. A special emphasis should be placed on the negative attitudes towards certain aspects (safety, comfort, attractiveness) and recommendations which citizens gave regarding some questions. The improvement and enlargement of the pedestrian network (which is planned to be implemented on the part of the study area) would then contribute to the increase of the pedestrian movement in the city and which would result in and influence on the improvement of public health of the citizens of this area as well all over Belgrade.



ACKNOWLEDGEMENT

The paper was realized, as a part of the research project "Modernization of Western Balkans" (No. 177009) and the project "Spatial, Environmental, Energy and Social Aspects of Developing Settlements and Climate Change – Mutual Impacts" (No TP36035), PP1: "Climate change as a factor of spatial development of settlements, natural areas and landscapes", both financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

REFERENCES

C3 Collaborating for Health. 2012. C3 *Collaborating for Health*. [Online], Available from: http://www.c3health.org/wp-content/uploads/2009/09/C3-report-on-walking-v-1-20120911.pdf. Accessed 27 June 2014.

Centers for Desease Control and Prevention. 2003. "Prevalence of physical activity, including lifestyle activities among adults - United States, 2000-2001" *Morbidity and Moratlity Weekley Report*, 764-769.

COST Action 358: Pedestrian Quality Needs. 2010. [Online] Available at: www.walkeurope.org. Accessed 29 February 2012.

Gehl, J. 2010. *Cities for People* Washington: Island Press.

Gerlach, J. 2010 "Pedestrian Quality Audits and Inspections – more than a part of the new EU-Directive on Road Safety Infrastructure Management". In Methorst R, Monterde i Bort H, Risser R, Sauter D, Tight M, Walker J, editors. *Pedestrian' Quality Needs. Final Report of the COST project 358*. Cheltenham: Walk21,83-133.

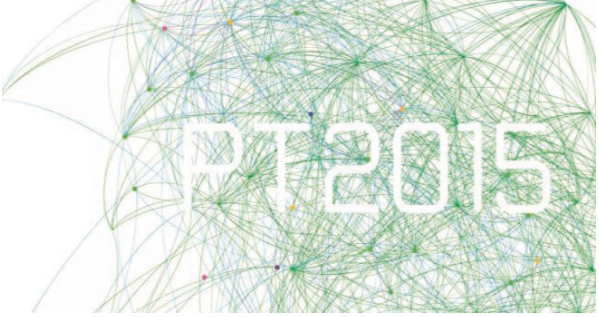
Kahlmeier, S., Cavill, N., Dinsdale, H., Rutter, H., Gtschi, T., Foster, C., et al. 2011. *Health economic assessment tools (HEAT) for walking and for cycling: methodology and user guide: economic assessment of transport infrastructure and policies* Copenhagen: WHO Regional Office for Europe.

Lee, I.M., Buchner, D.M. 2008. "The importance of walking to public health" *Medicine and science in sports and exercise* 40(7 Suppl.): S512-S518.

Litman, T. 2010. *Evaluating public transportation health benefits* Victoria: Victoria Transport Policy Institute.

Neithart, V. 1997. *Čovjek u prostoru: Antroposocijalna teorija projektiranja,* Zagreb: Školska knjiga.

Pikora, T., Giles-Corti, B., Bull, F., Jamrozik, K., Donovan, R. 2003. "Developing a framework for assessment of the environmental determinants of walking and cycling", *Social Science & Medicine*. (56): 1693-1703.



Sallis, J.F., Johnson, M.F., Calfas, K.J., Caparosa, S., Nichols, J.F. 1997 "Assessing perceived physical environmental variables that may influence physical activity". Research Quarterly for Exercise and Sport. December 01; 4(68), 345-351.

Vukmirović, M. 2010. *Projekat Napravi korak – Unapredi okruženje: Rezultati anketiranja građana*, Beograd. [Online] Available at: http://www.dub.org.rs/napravikorak/ankete.html. Accessed 29 February 2012.

Vukmirović M., Vukmirović J. 2014. "Pešačko kretanje u funkciji unapređenja javnog gradskog prostora i javnog zdravlja u Beogradu" Samardžić N. (ed.) *Special Issue Acta historiae medicinae, stomatologiae, pharmaciae, medicinae veterinariae: Javni gradskih prostor i zdravstvena kultura u Beogradu*, br. 1, str. 46-73.

WHO - World Health Organization. 2009. *WHO - World Health Organization*. [Online], Available from: http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf. Accessed 27 June 2014.