

2021

O1 INTELLECTUAL OUTPUT
Output type: Studies / analysis –
Best practice guidelines / report

REVIEW



BEST PRACTICES

In Educating Sustainability
and Heritage

EDITORIAL BOARD

VLADAN DJOKIĆ
MARIA PHILOKYPROU
ANA NIKEZIĆ
EMANUELA SORBO
KONSTANTINOS SAKANTAMIS
MAR LOREN-MÉNDEZ

PARTNERS:

The University of Belgrade - Faculty of Architecture // Serbia
Università IUAV di Venezia // Italy
The University of Cyprus // Cyprus
The Aristotle University of Thessaloniki // Greece
The University of Seville // Spain

**Enhancing of Heritage Awareness and
Sustainability of Built Environment in
Architectural and Urban Design Higher Education**



CONTRIBUTORS:
HERSUS CONSORTIUM MEMBERS

UB-FA
Vladan Djokić
Ana Radivojević
Ana Nikezić
Jelena Živković
Nataša Ćuković Ignjatović
Milica Milojević
Jelena Ristić Trajković
Aleksandra Milovanović
Aleksandra Đorđević
Mladen Pešić
Bojana Zeković
Tamara Popović
Nevena Lukić

IUAV
Emanuela Sorbo
Enrico Anguillari
Sofia Tonello

UCY
Maria Philokyprou
Aimilios Michael
Panayiota Pyla
Odysseas Kontovourkis
Maria Nodarakis
Theodora Hadjipetrou
Stavroula Thravalou
Andreas Savvides

AUTH
Konstantinos Sakantamis
Alkmini Paka
Kleoniki Axarli
Maria Doussi
Angeliki Chatzidimitriou
Sofoklis Kotsopoulos

USE
Mar Loren-Méndez
Marta García-Casasola
Daniel Pinzón-Ayala
Julia Rey Pérez
José Peral López
María F. Carrascal-Pérez
Enrique Larive
Roberto F. Alonso-Jiménez
María Alvarez de los Corrales

EXTERNAL COLLABORATORS:

Remorker architects
Dejan Miljković, Jovan Mitrović, mr Branko Pavić
Mihailo Timotijevic, Miroslava Petrovic-Balubdzic
Chryso Herakleus, University of Cyprus
Fabrizio Antonelli, The Iuav University of Venice
Municipality of Thessaloniki
Municipality of Pavlos Melas
State Museum of Modern Greek Culture
Miguel Hernández and Esther López, PhD architects. AF6 Arquitectura
Luis Machuca, PhD architect. Luis Machuca y Asociados
Miguel Angel Ramos Puertollano, Quality Surveyor. Antonio Jiménez Torrecillas architectural firm
Francisco Reina Fernández-Trujillo, architect
Victoria Segura Raya, Architect, Responsible of geo urban data IDE Sevilla, Department of Sustainability and Urban Innovation, Sevilla Town Council

IMPRESUM

EDITORIAL BOARD:

Vladan Djokić, Maria Philokyprou,
Ana Nikezić, Emanuela Sorbo,
Konstantinos Sakantamis, Mar Loren-
Méndez / *HERSUS Scientific Coordinators*

TITLE

Review: Best Practices In Educating
Sustainability and Heritage

PUBLISHER

University of Belgrade,
Faculty of Architecture

DESIGN LAYOUT

Aleksandra Đorđević, Aleksandra
Milovanović, Mladen Pešić

ISBN-978-86-7924-244-0

2021



Co-funded by the
Erasmus+ Programme
of the European Union

REVIEW: Best Practices In Educating Sustainability and Heritage

IO1 lead: Maria Philokyprou, UCY

HERSUS Project leader: Vladan Djokić, UBFA

This result has been produced as a part of O1 INTELLECTUAL OUTPUT within HERSUS project within Erasmus + Strategic Partnerships for higher education. The creation of these resources has been co-funded under grant no. 2020-1-RS01-KA203-065407 (funding period 2020-2023; total grant 246.922,00 €). This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



