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6th INTERNATIONAL
ACADEMIC CONFERENCE ON
PLACES AND TECHNOLOGIES

PLACES AND TECHNOLOGIES 2019

THE 6th INTERNATIONAL ACADEMIC CONFERENCE ON
PLACES AND TECHNOLOGIES

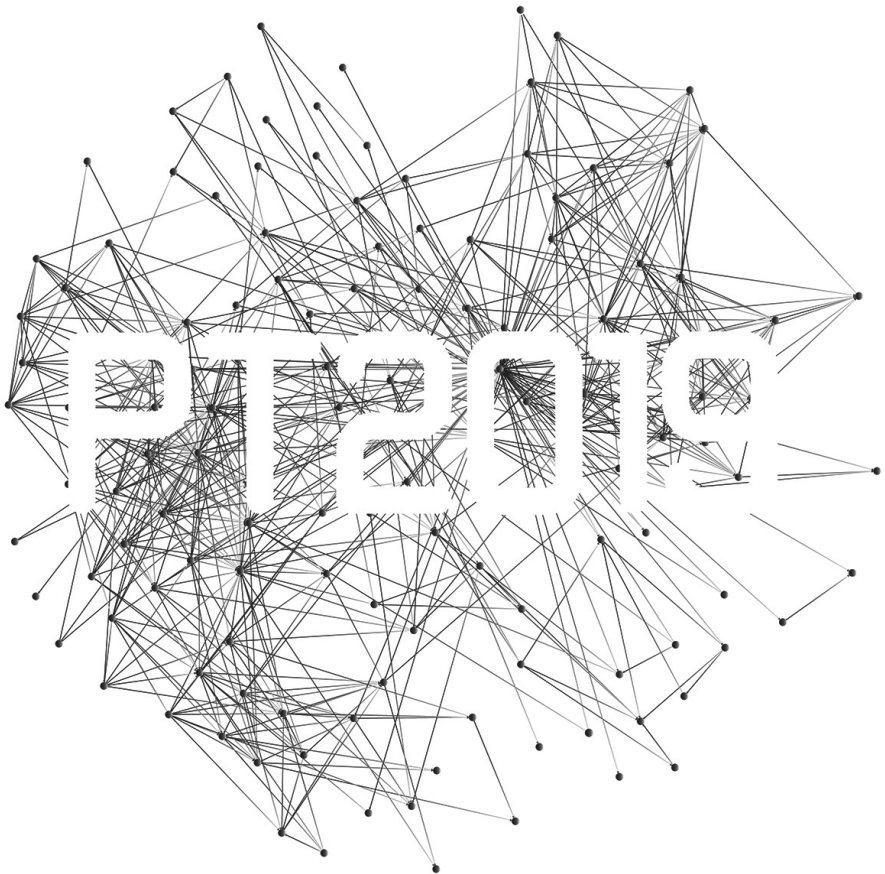
EDITORS: Dr Tamás Molnár, Dr Aleksandra Krstić-Furundžić, Dr Eva Vaništa Lazarević, Dr Aleksandra Djukić, Dr Gabriella Medvegy, Dr Bálint Bachmann, Dr Milena Vukmirović

PUBLISHER: © University of Pécs Faculty of Engineering and Information Technology

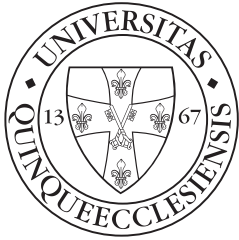
PUBLISHER RESPONSIBLE: Dr Gabriella Medvegy

PLACE AND YEAR: Pécs 2019

ISBN: ISBN 978-963-429-401-6 (PDF)



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PLACES AND TECHNOLOGIES 2019

**KEEPING UP WITH TECHNOLOGIES TO TURN BUILT HERITAGE INTO
THE PLACES OF FUTURE GENERATIONS**

**CONFERENCE PROCEEDING OF THE 6th INTERNATIONAL ACADEMIC
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TABLE OF CONTENTS

PLENARY LECTURE**44****HERITAGE AND TECHNOLOGY - GENERATING A SENSE OF PLACE**

.....45

Demeter Nóra, BA UC B, MYU, DLA UP

FORM AND ENERGY: INNOVATIONS IN METAL BUILDING**FAÇADES**.....53

Hachul, Helmut

ASSESSMENT AND REHABILITATION OF HERITAGE STRUCTURES**HELPED BY COMBINED NON-DESTRUCTIVE TESTS**64

Orbán Zoltán; Török Brigitta; Dormány András

SEARCHING THE RIGHT DISTANCE BETWEEN THE OBJECTIVITY**OF THE HISTORY AND THE NEED OF THE CONTEMPORARY**72

Stella, Antonello

PAPER**89****HUMAN MIGRATION CRISIS**90

Alwani, Omar; Borsos Ágnes

THE MULTIPLEX TYPOLOGIES OF SHRINKING CITIES 100

Antonić, Branislav; Djukić, Aleksandra; Lojanica, Vladimir

MONASTERY CRKVINA AND MONASTERY TVRDOŠ, TREBINJE,**FEDERATION BOSNIA AND HERZEGOVINA - COMPLEX****RECONSTRUCTION AND DEVELOPMENT** 109