Content

Introduction	7
Editors perspective	8
Built Architectural and Urban projects	13
SERBIA-UBFA	14
	PROJECTS
	Nebojša Tower, Kalemegdan Fortress 14
	Senjski Rudnik 24
	Office building BULEVAR 79 32
	DR Plan for The Old Core of Zemun 40
ITALY-IUAV	50
	PROJECTS
	Punta della Dogana 50
	H-FARM and H-CAMPUS 58
	Ex-Panificio Santa Marta Area 64
	Venzone (UD) 72
CYPRUS-UCY	80
	PROJECTS
	Urban landscape rehabilitation in Lefkara 80
	HYBUILD Multifunctional center 86
	Alexandrou Demetriou Tower 92
	Vernacular dwelling in Kapedes 100
GREECE-AUTH	106
	PROJECTS
	Area of Hrimatistiriou Square 106
	Kleious 24 114
	Building block defined by Adrianou, 122
	Vrissakiou, Kladou and Areos streets
	Historic barracks in the Pavlos Melas metropolitan park 130
SPAIN-USE	138
	PROJECTS
	Casa Diáñez 138
	Cerro de San Miguel 146
	El Caminito del Rey 154
	Antigua fábrica de Cerámica 162

Pedagogical and Educational Models

SERBIA-UBFA

173

174

COURSES	
IASA 48061-01/ 48062-01/ 48063-01	174
MASA12050-04	180
Workshop	186
SAS EEZA 1.10.	192

ITALY-IUAV

198

COURSES	
B77001	198
B76005	204
B76010	210
SSIBAP	216

CYPRUS-UCY

222

COURSES	
ARH 511	222
ARH 517	228
ARH 550	234
CON 500 A-C	240

GREECE-AUTH

248

COURSES	
02EE02	248
07EB10	256
LCIC	264
01EE01 / 02EE01	270

SPAIN-USE

276

COURSES	
2330051	276
2330038	282
2330050	288
2330042	296

Influence of National Policies on the Sustainability of Heritage

303

SERBIA-UBFA

304

ITALY- IUAV

312

CYPRUS-UCY

320

GREECE-AUTH

324

SPAIN-USE

330

Conclusions

339



Built Architectural & Urban Projects



Serbia (Belgrade)



Italy (Venice)



Cyprus (Nicosia)



Greece (Thessaloniki)



Spain (Seville)



SERBIA

×

Vladan Djokić
Aleksandra Milovanović
Aleksandra Đorđević

project

01

Nebojša Tower, Kalemegdan Fortress

Conservation and Reuse of the Nebojša Tower in the City of Belgrade and Founding of a Museum and Cultural Center

IDENTIFICATION

Information about the location

✗ Historic centre

Address

✗ Bulevar Vojvode Bojovića
11 000 Belgrade, Serbia

Country/Region

✗ Serbia / Belgrade Metropolitan Region

Coordinates

(GIS: ETRS89/Google Maps: WGS84)

✗ Long= 20.44784020 °
Lat= 44.82733520 °

City size

✗ The Capital

Website

✗ <https://kulanebojsa.rs>

Accessibility

✗ Public building

Public visits

✗ Yes

Category

✗ Architectural project
Reuse (adaptive)
Restoration / Reconstruction

Deliberative and participatory planning

✗ No

Current use

✗ Museum and Cultural Center

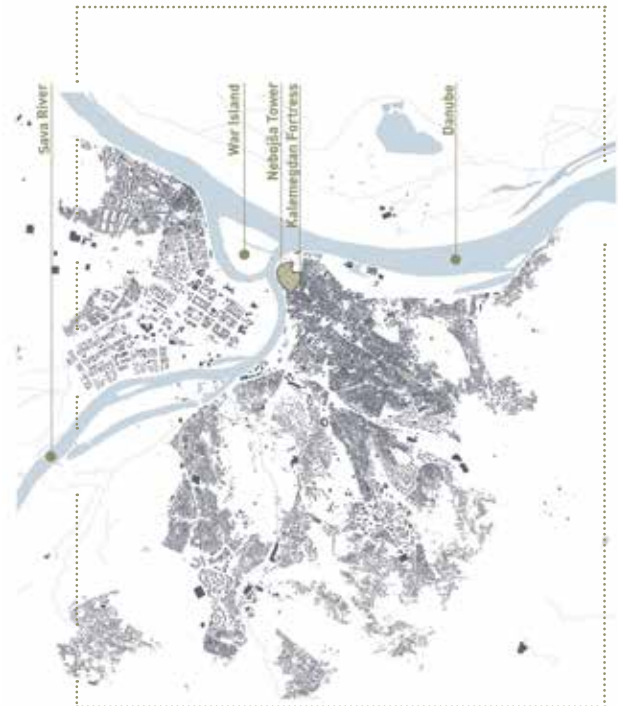


Figure 1. Location map
Authors of the case study report



Figure 2. Nebojša Tower
Aleksandra Milovanović

Year (period) of the project renovation/
restoration

✗ 2011

Area of the building (m²)

✗ 800m²

Current owner

✗ public: City of Belgrade

Architects

✗ Dejan Miljković. Jovan Mitrović
mr Branko Pavić

Other designers / engineers

✗ Representatives from the Faculty of
Architecture - University of Belgrade
and Institute for the Protection of
Cultural Monuments of Serbia

Other agents

✗ The city of Belgrade, Secretariat for
Culture, Republic of Serbia - Ministry
of Culture, Institute for the Protection
of Cultural Heritage of Belgrade,
Archaeological Institute, Project for
Belgrade Fortress, History Museum
of Serbia, Construction Company
"KOTO", Nature Protection of Serbia,
Institute for Nature Protection,
Institute of Water Management
"Jaroslav Černi", PE "Zelenilo -
Belgrade", Public Water Management
Company "Srbijavode", Secretariat
for Traffic, Traffic Institute CIP, PE
Electric power industry of Serbia,
"PMC Inženjering d.o.o., LOPICIC &
LOPICIC architectural office

Developer

✗ The project was realized with the co-
funding of important bodies of the
Greek Republic and the Republic of
Serbia and it was carried out under
the responsibility of the European
Centre for Byzantine and Post
Byzantine Monuments, and the city
of Belgrade.

Building contractor

✗ Supervision: Public Body "Belgrade
Fortress, consultants: Alpha MENTOR
Ltd.

Cost of the project/execution time

✗ 2.694.193,93€ (2007-2011, second
phase not completed)

Previous studies (Ex. Archaeological,
historical, structural, materials, etc.)

✗ Archaeological excavations,
restoration, and conservation
projects

KEY FEATURES



Remarkable attributes/
Singularities/Specific Values

- strategically important position and
relation to the historical monument of the
Belgrade Fortress
- a significant monument and witness of
history, both in cultural (multicultural) and
archeological manner
- authentic built structure and typology

Scope of application/necessity of
the project:

- Conservation-restoration works and
construction of new parts in order to
provide conditions for accommodation of
visitors
- Landscape design of the environment
- Development of infrastructure for a
permanent exhibition in the Tower

HISTORY OF THE BUILDING/SITE



Original use

✕ Military

HISTORIC USES

The Nebojša Tower (Tower) is a part of a wider monumental complex - the Belgrade Fortress - built on the strategically important position on the confluence of European rivers Sava and Danube in Belgrade city which represents a unique museum of Belgrade's past. The Tower is one of the few better preserved medieval buildings within Belgrade Fortress. It was built in 1456 within the framework of extensive fortifications construction, which was undertaken to rebuild the destroyed and damaged city fortifications. It belongs to the oldest type of early artillery cannon towers which represents a significant architectural and construction achievement of that period on the territory of the city of Belgrade. It was built for the purpose of the city defense and, in a broader sense, was part of the defense system - the wall of Christianity - which successfully stopped Osman empire incursions towards the center of Europe for decades. Centuries later, when it lost its former military significance, it was turned into a dungeon.