Arsić, Petar

COLLECTIVE REUSE – CO-HOUSING DEVELOPMENTS IN THE**SERVICE OF PRESERVATION THE BUILT HERITAGE** 117

Babos Annamária

TEENAGERS' PERCEPTIONS OF PUBLIC OPEN SPACES:**EXPERIENCES FROM A LIVING LAB IN LISBON, PORTUGAL** 124

Solipa Batista, Joana; Menezes, Marluci; Smaniotto Costa, Carlos; Almeida, Inês

THE PERCEPTION OF PUBLIC SPACE: IMAGES AND**REPRESENTATIONS OF STREET FURNITURE** 132

Ben Dhaou, Ons; Vasváry-Nádor Norbert

THE DESIGN CONCEPT OF A PRE-FABRICATED APARTMENT**BUILDING** 138

Borsos Ágnes; Kokas Balázs

PROTECTION AND TOURISM DEVELOPMENT OF ANCIENT VILLAGES FROM A SUSTAINABLE PERSPECTIVE - HOUGOU ANCIENT VILLAGE AS AN EXAMPLE	146
Cao Hui	
POP(O)S OF SHOPPING CENTRE - A NEW APPROACH TOWARDS URBAN DESIGN.....	154
Cvetković, Marija; Radić, Tamara	
TRANSCRIPTION OF FORMER ARCHITECTURE	163
Zinoski, Mihajlo; Dimitrievski, Tome	
THE LOCAL LEVEL OF GOVERNANCE IN THE EUROPEAN PROCESS OF ENERGY TRANSFORMATION: CHALLENGES AND EMPOWERMENT CHANCES IN BULGARIA.....	171
Dimitrova, Elena; Tasheva – Petrova, Milena; Burov, Angel; Mutafchiiska, Irina	
URBAN GROWTH PATTERNS AND ENVIRONMENTAL PERFORMANCE: A COMPARISON OF LATE 20TH CENTURY AMERICAN SUBURBAN PATTERNS TO THOSE OF LATE 19TH CENTURY CENTRAL EUROPEAN URBAN FABRIC.....	180
Dougherty, James, AICP, CNU-A, ASAI	
ENERGY CONSUMPTION INDICATORS DUE TO APPLIANCES USED IN RESIDENTIAL BUILDING, A CASE STUDY NEW MINIA, EGYPT	188
Elhadad, Sara; Baranyai Bálint; Gyergyák János; Kistelegdi István	
MANAGEMENT APPROACH FOR SUSTAINABLE URBAN OF EXISTING NEW CITIES IN THE DIFFERENT REGIONS OF EGYPT (COMPARATIVE STUDY).....	194
Elhadad, Sara; Baranyai Bálint; Gyergyák János; Kistelegdi István	
INVESTMENT LOCATIONS MAPING: KIKINDA CITY CASE STUDY	202
Furundžić, Danilo S.; Furundžić, Božidar S.; Borko Lj, Drašković	
“VISIBLE” AND “INVISIBLE” TECHNOLOGIES FOR THE INCLUSION OF VULNERABLE USERS AND THE ENHANCEMENT OF MINOR ARCHITECTURAL HERITAGE	211
Finucci, Fabrizio; Baratta, Adolfo F. L.; Calcagnini, Laura; Magarò, Antonio	
DETAIL ASSEMBLAGES.....	219
Gourdoukis, Dimitris	
CONVERTIBLE UMBRELLA PT2016.....	227
Halada Miklós	

BUILT HERITAGE PROTECTION STRATEGY OF GUANGZHOU HISTORIC DISTRICT BASED ON PUBLIC SPACE UPDATE	235
He Honghao	
THE FRENCH LEGACY IN ALGERIA : THE ARCHITECTURE OF A SHARED IDENTITY, THE CASE OF THE KASBAH: ALGIERS, AND THE COLONIAL CHECK BOARD: BISKRA	244
Hiba, Barbara; Molnár Tamás	
COMPLEX REHABILITATION OF BUILDINGS BUILT WITH INDUSTRIALIZED TECHNOLOGY	253
Horkai András; Kiss Gyula	
PRESERVING ARCHAEOLOGICAL ELEMENTS IN URBAN HERITAGE DYNAMIC STREET - THE MAKING OF PUBLIC STREET OPEN MUSEUM - CASE STUDY: THE STRAIGHT STREET OF THE ANCIENT CITY OF DAMASCUS	261
Ibrahim, Sonia	
FLUIDITY OF CONTEMPORARY CONTEXT AND THE POST-INDUSTRIAL PHASE OF THE FIRST INDUSTRIAL ZONE IN BELGRADE	271
Jerković-Babović, Bojana; Fotirić, Nebojša	
SEARCHING FOR THE CODE OF NEW BELGRADE'S OPEN SPACE: CASE STUDY OF BLOCK 37	279
Jovanović, Predrag; Vuković, Tamara; Mitrović, Biserka	
HUNGARIAN ENERGY+ CUBE	287
Kondor Tamás; Kósa Balázs; Baranyai Bálint; Kistelegdi István; Juhász Hajnalka; Szigony János; Zrena Zoltán	
ACTIVITY BASED-MODELLING AS BASIS FOR SUSTAINABLE TRANSPORT POLICIES	293
Jurak, Julijan; Šimunović, Ljupko; Radulović, Božo; Sikirić, Matija	
THE ARCHITECT'S DESIGN IN THE RURAL STIMULATES THE VITALITY OF RURAL— XIAMUTANG CHILDREN'S LIBRARY.....	299
Kang Xue; Medvegy Gabriella	
THE TRANSFORMATION OF URBAN FORM BETWEEN MODERNITY AND TRADITION, WITH REFERENCE TO ERBIL CITY	307
Khoshnaw, Rebaz	
NEW FORMS OF TOWNSCAPE REGULATION IN HUNGARY	315
Füleky Zsolt; Kolossa József	