CONSTRUCTION PERIOD

Initially built in 1456 (destroyed and rebuilt several times throughout history 1521, 1690, 1717-1739, 1960-1961)

SUMMARY OF MAJOR FUNCTIONAL AND STRUCTURAL CHANGES / YEAR OF INTERVENTION

Activities on the restoration of the Tower began in June 2009 including: (1) Conservation and restoration activities and construction of new infrastructure in order to provide conditions for accommodation of visitors, (2) landscaping for visitors'

access, (3) development of infrastructure for a permanent exhibition in Tower, and (4) preparation of full information material for the Tower promotion as a new center of cultural tourism in the wider Balkans.

ARCHITECTS / AGENTS

Anonym

PHYSICAL CONDITION BEFORE RESTORATION / RENOVATION

Although the Tower was destroyed and reconstructed throughout history, it was in well-preserved physical condition before restoration, with smaller cracks at the exterior level and severe mechanical damages and material obsolescence at the interior level. The adjoining Riverside rampart and Fortress Water Gate were physically endangered and exposed to flooding and sloughing.



Figure 3. Nebojša Tower before the interventions <https://commons.wikimedia.org/w/index.php?curid=730518>

STATUS OF PROTECTION

The Belgrade Fortress has been listed for the first time in 1946 (Decision no. 1108), under the jurisdiction of the Department for the Protection of Cultural Monuments of the National Republic of Serbia which was a part of the Art Museum. The next decision has been provided by the Institute for the Protection of Cultural Monuments of the City of Belgrade in 1965 (Decision no. 290/4), while the highest level of protection was declared in 1979 when the Belgrade Fortress became cultural monument of outstanding value at the national level (Official Gazette of Republic of Serbia, no. 17/79).

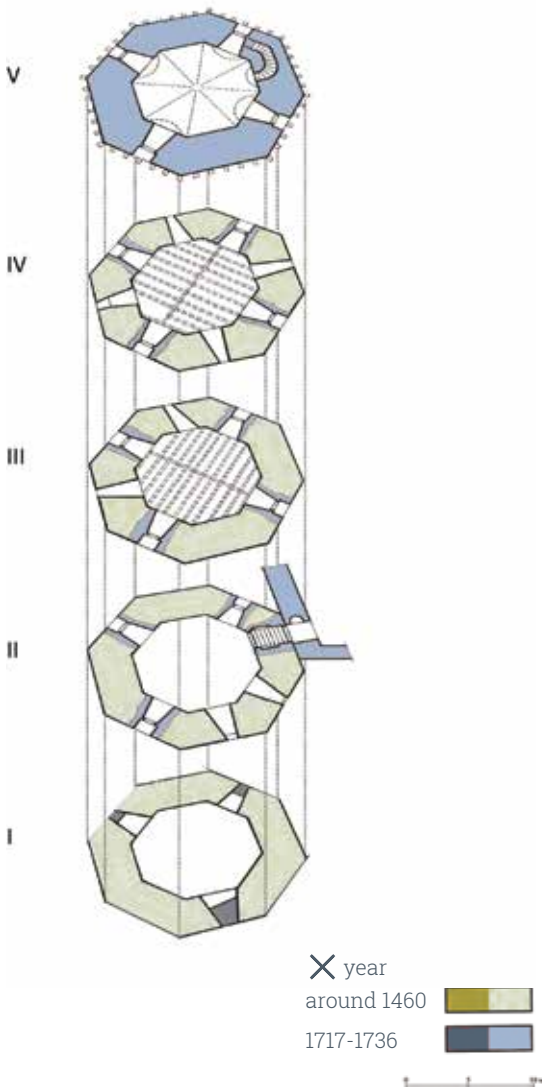


Figure 4. Surway drawings
Based on Popović, M. (2007).