THE ISSUE OF PRESERVATION OF TRADITIONAL RAMMED EARTH HOUSES: CURRENT PRACTICE OF PRESENTATION IN SERBIA AND REGION.....	322
Kontić Ana; Lukić, Nevena	
APPLICATION OF MULTI-CRITERIA ANALYSIS IN THE PROCESS OF ENERGY RENEWAL OF RESIDENTIAL BUILDINGS.....	331
Krstić-Furundžić, Aleksandra; Kosić, Tatjana	
SUSTAINABLE DEVELOPMENT OF THE TOWN CENTER OF VISEGRÁD.....	340
Kovács-Andor Krisztián; Tamás Anna Mária	
SPECIAL REQUIREMENTS OF EDUCATIONAL BUILDINGS	345
Kovács Péter; Kósa Balázs; Molnár Tamás	
ASPECTS OF THE RELATIONSHIP BETWEEN THE ARCHITECTURAL HERITAGE AND NATURE FOR BETTER PLACES IN FUTURE	353
Furundžić, Nikola Z.; Furundžić, Dijana P.; Krstić-Furundžić, Aleksandra	
URBAN REGENERATION OF OPEN PUBLIC SPACES AS A TOOL FOR THE STRENGTHENING OF CULTURAL TOURISM: THE EXAMPLE OF THE HISTORIC CORE OF SMEDEREVO	361
Lazarević, Milica; Djukić, Aleksandra; Antonić, Branislav	
THE STATUS QUO OF HERITAGE BUILDING PROTECTION IN CONTEMPORARY CHINA	371
Liu Sha Sha; Kovács-Andor Krisztián	
RESIDENTIAL DESIGN PATTERNS UNDER HUTONG CULTRE.....	379
Lu Chang	
THE CONTRIBUTION OF INTERMODAL TRANSPORT NODES TO THE VITALITY OF PUBLIC SPACE	386
Madzhirski, Vasil	
POST-DISASTER URBAN PLANNING STRATEGIES DEVELOPMENT OVERVIEW	395
Maiteh, Shaha Mazen; Zoltán Erzsébet Szeréna	
FLOATING BUILDINGS AS NEW CONCEPT OF RESIDENCE IN BELGRADE FOR FUTURE SOCIAL REQUIREMENTS	402
Jacovic Maksimovic, Tijana	
VALORISATION AND REVITALIZATION OF HERITAGE ALONGSIDE DANUBE RIVER: CASE STUDY OF SMEDEREVO CASTLE	410
Vanista Lazarevic, Eva; Komatina, Dragan; Maric, Jelena; Vucur, Aleksandar	