GENERAL DESCRIPTION OF THE BUILDING BEFORE ITS RENOVATION/ RESTORATION

The previous conservational and archaeological research [1-2] allowed insight into Tower original appearance (25m high, a regular eight-angular bases with a diameter of about 8.5 m, wall thickness 2.90 - 3 m). The outer envelope was built of relatively regular carvings of locally available soft limestone. The Tower interior walls were built of broken, hewn stone with brick fragments, while their face was drawn. The Tower foundation is based on a massive compact square slab (14.50x14.50 m, about 2 m thick). The Tower was divided by wooden mezzanine structures including ground floor and four additional floors (or probably originally five). The floor height was 4–4.30 m. The Tower belongs to the oldest type of early artillery high towers.

PROJECT DESCRIPTION

DESIGN PROJECT IDEA FOR THE RENOVATION / RESTORATION

The project aimed to include the monumental heritage into contemporary living, which means not only the restoration of the monuments themselves but also the adaptive reuse through introduction of new contents that are appropriate to the significance of the Belgrade Fortress.

The initial design goals were [3]: (1) preservation of an abandoned Tower and partially destroyed Tower complex in the historical center of Belgrade, at the Belgrade Fortress, (2) prevention of even more serious damage of this important medieval building, and (3) setting up adequate space for a memorial to the Greek patriot Riga of Fere.

The restoration was carried out through three design perspectives: (1) to provide a logical connection of the Tower with

the immediate environment and give an access plateau in order to attract visitors, (2) to provide technical and technological conditions for the building to be resilient to external influencing factors, and (3) to reuse the Tower and to design extension in the form of a multifunctional hall, envisioned as a new functional benchmark on the city map. The restoration and adaptive reuse of the Tower complex meant primarily securing the physical structure stability protecting it from the external influencing factors, and reprogramming the space into a spatial framework for organizing different cultural programs and projects.

According to the initial plan for the project realization, in addition to the restoration and adaptive reuse of the Tower, the formation of the extension of the Tower within Riverside rampart was also planned, in two phases. At the first phase, the design envisioned additional content indispensable for the functioning of the Tower: entrance hall, information point, visitors wardrobe and sanitary block (cca. 150m²). The second phase saw the formation of the Riverside rampart's interior with temporary exhibition space and event hall (cca. 650m²). However, up to date, only the first phase of the Tower extension has been realized.

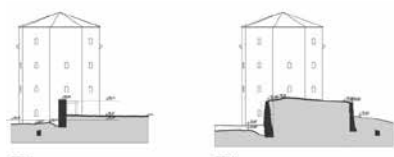
DESCRIPTION OF THE CHANGES AND ADDITIONS

Restoration (spatial rehabilitation) and adaptive reuse (functional reprogramming) of the Tower were carried out according to the previously stated design perspectives both on the urban and architectural level. The explanation of the suggested changes and additions will be presented only about the built phase of the project.

Urban level – Restoration and extension of Nebojša Tower towards reconnecting it in an overall urban silhouettes of the Belgrade Fortress.

Within the initial stage of the design process, the authors of the project recognized that it is necessary to provide an access plateau and an entrance hall with an information desk for entering into the museum exhibition space in order to provide effectiveness in the future functioning of the Tower. The restoration of the entrance hall was planned for the section of the Riverside rampart immediately next to the Tower. By testing different solutions based primarily on the technical and technological aspects, it was recognized that it is impossible to provide the rampart's stability and enable access to the Tower by partial reconstruction.