PARTICIPATORY PROCESSES AND DESIGN METHODOLOGIES FOR IMPROVING LIVEABILITY: A COMBINATION USED IN SOME HISTORICAL DISTRICTS IN ROME	420
Martincigh, Lucia; Di Guida, Marina	
ANALYSING THE HOSPITAL PATIENT ROOM THROUGH SOCIAL REPRESENTATIONS.....	429
Marx, Fernanda	
CEBU PROVINCIAL CAPITOL: BALANCING URBAN CONSERVATION AND DEVELOPMENT RIGHTS.....	437
Menjares, Neil Andrew Uy; Solis, Carmencita Mahinay	
INCLUSIVE AND DEMOCRATIC METHODS FOR THE APPRAISAL AND THE EVALUATION OF URBAN INFRASTRUCTURES.....	446
Miccoli, Saverio; Finucci, Fabrizio; Murro, Rocco	
THE INFLUENCE OF AN ELECTRONIC PAYMENT SYSTEM ON PASSENGER COMFORT IN VEHICLES OF URBAN PUBLIC PASSENGER TRANSPORT	455
Milenković, Ivana; Pitka, Pavle; Simeunović, Milan; Miličić, Milica; Savković, Tatjana	
SENTIMENT ANALYSIS OF TWITTER DATA OF HISTORICAL SITES	463
Raspopovic Milic, Miroslava; Banovic, Katarina; Vukmirovic, Milena	
UPGRADING URBAN MOBILITY: THE APPLICABILITY OF CYCLING APPS IN BANJALUKA	472
Milaković, Mladen; Stupar, Aleksandra	
DESIGN PRINCIPLES FOR BETTER OPEN SPACES AT UNIVERSITIES, DESIGN APPROACHES FOR UNIVERSITY OF PÉCS	479
Paári Péter; Gyergyák János; Sebestyén Péter	
THE IMPORTANCE OF STRATEGY IN THE DEVELOPMENT OF HUMANE CITY IN THE 21ST CENTURY – SYNERGIC ACTION FOR LOCAL IDENTITY IN THE GLOBAL CONTEXT: CASE OF NIKSIC (MONTENEGRO)	488
Perović, Svetlana K.	
CONCEPTUALIZING AN ACTIVE LEARNING TAXONOMY IN AN ARCHITECTURAL COURSE FOCUSED ON EVALUATION OF CLIMATE CHANGE EFFECTS	495
Pesic, Nikola	
MECHATRONICS IN ARCHITECTURE: DESIGN RESEARCH METHODOLOGY	507
Petrović, Milica; Stojanović, Djordje	

ANALYSIS OF THE WAITING TIME OF PASSENGERS ON PUBLIC TRANSPORT IN THE PERIOD MORNING PEAK HOURS.....	516
Radivojević, Dejan; Simeunović, Milan; Pitka, Pavle; Lazarević, Milan	
THE RELATIONSHIP BETWEEN SPACE QUALITY OF ADDICTION CENTRES AND PATIENT BEHAVIOUR.....	524
Sadoud, Nesma; Zoltán Erzsébet Szeréna	
HISTORICAL PRELUDES OF PARAMETRIC DESIGN TECHNIQUES	533
Sárközi Réka; Iványi Péter; Széll Attila Béla	
TEXTILE MEMBRANE STRUCTURES IN REFURBISHMENT OF BUILT HERITAGE	538
Savanović, Dijana; Krstić-Furundžić, Aleksandra; Josifovski, Andrej	
REBUILDING RURAL PUBLIC SPACE BY VERNACULAR AND ART METHOD IN CHONGQING CHINA.....	547
Shi Yongting	
IDENTIFYING PRIORITY INDICATORS FOR REUSE OF INDUSTRIAL BUILDINGS USING AHP METHOD - CASE STUDY OF ELECTRONIC INDUSTRY IN NIS, SERBIA	555
Stanojević, Ana; Jevremović, Ljiljana; Milošević, Mimica; Turnšek, Branko AJ; Milošević, Dušan	
ENERGETIC RETROFIT OF THE TRADITIONAL APARTMENT HOUSES	564
Sugár Viktória	
„UNITY IN THE MULTITUDE”	572
Šutović, Anastasija	
PARAMETRIC CURTAIN WALLS	578
Katalin Szommer; Sárközi Réka	
ALTERNATIVE COMMUNITY – PROMOTOR OR INHIBITOR OF SUSTAINABLE DEVELOPMENT	582
Temeljotov Salaj, Alenka; Leuraers, Cato; van Dooren, Amber; Bjørberg, Svein	
THE EFFECTS OF THE POPULATION DECLINE ON THE BUILT ENVIRONMENT AND DEVELOPMENT POSSIBILITIES FOR SMALL SETTLEMENTS – A CASE STUDY OF BARANYA COUNTY IN HUNGARY.....	591
Tőke Máté	
URBAN PARTICIPATION AS A TOOL ALL OVER THE WORLD	598
Tommasoli, Lavinia; Luciani, Francesca Romana	
EXPLORING THE SYMBOLISMS AND TECHNIQUES OF DAYLIGHT MANAGEMENT IN HISTORIC GREEK CONSTRUCTIONS	605
Tsikaloudaki, Katerina; Tsoka, Stella; Theodosiou, Theodore; Tsigirigi, Dimitra	

TECHNOLOGICAL SOLUTIONS FOR COVERING ARCHAEOLOGICAL SITES IN ORDER TO PRESENT MOSAICS IN SITU – CASE STUDIES	613
Ugrinović, Aleksandra; Krstić-Furundžić, Aleksandra	
THE RECONSTRUCTION OF TRADITIONAL PITCHED ROOF IN MOUNTAINOUS BUILDING	621
Wu Mengyang; Bachmann Bálint	
RETURN TO THE LOCALISM – TWO PROJECTS BASED ON LOCAL TRADITIONS	628
Zhang Qian; Hutter Ákos	
MEIXIAO VILLAGE YONGXING TOWN HAIKOU CITY PROTECTIVE RECONSTRUCTION DESIGN	635
Zhao Liangyu; Kertész András Tibor	
RELATIONSHIP BETWEEN URBAN REHABILITATION OF BUILT HERITAGE AND LOCAL INHABITANTS, CASE STUDY ON CHONGQING ROAD, TIANJIN	644
Zhao Tianyu; Gyergyák János	
LIVEABLE, MODULAR AND FLEXIBLE – NEW WAYS OF UPDATING AND UPGRADING POST WORLD WAR HOUSING ESTATES	652
Zoltán Erzsébet Szeréna; Gyergyák János	

TECHNOLOGICAL SOLUTIONS FOR COVERING ARCHAEOLOGICAL SITES IN ORDER TO PRESENT MOSAICS IN SITU – CASE STUDIES

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ABSTRACT

Great importance is given to the development and reconsideration of existing and creation of new approaches to the protection, preservation and management of heritage. This is a challenge for many professions involved in these activities, and therefore for the architectural profession. There are various approaches when it comes to protecting the heritage. In the case of archaeological sites, protective shelters are often a solution. Technological solutions for covering ancient sites in order to present mosaics in situ are discussed in the paper. The distinction between the two concepts of coverage is taken into consideration. The first concept is based on covering the site using protective structure without closing the space, while the second concept implies covering the site by forming a closed space. The subject of this paper is a comparative analysis of two case studies that represent the two concepts of covering the archaeological area in order to protect and present mosaics in situ. This analysis will examine the applied concepts, technical solutions, used materials and structures to cover the site. The aim of the study is to identify the advantages and disadvantages of the solutions, as well as to determine whether their performance has resulted in the devastation of the site or contributed to its higher quality presentation.

Keywords: presentation of the heritage, archaeological sites, protective structures, technological solutions, heritage sustainability

INTRODUCTION

The beginning of the site presentation in ruins was marked by the great archaeological discoveries during the 18th century and the transfer of original artifacts by the great world powers to their countries. As a result, there has been heritage abuse, smuggling, waste of collections and devastation during the displacement from one place to another. The development of theoretical thought, the emergence of international organizations and the definition of legal protection measures through charters, conventions and recommendations for the heritage preservation have enabled us to perceive the undertakings of artifact transfer as unacceptable nowadays.

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The considerable influence on the presentation of archaeological sites was carried out by the Restoration Theory of Cesare Brandi, based on the presentation of the finding *in situ*. It has left a great mark on the Venice Charter, which also prohibits the dislocation of artifacts from the place where they were found and introduces the notion of a cultural landscape where a monument is inextricably linked to the environment (Vučenović, 2004:153), be it urban or rural in which it is located. Accordingly, the concept of archaeological sites covering with the goal of their presentation of *in situ* was derived from the Restoration Theory of Cesare Brandi.

The topic of this paper includes the analysis of technological solutions for covering the ancient sites of Mediana located near Niš in Serbia and Armira in Bulgaria, in order to present mosaics *in situ*. The paper will discuss advantages and disadvantages of the two concepts of site covering. The first concept relates to the uncovering of the site without closing the space, while the other concept is based on the construction of an object above the remnants of the buildings from previous epochs resulting in the formation of a closed space. In the second case the object has a protective function with the museum setting *in situ*. This analysis will examine the applied concepts of protecting the coverage of archaeological sites from the aspect of design and construction. The aim of the study is to identify the problems with which the protection service encounters during the protection and presentation of the site *in situ*, understand the advantages and disadvantages of analyzed solutions, as well as whether their performance has resulted in devastation of the site or contributed to its presentation. Also, the intention of this paper is to encourage the opening of archaeological sites in Serbia for visitors and make affirmation of heritage by inclusion in modern life which would also enable its sustainability.

ARCHAEOLOGICAL SITE MEDIANA

Mediana is an ancient suburb, a suburbium, formed within the area of the city of Naissus, today's Niš. It is located near the village of Brzi Brod, positioned in the east of Naissus, on the left bank of Nišava, covering the area of 80ha. It is 4.5km, or three Roman miles, away from the hometown of the Emperor Constantine. Mediana takes a good strategic position because it is next to the Roman way *via publica* which merged Naissus and Serdica (Milošević-Jevtić, 2013:118). Archaeologist Nikola Vulić was of the opinion that it represented the residence of Constantine the Great (Crnoglavac, 2016:5) which has later been confirmed by archaeological research and the discovery of rich decoration, architectural plastics, about 1000m² of floor mosaics, reception spaces, as well as its spacious organization adapted to the procession. The residential complex on Mediana consists of a peristyle villa, *thermae* in the northwestern part of the complex and a monumental triumphal gate with a fence wall.

In 1979 Mediana was categorized as an immobile cultural property of exceptional significance. Findings informed us about large technological achievements in antiquity (floor heating – hypocausts, water supply – water pipe network) and the development of culture and art that had the function of showing honor to the emperor. Regardless of the fact that the antique layer is preserved at the level of foundation, the significance of the imperial residence on Mediana is enormous due to its rich decoration – a large surface covered in a mosaic with a geometric and figural motifs (covering about 1000m²) required to be presented to the general public. When talking about the presentation of Constantine's residence throughout history, several attempts to achieve it can be observed.