✗ Before



✗ After

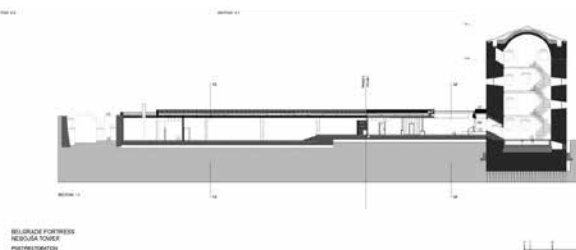
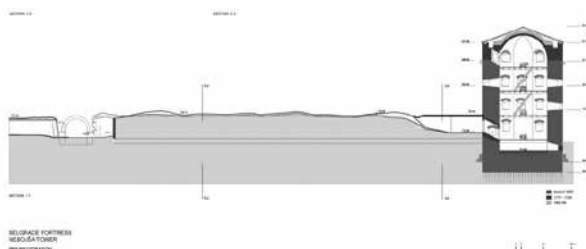
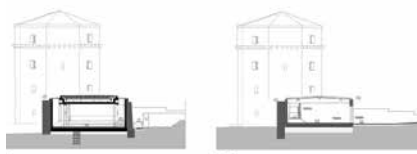


Figure 5. Sections before and after the interventions.
<https://dejanmilkovic.rs/sr/>

Accordingly, the removal of the entire soil fill between the walls of the rampart was realized. In this way, construction of a continual river channel made of impervious concrete has been realized, which has been contributed to neutralizing the external negative factors, stabilizing the walls of the Riverside rampart, and forming a new space for the purpose of the multifunctional hall. The construction of the multifunctional entrance hall enabled a direct link to the Tower. The general design approach was based on an intention to preserve the authentic appearance of the Tower and rampart in a comprehensive silhouette of Belgrade Fortress. In that sense, the intervention in the form of longitudinal lanterns based on mimicry was implemented on the roof of the multifunctional hall that enabled natural insolation and airing of the interior. Architectural level - Adaptive reuse of Tower as a new city exhibition space

The space of the Tower in those spatial contours and capacities that have been inherited throughout history has been functionally converted into an exhibition space. Exhibitions are organized on four levels with several themes: History of Tower, Riga of Fere Memorial, First Serbian Uprising, and Serbia and Greece as newly liberated European countries. In the architectural programming of the exhibition concept, the authors proposed the construction of four platforms connected by a staircase. Design of space and construction solution treated the space of the Tower as a monument of extraordinary cultural and historical importance and in accordance with the conditions of conservation.

BUILDING MATERIALS

The general idea was to use concrete and glass, as materials whose neutrality will least endanger the authentic elements of the Tower and Riverside rampart both in color and in texture. A concrete-steel structure was built inside the Riverside rampart and a concrete slab was poured below the floor level inside the Tower. The levels of the floors on the steel structure were re-installed in the Tower, and a new staircase was designed. Underfloor heating has been

installed on the ground floor of the building, enabling the use of the building throughout the year. A steel ship door was installed at the building entrance in a new concrete structure, which should provide its complete protection in case of large flood waters.

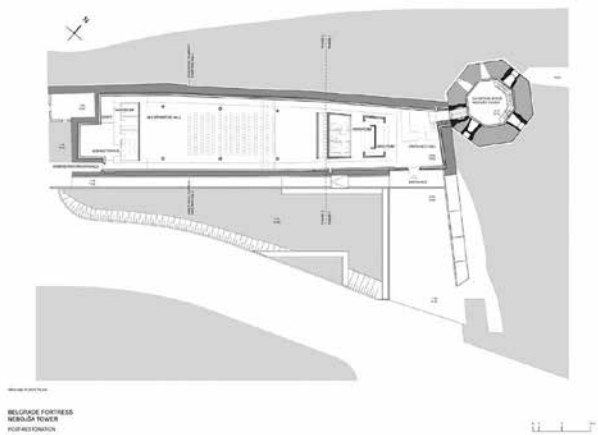


Figure 6. Plan Tower complex with entrance zone, multifunctional hall and exhibition space in Tower. <https://dejanmiljkovic.rs/sr/>



Figure 7. Interior of the Entrance Hall and Exhibition Tower. *Authors of the case study*



Figure 8. Interior of the Entrance Hall and Exhibition Tower.
Authors of the case study

PROJECT IN RELATION TO THE SUSTAINABILITY

Social aspect:

It is particularly important to single out the program aspect of the solution to reuse space in its original capacities and spatial frameworks and its conversion into a public function, which enriches the cultural offer at the city level without the construction of new facilities.