The first step was made in 1935, when stibadium A and floor mosaic were discovered. At the request of the citizens, the National Museum of Niš (2017) decided to erect a museum above this part of Constantine's residence. The designer of the museum was Vladimir Hodanović,

an engineer of the Ban administration (Crnoglavac, 2016:8). He suggested that the museum should be given the form of an antique temple an antis. The museum was opened for visitors on Vidovdan in 1936. It became a cultural monument because of its architectural values and it had the function of presenting ancient excavations. The museum was open for visitors until 2013, when archaeological research was conducted both outside and inside the building. By lowering the terrain to the antique layer, access to the museum has been disabled and the site was closed for visitors for a longer period of time.

In order to create conditions for the presentation of mosaics, the Institute for the Protection of Cultural Monuments of Niš has decided to build a protective balloon construction in 2015 over the whole spacial coverage of the excavation of the Constantine villa (Figures 1, 2, 3). The designer of the balloon construction was Mile Veljković, an architect and conservator of the Institute for the Protection of Cultural Monuments of Niš. The autor considered that by performing this construction, the site would be protected from atmospheric influences, thus continuously enabling the work on the conservation of mosaics, with the goal of not being covered after the conservation but rather presented to the visitors.



Figure 1 (left): External appearance of the structure;

Figure 2 (middle): Mosaic Medusa;

Figure 3 (right): Mosaics open for visitors (August – October 2016), Photos: A. Ugrinović

The construction was made of glued laminated wood. It covered an area of 127 x 72.5m. By laying the isolated footing of dimensions 2 x 3.5 x 1.5m and 2.8 x 3.5 x 1.5m, the remains of the northwestern part of the discovered object were destroyed (Figure 4). Archaeological excavations were not entirely protected by this construction. Even though a PVC membrane was placed on the upper side of the construction, this was not intended for the sides so as to enable ventilation, which led to the unprotectedness of this part against atmospheric conditions. Entry of animals is allowed, especially birds, whose excrement causes chemical reactions and damages the remains of antique buildings, frescoes and mosaics. Condensation is yet another problem characteristic of all balloon constructions and appears on the lower surface of the membrane due to the temperature difference between the outer and inner space. Considering the problems they cause and based on economic analysis of the financial resources used for the realization of the protective structure on Mediana and other locations in Serbia where they are applied (Kostić et al., 2017:9), it can be asserted even from an economic viewpoint that they are not sustainable. Although the aim of the balloon construction on Mediana was detecting and presenting mosaics, this was not accomplished. The construction of the protective structure has not yet been completed, that is, the northern and southern parts are not covered with a PVC membrane. Bearing this in mind the object is uncomfortable to stay in, especially during the strong wind which the construction directs, thus accelerating it. It was envisaged in the conceptual design for the sides to be covered with a transparent membrane, PVC membrane, because of natural lighting; the sides would contain holes, thus allowing controlled ventilation (Figure 5). Even though the conceptual design was intended to cover the area of *thermae* in the northwestern part of the villa, it has not been done because archaeological research was required first.

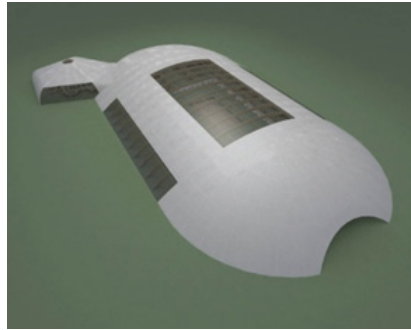
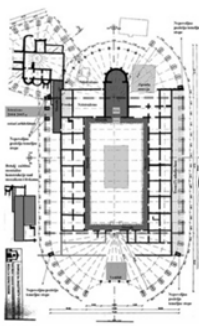


Figure 4 (left): The foundation of the site Photo: Gordana Milošević – Jevtić;

Figure 5 (middle): Conceptual design of protective balloon construction;

Figure 6 (right up): First-prize solution: external view;

Figure 7 (right down): Scheme of movement through the museum.

Based on abovementioned statements, the question arises concerning the purpose of the construction of the balloon structure. The formation of the protective structure devastated ancient sites and natural landscape, a change in the environment was detected as well as the appearance of condensation. This construction demolished the roof of the existing museum from 1936. From the aesthetic point of view, I believe that the application of these typical solutions is not adequate because the design of the object should be in line with the topic that is being presented. It is also necessary to be more careful when choosing a construction and materialization so as not to devastate the site and change the microclimate conditions. New problems have arisen on Mediana by setting the protective balloon structure, whereby the presentation of mosaics has still not been achieved.

Taking into considerations the newly emerging problems, the National Museum of Niš announced in 2017 a public, two-stage, anonymous contest for the reconstruction of the museum. The aim of the contest was to provide an adequate presentation of ancient findings in situ and movable archaeological objects. The participants in the contest were required to provide adequate conditions that would enable protection, presentation and visit to the site in order to promote Constantine's residence on Mediana. The significance of this contest was even greater, as a big step forward has been made in relation to the current practice of presenting archaeological sites in Serbia. Namely, the presentation of sites in our country is done by conservators at the Republic and Regional Offices. However, this contest enabled the professional public, designers and architects to provide a solution for the preservation and renovation of the building and propose a museum setting. Throughout the world, contest and public bidding for finding the best solution when designing in protected environments are not new; they are already an integral part of the practice.

The authors of the first-prize solution, professors from the Faculty of Architecture at the University of Belgrade, responded to the contest demands in a plain and simple way (National Museum of Niš, 2017). The concept of their solution was based on the existence of two levels. The level of memory, which was the reference level that is being presented, consisted of the archaeological findings of ancient architecture. The level of present was an intervention, a newly proposed solution (Figures 6, 7) which should serve to present the first level, that is, antique findings. The proposed solution was composed of a simple, orthogonal gallery following the geometry of the museum, the access stairway with the porch and the exhibition space in front of the entrance of the building. These two levels were connected but they were different in

design. The application of tempered glass to the floor covering, which enabled the examination of the findings in its entirety and the interaction of visitors with the heritage, proved that the level of present served to present ancient texts. Here the glass as a form of materialization in fact dematerialized the level of present, whereby visitors created an illusion of walking through the ancient excavations. The gallery allowed viewing of the findings, but one part included a space for exhibiting movable objects discovered at the site. The porch and the gallery were at a height of 1m from the ancient elevation of the terrain. The accessory staircase and the porch were made from the same material. Access to people with special needs was facilitated by a mobile platform located next to the porch. It did not rely on ancient findings but steel box sections were anchored for the peripheral reinforced concrete wall of the building. Tempered glass suggested for floor covering was sandblasted to anti-slip micro-textures which prevented slipping of its users (National Museum of Niš, 2017). The designers also envisaged a lighting system in accordance with the standards included in the typology of the museum's facilities. There were two attempts of presenting ancient findings on Mediana. The first included the construction of a museum, the type of temple an *antis* in 1936, with an enclosed space above the *stibadium* A. The second attempt included the construction of the protective balloon structure that has completely devastated the findings and created new problems without enabling the presentation of mosaics and opening of the site for visitors. On the other hand, I believe that the announcement of the contest for the renovation of the building in 1936 and the presentation of *stibadium* A has made an important step forward, with the first-prize solution being a new approach to the presentation of inherited heritage of the past by using modern materials and technologies.

ARCHAEOLOGICAL SITE ARMIRA

Armira is a Roman residence with the richest decoration of marble and mosaics in Bulgaria. It is located 4km southwest of Ivailovgrad in the southeastern part of Bulgaria, on the hill of the village of Armir with a beautiful panorama on a natural landscape. It was named after a nearby river in the southeast. The area of Armira was in the prehistoric times under the sea. Volcanic eruption influenced the formation of the land and magmatic rocks; therefore, there is abundance of marble in this area. The site was discovered in 1964 during the construction of the dam. The work was suspended, with the abandonment of the tank for storage of excess water. Archaeological research continued in 1981. Based on the findings, it was determined that the villa was built between the 50's and 70's of a new era (Kabachieva, 2012:4-8). Several stages of construction were detected.

Local materials were used for construction and decoration. Some rooms were painted with frescos. The floors were decorated with mosaic and marble tiles. The mosaics were dominated by geometric and floral motifs. One mosaic illustrated the figural performances of the owner of the residence and his sons. The richness of architectural plastic can be seen in a peristyle. Peristyle of dimensions 7 x 11m formed pillars of Roman – Corinthian order. There was an arch beam and a frieze above them, which showed several heads of Medusa. The same motif of Medusa can be found on Mediana on the mosaic in front of the auditorium entrance, as well as on the bronze fence discovered in 2000 (Vasić, 2003-2004:79-108). As opposed to Armira, where the fence and *thermae* were made in marble, they were made in bronze on Mediana.



Figure 8 (left up): The rich decoration—display of the pilaster capitals (Kabachieva, 2012);

Figure 9 (left down): Peristyle presentation, (<https://www.youtube.com/watch?v=Tdxz18lCtKY>);

Figure 10 (right): Portal reconstruction (<https://www.youtube.com/watch?v=Tdxz18lCtKY>);



Figure 11 (left): The first site coverage (Kabachieva, 2012);

Figure 12 (right): A renovated facility with a museological presentation (Kabachieva, 2012)

According to the decoration, plastic and discovered mosaic, Armira was believed to have belonged to the wealthy aristocratic family of Thrace (Figures 8, 9, 10). The residence was used until the second half of the 4th century, after which it was burnt.