Economic aspect:

It is worth mentioning that the project was financed from various funds from different countries. However, the various socio-political contextual factors affected the realization of the second phase.

Environmental aspect:

The use of in-situ materials such as stone and brick and its coherent combination with contemporary materials such as concrete

and glass have enabled the optimization of environmental impacts of building materials, but also contributed to the positive aspects when it comes to the energy efficiency of building in terms of insulation, insolation, and ventilation of building. One of the project's leading challenges is its resilience in relation to possible flooding, which was achieved by building a specific system of funding and a specific solution of the entrance zone.

SPECIAL METHODS OR TECHNIQUES USED IN THE PROJECT WHICH REFLECT THE SUSTAINABLE DESIGN

Institutional aspect - the cooperation of professionals in different domains (architectural design, structural engineering, archaeology, restoration, protection of monuments and history) is positively evaluated as well as the cooperation of public and private sector, which contributed to the integral perception of problems and potentials in the design process and realization of the final design.

Technical-technological aspect - intensive conservation-restoration activities have enabled maximum preservation of the existing condition, as well as the implementation of authentic materials and their combination with modern materials that contribute to the energy efficiency of the building.

DIGITAL DATA EMPLOYED FOR THE DOCUMENTATION (3D SCANNING, PHOTOGRAMMETRY, ETC.)

✗ N/A

TOOLS/TECHNOLOGIES USED FOR THE IMPLEMENTATION OF THE NEW USE

✗ N/A



Figure 9. Guest lectures in organization of UB-FA
Authors of the case study

DISSEMINATION / PROMOTION ACTIVITIES (WORKSHOPS, CONGRESS, PUBLICATIONS, PRIZES)

Nominations:

2013 Nomination for the European Union Prize for Contemporary Architecture – Mies van der Rohe Award, authors Miljković, D., Mitrović, J., Pavić, B.

Awards:

2012. Grand Prix for the constructed building (Kula Nebojša at the Belgrade Fortress, Belgrade) at the XXXIV Salon of Architecture in Belgrade, authors Miljković, D., Mitrović, J., Pavić, B.

2011. Award of the Society of Belgrade Architects for the Architectural Event of the Year (Nebojsa Tower at the Belgrade Fortress, Belgrade) authors Miljković, D., Mitrović, J., Pavić, B.

REFERENCES

- [1] Popović, M. (2007). Kula Nebojša da delom priobalnog bedema i vodenom kapijom II. *Nasleđe* 8: 9-28.
- [2] Marijanović Vujović, G. (1970). Pristaništa Beogradskog grada. *Saopštenja Zavoda za zaštitu spomenika kulture grada Beograda* 11: 22–25.
- [3] Lučić Todosić, I. (2020). Proizvodnja zajedničkog kulturnog nasleđa: Kula Nebojša. *Beograd - novi simboli u srednjovekovnoj kuli. Anthropology Magazine* 20 (1): 299-318.

ACADEMIC WORKS / STUDENTS RELATED PROJECTS / PUBLICATIONS

✕ N/A

OTHER SIMILAR PROJECTS AS A REFERENCE

Gianluca Gelmini's Attentive Restoration of the Medieval Torre Del Borgo
Via Vittorio Villa, 24040 Canonica d'Adda BG, Italy
Completed in 2015

REFERENCE TO WORLDWIDE EXAMPLES

A parallel can be made in the approach to allocate public funds to restore and reuse the desolated medieval building and to engage native architects for the renovation and extension. Additionally, regarding materialization, both architects decided not to compete with the original structure, but to implement necessary conservation works on stability carefully, upgrade infrastructure and use contemporary materials as a method for preserving the structural and visual integrity of the original buildings and walls. Last, but not least, both projects introduce new uses (museum and cultural centre, and public library) with rich public space, hence, providing visitors a unique experience of the historical times and events.

For more information visit

<https://projects.archiexpo.com/project-27637.html>