On the basis of the architectural analysis of the residence in Armira, a rich decoration has been noticed which deserved to be presented. It also represented the best preserved ancient residence on the Bulgarian soil (Kabachieva, 2012:8). In order to achieve a museological presentation of the heritage of ancient architecture, the object of a simple, rectangular shape that formed a closed space was erected (Figure 11), which was later restored (Figure 12). It did not represent the reconstruction of the ancient house, both in its appearance and materialization, but it was a typical example of the architecture of the time in which it was created. The object can be considered a membrane whose finishing layer of the covering was made of ribbed sheet tin, while the periphery contained low-emission glass panels. Steel was used for the building structure, with all the interior elements made in white, so as to highlight antique objects. The object with a museological setting did not include the complex of *thermae*. The most representative part of the residence was the peristyle presentation with impluvium in the center (Figure 10). A roof lantern above the impluvium was made as an analogy to the open center of the peristyle. A partial reconstruction of one of its segments was done. Based on the foundation of columns, shafts and capitals, parts of architectural plastic in general, the height of the column was reconstructed. These data made it possible to present architrave with ornaments and porch ceiling. Segments of the marble fence with busts near impluvium were exhibited. The reconstruction of the wall separating porch from the other room was executed in one segment. Marble tiles and pilasters were used for wall decoration. It was noticeable that even in antiquity, builders took care of the details. The transition from one level to the other was marked by battens or hooks in the form of parapet plates (Kabachieva, 2012:16-21). The mosaic in the porch was presented by placing glass panels on a steel substructure creating an illusion of walking on mosaics. In other rooms, mosaics were viewed from a walkway placed along the building perimeter. Interestingly, the pieces of antique furniture were displayed, which clarified the purpose of the room, thus forming a coulisse and theatrical scenery. In some

rooms, the doors were reconstructed and the doorposts and door beams were placed which gave a 3-dimensional effect (Figure 11). The floor heating system was also presented with an antique floor with hypocaustal installations reconstructed in one segment.

I reckon that the presentation of archaeological findings of the ancient residence of a prominent figure in Armira has been successfully carried out. Adequate air conditioning is not envisaged here; therefore it is certainly necessary to insist upon it in the following period.

CONCLUSIONS

On the basis of a case study of selected archaeological sites, ancient residential complexes on Mediana and in Armira, the complexity of their presentation is highly visible as well as various factors that affect it. On Mediana, the attempt to present Constantine's residence in 2015 was done by placing a protective balloon structure from glued laminated wood and PVC membrane covering it. In the last fifteen years, it can be stated that the protection services in Serbia insist on the application of protective balloon structures. The problems caused by setting them up are changes in the environment conditions, the appearance of condensation due to the use of inadequate materials, devastation of the findings by the foundation of protective structures and the absence of authors' expression. Taking into consideration all of the abovementioned problems, the protective structure applied above Constantine's residence on Mediana did not enable the formation of a museum setting, but caused the emergence of new problems that require additional financial means for rehabilitation. Due to this situation, mosaics have been buried in order to prevent further devastation, with the presentation not being accomplished. It is interesting to point out that the museum on Mediana, which represents the reconstruction of the ancient temple, is the only object with a museum setting in situ in Serbia since 1936 when it was built until the beginning of the site covering with balloon constructions (Kurtović-Folić, Milošević-Jevtić, Roter- Blagojević, Nikezić, 2008: 210). The construction of a museum in the form of a temple an *antis* is a concept based on the formation of a closed space above a part of the villa, more precisely above the excavation of *stibadium* A. The same concept was applied above Armira in Bulgaria, which enabled the presentation of mosaics and the opening of the site for visitors. It can be concluded that the presentation of Armira has been successfully implemented although there is room for improvement and solving the question of air-conditioning.

The results of the protection and presentation of ancient heritage in Serbia certainly reflect the economic situation, the size of the budget intended for the preservation of heritage, the social awareness of its significance, but they also reflect the exclusion of architects, designers and urban planners from the process of its protection and presentation. In order to obtain a viable solution, communication between an architect, archaeologist and conservator is essential. I consider it inept to establish a convention of marking ancient, archaeological sites with balloon constructions; we should strive and insist upon solutions to be in accordance with the topic that is presented and the context in which the site is located. Hence, this work requires careful consideration of every move, analysis of its advantages and disadvantages, anticipation of certain negative outcomes and their prevention. In order to remedy the existing problems on Mediana and create favorable environmental conditions for the presentation of mosaics, I believe that it is necessary to explore new materials and their performance and to offer the most rational solution in accordance with the results obtained. Consideration should be given to the use of renewable energy sources, since by investing in them, electricity and energy for heating and cooling would be provided. Thus, the local maintenance costs at the monthly level would be lower, allowing the sustainability and use of the site for a longer period of time.

6TH INTERNATIONAL CONFERENCE

The analyzed examples allowed us to look at various constructive solutions, the ways of materialization, the presentation of heritage, as well as the problems that occurred during and after their execution. Experience of the implemented solutions should be taken into account when presenting mosaics in situ so as to influence the change of the existing situation in Serbia, that is, to present heritage to the visitors, thus enabling its sustainability.

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